PSC REF#:209739

Public Service Commission of Wisconsin
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Wisconsin Power and Light Company

4902 North Biltmore Lane
P.O. Box 77007
Madison, WI 53707-1007

July 2, 2014

Ms. Sandra J. Paske
Secretary to the Commission
Public Service Commission of Wisconsin
610 North Whitney Way
PO Box 7854
Madison, WI 53707-7854

Joint Application of Wisconsin Power and Light Company, Wisconsin Public Service Corporation, and Madison Gas and Electric Company for a Certificate of Authority to Install a Selective Catalytic Reduction System at Columbia Energy Center Unit 2 **05-CE-143**

Dear Secretary Paske:

Please find enclosed an Application for Certificate of Authority in the above-captioned docket. The Application is submitted on behalf of Wisconsin Power and Light Company ("WPL"), Wisconsin Public Service Corporation ("WPS"), and Madison Gas and Electric Company ("MGE").

If you have any questions or concerns, please feel free to contact me.

Sincerely,

/s/ Michael Greiveldinger

Michael Greiveldinger
Attorney for Wisconsin Power and Light Company

Enclosure.

BEFORE THE

PUBLIC SERVICE COMMISSION OF WISCONSIN

Joint Application of Wisconsin Power and Light Company, Wisconsin Public Service Corporation, and Madison Gas and Electric Company for a Certificate of Authority to Install a Selective Catalytic Reduction System at Columbia Energy Center Unit 2	05-CE-143

APPLICATION

Wisconsin Power and Light Company (WPL), Wisconsin Public Service Corporation (WPS), and Madison Gas and Electric Company (MGE) (collectively "Applicants") apply, pursuant to Section 196.49 of the Wisconsin Statutes, Chapter PSC 112 of the Wisconsin Administrative Code, and any other applicable statute or rule for a Certificate of Authority (CA), to install a selective catalytic reduction (SCR) system at Unit 2 of the Columbia Energy Center, which is located in Pardeeville, Wisconsin. As shown in the attached Project Description and Justification, this project is required to ensure the continued operation of Columbia Unit 2 in accordance with applicable requirements. Additionally, the public convenience and necessity require the construction and installation of the SCR at Unit 2 (*see* Wis. Admin. Code § PSC 112.07(1)), and the installation of the SCR will not impair the efficiency of service, will not provide facilities in excess of future requirements, and will not add to the cost of service without proportionately increasing the value of service (*see* Wis. Stat. § 196.49(3)(b)).

WPL is a public utility organized and existing under the laws of the State of Wisconsin with its principle offices located at 4902 North Biltmore Lane, Madison, Wisconsin 53707. WPS is a public utility organized and existing under the laws of the State of Wisconsin with its principle offices located at 700 North Adams Street, Green Bay, Wisconsin 54301. MGE is a public utility organized and existing under the laws of the State of Wisconsin with its principle offices located at 133 South Blair Street, Madison, Wisconsin 53788.

Dated this 2nd day of July, 2014.

Respectfully submitted,

By: ***/s/ Scott R. Smith***
Scott R. Smith
Director, Regulatory Affairs
Wisconsin Power and Light Company

/s/ Charles Cloninger
Charles Cloninger
President
Wisconsin Public Service Corporation

/s/ Pete Waldron
Pete Waldron
Vice President and CIO
Madison Gas and Electric Company

Public Version







Certificate of Authority Application
Columbia Energy Center Unit 2
Selective Catalytic Reduction (SCR) Project

Project Description and Justification

05-CE-143

Wisconsin Power and Light Company
Wisconsin Public Service Corporation
Madison Gas and Electric Company

July 2, 2014

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EXECUTIVE SUMMARY

The Columbia Energy Center (Columbia), which includes two generating units (Unit 1 and Unit 2), is jointly owned by Wisconsin Power and Light Company (WPL), Wisconsin Public Service Corporation (WPS), and Madison Gas and Electric (MGE) (collectively (the "Applicants").

Columbia Units 1 and 2 are equipped with combustion controls to reduce the emission of oxides of nitrogen (NO_x); electrostatic precipitators (ESP) for particulate emissions control; activated carbon injection (ACI) to reduce mercury emissions; and dry flue gas desulfurization (dry FGD) and baghouse systems to reduce sulfur dioxide (SO_2), further reduce particulate matter and reduce acid gas emissions.

By this Application, the Applicants seek authority to install a selective catalytic reduction (SCR) system on Columbia Unit 2 (the "Project"). The Applicants are proposing the Project to comply with existing and anticipated NO_x emission requirements and regulations, which are applicable to Columbia Unit 2 and the Columbia Energy Center. In particular, the Project will enable the Applicants to comply with the NO_x emission requirements of the Consent Decree submitted to the United States District Court for the Western District of Wisconsin in April 2013. This Consent Decree was entered into with the EPA and the Sierra Club to resolve certain claims under the Clean Air Act. Additionally, the Project will promote compliance with interstate transport rules, and may assist in comporting with the Clean Air Visibility Rule (CAVR) and potential requirements associated with a possibly more stringent ozone national ambient air quality standard. The Applicants deem the project needed to ensure long-term emission compliance for the Columbia Unit 2, and help to ensure that the Applicants' customers continue to benefit from this cost-effective and reliable generating facility.

The technology proposed for NO_x reduction at Columbia Unit 2 is a conventional selective catalytic reduction (SCR) system. This technology removes NO_x from the flue gas via a catalyzed reaction with an ammonia-based reagent. Three types of SCR technologies (conventional SCR, in-duct SCR; and hybrid SCR) were evaluated based on the ability to meet Consent Decree requirements, the feasibility of implementation on Columbia Unit 2, and capital and operating cost considerations. Based on this evaluation, the conventional SCR system was chosen for NO_x reduction as it is proven, cost-effective, commercially-available technology that can achieve the level of NO_x removal required. The estimated capital costs for the Columbia Unit 2 SCR is approximately $150,000,000, excluding AFUDC.

The preliminary design for the SCR consists of the following major components: one reactor with multiple layers of catalyst; an ammonia storage and delivery system; an ammonia injection system; steam soot blowers, sonic horns, or both; instrumentation; inlet ductwork from the economizer to the SCR reactor including expansion joints; outlet ductwork from the SCR reactor outlet to the air heaters including expansion joints; and economizer outlet temperature control

modifications as needed (e.g. an economizer bypass). Based on preliminary engineering completed, no significant facilities are planned for demolition or removal from the unit.

The Applicants' current schedule for the Project assumes that the tie-in outage for the Unit 2 SCR system will be completed in the second quarter of 2018. This will ensure that the SCR is installed and operational prior to December 31, 2018, as required by the Consent Decree.

The Applicants have identified and evaluated four plans to meet the aforementioned needs. Plan 1, the proposed plan, includes the installation of an SCR on Columbia Unit 2, and continued operation of the unit through the year 2038. Plans 2 through 4 each assume the retirement of Columbia Unit 2 at the end of 2018 with replacement capacity and energy resources.

The alternatives were evaluated using a production cost analysis on a present value of revenue requirements (PVRR) basis. The production cost analysis was performed by determining the total customer cost of providing an equal amount of capacity and energy from all four plans. The annual energy and capacity volumes were benchmarked off of Unit 2, post completion of the recently approved turbine and pulverizer upgrade project. The least cost plan for the Applicants' customers is Plan 1. It is lower cost than plans 2, 3 and 4 by approximately $579 million, $571 million, and $562 million, respectively, on a PVRR basis.

In order to assess a range of potential outcomes, a sensitivity analysis was performed on the primary inputs that could potentially vary from the projected base case values. This was done through a combination of 5 futures and 10 sensitivities. In every one of the futures and sensitivities, Plan 1 proved to be the lowest cost plan, with lower costs than Plans 2, 3 and 4 ranging from approximately $138 million to $857 million.

PROJECT DESCRIPTION AND JUSTIFICATION

INTRODUCTION

With this application for a Certificate of Authority, Wisconsin Power and Light Company (WPL), Wisconsin Public Service Corporation (WPS), and Madison Gas and Electric Company (MGE) (collectively "Applicants") request that the Public Service Commission of Wisconsin ("Commission" or "PSCW") authorize the installation of a selective catalytic reduction (SCR) system for the reduction of oxides of nitrogen (NO_x) emissions from Unit 2 at the Columbia Energy Center (Columbia). The Applicants jointly own this Unit, with WPL holding a 46.2% share, WPS holding a 31.8% share, and MGE owning the remaining 22%. WPL operates the Unit.

Columbia Unit 2 is one of the largest and most efficient units in the state. Continued operation of this unit allows the Applicants' customers to continue to benefit from this existing asset. Our strategy is to equip this base-loaded unit with emission control technologies to ensure it complies with applicable environmental rules, now and in the future, so that the Applicants can continue to meet their customers' needs for reliable and affordable energy.

Columbia Unit 2 consists of a tangentially-fired boiler and steam turbine generator with a nameplate generating capacity of 511 MW. It is equipped with low NO_x burners (LNB) and separated overfire air (SOFA) to reduce Nitrogen Oxide (NO_x) emissions. Columbia Unit 2 is also equipped with a cold-side electrostatic precipitator (ESP) for particulate emissions control and activated carbon injection (ACI) to reduce mercury emissions. A dry flue gas desulfurization (dry FGD) system, comprised of spray dryer absorbers (SDAs) and a baghouse, is being placed in operation in 2014 on Columbia Unit 2, to reduce sulfur dioxide (SO_2), further reduce particulate matter and reduce acid gas emissions.

On January 18, 2014, the Commission approved a project to upgrade the steam turbines and replace the pulverizers on Columbia Unit 2. That project includes the installation of new HP/IP and LP turbine rotors and inner casings and replacement of all six existing pulverizers. The project, scheduled for completion in fourth quarter 2017, will improve the efficiency, capacity, reliability, and safety of the unit with no increase in gross heat input.

The Applicants seek authority under Wis. Stat. § 196.49 and Wis. Admin. Code Ch. PSC 112. Wis. Stat. § 196.49(2) that requires a public utility to obtain approval from the Commission prior to the construction of a Project. This Project meets the public convenience and necessity, and the Project will not:

1. Substantially impair the efficiency of the service of the public utility.
2. Provide facilities unreasonably in excess of the probable future requirements.

3. When placed in operation, add to the cost of service without proportionately increasing the value or available quantity of service unless the public utility waives consideration by the commission, in the fixation of rates, of such consequent increase of cost of service.

The installation of the SCR system on Columbia Unit 2 meets the public convenience and necessity because it allows the Applicants to continue to provide low-cost, efficient energy in compliance with applicable requirements and environmental rules. The Applicants are committed to working cooperatively with the Commission and affected stakeholders on this Project, which, as scheduled, would begin commercial operation in 2018. The Project will provide over one hundred jobs during peak construction. As is the case with our other emission control projects, Wisconsin-made materials will be used when possible, further boosting the local and State economies.

The proposed SCR system enables the Applicants to comply with NO_x emission reduction requirements of the Consent Decree filed in April 2013 in the United States District Court for the Western District of Wisconsin, promote compliance with the interstate transport rules, and may assist in comporting with the Clean Air Visibility Rule (CAVR) and potential requirements associated with a possibly more stringent ozone national ambient air quality standard.

Columbia Unit 2 will benefit from the installation of the SCR system through NO_x emissions reductions of approximately 50%, which also reduces the formation of fine particulate matter ($PM_{2.5}$) and ozone in the atmosphere, as NO_x is a precursor to $PM_{2.5}$ and ozone formation. A 50% reduction in NO_x emissions translates into the removal of over 30,000 tons of NO_x from Columbia Unit 2's current emissions over a 30-year period.

The Project is estimated to cost approximately $150,000,000, excluding AFUDC. The Applicants modeling of the Project and alternative scenarios (all of which include retirement of Columbia Unit 2) demonstrates that the Project is the most cost-effective alternative for meeting future capacity and energy needs of their customers. Installing the SCR system will help to ensure that the Applicants have sufficient capacity and energy to economically meet their customer’s long-term needs.

1.0 PROJECT DESCRIPTION

1.1. COLUMBIA ENERGY CENTER

The Columbia Energy Center (Columbia) is located in Pardeeville, Wisconsin. Columbia has two generating units: Unit 1 and Unit 2. Columbia Unit 1 began operation in 1975 and has a nameplate generation capacity of 512 MW. Columbia Unit 2 began operation in 1978 and has a nameplate generation capacity of 511 MW. Both units are jointly owned by Wisconsin Power and Light Company (WPL), Wisconsin Public Service Corporation (WPS), and Madison Gas and Electric (MGE), who own respective shares of 46.2%, 31.8%, and 22%. The Units are operated by WPL. A site location map is provided in Figure 1.

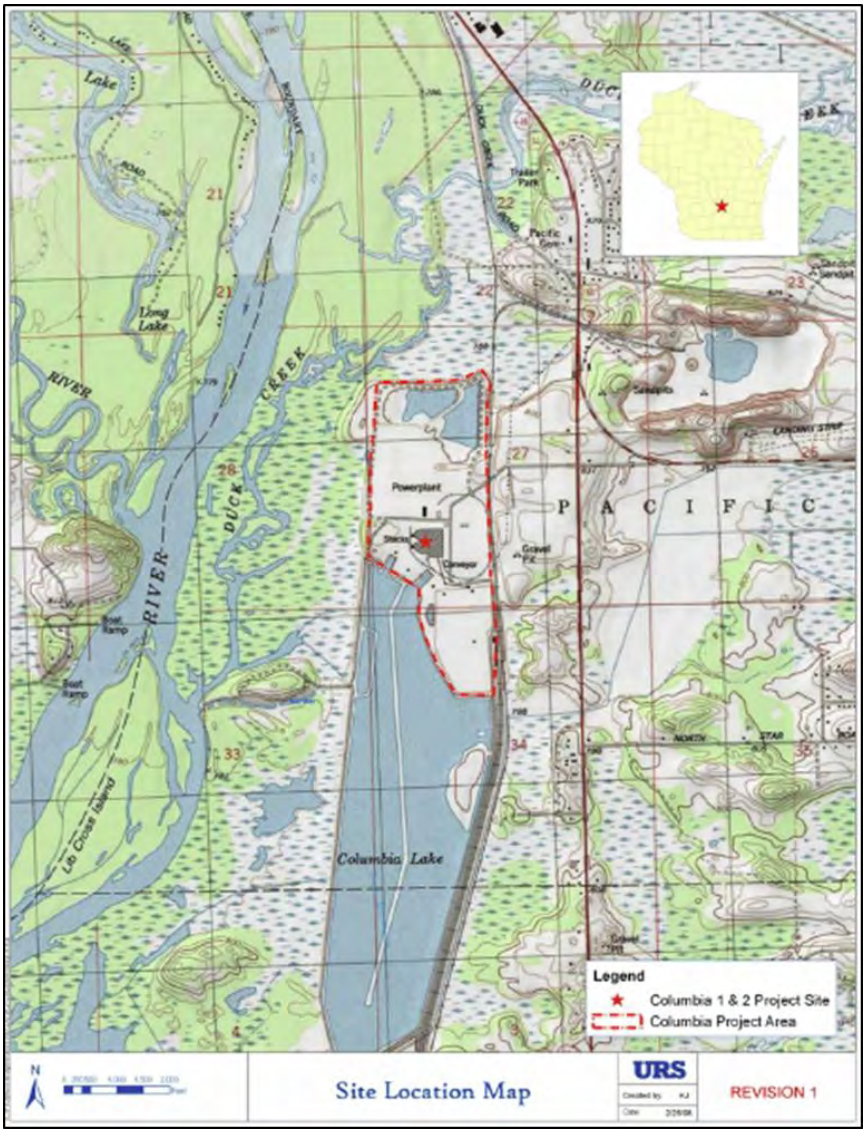


Figure 1 – Columbia Site Location

1.2. COLUMBIA UNIT 2

As noted above, Columbia Unit 2 began operation in 1978 and has a nameplate generation capacity of 511 MW. Unit 2 is equipped with low NO_x burners (LNB) and separated overfire air (SOFA) to reduce the emission of oxides of nitrogen (NO_x). Unit 2 is also equipped with a cold-side electrostatic precipitator (ESP) for particulate emissions control and activated carbon injection (ACI) to reduce mercury emissions. A dry flue gas desulfurization (dry FGD) system, comprised of spray dryer absorbers (SDAs) and a baghouse, was installed on Columbia Unit 2, to reduce sulfur dioxide (SO_2), further reduce particulate matter and reduce acid gas emissions. The dry FGD system is being placed in operation in 2014.

1.3. PROJECT PURPOSE

The Project is the installation of an SCR system on Columbia Unit 2. The Applicants are proposing the Project to comply with existing and anticipated NO_x emission requirements and regulations, which are applicable to Columbia Unit 2 and the Columbia Energy Center. The Project is intended to achieve the following key attributes:

- Reduce NO_x emissions to meet Consent Decree requirements, and improve air quality.
- Reduce NO_x emissions to required levels with the cost-effective technology.
- Minimize adverse impacts to other regulated pollutants.
- Maintain existing fuel flexibility.
- Maintain the reliability, operability, and performance of the unit.
- Minimize disruption to operations during the construction period.
- Minimize outage time during construction tie-ins.

1.4. PROJECT SCOPE

The preliminary design of the SCR system at Columbia Unit 2 consists of the following major components: one reactor with multiple layers of catalyst; an ammonia storage and delivery system; an ammonia injection system; steam soot blowers, sonic horns, or both; instrumentation; inlet ductwork from the economizer to the SCR reactor including expansion joints; outlet ductwork from the SCR reactor outlet to the air heaters including expansion joints; and economizer outlet temperature control modifications as needed (e.g. an economizer bypass).

The SCR system will be designed to meet approximately 0.06 lb/MMBtu average NO_x emission rate over the life of the catalyst. There are a number of currently active vendors in the North American market that have experience providing SCR systems of similar type and scale as the proposed SCR system for Columbia Unit 2. The Applicants expect to request proposals, using a competitive bid process, for engineering, procurement, and construction starting in 2014. No preference will be given to any particular vendor.

1.5. TECHNOLOGY

1.5.1. Technology Overview

The technology proposed for NO_x reduction at Columbia Unit 2 is a conventional selective catalytic reduction (SCR) system. This technology has been used for NO_x reduction for over thirty years with successful commercial operating experience at dozens of power plants similar in size and type to Columbia Unit 2, including eight installations already in the state of Wisconsin (one at Edgewater Unit 5, two at Elm Road, two at Oak Creek, two at Pleasant Prairie, and one at Weston Unit 4).

In an SCR system, NO_x is removed from the flue gas via reaction with an ammonia-based reagent, resulting in molecular nitrogen and water vapor. The ammonia-based reagent is vaporized and injected into the flue gas downstream of the economizer through an injection grid mounted in the ductwork. The hot flue gas and vaporized reagent then flow into the catalyst chamber where NO_x is reduced to nitrogen and water. The nitrogen gas and water vapor leave the SCR system and flow out the stack with the flue gas. A typical SCR installation is shown in Figure 2.

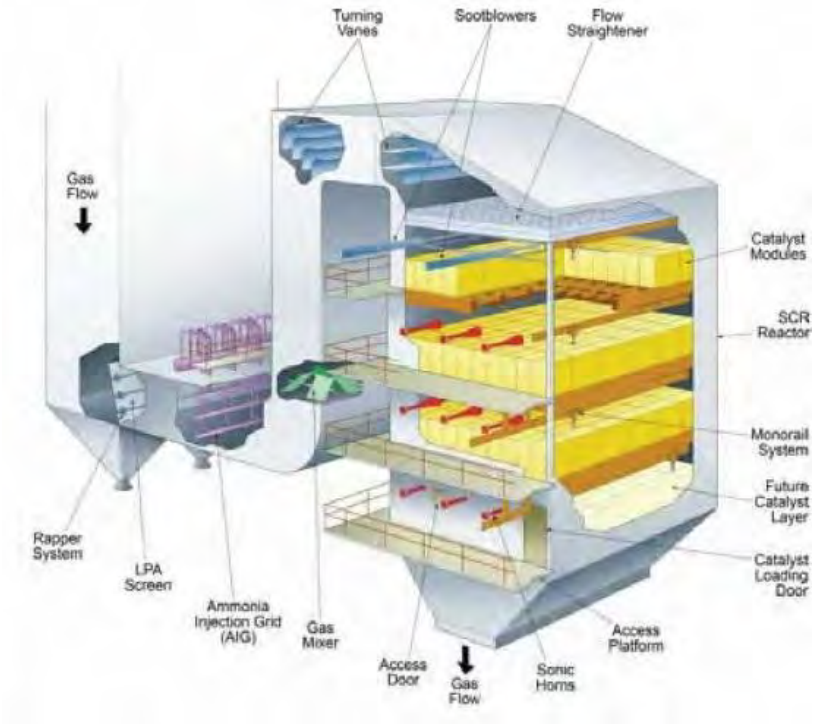


Figure 2 – Example SCR Installation

The major reactions, which occur as the flue gas passes through the catalyst, are as follows:

$$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$$

$$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$$

It is expected that 19% by weight aqueous ammonia solution is the reducing agent.

1.5.2. Technology Application at Columbia Unit 2

The preliminary design and sizing of the SCR system for Columbia Unit 2 is based on a Design Coal[1] that represents the range of current operating coals burned at Unit 2 from various Powder River Basin (PRB) mines.

The SCR system will be located west of Columbia Unit 2, between and above the two Unit 2 ESP sections. New ductwork will tie-in to the existing Unit 2 ductwork downstream of the existing economizer and will run to the inlet of the SCR reactor. New ductwork will tie in the SCR reactor outlet to the existing air heater inlet. Ammonia-receiving equipment will be located north of the SCR reactor to allow for easy access from the main gate and to limit truck traffic to the interior of the plant site.

Figure 3 is a site plan, which shows the proposed Unit 2 SCR project relative to the existing units; a larger version of the site plan is provided in Appendix A. This layout is based on preliminary system design and is subject to revision with further detailed design and selection of equipment vendors.

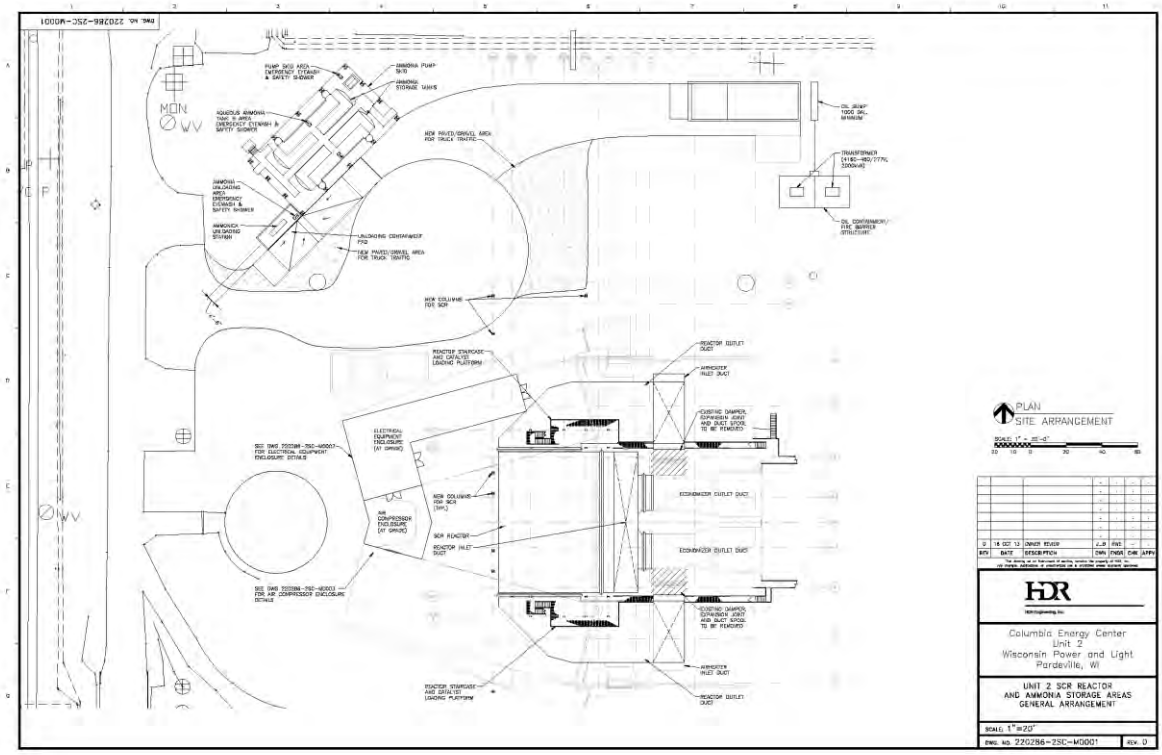


Figure 3 – Proposed Columbia Unit 2 SCR Site Arrangement

[1] Design Coal is defined in this Application as coal that will be used for design and sizing of the SCR system as well as determining costs for equipment. The Design Coal is a fuel with characteristics that could reasonably be burned at Columbia Unit 2 in the future and allows for future fuel flexibility.

1.6. CONSTRUCTION APPROACH

The following is a high-level overview of the construction approach for the project. Two primary objectives in the design, construction, and start-up of this equipment are to minimize impact on the operation of the unit during construction and to minimize the tie-in outage time.

1.6.1. Civil

Structures, components and foundations will be designed so that their strength equals or exceeds the effects of factored load combinations. Deep foundations will be used for heavily loaded SCR support columns; all other foundations, such as for the ammonia storage area, will be shallow foundations. Foundations will be installed early in the construction phase of the project.

1.6.2. Selective Catalytic Reduction (SCR) System

The SCR reactor will be mounted beyond the fan room at the west side of the Columbia Unit 2 boiler building. This location minimizes the length of inlet and outlet duct necessary to direct flue gas from the economizer outlet to the SCR reactor and return the treated flue gas from the SCR reactor to the existing air heaters. A rendering showing the conceptual location and arrangement of the SCR reactor is shown in Figure 4. In this figure, the reactor is colored light teal, the connecting ductwork is colored darker teal, the existing ESP is grey, and the boiler building is light brown.

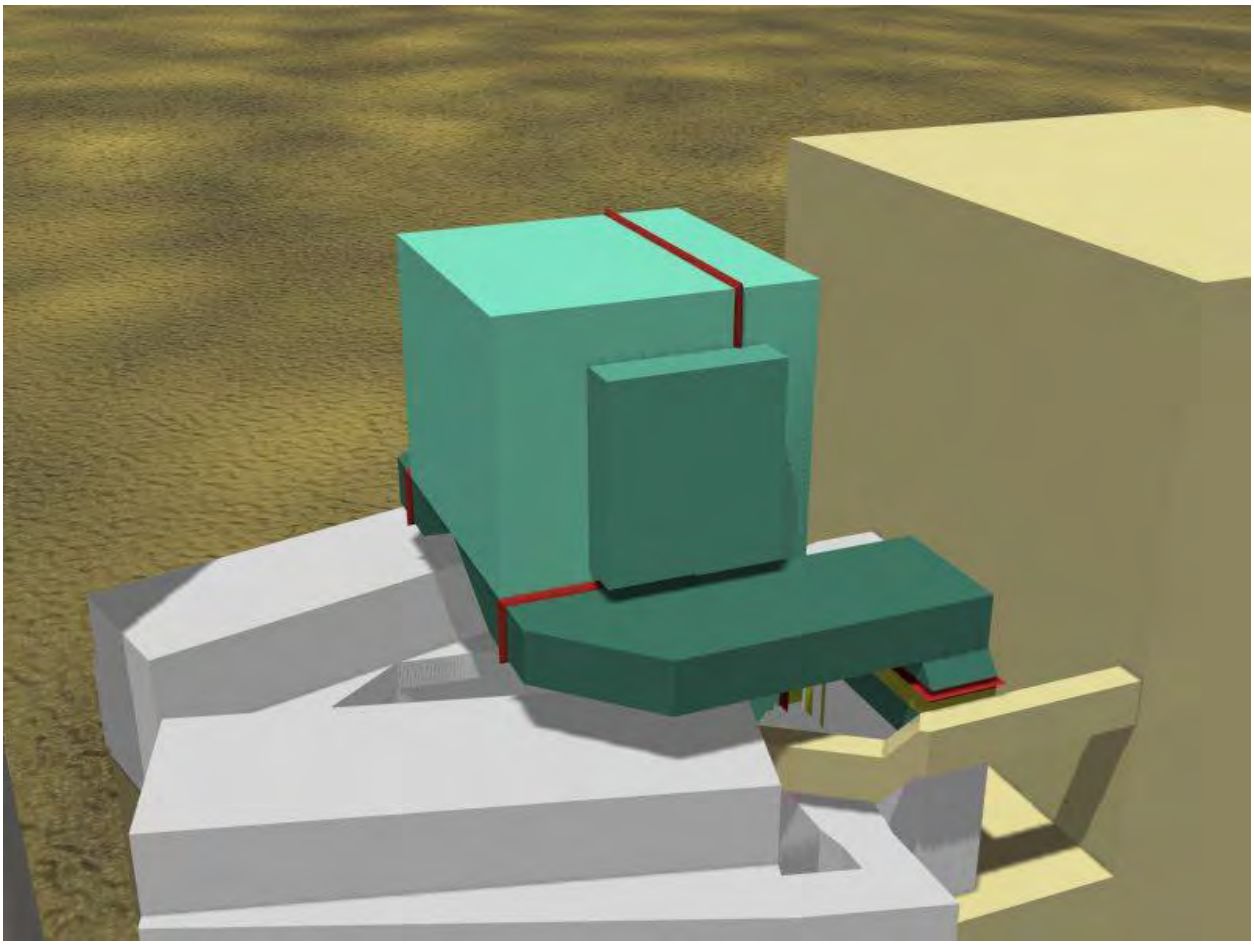


Figure 4 – Rendering of Conceptual Arrangement of an SCR on Columbia Unit 2

Catalyst cleaning will be accomplished a by large particle ash collection system, sonic horns and/or steam soot blowers.

1.6.3. Ammonia Handling/Injection System

Ammonia storage for the Columbia Unit 2 SCR system will be located on the north side of the Unit 2 boiler building in a diked area. Ammonia storage will be based on aqueous ammonia (19% by weight) delivered to the site by truck and stored in bullet type tanks. A minimum of 14 days of ammonia storage capacity will be provided. It is anticipated that three truckloads of aqueous ammonia will be delivered per week. The injection system will consist of ammonia supply skids, including necessary pumps, gauges, isolation valves, electrical panels, and input/output junctions for connection to the plant distributed control system (DCS). An ammonia injection system will be provided with the SCR. The ammonia injection system is comprised of an ammonia flow control system, distribution piping, and injection lances.

1.6.4. Ductwork

Ductwork will be added from the economizer to the SCR reactor inlet and from the SCR reactor outlet to the air heater inlet. Sufficient duct length before the reactor will be provided to ensure that ammonia will uniformly mix with the flue gas. Additionally, economizer outlet temperature control modifications (e.g. an economizer bypass) will be included as needed to maintain required operating temperatures to the SCR to avoid ammonium bisulfate plugging problems at low unit load operation. A conceptual drawing showing an economizer bypass arrangement is provided in Figure 5.

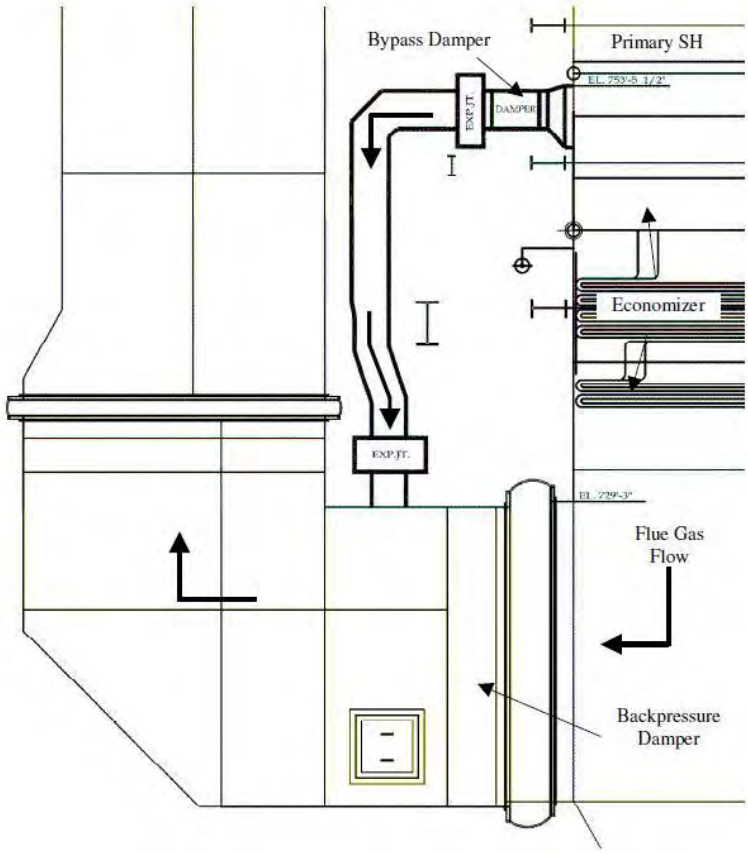


Figure 5 – Conceptual Arrangement of an Economizer Bypass

1.6.5. Mechanical Equipment

It is anticipated that no additional fan and motor modifications or upgrades will be necessary in order to maintain reasonable operating margins. Additional engineering studies will be conducted to confirm whether the existing fan capacity is adequate for the new SCR before the design is finalized.

1.6.6. Electrical

Electrical equipment will be installed on elevated concrete pads to prevent water intrusion. The AC auxiliary distribution system will be supplied from the existing plant power, requiring new transformers and motor control centers in the SCR area. The existing electrical system is expected to provide DC and vital AC requirements for the SCR system. Cables will be installed in cable trays, conduit and underground ducts. Additional ground protection, lighting systems, heat trace system, voice communication systems, and fire detection systems will be installed as necessary for safe and efficient operation of the SCR system.

1.6.7. Instrumentation and Controls

New instrumentation and controls are required for the SCR and ammonia tank systems. The additional instrumentation and controls will be integrated into the plant's existing distributed control system (DCS). The primary control functions will be automated process control, system monitoring, and operational alarms. New controllers and operator workstations will be integrated into existing operator interfaces.

1.7. CONSTRUCTABILITY SUMMARY

Based on site reviews and other assessments by engineering consultants, an SCR system is feasible for Columbia Unit 2. The SCR reactor will be located in between and above the two banks of the existing ESP located to the west of the boiler building. Laydown space is available to the north of the existing Unit 2 ESP with additional laydown on graveled areas of the existing landfill cap further north. Road and rail access exists up to the construction area; however, additional temporary roads may be required for construction.

Activities requiring more investigation prior to finalizing the construction approach include the following:

- Layout of selected SCR contractor's specific equipment.
- Confirm foundation design with geotechnical subsurface investigation.
- Structural analysis and inspection of ductwork upstream of the air heater and ESP to determine if additional draft system negative pressure on these sections will require structural reinforcement.
- Review of fire protection requirements with local fire officials.

It is expected that these issues will be finalized after the contractor is selected.

1.8. MILESTONE SCHEDULE

The schedule in Table 1 is a preliminary milestone schedule for the Project. The milestone dates shown in Table 1 are based on a preliminary level 1 schedule provided in Appendix B. This schedule assumes that the tie-in outage for the Unit 2 SCR system will be completed in the second quarter 2018, with testing and additional project completion occurring subsequently. This schedule will be refined after the SCR contractor has been selected and detailed engineering begins.

Table 1 – Milestone Schedule

Milestone	Anticipated Date
Start preliminary engineering and technical specifications[2]	Q2-2014
Submit CA Application to PSCW	Q2-2014
Award limited contract to start engineering for the SCR system (limited notice to proceed)	Q1-2015
Receive PSCW CA approval (expected)	Q2-2015
Receive environmental permits (expected)	Q4-2015
Issue Final Notice to Proceed to SCR contractor (initiate material commitments and fabrication)	Q3-2015
Site Mobilization	Q2-2016
Tie-in Outage Completion	Q2-2018
SCR Substantial Completion (guaranteed performance testing completed)	Q3-2018[3]

In order to plan for timely fabrication while minimizing cost risk, the schedule contemplates that the selected contractor will start engineering while this Application is being reviewed by the PSCW. However, fabrication of components and construction is not planned until after the receipt of a CA.

[2] This includes balance of plant engineering and preparation of the specifications for the required equipment.
[3] Certain work such as punch list completion and as-built drawings will occur after this date.

2.0 COST AND FINANCING ESTIMATES

An independent engineering consultant developed capital and operating and maintenance cost estimates for the Columbia Unit 2 SCR project. The total project cost estimate presented in this section includes the following major items:

- Civil, Structural and Architectural items (including foundations, support and structural steel, and flue gas ductwork);
- Mechanical and process related items (SCR systems, ammonia storage and transfer systems, process piping, fire protection, and balance of plant mechanical systems);
- Electrical systems (including auxiliary power distribution, lighting, grounding, heat tracing, and the construction power system);
- Instrumentation and Controls (including Distributed Control System integration into existing system and local instrumentation and controls);
- Engineering fees, construction management, and start-up services (including commissioning and performance testing) and contractor General and Administrative (G&A), profit and contingencies; and
- Owners' costs including project personnel, training, licensing and permitting support, initial reagent inventory, and contingency.

Costs presented in this Application represent the engineering consultant's estimate based on budgetary information received from several suppliers. The cost estimate for the SCR system, balance of plant equipment, and installation was developed by the engineering consultant using their internal database and cost development tools, in accordance with the Association for the Advancement of Cost Engineering (AACE) cost estimate guidelines and classifications.

Bidder selections and preliminary work under a limited notice to proceed are expected to take place during Q1 2015. Final notice to proceed is not expected until after receiving a CA for the Project.

2.1. ESTIMATED CAPITAL COST AND CASH FLOW

Estimated capital costs for the Columbia Unit 2 SCR are provided in Table 2 and are based on the schedule presented in Section 0. These costs do not include allowance for funds used during construction (AFUDC)[4].

[4] AFUDC is the process of including as a part of the total project costs, the applicable carrying costs on Construction Work in Progress (CWIP) expenditures. If such CWIP balances are included in net investment rate base in a rate proceeding, the AFUDC would not be included or computed on such amounts.

Table 2 – Columbia Unit 2 SCR Estimated Capital Cost

Line	Scope Description	Estimated Cost
1	Engineering	$17,830,000
2	Materials and Equipment	$37,370,000
3	Construction Labor	$34,820,000
4	Escalation	$11,810,000
5	Subtotal EPC Contract (includes contractor's project contingency, escalation, G&A and fee)	$101,830,000
6	Owners' Cost and Contingency	$48,170,000
7	**Total Estimated Project Cost (without AFUDC)**	**$150,000,000**

Cash flow estimates for the project schedule in Section 0 are shown in Table 3 in year-of-occurrence dollars.

Table 3 – Columbia Unit 2 SCR Project Annual Cash Flow

		Estimated Annual Cash Flow($)[5]			
Year	**Annual % of Total Cost**	**WPL**	**WPS**	**MGE**	**Total**
2013	0.2%	$108,570	$74,730	$51,700	**$235,000**
2014	1.2%	$815,430	$561,270	$388,300	**$1,765,000**
2015	19.3%	$13,398,000	$9,222,000	$6,380,000	**$29,000,000**
2016	28.0%	$19,404,000	$13,356,000	$9,240,000	**$42,000,000**
2017	36.0%	$24,948,000	$17,172,000	$11,880,000	**$54,000,000**
2018	14.0%	$9,702,000	$6,678,000	$4,620,000	**$21,000,000**
2019	1.3%	$924,000	$636,000	$440,000	**$2,000,000**
Total		$69,300,000	$47,700,000	$33,000,000	**$150,000,000**

Actual project costs and cash flow will vary depending upon project approval timing, actual project schedule, and market conditions. Timely approval of this project may allow the Applicants the opportunity to procure the equipment and services at the currently more favorable industry market conditions for utility owners. It will also allow the Applicants to better manage risks associated with long-lead time fabrication and assembly and overseas manufacture and shipment.

[5] Costs are represented in year-of-occurrence dollars.

2.2. FINANCING MECHANISM

The Project is expected to be financed in a manner consistent and compliant with the individual Applicants' utility capital structures and Commission-approved financing authorizations. For its respective portion of the project, MGE requests the authority to accrue AFUDC on 100% of the CWIP. Consistent with recent rate orders, WPL and WPS will also accrue AFUDC on 100% of the CWIP. Accordingly, the costs for the Project identified in this Application exclude AFUDC.

However, for the purpose of the economic analysis, the Applicants have modeled the accrual of AFUDC on 50% of the CWIP balances for this project. Specifically, the economic analysis has incorporated AFUDC in the revenue requirement calculations using the financing assumptions provided in Appendix D, Schedule 1. With AFUDC on 50% of CWIP, the total cumulative AFUDC for the Project amounts to approximately $5,000,000.

Applicants anticipate traditional rate treatment of all project costs in future rate proceedings.

3.0 NEED AND ALTERNATIVE ANALYSIS

This section provides an overview of the factors determining the need for the proposed SCR system and the economic analysis of the system in comparison to its alternatives.

3.1. NEEDS ANALYSIS

The Project – the installation of an SCR at the Columbia Unit 2 – will result in emission reductions that will enable the Applicants to not only comply with current environmental rules and requirements for NO_x emissions, but also promote compliance with proposed or anticipated environmental rules and requirements. Specifically, the Project enables the Applicants to comply with the NO_x emission requirements of the Consent Decree and fulfills NO_x emission control requirements that arose from any modifications commenced at Columbia Units 1 or 2 prior to June 17, 2013. Additionally, the Project will promote compliance with interstate transport rules, and may assist in comporting with the Clean Air Visibility Rule (CAVR) and potential requirements associated with a possibly more stringent ozone national ambient air quality standard (NAAQS).

3.1.1. Consent Decree with EPA and Sierra Club

3.1.1.1. Background

In December 2009, the EPA sent a notice of violation ("NOV") to the Applicants as owners of Columbia. The NOV alleged that the owners failed to obtain pre-construction review and permitting requirements for certain projects and as a result violated the Prevention of Significant Deterioration ("PSD") program requirements, Title V Operating Permit requirements of the Clean Air Act ("CAA"), and the Wisconsin State Implementation Plan ("SIP"). In September 2010, the Sierra Club filed a complaint against WPL, as owner and operator of Columbia, in the U.S. District Court for the Western District of Wisconsin, which included similar PSD claims. In 2013, the EPA filed a similar complaint against the Applicants.

If the PSD permits were required for the projects, the permits would have required the Applicants to install appropriate emission control equipment as determined by a best available control technology ("BACT") analysis performed on one or both of the Columbia units at the time that the projects were constructed. The Applicants denied the alleged violations contained in the NOV and the complaints. The Applicants contended that the projects did not trigger PSD because they were routine or not projected to increase emissions above an applicable threshold, and that the projects were appropriately reviewed and permitted by the Wisconsin Department of Natural Resources ("WDNR"). The Applicants did not admit liability and maintain that the projects at issue in the NOV and complaints were appropriately implemented.

As often occurs when EPA issues these types of NOVs, the Applicants entered into extensive discussion with EPA and Sierra Club to seek an amicable and prudent resolution to the allegations in the NOV and complaints. The Applicants recognized that a prudent settlement that

aligned with the Applicants' goal of promoting Columbia's continued cost-effective, reliable operations, while reducing emissions, could be in the best interests of their customers. A settlement can also limit the risks and uncertainty that are associated with complex PSD litigation – including risk and uncertainty regarding timing of emission controls and emission limits, more-stringent requirements, and additional or more costly emission controls. The Applicants were able to negotiate such a prudent settlement with EPA and Sierra Club.

In 2013, the Applicants entered into a Consent Decree with the EPA and the Sierra Club resolving certain claims under the Clean Air Act, while not admitting any liability. The executed Consent Decree was submitted to the United States District Court for the Western District of Wisconsin on April 22, 2013, in two cases: *United States of America v. Wisconsin Power and Light Company, Madison Gas and Electric Company, Wisconsin Electric Power Company, and Wisconsin Public Service Corporation*, Case No. 13-cv-266, and *Sierra Club v. Wisconsin Power and Light Company*, Case No. 13-cv-265. After a public comment period, the court simultaneously entered the Consent Decree in the two cases on June 17, 2013. The Consent Decree is currently effective. A copy of the Consent Decree is provided as Appendix C.

3.1.1.2. Requirements Related to Columbia NO_x Emissions

The Consent Decree applies to the Columbia Energy Center, Edgewater Generating Station and Nelson Dewey Generating Station and addresses NO_x, SO_2, and particulate matter emissions. Certain provisions of the Consent Decree directly relate to NO_x emissions at Columbia Energy Center and Columbia Unit 2, and require the Applicants to take actions to further control NO_x emissions and to achieve certain NO_x emission rates and caps.

The Applicants are currently required to "ensure the Continuous Operation of the Low NO_x combustion System at Columbia Units 1 and 2 so that Units 1 and 2 each achieves and maintains a 12-month Rolling Average Emission Rate for NO_x of no greater than 0.150 lb/MMBtu." (Consent Decree at ¶ 83.) and both units are in compliance with this requirement. Columbia Unit 2 is achieving a 12-month rolling average emission rate of approximately 0.12 lb/MMBtu. However, the NO_x emission rate for Columbia Unit 2 becomes more stringent in 2019.

The Consent Decree requires that the Applicants install a selective catalytic reduction (SCR) system at Columbia Unit 2 on or before December 31, 2018. (Consent Decree at ¶ 84.) The Applicants must also continuously operate the SCR as of January 1, 2019. The continuous operation requirement means, with certain exceptions, that the SCR "shall be operated at all times [Unit 2] is in operation…, consistent with the technological limitations, manufacturers' specifications, good engineering practices, and good air pollution control practices for minimizing emissions (as defined in 40 C.F.R. § 60.11(d))" for the SCR and Unit 2. (See Consent Decree at ¶ 15.)

Columbia Unit 2 must also achieve more stringent NO_x emission rates beginning in 2019. Specifically, starting no later than 30 Operating Days after January 1, 2019, Unit 2 must achieve a 30-day rolling average emission rate of no greater than 0.080 lb/MMBtu and a 12-month rolling average emission rate of no greater than 0.070 lb/MMBtu. (Consent Decree at ¶ 84.) The proposed SCR will enable Columbia Unit 2 to achieve these emission rates.

Columbia Energy Center is also required to comply with a plant-wide annual tonnage limitation for NO_x. (Consent Decree at ¶ 91.) This annual cap on NO_x emissions is a restriction on the amount of NO_x emissions (measured in tons) that Columbia Units 1 and 2 can achieve. For calendar years 2013 through 2018, the NO_x cap for Columbia is 5,550 tons per year. The NO_x cap for Columbia drops in 2019 to 4,300 tons per year. The drop in the annual NO_x cap reflects the required installation of an SCR on Columbia Unit 2. Meeting the requirements set forth in the Consent Decree resolves all claims for NO_x emission controls that arose from any modifications commenced at Columbia Units 1 or 2 prior to June 17, 2013

3.1.2. NO_x Air Emissions Regulatory Requirements

The following sections summarize the status of current state and federal NO_x-related air regulations and requirements applicable to Columbia Energy Center.

3.1.2.1. Interstate Transport Rules

Section 110(a)(2)(D) of the Clean Air Act requires states to develop a State Implementation Plan (SIP) to ensure emissions from their state do not cause or contribute significantly to air quality problems in other states. This section of the CAA is commonly referred to as the "good-neighbor provision." EPA has made multiple attempts to address this requirement by issuing cap-and-trade rules. The following summarizes, in part, EPA's actions related to interstate transport since 2005 as it relates to NO_x emissions.

EPA issued the Clean Air Interstate Rule (CAIR) in May 2005. CAIR set state-specific NO_x and SO_2 emission budgets for certain generating facilities in certain states, including Columbia Unit 2 in Wisconsin. The purpose of this rule was to help states achieve the 1997 ozone and particulate matter NAAQS. In December 2008, the U.S. Court of Appeals for the D.C. Circuit ("D.C. Circuit") identified certain flaws in CAIR and remanded it to the EPA. While originally vacating CAIR, the court ultimately left CAIR in place, but ordered EPA to correct CAIR or issue a replacement rule.

In response to the D.C. Circuit's decision, EPA issued the Cross-State Air Pollution Rule (CSAPR) in April 2011. The purpose of CSAPR was to replace CAIR and to help states achieve the 1997 ozone NAAQS and the 1997 and 2006 particulate matter NAAQS. The rule established emission limitations starting in the years 2012 and 2014. CSAPR, though, has not yet taken effect because the D.C. Circuit stayed the rule in December 2011 and later vacated the rule in August 2012. EPA successfully appealed this decision to the U.S. Supreme Court. In April 2014, the U.S. Supreme Court reversed the D.C. Circuit's decision. This ruling does not begin

immediate implementation of CSAPR. Rather, the case has been remanded to the D.C. Circuit to resolve certain legal issues that were on hold pending the outcome of the U.S. Supreme Court case.

The Applicants currently anticipate one of two future outcomes: either (1) EPA will decide to begin implementation of CSAPR after the remaining legal issues are resolved, or (2) EPA will propose a new transport rule to replace CAIR. If EPA implements CSAPR, EPA will likely need to undertake certain modifications of the rule, because CSAPR originally established emission limitations starting in the years 2012 and 2014.

As of the filing of this Application, CAIR remains in effect and will remain in effect until the next steps regarding the regulation of interstate transport of pollutants are determined and a replacement to CAIR is implemented. The first phase of CAIR emission reductions began on January 1, 2009 for NO_x and January 1, 2010 for SO_2. The second phase of CAIR, which includes more stringent NO_x and SO_2 emission caps, is scheduled to begin on January 1, 2015. Given the remaining CSAPR legal and regulatory uncertainties, the Applicants are unable to predict at this time whether the second phase of CAIR will take effect.

The purpose of both CAIR and CSAPR is to reduce ozone and fine particulate matter ($PM_{2.5}$) concentrations in the atmosphere. CAIR and CSAPR establish NO_x state emission caps for affected electric generating units because NO_x is a precursor pollutant for ozone and $PM_{2.5}$. Elevated ozone concentrations are typically a seasonal concern, whereas elevated $PM_{2.5}$ concentrations can occur year-round. Therefore, two separate emission caps, an ozone season NO_x emission cap (May – September) and an annual season NO_x emission cap must be achieved. Affected units are given emission allocations to ensure states comply with their emission caps.

Table 4 shows past NO_x emissions at Columbia Units 1 and 2 compared to CAIR Phase II NO_x emission allowance allocations and CSAPR 2012 and 2014 NO_x emission allowance allocations. Compliance is determined on a facility basis. The Applicants will ensure compliance with CSAPR or the second phase of CAIR at the Columbia Energy Center through the use of emission allowance allocations, banked emission allowances and traded emission allowances. There are currently no banked CSAPR emission allowances because implementation of the rule has not yet commenced. Long-term, the addition of a SCR on Columbia Unit 2 would likely eliminate the need to rely on banked or traded emission allowances whether for compliance with CAIR, CSAPR or a new transport rule.

Table 4 – Columbia Energy Center NO_x Emissions Compared to NO_x Emission Allowances

Annual Allowance Allocations		Ozone Season Allowance Allocations	
CAIR	**CSAPR**[6]	**CAIR**	**CSAPR**
2015 – 4,850 tons **2016** – 4,850 tons **2017** – 4,357 tons	**2012** – 5,137 tons **2014** – 4,940 tons	**2015** – 2,244 tons **2016** – 2,244 tons **2017** – 2,018 tons	**2012** – 2,294 tons **2014** – 2,212 tons

Time Period	Unit	2009	2010	2011	2012	2013	Average
Annual Emissions (tons)	Unit 2	2,329	2,447	2,703	2,655	2,244	2,476
	Unit 1	2,438	2,899	2,781	2,943	2,638	2,740
	Facility Total	4,767	5,346	5,484	5,598	4,882	5,217
Ozone Season Emissions (tons)	Unit 2	1,010	1,171	1,081	1,254	833	1,070
	Unit 1	1,039	1,305	1,413	1,430	1,225	1,282
	Facility Total	2,049	2,476	2,494	2,684	2,058	2,352

In January 2014, EPA announced that they intend to propose a new transport rule in October 2014. EPA has stated that the purpose of this rule would be to help states achieve the 2008 ozone NAAQS. This proposed rule would not consider any of the particulate matter NAAQS. This means emission reductions would likely only be established for NO_x for those sources in states subject to the rule. The Applicants are unable to predict at this time whether Wisconsin will be subject to this potential future interstate transport rule. Furthermore, given the recent U.S. Supreme Court decision regarding CSAPR, there is uncertainty whether EPA will continue with this rule or the schedule for proposed rulemaking. Additionally, the Applicants recognize that a future scenario may arise where Wisconsin is no longer subject to any interstate transport rules based on updated emissions modeling by EPA. Such an outcome would likely trigger additional Clean Air Visibility Rule (CAVR) requirements as discussed in the next section.

3.1.2.2. Clean Air Visibility Rule (CAVR)

The EPA issued the Clean Air Visibility Rule (CAVR) in 2005 to address regional haze. CAVR requires states to develop and implement SIPs to address visibility impairment in designated national parks and wilderness areas across the country with a national goal of no impairment by 2064. Affected states, including Wisconsin, are required to submit a SIP to EPA every 10 years with the purpose of meeting this goal. Wisconsin's first CAVR SIP included Best Available Retrofit Technology (BART) air pollution controls and other additional measures needed for reducing state contributions to regional haze. BART only applies to certain large sources with

[6] CSAPR 2012 and 2014 allowances are shown since the rule is not yet being implemented.

emissions of NO_x, PM or SO_2 that were in existence between 1962 and 1977. Columbia Unit 2 is a BART-eligible unit.

EPA approved Wisconsin's first 10-year CAVR SIP on August 7, 2012 (77 FR 46952). The BART requirements for Columbia Unit 2 include the current Title V PM permit limit of 0.10 lb/MMBtu and relied on the state's participation in CSAPR's cap-and-trade program to satisfy NO_x and SO_2 CAVR BART requirements.

The WDNR is required to submit their next 10-year SIP to EPA in 2018. The purpose of this SIP will be to ensure reasonable progress is being made towards the 2064 no impairment goal. This SIP could have an impact on allowable NO_x, PM and SO_2 emissions from Columbia Unit 2.

Given that Wisconsin currently relies on participation in CAIR/CSAPR to satisfy the BART requirements for NO_x, the legal and regulatory uncertainty surrounding CSAPR could affect Wisconsin's compliance strategy for CAVR. Should a future scenario arise where Wisconsin is no longer subject to any interstate transport rules based on updated emissions modeling by EPA, certain sources, including Columbia Unit 2, would be required to satisfy the BART requirements. The installation of a SCR on Columbia Unit 2 will position the unit well for future environmental requirements, whether they are revised interstate transport rules or the need to satisfy CAVR BART requirements.

3.1.2.3. Future Ozone NAAQS Revision

The current ozone NAAQS is set at a level of 75 parts per billion (ppb). EPA established this standard in March 2008. The CAA requires EPA to evaluate the adequacy of the NAAQS every five years to ensure they are protective of public health. EPA did not complete an evaluation of the ozone NAAQS in 2013. As a result, EPA was sued and is now under an order that requires EPA to issue an ozone NAAQS proposal by December 1, 2014 and issue a final rule by October 1, 2015.[7]

In January 2014, EPA released a health risk and exposure assessment which considered potential ozone standard levels of 60, 65 and 70 ppb.[8] In June 2014, EPA's science advisory board, the Clean Air Scientific Advisory Committee (CASAC), recommended EPA set the ozone NAAQS between 60 – 70 ppb.

Design values determine compliance with NAAQS. For ozone, this is a 3-year average of the fourth-highest daily 8-hour maximum ozone concentration. Areas with design values exceeding the NAAQS can be designated non-attainment. Table 5 shows the most recent five design values for Columbia County, Wisconsin, the county where Columbia Unit 2 is located.

[7] *Sierra Club et al. v. United States Environmental Protection Agency*, Case No.: 13-cv-2809-YGR, Order Granting Plaintiffs' Motion for Summary Judgment and Denying Defendant's Motion for Summary Judgment (N.Dist.)Cal., Apr. 30, 2014).

[8] http://www.epa.gov/ttn/naaqs/standards/ozone/data/20140131healthreacover.pdf

Table 5 – Columbia County, Wisconsin 8-Hour Ozone Design Values

2007-2009	2008-2010	2009-2011	2010-2012	2011-2013
67 ppb	63 ppb	64 ppb	68 ppb	71 ppb

Non-attainment designations are based on the most-recent design value at the time of designation. Depending on the final level of the revised ozone NAAQS, Columbia County has the potential of being in non-attainment in the future. States with non-attainment areas are required to develop SIPs detailing how they plan to get non-attainment areas back into attainment. Emission reductions of NO_x and volatile organic compounds (VOCs) would be the primary focus of these plans.

Given EPA's current schedule for revising the ozone NAAQS, the Applicants expect non-attainment designations to be determined between the fourth quarter of 2016 and the fourth quarter of 2017. The CAA allows areas varying amounts of time to reduce ozone levels in non-attainment areas depending on the severity of the exceedance. Historically, based on 2003 – 2012 emissions data, Columbia Energy Center has accounted for approximately 80 percent of the total NO_x emissions in Columbia County from stationary sources. If NO_x emission reductions are required within Columbia County, Columbia Units 1 and 2 would likely have to contribute to the required reduction. The Applicants are unable to predict at this time what, if any, NO_x emission reductions will be required at Columbia Energy Center and how long the compliance period will be as a result of the ozone NAAQS. Regardless, the installation of a SCR on Columbia Unit 2 will position the unit well for future requirements associated with a potential ozone non-attainment designation.

3.1.3. Summary of Needs Analysis

The Applicants deem the project needed to ensure long-term emission compliance for Columbia Energy Center. In particular, the project is needed for the following reasons:

- The Consent Decree requires a selective catalytic reduction (SCR) system be installed by December 31, 2018.
- Beginning on January 1, 2019, the SCR must be continuously operated and achieve a 30-day rolling average NO_x emission rate of 0.080 lb/MMBtu and a 12-month rolling average NO_x emission rate of 0.070 lb/MMBtu.
- The addition of a SCR on Columbia Unit 2 would likely eliminate the need to rely on banked or traded emission allowances for CAIR Phase II compliance, should implementation begin and continue for several more years. The SCR on Columbia Unit 2 would assist in compliance with CSAPR, should implementation begin, or a future interstate transport rule.
- The Columbia Unit 2 SCR may assist in compliance with future NO_x limits driven by the CAVR if Wisconsin was required to re-evaluate BART compliance.
- The Columbia Unit 2 SCR may assist in attainment of future ozone NAAQS.

3.2. ALTERNATIVES ANALYSIS

The Project was evaluated on an economic basis in comparison with three alternatives. The methodology and results of this analysis are provided in the following paragraphs.

3.2.1. Alternatives Identified for Evaluation

The Applicants have identified four plans to meet the aforementioned needs. Plan 1, the proposed plan, includes the installation of an SCR on Columbia Unit 2 (the Project), and continued operation of the unit through the year 2038.

Plans 2 through 4 are designed to study the value of Plan 1 relative to other capacity and energy resources. Plans 2 through 4 each assume the retirement of Columbia Unit 2 at the end of 2018. Since Unit 2 serves an important role as a base load energy resource in Wisconsin, the retirement of Unit 2 would create an immediate need for the energy and capacity equivalent of a replacement base load energy resource. Therefore, Plans 2 through 4 assume replacement resources that could meet the capacity and energy gap created by retiring Unit 2. Plans 2 through 4 represent reasonable proxies for replacing the capacity and energy that would be lost in the event of that Unit 2 was retired. The Applicants are not proposing the premature replacement of Columbia Unit 2.

For the purpose of conforming to the current MISO resource adequacy construct, new planning alternatives were assumed to be located in Zone 2 (WI) so that the capacity was deliverable to the Applicants' load zones.

3.2.1.1. Plan 1 - Install an SCR on Unit 2

Plan 1 assumes the installation and operating cost of an SCR on Unit 2, and continued operation of the unit through the year 2038. This plan assumes that the SCR will be placed into service during the first half of 2018, and will be capable of meeting the NO_x emission rate requirements that begin on January 1, 2019.

3.2.1.2. Plan 2 – Retire Columbia Unit 2; Install 2:1 Natural Gas Combined Cycle Base Load Resource

Plan 2 includes the installation and operating cost of a generic 2:1 natural gas combined cycle (NGCC) plant with a rated net capacity of 570 MW. This capacity was selected because it results in the same reserve planning capacity as Unit 2 in Plan 1.

The capacity factor of the NGCC plant in Plan 2 was adjusted to approximately 76% in order to match the projected annual energy output of Unit 2 in Plan 1. This plan is intended to represent a future in which the NGCC operates as a baseload energy resource, similar to how Unit 2 currently operates.

3.2.1.3. Plan 3 – Retire Columbia Unit 2; Install 2:1 Natural Gas Combined Cycle (NGCC) Intermediate Resource

Plan 3 assumes the installation and operating cost of a generic 570 MW 2:1 NGCC plant, like Plan 2. The capacity factor assumed in Plan 3 is based on operating the plant during on-peak hours only. On-peak operation is defined hereinafter as 16 hours per day, 5 days per week, 52 weeks per year. This scenario results in a capacity factor of approximately 47% for the NGCC.

At this capacity factor, the NGCC would provide approximately 2,400 GWh of energy annually. This is approximately 1,400 GWh lower than the projected output of Unit 2. The difference would need to be provided by market purchases. Since this plan assumes that the NGCC resource would provide energy during on-peak hours, the market purchases were assumed to be entirely during off-peak hours at off-peak prices.

3.2.1.4. Plan 4 – Retire Columbia Unit 2; Install 500MW of Wind and 500MW of Combustion Turbines (CTs)

Plan 4 assumes the installation and operating cost of 500 MW of wind located in Wisconsin with a capacity factor of approximately 35%, and a production tax credit (PTC) for the first 10 years of operation[9]. This plan represents a renewables based approach to replacing the energy production from Unit 2.

Since wind receives a 14.1% capacity credit,[10] 500 MW of peaking capacity resources would be required in addition to the wind resources in order to provide an amount of reserve planning capacity comparable to Plan 1. Therefore, this plan also includes the installation and operation of a generic combustion turbine site to fill the reserve capacity need with Unit 2 being retired.

Assuming a 35% capacity factor for wind and a 5% capacity factor for gas peaking units would provide approximately 1,800 GWh of energy annually. This is approximately 2,000 GWh lower than the projected output of Unit 2. Therefore the difference would need to be provided by market purchases. This plan assumes that the market purchases would be based on around-the-clock energy prices.

3.2.2. Analysis Summary

The least cost plan for the Applicants' customers is Plan 1, installation of SCR technology on Unit 2 (i.e. the Project). It is lower cost than Plans 2, 3 and 4 by $579 million, $571 million, and $562 million, respectively, on a present value of revenue requirements (PVRR) basis.

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[9] The capacity factor and PTC assumptions were designed to favor the installation of wind. PTCs are set to expire before a new wind farm could be constructed, and the Applicants have not drawn a conclusion that PTCs will be extended. The Applicants, though, included PTCs in the analysis as a way of evaluating wind on the favorable side of this uncertain variable. Similarly, the Applicants assumed that new wind in Wisconsin will be capable of achieving a 35% capacity factor, which the Applicants' believe is a favorable planning assumption for new wind.

[10] MISO. (2013). *Planning Year 2014-2015 Wind Capacity Credit.* Carmel: MISO.

The comparative analysis of Plans 1 through 4 was summarized into four cost categories:

- Production
- Purchased Power
- Capital Revenue Requirements
- Operations and Maintenance

Table 6 contains a summary of the PVRR for each of these categories for each of the four plans.

Table 6 – Analysis Summary (Estimated PVRR analysis in $2013)

	Present Value (PVRR) (discounted to end of year $2013)	**Plan 1**	**Plan 2**	**Plan 3**	**Plan 4**
Variable Costs	Production	$ 1,358	$ 1,634	$ 1,188	$ 274
	Purchased Power		$ (8)	$ 430	$ 688
Fixed Costs	Capital Revenue Requirements	$ 903	$ 1,257	$ 1,257	$ 1,744
	O&M	$ 138	$ 96	$ 96	$ 255
TOTAL	**Customer Cost**	**$ 2,400**	**$ 2,979**	**$ 2,970**	**$ 2,961**
	Delta (relative to Plan 1)		579	571	562

3.2.3. Evaluation Methodology

The Project and Alternatives are evaluated using a production cost analysis that calculates the present value of the total production costs (fixed and variable) for each plan. The PVRR of The Project is compared to the PVRR of the Alternatives to indicate the savings associated with The Project.

The annual energy and capacity volumes were benchmarked off of Columbia Unit 2, post completion of the recently approved turbine and pulverizer upgrade project (Docket No. 05-CE-141). Holding the energy and capacity constant across all four plans is based on the assumption that if Columbia Unit 2 retires, the system need for its energy and capacity will still remain, and the capacity and energy will need to be served by an alternate resource.

3.2.3.1. Evaluation Tool

The evaluation tool chosen for this analysis is a spreadsheet analysis, similar to the spreadsheet analysis used in Docket No. 05-CE-141. This was chosen for the following reasons:

- Spreadsheet software is standard on most modern computers;
- Spreadsheets clearly show the magnitude and timing of all inputs and calculations in every cost category of the analysis;
- Annual cost details can be easily extracted and tabled; and
- Spreadsheet analysis offers significant flexibility with sensitivity analysis.

3.2.3.2. Project Benefits

Plan 1 offers benefits over Plans 2, 3 and 4 through lower PVRR to provide customers with approximately 3,785 GWh of electricity and 540 MW of unforced (reserve planning) capacity annually, through the year 2038.

The fixed cost PVRR of Unit 2 through 2038, including the construction and maintenance of the SCR, is approximately $1,040 million. Although Plans 2, 3 and 4 include the retirement of Unit 2, the PVRR of fixed cost of Unit 2 in those plans is still approximately $740 million. This is due to the majority of Unit 2 revenue requirements being driven by sunk costs.

In comparison, Plans 2, 3 and 4 include the capital investment costs necessary to build replacement resources. The fixed cost PVRR for these replacement resources is approximately $610 million for Plans 2 and 3, and $1,260 million for Plan 4. Therefore, the alternatives represent an increase in fixed cost for customers of approximately $310 million PVRR for Plans 2 and 3, and $960 million PVRR for Plan 4.

In order for one of the alternative plans to be lower cost than Plan 1, it would need to include a variable cost savings that exceeds the fixed cost increase. None of the alternative plans provide such a savings. The detailed worksheets containing the inputs, calculations and outputs are included in Appendix D Schedule 1.

3.2.3.3. Project Cost

The total capital cost of the Unit 2 SCR Project exclusive of AFUDC is approximately $150,000,000. The annual total project cash flow was provided in Table 3 in Section 2.1. Revenue requirements for the SCR project, and all other Unit 2 capital additions, were developed using the financial modeling assumptions shown in Appendix D Schedule 2.

Table 7 includes the primary capital cost differences between Plans that drives the fixed cost increases mentioned in Section 3.2.3.2. The capital costs for the alternative resources in Plans 2, 3 and 4 are based on the 2013 Black & Veatch Power Characterization report provided to WPL for its Resource Planning studies.

Table 7 – Estimated Primary Capital Cost for Plans 1-4

Plan	Description of Primary Capital Cost Item	Estimated Capital Cost (millions)
Plan 1	Columbia Unit 2 SCR	$150
Plans 2 & 3	2:1 NGCC (570 MW)	[redacted]
Plan 4	Combustion Turbines (500 MW)	[redacted]
	Wind (500 MW)	[redacted]

All capital costs for Columbia Unit 2 were modeled using traditional utility revenue requirements.

The capital costs of the generic planning alternatives in Plans 2 through 4 were modeled using an escalating real carrying charge (ERCC). This was done because the life of those planning alternatives extends beyond the planning retirement date for Unit 2. Using an ERCC is a means to effectively performing a PVRR analysis with resources that have different planning lives. The carrying charge rate for each technology was set so that the PVRR of these carrying charges was equivalent to the present value of traditional utility revenue requirements, while recognizing the different tax depreciation schedules for each of the technologies.

Using the ERCC method allows the analysis to be cut off at the end of 2038 without missing or double counting costs associated with alternatives that still have a remaining useful life.

3.2.4. Modeling Assumptions

Unit Operating Characteristics

The operating characteristics of Unit 2 that have the most significant effect to this analysis are:

- Installed Capacity
- Operating Capacity
- Operating Factor

All three of these operating characteristics in this analysis for Unit 2 are consistent with the operating characteristics established in the most-recently approved CA Application for the turbine and pulverizer upgrades.[11] The Applicants do not have any new information that would suggest a different set of operating characteristics for Unit 2.

The operating factor is essentially the capacity factor during the hours of the year when the unit is available and is defined by the following equation:

$$Operating\ Factor\ (\%) = \frac{Annual\ MWh\ Generation\ (Megawatt\ hours)}{Rated\ Capacity\ (MW) \times [total\ hours\ per\ year - PM - UPM](hours)}$$

where PM = Planned Maintenance (hours/year)
UPM = Unplanned Maintenance (i.e. forced outages) (hours/year)

[11] See Docket No. 05-CE-141. PSCW written approval received on 01-08-2014.

The operating factor was set at 90% for the base case analysis and held constant for each year of the analysis. When the annual forced outage rate and the annual planned maintenance is applied to the operating factor of 90%, the result is an annual capacity factor in the low 70s during major outage years and high 70s during non-major outage years. The capacity factor is used in the variable production cost calculations and is defined by the following equation:

$$Capacity\ Factor\ (\%) = \frac{Annual\ MWh\ Generation\ (Megawatt\ \ hours)}{Operating\ Capacity\ (MW) \times total\ hours\ per\ year}$$

Fuel and Energy Price Forecasts

The Applicants each have internal fuel and energy price projections that are used for integrated resource planning purposes. In order to have a common fuel and energy price forecast for this analysis, the applicants used a generic data set comprised primarily of publicly available forecasts from the Energy Information Agency (EIA).[12]

The energy price is a blended energy price comprised of 4,600 hours of off-peak energy and 4,160 hours of on-peak energy. On-peak and off-peak energy prices were calculated using a weighted average of the dispatch cost for coal, natural gas combined cycle (NGCC), and combustion turbine (CT) peaking units.

A complete description of the sources used to develop the fuel and energy price forecasts can be found in Appendix D Schedule 3. The percentage weighting that each technology received in the on-peak and off-peak can be found in Appendix D Schedule 4. The resulting blended energy price and delivered fuel price is included in Appendix D Schedule 5.

Wind Production Tax Credit (PTC)

The Applicants applied a PTC to every Megawatt-hour generated from Wind in Plan 4 during the first 10 years of operation. This PTC was applied in every Future and Sensitivity, with the exception of Future 4 and Future 5. The Applicants withheld PTC in Future 4 and Future 5 because it was not considered reasonable to have CO2 monetization in addition to a PTC.

The value of each PTC was based on a starting price of 2.3 cents per kWh in 2013, escalating at the GDP Chain-type price index identified in EIA Annual Energy Outlook, 2014 Early Release.

3.2.5. Results and Sensitivity Analysis

The results of the economic analysis, using the base case assumptions discussed in the previous sections, show that Plan 1 is a lower estimated PVRR cost plan than Plans 2, 3 and 4 by $579 million, $571 million, and $562 million, respectively (*see* Table 6).

[12] The EIA data is from the 2014 Annual Energy Outlook which is available for download at http://www.eia.gov/forecasts/aeo.

In order to assess a range of potential outcomes, sensitivity analyses were performed on the primary inputs that could potentially vary from the projected base case values. This was done through a combination of 5 futures and 10 sensitivities. The aforementioned base case assumptions are represented in Future 1. All of the sensitivities utilize Future 1, and vary one input variable up or down. Futures 2 through 5 also utilize Future 1; however, the Futures vary more than one input variable simultaneously. Table 8 and Table 9 contain the lists of Futures and Sensitivities.

Table 8 – List of Futures

Future	Description
F1	**BASE Case** - Base Assumptions
F2	**High Fuel** (Coal +25%; Gas +25%)
F3	**Low Fuel** (Gas Price -25%, Coal Price -25%)
F4	**CO_2** (Base Case with the addition of a CO_2 price based on the Wood Mackenzie forecast utilized in Docket No. 6680-CE-141)
F5	**High CO_2** (Starting in 2022; High Energy Information Agency (EIA) CO_2; coal price -10%; gas price +10%; modified coal cap factor -10%)

Table 9 – List of Sensitivities

Sensitivity	Description
S1	Higher Cost of COL2 SCR and Ongoing Capital Adds by 10%
S2	Lower Cost of COL2 SCR and Ongoing Capital Adds by 10%
S3	Higher Construction Cost of the Alternatives by 10%
S4	Lower Construction Cost of the Alternatives by 10%
S5	Higher MISO Market Energy Price by 25%
S6	Lower MISO Market Energy Price by 25%
S7	Higher Delivered Gas Price by 25%
S8	Lower Delivered Gas Price by 25%
S9	Higher Delivered Coal Price by 25%
S10	Lower Delivered Coal Price by 25%

The annual average market energy forecasts are summarized in Table 10. Each of the five futures has an accompanying on-peak and off-peak energy price forecast. More detail on these price forecasts has been provided in Appendix D Schedule 6.

Table 10 – Energy Price Forecast Summary

	AROUND- THE-CLOCK ANNUAL AVERAGE MARKET ENERGY PRICE				
	Future 1	**Future 2**	**Future 3**	**Future 4**	**Future 5**
2013					
2014					
2015					
2016					
2017					
2018					
2019					
2020					
2021					
2022					
2023					
2024					
2025					
2026					
2027					
2028					
2029					
2030					
2031					
2032					
2033					
2034					
2035					
2036					
2037					
2038					

In every one of the futures and sensitivities, The Project proved to be the lowest cost plan, with outcomes ranging from an estimated savings of $138 million to $857 million PVRR. The results are shown in Table 11 and Table 12 using a heat map in each row to indicate relative magnitude of PVRR. Cool colors (green) indicate lowest costs in the row, and hot colors (red) indicate highest costs in the row. Using a heat map, it is clearly visible that Plan 1 is the lowest cost plan in all futures and sensitivities.

Table 11 – Futures Analysis Results (Estimated PVRR in 2013 millions of dollars)

Future	Plan 1 COL2 w/SCR	Plan 2 Retire COL2 Add NGCC	Plan 3 Retire COL2 Add NGCC	Plan 4 Retire COL2 Add CT & Wind	Delta (Plan 1 less the next least cost plan)
F1	2,400	2,979	2,970	2,961	(562)
F2	2,725	3,360	3,348	3,247	(523)
F3	2,075	2,598	2,593	2,675	(519)
F4	2,882	3,172	3,221	3,430	(290)
F5	3,133	3,270	3,356	3,477	(138)

Table 12 – Sensitivity Analysis Results (Estimated PVRR in 2013 millions of dollars)

Sensitivity	Plan 1 COL2 w/SCR	Plan 2 Retire COL2 Add NGCC	Plan 3 Retire COL2 Add NGCC	Plan 4 Retire COL2 Add CT & Wind	Delta (Plan 1 less the next least cost plan)
S1	2,430	2,979	2,970	2,961	(531)
S2	2,369	2,979	2,970	2,961	(592)
S3	2,400	3,037	3,029	3,068	(629)
S4	2,400	2,921	2,912	2,854	(455)
S5	2,400	2,977	3,078	3,133	(578)
S6	2,400	2,981	2,863	2,789	(390)
S7	2,400	3,256	3,144	2,986	(586)
S8	2,400	2,702	2,797	2,936	(302)
S9	2,725	3,084	3,076	3,066	(342)
S10	2,075	2,874	2,865	2,856	(781)

4.0 OPERATING PARAMETERS

The Columbia Unit 2 SCR will be designed to meet NO_x emission rates and other key operating parameters. The following sections describe operations of this system on Columbia Unit 2 and associated operating costs based on burning the Design Coal. Actual operating costs and emission reductions are subject to the coal type used at Columbia Unit 2.

4.1. COST OF OPERATIONS

Table 13 provides the key operating parameters related to the cost of operations of the SCR system to be installed on Columbia Unit 2. These parameters are based on operating and maintenance typical of an SCR system of this size and capability.

Table 13 – Columbia Unit 2 SCR Operating Parameters

Operating Parameter	Columbia Unit 2 SCR Value	Units
Plant Nameplate Rating	511	MW
Maximum Heat Input	5,885	MMBtu/hr
Annual Capacity Factor	85	%
Plant Uncontrolled NO_x Emissions	0.36	lb/MMBtu
Current NO_x Emissions (*includes LNB & SOFA reductions*)	0.12	lb/MMBtu
SCR NO_x Removal Efficiency	50	%
SCR outlet NO_x Emissions	0.06	lb/MMBtu
Flue Gas Flow at ID Fan Inlet	2,450,000	acfm
Total SCR Added Flue Gas Pressure Drop	7.9	Inches w.c.
Auxiliary Power Consumption by SCR	440	kW
SCR Ammonia Reagent Consumption	0.22	lb Ammonia/MW-hr
Initial Catalyst Life	24,000	Hours of SCR Operation
Catalyst Replacement	9 layers in 20 years	(281 m^3/layer)
Sootblowing Steam Requirement	0.4	MMBtu/hr

Fixed and variable operating costs are based on the consumption rates presented in Table 6 and the following assumptions: 19% aqueous ammonia reagent cost of $191/ton, catalyst cost of $5,900/$m^3$, steam cost $2.50/MMBtu. The total annual operating cost is expected to be approximately $2,191,000 (in 2014 dollars).

4.2. OPERATING CHARACTERISTICS

The installation of the SCR system will affect the operation of Columbia Unit 2. The most significant effects are as follows.

Furnace and Ductwork Pressure Capacity

The existing flue gas ductwork and ESP was reinforced in the late 1990s to accommodate the additional pressure loads resulting from an SCR installation. It is anticipated that new controls will be implemented to control pressure transients, thus avoiding the need for reinforcement of the furnace. A detailed evaluation of the furnace and flue gas ductwork, including analysis of pressure transients, will be undertaken after selection of the SCR technology supplier to verify their suitability. Additionally, the internal condition of the ductwork will be inspected early in the project execution to identify any wear or damage requiring repair as part of the project.

ID Fans

It is anticipated that the existing Induced Draft (ID) fans and motors, which were upgraded in the late 1990s, will accommodate the additional flue gas pressure drop caused by the SCR reactor and ductwork and not require further modification. However, a detailed evaluation of the ID fan capabilities will be undertaken after selection of the SCR technology supplier to verify that there is adequate operating capability and margin for the selected vendor's specific SCR design.

Process Control

The SCR system requires new controls to be added and integrated into the operator interface in the existing control room. Plant personnel will require training on all new equipment and controls.

Materials Handling System

Ammonia delivery and preparation will require a moderate amount of operator involvement. The 19% by weight aqueous ammonia will be delivered by truck and stored onsite for injection into the SCR.

Truck and/or Rail Traffic

Truck traffic will increase slightly because of the delivery of ammonia reagent for the SCR system. The SCR Reagent delivery traffic impacts will be studied early in the project and all significant reagent and waste hauling on the site will be evaluated, including SCR reagent.

Plant Operating Personnel

Existing personnel are expected to operate and maintain the new equipment.

Instrument Air

The SCR air system will tie into the existing instrument air system on site, and will include new air compressors and dryers to service new SCR air requirements.

Chemical Hazards

Ammonia is the primary chemical required for operation of the SCR system. In order to reduce hazardous chemical handling on-site, the project is using 19% by weight aqueous ammonia (compared to the alternative anhydrous ammonia). The aqueous reagent will be delivered to the site by truck and transferred to storage tanks from an unloading station. Additionally, the ammonia injection system will be provided with an Emergency Stop (E-Stop) system which terminates ammonia feed to the SCR reactor either from automatic leak detection or upon operator command. Ammonia tanks will be equipped with emergency relief valves and manual shut-off valves for tank fill and supply openings.

Auxiliary Power Consumption

The new SCR system will add to the auxiliary power load on Columbia Unit 2. The majority of the added auxiliary power demand is for additional ID fan power required to overcome the additional flue gas pressure drop caused by the SCR. A smaller amount of auxiliary power is required for new process equipment (pumps and heaters), air compressors, new area lighting, new HVAC, and controls.

5.0 DESCRIPTION AND COST OF PROPERTY BEING REMOVED

Based on preliminary engineering completed, no significant facilities are planned for demolition or removal from the unit. The current preliminary project layout and general arrangement of the SCR system was developed for constructability, reduced duration of tie-in outages, and minimal relocation and demolition work. As it is currently planned, no existing equipment is anticipated to be removed as part of the project.

6.0 TECHNOLOGY SELECTION

Various commercial NO_x reduction technologies were reviewed based on the ability to meet Consent Decree requirements, the feasibility of implementation on Columbia Unit 2, and capital and operating cost considerations.

Columbia Unit 2 currently has a NO_x emission rate of approximately 0.12 lb/MMBtu. This rate complies with the currently applicable NO_x emission rate under the Consent Decree. The Consent Decree requires, though, that a SCR system be installed on Unit 2 before December 31, 2018 and that Unit 2 achieve NO_x emission rates at or below 0.080 lb/MMBtu on a 30-day rolling average and 0.070 lb/MMBtu on a 12-month rolling average.

To meet Consent Decree requirements, a conventional SCR system was chosen for NO_x reduction as it is proven, commercially-available technology that can achieve the level of NO_x removal required. The conventional SCR system is also the cost-effective option.

6.1. TECHNOLOGY SELECTION PROCESS

The specific technology chosen to accomplish the goal of reduction emissions at Columbia Unit 2 was determined by an analysis of the following:

- Ability to meet Consent Decree requirements;
- Commercial availability of the technologies;
- Reliable, long-term NO_x removal capabilities;
- Specific costs for each technology at Columbia Unit 2;
- Implementation timeframes;
- Lead times and availability of critical components; and
- Plant-specific considerations (e.g. space or current plant equipment constraints).

6.2. TECHNOLOGIES EVALUATED

The Consent Decree requires an SCR technology to be installed and operated on Columbia Unit 2. An SCR is "a pollution control device for reducing NO_x emissions through the use of selective catalytic reduction technology." (Consent Decree at ¶ 60.) As such, all technologies evaluated needed to include SCR catalyst. This limited the technology options to three variations on the basic SCR concept: a conventional SCR (referred to herein simply as "SCR"); in-duct SCR; and hybrid SCR.

A conventional SCR includes a reactor located external to the existing flue gas ductwork path. It includes space for at least one additional layer of catalyst to be added after the initial installation and is capable of 85 to 90% NO_x removal. NO_x removal percentages in this section are typical for utility scale power plants without existing Low NO_x burners and SOFA systems thus having

much higher inlet NO_x levels. These values are not applicable to Columbia Unit 2 which already has relatively low NO_x emission levels due to already installed Low NO_x burners and SOFA systems.

An in-duct SCR is fundamentally similar to a conventional SCR except the reactor is more compact to enable it to fit into the existing economizer outlet ductwork path. This technology is capable of approximately 50% NO_x removal.

A hybrid SCR is a combination of a selective non-catalytic reduction (SNCR) system and an SCR reactor of reduced size and capacity. The reactor may be either external to the flue gas path, as with a conventional SCR, or within the flue gas path, as with an in-duct SCR. The overall NO_x removal capability of a hybrid system is limited to approximately 60%.

6.3. TECHNOLOGY SELECTION ANALYSIS

In order to directly compare the three SCR technology options for implementation at Columbia Unit 2, the conceptual capital and operating costs were estimated for each option.

Capital costs were developed for each of the three SCR technology options.

The capital cost estimate was developed for the SCR based on a design from a canceled SCR project for Columbia Unit 2 dating to the 1990s. That design was updated by adjusting the reactor dimensions to accommodate a state-of-the-art catalyst design obtained from a major SCR catalyst supplier. Quantities of material were then estimated based on the updated design through a material take-off process. The cost estimate was then developed from the material quantities using current cost factors for materials of the various types.

The capital cost estimate for the in-duct SCR was developed by making line-item modifications to the SCR cost estimate. The line-item modifications were based on a proposed conceptual in-duct reactor design provided by a supplier.

The capital costs were estimated for the hybrid system with both the conventional and in-duct reactor positions. These two cost estimates were developed by making line-item modifications to the conventional and in-duct cost estimates respectively.

The cost of lost generation during the tie-in outage was included in the comparison and was calculated for each option based on the estimated outage duration using a daily cost factor of $150,000. Life-cycle O&M cost estimates (including reagent, fan power, auxiliary power, soot blower steam, catalyst replacement, maintenance materials, and O&M labor) were developed for each option.

Other non-quantitative comparative factors related to the three technologies including technology maturity, technology availability, performance risk, and capacities for increased performance (as a hedge for potential future regulatory changes) were also compared. This comparison was done by ranking the three technologies in the various non-quantitative categories based on information provided by a range of suppliers.

6.4. TECHNOLOGY SELECTION SUMMARY

The technology comparison is summarized in Table 14 below. The capital, life cycle and lost generation costs in this table for the in-duct and hybrid SCR designs should be considered order-of-magnitude costs and be used only for relative comparisons of the technology options.

Table 14 – Technology Evaluation Summary

Comparison Factor	Conventional	In-Duct SCR	Hybrid SCR (Conventional Reactor Placement)	Hybrid SCR (In-Duct Reactor Placement)
EPC Contract Capital Cost	$101,822,044	$91,487,326	$90,309,888	$92,987,326
Life Cycle or NPV Operating Cost	$28,610,843	$40,644,554	$42,990,520	$42,990,520
Cost of Lost Generation for Tie-in Outage	Base	$9,000,000 to $13,500,000	Base	$9,000,000 to $13,500,000
Tie-in Outage Duration	3-4 weeks	12-16 weeks (possibly greater)	3-4 weeks	12-16 weeks (possibly greater)
Technology Maturity	high	low	low	low
Technology Availability	High, 6+ vendors	Single vendor	Single vendor	Single vendor
Catalyst Performance Risk	low	high	moderate	high
Capacity for Increased Performance	high	low	low	low

Based on the information summarized in the table above, the SCR technology (i.e., conventional SCR) was selected based on the following reasons:

1. It is capable of achieving the applicable Consent Decree requirements.
2. It has the lowest combined capital and O&M life cycle cost.
3. It has the shortest tie-in outage duration resulting in the lowest potential lost generation cost.
4. It has the highest level of technology maturity and includes no first-of-a-kind features, resulting in lower performance risk in meeting the consent decree NO_x emission limit.
5. It has the greatest level of supplier availability with multiple qualified and experienced suppliers allowing for a competitive procurement process.
6. It has significantly greater capacity for increased NO_x removal performance to enable compliance with potential future emission restrictions.

7.0 ENVIRONMENTAL IMPACTS/PERMITS

The proposed project location for the project is shown in Figure 1. The general site layout is shown in Attachment A.

7.1. EMISSIONS REDUCTIONS

The project site layout is shown in Figure 3. The Columbia Unit 2 SCR will significantly reduce NO_x emissions from the Columbia Energy Center, thereby improving air quality and visibility in Wisconsin.

7.2. PROXIMITY TO FLOODPLAINS

The area chosen for the location of the Columbia Unit 2 SCR is not within a 100 year floodplain.

7.3. INFORMATION ON APPLICABLE ENVIRONMENTAL FACTORS

Several environmental factors have been considered for the proposed project. Studies have been performed at the site as part of the Columbia Energy Center Emissions Reduction and Cooling Tower Replacement Projects. When these applications were filed, specific WDNR permits were obtained for these projects. Nothing has changed for evaluating the presence of features that could be impacted by the SCR project. The studies performed during the Columbia Energy Center Emissions Reduction Project included the following:

- Archaeological and historic resources;
- Threatened or endangered species;
- Solid waste;
- Water resources; and
- Wastewater discharge.

Additional information is found in the following sections.

7.3.1. Archaeological and Historic Resources

There are no known archaeological or historic resources in the construction footprint of the project. The Wisconsin Historical Society was consulted in permitting the adjacent Emission Reduction Project, and did not identify any concerns or needs for investigations.

7.3.2. Threatened and Endangered Species

A detailed analysis was performed on threatened/endangered species at the Columbia Energy Center as part of Expected Application of Wisconsin Power and Light Company to Construct a New Coal-fired Electric Generation Unit (Docket 6680-CE-170). Construction of the SCR will

occur almost entirely inside the footprint of the existing plant, with limited construction laydown on already developed Columbia Energy Center property.

It is not expected that there will be any adverse impacts to critical habitats for endangered, threatened, or special concern species. The Wisconsin Department of Natural Resources Bureau of Endangered Species (BES) as part of the Emissions Reduction Project, in which an expert habitat assessment was conducted and a mitigation plan was developed and approved by the BES. Based on the assumption that the previously developed areas will be adequate for construction and laydown for this project, it is anticipated that no further investigations or actions will be required.

7.3.3. Solid Waste

The Columbia Unit 2 SCR will have minimal impact to the current solid waste (i.e. fly ash) operations at the facility. Currently, bottom and fly ash is sold or trucked to an on-site company-owned landfill. The injection of ammonia into the flue gas, as part of the SCR process, may result in the entrainment of ammonia residuals in the fly ash. However, this is expected to be minimal and will not affect the end use of the fly ash. The replacement of SCR catalyst beds will result in additional solid waste management requirements. Catalyst replacement typically involves recycling of spent catalyst, which minimizes the amount of solid waste disposal.

7.3.4. Water Resources

Plant water consumption will not increase with the addition of the SCR system.

7.3.5. Wastewater Discharge

There will be no change in wastewater discharge constituents or rates from plant operations following the SCR Project.

7.3.6. Air Quality Resources

Operation of the SCR system can result in oxidation of sulfur dioxide (SO_2) to sulfur trioxide (SO_3) which combines with water vapor to form sulfuric acid mist (SAM). The dry FGD system on Columbia Unit 2 will capture these acid gas emissions with high efficiency such that SAM emissions will be minimal. Further review will determine whether or not SAM emissions will exceed the SAM Prevention of Significant Deterioration (PSD) threshold. If the threshold is expected to be exceeded, a formal PSD review will be conducted.

7.3.7. List of Permits and Approvals Needed

Table 15 provides a list of possible permits and approvals that may be required for the project. Some of the listed permits may not be required depending on the project scope.

Table 15 – List of Possible Permits and Approvals

Agency	Reference	Permit/ Plan/ Approval/ Report	Regulated Activity	Needed
Water Quality				
WDNR	NR 216 IAC 567 Chapter 60	Erosion Control Plan and Storm Water Management Plan for Construction Activities	Land disturbances greater than 1 acre	Prior to construction
Wisconsin Department of Commerce	COMM 60	Erosion Control Plan and Storm Water Management Plan for Construction Activities	Land disturbances greater than 1 acre	Prior to construction
WDNR	NR 216	SWPPP	Storm water management for industrial facilities. This may need to be updated for the new operation	Prior to operation
WDNR	NR 200	WPDES Discharge Permit	Tank containment and tank loading pad system discharge	Prior to construction
WDNR	NR 200	WPDES General Discharge Permit	Dewatering during construction	Prior to construction
WDNR	NR 200	WPDES General Discharge Permit	Hydrostatic testing of tanks and pipe flushing	Prior to testing / flushing
Hazardous Materials				
USEPA	40 CFR Part 112	SPCC Plan	Temporary oil storage on-site for construction activities	Within 6 months of having oil on site (but realistically when oil arrives on-site)
USEPA	40 CFR Part 112	SPCC Plan	Additional chemical or fuel storage on-site supporting the newly constructed equipment	Within 6-months of operation but realistically by the time operation commences.
USEPA	40 CFR part 302	CERCLA Emergency Response Planning	Spill response for hazardous materials.	Prior to chemicals being on-site
USEPA	40 CFR Part 355	EPCRA Emergency Response Planning	Spill response for hazardous materials.	Prior to chemicals being on-site

Agency	Reference	Permit/ Plan/ Approval/ Report	Regulated Activity	Needed
USEPA	40 CFR part 372	EPCRA Toxic Release Inventory Report	Disposition of chemicals used on site during construction and for the new operation need to be reported if used above applicable thresholds.	Calendar year reporting due July 1 of the following year
USEPA	40 CFR part 370	EPCRA Hazardous Chemical Inventory Report	Chemicals stored on-site during construction and new chemicals stored on-site for the new operation need to be reported if above applicable thresholds.	Calendar year reporting due March 1 of the following year
Air Quality				
USEPA	40 CFR part 72	Acid Rain Permit	Emission controls, rates, and averaging plans need to be updated if NO_x or SO_2 emissions change.	Prior to operation.
WDNR	WAC NR 405 and 406	Construction Permit (NSR, PSD, etc.)	New or increased emissions due to the modification	Prior to construction
WDNR	IAC 567 Chapter 22 WAC NR 407	Title V Operation Permit	Activities covered in construction permit need to be rolled into the Title V operating permit	Within time period specified in construction permit.
Tall Structures				
FAA	14 CFR Part 77	Notice of Proposed Construction or Alteration	Construction of new stacks or structures (cranes) 200 feet tall or within 20,000 feet of an airport.	Prior to construction
Local Approvals				
Columbia County		Zoning/Building Permit	Erection of new buildings, variance may be required for buildings over 80 feet tall	Prior to construction
Columbia County		Shorelands Permit.	Construction activities within shoreland district	Prior to construction
Columbia County		Conditional Use Permit	Filling or grading over 10,000 square feet within a shoreland district.	Prior to construction
Town of Pacific		Erosion Control Permit	Site clearing and grading	Prior to construction

Agency	Reference	Permit/ Plan/ Approval/ Report	Regulated Activity	Needed
City of Portage		Fire Protection Test Observation by Fire Marshal	Testing of new fire protection system	Prior to test
Construction Permits				
Wisconsin Department of Commerce		Construction – revision of existing buildings	Approval of plans and specifications	Prior to construction
Wisconsin Department of Commerce		Construction of plumbing facilities	Approval of plans and specifications	Prior to construction

8.0 DESIGNATION OF PUBLIC UTILITIES AND OTHERS AFFECTED

Columbia Unit 2 is jointly owned by Wisconsin Power and Light Company (WPL), Wisconsin Public Service Corporation (WPS), and Madison Gas and Electric (MGE). WPL owns 46.2%, WPS owns 31.8%, and MGE owns 22% of Units 1 and 2 at Columbia.

No other public utilities will be affected by this project.

9.0 OTHER STATUTORY CONSIDERATIONS

9.1. WISCONSIN ENVIRONMENTAL POLICY ACT

The Commission is required to conduct an environmental review of the Project in accordance with Wis. Stat. § 1.11 and Wis. Admin. Code ch. PSC 4. The Applicants submit that the Project is a Type III action under Wis. Admin. Code § PSC 4.10(3). Type III actions "normally do not have the potential to significantly affect the quality of the human environment, within the meaning of § 1.11(2)(c), Stats." (Wis. Admin. Code § PSC 4.10(3).) Here, the Project will significantly reduce NO_x emissions from Columbia Unit 2, improving the emissions profile of the unit. Additionally, the Project is not expected to result in any unusual circumstances suggesting the likelihood of significant negative environmental effects on the human environment.

9.2. BROWNFIELD SITES

Wis. Stat. § 196.49(4) requires the use of brownfields, as defined in Wis. Stat. § 560.13(I)(a), to the extent practicable. The Project is the installation of the SCR system on Unit 2 of Columbia, an existing generating facility. A separate Brownfield site is neither appropriate nor practicable.

9.3. WISCONSIN ENERGY PRIORITIES LAW

The Project meets the Wisconsin Energy Priorities Law, Wis. Stat. § 1.12(4). Wis. Stat. § 1.12(4) provides:

> Priorities. In meeting energy demands, the policy of the state is that, to the extent cost-effective and technically feasible, options be considered based on the following priorities, in the order listed:
>
> (a) Energy conservation and efficiency.
>
> (b) Noncombustible renewable energy resources.
>
> (c) Combustible renewable energy resources.
>
> (d) Nonrenewable combustible energy resources, in the order listed:
>
> 1. Natural gas.
>
> 2. Oil or coal with a sulfur content of less than 1%.
>
> 3. All other carbon-based fuels.

The Applicants need to install an SCR on Columbia Unit 2 to reduce the NO_x emission rate from the unit. Neither energy efficiency nor energy conservation will replace the need for the Project. Additionally, as demonstrated by the economic analysis higher-priority energy resources are not cost-effective alternatives to the Project.

APPENDIX A - SITE ARRANGEMENT DRAWING

Public Version

DWG. NO. 220286-2SC-M0001

PUMP SKID AREA EMERGENCY EYEWASH & SAFETY SHOWER

AMMONIA PUMP SKID

AMMONIA STORAGE TANKS

AQUEOUS AMMONIA TANK B AREA EMERGENCY EYEWASH & SAFETY SHOWER

AMMONIA UNLOADING AREA EMERGENCY EYEWASH & SAFETY SHOWER

AMMONICA UNLOADING STATION

UNLOADING CONTAINMENT PAD

NEW PAVED/GRAVEL AREA FOR TRUCK TRAFFIC

4'-6"

NEW PAVED/GRAVEL AREA FOR TRUCK TRAFFIC

OIL SUMP 1000 GAL. MINIMUM

TRANSFORMER (4160-480/277V, 2000kVA)

OIL CONTAINMENT/ FIRE BARRIER STRUCTURE

NEW COLUMNS FOR SCR

REACTOR STAIRCASE AND CATALYST LOADING PLATFORM

REACTOR OUTLET DUCT

AIRHEATER INLET DUCT

EXISTING DAMPER, EXPANSION JOINT AND DUCT SPOOL TO BE REMOVED

ELECTRICAL EQUIPMENT ENCLOSURE (AT GRADE)

SEE DWG 220286-2SC-M0002 FOR ELECTRICAL EQUIPMENT ENCLOSURE DETAILS

NEW COLUMNS FOR SCR (TYP.)

AIR COMPRESSOR ENCLOSURE (AT GRADE)

SCR REACTOR

REACTOR INLET DUCT

ECONOMIZER OUTLET DUCT

ECONOMIZER OUTLET DUCT

SEE DWG 220286-2SC-M0003 FOR AIR COMPRESSOR ENCLOSURE DETAILS

EXISTING DAMPER, EXPANSION JOINT AND DUCT SPOOL TO BE REMOVED

AIRHEATER INLET DUCT

REACTOR STAIRCASE AND CATALYST LOADING PLATFORM

REACTOR OUTLET DUCT

PLAN
SITE ARRANGEMENT

SCALE: 1" = 20'-0"

20 10 0 20 40 60

REV	DATE	DESCRIPTION	DWN	ENGR	CHK	APPV
0	18 OCT 13	OWNER REVIEW	J_B	RWE	–	.

This drawing as an instrument of service, remains the property of HDR, Inc.
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HDR Engineering, Inc.

Columbia Energy Center
Unit 2
Wisconsin Power and Light
Pardeville, WI

UNIT 2 SCR REACTOR
AND AMMONIA STORAGE AREAS
GENERAL ARRANGEMENT

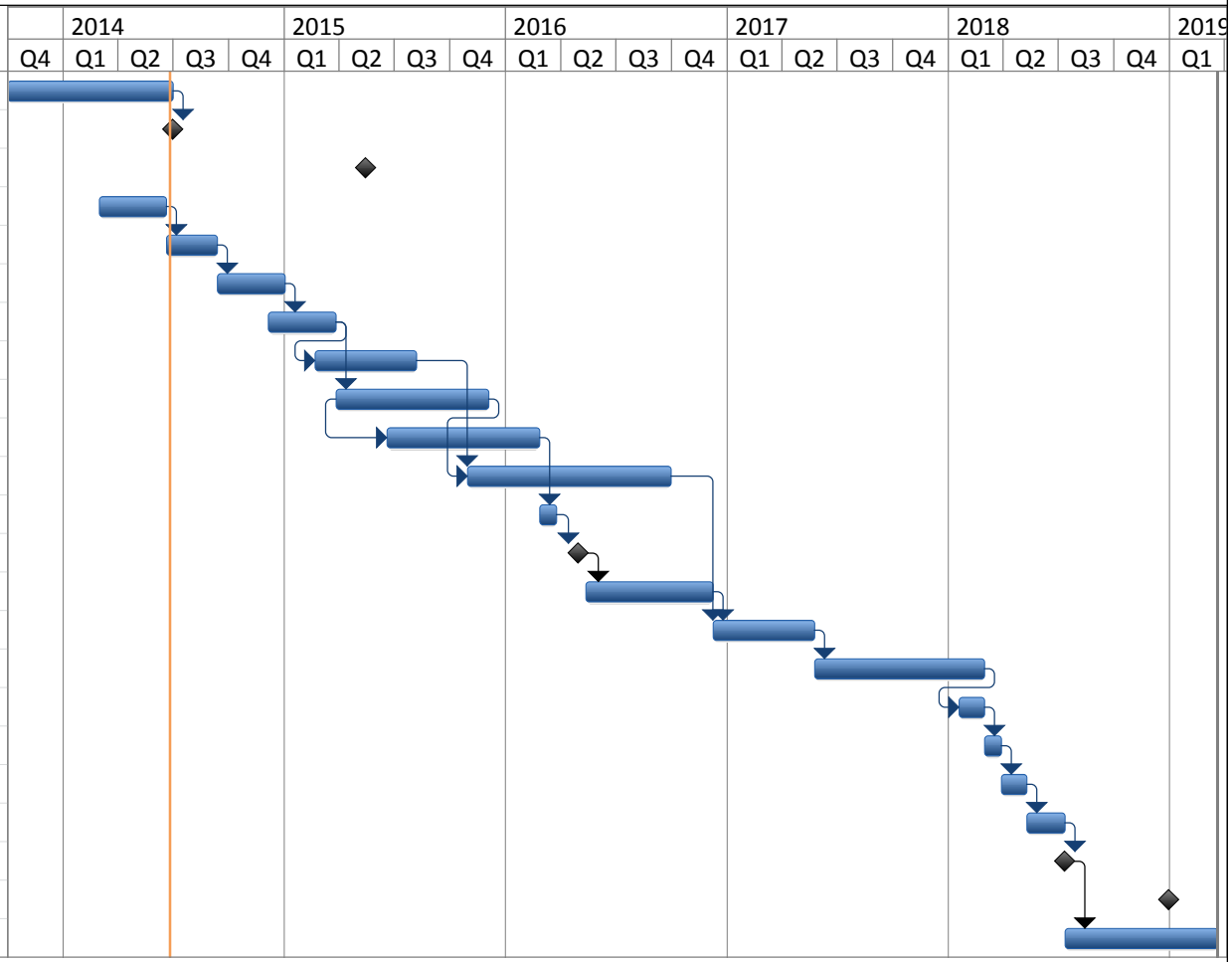
SCALE: 1"=20'

DWG. NO. 220286-2SC-M0001 REV. 0

APPENDIX B – PRELIMINARY LEVEL 1 SCHEDULE

Columbia Unit 2 SCR Project Schedule

ID	Task Name
1	CA Application Development
2	File CA with PSCW
3	CA Approval
4	Pre-Engineering
5	SCR Specification and RFQ Development
6	SCR Bidding - Equipment and Construction
7	Bid Evaluation and Award
8	Contract Negotiations
9	Engineering
10	Air Permit
11	Procurement and Fabrication
12	Site Mobilization
13	Start Construction
14	Construction Substructures
15	Construction Superstructures
16	Construction Wiring and Piping
17	Commissioning
18	Tie-In Outage
19	Tuning
20	Testing/Reporting
21	Substantial Completion
22	EPA Compliance Required
23	Punch List and Record Drawings



Project: Columbia Unit 2 SCR Sche
Date: Thu 6/26/14

Task

Milestone

APPENDIX C – CONSENT DECREE

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN

UNITED STATES OF AMERICA, Plaintiff, v. WISCONSIN POWER AND LIGHT COMPANY, MADISON GAS AND ELECTRIC COMPANY, WISCONSIN ELECTRIC POWER COMPANY, and WISCONSIN PUBLIC SERVICE CORPORATION, Defendants.	Civil Action No.: 13-cv-266

SIERRA CLUB, Plaintiff, v. WISCONSIN POWER AND LIGHT COMPANY Defendant.	Civil Action No.: 13-cv-265

CONSENT DECREE

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APPENDIX A -- ENVIRONMENTAL MITIGATION PROJECTS

WHEREAS, on September 9, 2010, Plaintiff, Sierra Club ("Sierra Club"), filed a Complaint for civil penalties, declaratory and injunctive relief, with costs and fees, under the Clean Air Act ("CAA" or the "Act"), 42 U.S.C. §§ 7401-7671q, and specifically the CAA's citizen suit provision, 42 U.S.C. § 7604, against Defendant, Wisconsin Power and Light Company ("WPL"), Civil Action No. 10-CV-511 (W.D. Wis.), and on May 8, 2012, dismissed that action by stipulation, without prejudice, in anticipation of this Consent Decree and is refiling its Complaint concurrently with this Consent Decree;

WHEREAS, on September 24, 2010, Sierra Club, filed a Complaint for civil penalties, declaratory and injunctive relief, with costs and fees, under the Clean Air Act ("CAA or the "Act"), 42 U.S.C. §§ 7401-7671q, and specifically the CAA's citizen suit provision, 42 U.S.C. § 7604, against Defendant WPL, Civil Action No. 10-cv-00835-AEG (E.D. Wis.);

WHEREAS, the United States of America ("United States"), on behalf of the United States Environmental Protection Agency ("EPA"), is concurrently filing a Complaint and this Consent Decree, for injunctive relief and civil penalties pursuant to Sections 113(b)(2) and 167 of the Act 42 U.S.C. §§ 7413(b)(2) and 7477, alleging that WPL, Madison Gas and Electric Company ("MGE"), Wisconsin Electric Power Company ("We Energies"), and Wisconsin Public Service Corporation ("WPSC") (collectively "Defendants"), violated the Prevention of Significant Deterioration ("PSD") provisions of Part C of Subchapter I of the Act, 42 U.S.C. §§ 7470-7492, the requirements of Title V of the Act, 42 U.S.C. §§ 7661-7661f, and the federally enforceable Wisconsin State Implementation Plan ("Wisconsin SIP");

WHEREAS, on December 14, 2009, EPA issued a Notice and Finding of Violation ("NOV/FOV") to Defendants with respect to alleged violations of the CAA;

WHEREAS, the United States provided Defendants and the State of Wisconsin with actual notice pertaining to Defendants' alleged violations, in accordance with Sections 113(a)(1) and (b) of the Act, 42 U.S.C. § 7413(a)(1) and (b);

WHEREAS, in their Complaints, the United States and the Sierra Club (hereinafter collectively "Plaintiffs") allege, *inter alia,* that one or more Defendants made major modifications to major emitting facilities, and failed to obtain the necessary permits and install and operate the controls necessary under the Act to reduce sulfur dioxide ("SO_2"), oxides of nitrogen ("NO_x"), and/or particulate matter ("PM"), at certain electricity generating stations located in Wisconsin, and that such emissions damage human health and the environment;

WHEREAS, the Sierra Club alleges in its Complaint, Case 10-cv-00835-AEG, that WPL exceeded its opacity permit limits at the Edgewater Generating Station;

WHEREAS, in their Complaints, the Plaintiffs allege claims upon which relief can be granted against the Defendants under Sections 113, 167, and 304 of the Act, 42 U.S.C. §§ 7413, 7477, and 7604;

WHEREAS, the Plaintiffs and Defendants (collectively, the "Parties") have agreed that settlement of these actions is in the best interests of the Parties and in the public interest, and that entry of this Consent Decree without further litigation is the most appropriate means of resolving these matters;

WHEREAS, the Parties anticipate that the installation and operation of pollution control equipment and practices pursuant to this Consent Decree, and the retirement, refueling, or repowering of certain facilities required by this Consent Decree, will achieve significant reductions of SO_2, NO_x, and PM emissions and improve air quality;

WHEREAS, the Parties have agreed, and this Court by entering this Consent Decree finds, that this Consent Decree has been negotiated in good faith and at arm's length and that this Consent Decree is fair, reasonable, in the public interest, and consistent with the goals of the Act;

WHEREAS, the Defendants have cooperated in the resolution of these matters;

WHEREAS, the Defendants deny the violations alleged in the Complaints, and nothing herein shall constitute an admission of liability; and

WHEREAS, the Parties have consented to entry of this Consent Decree without trial of any issues;

NOW, THEREFORE, without any admission of fact or law, it is hereby ORDERED, ADJUDGED, AND DECREED as follows:

I. JURISDICTION AND VENUE

1. This Court has jurisdiction over this action, the subject matter herein, and the Parties consenting hereto, pursuant to 28 U.S.C. §§ 1331, 1345, 1355, and 1367, and pursuant to Sections 113, 167, and 304 of the Act, 42 U.S.C. §§ 7413, 7477, and 7604. Venue is proper in the Western District of Wisconsin pursuant to Sections 113(b) and 304(c) of the Act, 42 U.S.C. §§ 7413(b) and 7604(c), and 28 U.S.C. §§ 1391(b) and (c). Solely for the purposes of this Consent Decree and the underlying Complaints, and for no other purpose, the Defendants waive all objections and defenses that they may have to the Court's jurisdiction over this action, to the sufficiency of any pre-suit notices required by Section 113 or 304 of the Act, to the Court's jurisdiction over the Defendants, and to venue in this district. The Defendants consent to and shall not challenge entry of this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree. Except as expressly provided for herein, this Consent Decree shall not

create any rights in or obligations of any party other than the Parties to this Consent Decree. Except as provided in Section XXVI (Public Comment/Agency Review) of this Consent Decree, the Parties consent to entry of this Consent Decree without further notice. Notwithstanding the foregoing, should this Consent Decree not be entered by this Court, then the waivers and consents set forth in this Section I (Jurisdiction and Venue) shall be null and void and of no effect.

II. APPLICABILITY

2. Upon entry, the provisions of this Consent Decree shall apply to and be binding upon the United States and upon the Sierra Club, the Defendants, and their respective successors and assigns or other entities or persons otherwise bound by law.

3. A Defendant performing work under this Consent Decree shall provide a copy of this Consent Decree to all vendors, suppliers, consultants, contractors, agents, and any other company or other organization retained to perform such work at issue. Notwithstanding any retention of contractors, subcontractors, or agents to perform any work required under this Consent Decree, each Defendant shall ensure that all work it is required to undertake is performed in accordance with the requirements of this Consent Decree. In any action to enforce this Consent Decree, except as expressly provided herein (*e.g.*, Section XV Force Majeure), Defendants shall not assert as a defense the failure of its officers, directors, employees, servants, agents, or contractors to take actions necessary to comply with this Consent Decree.

III. DEFINITIONS

4. Every term expressly defined by this Section shall have the meaning given that term herein. Every other term used in this Consent Decree that is also a term used under the Act

or in a regulation implementing the Act, including regulations approved as part of the Wisconsin SIP, shall mean in this Consent Decree what such term means under the Act or those regulations.

5. A "12-Month Rolling Average Emission Rate" shall be determined by calculating an arithmetic average of all hourly emission rates in lb/mmBTU for the current month and all hourly emission rates in lb/mmBTU for the previous 11 Unit Operating Months. A new 12-Month Rolling Average Emission Rate shall be calculated for each new complete month in accordance with the provisions of this Consent Decree. Each 12-Month Rolling Average Emission Rate shall include all emissions of the applicable pollutant that occur during all periods of operation, including startup, shutdown, and Malfunction. For purposes of calculating a "12-Month Rolling Average Emission Rate," a "Unit Operating Month" means any month during which a Unit fires Fossil Fuel.

6. A "30-Day Rolling Average Emission Rate" for a Unit shall be determined by calculating an arithmetic average of all hourly emission rates in lb/mmBTU for the current Unit Operating Day and all hourly emission rates in lb/mmBTU for the previous 29 Unit Operating Days. A new 30-Day Rolling Average Emission Rate shall be calculated for each new Unit Operating Day. Each 30-Day Rolling Average Emission Rate shall include all emissions of the applicable pollutant that occur during all periods within any Unit Operating Day, including emissions from startup, shutdown, and Malfunction.

7. A "24-Hour Rolling Average Emission Rate" for a Unit shall be determined by calculating an arithmetic average of the current Unit Operating Hour emission rate in lb/mm BTU and the previous 23 Unit Operating Hours. A new 24-Hour Rolling Average Emission Rate shall be calculated for each new Unit Operating Hour. Each 24-Hour Rolling Average

Emission Rate for PM shall include all emissions that occur during all periods of operation, including startup, shutdown, and Malfunction.

8. "Baghouse" means a full stream (fabric filter or membrane) particulate emissions control device on the main boilers.

9. "Boiler Island" means a Unit's (a) fuel combustion system (including bunker, coal pulverizers, crusher, stoker, and fuel burners); (b) combustion air system; (c) steam generating system (firebox, boiler tubes, and walls); and (d) draft system (excluding the stack), all as further described in "Interpretation of Reconstruction," by John B. Rasnic U.S.EPA (November 25, 1986) and attachments thereto.

10. "Capital Expenditures" means all capital expenditures, as defined by Generally Accepted Accounting Principles ("GAAP"), as those principles exist at the Date of Entry of this Consent Decree, excluding the cost of installing or upgrading pollution control devices.

11. "CEMS" or "Continuous Emission Monitoring System," means, for obligations involving the monitoring of NO_x, SO_2, and PM emissions under this Consent Decree, the devices defined in 40 C.F.R. § 72.2 and installed and maintained as required by 40 C.F.R. Part 60 and 40 C.F.R. Part 75.

12. "Clean Air Act," "CAA," or "Act" means the federal Clean Air Act, 42 U.S.C. §§ 7401-7671q, and its implementing regulations.

13. "Columbia Generating Station" or "Columbia Station" or "Columbia" means solely for purposes of this Consent Decree, the Columbia Energy Center consisting of two existing coal-fired boilers designated as Unit 1 (512 MW) and Unit 2 (511 MW), which is

located in Columbia County, Wisconsin. Columbia is operated by WPL and jointly owned by WPL, MGE, and WPSC.

14. "Consent Decree" means this Consent Decree and the Appendices hereto, which are incorporated into the Consent Decree.

15. "Continuously Operate" or "Continuous Operation" means that when a pollution control technology or combustion control is required to be continuously used at a Unit pursuant to this Consent Decree (including, but not limited to, SCR, SNCR, DFGD, ESP, Baghouse, or Low NO_x Combustion System), it shall be operated at all times such Unit is in operation (except as otherwise provided by Section XV (Force Majeure)), consistent with the technological limitations, manufacturers' specifications, good engineering and maintenance practices, and good air pollution control practices for minimizing emissions (as defined in 40 C.F.R. § 60.11(d)) for such equipment and the Unit.

16. "Date of Entry" means the date this Consent Decree is approved or signed by the United States District Court Judge.

17. "Date of Lodging" means the date this Consent Decree is filed for lodging with the Clerk of the Court for the United States District Court for the Western District of Wisconsin.

18. "Day" means calendar day unless otherwise specified in this Consent Decree.

19. "Defendants" means Wisconsin Power and Light Company ("WPL"), Madison Gas and Electric Company ("MGE"), Wisconsin Electric Power Company ("We Energies"), and Wisconsin Public Service Corporation ("WPSC"). "Defendant" means one of the Defendants.

20. "Dry Flue Gas Desulfurization" or "Dry FGD" or "DFGD" means an add-on air pollution control system for the reduction of SO_2 located downstream of a boiler that sprays an

alkaline sorbent slurry in one or more absorber vessels designed to provide intimate contact between an alkaline slurry and the flue gas stream to react with and remove SO_2 from the exhaust stream forming a dry powder material which is captured in a downstream particulate control device. The Parties acknowledge that what was approved by the Public Service Commission of Wisconsin on March 11, 2011, in Docket No. 05-CE-138, to be installed at Columbia Units 1 and 2 would qualify as a DFGD for purposes of this Consent Decree. Likewise, the Parties acknowledge that what was filed on July 27, 2012, with the Public Service Commission of Wisconsin in Docket No. 6680-CE-174 to be installed at Edgewater Unit 5 would qualify as a DFGD for purposes of this Consent Decree.

21. "Edgewater Generating Station" or "Edgewater Station" or "Edgewater" means solely for purposes of this Consent Decree, the Edgewater Generating Station consisting of three existing coal-fired boilers designated as Unit 3 (60 MW), Unit 4 (330 MW), and Unit 5 (380 MW), which is located in Sheboygan County, Wisconsin. Edgewater Unit 3 is owned by WPL, Edgewater Unit 4 is jointly owned by WPL and WPSC, and Edgewater Unit 5 is owned by WPL and was formerly jointly owned by WPL and We Energies. WPL is the operator of Edgewater Units 3, 4, and 5.

22. "Electrostatic Precipitator" or "ESP" means a device for removing particulate matter from combustion gases by imparting an electric charge to the particles and then attracting them to a metal plate or screen of opposite charge before the combustion gases are exhausted to the atmosphere.

23. "Emission Rate" for a given pollutant means the number of pounds of that pollutant emitted per million British thermal units of heat input (lb/mmBTU), measured in accordance with this Consent Decree.

24. "Environmental Mitigation Projects" or "Projects" means the projects set forth in Section IX (Environmental Mitigation Projects) and Appendix A of this Consent Decree, and any other project undertaken for the purpose of fulfilling a Defendant's obligations under Section IX and approved for that purpose by the EPA pursuant to Section XIII (Review and Approval of Submittals).

25. "EPA" means the United States Environmental Protection Agency.

26. "Fossil Fuel" means any hydrocarbon fuel, including but not limited to coal, metallurgical coke, petroleum coke, petroleum oil, natural gas, or any other fuel made or derived from the foregoing.

27. "Greenhouse Gases" means the air pollutant defined at 40 C.F.R. § 86.1818-12(a) as of the Date of Lodging of this Consent Decree as the aggregate group of six greenhouse gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. This definition continues to apply even if 40 C.F.R. § 86.1818-12(a) is subsequently revised, stayed, vacated, or otherwise modified.

28. "Improved Unit" for NO_x means a System Unit equipped with an SCR or scheduled under this Consent Decree to be equipped with an SCR. A Unit may be an Improved Unit for one pollutant without being an Improved Unit for another pollutant. Columbia Unit 2 and Edgewater Unit 5 are Improved Units for NO_x.

29. "Improved Unit" for SO_2 means a System Unit equipped with a DFGD or scheduled under this Consent Decree to be equipped with a DFGD. A Unit may be an Improved Unit for one pollutant without being an Improved Unit for another pollutant. Columbia Units 1 and 2 and Edgewater Unit 5 are Improved Units for SO_2.

30. "kW" means Kilowatt or one thousand watts.

31. "lb/mmBTU" means pound per million British thermal units.

32. "Low NO_x Combustion System" means burners and associated combustion air control equipment, including Overfire Air and Rich Reagent Injection (if installed at the Unit), which control mixing characteristics of Fossil Fuel and oxygen, thus restraining the formation of NO_x during combustion of fuel in the boiler.

33. "Malfunction" means a failure to operate in a normal or usual manner by any air pollution control equipment, process equipment, or a process, which is sudden, infrequent, and not reasonably preventable. Failures that are caused in part by poor maintenance or careless operation are not Malfunctions.

34. "MGE" means Defendant, Madison Gas and Electric Co., a co-owner of the Columbia Station.

35. "Natural Gas" means natural gas received directly or indirectly through a connection to an interstate pipeline.

36. "Nelson Dewey Generating Station" or "Nelson Dewey Station" or "Nelson Dewey" means, solely for purposes of this Consent Decree, the Nelson Dewey Generating Station consisting of two existing coal-fired boilers designated as Unit 1 (100 MW) and Unit 2

(100 MW), which is located in Grant County, Wisconsin. Nelson Dewey is owned and operated by WPL.

37. "Netting" shall mean the process of determining whether a particular physical change or change in the method of operation of a major stationary source results in a "net emissions increase," as that term is defined at 40 C.F.R. §§ 51.165(a)(2)(vi), 52.21(b)(3)(i), and in the Wisconsin SIP.

38. "NO_x" means oxides of nitrogen.

39. "NO_x Allowance" means an authorization to emit a specified amount of NO_x that is allocated or issued under an emissions trading or marketable permit program of any kind established under the Clean Air Act or applicable State Implementation Plan; provided, however, that with respect to any such program that first applies to emissions occurring after December 31, 2011, a "NO_x Allowance" shall include an allowance created and allocated under such program only for control periods starting on or after the fourth anniversary of the Date of Entry of this Consent Decree.

40. "Nonattainment NSR" means the new source review program within the meaning of Part D of Subchapter I of the Act, 42 U.S.C. §§ 7501-7515 and 40 C.F.R. Part 51, and corresponding provisions of the federally enforceable Wisconsin SIP.

41. "Operational Interest" means part or all of a Defendant's right to be the operator (as that term is used and interpreted under the Act) of any Unit.

42. "Ownership Interest" with respect to a Unit means part or all of a Defendant's legal or equitable ownership interest in any Unit. A Defendant has an "Ownership Interest" with respect to a Plant if the Defendant is a Unit Owner of any Unit included within that Plant.

43. "Other Unit" means any Unit within the System that is not an Improved Unit for the pollutant in question. A Unit may be an Improved Unit for NO_x and an Other Unit for SO_2, and vice versa.

44. "Over-Fire Air" or "OFA" means an in-furnace staged combustion control to reduce NO_x emissions.

45. "Parties" means the United States of America on behalf of EPA, the Sierra Club, and the Defendants. "Party" means one of the named "Parties."

46. "Plant" means each of the following individually: (i) the Columbia Generating Station (consisting of Units 1 & 2); (ii) Edgewater Generating Station (consisting of Units 3, 4 & 5); or (iii) the Nelson Dewey Generating Station (consisting of Units 1 & 2).

47. "Plant-Wide Annual Tonnage Limitation" for a pollutant means the sum of the tons of the pollutant emitted from all the Units at a Plant including, without limitations, all tons of that pollutant emitted during periods of startup, shutdown, and Malfunction, in the designated year.

48. "PM" means total filterable particulate matter, measured in accordance with the provisions of this Consent Decree.

49. "PM CEMS" or "PM Continuous Emission Monitoring System" means, for obligations involving the monitoring of PM emissions under this Consent Decree, the equipment that samples, analyzes, measures, and provides, by readings taken at frequent intervals, an electronic and/or paper record of PM emissions.

50. "PM Control Device" means any device, including an ESP or Baghouse, which reduces emissions of PM. Where a Unit is equipped with both an ESP and a Baghouse, the Baghouse, and not the ESP, shall be considered the PM Control Device for that Unit.

51. "PM Emission Rate" means the number of pounds of PM emitted per million BTU of heat input (lb/mmBTU).

52. "Prevention of Significant Deterioration" or "PSD" means the new source review program within the meaning of Part C of Subchapter I of the Clean Air Act, 42 U.S.C. §§ 7470-7492 and 40 C.F.R. Part 52, and corresponding provisions of the federally enforceable Wisconsin SIP.

53. "Project Dollars" means expenditures and payments incurred or made by a Defendant in carrying out the Environmental Mitigation Projects identified in Section IX (Environmental Mitigation Projects) of this Consent Decree for which such Defendant is responsible to the extent that such expenditures or payments both: (a) comply with the requirements set forth in Section IX and Appendix A of this Consent Decree, and (b) constitute a Defendant's direct payments for such projects, or a Defendant's external costs for contractors, vendors, and equipment.

54. "Refuel" or "Refueled" means that a Unit is either Refueled to Natural Gas or Refueled to Another Non-Fossil Fuel Approved by EPA within the meaning of this Consent Decree.

55. "Refuel to Natural Gas" or "Refueled to Natural Gas" means, solely for purposes of this Consent Decree, the modification of a Unit such that the modified unit generates electricity solely through the combustion of Natural Gas rather than coal, including installation

of at least the following combustion controls to reduce emissions of NOx: low-NOx natural gas burners and an overfire air system. Nothing herein shall prevent the reuse of any equipment at any existing unit or new emissions unit, provided that the Unit Owner(s) applies for, and obtains, all required permits, including, if applicable, a PSD or Nonattainment NSR permit.

56. "Refuel to Another Non-Fossil Fuel Approved by EPA" or "Refueled to Another Non-Fossil Fuel Approved by EPA" means, solely for purposes of this Consent Decree, the modification of a unit such that the modified unit generates electricity solely through the combustion of a non-fossil fuel approved by EPA pursuant to Section XIII (Review and Approval of Submittals). Nothing herein shall prevent the reuse of any equipment at any existing unit or new emissions unit, provided that the Unit Owner(s) applies for, and obtains, all required permits, including, if applicable, a PSD or Nonattainment NSR permit.

57. "Repower" or "Repowered" means, solely for purposes of this Consent Decree, the removal and replacement of the Unit components such that the replaced unit generates electricity solely through the combustion of Natural Gas rather than coal, through the use of a combined cycle combustion turbine technology. Nothing herein shall prevent the reuse of any equipment at any existing unit or new emissions unit, provided that the Unit Owner(s) applies for, and obtains, all required permits, including, if applicable, a PSD or Nonattainment NSR permit.

58. "Retire" means to permanently shut down a Unit such that the Unit cannot physically or legally burn coal, and with respect to the applicable Unit Owner(s) and/or Unit Operator, to comply with applicable state and federal requirements for permanently ceasing operation of the Unit as a coal-fired electric generating Unit, including removing the Unit from

Wisconsin's air emissions inventory, and amending all applicable permits so as to reflect the permanent shutdown status of such Unit. The Unit Owners can choose to not retire and to continue to operate such a Unit only if it is Refueled or Repowered within the meaning of this Consent Decree, and such Unit Owner(s) obtains any and all required CAA permit(s) for the Refueled or Repowered Unit, including but not limited to an appropriate permit pursuant to CAA Subchapter I, Parts C and D, and pursuant to the applicable Wisconsin SIP provisions implementing CAA Subchapter I.

59. "Rich Reagent Injection" means a process of adding NO_x reducing agents in a staged fuel rich region of the lower furnace to reduce the formation of NO_x.

60. "SCR" or "Selective Catalytic Reduction" means a pollution control device for reducing NO_x emissions through the use of selective catalytic reduction technology.

61. "SNCR" or "Selective Non-Catalytic Reduction" means a pollution control device for the reduction of NO_x emissions through the use of selective non-catalytic reduction technology that utilizes ammonia or urea injection into the boiler.

62. "SO_2" means sulfur dioxide.

63. "SO_2 Allowance" means an authorization to emit a specified amount of SO_2 that is allocated or issued under an emissions trading or marketable permit program of any kind established under the Clean Air Act or applicable State Implementation Plan; provided, however, that with respect to any such program that first applies to emissions occurring after December 31, 2011, a "SO_2 Allowance" shall include an allowance created and allocated under such program only for control periods starting on or after the fourth anniversary of the Date of Entry of this Consent Decree.

64. "State" means the State of Wisconsin.

65. "Super-Compliant Allowance" means a NO_x Allowance or SO_2 Allowance attributable to reductions beyond the requirements of this Consent Decree, as described in Paragraphs 98 and 113.

66. "Surrender" or "Surrender of Allowances" means, for purposes of SO_2 or NO_x Allowances, permanently surrendering allowances from the accounts administered by EPA and the State of Wisconsin, if applicable, so that such allowances can never be used thereafter to meet any compliance requirements under the CAA, a state implementation plan, or this Consent Decree.

67. "System" means collectively, and solely for purposes of this Consent Decree, the Columbia Generating Station (consisting of Units 1 & 2), the Edgewater Generating Station (consisting of Units 3, 4 & 5), and the Nelson Dewey Generating Station (consisting of Units 1 & 2).

68. "Title V Permit" means the permit required of major sources pursuant to Subchapter V of the Act, 42 U.S.C. §§ 7661-7661e.

69. "Unit" means collectively, the coal pulverizer, stationary equipment that feeds coal to the boiler, the boiler that produces steam for the steam turbine, the steam turbine, the generator, the equipment necessary to operate the generator, steam turbine, and boiler, and all ancillary equipment, including pollution control equipment and systems necessary for production of electricity. An electric steam generating station may be comprised of one or more Units.

70. "Unit Operating Day" means any Day on which a Unit fires Fossil Fuel.

71. "Unit Operating Hour" means each clock hour during which any fuel is combusted at any time in the Unit.

72. "Unit Operator" means the operator (as that term is used and interpreted under the Act) of a Unit. For purposes of this Consent Decree, "Unit Operator" means WPL.

73. "Unit Owner" or "Unit Owners" means, with respect to any Unit addressed in this Consent Decree, in singular form, WPL, MGE, or WPSC, each of which has ownership interests, in whole or in part, in the following Units addressed in this Consent Decree: Nelson Dewey Units 1 & 2 - WPL; Columbia Units 1 & 2 - WPL, MGE, and WPSC; Edgewater Unit 3 - WPL; Edgewater Unit 4 - WPL and WPSC; and Edgewater Unit 5 – WPL, and in plural form, means all Unit Owners that have an Ownership Interest in the particular Unit or Units addressed.

74. "Unit-Specific Annual Tonnage Cap" for a Unit means the sum of the tons of the pollutant in question emitted from the Unit including, without limitations, all tons of that pollutant emitted during periods of operation, startup, shutdown, and Malfunction, in the designated calendar year.

75. "We Energies" means Defendant, Wisconsin Electric Power Company, a former co-owner of Edgewater Unit 5.

76. "Wisconsin SIP" means the Wisconsin State Implementation Plan, and any amendments thereto, as approved by EPA pursuant to Section 110 of the Act, 42 U.S.C. § 7410.

77. "Working Day" means a day other than a Saturday, Sunday, or Federal Holiday. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or Federal Holiday, the period shall run until the close of business on the next Working Day.

78. "WPL" means Defendant, Wisconsin Power and Light Company, the operator and the owner or co-owner of the Columbia Station, the Edgewater Station, and the Nelson Dewey Station.

79. "WPSC" means Defendant, Wisconsin Public Service Corporation, a co-owner of the Columbia Station and Edgewater Unit 4.

IV. REQUIREMENT TO RETIRE, REFUEL, OR REPOWER UNITS

80. By no later than December 31, 2015, WPL shall Retire, Refuel, or Repower Nelson Dewey Units 1 and 2.

81. By no later than December 31, 2015, WPL shall Retire, Refuel, or Repower Edgewater Unit 3.

82. By no later than December 31, 2018, WPL and WPSC shall ensure that Edgewater Unit 4 is Retired, Refueled, or Repowered.

V. NO_x EMISSION REDUCTIONS AND CONTROLS

A. Installation, Operation, and Performance NO_x Requirements at Columbia Station

83. Commencing no later than 90 Days after the Date of Entry of this Consent Decree, and continuing thereafter, WPL, MGE, and WPSC shall ensure the Continuous Operation of the Low NO_x Combustion System at Columbia Units 1 and 2 so that Units 1 and 2 each achieves and maintains a 12-Month Rolling Average Emission Rate for NO_x of no greater than 0.150 lb/mmBTU.

84. WPL, MGE, and WPSC shall install an SCR at Columbia Unit 2 on or before December 31, 2018. Commencing on January 1, 2019, and continuing thereafter, WPL, MGE, and WPSC shall ensure Continuous Operation of the SCR. Commencing no later than 30

Operating Days after January 1, 2019, WPL, MGE, and WPSC shall ensure Continuous Operation of the SCR so that Unit 2 achieves and maintains a 30-Day Rolling Average Emission Rate for NO_x of no greater than 0.080 lb/mmBTU and a 12-Month Rolling Average Emission Rate for NO_x of no greater than 0.070 lb/mmBTU.

B. Installation, Operation, and Performance NOx Requirements at Edgewater Unit 5

85. WPL shall install an SCR at Edgewater Unit 5 on or before May 1, 2013. Commencing on May 1, 2013, and continuing thereafter, WPL shall Continuously Operate the SCR. Commencing no later than 30 Operating Days after May 1, 2013, WPL shall Continuously Operate the SCR so that Unit 5 achieves and maintains a 30-Day Rolling Average Emission Rate for NO_x of no greater than 0.080 lb/mmBTU and a 12-Month Rolling Average Emission Rate for NO_x of no greater than 0.070 lb/mmBTU.

C. Operation and Performance Requirements for Existing Selective Non-Catalytic Reduction, Overfire Air, and Rich Reagent Injection at Edgewater Unit 4

86. Commencing immediately upon the Date of Entry of this Consent Decree, and continuing until January 1, 2014, WPL and WPSC shall ensure that the existing Selective Non-Catalytic Reduction System and Low NO_x Combustion System at Edgewater Unit 4 is Continuously Operated. Commencing no later than 30 Operating Days after the Date of Entry of this Consent Decree, WPL and WPSC shall ensure Continuous Operation of the existing Selective Non-Catalytic Reduction System and Low NO_x Combustion System so that Unit 4 achieves and maintains a 30-Day Rolling Average Emission Rate for NO_x of no greater than 0.170 lb/mmBTU.

87. Commencing on January 1, 2014, and continuing thereafter, WPL and WPSC shall ensure that the existing Selective Non-Catalytic Reduction System and Low NO_x

Combustion System at Edgewater Unit 4 is Continuously Operated so that Unit 4 achieves and maintains a 12-Month Rolling Average Emission Rate for NO_x of no greater than 0.150 lb/mmBTU.

D. Unit-Specific Annual Tonnage Cap for NO_x for Edgewater Unit 3

88. Commencing with calendar year 2013, and continuing each calendar year thereafter until the Edgewater Unit 3 is Retired, Refueled, or Repowered as required by Paragraph 81, WPL shall not exceed a Unit-Specific Annual Tonnage Cap of 250 tons of NO_x emissions each year at Edgewater Unit 3.

E. Requirement to Cease Burning Petcoke and Commence Burning 100% PRB Coal or Equivalent at Nelson Dewey Units 1 and 2

89. Commencing immediately upon the Date of Entry of this Consent Decree, and continuing thereafter, WPL shall cease burning Petcoke in the boilers of Nelson Dewey Units 1 and 2 and shall commence burning 100% Powder River Basin ("PRB") or equivalent fuel containing ≤ (less than or equal to) 1.00 lb/mmBTU of SO_2.

90. Commencing on the first Day of the month following the Date of Entry of this Consent Decree, and continuing thereafter, WPL shall achieve and maintain a combined 12-Month Rolling Average Emission Rate for NO_x at Nelson Dewey Units 1 and 2 of no greater than 0.300 lb/mmBTU.

F. Plant-Wide Annual Tonnage Limitations for NO_x

91. For each calendar year as specified below, the Unit Owners of each Plant shall, with respect to the Plant(s) in which they have an Ownership Interest, ensure that the following Plant-Wide Annual Tonnage Limitations for NO_x are not exceeded for such Plants:

Plant (Unit Owners)	For the Calendar Year Specified Below	Plant-Wide NO_x Cap (TPY)
Nelson Dewey Units 1 & 2 (WPL)	Each calendar year from 2013 through 2015	2,500
	2016 and continuing each calendar year thereafter	0
Columbia Units 1& 2 (WPL, MGE, and WPSC)	Each calendar year from 2013 through 2018	5,550
	2019 and continuing each calendar year thereafter	4,300
Edgewater Units 3, 4 & 5 (WPL for Units 3 & 5) WPL and WPSC for Unit 4 only)	Calendar year 2013	3,600
	Each calendar year from 2014 through 2018	2,500
	2019 and continuing each calendar year thereafter	1,100[1]

G. Monitoring of NO_x Emissions

92. In determining a 30-Day Rolling Average Emission Rate for NO_x or a 12-Month Rolling Average Emission Rate for NO_x, Unit Owners shall use NO_x emission data obtained from a CEMS in accordance with the procedures of 40 C.F.R. Part 75, except that NO_x emissions data need not be bias adjusted and the missing data substitution procedures of 40 C.F.R. Part 75 shall not apply to such determinations. Diluent capping (*i.e.*, 5% CO_2) will be applied to the NO_x emission rate for any hours where the measured CO_2 concentration is less than 5% following the procedures in 40 C.F.R. Part 75, Appendix F, Section 3.3.4.1.

93. For purposes of determining compliance with any Plant-Wide Annual Tonnage Limitation and Unit-Specific Annual Tonnage Cap for NO_x, Unit Owners shall, with respect to

[1] If Edgewater Unit 4 is Refueled or Repowered to Natural Gas, the Plant-Wide NO_x cap shall be 1,600 TPY. In this event, Unit 4 shall be operated so that the combined emission rate of Units 4 and 5 achieve and maintain a 12-Month Rolling Average Emission Rate for NO_x of no greater than 0.100 lb/mmBTU, commencing on January 1, 2019, and continuing each calendar year thereafter.

the Units in which they have an Ownership Interest, ensure that NO_x emission data are obtained from a CEMS in accordance with the procedures specified in 40 C.F.R. Part 75.

H. Use and Surrender of NO_x Allowances

94. Except as may be necessary to comply with Section XIV (Stipulated Penalties), no Unit Owner shall use NO_x Allowances to comply with any requirement of this Consent Decree at plants in which it has an Ownership Interest, including by claiming compliance with any emission limitation required by this Consent Decree by using, tendering, or otherwise applying NO_x Allowances to offset any excess emissions.

95. Except as provided in this Consent Decree, and specifically in paragraphs 96 and 97, beginning in calendar year 2013 and continuing each calendar year thereafter, no Unit Owner shall sell, bank, trade, or transfer its interest in any NO_x Allowances allocated to Units in the System.

96. Beginning in calendar year 2013, and continuing each calendar year thereafter, the Unit Owners shall ensure the Surrender of all NO_x Allowances allocated to the Units in the System in which they have an Ownership Interest for that calendar year that are not needed to meet federal and/or state CAA regulatory requirements for (a) the System Units, or (b) any electricity generating unit in the State of Wisconsin in which any Unit Owner has an Operational Interest or Ownership Interest, that is subject to a federal consent decree addressing PSD and/or Nonattainment NSR violations to which the United States is a party.

97. Nothing in this Consent Decree shall prevent any Unit Owner from purchasing or otherwise obtaining NOx Allowances from another source or from another Unit Owner for purposes of complying with federal and/or state CAA regulatory requirements to the extent

otherwise allowed by law. The requirements of this Consent Decree pertaining to Unit Owners' use and Surrender of NOx Allowances are permanent and are not subject to any termination provision of this Consent Decree.

I. Super-Compliant NO_x Allowances

98. Notwithstanding Paragraphs 95 and 96, in each calendar year beginning in 2013, and continuing thereafter, each Unit Owner may sell, bank, use, trade, or transfer NO_x Allowances allocated to the Units in the System for which the Unit Owner has an Ownership Interest that are made available in that calendar year solely as a result of:

a. the installation and operation of any NO_x air pollution control equipment that is not otherwise required under this Consent Decree, and is not otherwise required by law;

b. the use of an SCR prior to the date established by this Consent Decree; or

c. achievement and maintenance of an Emission Rate below an applicable 30-Day Rolling Average Emission Rate and 12-Month Rolling Average Emission Rate for NO_x;

provided that such Unit Owner is also in compliance for that calendar year with all emission limitations for NO_x set forth in this Consent Decree. Each Unit Owner shall ensure the reporting of the generation of such Super-Compliant Allowances in accordance with Section XII (Periodic Reporting) of this Consent Decree.

J. Method for Surrender of NO_x Allowances

99. Each Unit Owner shall Surrender, or transfer to a non-profit third-party selected by that Unit Owner for Surrender, all NO_x Allowances required to be Surrendered pursuant to

Paragraph 96 by June 30 of the immediately following calendar year. If any NO_x Allowances required to be Surrendered under this Consent Decree are transferred directly to a non-profit third-party, the Unit Owner shall include a description of such transfer in the next report submitted to EPA pursuant to Section XII (Periodic Reporting) of this Consent Decree. Such report shall: (a) identify the non-profit third-party recipient(s) of the NO_x Allowances and list the serial numbers of the transferred NO_x Allowances; and (b) include a certification by the third-party recipient(s) stating that the recipient(s) will not sell, trade, or otherwise exchange any of the NO_x Allowances and will not use any of the NO_x Allowances to meet any obligation imposed by any environmental law. No later than the third periodic report due after the transfer of any NO_x Allowances, the Unit Owner shall include a statement that the third-party recipient(s) Surrendered the NO_x Allowances for permanent Surrender to EPA in accordance with the provisions of Paragraph 100 within one year after the Unit Owner transferred the NO_x Allowances to them. The Unit Owner shall not have complied with the NO_x Allowance Surrender requirements of this Paragraph until all third-party recipient(s) have actually Surrendered the transferred NO_x Allowances to EPA.

100. For all NO_x Allowances required to be Surrendered, each Unit Owner shall, with respect to the NO_x Allowances that the Unit Owner is to Surrender, ensure that a NO_x Allowance transfer request form is first submitted to EPA's Office of Air and Radiation's Clean Air Markets Division directing the transfer of such NO_x Allowances to the EPA Enforcement Surrender Account or to any other EPA account that EPA may direct in writing. Such NO_x Allowance transfer requests may be made in an electronic manner using the EPA's Clean Air Markets Division Business System, or similar system provided by EPA. As part of submitting these

transfer requests, each Unit Owner shall ensure that the transfer of its NO_x Allowances are irrevocably authorized and that the source and location of the NOx Allowances being Surrendered are identified by name of account and any applicable serial or other identification numbers or station names.

VI. SO_2 EMISSION REDUCTIONS AND CONTROLS

A. SO_2 Emission Limitations and Control Performance Requirements at Columbia Station

101. WPL, MGE, and WPSC shall install DFGDs at Columbia Unit 1 and Columbia Unit 2 on or before December 31, 2014. Commencing on January 1, 2015, and continuing thereafter, WPL, MGE, and WPSC shall ensure the Continuous Operation of the DFGDs. Commencing no later than 30 Operating Days after January 1, 2015, WPL, MGE, and WPSC shall ensure Continuous Operation of the DFGDs so that Units 1 and 2 achieve and maintain a 30-Day Rolling Average Emission Rate for SO_2 of no greater than 0.075 lb/mmBTU at each Unit.

B. SO_2 Emission Limitations and Control Performance Requirements at Edgewater Station

102. WPL shall install a DFGD at Edgewater Unit 5 on or before December 31, 2016. Commencing on January 1, 2017, and continuing thereafter, WPL shall Continuously Operate the DFGD. Commencing no later than 30 Operating Days after January 1, 2017, WPL shall Continuously Operate the DFGD so that Unit 5 achieves and maintains a 30-Day Rolling Average Emission Rate for SO_2 of no greater than 0.075 lb/mmBTU.

103. Commencing no later than 30 Operating Days after the Date of Entry of this Consent Decree, and continuing thereafter, WPL and WPSC shall achieve and maintain a 12-

Month Rolling Average Emission Rate for SO_2 of no greater than 0.700 lb/mmBTU for Edgewater Unit 4.

C. Unit-Specific Annual Tonnage Cap for SO_2 for Edgewater Unit 3

104. Commencing with calendar year 2013, and continuing each calendar year thereafter until the date the Unit is Retired, Refueled, or Repowered as required by Paragraph 81, WPL shall not exceed a Unit-Specific Annual Tonnage Cap of 700 Tons of SO_2 per year at Edgewater Unit 3.

D. SO_2 Emission Limitations and Control Requirements at Nelson Dewey Units 1 and 2

105. Commencing on the first Day of the month following the Date of Entry of this Consent Decree, and continuing thereafter, WPL shall achieve and maintain a combined 12-Month Rolling Average Emission Rate for SO_2 at Nelson Dewey Units 1 and 2 of no greater than 0.800 lb/mmBTU.

E. Plant-Wide Annual SO_2 Tonnage Limitation.

106. For each calendar year as specified below, the Unit Owners of each Plant shall, with respect to the Plant(s) in which they have an Ownership Interest, ensure that the following Plant-Wide Annual Tonnage Limitations for SO_2 are not exceeded for the Plants in which they have an Ownership Interest:

Plant (Unit Owner(s))	For the Calendar Year Specified Below	Plant-Wide Cap (TPY)
Nelson Dewey Units 1 & 2 (WPL)	Each calendar year from 2013 through 2015	6,300
	2016 and continuing each calendar year thereafter	0
	Each calendar year from 2013	28,537

Columbia Units 1 & 2 (WPL, MGE, andWPSC)	through 2014	
	2015 and continuing each calendar year thereafter	3,286
Edgewater Units 3, 4 & 5 (WPL for Units 3 & 5; WPL and WPSC for Unit 4 only)	Each calendar year from 2013 through 2015	14,500
	2016	12,500
	Each calendar year from 2017 through 2018	6,000
	2019 and continuing each calendar year thereafter	1,100

F. Monitoring of SO_2 Emissions

107. In determining a 30-Day Rolling Average Emission Rate for SO_2 or a 12-Month Rolling Average Emission Rate for SO_2, Unit Owners shall, with respect to Units in which they have an Ownership Interest, ensure the use of SO_2 emission data obtained from a CEMS in accordance with the procedures of 40 C.F.R. Part 75, except that SO_2 emissions data need not be bias adjusted and the missing data substitution procedures of 40 C.F.R. Part 75 shall not apply to such determinations. Diluent capping (i.e., 5% CO_2) will be applied to the SO_2 Emission Rate for any hours where the measured CO_2 concentration is less than 5% following the procedures in 40 C.F.R. Part 75, Appendix F, Section 3.3.4.1.

108. For purposes of determining compliance with any Plant-Wide Annual Tonnage Limitation and Unit-Specific Annual Tonnage Cap for SO_2, Unit Owners shall, with respect to Units in which they have an Ownership Interest, ensure the use of SO_2 emission data obtained from a CEMS in accordance with the procedures specified in 40 C.F.R. Part 75.

G. Use and Surrender of SO_2 Allowances

109. Except as may be necessary to comply with Section XIV (Stipulated Penalties), no Unit Owner shall use SO_2 Allowances to comply with any requirement of this Consent

Decree at Plants in which they have an Ownership Interest, including by claiming compliance with any emission limitation required by this Consent Decree by using, tendering, or otherwise applying SO_2 Allowances to offset any excess emissions.

110. Except as provided in this Consent Decree, and specifically in Paragraphs 111 and 112, beginning in calendar year 2013 and continuing each calendar year thereafter, no Unit Owner shall sell, bank, trade, or transfer any SO_2 Allowances allocated to Units in the System.

111. Beginning in calendar year 2013, and continuing each calendar year thereafter, the Unit Owners shall ensure the Surrender of all SO_2 Allowances allocated to the Units in the System in which they have an Ownership Interest for that calendar year that are not needed to meet federal and/or state CAA regulatory requirements for (a) the System Units, or (b) any electricity generating unit in the State of Wisconsin in which any Unit Owner has an Operational Interest or Ownership Interest, that is subject to a federal consent decree addressing PSD and/or Nonattainment NSR violations to which the United States is a party.

112. Nothing in this Consent Decree shall prevent any Unit Owners from purchasing or otherwise obtaining SO_2 Allowances from another source or from another Unit Owner for purposes of complying with federal and/or state CAA regulatory requirements to the extent otherwise allowed by law. The requirements of this Consent Decree pertaining to Unit Owners' use and Surrender of SO_2 Allowances are permanent and are not subject to any termination provision of this Consent Decree.

H. Super-Compliant SO_2 Allowances

113. Notwithstanding Paragraphs 110 and 111, in each calendar year beginning in 2013, and continuing thereafter, each Unit Owner may sell, bank, use, trade, or transfer SO_2

Allowances allocated to the Units in the System for which they have an Ownership Interest that are made available in that calendar year solely as a result of:

a. the installation and operation of any SO_2 air pollution control equipment that is not otherwise required under this Consent Decree, and is not otherwise required by law;

b. the use of DFGD prior to the date established by this Consent Decree; or

c. achievement and maintenance of an Emission Rate below an applicable 30-Day Rolling Average Emission Rate and 12-Month Rolling Average Emission Rate for SO_2;

provided that such Unit Owners are also in compliance for that calendar year with all emission limitations for SO_2 set forth in this Consent Decree. Each Unit Owner shall ensure the reporting of the generation of such Super-Compliant Allowances in accordance with Section XII (Periodic Reporting) of this Consent Decree.

I. Method for Surrender of SO_2 Allowances.

114. Each Unit Owner shall Surrender, or transfer to a non-profit third-party selected by that Unit Owner for Surrender, all SO_2 Allowances required to be Surrendered pursuant to Paragraph 111 by June 30 of the immediately following calendar year. If any SO_2 Allowances required to be Surrendered under this Consent Decree are transferred directly to a non-profit third-party, the Unit Owner shall include a description of such transfer in the next report submitted to EPA pursuant to Section XII (Periodic Reporting) of this Consent Decree. Such report shall: (a) identify the non-profit third-party recipient(s) of the SO_2 Allowances and list the serial numbers of the transferred SO_2 Allowances; and (b) include a certification by the third-

party recipient(s) stating that the recipient(s) will not sell, trade, or otherwise exchange any of the SO_2 Allowances and will not use any of the SO_2 Allowances to meet any obligation imposed by any environmental law. No later than the third periodic report due after the transfer of any SO_2 Allowances, the Unit Owner shall include a statement that the third-party recipient(s) Surrendered the SO_2 Allowances for permanent Surrender to EPA in accordance with the provisions of Paragraph 115 within one year after the Unit Owner transferred the SO_2 Allowances to them. The Unit Owner shall not have complied with the SO_2 Allowance Surrender requirements of this Paragraph until all third-party recipient(s) have actually Surrendered the transferred SO_2 Allowances to EPA.

115. For all SO_2 Allowances required to be Surrendered, each Unit Owner shall, with respect to its SO_2 Allowances that the Unit Owner is to Surrender, ensure that an SO_2 Allowance transfer request form is first submitted to EPA's Office of Air and Radiation's Clean Air Markets Division directing the transfer of such SO_2 Allowances to the EPA Enforcement Surrender Account or to any other EPA account that EPA may direct in writing. Such SO_2 Allowance transfer requests may be made in an electronic manner, using the EPA's Clean Air Act Markets Division Business System, or similar system provided by EPA. As part of submitting these transfer requests, each Unit Owner shall ensure that the transfer of its SO_2 Allowances are irrevocably authorized and that the source and location of the SO_2 Allowances being Surrendered are identified – by name of account and any applicable serial or other identification numbers and station names.

VII. PM EMISSION REDUCTIONS AND CONTROLS

A. Optimization of ESPs and Baghouses

116. By no later than 90 Days from the Date of Entry of this Consent Decree, and continuing thereafter, with respect to each Unit in which they have an Ownership Interest, the Unit Owners shall ensure the Continuous Operation of each PM Control Device on such Unit to maximize PM emission reductions at all times when the Unit is in operation. Notwithstanding the foregoing sentence in this Paragraph, the Unit Owners shall not be required to Continuously Operate an ESP on any Unit if a Baghouse is installed and operating to replace the PM Control Device function of the ESP at that Unit. Except as required during correlation testing under 40 C.F.R. Part 60, Appendix B, Performance Specification 11, and Quality Assurance Requirements under Appendix F, Procedure 2, as required by this Consent Decree, with respect to each Unit in which they have an Ownership Interest, the Unit Owners shall, at a minimum, ensure that to the extent practicable: (a) where the PM Control Device is an ESP, each section of each ESP at such Unit is fully energized, and where the PM Control Device is a Baghouse, each compartment, except for any compartment specifically designated and designed as a spare compartment, of each Baghouse at such Unit remains operational; (b) repair any failed ESP section or Baghouse compartment at the next planned outage (or unplanned outage of sufficient length); (c) the automatic control systems on each ESP at such Unit are operated to maximize PM collection efficiency, where applicable; (d) each opening in the casings, ductwork, and expansion joints for each ESP and each Baghouse at such Unit is inspected and repaired during the next planned Unit outage (or unplanned outage of sufficient length) to minimize air leakage; (e) the power levels delivered to each ESP at such Unit are maintained, where applicable, consistent with

manufacturers' specifications, the operational design of the Unit, and good engineering practices; (f) the plate-cleaning and discharge-electrode-cleaning systems for each ESP at such Unit are optimized, where applicable, by varying the cycle time, cycle frequency, rapper-vibrator intensity, and number of strikes per cleaning event; and (g) for each such Unit with one or more Baghouses, a bag leak detection program is developed and implemented to ensure that leaking bags are promptly replaced.

B. Operation and Performance Requirements for PM Controls at Columbia Station

117. WPL, MGE, and WPSC shall ensure a Baghouse is installed on each of Columbia Units 1 and 2. Commencing not later than December 31, 2014, and continuing thereafter, WPL, MGE, and WPSC shall ensure each such Baghouse is Continuously Operated so that it achieves and maintains a filterable PM Emission Rate of no greater than 0.015 lb/mmBTU for each Unit based on a 24-Hour Rolling Average Emission Rate determined by PM CEMS. Notwithstanding this PM Emission Rate requirement, WPL, MGE, and WPSC may ensure that each of Columbia Units 1 and 2 achieves a filterable PM Emission Rate of no greater than 0.030 lb/mmBTU during periods of level 3 (high range) correlation testing under PS-11, Section 8.6(4), provided that such correlation testing is conducted in accordance with the procedures approved by EPA as part of the correlation plan required by Paragraph 126. Once a Baghouse is in Continuous Operation at a Unit, the PM optimization requirements of Paragraph 116 related to an ESP at that Unit are no longer applicable.

C. Operation and Performance Requirements for PM Controls at Edgewater Station

118. WPL shall install a Baghouse on Edgewater Unit 5, and commencing on or before December 31, 2016, and continuing thereafter, shall Continuously Operate such Baghouse so

that it achieves and maintains a filterable PM Emission Rate of no greater than 0.015 lb/mmBTU based on a 24-Hour Rolling Average Emission Rate determined by PM CEMS. Notwithstanding this PM Emission Rate requirement, WPL may ensure that Edgewater Unit 5 achieves a filterable PM Emission Rate of no greater than 0.030 lb/mmBTU during periods of level 3 (high range) correlation testing under PS-11, Section 8.6(4), provided that such correlation testing is conducted in accordance with the procedures approved by EPA as part of the correlation plan required by Paragraph 126. Once a Baghouse is in Continuous Operation at a Unit, the PM optimization requirements of Paragraph 116 related to an ESP at that Unit are no longer applicable.

119. Commencing no later than December 31, 2013, and continuing thereafter, WPL and WPSC shall ensure the Continuous Operation of the existing ESP on Edgewater Unit 4 so that it achieves and maintains a filterable PM Emission Rate of no greater than 0.030 lb/mmBTU based on a 3-hour average.

D. Operation and Performance Requirements for PM Controls at Nelson Dewey Units 1 and 2

120. Commencing immediately upon the Date of Entry of this Consent Decree, and continuing thereafter, WPL shall achieve and maintain at Nelson Dewey Units 1 and 2 a filterable PM Emission Rate of no greater than 0.100 lbs/mmBTU at each Unit based on a 3-hour average, and shall also comply with other applicable emission limitations.

E. Annual PM Stack Tests

121. Commencing in calendar year 2013, and continuing annually thereafter, for each Unit in which they have an Ownership Interest, Unit Owners shall ensure that stack tests are conducted for PM once per calendar year pursuant to Paragraphs 122 and 123, unless the Unit is

Retired, Refueled, or Repowered to Natural Gas by December 31 of the prior calendar year, at which point this requirement shall no longer apply.

122. To determine compliance with the PM Emission Rates established in Paragraphs 119 and 120, the Unit Operator shall ensure that EPA Method 5 (filterable portion only), or any alternate method approved by EPA under the terms of this Consent Decree, is employed during stack testing required by Paragraph 121. Each stack test shall consist of three separate runs performed under representative operating conditions not including periods of startup, shutdown, or Malfunction. The sampling time for each run shall be at least 60 minutes and the volume of each run shall be at least 0.85 dry standard cubic meters (30 dry standard cubic feet). The Unit Operator shall ensure that the PM Emission Rate from the stack test results is calculated in accordance with 40 C.F.R. § 60.8(f). The results of each PM stack test shall be submitted to Plaintiffs by the Unit Operator within 60 Days of completion of each test.

123. Commencing in calendar year 2013, and continuing annually thereafter, for each Unit in which they have an Ownership Interest, Unit Owners shall ensure that a PM stack test is conducted for condensable PM using the reference methods and procedures set forth at 40 C.F.R. Part 51, Appendix M, Method 202, or any alternate method approved by EPA under the terms of this Consent Decree. Each test shall consist of three separate runs performed under representative operating conditions not including periods of startup, shutdown, or Malfunction. The sampling time for each run shall be at least 60 minutes and the volume of each run shall be at least 0.85 dry standard cubic meters (30 dry standard cubic feet). The Unit Operator shall ensure that the number of pounds of condensable PM emitted per million BTU of heat input (lb/mmBTU) from the stack test results are calculated in accordance with 40 C.F.R. § 60.8(f).

The results of the PM stack test conducted pursuant to this Paragraph shall not be used for the purpose of determining compliance with the PM Emission Rates required by this Consent Decree. The results of each PM stack test shall be submitted to Plaintiffs by the Unit Operator within 60 Days of completion of each test.

124. When the Unit Operator submits the applications for amendment to the Title V Permits pursuant to Paragraph 202, those applications shall include a Compliance Assurance Monitoring ("CAM") plan, under 40 C.F.R. Part 64, for the PM Emission Rate in Paragraphs 117, 118, 119, and 120. The PM CEMS required under Paragraph 125 may be used in that CAM plan.

F. PM Continuous Emissions Monitoring Systems ("CEMS")

125. By no later than December 31, 2014, WPL, MGE, and WPSC shall ensure that PM CEMS are installed, correlated, maintained, and operating on Columbia Units 1 and 2. By no later than December 31, 2016, WPL shall install, correlate, maintain, and operate a PM CEMS on Edgewater Unit 5. The PM CEMS shall comprise a continuous particle mass monitor measuring filterable particulate matter concentration, directly or indirectly, on an hourly average basis and a diluent monitor used to convert the concentration to units expressed in lb/mmBTU. The PM CEMS installed at each Unit must be appropriate for the anticipated stack conditions and capable of measuring filterable PM concentrations on an hourly average basis. For each Unit in the System that is subject to this Paragraph, the Unit Owners with an Ownership Interest in such Unit shall ensure that there will be maintained, in an electronic database that maintains data for at least five years, the hourly average emission values of all PM CEMS at such Unit in lb/mmBTU. Except for periods of monitor Malfunction, maintenance, or repair, for each Unit in

the System that is subject to this Paragraph, the Unit Operator shall Continuously Operate the PM CEMS at all times when the Unit it serves is operating.

126. By no later than December 31, 2013, WPL, MGE, and WPSC shall ensure that a plan for the installation and correlation of the PM CEMS for Columbia Units 1 and 2 is submitted to EPA for review and approval pursuant to Section XIII (Review and Approval of Submittals) of this Consent Decree. By no later than December 31, 2015, WPL shall submit to EPA for review and approval pursuant to Section XIII (Review and Approval of Submittals) of this Consent Decree a plan for the installation and correlation of the PM CEMS for Edgewater Unit 5.

127. By no later than June 30, 2014, WPL, MGE, and WPSC shall ensure that a proposed Quality Assurance/Quality Control ("QA/QC") protocol for Columbia Units 1 and 2 is submitted to EPA for review and approval pursuant to Section XIII (Review and Approval of Submittals) of the Consent Decree. By no later than June 30, 2016, WPL shall submit to EPA for review and approval pursuant to Section XIII (Review and Approval of Submittals) of this Consent Decree a proposed Quality Assurance/Quality Control ("QA/QC") protocol that shall be followed for the PM CEMS at Edgewater Unit 5.

128. In developing both the plan for installation and correlation of the PM CEMS and the QA/QC protocol, Unit Owners shall ensure that the criteria set forth in 40 C.F.R. Part 60, Appendix B, Performance Specification 11, and 40 C.F.R. Part 60, Appendix F, Procedure 2 are used. Following EPA's approval of the plan described in Paragraph 126 and the QA/QC protocol described in Paragraph 127, Unit Owners shall thereafter operate the PM CEMS in accordance with the approved plan and QA/QC protocol.

129. By no later than December 31, 2014, for Columbia Units 1 and 2, and by no later than December 31, 2016, for Edgewater Unit 5, WPL, MGE, and WPSC for Columbia Units 1 and 2 and WPL for Edgewater Unit 5 shall ensure that the PM CEMS at the Columbia and Edgewater Generating Stations are installed, correlated, maintained, and Continuously Operated. WPL, MGE, and WPSC for Columbia Units 1 and 2 and WPL for Edgewater Unit 5 shall ensure that performance specification tests on the PM CEMS are conducted, and shall ensure compliance with the PM CEMS installation and correlation plans submitted to and approved by EPA in accordance with Paragraphs 126 and 127 is demonstrated. The PM CEMS shall be operated in accordance with the approved plan and QA/QC protocol. Pursuant to Section XII (Periodic Reporting), the data recorded by the PM CEMS during Unit operation, expressed in lb/mmBTU on a 24-Hour Rolling Average, shall be reported in electronic format to EPA, identifying in the report any PM Emission Rates in excess of the applicable PM Emission Rate and any concentrations measured by the PM CEMS that are greater than 125% of the highest PM concentration level used in the most recent correlation testing performed pursuant to Performance Specification 11 in 40 C.F.R. Part 60, Appendix B.

130. For purposes of determining compliance with Paragraphs 119 and 120 of this Consent Decree, stack testing using EPA Method 5 (filterable only) or any alternate method approved by EPA under the terms of this Consent Decree shall be the compliance method for the PM Emission Rates established by this Consent Decree.

131. Nothing in this Consent Decree is intended to, or shall, alter or waive any applicable law (including but not limited to any defenses, entitlements, challenges, or clarifications related to the Credible Evidence Rule, 62 Fed. Reg. 8,314 (Feb. 24, 1997)), or

monitoring requirements of 40 C.F.R. Part 70, concerning the use of data for any purpose under the Act.

VIII. PROHIBITION ON NETTING CREDITS OR OFFSETS

132. Except as provided in Paragraph 133, emission reductions that result from actions to be taken by Unit Owners after the Date of Entry of this Consent Decree to comply with the requirements of this Consent Decree shall not be considered as a creditable contemporaneous emission decrease for the purpose of obtaining a Netting credit or offset under the CAA's Nonattainment NSR and PSD programs.

133. The limitations on the generation and use of Netting credits and offsets set forth in the previous Paragraph do not apply to emission reductions achieved by a particular System Unit that are greater than those required under this Consent Decree for that particular System Unit. For purposes of this Paragraph, emission reductions from a System Unit are greater than those required under this Consent Decree if they result from such Unit's compliance with federally-enforceable emission limits that are more stringent than those limits imposed on the Unit under this Consent Decree and under applicable provisions of the CAA or the Wisconsin SIP.

134. Nothing in this Consent Decree is intended to preclude the emission reductions generated under this Consent Decree from being considered by the applicable state regulatory agency or EPA for the purpose of attainment demonstrations submitted pursuant to § 110 of the Act, 42 U.S.C. § 7410, or in determining impacts on National Ambient Air Quality Standards, PSD increment, or air quality related values, including visibility, in a Class I area.

IX. ENVIRONMENTAL MITIGATION PROJECTS

135. Each Defendant shall implement one or more of the Environmental Mitigation Projects ("Projects") described in Appendix A to this Consent Decree, or any other Environmental Mitigation Project approved by the EPA pursuant to Section XIII (Review and Approval of Submittals), in compliance with the approved plans and schedules for such Projects and other terms of this Consent Decree. In implementing the Projects, each Defendant shall spend no less than the amount described in Appendix A. The obligation of each Defendant to implement and finance the Projects shall be limited to each individual Defendant's obligation as set forth in Appendix A. Defendants shall not include their own personnel costs in overseeing the implementation of the Projects as Project Dollars.

136. The Projects described in Appendix A to be performed by each Defendant shall be for the purpose of beneficially restoring and/or mitigating the environments that EPA and/or the Sierra Club allege were damaged by the operation of the Defendants' Units, including environments allegedly damaged within the Defendants' service territories.

137. Each Defendant shall maintain, and present to EPA and/or Sierra Club upon request, documents to substantiate the Project Dollars expended to implement the Defendant's Projects described in Appendix A, and shall provide these documents to EPA and/or Sierra Club within 60 Days of a request for the documents.

138. All plans and reports prepared by Defendants for their respective Projects pursuant to the requirements of this Section IX of the Consent Decree and required to be submitted to EPA shall be publicly available from Defendants without charge in paper or electronic format.

139. For each Project undertaken, each Defendant shall certify, as part of each plan submitted to EPA for the Project, that Defendant is not otherwise required by law to perform the Project described in the plan, that Defendant is unaware of any other person who is required by law to perform the Project, and that Defendant will not use any Project, or portion thereof, to satisfy any obligations that it may have under other applicable requirements of law, including but not limited to any applicable renewable or energy efficiency portfolio standards.

140. Each Defendant shall use good faith efforts to secure as much environmental benefit as possible for the Project Dollars it expends, consistent with the applicable requirements and limits of this Consent Decree.

141. If a Defendant elects (where such an election is allowed) to undertake a Project by contributing funds to another person or entity that will carry out the Project in lieu of one or more Defendant(s), but not including a Defendant's agents or contractors, that person or instrumentality must, in writing: (a) identify its legal authority for accepting such funding; and (b) identify its legal authority to conduct the Project for which one or more Defendant contributes the funds. Regardless of whether one or more Defendant(s) elects (where such election is allowed) to undertake a Project by itself or to do so by contributing funds to another person or instrumentality that will carry out the Project, Defendant(s) acknowledge that a Defendant will receive credit for the expenditure of such funds as Project Dollars only if the Defendant(s) demonstrates that the funds have been actually spent by either one or more of the Defendants or by the person or instrumentality receiving them, and that such expenditures met all requirements of this Consent Decree.

142. Each Defendant shall comply with the reporting requirements described in Appendix A.

143. Within 90 Days following the completion of each Project required under this Consent Decree (including any applicable periods of demonstration or testing), the Defendant performing the Project shall submit to the United States and Sierra Club a report that documents the date that the Project was completed, Defendant's results of implementing the Project, including the emission reductions or other environmental benefits achieved, and the Project Dollars expended by the Defendant in implementing the Project.

X. CIVIL PENALTY

144. Within 30 Days after the Date of Entry of this Consent Decree, Defendants shall pay to the United States a civil penalty in the amount of $2,450,000. The civil penalty shall be paid by Electronic Funds Transfer ("EFT") to the United States Department of Justice, in accordance with current EFT procedures, referencing USAO File Number 2010-CV-00328 and DOJ Case Number 90-5-2-1-09878 and the civil action case name and case number assigned to the United States' enforcement action in this case. The costs of such EFT shall be Defendants' responsibility. Payment shall be made in accordance with instructions provided to Defendants by the Financial Litigation Unit of the U.S. Attorney's Office for the Western District of Wisconsin. Any funds received after 2:00 p.m. EDT shall be credited on the next Working Day. At the time of payment, Defendants shall provide notice of payment, referencing the USAO File Number, the DOJ Case Number, and the civil action case name and case number, to the Department of Justice and to EPA in accordance with Section XIX (Notices) of this Consent Decree.

145. Failure to timely pay the civil penalty shall subject Defendants to interest accruing from the date payment is due until the date payment is made at the rate prescribed by 28 U.S.C. § 1961, and shall render Defendants liable for all charges, costs, fees, and penalties established by law for the benefit of a creditor or of the United States in securing payment.

146. Payments made pursuant to this Section are penalties within the meaning of Section 162(f) of the Internal Revenue Code, 26 U.S.C. § 162(f), and are not tax-deductible expenditures for purposes of federal law.

147. The obligations of Defendants to pay the civil penalty amount owed the United States under this Consent Decree are joint and several. In the event of the failure of Defendants to make the civil penalty payment amount required under this Consent Decree, the remaining Defendants shall be responsible for such payment.

XI. RESOLUTION OF CLAIMS

A. Resolution of Civil Claims

148. Claims of the United States Based on Modifications Occurring Before the Date of Lodging of this Consent Decree. Entry of this Consent Decree shall resolve all civil claims of the United States against the Defendants that arose from any modifications commenced at any System Unit prior to the Date of Lodging of this Consent Decree, including but not limited to those modifications alleged in the NOV/FOV issued by EPA to Defendants on December 14, 2009, and the Complaint filed in this civil action, under any or all of: (a) Part C or D of Subchapter I of the CAA, 42 U.S.C. §§ 7470-7492, 7501-7515, and the implementing PSD and Nonattainment NSR provisions of the Wisconsin SIP; (b) Section 111 of the CAA, 42 U.S.C. § 7411, and 40 C.F.R. § 60.14; and (c) Title V of the CAA, 42 U.S.C. §§ 7661-7661f, but only to

the extent that such Title V claims are based on Defendants' failure to obtain an operating permit that reflects applicable requirements imposed under Part C or D of Subchapter I of the CAA.

149. Claims of the United States Based on Modifications after the Date of Lodging of this Consent Decree. Entry of this Consent Decree also shall resolve all civil claims of the United States that arise from a modification commenced before December 31, 2018, for pollutants regulated under Part C or D of Subchapter I of the CAA and under regulations, which are promulgated thereunder as of the Date of Lodging, where:

a. such modification is commenced at any System Unit after the Date of Lodging of this Consent Decree, or

b. such modification is one this Consent Decree expressly directs Defendants to undertake.

The term "modification" as used in this Paragraph shall have the meaning that term is given under the CAA, the Wisconsin SIP, and under the regulations in effect as of the Date of Lodging of this Consent Decree. The claims resolved by this Paragraph shall not include claims based on modifications for Greenhouse Gases and sulfuric acid mist.

150. Reopener. The resolution of the United States' civil claims against the Unit Owners, as provided by this Subsection A, is subject to the provisions of Subsection B of this Section. The resolution of claims against We Energies for claims based on modifications prior to the lodging of the Consent Decree is not subject to Subsection B of this Section.

151. Claims of the Sierra Club.

a. Entry of this Consent Decree shall resolve all civil claims of the Sierra Club, and the Sierra Club hereby releases all claims it made or could have made against the

Defendants that arose, directly or indirectly, from any modifications commenced at any System Unit prior to the Date of Lodging of this Consent Decree, including but not limited to those set forth in the NOV/FOV issued by EPA to Defendants on December 14, 2009; the Complaint filed in this civil action, in *Sierra Club v. Wisconsin Power and Light Company*, United States District Court, Western District of Wisconsin, Case No. 3:10-cv-511-wmc; *Sierra Club v. Wisconsin Power and Light Company*, United States District Court, Eastern District of Wisconsin, Case No. 2:10-cv-00835-aeg; and the Notice of Intent to Sue Letters issued by Sierra Club to Defendants on October 10, 2009, December 14, 2009, and December 21, 2009, and related to the System Units, under any or all of: (a) Part C or D of Subchapter I of the CAA, 42 U.S.C. §§ 7470-7492, 7501-7515, and the implementing PSD and Nonattainment NSR provisions of the Wisconsin SIP; (b) Section 111 of the CAA, 42 U.S.C. § 7411, and 40 C.F.R. Section 60.14; (c) Title V of the CAA, 42 U.S.C. §§ 7661-7661f, arising prior to the Date of Lodging of the Consent Decree at any of the System Units.

b. Entry of this Consent Decree shall also resolve all civil claims of the Sierra Club against the Defendants, known or unknown, as to the System Units that arose, directly or indirectly, from violations of opacity standards, carbon monoxide, under 42 U.S.C. § 7412, under the Wisconsin SIP, or any federally-enforceable air pollution control permit through the Date of Lodging of this Consent Decree.

c. Sierra Club further agrees that it will not pursue Best Available Control Technology or Lowest Achievable Emission Rate limits or New Source Review

applicability determinations related to the System Units in any administrative action now pending or contemplated (including in response to EPA Clean Air Act Title V orders related to Columbia and Edgewater) for modifications made prior to the Date of Lodging of this Consent Decree through any filing with a court, any administrative adjudication, or any formal comments submitted to any governmental entity.

d. Sierra Club agrees not to file a legal challenge, including any lawsuit or any petition for a contested case hearing, or take a litigation position or submit comments to any governmental agency in any public forum challenging or criticizing a Unit Owner's or, if applicable, We Energies' request(s) for rate recovery for the costs incurred in achieving compliance with the Consent Decree and/or the issuance of any permits or other regulatory approvals necessary for the construction of any environmental control equipment or Environmental Mitigation Project(s) required by the Consent Decree, except as provided in the section of the Consent Decree concerning dispute resolution. Sierra Club further agrees not to provide legal assistance by any Sierra Club staff, contract with any outside counsel to provide legal assistance, or fund any third parties in any legal challenge, including any lawsuit or any petition for a contested case hearing, or in any public or private initiative challenging or criticizing the Unit Owners' request(s) for rate recovery for the costs incurred in achieving compliance with the Consent Decree and/or the issuance of any permits or other regulatory approvals necessary for the construction of any environmental control equipment

or Environmental Mitigation Project(s) required by the Consent Decree.

e. Sierra Club further releases all claims it made or could have made and will withdraw and cause to be dismissed with prejudice, where appropriate, its petition and related administrative and federal court litigation arising from *In the Matter of Wisconsin Power and Light Columbia Generating Station*, U.S. EPA, Petition No. V-2008-1 (October 8, 2009); *In the Matter of Alliant Energy – WPL Edgewater Generating Station* (August 17, 2010) Petition No. V-2009-2; Petition to Reopen and Correct the Title V Operating Permits Issued By the Wisconsin Department of Natural Resources to the Nelson Dewey Generating Station in Cassville, Grant County, Wisconsin, Permit No. 12201450-P11; and *Sierra Club v. Lisa Jackson*, United States Court, Western District of Wisconsin, Case No. 3:11-cv-00116.

f. Entry of this Consent Decree also shall resolve all civil claims of the Sierra Club related to the System Units that arise from a modification commenced before December 31, 2018, pursuant to Part C or D of the Act or 42 U.S.C. § 7411, that arise prior to December 31, 2018, from the Title V program, 42 U.S.C. §§ 7661-7661d, that arise prior to December 31, 2018, from emissions standards or limitations in the existing Wisconsin SIP, or that arise prior to December 31, 2018, from a hazardous air pollutant standard in effect or proposed as of the date of the entry of this Consent Decree and that is promulgated pursuant to 42 U.S.C. § 7412. The future claims resolved by this Paragraph shall not include claims based on modifications that increase Greenhouse Gases or sulfuric acid mist emissions.

g. Any dispute as to Paragraph 151 is subject to the Dispute Resolution provisions of this Consent Decree, including the written notice and right to cure provisions. Any remedy arising from commitments of Sierra Club pursuant to this Consent Decree is limited to equitable relief (*i.e.*, specific performance) and shall not include monetary damages.

B. Pursuit of Civil Claims Otherwise Resolved by Subsection A

152. Bases for Pursuing Resolved Claims for the System. If: i) a Unit Owner or Owners violate a Plant-Wide Annual Tonnage Limitation for SO_2 or NO_x applicable to a Plant in which it or they have an Ownership Interest; or ii) if a Unit Owner or Owners fail by more than 90 Days to Retire, Refuel, or Repower a Unit as required by this Consent Decree; or iii) if a Unit Owner or Owners fail by more than 90 Days to install, upgrade, or commence Continuous Operation of any emission control device required pursuant to this Consent Decree; or iv) if a Unit Owner or Owners fail by more than 90 Days to achieve any Emission Rate or other obligation or limitation required pursuant to this Consent Decree for a Unit or Plant in which it or they have an Ownership Interest; then the United States may pursue any claim against that Unit Owner or Owners with respect to the Unit or Plant at issue that is otherwise resolved under Subsection XI.A. (Resolution of Civil Claims) against the Unit Owner or Owners of that affected Unit or Plant, subject to subparagraphs a. and b. below.

a. For any claims based on modifications undertaken at an Other Unit (*i.e.*, any unit of the System that is not an Improved Unit for the pollutant in question), claims may be pursued only regarding the pollutant that causes the Unit's designation as an Other Unit where the modification(s) on which such claim is based was

commenced within the 5 years preceding the violation or failure specified in this Paragraph.

b. For any claims based on modifications undertaken at an Improved Unit, claims may be pursued only regarding the pollutant that causes the Unit's designation as an Improved Unit where the modification(s) on which such claim is based was commenced: (1) after the Date of Lodging of this Consent Decree, and (2) within the 5 years preceding the violation or failure specified in this Paragraph.

153. Additional Bases for Pursuing Resolved Claims for Modifications at an Improved Unit. Solely with respect to the pollutant that causes the Unit's designation as an Improved Unit, the United States may also pursue claims against a Unit Owner of an Improved Unit arising from the Unit Owner's modification (or collection of modifications) at the Improved Unit that have otherwise been resolved under Subsection XI.A. (Resolution of Civil Claims), if the modification (or collection of modifications) at the Improved Unit on which such claim is based (a) was commenced after the Date of Lodging, and (b) individually (or collectively) increased the maximum hourly Emission Rate of that Unit for the pollutant that caused the Unit's designation as an Improved Unit (as measured by 40 C.F.R. §§ 60.14(b) and (h)) by more than 10%.

154. Additional Bases for Pursuing Resolved Claims for Modification at an Other Unit. Solely with respect to the pollutant that causes the Unit's designation as an Other Unit, the United States may also pursue claims against a Unit Owner of an Other Unit arising from the Unit Owner's modification (or collection of modifications) at the Other Unit that have otherwise been resolved under Subsection XI.A. (Resolution of Civil Claims), if the modification (or

collection of modifications) at the Other Unit which such claims are based was commenced within 5 years preceding any of the following events:

a. A modification (or collection of modifications) at such Other Unit commenced after the Date of Lodging of this Consent Decree that increases the maximum hourly Emission Rate for such pollutant that caused the Unit's designation as an Other Unit (NO_x or SO_2), as measured by 40 C.F.R. §§ 60.14(b) and (h);

b. The aggregate of all Capital Expenditures made at such Other Unit exceeds $150/kW on the Other Unit's Boiler Island (based on the generating capacities identified in this Consent Decree) during the period from the Date of Entry of this Consent Decree through December 31, 2018 (Capital Expenditures shall be measured in calendar year 2012 constant dollars, as adjusted by the McGraw-Hill Engineering News-Record Construction Cost Index); or

c. A modification (or collection of modifications) at such Other Unit commenced after the Date of Lodging of this Consent Decree that results in an emissions increase for such pollutant that caused the Unit's designation as an Other Unit (NO_x and/or SO_2) at such Other Unit, and such increase of such pollutant: (i) presents, by itself, or in combination with other emissions or sources, "an imminent and substantial endangerment" within the meaning of Section 303 of the Act, 42 U.S.C. § 7603; (ii) causes or contributes to violation of a NAAQS in any Air Quality Control Area that is in attainment with that NAAQS; (iii) causes or contributes to violation of a PSD increment; or (iv) causes or contributes to any adverse impact on any formally-recognized air quality and related values in any

Class I area. The introduction of any new or changed NAAQS shall not, standing alone, provide the showing needed under this Subparagraph (c) to pursue any claim for modification at an Other Unit resolved under Subsection A of this Section.

XII. PERIODIC REPORTING

155. After entry of this Consent Decree, the Unit Owners shall, with respect to Units in which they have an Ownership Interest, ensure that there shall be submitted to Plaintiffs a single periodic report, within 60 Days after the end of each half of the calendar year (January through June and July through December). We Energies will join in this report for the purpose of reporting progress on completing its Environmental Mitigation Projects as set forth in Appendix A until the completion of the Project(s). The report shall include the following information:

a. all information necessary to determine compliance during the reporting period with: all applicable 30-Day Rolling Average Emission Rates for NO_x, 30-Day Rolling Average Emission Rates for SO_2, and 24-Hour Rolling Average Emission Rates for PM; all applicable 12-Month Rolling Average Emission Rates for NO_x and all 12-Month Rolling Average Emission Rates for SO_2; all applicable 3-hour average PM Emission Rates; all applicable Unit-Specific Annual Tonnage Caps; all applicable Plant-Wide Annual Tonnage Caps; the obligation to monitor NO_x, SO_2, and PM emissions; the obligation to optimize PM emission controls; and the obligation to Surrender NO_x Allowances and SO_2 Allowances;

b. all periods of monitor Malfunction, maintenance, and/or repair as provided in Paragraph 125;

c. emission reporting and Allowance accounting information necessary to determine Super-Compliant NO_x and SO_2 Allowances that a Unit Owner claims to have generated in accordance with Paragraphs 98 and 113 through control of emissions beyond the requirements of this Consent Decree;

d. schedule for the installation or upgrade and commencement of operation of new or upgraded pollution control devices required by this Consent Decree, including the nature and cause of any actual or anticipated delays, and any steps taken by the Unit Owners to mitigate such delay;

e. all affirmative defenses asserted pursuant to Paragraphs 172 to 180 during the period covered by the progress report;

f. an identification of all periods when any pollution control device required by this Consent Decree to Continuously Operate was not operating, the reason(s) for the equipment not operating, and the basis for each applicable Defendant's compliance or non-compliance with the Continuous Operation requirements of this Consent Decree; and

g. a summary of each Defendant's actions implemented and expenditures (cumulative and in the current reporting period) made pursuant to implementation of the Environmental Mitigation Projects required pursuant to Section IX.

156. In any periodic report submitted pursuant to this Section XII, Unit Owners may incorporate by reference information previously submitted under its Title V permitting requirements, provided that the Unit Owners attach the Title V Permit report (or the pertinent

portions of such report) and provide a specific reference to the provisions of the Title V Permit report that are responsive to the information required in the periodic report.

157. In addition to the reports required pursuant to this Section, any Defendant that violates or deviates from any provision of this Consent Decree shall submit to Plaintiffs a report on the violation or deviation within 15 Working Days after such Defendant knew or should have known of the event. In the report, the Defendant shall explain the cause or causes of the violation or deviation and all measures taken or to be taken by the applicable Defendant to cure the reported violation or deviation or to prevent such violations or deviations in the future. If at any time the provisions of this Consent Decree are included in Title V Permits, consistent with the requirements for such inclusion in this Consent Decree, then the deviation reports required under applicable Title V regulations shall be deemed to satisfy all the requirements of this Paragraph.

158. Each report required by this Consent Decree shall be signed by the Responsible Official as defined in Title V of the Clean Air Act for Columbia, Edgewater, or Nelson Dewey, as appropriate, or other authorized representative for the Unit Owner or We Energies (with respect to other Consent Decree requirements, *e.g.*, Environmental Mitigation Project status), and shall contain the following certification:

> *This information was prepared either by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my evaluation, or the direction and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, I hereby certify under penalty of law that, to the best of my knowledge and belief, this information is true, accurate, and complete. I understand that there are significant penalties for submitting false, inaccurate, or incomplete information to the United States.*

XIII. REVIEW AND APPROVAL OF SUBMITTALS

159. The Unit Owners shall, with respect to the Units in which they have an Ownership Interest, ensure the submission of each plan, report, or other submission required by this Consent Decree to Plaintiffs whenever and in the manner such a document is required to be submitted for review or approval pursuant to this Consent Decree. EPA may approve the submittal or decline to approve it and provide written comments explaining the bases for declining such approval as soon as reasonably practicable. Within 60 Days of receiving written comments from EPA, the applicable Unit Owner or Owners shall either: (a) revise the submittal consistent with the written comments and provide the revised submittal to EPA; or (b) submit the matter for dispute resolution, including the period of informal negotiations, under Section XVI (Dispute Resolution) of this Consent Decree.

160. Upon receipt of EPA's final approval of the submittal, or upon completion of the submittal pursuant to dispute resolution, the applicable Unit Owner or Owners shall ensure implementation of the approved submittal in accordance with the schedule specified therein or another EPA-approved schedule.

161. We Energies shall comply with this Section regarding reporting related to the Environmental Mitigation Projects undertaken by We Energies as set forth in Appendix A and the payment of the civil penalty.

XIV. STIPULATED PENALTIES

162. For any failure by one or more Defendants to comply with the terms of this Consent Decree, and subject to the provisions of Sections XV (Force Majeure) and XVI (Dispute Resolution) and the other paragraphs in this Section of the Consent Decree, such Defendant or

Defendants shall pay, within 30 Days after receipt of written demand to such Defendant or Defendants by the United States, the following stipulated penalties to the United States, as specified in this Consent Decree.

Consent Decree Violation	**Stipulated Penalty**
a. Failure to pay the civil penalty as specified in Section X (Civil Penalty) of this Consent Decree	$10,000 per Day
b. Failure to comply with any applicable 30-Day Rolling Average Emission Rate for NO_x or SO_2	$2,500 per Day per violation where the violation is less than 5% in excess of the lb/mmBTU limits $5,000 per Day per violation where the violation is equal to or greater than 5% but less than 10% in excess of the lb/mmBTU limits $10,000 per Day per violation where the violation is equal to or greater than 10% in excess of the lb/mmBTU limits
c. Failure to comply with any applicable 12-Month Rolling Average SO_2 Emission Rate, where the violation is less than 5% in excess of the limits set forth in this Consent Decree	$200 per Day per violation
d. Failure to comply with any applicable 12-Month Rolling Average SO_2 Emission Rate, where the violation is equal to or greater than 5% but less than 10% in excess of the limits set forth in this Consent Decree	$400 per Day per violation
e. Failure to comply with any applicable 12-Month Rolling Average SO_2 Emission Rate, where the violation is equal to or greater than 10% in excess of the limits set forth in this Consent Decree	$800 per Day per violation

f. Failure to comply with the applicable Plant-Wide Annual Tonnage Limitations for NO_x established by this Consent Decree	(1) $5,000 per ton for first 100 tons, $10,000 per ton for each additional ton above 100 tons, plus (2) at the option of the Owner(s) of the Unit at issue either the Surrender of NO_x Allowances in an amount equal to two times the number of tons of NO_x emitted that exceeded the Plant-Wide Annual Tonnage Limitation for NO_x, or the payment of $2,500 per ton for an amount of tons equal to two times the number of tons of NO_x emitted that exceeded the Plant-Wide Annual Tonnage Limitation for NO_x
g. Failure to comply with Unit-Specific Annual NO_x Tonnage Cap for Edgewater Unit 3	(1) $5,000 per ton for first 100 tons, $10,000 per ton for each additional ton above 100 tons, plus (2) at the option of the Owner(s) of the Unit at issue either the Surrender of NO_x Allowances in an amount equal to two times the number of tons of NO_x emitted that exceeded the Unit-Specific Annual Tonnage Cap, or the payment of $2,500 per ton for an amount of tons equal to two times the number of tons of NO_x emitted that exceeded the Unit-Specific Annual Tonnage Cap

h. Failure to comply with any applicable Plant-Wide Annual SO_2 Tonnage Limitation required by this Consent Decree.	(1) $5,000 per ton for the first 100 tons over the limit, and $10,000 per ton for each additional ton over the limit, plus (2) at the option of the Owner(s) of the Unit at issue either the Surrender of SO_2 Allowances in an amount equal to two times the number of tons of SO_2 emitted that exceeded Plant-Wide Annual Tonnage Limitation, or the payment of $2,500 per ton for an amount of tons equal to two times the number of tons of SO_2 emitted that exceeded the Plant-Wide Annual Tonnage Limitation
i. Failure to comply with any applicable Unit-Specific Annual SO_2 Tonnage Cap for Edgewater Unit 3	(1) $5,000 per ton for the first 100 tons over the limit, and $10,000 per ton for each additional ton over the limit, plus (2) at the option of the Owner(s) of the Unit at issue either the Surrender of SO_2 Allowances in an amount equal to two times the number of tons of SO_2 emitted that exceeded Unit-Specific Annual Tonnage Cap, or the payment of $2,500 per ton for an amount of tons equal to two times the number of tons of SO_2 emitted that exceeded the Unit-Specific Annual Tonnage Cap

j. Failure to comply with any applicable PM Emission Rate, where the violation is less than 5% in excess of the lb/mmBTU limit	$2,500 per Unit Operating Day per violation, starting on the Unit Operating Day that a stack test result demonstrates a violation and continuing each Unit Operating Day thereafter until and excluding such Unit Operating Day on which a subsequent stack test demonstrates compliance with the applicable PM Emission Rate
k. Failure to comply with any applicable PM Emission Rate, where the violation is equal to or greater than 5% but less than 10% in excess of the lb/mmBTU limit	$5,000 per Unit Operating Day per violation, starting on the Unit Operating Day a stack test result demonstrates a violation and continuing each Unit Operating Day thereafter until and excluding such Unit Operating Day on which a subsequent stack test demonstrates compliance with the applicable PM Emission Rate
l. Failure to comply with any applicable PM Emission Rate, where the violation is equal to or greater than 10% in excess of the lb/mmBTU limit	$10,000 per Unit Operating Day per violation, starting on the Unit Operating Day a stack test result demonstrates a violation and continuing each Unit Operating Day thereafter until and excluding such Unit Operating Day on which a subsequent stack test demonstrates compliance with the applicable PM Emission Rate
m. Failure to install, commence Continuous Operation, or Continuously Operate a NO_x, SO_2, or PM control device as required under this Consent Decree	$10,000 per Day per violation during the first 30 Days; $37,500 per Day per violation thereafter

n. Failure to Retire, Refuel, or Repower a Unit as required under this Consent Decree	$10,000 per Day per violation during the first 30 Days; $37,500 per Day per violation thereafter
o. Failure to cease burning petcoke in a Unit and instead burn 100% PRB coal or equivalent fuel	$10,000 per Day per violation during the first 30 Days; $37,500 per Day per violation thereafter
o. Failure to conduct a stack test for PM as required by Paragraphs 121 to 123 of this Consent Decree	$5,000 per Day per violation
p. Failure to install or operate NO_x, SO_2, and/or PM CEMS as required in this Consent Decree	$1,000 per Day per violation
q. Failure to apply for any permit required by Section XVII (Permits)	$1,000 per Day per violation
r. Failure to timely submit or implement, as approved, the reports, plans, studies, analyses, protocols, or other submittals required by this Consent Decree	$750 per Day per violation during the first 10 Days; $1,000 per Day per violation thereafter
s. Failure to Surrender SO_2 Allowances as required under this Consent Decree	$37,500 per Day. In addition, $1,000 per SO_2 Allowance not Surrendered
t. Failure to Surrender NO_x Allowances as required under this Consent Decree	$37,500 per Day. In addition, $1,000 per NO_x Allowance not Surrendered
u. Using, selling, banking, trading, or transferring NO_x Allowances or SO_2 Allowances except as permitted under this Consent Decree	At the option of the Owner(s) of the Unit at issue either the Surrender of Allowances in an amount equal to four times the number of Allowances used, sold, banked, traded, or transferred in violation of this Consent Decree, or the payment of $2,500 per ton for an amount of tons equal to four times the number of Allowances used, sold, banked, traded, or transferred in violation of this Consent Decree
v. Failure to optimize ESPs as required by Paragraph 116.	$1,000 per Day per violation

w. Failure to undertake and complete as described in Appendix A any of the Environmental Mitigation Projects in compliance with Section IX (Environmental Mitigation Projects) of this Consent Decree	$1,000 per Day per violation during the first 30 Days; $5,000 per Day per violation thereafter
x. Any other violation of this Consent Decree	$1,000 per Day per violation

163. Violations of any limit based on a 30-Day Rolling Average Emission Rate constitutes 30 Days of violation, provided, however, that where such a violation (for the same pollutant and from the same Unit) recurs within periods less than 30 Days, Unit Owners shall not be obligated to pay a daily stipulated penalty for any Day of the recurrence for which a stipulated penalty has already been paid.

164. Violations of any limit based on a 12-Month Rolling Average Emission Rate constitutes 365 Days of violation, provided, however, that where such a violation (for the same pollutant and from the same Unit) recurs within periods less than 12 months, Unit Owners shall not be obligated to pay a daily stipulated penalty for any Day of the recurrence for which a stipulated penalty has already been paid.

165. All stipulated penalties shall begin to accrue on the Day after the performance is due or on the Day a violation occurs, whichever is applicable, and shall continue to accrue until performance is satisfactorily completed or until the violation ceases, whichever is applicable. For example, emissions for one Day may be included in only one 30-Day Rolling Average calculation. Nothing in this Consent Decree shall prevent the simultaneous accrual of separate stipulated penalties for separate violations of this Consent Decree. The stipulated penalties provided for in this section are cumulative and shall not be increased due to a Unit having more than one Owner.

166. For purposes of the stipulated penalty for failure to make any Allowance Surrender required pursuant to Subparagraphs 162.s to 162.u, a Unit Owner shall make the Surrender of any Allowances required by such Subparagraph by June 30 of the immediately following calendar year.

167. All stipulated penalties shall be paid to the United States within 30 Days of receipt of written demand to the applicable Defendant(s) from the United States, and the applicable Defendant(s) shall continue to make such payments every 30 Days thereafter until the violation(s) no longer continues, unless such Defendant(s) elect within 20 Days of receipt of written demand to such Defendant(s) from the United States to dispute the imposition or accrual of stipulated penalties in accordance with the provisions in Section XVI (Dispute Resolution) of this Consent Decree.

168. Stipulated penalties shall continue to accrue as provided in accordance with Paragraph 165 during any dispute, with interest on accrued stipulated penalties payable and calculated at the rate established by the Secretary of the Treasury, pursuant to 28 U.S.C. § 1961, but need not be paid until the following:

a. If the dispute is resolved by agreement, or by a decision of the United States pursuant to Section XVI (Dispute Resolution) of this Consent Decree that is not appealed to the Court, accrued stipulated penalties agreed or determined to be owing, together with accrued interest, shall be paid within 30 Days of the effective date of the agreement or of the receipt of the United States' decision;

b. If the dispute is appealed to the Court and the United States prevails in whole or in part, the applicable Defendant(s) shall, within 30 Days of receipt of the Court's

decision or order, pay all accrued stipulated penalties determined by the Court to be owing, together with interest accrued on such penalties determined by the Court to be owing, except as provided in Subparagraph c, below;

c. If the Court's decision is appealed by either Party, the applicable Defendant(s) shall, within 15 Days of receipt of the final appellate court decision, pay all accrued stipulated penalties determined to be owed, together with interest accrued on such stipulated penalties determined to be owed by the appellate court.

Notwithstanding any other provision of this Consent Decree, the accrued stipulated penalties agreed to by the United States and the applicable Defendants, or determined by the United States through Dispute Resolution to be owed, may be less than the stipulated penalty amounts set forth in Paragraph 162.

169. All monetary stipulated penalties shall be paid in the manner set forth in Section X (Civil Penalty) of this Consent Decree and all Allowance Surrender stipulated penalties shall comply with the Allowance Surrender procedures of Paragraphs 96 to 97 and 111 to 112. The obligations of Defendants to pay stipulated penalties under subparagraph 162.a are joint and several. The remaining obligations to pay stipulated penalties, including with respect to subparagraph 162.p, are joint and several as to the Unit Owners with an Ownership Interest in the Unit at issue, and individual as to the Defendant responsible for each Environmental Mitigation Project at issue.

170. Should one or more Defendants fail to pay stipulated penalties in compliance with the terms of this Consent Decree, the United States shall be entitled to collect interest on such penalties from such Defendant(s), as provided for in 28 U.S.C. § 1961.

171. The stipulated penalties provided for in this Consent Decree shall be in addition to any other rights, remedies, or sanctions available to the United States and/or Sierra Club by reason of Defendants' failure to comply with any requirement of this Consent Decree or applicable law, except that for any violation of the Act for which this Consent Decree provides for payment of a stipulated penalty, Defendants shall be allowed a credit for stipulated penalties paid against any statutory penalties also imposed for such violation.

172. Affirmative Defense as to Stipulated Penalties for Excess Emissions Occurring During Malfunctions. If any of the Units in the System exceed an applicable 30-Day Rolling Average Emission Rate set forth in this Consent Decree, due to Malfunction, the Unit Owner(s) operating or owning such Units, bearing the burden of proof by a preponderance of the evidence, have an affirmative defense to a claim for stipulated penalties under this Consent Decree, if such Unit Owners have complied with the reporting requirements of Paragraphs 177 and 178 and demonstrate all of the following:

a. the excess emissions were caused by a sudden, unavoidable breakdown of technology, beyond the control of the Unit Operator;

b. the excess emissions (1) did not stem from any activity or event that could have been foreseen and avoided, or planned for, and (2) could not have been avoided by better operation and maintenance practices in accordance with manufacturers' specifications and good engineering and maintenance practices;

c. to the maximum extent practicable, the air pollution control equipment and processes were maintained and operated in a manner consistent with good

practice for minimizing emissions in accordance with manufacturers' specifications and good engineering and maintenance practices;

d. repairs were made in an expeditious fashion when Unit Owners knew or should have known that an applicable 30-Day Rolling Average Emission Rate was being or would be exceeded. Off-shift labor and overtime must have been utilized, to the extent practicable, to ensure that such repairs were made as expeditiously as practicable;

e. the amount and duration of the excess emissions (including any bypass) were minimized to the maximum extent practicable during periods of such emissions in accordance with manufacturers' specifications and good engineering and maintenance practices;

f. all possible steps were taken to minimize the impact of the excess emissions on ambient air quality;

g. all emission monitoring systems were kept in operation if at all possible in accordance with manufacturers' specifications and good engineering and maintenance practices;

h. Unit Operator's actions in response to the excess emissions were documented by properly signed or otherwise validated, contemporaneous operating logs, or other relevant evidence;

i. the excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance; and

j. Unit Owners properly and promptly notified EPA and Sierra Club as required by this Consent Decree.

173. To assert an affirmative defense for Malfunction under Paragraph 172, the applicable Unit Owners shall submit all data demonstrating the actual emissions for the Day the Malfunction occurs and the 29-Unit Operating Day period following the Day the Malfunction occurs. Unit Owners may, if they elect, submit emissions data for the same 30-Unit Operating Day period but that excludes the excess emissions.

174. Affirmative Defense as to Stipulated Penalties for Excess Emissions Occurring During Startup and Shutdown. If any of the Units in the System exceed an applicable 30-Day Rolling Average Emission Rate set forth in this Consent Decree, due to startup or shutdown, the Unit Owners with an Ownership Interest in such Units, bearing the burden of proof by a preponderance of the evidence, have an affirmative defense to a claim for stipulated penalties under this Consent Decree, if the Unit Owners have complied with the reporting requirements of Paragraphs 177 and 178 and demonstrate all of the following:

a. the periods of excess emissions that occurred during startup and shutdown were short and infrequent and could not have been prevented through careful planning and design in accordance with manufacturers' specifications and good engineering and maintenance practices;

b. the excess emissions were not part of a recurring pattern indicative of inadequate design, operation, or maintenance or which could have been prevented by following manufacturers' specifications and recommendations and good engineering and maintenance practices;

c. if the excess emissions were caused by a bypass (an intentional diversion of control equipment), then the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

d. at all times, the facility was operated in a manner consistent with good engineering and maintenance practices and manufacturers' specifications and recommendations for minimizing emissions;

e. the frequency and duration of operation in startup or shutdown mode was minimized to the maximum extent practicable in accordance with manufacturers' specifications and good engineering and maintenance practices;

f. all possible steps were taken to minimize the impact of the excess emissions on ambient air quality in accordance with manufacturers' specifications and good engineering and maintenance practices;

g. All emissions monitoring systems were kept in operation if at all possible in accordance with manufacturers' specifications and good engineering and maintenance practices;

h. The Unit Operator's actions during the period of excess emissions were documented by properly signed or otherwise validated, contemporaneous operating logs or other relevant evidence; and

i. The applicable Unit Owners properly and promptly notified EPA as required by this Consent Decree.

175. To assert an affirmative defense for startup or shutdown under Paragraph 174, the applicable Unit Owners shall submit all data demonstrating the actual emissions for the Day the

excess emissions from startup or shutdown occurs and the 29-Unit Operating Day period following the Day the excess emissions from startup or shutdown occurs. Unit Owners may, if they elect, submit emissions data for the same 30-Unit Operating Day period but that excludes the excess emissions.

176. If excess emissions occur due to a Malfunction during routine startup and shutdown, then those instances shall be treated as other Malfunctions subject to Paragraphs 172 and 173.

177. For an affirmative defense under Paragraphs 172 and 174, applicable Unit Owners, bearing the burden of proof by a preponderance of the evidence, shall demonstrate, through submission of the data and information under the reporting provisions of this Section, that all reasonable and practicable measures in accordance with good engineering and maintenance practices and within the Unit Operator's control were implemented to prevent the occurrence of the excess emissions.

178. Defendant(s) shall provide notice to Plaintiffs in writing of Defendant's intent to assert an affirmative defense for Malfunction, startup, or shutdown under Paragraphs 172 and 174 in Defendants semi-annual progress reports as required by Paragraph 155(e). This notice shall be submitted pursuant to the provisions of Section XIX (Notices). The notice shall contain:

a. The identity of each stack or other emission point where the excess emissions occurred;

b. The magnitude of the excess emissions expressed in lb/mmBTU and the operating data and calculations used in determining the magnitude of the excess emissions;

c. The time and duration or expected duration of the excess emissions;

d. The identity of the equipment causing the excess emissions;

e. The nature and suspected cause of the excess emissions;

f. The steps taken, if the excess emissions were the result of a Malfunction, to remedy the Malfunction and the steps taken or planned to prevent the recurrence of the Malfunction;

g. The steps that were or are being taken to limit the excess emissions; and

h. If applicable, a list of the steps taken to comply with permit conditions governing Unit operation during periods of startup, shutdown, and/or Malfunction.

179. A Malfunction, startup, or shutdown shall not constitute a Force Majeure Event unless the Malfunction, startup, or shutdown also meets the definition of a Force Majeure Event, as provided in Section XV (Force Majeure).

180. The affirmative defense provided herein is only an affirmative defense to stipulated penalties for violations of this Consent Decree, and not a defense to any civil or administrative action for injunctive relief.

XV. FORCE MAJEURE

181. For purposes of this Consent Decree, a "Force Majeure Event" shall mean an event that has been or will be caused by circumstances beyond the control of one or more the Unit Owners, their contractors, or any entity controlled by a Unit Owner that delays or prevents the performance of any obligation under this Consent Decree or otherwise causes a violation of any provision of this Consent Decree despite the Unit Owners' best efforts to fulfill the obligation. "Best efforts to fulfill the obligation" include using best efforts to anticipate any potential Force Majeure Event and to address the effects of any such event (a) as it is occurring

and (b) after it has occurred, such that the delay and/or violation are minimized to the greatest extent possible and the emissions during such event are minimized to the greatest extent possible. Specific references to Force Majeure in other parts of this Consent Decree do not restrict the ability of the Unit Owners to assert Force Majeure pursuant to the process described in this Section. Without limiting the applicability of this Section to an activity of any other Defendant, the Force Majeure provisions apply to We Energies to the extent that a claim relates to an Environmental Mitigation Project undertaken by We Energies.

182. Notice of Force Majeure Events. If any event occurs or has occurred that may delay or prevent compliance with or otherwise cause a violation of any obligation under this Consent Decree, as to which one or more Unit Owners intend to assert a claim of Force Majeure, then the applicable Unit Operator or Unit Owners shall notify Plaintiffs in writing as soon as practicable, but in no event later than 14 Working Days following the date the Unit Operator or the Unit Owners first knew, or by the exercise of due diligence should have known, that the event caused or may cause such delay or violation. In this notice, the Unit Operator or the applicable Unit Owners shall reference this Paragraph of this Consent Decree and describe the anticipated length of time that the delay or violation may persist, the cause or causes of the Force Majeure Event, all measures taken or to be taken by the Unit Operator or the Unit Owners to prevent or minimize the delay or violation, the schedule by which the Unit Operator or Unit Owners propose to implement those measures, and the applicable Unit Operator's or Unit Owners' rationale for attributing the failure, delay, or violation to a Force Majeure Event. A copy of this Notice shall be sent electronically, as soon as practicable, to Plaintiffs. The applicable Unit Operator and Unit Owners shall adopt all reasonable measures to avoid or

minimize such failures, delays, or violations. The Unit Operator and Unit Owners shall be deemed to know of any circumstance which they, their contractors, or any entity controlled by them, knew or should have known.

183. Failure to Give Notice. If the applicable Unit Operator or one or more of the applicable Unit Owners fail to comply with the notice requirements of this Section, the United States (after consultation with the Sierra Club) may void such Unit Owner's claim for Force Majeure as to the specific event for which the Unit Operator or Unit Owners have failed to comply with such notice requirement.

184. Plaintiffs' Response. The United States shall notify the applicable Unit Owners in writing regarding Unit Owners' claim of Force Majeure as soon as reasonably practicable. If the United States (after consultation with Sierra Club) agrees that a delay in performance has been or will be caused by a Force Majeure Event, the Plaintiffs and the Unit Owners shall stipulate to an extension of deadline(s) for performance of the affected compliance requirement(s) by a period equal to the delay actually caused by the event, in which case the delay at issue shall be deemed not to be a violation of the affected requirement(s) of this Consent Decree. In such circumstances, an appropriate modification shall be made pursuant to Section XXIII (Modification) of this Consent Decree.

185. Disagreement. If the United States (after consultation with Sierra Club) does not agree with the Unit Owners' claim of Force Majeure, or if the United States and the Unit Owners cannot agree on the length of the delay actually caused by the Force Majeure Event, the matter shall be resolved in accordance with Section XVI (Dispute Resolution) of this Consent Decree.

186. Burden of Proof. In any dispute regarding Force Majeure, the applicable Unit Owner(s) of the Unit at issue shall bear the burden of proving that any delay in performance, or any other violation of any requirement of this Consent Decree, was caused by or will be caused by a Force Majeure Event. The applicable Unit Owners shall also bear the burden of proving that the Unit Owners gave the notice required by this Section and the anticipated duration and extent of any failure, delay, or violation(s) attributable to a Force Majeure Event. An extension of one compliance date may, but will not necessarily, result in an extension of a subsequent compliance date.

187. Events Excluded. Unanticipated or increased costs or expenses associated with the performance of the Unit Owners' obligations under this Consent Decree shall not constitute a Force Majeure Event.

188. Potential Force Majeure Events. The Parties agree that, depending upon the circumstances related to an event and the applicable Unit Owners' response to such circumstances, the kinds of events listed below are among those that could qualify as Force Majeure Events within the meaning of this Section: construction, labor, or equipment delays; Malfunction of a Unit or emission control device; unanticipated coal supply or pollution control reagent delivery interruptions; acts of God; acts of war or terrorism; and orders by a government official, government agency, other regulatory authority, or a regional transmission organization (e.g., the Midwest Independent System Operator), acting under and authorized by applicable law or tariff as accepted by the Federal Energy Regulatory Commission, that directs the Unit Owners to supply electricity so long as such order is a response to a state-wide or regional emergency or is necessary to preserve the reliability of the bulk power system. Depending upon the

circumstances and the Unit Owners' response to such circumstances, failure of a permitting authority or the Public Service Commission of Wisconsin to issue a necessary permit or order with sufficient time for the Unit Owners to achieve compliance with this Consent Decree may constitute a Force Majeure Event where the failure of the authority to act is beyond the control of the Unit Owners and the Unit Owners have taken all steps available to them to obtain the necessary permit or order, including, but not limited to: submitting a complete permit application or request; responding to requests for additional information by the authority in a timely fashion; and accepting lawful permit terms and conditions after expeditiously exhausting any legal rights to appeal terms and conditions imposed by the authority.

189. Extended Schedule. As part of the resolution of any matter submitted to this Court under Section XVI (Dispute Resolution) of this Consent Decree regarding a claim of Force Majeure, the United States and one or more Unit Owners by agreement, or this Court by order, may in appropriate circumstances extend or modify the schedule for completion of work and/or obligations under this Consent Decree to account for the delay in the work and/or obligations that occurred as a result of any delay agreed to by the United States or approved by the Court. The applicable Unit Owners shall be liable for stipulated penalties pursuant to Section XIV (Stipulated Penalties) for their failure thereafter to complete the work and/or obligations in accordance with the extended or modified schedule (provided that the applicable Unit Owners shall not be precluded from asserting that a further Force Majeure Event has caused or may cause a delay in complying with the extended or modified schedule).

XVI. DISPUTE RESOLUTION

190. The dispute resolution procedure provided by this Section shall be available to resolve all disputes arising under this Consent Decree, provided that the Party invoking such procedure has first made a good faith attempt to resolve the matter with the other Party. The provisions of this Section XVI shall be the sole and exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree.

191. The dispute resolution procedure required herein shall be invoked by one Party giving written notice to the other Party, as well as all other Defendants, advising of a dispute pursuant to this Section. The notice shall describe the nature of the dispute and shall state the noticing Party's position with regard to such dispute. The Party receiving such a notice shall acknowledge receipt of the notice, and the Parties in dispute shall expeditiously schedule a meeting to discuss the dispute informally not later than 14 Days following receipt of such notice.

192. Disputes submitted to dispute resolution under this Section shall, in the first instance, be the subject of informal negotiations between the Parties. Such period of informal negotiations shall not extend beyond 30 Days from the date of the first meeting between the Parties' representatives unless they agree in writing to shorten or extend this period.

193. If the Parties are unable to reach agreement during the informal negotiation period, the Plaintiff or Plaintiffs shall provide those Defendants seeking dispute resolution with a written summary of their position(s) regarding the dispute. The written position provided by the Plaintiff or Plaintiffs, or by the United States if Plaintiffs have different positions, shall be considered binding unless, within 45 Days thereafter, the applicable Defendants, or Sierra Club if Plaintiffs have different positions, seeks judicial resolution of the dispute by filing a petition with

this Court. Any Party opposing such petition may submit a response to the petition within 45 Days of filing.

194. The time periods set out in this Section may be shortened or lengthened upon motion to the Court of one of the Parties to the dispute, explaining the Party's basis for seeking such a scheduling modification.

195. This Court shall not draw any inferences nor establish any presumptions adverse to either Party as a result of invocation of this Section or the Parties' inability to reach agreement.

196. As part of the resolution of any dispute under this Section, in appropriate circumstances the Parties may agree, or this Court may order, an extension or modification of the schedule for the completion of the activities required under this Consent Decree to account for the delay that occurred as a result of dispute resolution. The applicable Defendants shall be liable for stipulated penalties pursuant to Section XIV (Stipulated Penalties) for their failure thereafter to complete the work in accordance with the extended or modified schedule, provided that such Defendants shall not be precluded from asserting that a Force Majeure Event has caused or may cause a delay in complying with the extended or modified schedule.

197. The Court shall decide all disputes pursuant to applicable principles of law for resolving such disputes. In their filings with the Court under Paragraph 193, the Parties shall state their respective positions as to the applicable standard of law for resolving the particular dispute.

XVII. PERMITS

198. Unless expressly stated otherwise in this Consent Decree, in any instance where otherwise applicable law or this Consent Decree requires one or more of the Unit Owners or the Unit Operator to secure a permit to authorize construction or operation of any device, including all preconstruction, construction, and operating permits required under State law, the Unit Operator or, where appropriate, the Unit Owners shall ensure that such application is made in a timely manner. Recognizing that the Wisconsin Department of Natural Resources is the SIP-approved permitting authority, EPA will use best efforts to review expeditiously, to the extent applicable, all permit applications submitted by Unit Owners to meet the requirements of this Consent Decree. Sierra Club agrees not to submit any agency comments in a public forum, file a legal challenge, take a litigation position, file a request for a contested case hearing, a request for state circuit court review, or a petition pursuant to 42 U.S.C. § 7661d(b), regarding, criticizing and/or challenging the issuance of any permits or other regulatory approvals necessary for the construction or operation of any environmental control equipment or Environmental Mitigation Project(s) required by this Consent Decree, except as provided in the Dispute Resolution provisions in Section XVI of this Consent Decree. Any disputes regarding Sierra Club's compliance with this provision is subject to the Dispute Resolution provisions in Section XVI, including written notice and period to cure, and Unit Owners' remedies for alleged breaches by Sierra Club shall be limited to specific performance and shall exclude any monetary damages.

199. Notwithstanding the previous Paragraphs, nothing in this Consent Decree shall be construed to require one or more Unit Owners or the Unit Operator to apply for, amend, or obtain a PSD or Nonattainment NSR permit or permit modification for any physical change in,

or any change in the method of operation of, any System Unit that would give rise to claims resolved by Section XI (Resolution of Claims) of this Consent Decree.

200. When permits are required, the applicable Unit Owners shall complete and submit applications for such permits to the applicable State agency to allow sufficient time for all legally required processing and review of the permit request, including requests for additional information by the applicable State agency. Any failure by Unit Owners to submit a timely permit application for a System Unit in which they have an Ownership Interest, as required by permitting requirements under state and/or federal regulations, shall bar any use of Section XV (Force Majeure) of this Consent Decree where a Force Majeure claim is based on permitting delays.

201. Notwithstanding the reference to the Title V Permits for the System Units in this Consent Decree, the enforcement of such permits shall be in accordance with their own terms and the CAA and its implementing regulations. Such Title V Permits shall not be enforceable under this Consent Decree, although any term or limit established by or under this Consent Decree shall be enforceable under this Consent Decree regardless of whether such term has or will become part of a Title V Permit, subject to the terms of Section XXVII (Conditional Termination of Enforcement Under Decree) of this Consent Decree.

202. Within 180 Days after the Date of Entry of this Consent Decree, the Unit Operator shall amend any applicable Title V Permit application(s), or apply for amendments of its Title V Permits, to include a schedule for all Unit-specific, Plant-specific, and System-specific performance, operational, maintenance, and control technology requirements established by this Consent Decree including, but not limited to, any (a) 12-Month Rolling Average Emission Rate,

(b) 30-Day Rolling Average Emission Rate for NO_x, (c) 30-Day Rolling Average Emission Rate for SO_2, (d) Plant-Wide Annual Tonnage Limitation, (e) Unit-Specific Annual Tonnage Cap, (f) requirements pertaining to the Surrender of SO_2 and NO_x Allowances, (g) requirements to cease burning petcoke and commence burning 100% PRB coal or equivalent, (h) PM Emission Rate and annual stack test requirements, (i) PM CEMS monitoring equipment, and (j) the Retirement, Refueling, or Repowering of any Unit as required under this Consent Decree.

203. Within one year from the Date of Entry of this Consent Decree, with respect to any Unit in which they have an Ownership Interest, Unit Owners shall either apply to permanently include the requirements and limitations enumerated in this Consent Decree into a federally enforceable permit or request a site-specific amendment to the Wisconsin SIP, such that the requirements and limitations enumerated in this Consent Decree become and remain 'applicable requirements' as that term is defined in 40 C.F.R. Part 70.2. The permit or Wisconsin SIP amendment shall require compliance with the following: any applicable (a) 12-Month Rolling Average Emission Rate, (b) 30-Day Rolling Average Emission Rate for NO_x, (c) 30-Day Rolling Average Emission Rate for SO_2, (d) Plant-Wide Annual Tonnage Limitation, (e) Unit-Specific Annual Tonnage Cap, (f) requirements pertaining to the Surrender of SO_2 and NO_x Allowances, (g) requirements to cease burning petcoke and commence burning 100% PRB coal or equivalent, (h) PM Emission Rate and annual stack test requirements, (i) PM CEMS monitoring equipment, and (j) Retirement requirements.

204. Unit Owners shall ensure that the Plaintiffs are provided with a copy of each application for a federally enforceable permit or Wisconsin SIP amendment filed by them in relation to any Unit in which they have an Ownership Interest, as well as a copy of any permit

proposed as a result of such application, to allow for timely participation in any public comment opportunity.

205. Prior to conditional termination of enforcement through this Consent Decree, Unit Owners shall ensure that enforceable provisions are obtained in their respective Title V Permits that incorporate all applicable Unit-specific, Plant-specific, and System-specific performance, operational, maintenance, and control technology requirements established by this Consent Decree including, but not limited to, any applicable (a) 12-Month Rolling Average Emission Rate, (b) 30-Day Rolling Average Emission Rate for NO_x, (c) 30-Day Rolling Average Emission Rate for SO_2, (d) Plant-Wide Annual Tonnage Limitation, (e) Unit-Specific Annual Tonnage Cap, (f) the requirements pertaining to the Surrender of SO_2 and NO_x Allowances, (g) requirement to cease burning petcoke and commence burning 100% PRB coal or equivalent, (h) PM Emission Rate and annual stack test requirements, (i) PM CEMS monitoring equipment, and (j) the Retirement, Refueling, or Repowering of any Unit as required or elected under this Decree.

XVIII. INFORMATION COLLECTION AND RETENTION

206. Any authorized representative of the United States, including its attorneys, contractors, and consultants, upon presentation of credentials, shall have a right of entry upon the premises of a System Unit at any reasonable time for the purpose of:

a. monitoring the progress of activities required under this Consent Decree;

b. verifying any data or information submitted to the United States in accordance with the terms of this Consent Decree;

c. obtaining samples and, upon request, splits of any samples taken by Unit Owners or their representatives, contractors, or consultants; and

d. assessing Unit Owners' compliance with this Consent Decree.

207. Where applicable, Defendants shall retain, and instruct their contractors and agents to preserve, all non-identical copies of all records and documents (including records and documents in electronic form) now in their or their contractors' or agents' possession or control, and that directly relate to Defendants' performance of their respective obligations under this Consent Decree for the following periods: (a) until December 31, 2023, for records concerning physical or operational changes undertaken in accordance with Section V (NO_x Emission Reductions and Controls), Section VI (SO_2 Emission Reductions and Controls), and Section VII (PM Emission Reductions and Controls); and (b) until December 31, 2021, for all other records. This record retention requirement shall apply regardless of any corporate document retention policy to the contrary.

208. All information and documents submitted by Defendants pursuant to this Consent Decree shall be subject to any requests under applicable law providing public disclosure of documents unless (a) the information and documents are subject to legal privileges or protection or (b) Defendants claim and substantiate in accordance with 40 C.F.R. Part 2 that the information and documents contain confidential business information.

209. Nothing in this Consent Decree shall limit the authority of EPA to conduct tests and inspections at Unit Owners' facilities under Section 114 of the Act, 42 U.S.C. § 7414, or any other applicable federal laws, regulations, or permits.

XIX. NOTICES

210. Unless otherwise provided herein, whenever notifications, submissions, or communications are required by this Consent Decree, they shall be made in writing and addressed as follows:

As to the United States of America:

(if by mail service)
Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611, Ben Franklin Station
Washington, DC 20044-7611
DJ# 90-5-2-1-09878

(if by commercial delivery service)
Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
ENRD Mailroom, Room 2121
601 D Street, NW
Washington, DC 20004
DJ# 90-5-2-1-09878

(if by mail or commercial delivery service)
Chief, Civil Division
United States Attorney's Office
Western District of Wisconsin
660 W. Washington Ave., Suite 303
Madison, WI 53703

and

(if by mail service)
Director, Air Enforcement Division
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Mail Code 2242A
1200 Pennsylvania Avenue, NW
Washington, DC 20460

(if by commercial delivery service)
Director, Air Enforcement Division
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Ariel Rios South Building, Room 1119
1200 Pennsylvania Avenue, NW
Washington, DC 20004

and

Director, Air Division
U.S. EPA Region 5
77 W. Jackson Blvd. (AE-17J)
Chicago, IL 60604

As to the Sierra Club:

Director, Environmental Law Program
Sierra Club
85 Second Street, 2nd Fl.
San Francisco, CA 94105

and

David C. Bender
Pamela McGillivray
McGillivray Westerberg & Bender LLC
211 S. Paterson St., Ste 320
Madison, WI 53703

As to Defendants:

As to Wisconsin Power and Light Company:

President, Wisconsin Power and Light Company
4902 N. Biltmore Lane
Madison, WI 53718

and

General Counsel, Wisconsin Power and Light Company
4902 N. Biltmore Lane
Madison, WI 53718

and

Vice President, Environmental Affairs, Wisconsin Power and Light Company
4902 N. Biltmore Lane
Madison , WI 53718

As to We Energies:

Vice President, Environmental
Wisconsin Electric Power Company
231 W. Michigan St.
Milwaukee, WI 53203

and

General Counsel
Wisconsin Electric Power Company
231 W. Michigan St.
Milwaukee, WI 53203

As to Madison Gas and Electric Company:

President
Madison Gas and Electric Co.
P.O. Box 1231
Madison, WI 53701-1231

and

Vice President and General Counsel
Madison Gas and Electric Co.
P.O. Box 1231
Madison, WI 53701-1231

and

Director of Safety and Environmental Affairs
Madison Gas and Electric Co.
P.O. Box 1231
Madison, WI 53701-1231

As to Wisconsin Public Service Corporation:

President
Wisconsin Public Service Corporation
700 N. Adams
Green Bay, WI 54301

and

General Counsel
Wisconsin Public Service Corporation
700 N. Adams
Green Bay, WI 54301

211. All notifications, communications, or submissions made pursuant to this Section shall be sent either by: (a) overnight mail or overnight delivery service with signature required for delivery, or (b) certified or registered mail, return receipt requested. All notifications, communications, and transmissions (a) sent by overnight, certified, or registered mail shall be deemed submitted on the date they are postmarked, or (b) sent by overnight delivery service shall be deemed submitted on the date they are delivered to the delivery service.

212. Any Party may change either the notice recipient or the address for providing notices to it by serving the other Parties with a notice setting forth such new notice recipient or address.

XX. SALES OR TRANSFERS OF OPERATIONAL OR OWNERSHIP INTERESTS

213. If a Unit Owner proposes to sell or transfer an Operational Interest or Ownership Interest to any entity other than another Unit Owner or to a Unit Owner's successors or assigns ("Third Party Purchaser"), such Unit Owner shall advise the Third Party Purchaser in writing of the existence of this Consent Decree prior to such sale or transfer, and shall send a copy of such written notification and a copy of any written agreement proposing the transfer of an Operation

or Ownership Interest to the EPA pursuant to Section XIX (Notices) of this Consent Decree at least 60 Days before such proposed sale or transfer. Recipients of this notice shall treat it as confidential for the 60 days if requested by the notifying Unit Owner.

214. No earlier than 30 days after providing the notice in Paragraph 213, the Unit Owner may file a motion with the Court to modify this Consent Decree to make the terms and conditions of this Consent Decree applicable to the Third Party Purchaser. No sale or transfer to a Third Party Purchaser of an Operational Interest or Ownership Interest shall take place before the Third Party Purchaser has executed, and the Court has approved, a modification pursuant to Section XXIII (Modification) of this Consent Decree making the Third Party Purchaser a party to this Consent Decree and liable for the selling Defendant's applicable requirements of this Consent Decree.

215. This Consent Decree shall not be construed to impede the transfer of any Operational Interests or Ownership Interests between a Unit Operator or Unit Owner and any Third Party Purchaser so long as the requirements of this Consent Decree are met. This Consent Decree shall not be construed to prohibit a contractual allocation – as between a Unit Operator or Unit Owner and any Third Party Purchaser of Operational Interests or Ownership Interests – of the burdens of compliance with this Consent Decree.

216. No sale or transfer of an Operational or Ownership Interest, whether in compliance with the procedures of this Section or otherwise, shall relieve a Unit Owner of its obligation to ensure that the terms of this Consent Decree are implemented, unless (1) the transferee agrees to undertake all of the obligations required by this Consent Decree that may be applicable to the transferred or purchased Operational or Ownership Interests, and to be

substituted for the Unit Owner as a Party under the Decree pursuant to Section XXIII (Modification) and thus be bound by the terms thereof, and (2) the United States consents to relieve the Unit Owner of its obligations. The United States may refuse to approve the substitution of the transferee for the Unit Owner if it determines that the proposed transferee does not possess the requisite technical abilities or financial means to comply with the Consent Decree. Notwithstanding the foregoing, however, Defendants may not assign, and may not be released from, any obligation under this Consent Decree that is not specific to the purchased or transferred Operational Interest or Ownership Interests, including the obligations set forth in Sections IX (Environmental Mitigation Projects) and X (Civil Penalty).

217. Plaintiffs expressly acknowledge that a Unit Owner may sell or transfer an Operational Interest or Ownership Interest to another existing Unit Owner, or a Unit Owner's successors or assigns, at any time and without Plaintiffs' pre-approval and without any obligation to comply with the requirements of this Section. The selling or transferring Unit Owner shall promptly (but not later than 30 Days after such sale or transfer) notify in writing the Plaintiffs and other Unit Owners. Upon the consummation of the sale or transfer, all applicable requirements of this Consent Decree related to the applicable Unit or Units that are being sold or transferred shall apply to the new Unit Owner and all such applicable requirements shall terminate and no longer be applicable to the selling or transferring Unit Owner, with the exception of the obligations set forth in Sections IX (Environmental Mitigation Projects) and X (Civil Penalty).

218. Paragraphs 213 to 214 of this Consent Decree do not apply if an Ownership Interest is sold or transferred solely as collateral security in order to consummate a financing

arrangement (not including a sale-leaseback), so long as the transferring Unit Owner: (a) remains the Owner or Operator (as those terms are used and interpreted under the Clean Air Act) of the subject Unit(s); (b) remains subject to and liable for all obligations and liabilities of this Consent Decree; and (c) supplies Plaintiffs with the following certification within 30 Days of the sale or transfer:

> "Certification of Change in Ownership Interest Solely for Purpose of Consummating Financing. We, the Chief Executive Officer and General Counsel of [insert name of Unit Owner], hereby jointly certify under Title 18 U.S.C. Section 1001, on our own behalf and on behalf of [insert name of Unit Owner], that any change in [insert name of Unit Owner]'s Ownership Interest in any Unit that is caused by the sale or transfer as collateral security of such Ownership Interest in such Unit(s) pursuant to the financing agreement consummated on [insert applicable date] between [insert name of Unit Owner] and [insert applicable entity]: a) is made solely for the purpose of providing collateral security in order to consummate a financing arrangement; b) does not impair [insert name of Unit Owner]'s ability, legally or otherwise, to comply timely with all terms and provisions of the Consent Decree entered in *United States v. Wisconsin Power and Light Company, et al.*, Civil Action 13-cv-266; c) does not affect [insert name of Unit Owner]'s ownership or operational control of any Unit covered by that Consent Decree in a manner that is inconsistent with [insert name of Unit Owner]'s performance of its obligations under the Consent Decree; and d) in no way affects the status of [insert name of Unit Owner]'s obligations or liabilities under that Consent Decree."

XXI. EFFECTIVE DATE

219. The effective date of this Consent Decree shall be the Date of Entry.

XXII. RETENTION OF JURISDICTION

220. The Court shall retain jurisdiction of this case after entry of this Consent Decree to enforce compliance with the terms and conditions of this Consent Decree and to take any action necessary or appropriate for the interpretation, construction, execution, or modification of the Consent Decree, or for adjudication of disputes. During the term of this Consent Decree, any Party to this Consent Decree may apply to the Court for any relief necessary to construe or effectuate this Consent Decree.

XXIII. MODIFICATION

221. The terms of this Consent Decree may be modified only by a subsequent written agreement signed by Plaintiffs and the applicable Defendants. Where the modification constitutes a material change to any term of this Consent Decree, it shall be effective only upon approval by the Court. This section shall not apply to any Defendant for which this Consent Decree has been terminated.

XXIV. GENERAL PROVISIONS

222. When this Consent Decree specifies that a Unit Owner or Unit Owners shall achieve and maintain a 30-Day Rolling Average Emission Rate, the Parties expressly recognize that compliance with such 30-Day Rolling Average Emission Rate shall commence immediately upon the date specified and that compliance as of such specified date (e.g., December 30) shall be determined based on data from that date and the 29 prior Unit Operating Days.

223. When this Consent Decree specifies that a Unit Owner or Unit Owners shall achieve and maintain a 12-Month Rolling Average Emission Rate, then the Month containing that Day if that Day is the first Day of the Month, or if that Day is not the first Day of the Month then the next complete Month, shall be the first Month used in the calculation of the specified 12-Month limitation. For example, if the specified 12-Month Rolling Average Emission Rate is to be achieved starting January 1, 2013, then January 2013 is the first Month used in the calculation of the first applicable 12-Month Rolling Average Emission Rate, such that the first complete 12-Month Rolling Average Emission Rate period would, provided that the Unit fires Fossil Fuel in each month, include January 2013 through December 2013.

224. This Consent Decree is not a permit. Compliance with the terms of this Consent Decree does not guarantee compliance with all applicable federal, state, or local laws or regulations. The emission rates set forth herein do not relieve Unit Owners from any obligation to comply with other state and federal requirements under the CAA, including Unit Owners' obligation to satisfy any State modeling requirements set forth in the Wisconsin SIP.

225. This Consent Decree does not apply to any claim(s) of alleged criminal liability.

226. In any subsequent administrative or judicial action initiated by the United States or Sierra Club for injunctive relief or civil penalties relating to the Columbia Station, Edgewater Station, or Nelson Dewey Station, as covered by this Consent Decree, Unit Owners shall not assert any defense or claim based upon principles of waiver, res judicata, collateral estoppel, issue preclusion, claim preclusion, or claim splitting, or any other defense based upon the contention that the claims raised by the United States or Sierra Club in the subsequent proceeding were brought, or should have been brought, in the instant case; provided, however, that nothing in this Paragraph is intended to affect the validity of Section XI (Resolution of Claims) or in any way compromise or diminish the waivers, releases, and covenants provided by Plaintiffs in Section XI (Resolution of Claims).

227. Nothing in this Consent Decree shall relieve Unit Owners from their obligations to comply with all applicable federal, state, and local laws and regulations, including laws, regulations, and compliance deadlines that become applicable after the Date of Entry of the Consent Decree. Such laws and regulations include, but are not limited to, the Utility MACT, the Utility NSPS requirements, and the obligation to apply for a Clean Water Act NPDES permit(s) for the discharge of wastewater, and in connection with any such application or

application for permit renewal, to provide the NPDES permitting authority with all information necessary to appropriately characterize effluent from their operations and develop appropriate effluent limitations, including but not limited to all information necessary for the NPDES permitting authority to appropriately evaluate discharges of total dissolved solids ("TDS") for their operations. Nothing in this Consent Decree should be construed to provide any relief from the emission limits or deadlines specified in such regulations, including, but not limited to, deadlines for the installation of pollution controls required by any such regulations, nor shall this Decree be construed as a pre-determination of eligibility for the one year extension that may be provided under 42 U.S.C. § 7412(i)(3)(B).

228. Subject to the provisions in Section XI (Resolution of Claims), Section XVI (Dispute Resolution), and XIV (Stipulated Penalties) nothing contained in this Consent Decree shall be construed to prevent or limit the rights of the Plaintiffs to obtain penalties or injunctive relief under the Act or other federal, state, or local statutes, regulations, or permits. However, in addition to the provisions of Paragraph 151(d), Sierra Club agrees not to file a legal challenge, take a litigation position, file a request for a contested case hearing, a request for state circuit court review, or a petition pursuant to 42 U.S.C. § 7661d(b), challenging the issuance of any permits or other regulatory approvals that are necessary for the construction or operation of environmental control equipment, or for any Environmental Mitigation Project identified in Appendix A, which is required by this Consent Decree. Nothing in this Paragraph prevents Sierra Club from making use of the Dispute Resolution provisions in section XVI of this Consent Decree. Any disputes regarding Sierra Club's compliance with this provision is subject to the Dispute Resolution provisions in Section XVI, including written notice and period to cure, and

Unit Owners' remedies for alleged breaches by Sierra Club shall be limited to specific performance and shall exclude any monetary damages.

229. Each limit and/or other requirement established by or under this Consent Decree is a separate, independent requirement.

230. Performance standards, emissions limits, and other quantitative standards set by or under this Consent Decree must be met to the number of significant digits in which the standard or limit is expressed. For example, an Emission Rate of 0.100 is not met if the actual Emission Rate is 0.101. Unit Owners shall round the fourth significant digit to the nearest third significant digit, or the third significant digit to the nearest second significant digit, depending upon whether the limit is expressed to three or two significant digits. For example, if an actual Emission Rate is 0.1004, that shall be reported as 0.100, and shall be in compliance with an Emission Rate of 0.100, and if an actual Emission Rate is 0.1005, that shall be reported as 0.101, and shall not be in compliance with an Emission Rate of 0.100. Unit Owners shall report data to the number of significant digits in which the standard or limit is expressed.

231. This Consent Decree does not limit, enlarge, or affect the rights of any Party to this Consent Decree as against any third parties.

232. This Consent Decree constitutes the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Consent Decree, and supersedes all prior agreements and understandings among the Parties related to the subject matter herein. No document, representation, inducement, agreement, understanding, or promise constitutes any part of this Consent Decree or the settlement it represents, nor shall they be used in construing the terms of this Consent Decree.

233. Except as provided below, each Party to this action shall bear its own costs and attorneys' fees. Defendants shall pay Sierra Club's reasonable attorneys' fees and costs, pursuant to 42 U.S.C. § 7604(d), for the time and expenses incurred in this case, in *Sierra Club v. Wisconsin Power and Light Company*, United States District Court, Western District of Wisconsin, Case No. 3:10-cv-511-wmc, and in *Sierra Club v. Wisconsin Power and Light Company*, United States District Court, Eastern District of Wisconsin, Case No. 2:10-cv-00835-aeg. The deadline for Sierra Club to file a motion for costs of litigation (including attorneys' fees) for activities prior to entry of this Consent Decree by the Court is hereby extended until 30 Days after this Consent Decree is entered by the Court. Prior to and/or during this 30-Day period, Sierra Club and Defendants shall seek to resolve informally any claim for costs of litigation (including attorneys' fees), and, if they cannot, will submit that issue to the Court for resolution. An award of fees for activities prior to entry of this Consent Decree by the Court under this Paragraph does not waive Sierra Club's ability to seek recovery for costs of litigation (including attorneys' fees) incurred to monitor and/or enforce the provisions of this Consent Decree.

234. As a former owner of Edgewater Unit 5, We Energies is subject to the requirements of Section IX (Environmental Mitigation Projects) and Section X (Civil Penalty). The requirements of Sections XII (Periodic Reporting), XIII (Review and Approval of Submittals), XIV (Stipulated Penalties), XV (Force Majeure), XVI (Dispute Resolution) and XVIII (Information Collection and Retention) only apply to We Energies to the extent that they relate to We Energies' obligations as set forth in Sections IX and X.

XXV. SIGNATORIES AND SERVICE

235. Each undersigned representative of Defendants and Sierra Club, and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice, certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind to this document the Party he or she represents.

236. This Consent Decree may be signed in counterparts, and such counterpart signature pages shall be given full force and effect.

237. Each Party hereby agrees to accept service of process by mail with respect to all matters arising under or relating to this Consent Decree and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court including, but not limited to, service of a summons.

238. Unless otherwise ordered by the Court, the United States agrees that none of the Defendants will be required to file any answer or other pleading responsive to the United States' concurrently filed Complaint in this matter until and unless the Court expressly declines to enter this Consent Decree, in which case each Defendant shall have no less than 30 Days after receiving notice of such express declination to file an answer or other pleading in response to the Complaint.

XXVI. PUBLIC COMMENT/AGENCY REVIEW

239. The Parties agree and acknowledge that final approval by the United States and entry of this Consent Decree is subject to the procedures of 28 C.F.R. § 50.7, which provides for notice of the lodging of this Consent Decree in the Federal Register, an opportunity for public comment, and the right of the United States to withdraw or withhold consent if the comments

disclose facts or considerations which indicate that this Consent Decree is inappropriate, improper, or inadequate. Neither the Sierra Club nor Defendants shall oppose entry of this Consent Decree by this Court or challenge any provision of this Consent Decree unless the United States has notified the Sierra Club and Defendants, in writing, that the United States no longer supports entry of this Consent Decree. Additionally, the Parties agree and acknowledge that final approval of this Consent Decree by the Court is subject to 42 U.S.C. § 7604(c)(3), which provides that a consent judgment in a citizen suit action must provide for review and comment by the Attorney General and the U.S. EPA Administrator for 45 Days.

XXVII. CONDITIONAL TERMINATION OF ENFORCEMENT UNDER CONSENT DECREE

240. Termination as to Completed Tasks. As soon as any individual Defendant completes a construction project, retirement or any other requirement of this Consent Decree that is not ongoing or recurring, Defendants may, by motion to this Court, seek termination of the provision or provisions of this Consent Decree that imposed the requirement.

241. Termination as to We Energies. Following the successful completion of its obligations under Sections IX (Environmental Mitigation Projects) and X (Civil Penalty), including all associated reporting obligations, We Energies may so certify these facts to the Plaintiffs, all other Defendants and this Court, and We Energies may move the Court for termination of the provisions of this Consent Decree as to We Energies. If the Plaintiffs do not object in writing with specific reasons within 45 Days of receipt of We Energies' certification, then We Energies shall be terminated from the requirements of this Consent Decree.

242. Conditional Termination of Enforcement Through this Consent Decree. Subject to the provisions of Paragraph 243, after all projects, tasks, or requirements of this Consent

Decree have been completed as to a Unit Owner(s), a Unit Owner(s) may, by motion to this Court, seek termination of this Consent Decree if the Unit Owner(s):

a. have successfully completed construction, and have maintained operation, of all pollution controls on Units owned or operated by them as required by this Consent Decree for a period of two years and have successfully completed all actions necessary to Retire, Refuel, or Repower any Unit as required by this Consent Decree; and

b. have obtained all the final permits and/or site-specific SIP amendments (i) as required by Section XVII (Permits) of this Consent Decree for the applicable Unit and (ii) that include as federally enforceable permit terms, all Unit-specific, and Plant-specific, operational, maintenance, and control technology requirements established by this Consent Decree for the applicable Unit.

c. certify these facts to the Plaintiffs and this Court. If the Plaintiffs do not object in writing with specific reasons within 45 Days of receipt of Unit Owner'(s) certification, then, for any violations of this Consent Decree that occur after the filing of notice, the Plaintiffs shall pursue enforcement of the requirements through the applicable permits and/or other enforcement authorities and not through this Consent Decree. If Plaintiffs object, the dispute will be resolved pursuant to the procedures in Section XVI (Dispute Resolution).

243. Enforcement under this Consent Decree. Notwithstanding Paragraph 242, if enforcement of a provision in this Consent Decree cannot be pursued by the United States under the applicable permit(s) issued pursuant to the CAA or its implementing regulations ("CAA Permit"), or if a Consent Decree requirement was intended to be part of a CAA Permit and did

not become or remain part of such permit, then such requirement may be enforced under the terms of this Consent Decree at any time.

XXVIII. FINAL JUDGMENT

244. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment between the Plaintiffs and each and all of the Defendants.

So Ordered By the Court:

Dated this 17th day of June, 2013.

WILLIAM M. CONLEY
United States District Court Judge

Public Version

Signature Page for *United States of America v. Wisconsin Power and Light, et al.* Consent Decree, and *Sierra Club v. Wisconsin Power and Light* Consent Decree

FOR THE UNITED STATES DEPARTMENT OF JUSTICE

Respectfully submitted,

JOHN W. VAUDREUIL
United States Attorney



LESLIE K. HERJE
Assistant U.S. Attorney
Chief, Civil Division
United States Attorney's Office
Western District of Wisconsin
660 W. Washington Ave.
Suite 303
Madison, WI 53703
(608) 264-5158

Signature Page for *United States of America v. Wisconsin Power and Light, et al.* Consent Decree, and *Sierra Club v. Wisconsin Power and Light* Consent Decree

FOR THE UNITED STATES DEPARTMENT OF JUSTICE

Respectfully submitted,

IGNACIA S. MORENO
Assistant Attorney General
Environment and Natural Resources Division
United States Department of Justice

JAMES A. LOFTON
Counsel to the Chief
Environmental Enforcement Section
Environment and Natural Resources Division
P.O. Box 7611
Washington, DC 20044-7611
(202) 514-2750

JASON DUNN
Senior Attorney
Environmental Enforcement Section
Environment and Natural Resources Division
P.O. Box 7611
Washington, DC 20044-7611
(202) 514-1111

Signature Page for *United States of America v. Wisconsin Power and Light, et al.* Consent Decree, and *Sierra Club v. Wisconsin Power and Light* Consent Decree

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Respectfully submitted,

CYNTHIA GILES
Assistant Administrator
Office of Enforcement and
Compliance Assurance
United States Environmental
Protection Agency

PHILLIP A. BROOKS
Director, Air Enforcement Division
United States Environmental
Protection Agency

KELLIE ORTEGA
Attorney-Advisor
United States Environmental
Protection Agency
1200 Pennsylvania Ave, N.W. (2242A)
Washington, DC 20460

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FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Respectfully submitted,

SUSAN HEDMAN
Regional Administrator, Region 5
United States Environmental
Protection Agency

TERENCE BRANIGAN
Associate Regional Counsel
United States Environmental
Protection Agency, Region 5
77 W. Jackson Blvd. (C-14J)
Chicago, IL 60604

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FOR SIERRA CLUB

By its Counsel:

DAVID C. BENDER
McGillivray Westerberg & Bender LLC
211 S. Paterson Street, Ste 320
Madison, WI 53703

Signature Page for *United States of America v. Wisconsin Power and Light, et al.* Consent Decree, and *Sierra Club v. Wisconsin Power and Light* Consent Decree

FOR WISCONSIN POWER AND LIGHT COMPANY

By: _____

President – Wisconsin Power and Light Company

_____

ROBERT R. CLARK
Taft, Stettinius & Hollister, LLP
One Indiana Square, Suite 3500
Indianapolis, Indiana 46204-2023

Counsel for Wisconsin Power and Light

Signature Page for *United States of America v. Wisconsin Power and Light, et al.* Consent Decree, and *Sierra Club v. Wisconsin Power and Light* Consent Decree

FOR MADISON GAS AND ELECTRIC COMPANY

By: _____
Gary J. Wolter

Title: Chairman, President and CEO

_____
TODD E. PALMER
Michael Best & Friedrich LLP
One South Pinckney Street, Suite 700
Madison, WI 53701-1806

Counsel for Madison Gas and Electric

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FOR WISCONSIN ELECTRIC POWER COMPANY

ALLEN L. LEVERETT
Executive Vice President

CYNTHIA A. FAUR
Quarles & Brady LLP
300 N. LaSalle Street, Suite 4000
Chicago, Illinois 60654-3422

Counsel for Wisconsin Electric Power Company

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FOR WISCONSIN PUBLIC SERVICE CORPORATION

By: _____

Title: Chairman and C.E.O.

LINDA E. BENFIELD
Foley & Lardner LLP
777 East Wisconsin Avenue
Milwaukee, WI 53202-5306

Counsel for Wisconsin Public Service Corp.

Signature Page for *United States of America v. Wisconsin Power and Light, et al.* Consent Decree, and *Sierra Club v. Wisconsin Power and Light* Consent Decree

FOR WISCONSIN PUBLIC SERVICE CORPORATION

By:_____

Title:_____

LINDA E. BENFIELD
Foley & Lardner LLP
777 East Wisconsin Avenue
Milwaukee, WI 53202-5306

Counsel for Wisconsin Public Service Corp.

APPENDIX D – ECONOMIC MODELING INFORMATION

Future 1 Plan 1 | **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,358**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,400**																										
		All-in Cost per MWh	$/MWh																											

Future 1 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh								3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu								5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 130**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																											
			GW-h								-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$ (11.6)**																										
		Total Variable Cost	**$ Millions**	**$ 1,808.9**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 420**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 2,979**	
	All-in Cost per MWh	$/MWh		

Future 1 Columbia Unit 2 Retirement Analysis
Plan 3 CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh								2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu								5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost	**$Million/yr**	**$ 81**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																											
			GW-h								1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$ 655.2**																										
		Total Variable Cost	**$ Millions**	**$ 1,795.9**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 420**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr	14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 2,970**	
	All-in Cost per MWh	$/MWh		

Future 1 **Columbia Unit 2 Retirement Analysis**
Plan 4 **CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)**

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,048.9**																										
		Total Variable Cost	$ Millions	**$**	**796.8**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**2,961**																										
		All-in Cost per MWh	$/MWh																												

Future 2 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,625**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,683**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,725**																										
		All-in Cost per MWh	$/MWh																											

Future 2 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									7.1	7.0	7.3	7.5	7.7	8.1	8.5	8.7	9.0	9.3	9.8	10.4	10.8	11.3	11.9	12.5	13.2	14.0	14.6	15.2
		Annual Fuel Cost	**$Million/yr**	**$**	**2,114**							**177.9**	**176.9**	**183.8**	**187.7**	**194.1**	**204.6**	**213.1**	**218.7**	**225.7**	**234.6**	**246.9**	**260.3**	**271.7**	**284.5**	**299.6**	**314.5**	**331.7**	**351.6**	**367.1**	**382.5**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(14.3)**																										-
		Total Variable Cost	**$ Millions**	**$**	**2,229.0**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	Fixed O&M										4.1	4.2	4.3	4.4	4.6	4.7	4.9	5.0	5.1	5.3	5.5	5.6	5.8	6.0	6.1	6.3	6.5	6.7	6.9	7.1
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**526**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**3,360**																										
		All-in Cost per MWh	$/MWh																												

Future 2 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh								2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu								7.1	7.0	7.3	7.5	7.7	8.1	8.5	8.7	9.0	9.3	9.8	10.4	10.8	11.3	11.9	12.5	13.2	14.0	14.6	15.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,324**							**111.5**	**110.9**	**115.1**	**117.6**	**121.6**	**128.2**	**133.5**	**137.0**	**141.4**	**147.0**	**154.7**	**163.1**	**170.2**	**178.3**	**187.7**	**197.0**	**207.9**	**220.3**	**230.0**	**239.6**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost	**$Million/yr**	**$ 81**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																											
			GW-h								1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$ 805.3**																										
		Total Variable Cost	**$ Millions**	**$ 2,210.8**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 526**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr	14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 3,348**	
	All-in Cost per MWh	$/MWh		

Future 2 Plan 4 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									7.1	7.0	7.3	7.5	7.7	8.1	8.5	8.7	9.0	9.3	9.8	10.4	10.8	11.3	11.9	12.5	13.2	14.0	14.6	15.2
		Annual Fuel Cost	**$Million/yr**	**$**	**188**							**15.8**	**15.7**	**16.4**	**16.7**	**17.3**	**18.2**	**19.0**	**19.5**	**20.1**	**20.9**	**22.0**	**23.2**	**24.2**	**25.3**	**26.7**	**28.0**	**29.5**	**31.3**	**32.7**	**34.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,287.7**																										
		Total Variable Cost	$ Millions	**$**	**1,073.2**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**526**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**3,247**																										
		All-in Cost per MWh	$/MWh																												

Future 3 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 975**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,033**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,075**																										
		All-in Cost per MWh	$/MWh																											

Future 3 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									4.2	4.2	4.4	4.5	4.6	4.9	5.1	5.2	5.4	5.6	5.9	6.2	6.5	6.8	7.2	7.5	7.9	8.4	8.8	9.1
		Annual Fuel Cost	**$Million/yr**	**$**	**1,268**							**106.7**	**106.2**	**110.3**	**112.6**	**116.5**	**122.7**	**127.9**	**131.2**	**135.4**	**140.8**	**148.1**	**156.2**	**163.0**	**170.7**	**179.8**	**188.7**	**199.0**	**211.0**	**220.3**	**229.5**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(8.9)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,388.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**315**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,598**	
	All-in Cost per MWh	$/MWh			

Future 3 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh									2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu									4.2	4.2	4.4	4.5	4.6	4.9	5.1	5.2	5.4	5.6	5.9	6.2	6.5	6.8	7.2	7.5	7.9	8.4	8.8	9.1
		Annual Fuel Cost	**$Million/yr**	**$**	**795**							**66.9**	**66.5**	**69.1**	**70.6**	**73.0**	**76.9**	**80.1**	**82.2**	**84.9**	**88.2**	**92.8**	**97.8**	**102.1**	**107.0**	**112.6**	**118.2**	**124.7**	**132.2**	**138.0**	**143.8**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost	**$Million/yr**	**$**	**81**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																												
			GW-h									1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$**	**505.2**																										
		Total Variable Cost	**$ Millions**	**$**	**1,381.0**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**315**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,593**	
	All-in Cost per MWh	$/MWh			

Future 3 / Plan 4 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									4.2	4.2	4.4	4.5	4.6	4.9	5.1	5.2	5.4	5.6	5.9	6.2	6.5	6.8	7.2	7.5	7.9	8.4	8.8	9.1
		Annual Fuel Cost	**$Million/yr**	**$**	**113**							**9.5**	**9.4**	**9.8**	**10.0**	**10.4**	**10.9**	**11.4**	**11.7**	**12.0**	**12.5**	**13.2**	**13.9**	**14.5**	**15.2**	**16.0**	**16.8**	**17.7**	**18.8**	**19.6**	**20.4**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**810.1**																										
		Total Variable Cost	$ Millions	**$**	**520.4**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**315**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,675**	
	All-in Cost per MWh	$/MWh			

Future 4 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																										
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																									
		$/MMBtu VO&M Cost	$/MMBtu																										
		Annual VO&M Cost		**$ 58**																									
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																										
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	16.1	17.4	18.8	20.3	22.0	23.7	25.7	27.8	30.0	32.4	35.1	37.9	41.0	44.3	47.9	51.8	56.0
		Annual CO2 Cost	**$ Millions**	**$ 483**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**64.2**	**69.4**	**75.1**	**81.2**	**82.0**	**94.9**	**102.6**	**110.9**	**120.0**	**129.7**	**140.2**	**151.6**	**163.9**	**177.2**	**178.9**	**207.1**	**224.0**
		Total Variable Cost	**$ Millions**	**$ 1,841**																									
		Variable Cost per MWh	$/MWh																										
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST	All-in Cost All-in Cost per MWh		$Million/yr $/MWh	**$ 2,882**																									

Future 4 Columbia Unit 2 Retirement Analysis
Plan 2 CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	16.1	17.4	18.8	20.3	22.0	23.7	25.7	27.8	30.0	32.4	35.1	37.9	41.0	44.3	47.9	51.8	56.0
		Annual CO2 Cost	**$ Millions**	**$**	**298**							**-**	**-**	**-**	**25.8**	**27.9**	**30.2**	**32.7**	**35.3**	**38.2**	**41.3**	**44.6**	**48.3**	**52.2**	**56.4**	**61.0**	**65.9**	**71.3**	**77.1**	**83.3**	**90.1**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(15.1)**																										
		Total Variable Cost	**$ Millions**	**$**	**2,103.7**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**3,172**																										
		All-in Cost per MWh	$/MWh																												

Future 4 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh									2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost	**$Million/yr**	**$**	**81**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton									-	-	-	16.1	17.4	18.8	20.3	22.0	23.7	25.7	27.8	30.0	32.4	35.1	37.9	41.0	44.3	47.9	51.8	56.0
		Annual CO2 Cost	**$ Millions**	**$**	**187**							**-**	**-**	**-**	**16.2**	**17.5**	**18.9**	**20.5**	**22.1**	**23.9**	**25.9**	**28.0**	**30.2**	**32.7**	**35.3**	**38.2**	**41.3**	**44.7**	**48.3**	**52.2**	**56.5**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																												
			GW-h									1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$**	**850.9**																										
		Total Variable Cost	**$ Millions**	**$**	**2,178.5**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**3,221**	
	All-in Cost per MWh	$/MWh			

Future 4 **Columbia Unit 2 Retirement Analysis**
Plan 4 **CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)**

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	16.1	17.4	18.8	20.3	22.0	23.7	25.7	27.8	30.0	32.4	35.1	37.9	41.0	44.3	47.9	51.8	56.0
		Annual CO2 Cost	**$ Millions**	**$**	**27**							**-**	**-**	**-**	**2.3**	**2.5**	**2.7**	**2.9**	**3.1**	**3.4**	**3.7**	**4.0**	**4.3**	**4.6**	**5.0**	**5.4**	**5.9**	**6.3**	**6.9**	**7.4**	**8.0**
		Wind PTC Tax Credit	$/MWh									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,290.1**																										
		Total Variable Cost	$ Millions	**$**	**1,511.3**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			**-**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**3,430**																										
		All-in Cost per MWh	$/MWh																												

Future 5 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	70%	70%	70%	70%	65%	70%	70%	70%	70%	70%	70%	70%	70%	65%	70%	70%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,364	3,364	3,364	3,364	3,141	3,364	3,364	3,364	3,364	3,364	3,364	3,364	3,364	3,141	3,364	3,364
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	34.0	34.0	34.0	34.0	31.8	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	31.8	34.0	34.0
		$/MMBtu Delivered Fuel Cost	$/MMBtu																										
		Annual Fuel Cost	**$Million/yr**	**$ 1,163**																									
		$/MMBtu VO&M Cost	$/MMBtu																										
		Annual VO&M Cost		**$ 55**																									
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,057.7	1,057.7	1,057.7	1,057.7	987.5	1,057.7	1,057.7	1,057.7	1,057.7	1,057.7	1,057.7	1,057.7	1,057.7	1,057.7	987.5	1,057.7	1,057.7
		NOx Credit Cost	$/ton																										
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	3.6	3.6	3.6	3.6	3.3	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.6	3.6
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	40.7	42.8	44.9	47.1	49.5	52.0	54.6	57.3	60.2	63.2	66.3	69.6	73.1	76.8	80.6	84.7	88.9
		Annual CO2 Cost	**$ Millions**	**$ 873**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**144.7**	**151.9**	**159.5**	**167.5**	**164.2**	**184.7**	**193.9**	**203.6**	**213.8**	**224.5**	**235.7**	**247.5**	**259.9**	**272.8**	**267.5**	**300.8**	**315.9**
		Total Variable Cost	**$ Millions**	**$ 2,091**																									
		Variable Cost per MWh	$/MWh																										
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST	All-in Cost All-in Cost per MWh		$Million/yr $/MWh	**$ 3,133**																									

Future 5 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.6	6.8	7.2	7.5	7.7	7.9	8.2	8.6	9.1	9.5	10.0	10.5	11.0	11.6	12.3	12.9	13.4
		Annual Fuel Cost	**$Million/yr**	**$**	**1,823**							**142.3**	**141.5**	**147.0**	**165.1**	**170.8**	**180.0**	**187.5**	**192.4**	**198.6**	**206.4**	**217.2**	**229.0**	**239.1**	**250.4**	**263.7**	**276.7**	**291.9**	**309.4**	**323.0**	**336.6**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	40.7	42.8	44.9	47.1	49.5	52.0	54.6	57.3	60.2	63.2	66.3	69.6	73.1	76.8	80.6	84.7	88.9
		Annual CO2 Cost	**$ Millions**	**$**	**607**							**-**	**-**	**-**	**65.5**	**68.8**	**72.2**	**75.8**	**79.6**	**83.6**	**87.8**	**92.2**	**96.8**	**101.6**	**106.7**	**112.0**	**117.6**	**123.5**	**129.7**	**136.2**	**143.0**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	(420.5)	(420.5)	(420.5)	(420.5)	(643.8)	(420.5)	(420.5)	(420.5)	(420.5)	(420.5)	(420.5)	(420.5)	(420.5)	(420.5)	(643.8)	(420.5)	(420.5)
			$million/yr	**$**	**(307.3)**																										
		Total Variable Cost	**$ Millions**	**$**	**2,252.8**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**3,270**	
	All-in Cost per MWh	$/MWh			

Future 5 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh									2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.6	6.8	7.2	7.5	7.7	7.9	8.2	8.6	9.1	9.5	10.0	10.5	11.0	11.6	12.3	12.9	13.4
		Annual Fuel Cost	**$Million/yr**	**$**	**1,143**							**89.2**	**88.7**	**92.1**	**103.5**	**107.0**	**112.8**	**117.5**	**120.6**	**124.5**	**129.4**	**136.1**	**143.5**	**149.8**	**156.9**	**165.2**	**173.4**	**182.9**	**193.9**	**202.4**	**210.9**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost	**$Million/yr**	**$**	**81**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton									-	-	-	40.7	42.8	44.9	47.1	49.5	52.0	54.6	57.3	60.2	63.2	66.3	69.6	73.1	76.8	80.6	84.7	88.9
		Annual CO2 Cost	**$ Millions**	**$**	**380**							**-**	**-**	**-**	**41.0**	**43.1**	**45.2**	**47.5**	**49.9**	**52.4**	**55.0**	**57.7**	**60.6**	**63.7**	**66.8**	**70.2**	**73.7**	**77.4**	**81.3**	**85.3**	**89.6**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																												
			GW-h									1,413.2	1,413.2	1,413.2	992.7	992.7	992.7	992.7	769.4	992.7	992.7	992.7	992.7	992.7	992.7	992.7	992.7	992.7	769.4	992.7	992.7
			$million/yr	**$**	**779.9**																										
		Total Variable Cost	**$ Millions**	**$**	**2,384.0**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

					2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																									
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$**	**19**																									
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**3,356**	
	All-in Cost per MWh	$/MWh			

Future 5 Plan 4 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.6	6.8	7.2	7.5	7.7	7.9	8.2	8.6	9.1	9.5	10.0	10.5	11.0	11.6	12.3	12.9	13.4
		Annual Fuel Cost	**$Million/yr**	**$**	**162**							**12.7**	**12.6**	**13.1**	**14.7**	**15.2**	**16.0**	**16.7**	**17.1**	**17.7**	**18.4**	**19.3**	**20.4**	**21.3**	**22.3**	**23.5**	**24.6**	**26.0**	**27.5**	**28.7**	**29.9**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	40.7	42.8	44.9	47.1	49.5	52.0	54.6	57.3	60.2	63.2	66.3	69.6	73.1	76.8	80.6	84.7	88.9
		Annual CO2 Cost	**$ Millions**	**$**	**54**							**-**	**-**	**-**	**5.8**	**6.1**	**6.4**	**6.7**	**7.1**	**7.4**	**7.8**	**8.2**	**8.6**	**9.0**	**9.5**	**10.0**	**10.5**	**11.0**	**11.5**	**12.1**	**12.7**
		Wind PTC Tax Credit	$/MWh									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	1,612.1	1,612.1	1,612.1	1,612.1	1,388.8	1,612.1	1,612.1	1,612.1	1,612.1	1,612.1	1,612.1	1,612.1	1,612.1	1,612.1	1,388.8	1,612.1	1,612.1
			$million/yr	**$**	**1,323.7**																										
		Total Variable Cost	$ Millions	**$**	**1,584.1**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**3,477**	
	All-in Cost per MWh	$/MWh			

F1S1 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																											
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$ 58**																											
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,358**																											
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			20.6	9.7	13.6	6.8	11.3	11.5	11.5	11.5	11.4	16.4	16.5	16.6	16.8	16.9	17.1	17.2	17.4	17.5	17.7	9.3	9.3	7.0	4.8	2.8	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr			1.1	33.0	46.7	66.4	23.1	2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	60.1	60.6	90.3	70.4	34.4	14.4	12.3	12.3	12.4	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.3	18.4	18.6	10.2	10.2	8.0	5.8	3.6	1.3	
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	182	-	2.9	9.8	7.0	9.2	10.7	12.4	14.0	15.5	17.1	18.3	21.8	24.2	28.6	29.7	31.4	33.0	36.2	36.9	41.7	42.4	42.9	42.4	41.0	34.0	
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4	
		Capital Rev Req SCR Construction	$million/yr	158		0.9	3.1	3.7	7.1	7.7	21.4	20.9	20.5	20.3	24.6	23.9	23.2	22.9	19.9	19.0	18.0	17.1	16.1	15.2	14.2	13.1	12.1	11.4	10.4	8.9	7.3	
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1	
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7	
		Capital Rev Req Total	**$million/yr**	**$ 933.7**	**9.4**	**71.6**	**78.8**	**87.8**	**91.0**	**109.3**	**112.1**	**109.2**	**106.1**	**103.2**	**100.8**	**98.8**	**96.8**	**95.1**	**93.8**	**92.5**	**91.3**	**90.1**	**89.0**	**88.1**	**85.3**	**82.3**	**79.4**	**76.1**	**72.3**	**59.1**	
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2	
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**	
	TOTAL COST	All-in Cost	$Million/yr	**$ 2,430**																											
		All-in Cost per MWh	$/MWh																												

F1S1 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(11.6)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,808.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			**-**						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,979**	
	All-in Cost per MWh	$/MWh			

F1S1 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh								2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu								5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost	**$Million/yr**	**$ 81**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																											
			GW-h								1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$ 655.2**																										
		Total Variable Cost	**$ Millions**	**$ 1,795.9**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		-							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 420**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr	14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 2,970**	
	All-in Cost per MWh	$/MWh		

F1S1 Plan 4 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,048.9**																										
		Total Variable Cost	$ Millions	**$**	**796.8**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,961**	
	All-in Cost per MWh	$/MWh			

F1S2 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,358**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	16.3	8.0	11.5	7.2	9.2	9.4	9.4	9.4	9.8	13.4	13.8	13.6	13.7	13.6	14.0	14.1	14.2	14.3	14.4	7.6	7.8	5.8	3.9	2.1	0.2
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	0.9	27.0	37.0	46.6	14.9	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	56.3	52.9	79.4	58.0	28.1	11.9	10.2	10.2	10.3	14.2	14.3	14.4	14.6	14.7	14.8	15.0	15.1	15.2	15.4	8.5	8.6	6.7	4.9	3.1	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	149	-	2.4	4.6	8.2	7.5	8.6	10.1	11.4	12.7	14.0	15.2	17.8	18.8	21.8	23.7	25.7	27.7	29.7	31.8	34.1	34.7	35.1	35.1	34.7	33.5	27.8
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	129	-	0.9	0.9	3.0	9.8	22.2	25.7	24.9	23.8	23.0	22.1	18.8	17.4	16.3	15.5	14.8	14.0	13.2	12.4	11.7	10.9	10.1	9.3	8.5	7.8	6.2
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 871.8**	**9.4**	**71.1**	**77.6**	**85.7**	**88.1**	**102.4**	**104.2**	**101.2**	**98.2**	**95.3**	**92.9**	**90.7**	**88.5**	**86.7**	**85.1**	**83.6**	**82.0**	**80.5**	**79.2**	**77.9**	**75.1**	**72.3**	**69.5**	**66.5**	**63.1**	**51.5**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,369**																										
		All-in Cost per MWh	$/MWh																											

F1S2
Plan 2

Columbia Unit 2 Retirement Analysis
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(11.6)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,808.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			**-**						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,979**	
	All-in Cost per MWh	$/MWh			

F1S2 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh								2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu								5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost	**$Million/yr**	**$ 81**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																											
			GW-h								1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$ 655.2**																										
		Total Variable Cost	**$ Millions**	**$ 1,795.9**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 420**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr	14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 2,970**	
	All-in Cost per MWh	$/MWh		

F1S2 **Columbia Unit 2 Retirement Analysis**
Plan 4 **CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)**

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor									35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW								500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW								470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW								500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%								5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh								1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh								219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh								10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu								2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu								5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$ 150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 44**																										
		NOx Emission Rate	lbs/MMBtu								0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr								19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh								(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$ (447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																											
			GW-h								2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$ 1,048.9**																										
		Total Variable Cost	$ Millions	**$ 796.8**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**									**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$ 190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 420**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr		-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 2,961**		
	All-in Cost per MWh	$/MWh			

F1S3 **Columbia Unit 2 Retirement Analysis**
Plan 1 **CALCS - COL2 SCR**

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,358**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,400**																										
		All-in Cost per MWh	$/MWh																											

F1S3 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									**-**	**-**	**-**	**-**	**-**	**-**	**-**	(251.2)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	(251.2)	**-**	**-**
			$million/yr	**$**	**(11.6)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,808.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		639.5	-	-	-	-	-	83.4	84.9	86.4	87.9	89.5	91.1	92.8	94.4	96.1	97.9	99.6	101.4	103.3	105.1	107.0	108.9	110.9	112.9	114.9	117.0	119.1
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**639.5**	**-**	**-**	**-**	**-**	**-**	**83.4**	**84.9**	**86.4**	**87.9**	**89.5**	**91.1**	**92.8**	**94.4**	**96.1**	**97.9**	**99.6**	**101.4**	**103.3**	**105.1**	**107.0**	**108.9**	**110.9**	**112.9**	**114.9**	**117.0**	**119.1**
	FIXED COST O&M	Fixed O&M										4.1	4.2	4.3	4.4	4.6	4.7	4.9	5.0	5.1	5.3	5.5	5.6	5.8	6.0	6.1	6.3	6.5	6.7	6.9	7.1
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544
		Operating Capacity	MW		513	507	507	555	555	555
		Capacity Factor	%		75%	78%	78%	73%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu							
		Annual Fuel Cost	**$Million/yr**	**$**	**420**						
		$/MMBtu VO&M Cost	$/MMBtu							
		Annual VO&M Cost		**$**	**19**						
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411
		NOx Credit Cost	$/ton		-	-	-	-	-	-
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Total Variable Cost	**$ Millions**								
		Cost per MWh	**$/MWh**								
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**3,037**																										
		All-in Cost per MWh	$/MWh																												

F1S3
Plan 3

Columbia Unit 2 Retirement Analysis
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh									2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost	**$Million/yr**	**$**	**81**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																												
			GW-h									1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$**	**655.2**																										
		Total Variable Cost	**$ Millions**	**$**	**1,795.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		639.5	-	-	-	-	-	83.4	84.9	86.4	87.9	89.5	91.1	92.8	94.4	96.1	97.9	99.6	101.4	103.3	105.1	107.0	108.9	110.9	112.9	114.9	117.0	119.1
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**639.5**	**-**	**-**	**-**	**-**	**-**	**83.4**	**84.9**	**86.4**	**87.9**	**89.5**	**91.1**	**92.8**	**94.4**	**96.1**	**97.9**	**99.6**	**101.4**	**103.3**	**105.1**	**107.0**	**108.9**	**110.9**	**112.9**	**114.9**	**117.0**	**119.1**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu								9																				
		Annual Fuel Cost	**$Million/yr**	**$**	**420**						**0**																				
		$/MMBtu VO&M Cost	$/MMBtu								1																				
		Annual VO&M Cost		**$**	**19**						**2**																				
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**3,029**																										
		All-in Cost per MWh	$/MWh																												

F1S3 Plan 4 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	-	-	-	-	-	-	-	-	-	-	-	-
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,048.9**																										
		Total Variable Cost	$ Millions	**$**	**796.8**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,174.4	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,174.4**	**-**	**-**	**-**	**-**	**-**	**153.1**	**155.8**	**158.6**	**161.5**	**164.4**	**167.4**	**170.4**	**173.4**	**176.6**	**179.7**	**183.0**	**186.3**	**189.6**	**193.0**	**196.5**	**200.0**	**203.6**	**207.3**	**211.0**	**214.8**	**218.7**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**3,068**																										
		All-in Cost per MWh	$/MWh																												

F1S4 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,358**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,400**																										
		All-in Cost per MWh	$/MWh																											

F1S4 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(11.6)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,808.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		523.2	-	-	-	-	-	68.2	69.4	70.7	71.9	73.2	74.6	75.9	77.3	78.7	80.1	81.5	83.0	84.5	86.0	87.5	89.1	90.7	92.4	94.0	95.7	97.4
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**523.2**	**-**	**-**	**-**	**-**	**-**	**68.2**	**69.4**	**70.7**	**71.9**	**73.2**	**74.6**	**75.9**	**77.3**	**78.7**	**80.1**	**81.5**	**83.0**	**84.5**	**86.0**	**87.5**	**89.1**	**90.7**	**92.4**	**94.0**	**95.7**	**97.4**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**2,921**																										
		All-in Cost per MWh	$/MWh																												

F1S4 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh								2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu								5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost	**$Million/yr**	**$ 81**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																											
			GW-h								1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$ 655.2**																										
		Total Variable Cost	**$ Millions**	**$ 1,795.9**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		-							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	523.2	-	-	-	-	-	68.2	69.4	70.7	71.9	73.2	74.6	75.9	77.3	78.7	80.1	81.5	83.0	84.5	86.0	87.5	89.1	90.7	92.4	94.0	95.7	97.4
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 523.2**	**-**	**-**	**-**	**-**	**-**	**68.2**	**69.4**	**70.7**	**71.9**	**73.2**	**74.6**	**75.9**	**77.3**	**78.7**	**80.1**	**81.5**	**83.0**	**84.5**	**86.0**	**87.5**	**89.1**	**90.7**	**92.4**	**94.0**	**95.7**	**97.4**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 420**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr	14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 2,912**	
	All-in Cost per MWh	$/MWh		

F1S4 Plan 4 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,048.9**																										
		Total Variable Cost	$ Millions	**$**	**796.8**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		960.9	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**960.9**	**-**	**-**	**-**	**-**	**-**	**125.2**	**127.5**	**129.8**	**132.1**	**134.5**	**136.9**	**139.4**	**141.9**	**144.5**	**147.1**	**149.7**	**152.4**	**155.1**	**157.9**	**160.8**	**163.7**	**166.6**	**169.6**	**172.7**	**175.8**	**178.9**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,854**	
	All-in Cost per MWh	$/MWh			

F1S5 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																											
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																											
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,358**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST	All-in Cost All-in Cost per MWh		$Million/yr $/MWh	**$ 2,400**																										

F1S5 **Columbia Unit 2 Retirement Analysis**
Plan 2 **CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)**

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(14.5)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,806.0**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			**-**						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**2,977**																										
		All-in Cost per MWh	$/MWh																												

F1S5 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh								2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu								5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost	**$Million/yr**	**$ 81**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																											
			GW-h								1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$ 819.0**																										
		Total Variable Cost	**$ Millions**	**$ 1,959.7**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		-							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 420**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr	14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 3,078**		
	All-in Cost per MWh	$/MWh			

F1S5 **Columbia Unit 2 Retirement Analysis**
Plan 4 **CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)**

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,311.1**																										
		Total Variable Cost	$ Millions	**$**	**1,059.0**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
	TOTAL COST	All-in Cost	$million/yr	**$**	**3,133**																										
		All-in Cost per MWh	$/MWh																												

F1S6 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Total Variable Cost	**$ Millions**	**$ 1,358**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr																											
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,400**																										
		All-in Cost per MWh	$/MWh																											

F1S6 Plan 2 — **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(8.7)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,811.8**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	Fixed O&M										4.1	4.2	4.3	4.4	4.6	4.7	4.9	5.0	5.1	5.3	5.5	5.6	5.8	6.0	6.1	6.3	6.5	6.7	6.9	7.1
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,981**	
	All-in Cost per MWh	$/MWh			

F1S6 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh									2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost	**$Million/yr**	**$**	**81**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																												
			GW-h									1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$**	**491.4**																										
		Total Variable Cost	**$ Millions**	**$**	**1,632.1**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			**-**						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,863**	
	All-in Cost per MWh	$/MWh			

F1S6 **Columbia Unit 2 Retirement Analysis**
Plan 4 **CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)**

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**786.7**																										
		Total Variable Cost	$ Millions	**$**	**534.6**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,789**	
	All-in Cost per MWh	$/MWh			

F1S7 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,358**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
	TOTAL COST	All-in Cost	$Million/yr	**$ 2,400**																										
		All-in Cost per MWh	$/MWh																											

F1S7 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									7.1	7.0	7.3	7.5	7.7	8.1	8.5	8.7	9.0	9.3	9.8	10.4	10.8	11.3	11.9	12.5	13.2	14.0	14.6	15.2
		Annual Fuel Cost	**$Million/yr**	**$**	**2,114**							**177.9**	**176.9**	**183.8**	**187.7**	**194.1**	**204.6**	**213.1**	**218.7**	**225.7**	**234.6**	**246.9**	**260.3**	**271.7**	**284.5**	**299.6**	**314.5**	**331.7**	**351.6**	**367.1**	**382.5**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(11.6)**																										
		Total Variable Cost	**$ Millions**	**$**	**2,231.6**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			**-**						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**3,256**	
	All-in Cost per MWh	$/MWh			

F1S7 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh								2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu								7.1	7.0	7.3	7.5	7.7	8.1	8.5	8.7	9.0	9.3	9.8	10.4	10.8	11.3	11.9	12.5	13.2	14.0	14.6	15.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,324**							**111.5**	**110.9**	**115.1**	**117.6**	**121.6**	**128.2**	**133.5**	**137.0**	**141.4**	**147.0**	**154.7**	**163.1**	**170.2**	**178.3**	**187.7**	**197.0**	**207.9**	**220.3**	**230.0**	**239.6**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost	**$Million/yr**	**$ 81**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton																											
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																											
			GW-h								1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$ 655.2**																										
		Total Variable Cost	**$ Millions**	**$ 2,060.8**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 420**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr	14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 3,144**	
	All-in Cost per MWh	$/MWh		

F1S7 Plan 4 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									7.1	7.3	7.5	7.6	7.7	8.1	8.5	8.7	8.8	9.0	9.6	10.4	10.6	11.3	11.9	12.5	13.2	14.0	14.8	15.7
		Annual Fuel Cost	**$Million/yr**	**$**	**188**							**15.8**	**15.7**	**16.4**	**16.7**	**17.3**	**18.2**	**19.0**	**19.5**	**20.1**	**20.9**	**22.0**	**23.2**	**24.2**	**25.3**	**26.7**	**28.0**	**29.5**	**31.3**	**32.7**	**34.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,048.9**																										
		Total Variable Cost	$ Millions	**$**	**834.4**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,986**	
	All-in Cost per MWh	$/MWh			

F1S8 Plan 1 **Columbia Unit 2 Retirement Analysis**
CALCS - COL2 SCR

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,300**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,358**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,400**																										
		All-in Cost per MWh	$/MWh																											

F1S8 Columbia Unit 2 Retirement Analysis
Plan 2 CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									4.2	4.2	4.4	4.5	4.6	4.9	5.1	5.2	5.4	5.6	5.9	6.2	6.5	6.8	7.2	7.5	7.9	8.4	8.8	9.1
		Annual Fuel Cost	**$Million/yr**	**$**	**1,268**							**106.7**	**106.2**	**110.3**	**112.6**	**116.5**	**122.7**	**127.9**	**131.2**	**135.4**	**140.8**	**148.1**	**156.2**	**163.0**	**170.7**	**179.8**	**188.7**	**199.0**	**211.0**	**220.3**	**229.5**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(11.6)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,386.2**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			**-**						-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	Fixed O&M										4.1	4.2	4.3	4.4	4.6	4.7	4.9	5.0	5.1	5.3	5.5	5.6	5.8	6.0	6.1	6.3	6.5	6.7	6.9	7.1
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M		**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,702**	
	All-in Cost per MWh	$/MWh			

F1S8
Plan 3

Columbia Unit 2 Retirement Analysis
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh									2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu									4.2	4.2	4.4	4.5	4.6	4.9	5.1	5.2	5.4	5.6	5.9	6.2	6.5	6.8	7.2	7.5	7.9	8.4	8.8	9.1
		Annual Fuel Cost	**$Million/yr**	**$**	**795**							**66.9**	**66.5**	**69.1**	**70.6**	**73.0**	**76.9**	**80.1**	**82.2**	**84.9**	**88.2**	**92.8**	**97.8**	**102.1**	**107.0**	**112.6**	**118.2**	**124.7**	**132.2**	**138.0**	**143.8**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost	**$Million/yr**	**$**	**81**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																												
			GW-h									1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$**	**655.2**																										
		Total Variable Cost	**$ Millions**	**$**	**1,531.1**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,797**	
	All-in Cost per MWh	$/MWh			

F1S8 **Columbia Unit 2 Retirement Analysis**
Plan 4 **CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)**

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									4.3	4.3	4.4	4.5	4.6	4.7	5.1	5.2	5.4	5.6	5.9	6.1	6.5	6.8	7.2	7.5	7.9	8.3	8.6	9.1
		Annual Fuel Cost	**$Million/yr**	**$**	**113**							**9.5**	**9.4**	**9.8**	**10.0**	**10.4**	**10.9**	**11.4**	**11.7**	**12.0**	**12.5**	**13.2**	**13.9**	**14.5**	**15.2**	**16.0**	**16.8**	**17.7**	**18.8**	**19.6**	**20.4**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,048.9**																										
		Total Variable Cost	$ Millions	**$**	**759.2**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**420**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**
TOTAL COST		All-in Cost	$million/yr	**$**	**2,936**																										
		All-in Cost per MWh	$/MWh																												

F1S9 **Columbia Unit 2 Retirement Analysis**
Plan 1 **CALCS - COL2 SCR**

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 1,625**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,683**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,725**																										
		All-in Cost per MWh	$/MWh																											

F1S9 Plan 2 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(11.6)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,808.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**526**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**							**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**3,084**	
	All-in Cost per MWh	$/MWh			

F1S9 Plan 3 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

				PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW								541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW								570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%								47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh								2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh								6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu								15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu								5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$ 1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost	**$Million/yr**	**$ 81**																										
		NOx Emission Rate	lbs/MMBtu								0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr								78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu								128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr								1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																											
			GW-h								1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$ 655.2**																										
		Total Variable Cost	**$ Millions**	**$ 1,795.9**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Capital Construction Cost	$million/yr								-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**		-							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr	581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$ 581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**									**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$ 30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544																				
		Operating Capacity	MW		513	507	507	555	555	555																				
		Capacity Factor	%		75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 526**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 19**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr		2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton		-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$ -**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																											
		Cost per MWh	**$/MWh**																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$ 278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr	56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr	14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr	419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$ 676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$ 64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$ 3,076**	
	All-in Cost per MWh	$/MWh		

F1S9 Plan 4 **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,048.9**																										
		Total Variable Cost	$ Millions	**$**	**796.8**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**526**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**3,066**	
	All-in Cost per MWh	$/MWh			

F1S10 **Columbia Unit 2 Retirement Analysis**
Plan 1 **CALCS - COL2 SCR**

Confidential Information is Highlighted in Gray

			Units	PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
UNIT 2 With SCR	Capacity Factor	Installed Capacity (ICAP)	MW		557	559	553	553	563	563	563	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560	560
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544	544	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Operating Capacity	MW		513	507	507	555	555	555	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552	552
		Operating Factor	%		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
		Scheduled Maintenance	Weeks		7	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5	5	5	5	5	5	5	8	5	5	5
		Forced Outage Rate	%		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
		Capacity Factor	%		75%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%	78%	78%	78%	78%	78%	78%	73%	78%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,533	3,785	3,785
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119	10,119
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	35.8	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu																											
		Annual Fuel Cost	**$Million/yr**	**$ 975**																										
		$/MMBtu VO&M Cost	$/MMBtu																											
		Annual VO&M Cost		**$ 58**																										
		NOx Emission Rate	lbs/MMBtu		0.140	0.140	0.140	0.140	0.126	0.126	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062
		NOx emissions	tons/yr		2,471.6	2,561.6	2,561.6	2,501.0	2,410.9	2,410.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,189.9	1,110.9	1,189.9	1,189.9
		NOx Credit Cost	$/ton																											
		Annual NOx Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu		208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr		3.7	3.8	3.8	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	4.0	4.0
		CO2 Credit Cost	$/ton		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$ -**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**	**$ 1,033**																										
		Variable Cost per MWh	$/MWh																											
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	18.1	8.9	12.6	8.0	10.2	10.4	10.5	10.5	10.5	14.9	15.0	15.1	15.3	15.4	15.5	15.6	15.8	15.9	16.0	8.4	8.4	6.4	4.3	2.3	0.3
		Capital adder - Turbine & Mill upgrades	$million/yr		0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Construction	$million/yr		-	1.0	30.0	42.0	54.0	21.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - SCR Maintenance	$million/yr		-	-	-	-	-	-	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0
		Capital adder - Scrubber & Baghouse	$million/yr		153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		154.2	58.2	56.7	84.9	64.2	31.2	13.2	11.2	11.3	11.3	15.7	15.8	16.0	16.1	16.2	16.4	16.5	16.7	16.8	17.0	9.4	9.4	7.4	5.4	3.3	1.3
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr	104	-	12.3	15.9	14.3	12.9	12.4	11.8	11.3	10.7	10.2	9.7	9.2	8.7	8.2	7.8	7.3	6.8	6.3	5.9	5.4	5.0	4.6	4.1	3.7	3.2	1.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	166	-	2.7	5.1	6.9	8.3	9.7	11.2	12.7	14.2	15.6	17.6	19.8	22.0	24.2	26.4	28.6	30.8	33.0	35.4	37.9	38.6	39.0	39.0	38.5	37.3	30.9
		Capital Rev Req Turbine & Mill Upgrades	$million/yr	73	0.0	0.5	1.5	10.0	12.0	11.5	11.0	10.5	10.0	9.5	9.1	8.6	8.2	7.8	7.3	6.9	6.4	6.0	5.6	5.1	4.7	4.3	3.8	3.4	3.1	2.4
		Capital Rev Req SCR Construction	$million/yr	144	-	0.0	1.0	3.4	6.4	24.6	28.5	27.0	25.5	23.9	22.4	20.8	19.3	18.1	17.3	16.4	15.5	14.7	13.8	12.9	12.1	11.2	10.4	9.5	8.6	6.8
		Capital Rev Req SCR Maintenance	$million/yr		-	-	-	-	-	-	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.8	3.3	4.1
		Capital Rev Req Scrubber & Baghouse	$million/yr	410	9.4	55.8	54.6	52.2	49.9	47.7	45.6	43.5	41.5	39.5	37.5	35.6	33.6	31.6	29.6	27.7	25.7	23.7	21.8	19.8	17.8	16.1	14.7	13.5	12.2	9.7
		Capital Rev Req Total	**$million/yr**	**$ 902.8**	**9.4**	**71.3**	**78.2**	**86.7**	**89.5**	**105.9**	**108.2**	**105.2**	**102.2**	**99.2**	**96.9**	**94.8**	**92.7**	**90.9**	**89.5**	**88.0**	**86.6**	**85.3**	**84.1**	**83.0**	**80.2**	**77.3**	**74.4**	**71.3**	**67.7**	**55.3**
	FIXED COST O&M	Fixed O&M	$million/yr		9.2	10.4	9.7	10.4	10.7	11.1	11.4	11.7	12.1	12.5	12.8	13.2	13.6	14.0	14.4	14.9	15.3	15.8	16.3	16.7	17.2	17.8	18.3	18.8	19.4	22.2
		Fixed O&M adder SCR	$million/yr		0.2	0.8	-	-	-	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		TOTAL Fixed O&M	**$million/yr**	**$ 138.5**	**9.4**	**11.1**	**9.7**	**10.4**	**10.7**	**11.2**	**11.6**	**11.9**	**12.3**	**12.7**	**13.0**	**13.4**	**13.8**	**14.2**	**14.7**	**15.1**	**15.6**	**16.0**	**16.5**	**17.0**	**17.5**	**18.1**	**18.6**	**19.2**	**19.7**	**22.5**
TOTAL COST		All-in Cost	$Million/yr	**$ 2,075**																										
		All-in Cost per MWh	$/MWh																											

F1S10 Columbia Unit 2 Retirement Analysis
Plan 2 CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 2	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%	76%
	VARIABLE COST	Energy Production	GWh									3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785	3,785
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,691**							**142.3**	**141.5**	**147.0**	**150.1**	**155.3**	**163.7**	**170.5**	**174.9**	**180.6**	**187.7**	**197.5**	**208.2**	**217.3**	**227.6**	**239.7**	**251.6**	**265.4**	**281.3**	**293.7**	**306.0**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**130**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6	125.6
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Purchased Power (Based on Round the Clock Price)	**$/MW-h**																												
			GW-h									-	-	-	-	-	-	-	(251.2)	-	-	-	-	-	-	-	-	-	(251.2)	-	-
			$million/yr	**$**	**(11.6)**																										
		Total Variable Cost	**$ Millions**	**$**	**1,808.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	Fixed O&M										4.1	4.2	4.3	4.4	4.6	4.7	4.9	5.0	5.1	5.3	5.5	5.6	5.8	6.0	6.1	6.3	6.5	6.7	6.9	7.1
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

					2013	2014	2015	2016	2017	2018
Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW		557	559	553	553	563	563
		Unforced Capacity (UCAP)	MW		538	540	534	534	544	544
		Operating Capacity	MW		513	507	507	555	555	555
		Capacity Factor	%		75%	78%	78%	73%	78%	78%
	VARIABLE COST	Energy Production	GWh		3,357	3,474	3,474	3,551	3,804	3,804
		Full Load Heat Rate	Btu/kWh		10,518	10,534	10,534	10,061	10,061	10,061
		MMBtu Fuel Burn	Million MMBtu		35.3	36.6	36.6	35.7	38.3	38.3
		$/MMBtu Delivered Fuel Cost	$/MMBtu							
		Annual Fuel Cost	**$Million/yr**	**$**	**315**					
		$/MMBtu VO&M Cost	$/MMBtu							
		Annual VO&M Cost		**$**	**19**					
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411
		NOx Credit Cost	$/ton			-	-	-	-	-	-
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0
		CO2 Credit Cost	$/ton			-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-
		Total Variable Cost	**$ Millions**								
		Cost per MWh	**$/MWh**								
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-
		Total Capital Adds	**$million/yr**	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr			-	-	-	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**						

					2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW																					
		Unforced Capacity (UCAP)	MW																					
		Operating Capacity	MW																					
		Capacity Factor	%																					
	VARIABLE COST	Energy Production	GWh																					
		Full Load Heat Rate	Btu/kWh																					
		MMBtu Fuel Burn	Million MMBtu																					
		$/MMBtu Delivered Fuel Cost	$/MMBtu																					
		Annual Fuel Cost	**$Million/yr**																					
		$/MMBtu VO&M Cost	$/MMBtu																					
		Annual VO&M Cost																						
		NOx Emission Rate	lbs/MMBtu																					
		NOx emissions	tons/yr																					
		NOx Credit Cost	$/ton																					
		Annual NOx Cost	**$ Millions**																					
		CO2 Emission Rate	lbs/MMBtu																					
		CO2 emissions	million tons/yr																					
		CO2 Credit Cost	$/ton																					
		Annual CO2 Cost	**$ Millions**																					
		Total Variable Cost	**$ Millions**																					
		Cost per MWh	**$/MWh**																					
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr		1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr		1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**		**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr		2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**		**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,874**	
	All-in Cost per MWh	$/MWh			

F1S10
Plan 3

Columbia Unit 2 Retirement Analysis
CALCS - (Retire COL2 and Replace with 2:1 NGCC Plant and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 3	CAPACITY FACTOR	Installed Capacity (ICAP)	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Unforced Capacity (UCAP)	MW									541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541	541
		Rated/Operating Capacity	MW									570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570	570
		Capacity Factor	%									47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
	VARIABLE COST	Energy Production	GWh									2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371	2,371
		Full Load Heat Rate	Btu/kWh									6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640	6,640
		MMBtu Fuel Burn	Million MMBtu									15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**1,059**							**89.2**	**88.7**	**92.1**	**94.1**	**97.3**	**102.5**	**106.8**	**109.6**	**113.1**	**117.6**	**123.7**	**130.5**	**136.2**	**142.6**	**150.2**	**157.6**	**166.3**	**176.3**	**184.0**	**191.7**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost	**$Million/yr**	**$**	**81**																										
		NOx Emission Rate	lbs/MMBtu									0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		NOx emissions	tons/yr									78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7	78.7
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Off-Peak Price)	**$/MW-h**																												
			GW-h									1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,413.2	1,162.0	1,413.2	1,413.2
			$million/yr	**$**	**655.2**																										
		Total Variable Cost	**$ Millions**	**$**	**1,795.9**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		581.4	-	-	-	-	-	75.8	77.1	78.5	79.9	81.4	82.8	84.3	85.9	87.4	89.0	90.6	92.2	93.9	95.6	97.3	99.0	100.8	102.6	104.5	106.4	108.3
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**581.4**	**-**	**-**	**-**	**-**	**-**	**75.8**	**77.1**	**78.5**	**79.9**	**81.4**	**82.8**	**84.3**	**85.9**	**87.4**	**89.0**	**90.6**	**92.2**	**93.9**	**95.6**	**97.3**	**99.0**	**100.8**	**102.6**	**104.5**	**106.4**	**108.3**
	FIXED COST O&M	**Fixed O&M**										**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**
		Total Fixed O&M	**$million/yr**	**$**	**30.6**	**-**	**-**	**-**	**-**	**-**	**-**	**4.1**	**4.2**	**4.3**	**4.4**	**4.6**	**4.7**	**4.9**	**5.0**	**5.1**	**5.3**	**5.5**	**5.6**	**5.8**	**6.0**	**6.1**	**6.3**	**6.5**	**6.7**	**6.9**	**7.1**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**315**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	**-**	**-**	**-**	**-**	**-**	**-**																				
		Total Variable Cost	**$ Millions**																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloc	$million/yr		14	-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,865**	
	All-in Cost per MWh	$/MWh			

F1S10 Plan 4 — **Columbia Unit 2 Retirement Analysis**
CALCS - (Retire COL2 and Replace with CT, Wind and Power Purchases)

Confidential Information is Highlighted in Gray

					PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 4	Capacity Factor WIND	Operating Capacity										500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor										35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
	Capacity Factor CT	Installed Capacity (ICAP)	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Unforced Capacity (UCAP)	MW									470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Operating Capacity	MW									500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
		Capacity Factor	%									5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
	VARIABLE COST (Wind Variable Cost Assumed at Zero and excluded from Fuel, VO&M, NOx and CO2 Cost Calculations)	Wind Energy Production (assumes $0	GWh									1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533	1,533
		CT Energy Production	GWh									219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219	219
		Full Load Heat Rate	Btu/kWh									10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210	10,210
		MMBtu Fuel Burn	Million MMBtu									2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
		$/MMBtu Delivered Fuel Cost	$/MMBtu									5.7	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.2	7.5	7.9	8.3	8.6	9.1	9.5	10.0	10.6	11.2	11.7	12.2
		Annual Fuel Cost	**$Million/yr**	**$**	**150**							**12.7**	**12.6**	**13.1**	**13.4**	**13.8**	**14.6**	**15.2**	**15.6**	**16.1**	**16.7**	**17.6**	**18.5**	**19.3**	**20.3**	**21.3**	**22.4**	**23.6**	**25.0**	**26.1**	**27.2**
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**44**																										
		NOx Emission Rate	lbs/MMBtu									0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
		NOx emissions	tons/yr									19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
		NOx Credit Cost	$/ton																												
		Annual NOx Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		CO2 Emission Rate	lbs/MMBtu									128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
		CO2 emissions	million tons/yr									0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		CO2 Credit Cost	$/ton									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual CO2 Cost	**$ Millions**	**$**	**-**							**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Wind PTC Tax Credit	$/MWh									(42.2)	(42.9)	(43.6)	(44.3)	(45.1)	(45.8)	(46.6)	(47.4)	(48.3)	(49.1)	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Wind PTC Credit	**$/yr**	**$**	**(447)**							**(64.7)**	**(65.7)**	**(66.8)**	**(67.9)**	**(69.1)**	**(70.3)**	**(71.5)**	**(72.7)**	**(74.0)**	**(75.3)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Purchased Power (Based on Round the clock Price)	**$/MW-h**																												
			GW-h									2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	2,032.6	1,781.4	2,032.6	2,032.6
			$million/yr	**$**	**1,048.9**																										
		Total Variable Cost	$ Millions	**$**	**796.8**																										
		Variable Cost per MWh	$/MWh																												
	Capital Adds	Capital Construction Cost	$million/yr									-																			
		Ongoing Capital Adds	$million/yr										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	**$million/yr**			-						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Construction	$million/yr		1,067.6	-																									
		Capital Rev Req Ongoing Capital Adds	$million/yr	$	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total NET Capital Revenue Requirements		**$**	**1,067.6**	**-**	**-**	**-**	**-**	**-**	**139.2**	**141.7**	**144.2**	**146.8**	**149.4**	**152.1**	**154.9**	**157.7**	**160.5**	**163.4**	**166.3**	**169.3**	**172.4**	**175.5**	**178.6**	**181.9**	**185.1**	**188.5**	**191.9**	**195.3**	**198.8**
	FIXED COST O&M	**Fixed O&M**										**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**
		Total Fixed O&M	**$million/yr**	**$**	**190.3**	**-**	**-**	**-**	**-**	**-**	**-**	**25.3**	**26.0**	**26.8**	**27.6**	**28.4**	**29.3**	**30.2**	**31.1**	**32.0**	**33.0**	**34.0**	**35.0**	**36.0**	**37.1**	**38.2**	**39.4**	**40.6**	**41.8**	**43.0**	**44.3**

Existing Columbia Unit 2 Resource	CAPACITY FACTOR	Installed Capacity (ICAP)	MW			557	559	553	553	563	563																				
		Unforced Capacity (UCAP)	MW			538	540	534	534	544	544																				
		Operating Capacity	MW			513	507	507	555	555	555																				
		Capacity Factor	%			75%	78%	78%	73%	78%	78%																				
	VARIABLE COST	Energy Production	GWh			3,357	3,474	3,474	3,551	3,804	3,804																				
		Full Load Heat Rate	Btu/kWh			10,518	10,534	10,534	10,061	10,061	10,061																				
		MMBtu Fuel Burn	Million MMBtu			35.3	36.6	36.6	35.7	38.3	38.3																				
		$/MMBtu Delivered Fuel Cost	$/MMBtu																												
		Annual Fuel Cost	**$Million/yr**	**$**	**315**																										
		$/MMBtu VO&M Cost	$/MMBtu																												
		Annual VO&M Cost		**$**	**19**																										
		NOx Emission Rate	lbs/MMBtu			0.140	0.140	0.140	0.140	0.126	0.126																				
		NOx emissions	tons/yr			2,472	2,562	2,562	2,501	2,411	2,411																				
		NOx Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual NOx Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		CO2 Emission Rate	lbs/MMBtu			208.8	208.8	208.8	208.8	208.8	208.8																				
		CO2 emissions	million tons/yr			3.7	3.8	3.8	3.7	4.0	4.0																				
		CO2 Credit Cost	$/ton			-	-	-	-	-	-																				
		Annual CO2 Cost	**$ Millions**	**$**	**-**	-	-	-	-	-	-																				
		Total Variable Cost	$ Millions																												
		Cost per MWh	**$/MWh**																												
	Capital Adds	Ongoing Cap Adds excl. SCR Maint. (OGC)	$million/yr			-	18.1	8.9	12.6	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Ongoing Cap Adds (reallocated to Unit 1)	$million/yr			-	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
		Capital adder - Turbine & Mill upgrades	$million/yr			0.5	13.8	17.9	30.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital adder - Scrubber & Baghouse	$million/yr			153.8	25.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Capital Adds	$million/yr	**$**	**278**	154.2	57.2	26.7	42.9	6.2	-	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.7	1.2	0.6	-	-	-	-
	FIXED COST Capital Revenue Requirements	Capital Rev Req Sunk/Decom	$million/yr		113	-	15.5	19.4	18.3	17.3	16.3	15.3	14.4	13.4	12.5	11.5	10.6	9.6	7.2	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds	$million/yr		56	-	3.6	6.4	8.7	9.8	9.5	9.0	8.5	7.9	7.4	6.9	6.4	5.9	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Ongoing Capital Adds (realloca	$million/yr			-	-	-	-	-	-	0.2	0.6	1.0	1.3	1.7	2.0	2.4	2.8	3.1	3.5	4.0	4.4	5.0	5.4	5.6	5.7	4.7	-	-	-
		Capital Rev Req Turbine & Mill Upgrades	$million/yr		74	0.0	0.5	1.5	12.7	15.5	14.8	13.9	13.1	12.3	11.6	10.8	10.1	9.3	7.4	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Scrubber & Baghouse	$million/yr		419	9.4	69.0	67.2	63.7	60.3	57.0	53.7	50.5	47.4	44.3	41.2	38.1	35.0	27.8	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capital Rev Req Total	**$million/yr**	**$**	**676.0**	**9.4**	**88.6**	**94.4**	**103.5**	**102.9**	**97.6**	**92.2**	**87.1**	**82.0**	**77.1**	**72.1**	**67.2**	**62.3**	**49.8**	**3.1**	**3.5**	**4.0**	**4.4**	**5.0**	**5.4**	**5.6**	**5.7**	**4.7**	**-**	**-**	**-**
	FIXED COST O&M	Fixed O&M	$million/yr			8.7	10.4	9.7	10.4	10.7	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Fixed O&M (Common Costs reallocated to Unit	$million/yr			-	-	-	-	-	-	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	-	-	-
		Fixed O&M adder SCR	$million/yr			0.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL Fixed O&M	**$million/yr**	**$**	**64.9**	**8.9**	**11.1**	**9.7**	**10.4**	**10.7**	**11.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**-**	**-**	**-**

TOTAL COST	All-in Cost	$million/yr	**$**	**2,856**	
	All-in Cost per MWh	$/MWh			

Future 1 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,634	1,188	274
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,400**	**2,979**	**2,970**	**2,961**
		Delta (relative to Plan 1)		579	571	562

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,400**																										
Plan 2	**Total Cost per MWh**																											
	Variable Cost - Production	**1,634**																										
	Variable Cost - Purchased Power	**(8)**																										-
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,979**																										
Plan 3	**Total Cost per MWh**																											
	Variable Cost - Production	**1,188**																										
	Variable Cost - Purchased Power	**430**																										
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,970**																										
Plan 4	**Total Cost per MWh**																											
	Variable Cost - Production	**274**																										
	Variable Cost - Purchased Power	**688**																										
	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,961**																										
	Total Cost per MWh																											

Future 2 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,683	2,016	1,467	404
		Purchased Power		(9)	528	845
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,725**	**3,360**	**3,348**	**3,247**
		Delta (relative to Plan 1)		635	623	523

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,683**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,725**																										
	Total Cost per MWh																											
	Variable Cost - Production	**2,016**																										
	Variable Cost - Purchased Power	**(9)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,360**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,467**																										
	Variable Cost - Purchased Power	**528**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,348**																										
	Total Cost per MWh																											
	Variable Cost - Production	**404**																										
	Variable Cost - Purchased Power	**845**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**3,247**																										
	Total Cost per MWh																											

Future 3 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	**Plan 1**	**Plan 2**	**Plan 3**	**Plan 4**
SUMMARY	Variable Costs	Production	1,033	1,251	909	144
		Purchased Power		(6)	331	531
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,075**	**2,598**	**2,593**	**2,675**
		Delta (relative to Plan 1)		524	519	600

		PV Discounted to end of year 2013	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**
Plan 1	Variable Cost - Production	**1,033**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,075**																										
Plan 2	**Total Cost per MWh**																											
	Variable Cost - Production	**1,251**																										
	Variable Cost - Purchased Power	**(6)**																										-
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,598**																										
Plan 3	**Total Cost per MWh**																											
	Variable Cost - Production	**909**																										
	Variable Cost - Purchased Power	**331**																										
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,593**																										
Plan 4	**Total Cost per MWh**																											
	Variable Cost - Production	**144**																										
	Variable Cost - Purchased Power	**531**																										
	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,675**																										
	Total Cost per MWh																											

Future 4 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	**Plan 1**	**Plan 2**	**Plan 3**	**Plan 4**
SUMMARY	Variable Costs	Production	1,841	1,829	1,310	585
		Purchased Power		(10)	558	846
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,882**	**3,172**	**3,221**	**3,430**
		Delta (relative to Plan 1)		290	339	548

		PV Discounted to end of year 2013	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**
Plan 1	Variable Cost - Production	**1,841**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,882**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,829**																										
	Variable Cost - Purchased Power	**(10)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,172**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,310**																										
	Variable Cost - Purchased Power	**558**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,221**																										
	Total Cost per MWh																											
	Variable Cost - Production	**585**																										
	Variable Cost - Purchased Power	**846**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**3,430**																										
	Total Cost per MWh																											

Future 5 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	2,091	2,119	1,492	610
		Purchased Power		(202)	512	868
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**3,133**	**3,270**	**3,356**	**3,477**
		Delta (relative to Plan 1)		138	224	345

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**2,091**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**3,133**																										
	Total Cost per MWh																											
Plan 2	Variable Cost - Production	**2,119**																										
	Variable Cost - Purchased Power	**(202)**																										
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,270**																										
	Total Cost per MWh																											
Plan 3	Variable Cost - Production	**1,492**																										
	Variable Cost - Purchased Power	**512**																										
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,356**																										
	Total Cost per MWh																											
Plan 4	Variable Cost - Production	**610**																										
	Variable Cost - Purchased Power	**868**																										
	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**3,477**																										
	Total Cost per MWh																											

Future 1 S1 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,634	1,188	274
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	934	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,430**	**2,979**	**2,970**	**2,961**
		Delta (relative to Plan 1)		549	540	531

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**934**	9	72	79	88	91	109	112	109	106	103	101	99	97	95	94	93	91	90	89	88	85	82	79	76	72	59
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,430**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,634**																										
	Variable Cost - Purchased Power	**(8)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,979**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,188**																										
	Variable Cost - Purchased Power	**430**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,970**																										
	Total Cost per MWh																											
	Variable Cost - Production	**274**																										
	Variable Cost - Purchased Power	**688**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,961**																										
	Total Cost per MWh																											

Future 1 S2 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,634	1,188	274
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	872	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,369**	**2,979**	**2,970**	**2,961**
		Delta (relative to Plan 1)		610	602	592

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**872**	9	71	78	86	88	102	104	101	98	95	93	91	89	87	85	84	82	81	79	78	75	72	70	67	63	52
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,369**																										
Plan 2	**Total Cost per MWh**																											
	Variable Cost - Production	**1,634**																										
	Variable Cost - Purchased Power	**(8)**																										-
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,979**																										
Plan 3	**Total Cost per MWh**																											
	Variable Cost - Production	**1,188**																										
	Variable Cost - Purchased Power	**430**																										
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,970**																										
Plan 4	**Total Cost per MWh**																											
	Variable Cost - Production	**274**																										
	Variable Cost - Purchased Power	**688**																										
	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,961**																										
	Total Cost per MWh																											

Future 1 S3 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,634	1,188	274
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	903	1,316	1,316	1,850
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,400**	**3,037**	**3,029**	**3,068**
		Delta (relative to Plan 1)		638	629	668

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,400**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,634**																										
	Variable Cost - Purchased Power	**(8)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,316**	9	89	94	104	103	181	177	173	170	167	163	160	157	146	101	103	105	108	110	112	115	117	118	115	117	119
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,037**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,188**																										
	Variable Cost - Purchased Power	**430**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,316**	9	89	94	104	103	181	177	173	170	167	163	160	157	146	101	103	105	108	110	112	115	117	118	115	117	119
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,029**																										
	Total Cost per MWh																											
	Variable Cost - Production	**274**																										
	Variable Cost - Purchased Power	**688**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,850**	9	89	94	104	103	251	248	246	244	241	239	238	236	226	183	187	190	194	198	202	206	209	212	211	215	219
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**3,068**																										
	Total Cost per MWh																											

Future 1 S4 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,634	1,188	274
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	903	1,199	1,199	1,637
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,400**	**2,921**	**2,912**	**2,854**
		Delta (relative to Plan 1)		521	513	455

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,400**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,634**																										
	Variable Cost - Purchased Power	**(8)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,199**	9	89	94	104	103	166	162	158	154	150	147	143	140	128	83	85	87	89	91	93	95	96	97	94	96	97
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,921**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,188**																										
	Variable Cost - Purchased Power	**430**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,199**	9	89	94	104	103	166	162	158	154	150	147	143	140	128	83	85	87	89	91	93	95	96	97	94	96	97
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,912**																										
	Total Cost per MWh																											
	Variable Cost - Production	**274**																										
	Variable Cost - Purchased Power	**688**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,637**	9	89	94	104	103	223	220	217	214	212	209	207	204	194	150	153	156	160	163	166	169	172	174	173	176	179
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,854**																										
	Total Cost per MWh																											

Future 1 S5 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,634	1,188	274
		Purchased Power		(10)	537	860
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,400**	**2,977**	**3,078**	**3,133**
		Delta (relative to Plan 1)		578	678	734

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,400**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,634**																										
	Variable Cost - Purchased Power	**(10)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,977**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,188**																										
	Variable Cost - Purchased Power	**537**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,078**																										
	Total Cost per MWh																											
	Variable Cost - Production	**274**																										
	Variable Cost - Purchased Power	**860**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**3,133**																										
	Total Cost per MWh																											

Future 1 S6 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,634	1,188	274
		Purchased Power		(6)	322	516
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,400**	**2,981**	**2,863**	**2,789**
		Delta (relative to Plan 1)		581	463	390

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,400**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,634**																										
	Variable Cost - Purchased Power	**(6)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,981**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,188**																										
	Variable Cost - Purchased Power	**322**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,863**																										
	Total Cost per MWh																											
	Variable Cost - Production	**274**																										
	Variable Cost - Purchased Power	**516**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,789**																										
	Total Cost per MWh																											

Future 1 S7 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,911	1,362	299
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,400**	**3,256**	**3,144**	**2,986**
		Delta (relative to Plan 1)		857	745	586

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,400**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,911**																										
	Variable Cost - Purchased Power	**(8)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,256**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,362**																										
	Variable Cost - Purchased Power	**430**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,144**																										
	Total Cost per MWh																											
	Variable Cost - Production	**299**																										
	Variable Cost - Purchased Power	**688**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,986**																										
	Total Cost per MWh																											

Future 1 S8 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,358	1,356	1,014	250
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,400**	**2,702**	**2,797**	**2,936**
		Delta (relative to Plan 1)		302	397	537

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,358**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,400**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,356**																										
	Variable Cost - Purchased Power	**(8)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,702**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,014**																										
	Variable Cost - Purchased Power	**430**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,797**																										
	Total Cost per MWh																											
	Variable Cost - Production	**250**																										
	Variable Cost - Purchased Power	**688**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,936**																										
	Total Cost per MWh																											

Future 1 S9 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,683	1,739	1,293	379
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,725**	**3,084**	**3,076**	**3,066**
		Delta (relative to Plan 1)		360	351	342

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,683**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,725**																										
Plan 2	**Total Cost per MWh**																											
	Variable Cost - Production	**1,739**																										
	Variable Cost - Purchased Power	**(8)**																										-
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,084**																										
Plan 3	**Total Cost per MWh**																											
	Variable Cost - Production	**1,293**																										
	Variable Cost - Purchased Power	**430**																										
	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**3,076**																										
Plan 4	**Total Cost per MWh**																											
	Variable Cost - Production	**379**																										
	Variable Cost - Purchased Power	**688**																										
	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**3,066**																										
	Total Cost per MWh																											

Future 1 S10 **Columbia Unit 2 Retirement Analysis**
SUMMARY OUTPUT

Confidential Information is Highlighted in Gray

		Present Value (PVRR millions) (discounted to end of year 2013)	Plan 1	Plan 2	Plan 3	Plan 4
SUMMARY	Variable Costs	Production	1,033	1,529	1,083	169
		Purchased Power		(8)	430	688
	Fixed Costs	Capital Revenue Requirements	903	1,257	1,257	1,744
		O&M	138	96	96	255
	TOTAL	**Customer Cost**	**2,075**	**2,874**	**2,865**	**2,856**
		Delta (relative to Plan 1)		799	791	781

		PV Discounted to end of year 2013	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Plan 1	Variable Cost - Production	**1,033**																										
	Fixed Cost - Capital Rev Req	**903**	9	71	78	87	90	106	108	105	102	99	97	95	93	91	89	88	87	85	84	83	80	77	74	71	68	55
	Fixed Cost - O&M	**138**	9	11	10	10	11	11	12	12	12	13	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	23
	Total Cost	**2,075**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,529**																										
	Variable Cost - Purchased Power	**(8)**																										-
Plan 2	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,874**																										
	Total Cost per MWh																											
	Variable Cost - Production	**1,083**																										
	Variable Cost - Purchased Power	**430**																										
Plan 3	Fixed Cost - Capital Rev Req	**1,257**	9	89	94	104	103	173	169	166	162	158	155	152	148	137	92	94	96	98	101	103	105	106	107	104	106	108
	Fixed Cost - O&M	**96**	9	11	10	10	11	11	7	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	7	7	7
	Total Cost	**2,865**																										
	Total Cost per MWh																											
	Variable Cost - Production	**169**																										
	Variable Cost - Purchased Power	**688**																										
Plan 4	Fixed Cost - Capital Rev Req	**1,744**	9	89	94	104	103	237	234	231	229	227	224	222	220	210	167	170	173	177	180	184	187	191	193	192	195	199
	Fixed Cost - O&M	**255**	9	11	10	10	11	11	28	29	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	42	43	44
	Total Cost	**2,856**																										
	Total Cost per MWh																											

Each row of the following tables has a heat map showing lowest cost in cool (green) colors, and highest cost in warm (red) colors

Columbia Unit 2 SCR Futures and Sensitivities Analysis Summary

FUTURES ANALYSIS

Future	Description	Futures Analysis Results PVRR $2013 (millions)				Delta		
		Plan 1 COL2 w/SCR	Plan 2 Retire COL2 Add NGCC	Plan 3 Retire COL2 Add NGCC	Plan 4 Retire COL2 Add CT & Wind	Plan 1 less Plan 2	Plan 1 less Plan 3	Plan 1 less Plan 4
F1	BASE Case - Base Assumptions	2,400	2,979	2,970	2,961	(579)	(571)	(562)
F2	High Fuel (Coal +25%; Gas +25%)	2,725	3,360	3,348	3,247	(635)	(623)	(523)
F3	Low Fuel (Gas Price -25%, Coal Price -25%)	2,075	2,598	2,593	2,675	(524)	(519)	(600)
F4	CO2 (Base Case with the addition of a CO2 price based on the Wood Mackenzie forecast from Docket No. 141)	2,882	3,172	3,221	3,430	(290)	(339)	(548)
F5	High CO2 (Starting in 2022; High EIA CO2, coal price -10%; gas price +10%; modified coal cap factor -10%)	3,133	3,270	3,356	3,477	(138)	(224)	(345)

SENSITIVITY ANALYSIS - All Sensitivities were tested on Future 1

Sensitivity	Description	Sensitivity Analysis Results PVRR $2013 (millions)				Delta		
		Plan 1 COL2 w/SCR	Plan 2 Retire COL2 Add NGCC	Plan 3 Retire COL2 Add NGCC	Plan 4 Retire COL2 Add CT & Wind	Plan 1 less Plan 2	Plan 1 less Plan 3	Plan 1 less Plan 4
S1	Higher Cost of COL2 SCR and Ongoing Capital Adds by 10%	2,430	2,979	2,970	2,961	(549)	(540)	(531)
S2	Lower Cost of COL2 SCR and Ongoing Capital Adds by 10%	2,369	2,979	2,970	2,961	(610)	(602)	(592)
S3	Higher Construction Cost of the Alternatives by 10%	2,400	3,037	3,029	3,068	(638)	(629)	(668)
S4	Lower Construction Cost of the Alternatives by 10%	2,400	2,921	2,912	2,854	(521)	(513)	(455)
S5	Higher MISO Market Energy Price by 25%	2,400	2,977	3,078	3,133	(578)	(678)	(734)
S6	Lower MISO Market Energy Price by 25%	2,400	2,981	2,863	2,789	(581)	(463)	(390)
S7	Higher Delivered Gas Price by 25%	2,400	3,256	3,144	2,986	(857)	(745)	(586)
S8	Lower Delivered Gas Price by 25%	2,400	2,702	2,797	2,936	(302)	(397)	(537)
S9	Higher Delivered Coal Price by 25%	2,725	3,084	3,076	3,066	(360)	(351)	(342)
S10	Lower Delivered Coal Price by 25%	2,075	2,874	2,865	2,856	(799)	(791)	(781)

Maximum Delta	(857)
Minimum Delta	(138)

Financial Modeling Assumptions for an SCR on Columbia Generating Station Unit 2

The Applicants propose that traditional rate making shall be used for the return on and off the investment in the SCR at Columbia Generating Station Unit 2. The cost of capital assumptions included in **Table 1** are proposed for the purpose of having MGE, WPS and WPL align on a common cost of capital for the use in economic modeling of the project. The capital sources of 55% Common Equity and 45% Long Term Debt, Equity Cost Rate of 11.5%, and Long Term Debt rate of 5.5% are all consistent with the capital sources agreed upon for the Columbia Turbine and Pulverizer Upgrade, Docket No. 05-CE-141.

Table 1: Cost of Capital Assumptions

Weighted Average Cost of Capital

Capital Source	% of Total	Cost Rate	After Tax WACC	Pre Tax WACC
Common Equity	55.00%	11.500%	6.33%	10.565%
Long Term Debt	45.00%	5.500%	2.48%	2.475%
Preferred Stock	0.00%	0.000%	0.00%	0.000%
Short Term Debt	0.00%	0.000%	0.00%	0.000%
Totals	100.00%		8.80%	13.040%

Retail AFUDC Rate = WACC AfterTax	8.800%
Tax Capitalized Interest Rate at LTD Rate	5.500%
Discount Rate	8.80%

CWIP Treatment:	
Current Return on CWIP:	50%
AFUDC	50%

Effective Income Tax Rate

Federal Tax Rate	35.000%
Wisconsin Tax Rate	7.900%
Weighted Average Tax Rate	40.135%
Effective Tax Rate Reciprical	59.865%
Effective Tax Rate Multiplier	1.6704

The project in service dates to be used in the revenue requirement calculations are shown for each unit in **Table 2.**

Table 2: In Service Dates

Cost Component - In Service Date Assumptions:	
Existing NBV	2013
Ongoing Maintenance Capital	As Spent
Scrubber Baghouse	2014
Turbine & Mill Upgrades	2015-2017
SCR (1)	2018
Retirement Date Assumption	2038

(1) Spend through 2018 assumed in-service in first half of 2018. NOx emission reduction guaranteed by 1/1/2019

Decommissioning Cost Estimate: The models reflect a combined Net Salvage (salvage less cost of removal) and Asset Retirement Obligation (ARO) of (-18%). This amount is generally consisten with WPL's most recent PSCW approved depreciation study; Docket 6680-DU-107.

Tax Amortization/Depreciation: For tax purposes, it is anticipated that 60% of the costs will be amortized under IRC Code Section 169 for pollution control facilities over 7 years and the remaining portion of the SCR for Columbia Unit 2 would be depreciated using 20 year MACRS.

Book Depreciation: The analysis reflect the "remaining life" method of book depreciation for existing book value and the incremental investments made. This modeling assumption ensures that the revenue requirement calculations reflect full recovery of the investments at the plant over the modeled life of the unit(s).

Economic Modeling Fuel and Energy Price Assumptions

1. **Delivered Fuel Price** to the Columbia node
    a. **Coal Price** is the sum of fuel and transport cost:
        i. Fuel:
            1. Mine mouth coal from the EIA 2014-AEO for WY PRB Low Sulfur (Sub-Bituminous)
        ii. Transport:
            1. 2013-2016: WPL transport cost projection through 2016 from WPL's fuel supply and transportation group
            2. 2017-2038: The 2016 transport cost was inflated using a constant escalation rate per the recommendation of WPL's fuel supply and transportation group

2. **Blended Energy Price** (round the clock) at the Columbia node is a weighted average of 4600hrs of off-peak energy price and 4160hrs of on-peak energy price
    a. Off-Peak energy price ($/MWh) is based on the weighted average of a and a natural gas combined cycle unit dispatch cost
        i. **Coal dispatch cost** is a function of the delivered coal price, variable O&M, and average coal heat rate
            1. Delivered Coal Price – per 1.a
            2. Variable O&M is based on the 2013$ for a 600MW coal unit, from the Black & Veatch 2013 Power Station Characterization Study, dated Nov. 2013, and is escalated at 1.8% per year
            3. Average Coal heat rate is based on the 2008-2012 average coal prime mover heat rate from U.S. EIA, Form EIA-860, 'Annual Electric Generator Report.'
        ii. **Natural Gas Combined Cycle dispatch cost** is a function of delivered Natural Gas Price, Variable O&M, and Average Natural Gas Combined Cycle (NGCC) heat rate
            1. Delivered Natural Gas price is based on EIA 2014-AEO for the MRO-East region
            2. Variable O&M is based on the 2013$ for a 605MW NGCC unit, from the Black & Veatch 2013 Power Station Characterization Study, dated Nov. 2013, and is escalated at 1.8% per year
            3. Average NGCC heat rate is based on the 2008-2012 average NGCC prime mover heat rate from U.S. EIA, Form EIA-860, 'Annual Electric Generator Report.'
    b. On-Peak energy price ($/MWh) is based on the weighted average of a coal unit, a NGCC unit and a Natural Gas simple cycle unit dispatch cost
        i. **Coal Dispatch Cost**
            1. Same as described in 2.a.i
        ii. **Natural Gas Combined Cycle dispatch cost**
            1. Same as described in 2.a.ii
        iii. **Natural Gas Simple Cycle dispatch cost** is a function of delivered Natural Gas Price, Variable O&M, and Average Natural Gas Simple Cycle (NGSC) heat rate
            1. Delivered Natural Gas Price is based on EIA 2014-AEO for the MRO-East region
            2. Variable O&M is based on the 2013$ for 1x0 7F simple cycle gas CT unit from the Black & Veatch 2013 Power Station Characterization Study, dated Nov. 2013, and is escalated at 1.8% per year
            3. Average NGCT heat rate is based on the 2008-2012 NGSC prime mover heat rate from U.S. EIA, Form EIA-860, 'Annual Electric Generator Report.'
    c. The percentage weight that each technology received in the on-peak and off-peak is identified in Appendix D Schedule 3. The resulting blended energy price is included in Appendix D Schedule 4.

These fuel and energy price assumptions are only for use in the Economic Analysis portion of the CA for the Columbia Unit 2 SCR project to be filed with the PSCW in Q2 of 2014. They represent a generic forecast for modeling 100% share of the Joint Owned units.

Columbia Unit 2 SCR Analysis
Marginal unit contribution to on-peak and off-peak periods by technology type

Marginal Energy Source

These tables represent the percentage of hours that each technology is setting the price in the region. It does not represent the percent of energy volume for the year.

Futures with No Carbon Price

As a result of MATS compliance requirements, the older, less efficient, high cost coal units that are marginal on-peak resources will retire in 2015 and 2016.

The current on-peak coal:gas split is assumed 50:50

The current off-peak coal:gas split is assumed 80:20

It is assumed that simple cycle gas peakers do not contribute to the off-peak price in any year

Post-MATS retirements of marginal coal units are reflected in 2017 and beyond by doubling the percentage of marginal hours from gas relative to 2015. This change was made over a 2-year period to account for some units getting a one-year extension for MATS compliance

In the On-peak columns, marginal coal units are assumed to be retired in 2017 and beyond, however it is assumed that shoulder on-peak hours will still have a percentage of marginal coal.

Coal units are continuing to age and retire and new coal units are not being built. It is assumed that the coal:gas percentage in the Off-peak will flip at some point in the future. 2030 was picked as an proxy year for this flip to take place.

	On Peak			Off Peak		
Year	Coal	Gas (CC)	Gas (SC)	Coal	Gas (CC)	Gas (SC)
2013	50%	45%	5%	80%	20%	0%
2014	50%	45%	5%	80%	20%	0%
2015	50%	45%	5%	80%	20%	0%
2016	30%	60%	10%	70%	30%	0%
2017	10%	80%	10%	60%	40%	0%
2018	10%	80%	10%	60%	40%	0%
2019	10%	80%	10%	60%	40%	0%
2020	10%	80%	10%	60%	40%	0%
2021	10%	80%	10%	60%	40%	0%
2022	10%	80%	10%	60%	40%	0%
2023	10%	80%	10%	60%	40%	0%
2024	10%	80%	10%	60%	40%	0%
2025	10%	80%	10%	60%	40%	0%
2026	10%	80%	10%	60%	40%	0%
2027	10%	80%	10%	60%	40%	0%
2028	10%	80%	10%	60%	40%	0%
2029	10%	80%	10%	60%	40%	0%
2030	10%	80%	10%	40%	60%	0%
2031	10%	80%	10%	40%	60%	0%
2032	10%	80%	10%	40%	60%	0%
2033	10%	80%	10%	40%	60%	0%
2034	10%	80%	10%	40%	60%	0%
2035	10%	80%	10%	40%	60%	0%
2036	10%	80%	10%	40%	60%	0%
2037	10%	80%	10%	40%	60%	0%
2038	10%	80%	10%	40%	60%	0%

Columbia Unit 2 SCR Analysis
Marginal unit contribution to on-peak and off-peak periods by technology type

Marginal Energy Source

These tables represent the percentage of hours that each technology is setting the price in the region. It does not represent the percent of energy volume for the year.

Futures with Carbon Price

Values in the 'With Carbon Price' table were set equal to values in the 'no carbon price' table through 2021.

When carbon prices begin, it is assumed that NGCC and Coal Poduction Cost curves will overlap

When carbon prices begin, it is assumed that in the on-peak, coal is on the margin for majority of hours with SC meeting high peaks in demand, and less efficient CC units setting the price during some of the shoulder on-peak hours

When carbon prices begin, it is assumed that the coal and combined cycle gas relationship will filp. Combined cycle will move left in the dispatch curve and coal will move right in the dispatch curve.

60% coal in the off-peak predominantly represents coal units at or above minimum load. When CO2 monitization is added in 2022, it is assumed that some coal units will be pushed out of the money enough in the off-peak such that they will come offline. THis presents itself in this table as an increase in the number of hours that Combined cycle is setting the off-peak price because there is less volume of coal online

	On Peak			Off Peak		
Year	Coal	Gas (CC)	Gas (SC)	Coal	Gas (CC)	Gas (SC)
2013	50%	45%	5%	80%	20%	0%
2014	50%	45%	5%	80%	20%	0%
2015	50%	45%	5%	80%	20%	0%
2016	30%	60%	10%	70%	30%	0%
2017	10%	80%	10%	60%	40%	0%
2018	10%	80%	10%	60%	40%	0%
2019	10%	80%	10%	60%	40%	0%
2020	10%	80%	10%	60%	40%	0%
2021	10%	80%	10%	60%	40%	0%
2022	80%	10%	10%	40%	60%	0%
2023	80%	10%	10%	40%	60%	0%
2024	80%	10%	10%	40%	60%	0%
2025	80%	10%	10%	40%	60%	0%
2026	80%	10%	10%	40%	60%	0%
2027	80%	10%	10%	40%	60%	0%
2028	80%	10%	10%	40%	60%	0%
2029	80%	10%	10%	40%	60%	0%
2030	80%	10%	10%	40%	60%	0%
2031	80%	10%	10%	40%	60%	0%
2032	80%	10%	10%	40%	60%	0%
2033	80%	10%	10%	40%	60%	0%
2034	80%	10%	10%	40%	60%	0%
2035	80%	10%	10%	40%	60%	0%
2036	80%	10%	10%	40%	60%	0%
2037	80%	10%	10%	40%	60%	0%
2038	80%	10%	10%	40%	60%	0%

Note: Carbon price assumed effective in 2022.

Confidential data is high-lighted in gray

Energy price forecasts based on EIA Fuel Prices; WPL coal transport cost; and EIA prime mover heat rates

Future 1	Base Case	No CO2
Future 2	High Fuel	Gas Price +25%, Coal Price +25%
Future 3	Low Fuel	Gas Price -25%, Coal Price -25%
Future 4	CO2	Base Case with the addition of a CO2 price based on the Wood Mackenzie forecast from Docket No. 141
Future 5	High CO2	Starting in 2022; High EIA CO2, coal price -10%; gas price +10%; modified coal cap factor -10%

			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ENERGY PRICE	**Off-Peak**	Future 1											
		Future 2											
		Future 3											
		Future 4											
		Future 5											
	On-Peak	Future 1											
		Future 2											
		Future 3											
		Future 4											
		Future 5											
	Round the Clock	Future 1											
		Future 2											
		Future 3											
		Future 4											
		Future 5											
DELIVERED FUEL PRICE	**Coal**	Future 1											
		Future 2											
		Future 3											
		Future 4											
		Future 5											
	Natural Gas	Future 1	4.01	4.30	4.30	4.57	4.94	5.46	5.66	5.63	5.85	5.97	6.18
		Future 2	5.01	5.38	5.37	5.71	6.17	6.82	7.08	7.04	7.31	7.47	7.72
		Future 3	3.00	3.23	3.22	3.42	3.70	4.09	4.25	4.22	4.39	4.48	4.63
		Future 4	4.01	4.30	4.30	4.57	4.94	5.46	5.66	5.63	5.85	5.97	6.18
		Future 5	4.01	4.30	4.30	4.57	4.94	5.46	5.66	5.63	5.85	6.57	6.80
CO2	**CO2**	Future 1	-	-	-	-	-	-	-	-	-	-	-
		Future 2	-	-	-	-	-	-	-	-	-	-	-
		Future 3	-	-	-	-	-	-	-	-	-	-	-
		Future 4	-	-	-	-	-	-	-	-	-	16.07	17.37
		Future 5	-	-	-	-	-	-	-	-	-	40.72	42.76

Confidential data is high-lighted in gray

Energy price forecasts based on EIA Fuel Prices; WPL coal transport cost; and EIA prime mover heat rates

Future 1	Base Case	No CO2
Future 2	High Fuel	Gas Price +25%, Coal Price +25%
Future 3	Low Fuel	Gas Price -25%, Coal Price -25%
Future 4	CO2	Base Case with the addition of a CO2 price based on the Wood Mackenzie forecast from Docket No. 141
Future 5	High CO2	Starting in 2022; High EIA CO2, coal price -10%; gas price +10%; modified coal cap factor -10%

2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
[redacted]														
[redacted]														
6.51	6.78	6.96	7.19	7.47	7.86	8.29	8.65	9.06	9.54	10.01	10.56	11.19	11.69	12.18
8.14	8.48	8.70	8.98	9.34	9.82	10.36	10.81	11.32	11.92	12.51	13.20	13.99	14.61	15.22
4.88	5.09	5.22	5.39	5.60	5.89	6.21	6.49	6.79	7.15	7.51	7.92	8.40	8.76	9.13
6.51	6.78	6.96	7.19	7.47	7.86	8.29	8.65	9.06	9.54	10.01	10.56	11.19	11.69	12.18
7.16	7.46	7.66	7.90	8.22	8.65	9.11	9.51	9.96	10.49	11.01	11.62	12.31	12.86	13.39
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.79	20.31	21.96	23.74	25.67	27.75	30.01	32.44	35.07	37.92	41.00	44.33	47.93	51.82	56.03
44.90	47.14	49.50	51.97	54.57	57.30	60.17	63.17	66.33	69.65	73.13	76.79	80.63	84.66	88.89

Public Version

Confidential data is high-lighted in gray

EIA Delivered Gas Price;
EIA Minemouth Coal Price;
WPL Coal Transport Cost
EIA 5-yr Avg Prime Mover Heat Rates

Energy Cost by Generator and Fuel Type

	COAL			COMBINED CYCLE				SIMPLE CYCLE			Off Peak % of time fuel on margin			On Peak % of time fuel on margin		
	EIA 5-year Average Coal Heat Rate	CO2 Cost	EIA Delivered Natual Gas Price	EIA 5-year Average Combined Cycle Heat Rate	CO2 Cost	Combined Cycle Energy Cost	EIA Delivered Natural Gas Fuel Cost	EIA 5-year Average Simple Cycle Heat Rate	CO2 Cost	Simple Cycle Energy Cost	Coal	Gas Combined Cycle	Gas Simple Cycle	Coal	Gas Combined Cycle	Gas Simple Cycle
	Btu/kWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	%	%	%	%	%	
2013	10,133	$ -	$ 4.01	7,617	$ -	$ 33.44	$ 4.01	11,559	$ -	$ 63.54	80%	20%	0%	50%	45%	5%
2014	10,133	$ -	$ 4.30	7,617	$ -	$ 35.76	$ 4.30	11,559	$ -	$ 67.35	80%	20%	0%	50%	45%	5%
2015	10,133	$ -	$ 4.30	7,617	$ -	$ 35.80	$ 4.30	11,559	$ -	$ 67.70	80%	20%	0%	50%	45%	5%
2016	10,133	$ -	$ 4.57	7,617	$ -	$ 37.91	$ 4.57	11,559	$ -	$ 71.18	70%	30%	0%	30%	60%	10%
2017	10,133	$ -	$ 4.94	7,617	$ -	$ 40.81	$ 4.94	11,559	$ -	$ 75.89	60%	40%	0%	10%	80%	10%
2018	10,133	$ -	$ 5.46	7,617	$ -	$ 44.83	$ 5.46	11,559	$ -	$ 82.29	60%	40%	0%	10%	80%	10%
2019	10,133	$ -	$ 5.66	7,617	$ -	$ 46.47	$ 5.66	11,559	$ -	$ 85.10	60%	40%	0%	10%	80%	10%
2020	10,133	$ -	$ 5.63	7,617	$ -	$ 46.31	$ 5.63	11,559	$ -	$ 85.18	60%	40%	0%	10%	80%	10%
2021	10,133	$ -	$ 5.85	7,617	$ -	$ 48.05	$ 5.85	11,559	$ -	$ 88.14	60%	40%	0%	10%	80%	10%
2022	10,133	$ -	$ 5.97	7,617	$ -	$ 49.07	$ 5.97	11,559	$ -	$ 90.02	60%	40%	0%	10%	80%	10%
2023	10,133	$ -	$ 6.18	7,617	$ -	$ 50.71	$ 6.18	11,559	$ -	$ 92.85	60%	40%	0%	10%	80%	10%
2024	10,133	$ -	$ 6.51	7,617	$ -	$ 53.33	$ 6.51	11,559	$ -	$ 97.18	60%	40%	0%	10%	80%	10%
2025	10,133	$ -	$ 6.78	7,617	$ -	$ 55.47	$ 6.78	11,559	$ -	$ 100.79	60%	40%	0%	10%	80%	10%
2026	10,133	$ -	$ 6.96	7,617	$ -	$ 56.91	$ 6.96	11,559	$ -	$ 103.34	60%	40%	0%	10%	80%	10%
2027	10,133	$ -	$ 7.19	7,617	$ -	$ 58.70	$ 7.19	11,559	$ -	$ 106.43	60%	40%	0%	10%	80%	10%
2028	10,133	$ -	$ 7.47	7,617	$ -	$ 60.94	$ 7.47	11,559	$ -	$ 110.22	60%	40%	0%	10%	80%	10%
2029	10,133	$ -	$ 7.86	7,617	$ -	$ 64.01	$ 7.86	11,559	$ -	$ 115.26	60%	40%	0%	10%	80%	10%
2030	10,133	$ -	$ 8.29	7,617	$ -	$ 67.35	$ 8.29	11,559	$ -	$ 120.73	40%	60%	0%	10%	80%	10%
2031	10,133	$ -	$ 8.65	7,617	$ -	$ 70.21	$ 8.65	11,559	$ -	$ 125.47	40%	60%	0%	10%	80%	10%
2032	10,133	$ -	$ 9.06	7,617	$ -	$ 73.42	$ 9.06	11,559	$ -	$ 130.76	40%	60%	0%	10%	80%	10%
2033	10,133	$ -	$ 9.54	7,617	$ -	$ 77.18	$ 9.54	11,559	$ -	$ 136.89	40%	60%	0%	10%	80%	10%
2034	10,133	$ -	$ 10.01	7,617	$ -	$ 80.88	$ 10.01	11,559	$ -	$ 142.94	40%	60%	0%	10%	80%	10%
2035	10,133	$ -	$ 10.56	7,617	$ -	$ 85.17	$ 10.56	11,559	$ -	$ 149.89	40%	60%	0%	10%	80%	10%
2036	10,133	$ -	$ 11.19	7,617	$ -	$ 90.09	$ 11.19	11,559	$ -	$ 157.82	40%	60%	0%	10%	80%	10%
2037	10,133	$ -	$ 11.69	7,617	$ -	$ 93.95	$ 11.69	11,559	$ -	$ 164.15	40%	60%	0%	10%	80%	10%
2038	10,133	$ -	$ 12.18	7,617	$ -	$ 97.79	$ 12.18	11,559	$ -	$ 170.44	40%	60%	0%	10%	80%	10%

Gas Price Multiplier	1.25
Coal Price Multiplier	1.25

Confidential data is high-lighted in gray

EIA Delivered Gas Price;
EIA Minemouth Coal Price;
WPL Coal Transport Cost
EIA 5-yr Avg Prime Mover Heat Rates

Energy Cost by Generator and Fuel Type

	COAL			COMBINED CYCLE				SIMPLE CYCLE				Off Peak % of time fuel on margin			On Peak % of time fuel on margin		
	EIA 5-year Average Coal Heat Rate	CO2 Cost	EIA Delivered Natual Gas Price	EIA 5-year Average Combined Cycle Heat Rate	CO2 Cost	Combined Cycle Energy Cost	EIA Delivered Natural Gas Fuel Cost	EIA 5-year Average Simple Cycle Heat Rate	CO2 Cost	Simple Cycle Energy Cost	Coal	Gas Combined Cycle	Gas Simple Cycle	Coal	Gas Combined Cycle	Gas Simple Cycle
	Btu/kWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	%	%	%	%	%	
2013	10,133	$ -	$ 5.01	7,617	$ -	$ 41.07	$ 5.01	11,559	$ -	$ 75.12	80%	20%	0%	50%	45%	5%
2014	10,133	$ -	$ 5.38	7,617	$ -	$ 43.96	$ 5.38	11,559	$ -	$ 79.78	80%	20%	0%	50%	45%	5%
2015	10,133	$ -	$ 5.37	7,617	$ -	$ 43.99	$ 5.37	11,559	$ -	$ 80.12	80%	20%	0%	50%	45%	5%
2016	10,133	$ -	$ 5.71	7,617	$ -	$ 46.60	$ 5.71	11,559	$ -	$ 84.37	70%	30%	0%	30%	60%	10%
2017	10,133	$ -	$ 6.17	7,617	$ -	$ 50.22	$ 6.17	11,559	$ -	$ 90.17	60%	40%	0%	10%	80%	10%
2018	10,133	$ -	$ 6.82	7,617	$ -	$ 55.22	$ 6.82	11,559	$ -	$ 98.06	60%	40%	0%	10%	80%	10%
2019	10,133	$ -	$ 7.08	7,617	$ -	$ 57.25	$ 7.08	11,559	$ -	$ 101.46	60%	40%	0%	10%	80%	10%
2020	10,133	$ -	$ 7.04	7,617	$ -	$ 57.04	$ 7.04	11,559	$ -	$ 101.46	60%	40%	0%	10%	80%	10%
2021	10,133	$ -	$ 7.31	7,617	$ -	$ 59.18	$ 7.31	11,559	$ -	$ 105.04	60%	40%	0%	10%	80%	10%
2022	10,133	$ -	$ 7.47	7,617	$ -	$ 60.44	$ 7.47	11,559	$ -	$ 107.29	60%	40%	0%	10%	80%	10%
2023	10,133	$ -	$ 7.72	7,617	$ -	$ 62.47	$ 7.72	11,559	$ -	$ 110.71	60%	40%	0%	10%	80%	10%
2024	10,133	$ -	$ 8.14	7,617	$ -	$ 65.73	$ 8.14	11,559	$ -	$ 116.00	60%	40%	0%	10%	80%	10%
2025	10,133	$ -	$ 8.48	7,617	$ -	$ 68.39	$ 8.48	11,559	$ -	$ 120.40	60%	40%	0%	10%	80%	10%
2026	10,133	$ -	$ 8.70	7,617	$ -	$ 70.17	$ 8.70	11,559	$ -	$ 123.46	60%	40%	0%	10%	80%	10%
2027	10,133	$ -	$ 8.98	7,617	$ -	$ 72.38	$ 8.98	11,559	$ -	$ 127.19	60%	40%	0%	10%	80%	10%
2028	10,133	$ -	$ 9.34	7,617	$ -	$ 75.17	$ 9.34	11,559	$ -	$ 131.80	60%	40%	0%	10%	80%	10%
2029	10,133	$ -	$ 9.82	7,617	$ -	$ 78.98	$ 9.82	11,559	$ -	$ 137.97	60%	40%	0%	10%	80%	10%
2030	10,133	$ -	$ 10.36	7,617	$ -	$ 83.13	$ 10.36	11,559	$ -	$ 144.67	40%	60%	0%	10%	80%	10%
2031	10,133	$ -	$ 10.81	7,617	$ -	$ 86.68	$ 10.81	11,559	$ -	$ 150.46	40%	60%	0%	10%	80%	10%
2032	10,133	$ -	$ 11.32	7,617	$ -	$ 90.66	$ 11.32	11,559	$ -	$ 156.93	40%	60%	0%	10%	80%	10%
2033	10,133	$ -	$ 11.92	7,617	$ -	$ 95.34	$ 11.92	11,559	$ -	$ 164.46	40%	60%	0%	10%	80%	10%
2034	10,133	$ -	$ 12.51	7,617	$ -	$ 99.94	$ 12.51	11,559	$ -	$ 171.87	40%	60%	0%	10%	80%	10%
2035	10,133	$ -	$ 13.20	7,617	$ -	$ 105.28	$ 13.20	11,559	$ -	$ 180.41	40%	60%	0%	10%	80%	10%
2036	10,133	$ -	$ 13.99	7,617	$ -	$ 111.41	$ 13.99	11,559	$ -	$ 190.17	40%	60%	0%	10%	80%	10%
2037	10,133	$ -	$ 14.61	7,617	$ -	$ 116.21	$ 14.61	11,559	$ -	$ 197.92	40%	60%	0%	10%	80%	10%
2038	10,133	$ -	$ 15.22	7,617	$ -	$ 120.97	$ 15.22	11,559	$ -	$ 205.62	40%	60%	0%	10%	80%	10%

Gas Price Multiplier	0.75
Coal Price Multiplier	0.75

Confidential data is high-lighted in gray

EIA Delivered Gas Price;
EIA Minemouth Coal Price;
WPL Coal Transport Cost
EIA 5-yr Avg Prime Mover Heat Rates

Energy Cost by Generator and Fuel Type

	COAL			COMBINED CYCLE				SIMPLE CYCLE			Off Peak % of time fuel on margin			On Peak % of time fuel on margin		
	EIA 5-year Average Coal Heat Rate	CO2 Cost		EIA Delivered Natual Gas Price	EIA 5-year Average Combined Cycle Heat Rate	CO2 Cost	Combined Cycle Energy Cost	EIA Delivered Natural Gas Fuel Cost	EIA 5-year Average Simple Cycle Heat Rate	CO2 Cost	Simple Cycle Energy Cost	Coal	Gas Combined Cycle	Gas Simple Cycle	Coal	Gas Combined Cycle	Gas Simple Cycle
	Btu/kWh	$/MWh		$/MMBtu	Btu/kWh	$/MWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	%	%	%	%	%	
2013	10,133	$ -		$ 3.00	7,617	$ -	$ 25.81	$ 3.00	11,559	$ -	$ 51.97	80%	20%	0%	50%	45%	5%
2014	10,133	$ -		$ 3.23	7,617	$ -	$ 27.57	$ 3.23	11,559	$ -	$ 54.92	80%	20%	0%	50%	45%	5%
2015	10,133	$ -		$ 3.22	7,617	$ -	$ 27.62	$ 3.22	11,559	$ -	$ 55.28	80%	20%	0%	50%	45%	5%
2016	10,133	$ -		$ 3.42	7,617	$ -	$ 29.21	$ 3.42	11,559	$ -	$ 57.99	70%	30%	0%	30%	60%	10%
2017	10,133	$ -		$ 3.70	7,617	$ -	$ 31.41	$ 3.70	11,559	$ -	$ 61.62	60%	40%	0%	10%	80%	10%
2018	10,133	$ -		$ 4.09	7,617	$ -	$ 34.44	$ 4.09	11,559	$ -	$ 66.53	60%	40%	0%	10%	80%	10%
2019	10,133	$ -		$ 4.25	7,617	$ -	$ 35.69	$ 4.25	11,559	$ -	$ 68.73	60%	40%	0%	10%	80%	10%
2020	10,133	$ -		$ 4.22	7,617	$ -	$ 35.59	$ 4.22	11,559	$ -	$ 68.91	60%	40%	0%	10%	80%	10%
2021	10,133	$ -		$ 4.39	7,617	$ -	$ 36.91	$ 4.39	11,559	$ -	$ 71.23	60%	40%	0%	10%	80%	10%
2022	10,133	$ -		$ 4.48	7,617	$ -	$ 37.69	$ 4.48	11,559	$ -	$ 72.76	60%	40%	0%	10%	80%	10%
2023	10,133	$ -		$ 4.63	7,617	$ -	$ 38.94	$ 4.63	11,559	$ -	$ 75.00	60%	40%	0%	10%	80%	10%
2024	10,133	$ -		$ 4.88	7,617	$ -	$ 40.93	$ 4.88	11,559	$ -	$ 78.36	60%	40%	0%	10%	80%	10%
2025	10,133	$ -		$ 5.09	7,617	$ -	$ 42.56	$ 5.09	11,559	$ -	$ 81.19	60%	40%	0%	10%	80%	10%
2026	10,133	$ -		$ 5.22	7,617	$ -	$ 43.66	$ 5.22	11,559	$ -	$ 83.23	60%	40%	0%	10%	80%	10%
2027	10,133	$ -		$ 5.39	7,617	$ -	$ 45.02	$ 5.39	11,559	$ -	$ 85.67	60%	40%	0%	10%	80%	10%
2028	10,133	$ -		$ 5.60	7,617	$ -	$ 46.72	$ 5.60	11,559	$ -	$ 88.64	60%	40%	0%	10%	80%	10%
2029	10,133	$ -		$ 5.89	7,617	$ -	$ 49.05	$ 5.89	11,559	$ -	$ 92.55	60%	40%	0%	10%	80%	10%
2030	10,133	$ -		$ 6.21	7,617	$ -	$ 51.57	$ 6.21	11,559	$ -	$ 96.79	40%	60%	0%	10%	80%	10%
2031	10,133	$ -		$ 6.49	7,617	$ -	$ 53.74	$ 6.49	11,559	$ -	$ 100.48	40%	60%	0%	10%	80%	10%
2032	10,133	$ -		$ 6.79	7,617	$ -	$ 56.17	$ 6.79	11,559	$ -	$ 104.58	40%	60%	0%	10%	80%	10%
2033	10,133	$ -		$ 7.15	7,617	$ -	$ 59.02	$ 7.15	11,559	$ -	$ 109.33	40%	60%	0%	10%	80%	10%
2034	10,133	$ -		$ 7.51	7,617	$ -	$ 61.82	$ 7.51	11,559	$ -	$ 114.02	40%	60%	0%	10%	80%	10%
2035	10,133	$ -		$ 7.92	7,617	$ -	$ 65.06	$ 7.92	11,559	$ -	$ 119.38	40%	60%	0%	10%	80%	10%
2036	10,133	$ -		$ 8.40	7,617	$ -	$ 68.78	$ 8.40	11,559	$ -	$ 125.48	40%	60%	0%	10%	80%	10%
2037	10,133	$ -		$ 8.76	7,617	$ -	$ 71.70	$ 8.76	11,559	$ -	$ 130.38	40%	60%	0%	10%	80%	10%
2038	10,133	$ -		$ 9.13	7,617	$ -	$ 74.60	$ 9.13	11,559	$ -	$ 135.25	40%	60%	0%	10%	80%	10%

Gas Price Multiplier	1.00
Coal Price Multiplier	1.00

Confidential data is high-lighted in gray

EIA Delivered Gas Price;
EIA Minemouth Coal Price;
WPL Coal Transport Cost
EIA 5-yr Avg Prime Mover Heat Rates

Energy Cost by Generator and Fuel Type

	COAL			COMBINED CYCLE				SIMPLE CYCLE				Off Peak % of time fuel on margin				On Peak % of time fuel on margin			
	EIA 5-year Average Coal Heat Rate	CO2 Cost (Wood Mackenzie)	EIA Delivered Natual Gas Price	EIA 5-year Average Combined Cycle Heat Rate	CO2 Cost (Wood Mackenzie)	Combined Cycle Energy Cost	EIA Delivered Natural Gas Fuel Cost	EIA 5-year Average Simple Cycle Heat Rate	CO2 Cost (Wood Mackenzie)	Simple Cycle Energy Cost	Coal	Gas Combined Cycle	Gas Simple Cycle	Coal	Gas Combined Cycle	Gas Simple Cycle	
	Btu/kWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	%	%	%	%	%		
2013	10,133	$ -	$ 4.01	7,617	$ -	$ 33.44	$ 4.01	11,559	$ -	$ 63.54	80%	20%	0%	50%	45%	5%	
2014	10,133	$ -	$ 4.30	7,617	$ -	$ 35.76	$ 4.30	11,559	$ -	$ 67.35	80%	20%	0%	50%	45%	5%	
2015	10,133	$ -	$ 4.30	7,617	$ -	$ 35.80	$ 4.30	11,559	$ -	$ 67.70	80%	20%	0%	50%	45%	5%	
2016	10,133	$ -	$ 4.57	7,617	$ -	$ 37.91	$ 4.57	11,559	$ -	$ 71.18	70%	30%	0%	30%	60%	10%	
2017	10,133	$ -	$ 4.94	7,617	$ -	$ 40.81	$ 4.94	11,559	$ -	$ 75.89	60%	40%	0%	10%	80%	10%	
2018	10,133	$ -	$ 5.46	7,617	$ -	$ 44.83	$ 5.46	11,559	$ -	$ 82.29	60%	40%	0%	10%	80%	10%	
2019	10,133	$ -	$ 5.66	7,617	$ -	$ 46.47	$ 5.66	11,559	$ -	$ 85.10	60%	40%	0%	10%	80%	10%	
2020	10,133	$ -	$ 5.63	7,617	$ -	$ 46.31	$ 5.63	11,559	$ -	$ 85.18	60%	40%	0%	10%	80%	10%	
2021	10,133	$ -	$ 5.85	7,617	$ -	$ 48.05	$ 5.85	11,559	$ -	$ 88.14	60%	40%	0%	10%	80%	10%	
2022	10,133	$ 17.32	$ 5.97	7,617	$ 7.17	$ 56.23	$ 5.97	11,559	$ 10.87	$ 100.90	40%	60%	0%	80%	10%	10%	
2023	10,133	$ 18.72	$ 6.18	7,617	$ 7.75	$ 58.45	$ 6.18	11,559	$ 11.75	$ 104.61	40%	60%	0%	80%	10%	10%	
2024	10,133	$ 20.25	$ 6.51	7,617	$ 8.38	$ 61.70	$ 6.51	11,559	$ 12.71	$ 109.89	40%	60%	0%	80%	10%	10%	
2025	10,133	$ 21.89	$ 6.78	7,617	$ 9.06	$ 64.53	$ 6.78	11,559	$ 13.74	$ 114.54	40%	60%	0%	80%	10%	10%	
2026	10,133	$ 23.67	$ 6.96	7,617	$ 9.79	$ 66.70	$ 6.96	11,559	$ 14.86	$ 118.20	40%	60%	0%	80%	10%	10%	
2027	10,133	$ 25.58	$ 7.19	7,617	$ 10.59	$ 69.29	$ 7.19	11,559	$ 16.06	$ 122.50	40%	60%	0%	80%	10%	10%	
2028	10,133	$ 27.66	$ 7.47	7,617	$ 11.45	$ 72.39	$ 7.47	11,559	$ 17.37	$ 127.59	40%	60%	0%	80%	10%	10%	
2029	10,133	$ 29.90	$ 7.86	7,617	$ 12.37	$ 76.39	$ 7.86	11,559	$ 18.78	$ 134.04	40%	60%	0%	80%	10%	10%	
2030	10,133	$ 32.34	$ 8.29	7,617	$ 13.38	$ 80.73	$ 8.29	11,559	$ 20.31	$ 141.04	40%	60%	0%	80%	10%	10%	
2031	10,133	$ 34.96	$ 8.65	7,617	$ 14.46	$ 84.67	$ 8.65	11,559	$ 21.95	$ 147.42	40%	60%	0%	80%	10%	10%	
2032	10,133	$ 37.79	$ 9.06	7,617	$ 15.64	$ 89.05	$ 9.06	11,559	$ 23.73	$ 154.49	40%	60%	0%	80%	10%	10%	
2033	10,133	$ 40.86	$ 9.54	7,617	$ 16.91	$ 94.09	$ 9.54	11,559	$ 25.66	$ 162.55	40%	60%	0%	80%	10%	10%	
2034	10,133	$ 44.18	$ 10.01	7,617	$ 18.28	$ 99.16	$ 10.01	11,559	$ 27.74	$ 170.69	40%	60%	0%	80%	10%	10%	
2035	10,133	$ 47.77	$ 10.56	7,617	$ 19.77	$ 104.93	$ 10.56	11,559	$ 30.00	$ 179.89	40%	60%	0%	80%	10%	10%	
2036	10,133	$ 51.65	$ 11.19	7,617	$ 21.37	$ 111.46	$ 11.19	11,559	$ 32.43	$ 190.25	40%	60%	0%	80%	10%	10%	
2037	10,133	$ 55.84	$ 11.69	7,617	$ 23.11	$ 117.06	$ 11.69	11,559	$ 35.06	$ 199.21	40%	60%	0%	80%	10%	10%	
2038	10,133	$ 60.38	$ 12.18	7,617	$ 24.98	$ 122.77	$ 12.18	11,559	$ 37.91	$ 208.35	40%	60%	0%	80%	10%	10%	

Gas Price Multiplier	1.1	2022+ only
Coal Price Multiplier	0.9	2022+ only

Confidential data is high-lighted in gray

EIA Delivered Gas Price;
EIA Minemouth Coal Price;
WPL Coal Transport Cost
EIA 5-yr Avg Prime Mover Heat Rates

Energy Cost by Generator and Fuel Type

	COAL				COMBINED CYCLE				SIMPLE CYCLE			Off Peak % of time fuel on margin			On Peak % of time fuel on margin		
	EIA 5-year Average Coal Heat Rate	CO2 Cost (EIA AEO 2013)	EIA Delivered Natual Gas Price	EIA 5-year Average Combined Cycle Heat Rate	CO2 Cost (EIA AEO 2013)	Combined Cycle Energy Cost	EIA Delivered Natural Gas Fuel Cost	EIA 5-year Average Simple Cycle Heat Rate	CO2 Cost (EIA AEO 2013)	Simple Cycle Energy Cost	Coal	Gas Combined Cycle	Gas Simple Cycle	Coal	Gas Combined Cycle	Gas Simple Cycle
	Btu/kWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	$/MMBtu	Btu/kWh	$/MWh	$/MWh	%	%	%	%	%	
2013	10,133	$ -	$ 4.01	7,617	$ -	$ 33.44	$ 4.01	11,559	$ -	$ 63.54	80%	20%	0%	50%	45%	5%
2014	10,133	$ -	$ 4.30	7,617	$ -	$ 35.76	$ 4.30	11,559	$ -	$ 67.35	80%	20%	0%	50%	45%	5%
2015	10,133	$ -	$ 4.30	7,617	$ -	$ 35.80	$ 4.30	11,559	$ -	$ 67.70	80%	20%	0%	50%	45%	5%
2016	10,133	$ -	$ 4.57	7,617	$ -	$ 37.91	$ 4.57	11,559	$ -	$ 71.18	70%	30%	0%	30%	60%	10%
2017	10,133	$ -	$ 4.94	7,617	$ -	$ 40.81	$ 4.94	11,559	$ -	$ 75.89	60%	40%	0%	10%	80%	10%
2018	10,133	$ -	$ 5.46	7,617	$ -	$ 44.83	$ 5.46	11,559	$ -	$ 82.29	60%	40%	0%	10%	80%	10%
2019	10,133	$ -	$ 5.66	7,617	$ -	$ 46.47	$ 5.66	11,559	$ -	$ 85.10	60%	40%	0%	10%	80%	10%
2020	10,133	$ -	$ 5.63	7,617	$ -	$ 46.31	$ 5.63	11,559	$ -	$ 85.18	60%	40%	0%	10%	80%	10%
2021	10,133	$ -	$ 5.85	7,617	$ -	$ 48.05	$ 5.85	11,559	$ -	$ 88.14	60%	40%	0%	10%	80%	10%
2022	10,133	$ 43.88	$ 6.57	7,617	$ 18.16	$ 71.78	$ 6.57	11,559	$ 27.55	$ 124.48	40%	60%	0%	80%	10%	10%
2023	10,133	$ 46.08	$ 6.80	7,617	$ 19.07	$ 74.48	$ 6.80	11,559	$ 28.93	$ 128.93	40%	60%	0%	80%	10%	10%
2024	10,133	$ 48.38	$ 7.16	7,617	$ 20.02	$ 78.31	$ 7.16	11,559	$ 30.38	$ 135.08	40%	60%	0%	80%	10%	10%
2025	10,133	$ 50.80	$ 7.46	7,617	$ 21.02	$ 81.66	$ 7.46	11,559	$ 31.90	$ 140.53	40%	60%	0%	80%	10%	10%
2026	10,133	$ 53.34	$ 7.66	7,617	$ 22.07	$ 84.29	$ 7.66	11,559	$ 33.49	$ 144.88	40%	60%	0%	80%	10%	10%
2027	10,133	$ 56.01	$ 7.90	7,617	$ 23.17	$ 87.35	$ 7.90	11,559	$ 35.17	$ 149.90	40%	60%	0%	80%	10%	10%
2028	10,133	$ 58.81	$ 8.22	7,617	$ 24.33	$ 90.97	$ 8.22	11,559	$ 36.93	$ 155.78	40%	60%	0%	80%	10%	10%
2029	10,133	$ 61.75	$ 8.65	7,617	$ 25.55	$ 95.55	$ 8.65	11,559	$ 38.77	$ 163.12	40%	60%	0%	80%	10%	10%
2030	10,133	$ 64.84	$ 9.11	7,617	$ 26.83	$ 100.49	$ 9.11	11,559	$ 40.71	$ 171.02	40%	60%	0%	80%	10%	10%
2031	10,133	$ 68.08	$ 9.51	7,617	$ 28.17	$ 104.96	$ 9.51	11,559	$ 42.75	$ 178.21	40%	60%	0%	80%	10%	10%
2032	10,133	$ 71.48	$ 9.96	7,617	$ 29.58	$ 109.89	$ 9.96	11,559	$ 44.88	$ 186.11	40%	60%	0%	80%	10%	10%
2033	10,133	$ 75.06	$ 10.49	7,617	$ 31.06	$ 115.50	$ 10.49	11,559	$ 47.13	$ 195.05	40%	60%	0%	80%	10%	10%
2034	10,133	$ 78.81	$ 11.01	7,617	$ 32.61	$ 121.11	$ 11.01	11,559	$ 49.48	$ 204.00	40%	60%	0%	80%	10%	10%
2035	10,133	$ 82.75	$ 11.62	7,617	$ 34.24	$ 127.45	$ 11.62	11,559	$ 51.96	$ 214.06	40%	60%	0%	80%	10%	10%
2036	10,133	$ 86.89	$ 12.31	7,617	$ 35.95	$ 134.57	$ 12.31	11,559	$ 54.56	$ 225.32	40%	60%	0%	80%	10%	10%
2037	10,133	$ 91.23	$ 12.86	7,617	$ 37.75	$ 140.60	$ 12.86	11,559	$ 57.28	$ 234.94	40%	60%	0%	80%	10%	10%
2038	10,133	$ 95.79	$ 13.39	7,617	$ 39.64	$ 146.69	$ 13.39	11,559	$ 60.15	$ 244.66	40%	60%	0%	80%	10%	10%