REDACTED VERSION

Application of WPPI Energy for a Certificate of Authority and Any Other Authorization to Participate in the Upgrade of Boswell Energy Center Unit 4 Air Quality Control System

Submitted To:

Public Service Commission of Wisconsin

October 11, 2012

WPPI energy

The way energy should be

REDACTED VERSION

BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Application of WPPI Energy for a
Certificate of Authority and Any
Other Authorization to Participate in
the Upgrade of Boswell Energy Center
Unit 4 Air Quality Control System

APPLICATION

This Application is filed pursuant to Wis. Stat. §196.49 and Wis. Admin. Code §§PSC 112.05 and 112.06 by WPPI Energy ("WPPI"), a municipal electric company formed pursuant to Wis. Stat. §66.0825.

WPPI requests that the Public Service Commission of Wisconsin grant (1) a Certificate of Authority ("CA") to allow WPPI to participate as a joint owner with Minnesota Power in the upgrade (the "Project") of the air quality control system at Boswell Energy Center Unit 4 in Cohasset, Minnesota and (2) any other authorizations needed to permit WPPI to participate in the Project.

This Application supports WPPI's request. The CA, if granted, will not (1) substantially impair the efficiency of WPPI's services, (2) provide facilities unreasonably in excess of WPPI's probable future requirements, or (3) add to WPPI's cost of service without proportionately increasing the value or available quantity of service. Wis. Stat. §196.49(3)(b).

Respectfully submitted this 11th day of October, 2012,

WPPI ENERGY

By: /s/ Thomas S. Hanrahan
Thomas S. Hanrahan
General Counsel
1425 Corporate Center Drive
Sun Prairie, WI 53590
(608) 834-4500 (phone)
(608) 825-1727 (fax)

TABLE OF CONTENTS

REDACTED VERSION

EXECUTIVE SUMMARY

WPPI Energy ("WPPI") is a 20 percent co-owner of the Boswell Energy Center Unit 4, located in Cohasset, Minnesota ("BEC4"), along with Minnesota Power which operates BEC4 and owns the remaining 80 percent. BEC4 is a 585MW low-sulphur coal-fired generating unit placed in operation in 1980. On August 31, 2012, Minnesota Power filed with the Minnesota Pollution Control Agency ("MPCA") and the Minnesota Public Utilities Commission ("MPUC") a plan to execute an environmental retrofit project at BEC4 as a multi-pollutant solution for reducing mercury, particulate matter ("PM"), sulphur dioxide ("SO_2") and other hazardous air pollutants in order to achieve compliance with the Minnesota Mercury Emission Reduction Act (Minn. Stat. §§ 216B.68-216B.688) ("MERA"), the U.S. Environmental Protection Agency ("EPA") Mercury and Air Toxics Standard ("MATS") and other enacted or pending federal and state environmental rulemakings regulating air and water emissions and solid byproducts from coal-fired power plants (the "Project"). As the minority co-owner supporting the Project, WPPI files this request for a Certificate of Authority ("CA") for WPPI's participation in the Project.

BEC4 has been the anchor baseload resource in WPPI's power supply portfolio since the Public Service Commission of Wisconsin ("Commission") approved its ownership interest in 1990. BEC4 is WPPI's lowest-cost resource, and will remain its lowest cost resource after the Project, WPPI's cost of which is expected to be approximately $96 million. The emissions profile of BEC4 after the Project is completed, combined with earlier BEC4 emissions improvement projects, is expected to compare favorably with the emission rates of WPPI's other core baseload resource, the Elm Road Generating Station, one of the cleanest coal plants in the United States.

The timeline for the Project is driven in large part by the MATS rule, with which compliance is required by April 2016, assuming that a one-year extension is granted by the State of Minnesota. The Project schedule calls for construction to begin in April 2013 in order to ensure the MATS deadline is met.

WPPI's continued utilization of BEC4 as a baseload power supply resource through approval of the Project is in the best interests of WPPI, its members, and their customers for several reasons:

- Continuing Need. BEC4 continues to meet a key WPPI baseload capacity resource need. Without BEC4, WPPI would have to fill an immediate baseload need of 117 MW to maintain a balanced portfolio, since WPPI currently does not have any excess baseload resources and has additional capacity needs starting in 2017.
- Ownership. BEC4 provides WPPI with continued ownership of its key lowest-cost baseload resource, lessening WPPI's need to rely on purchased power to serve its member needs at higher overall costs and cost uncertainty.
- Diversity. BEC4 serves WPPI's continuing business objective to maintain a diverse power supply portfolio by providing balance to a portfolio that includes substantial renewable resources, natural gas resources, and, with WPPI's recent long term purchase of output from Point Beach, nuclear resources.
- Low Cost Option. Economies of scale associated with BEC4 and the Project make the all-in cost of electricity from the facility very attractive compared to WPPI's alternatives. WPPI will be financing its share of the Project through the issuance of tax-exempt revenue bonds at a time of historically low interest rates, resulting in lower costs for WPPI's members and their customers over the useful life of BEC4.

Given these benefits, the Project will enable WPPI to maintain a resource and capacity status quo from a power supply standpoint, and therefore the Project will not provide excess facilities or impair WPPI's current efficient service to its members and their customers, thus satisfying the first two standards of Wis. Stat. §196.49(3)(b). As discussed further in this Application, WPPI believes that the third standard of §196.49(3)(b) is not subject to the Commission's purview. However, cost considerations are evaluated by WPPI's Board of Directors, and those considerations show that the Project will not add to WPPI's cost of service without proportionately increasing the value or available quantity of such service.

For the reasons stated above, and as more fully supported in this Application, WPPI has satisfied the provisions of Wis. Stat. §196.49. WPPI respectfully requests that the Commission issue a CA and any other authorizations needed for WPPI to participate in the Project. Such issuance is requested by April 1, 2013 to accommodate the tight construction schedule necessitated by the MATS rule compliance deadline.

1.0 INTRODUCTION

1.1 Description of WPPI

WPPI is a municipal electric company formed pursuant to Wis. Stat. §66.0825. WPPI supplies all of the electric power requirements of its fifty-one member distribution systems within Wisconsin, Iowa and Michigan, including forty-one municipal members in Wisconsin (with limited exceptions related primarily to small, locally owned hydroelectric facilities).[1] Each

[1] WPPI's members within Wisconsin are the cities and villages of Algoma, Black River Falls, Boscobel, Brodhead, Cedarburg, Columbus, Cuba City, Eagle River, Evansville, Florence, Hartford, Hustisford, Jefferson, Juneau, Kaukauna, Lake Mills, Lodi, Menasha, Mount Horeb, Muscoda, New Glarus, New Holstein, New London, New Richmond, Oconomowoc, Oconto Falls, Plymouth, Prairie du Sac, Reedsburg, Richland Center, River Falls, Slinger, Stoughton, Sturgeon Bay, Sun Prairie, Two Rivers, Waterloo, Waunakee, Waupun, Westby and Whitehall. WPPI's members within Iowa are the cities of Independence, Maquoketa and Preston. WPPI's members within Michigan are the cities and villages of Baraga, Crystal Falls, Gladstone, L'Anse, Negaunee and Norway. While Alger Delta Cooperative Electric Association is not eligible for full membership as a non-governmental entity, WPPI serves its power needs on a substantially identical basis as WPPI's members.

WPPI member owns and operates an electric distribution system within and around its borders. The members provide retail electric service to the industries, businesses and citizens within their service areas and serve a total of approximately 195,000 customers. WPPI recently established a new peak demand of 1048 MW on July 17, 2012. WPPI has entered into separate long term power supply contracts with each of its members. Each long term power supply contract is substantially identical and remains in effect through December 31, 2037, and may, subject to certain limitations, cap purchases from WPPI upon five years prior written notice.

WPPI's primary mission is to provide a low cost, reliable and stable supply of electricity to its members. WPPI develops and maintains a diversified portfolio of owned and long and short-term purchased power resources to meet its members' power requirements consistent with this mission. WPPI evaluates potential resource options as they become available on a case-by-case basis and seeks to implement the most cost-effective and feasible options as part of its supply portfolio. In this Application, WPPI is seeking a CA and any other authorizations needed to participate in the Project.

1.2 Description of BEC4

BEC4 is a 585 MW low-sulfur coal-fired generating unit located on the Mississippi River in Cohasset, Minnesota. BEC4 was placed in operation in 1980 and is operated by the unit's majority owner, Minnesota Power. Minnesota Power owns and operates a total of nine coal-fired units, including four units at the Boswell site. BEC4 is the newest and largest generating unit in the Minnesota Power system. By order dated June 18, 1990, in Docket No. 6685-CE-101, the Commission approved the purchase by WPPI of a 20 percent share of the ownership of BEC4. The remaining 80 percent ownership interest of BEC4 is held by Minnesota Power. In 2009, the Commission granted a CA authorizing WPPI's participation in a steam turbine generator upgrade project at BEC4 (Docket No. 6685-CE-109). The project improvements resulted in a 10 percent

increase in energy output from BEC4 with no increase in fuel consumption, thus decreasing the emissions per unit of output correspondingly. In 2010, a low NO_x burner project was completed (at a cost to WPPI below the threshold requiring Commission approval), substantially reducing NO_x emissions from BEC4.

1.3 Compliance with the Provisions of Wis. Stat. §196.49

To approve a CA under Wis. Stat. §196.49, the Commission must conclude that approval of a project will not: (1) substantially impair the efficiency of service to the public utility; (2) provide facilities unreasonably in excess of the probable future requirements; and (3) when placed in operation, add to the cost of service without proportionately increasing the value or available quantity of service. Wis. Stat. §196.49(3)(b).

This Application demonstrates that WPPI has a significant continuing need for the baseload capacity provided by BEC4. Participation in the Project will not provide excess facilities or impair WPPI's efficiency of service. Such ownership will allow WPPI to continue the use of BEC4 and maintain WPPI's current efficiency of service. Therefore, the first two standards of Wis. Stat. §196.49(3)(b) are satisfied.

With respect to the third standard of Wis. Stat. §196.49(3)(b), cost of service, WPPI believes it is not subject to the same standards as other utilities under §196.49(3)(b) because of the existence of Wis. Stat. §66.0825(10). Due to local governmental oversight of municipal electric companies and their not-for-profit status, the Wisconsin Legislature has determined in §66.0825 (the statute under which WPPI is created and exists) that Commission oversight of WPPI's rates to members is unnecessary.[2] The cost of service impacts of the Project on WPPI members is a matter which the Legislature has delegated solely to local government oversight.

[2] Wis. Stat. §66.0825(10) provides the "terms and conditions and rates at which a [municipal electric] company sells power and energy for resale are not subject to regulation or alteration by the Public Service Commission."

WPPI's Board of Directors (comprised of local governmental officials and employees) must approve WPPI's ownership and financing of the Project.

Although WPPI believes that cost of service is not an issue in this proceeding, it provides cost justification of such projects to its Board of Directors, which must approve WPPI's participation and funding for the Project. WPPI provides herein the cost analysis of WPPI's share of the Project costs, which shows that the Project and continued use of BEC4 is the least cost alternative for WPPI. The Project is consistent with the objectives of WPPI's Board of Directors for WPPI to continue to own a sufficient share of its power supply resources to provide long-term rate stability to its members.

The Commission can easily conclude that the cost impacts of WPPI's participation in the Project are reasonable and appropriate without grappling with the jurisdictional issue. The economic analysis clearly establishes WPPI's participation in the Project to allow continued use of BEC4 as a least cost option. For this reason, the Commission can conclude that participation in the Project will not "add to WPPI's cost of service without proportionally increasing the value or available quantity of service." Wis. Stat. §196.49(3)(b). Consequently, WPPI has satisfied the provisions of Wis. Stat. §196.49.

2.0 PROJECT DESCRIPTION

2.1 Existing BEC4 Air Quality Control System ("ACQS")

BEC4 was originally constructed with first generation low NO_x burners and close coupled over-fire air[3] and what was in 1980 a state-of-the-art wet spray tower absorber/particulate removal system. This system removes more than 85 percent of the SO_2 and

[3] Close coupled over-fire air ("CCOFA") is a type of over-fire air system used for NO_x emission reduction. This was an early technology used for NO_x control.

over 97.5 percent of PM. Recent investments made in emissions reduction have resulted in continued improvements in emissions reduction at BEC4.

NO_x Control

In late 2008, Selective Non-Catalytic Reduction ("SNCR") technology was installed for the removal of NO_x at BEC4. The SNCR system utilizes NALCO Mobotec's Rotamix technology. Boiler injection ports are used to deliver urea into the boiler to chemically transform NO_x emissions into nitrogen gas and water vapor. In 2010, the first generation low NO_x burners were replaced with state-of-the-art low NO_x burners and separated over-fire air technology that is widely used in coal-fired utility boilers to minimize the creation of NO_x in the coal combustion process. These NO_x controls provide a reduction in annual NO_x emissions of approximately 55 percent.

PM and SO_2 Control

BEC4 currently utilizes a wet particulate scrubber system for PM control coupled with a spray tower absorber for SO_2 control. A small portion of the flue gas (approximately 2 to 5 percent) bypasses the scrubber and absorber. This bypass stream is treated by an electrostatic precipitator for PM control before being blended with the remainder of the flue gas, where it acts to reheat the flue gas treated by the scrubber. This process results in keeping the flue gas dry after it exits the spray tower absorber and passes through the induced draft ("ID") fans, duct work, and finally through the stack. Dry flue gas is critical because moist gas is highly corrosive and would corrode the fans, ductwork, and soften the mortar within the stack. New units equipped with a scrubber utilizing a spray tower absorber are designed for wet operation. The fans are positioned before the spray tower absorber, and the ductwork is constructed out of a corrosion resistant alloy. The stack is also specially designed with corrosion resistant linings to withstand the corrosive nature of the wet flue gas.

2.2 Proposed Project

The Project will replace BEC4's existing PM and SO_2 emission control system with a Circulating Dry Scrubber ("CDS") system incorporating a fabric filter, and with installation of a powdered activated carbon ("PAC") injection system. In addition to reducing emissions of SO_2, PM and mercury, the Project will also reduce emissions of acid gases, including hydrogen chloride, and trace metals.

Circulating Dry Scrubber

A CDS is a type of semi-dry flue gas desulfurization system. In a CDS system, flue gas enters a vertical reactor tower before exiting to a fabric filter where additional emission capture and collection takes place. Flue gas enters at the base of the vertical reactor tower and flows upward through a venturi and mixes with a fluidized bed[4] which is comprised of a mixture of dry lime and fly ash. The intensive gas-solid mixing occurring at this point in the CDS process promotes reaction of sulfur oxides in the flue gas with the dry lime particles. Water is introduced for flue gas humidification and to enhance the reactivity of the lime and physical absorption for more effective SO_2 removal. As discussed more fully below, PAC is injected into the vertical reactor tower for the purpose of capturing mercury and is collected along with the PM in the fabric filter. Introducing the PAC prior to the flue gas entering the fabric filter allows for the necessary reaction time to maximize mercury removal.

Using 2011 as a baseline, annual SO_2 emissions at BEC4 are expected to decrease from nearly 1061 tons to 647 tons as a result of the Project. The new emission rate is expected to be approximately 0.030 lb/MMBtu compared to the 2011 average emission rate of 0.049

[4] A fluidized bed is a layer of small solid particles suspended and kept in motion by an upward flow of a fluid (as a gas). The fluidized bed acts as a reactor for the flue gas to make contact with the reagent.

lb/MMBtu, about a 39 percent reduction. Emission reductions for mercury and PM are discussed as part of the PAC and fabric filter descriptions.

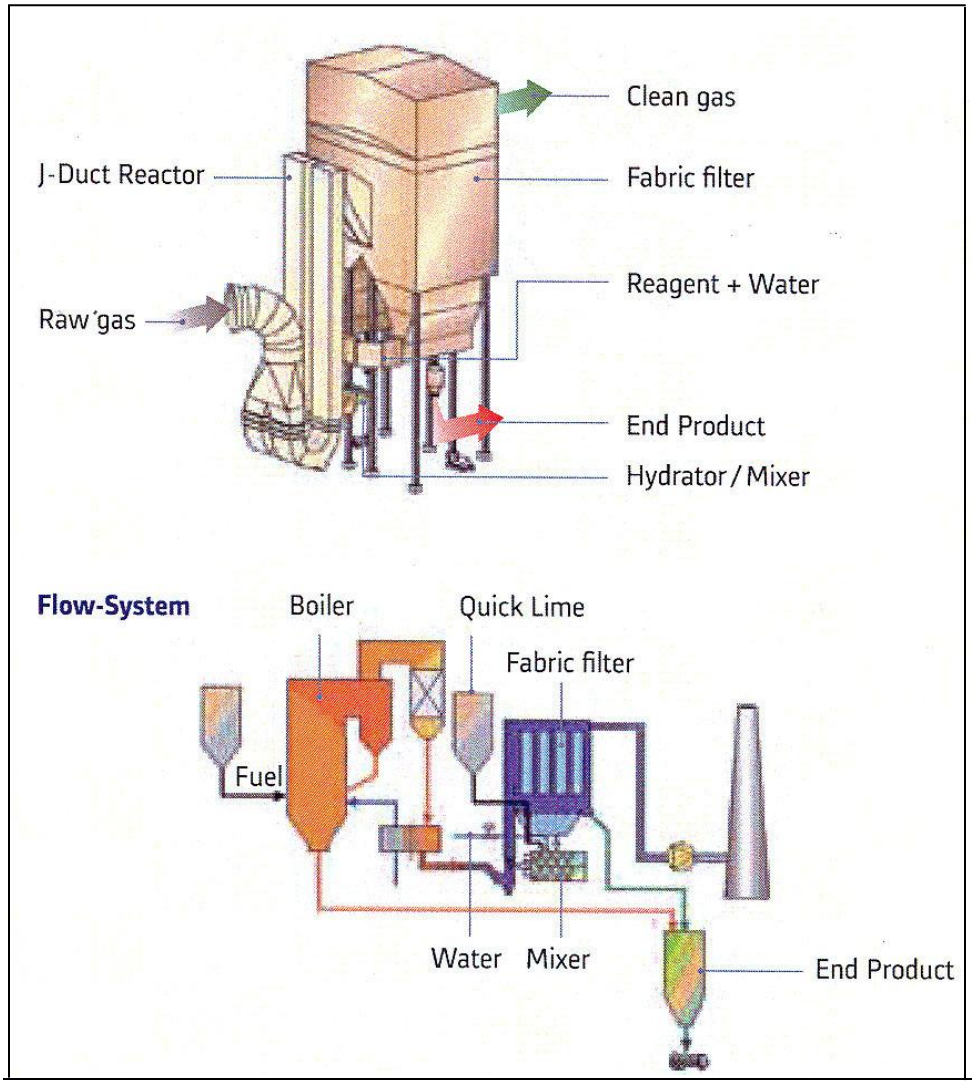


Figure 1 - CDS Flow Process Diagram

Powdered Activated Carbon

PAC systems are proven power plant mercury reduction technologies able to achieve very high removal efficiencies (i.e., 90 percent). PAC is used to remove mercury from the flue gas. The injected carbon compound adsorbs[5] the vaporized mercury from the flue gas and

[5] Adsorption is the process where one substance sticks to the surface of another substance. Absorption is the process where one substance has fully entered or is taken into the other substance.

combines the mercury with carbon and fly ash particulate. The particulates are then captured by a fabric filter.

This system is expected to achieve approximately a 90 percent mercury removal at BEC4 using PAC in combination with a fabric filter, discussed below.

Fabric Filter

The fabric filter, also commonly referred to as a "bag house," is integral in maximizing mercury removal. Fabric filters use fiberglass or other fabric bags to collect filterable PM and fly ash. The fly ash is periodically cleaned from the fabric bags and sent to the waste ash handling system. The unique concept of the fabric filter with a CDS system is that a portion of the fly ash is recirculated to the absorber tower to assist in SO_2 removal.

The Project is expected to reduce annual filterable PM emissions from a 2011 baseline of 1,275 tons to 259 tons, and reduce the filterable PM emission rate to 0.012 lb/MMBtu compared to the 2011 average PM emission rate of 0.06 lb/MMBtu, about an 80 percent reduction.

Post-Project mercury emissions will drop from a 2011 baseline of 228 lbs/year to 26 lbs/year. The post-Project emission rate is expected to be 0.60 lb/TBtu compared to the 2011 average mercury emission rate of 5.283 lb/TBtu, about an 89 percent reduction.

Waste Ash Handling System ("Ash System")

Conversion of BEC4 to a CDS system will change the way waste fly ash is currently managed in the existing Boswell Energy Center ash disposal system. The BEC4 dry fly ash and flue gas desulfurization ("FGD") solids will be transported pneumatically from the BEC4 CDS to a newly constructed BEC4 fly ash silo, then transported to the ash disposal area via truck for deposition with dry coal combustion residuals ("CCRs" or "coal ash") from Units 1, 2, and 3 at the Boswell Energy Center's on-site ash storage system. Upgrades to the Boswell Energy Center's ash disposal infrastructure are necessary to accommodate the increased volume of fly

ash generated by the BEC4 CDS. The necessary upgrades include expansion of the bottom ash foundation base layer in the pond disposal area, larger final cover construction projects, an increased storm water sedimentation pond, access ramp and haul road improvements, and additional equipment to transport the additional fly ash.

2.3 Project Schedule

The Project schedule was largely developed by Minnesota Power as operator and majority owner of BEC4, and is designed to satisfy the requirements described in Section 3.0 below. Due to the integrated nature of the entire project, there is a need to provide considerable upfront time for conceptual engineering, final design, procurement and construction. Equipment and labor resource (*e.g.*, skilled craft, engineering) availability were heavily considered in developing a schedule. Similarly, effort was made to schedule the required outage(s) at the optimal time in order to minimize any replacement energy and associated operation and maintenance costs. Final tie-in of the entire Project will occur during a single scheduled maintenance outage. Minnesota Power plans to begin onsite construction for the Project in spring 2013, assuming receipt of construction permits, with in-service expected by year-end 2015. The following table presents the projected schedule for Project implementation activities:

Table 2-1 - Project Implementation Schedule

Activity – Project Implementation	Timeline
Phase 1 – Conceptual Engineering	
Target Procurement Activities – Environmental Equipment	Apr 2012 – Dec 2012
Phase 2 – Final Design & Procurement	
Fabricate/Deliver – Fabric Filter/CDS	Jul 2012 – May 2015
Phase 3 – Construction	
Site Preparation	Apr 2013 – Jul 2013
Pile/Pile cap construction	Jul 2013 – Nov 2013
Construction – Civil & Foundations	Apr 2013 – Sep 2014
Construction – CDS/Fabric Filter and Ash Silo	Apr 2014 – Jul 2015
Construction – Electrical and Controls	Nov 2014 – Jul 2015
Phase 4 – Start-Up	
Checkout & Commission for Tuning	Apr 2015 – Oct 2015
Final Plant Start-Up and Tuning	Oct 2015 – Jan 2016

3.0 PROJECT PURPOSE AND NECESSITY

The Project is required in order for BEC4 to comply with pending and future environmental regulations, including MERA and MATS.

3.1 Minnesota Mercury Emissions Reduction Act

MERA was signed into law on May 11, 2006. MERA targeted six generating units at Minnesota's three largest coal-fired power plants.[6] The original legislation called for Minnesota Power to file a mercury reduction plan for BEC4 with the MPUC by July 1, 2011, with plan implementation completed by December 31, 2014. The plan filing date was extended to July 1, 2015 and the plan implementation date to December 31, 2018. Minnesota Power filed its mercury reduction plan petition for BEC4 August 31, 2012. The Project is designed to satisfy MERA mercury reduction requirements, and regulatory approval from the MPUC is expected.

3.2 EPA Mercury and Air Toxics Standards

Under Section 112 of the Clean Air Act, the EPA is required to set emission standards for hazardous air pollutants ("HAPs") for certain source categories. The EPA published the final MATS rule in the Federal Register on February 16, 2012, addressing such emissions from coal-fired utility units greater than 25 MW. There are currently 188 listed HAPs that the EPA is required to evaluate for establishment of Maximum Achievable Control Technology standards. In the final MATS rule, the EPA established categories of HAPs, including mercury, trace metals other than mercury, acid gases, dioxin/furans, and organics other than dioxin/furans. The EPA also established emission limits for the first three categories of HAPs, and work practice standards for the remaining categories. Affected sources such as BEC4 must be in compliance with the rule by April 2015. States have the authority to grant sources a one-year extension.

[6] Minnesota's three largest coal-fired power plants at the time the legislation was enacted were: Xcel Energy's Sherco and Allen S. King plants and Minnesota Power's Boswell Energy Center, also known as the Clay Boswell Plant.

Such an extension from the State of Minnesota is anticipated for the Project. Table 3-1 shows the MATS emission limits compared to BEC4's baseline emission rates and the expected post-Project emission rate.

Table 3-1 - Standards Comparisons

Boswell Unit 4	SO_2 [a] (lbs/mmBtu)	PM [b] (lbs/mmbtu)	Hg (lbs/TBtu)
Baseline Emission Rate	0.049	0.06	5.283
MATS Standard	0.20	0.030	1.2
Post-Project Emission Rate Guarantee	0.03	0.012	0.6

a. Note that under the MATS rule, SO_2 is an alternate parameter for the hydrogen chloride standard, for which the Project will also meet requirements.
b. Filterable portion only.

3.3 Other Environmental Considerations

While MERA and MATS are the primary requirements driving the need for the Project, the Project will also help BEC4 comply with a number of additional current and pending environmental requirements.

Cross-State Air Pollution Rule ("CSAPR")

On July 6, 2011, the EPA issued CSAPR, which requires electric generating facilities in certain states, including Minnesota, to have sufficient allowances to cover emissions of SO_2 and NO_x. The final rule replaced the EPA's 2005 Clean Air Interstate Rule ("CAIR"). On August 21, 2012, the United States Court of Appeals for the District of Columbia Circuit issued a ruling vacating CSAPR, and ordered that CAIR remain in place while EPA develops a replacement for CSAPR. Minnesota participation in CAIR has been stayed by EPA administrative action. While CAIR remains in effect, Minnesota participation in CAIR will continue to be stayed. If the EPA's replacement for CSAPR requires BEC4 to have allowances to cover its emissions of SO_2,

the improved SO_2 emissions control performance provided by the Project would substantially reduce or eliminate the need to obtain allowances for compliance.

National Ambient Air Quality Standards ("NAAQS")

NAAQS are established to protect human health ("primary standards") or public welfare ("secondary standards"). EPA is required to review the NAAQS every five years. If the EPA determines that a state's air quality is not in compliance with a NAAQS, the state is required to establish plans to reduce emissions to demonstrate attainment with that NAAQS.

BEC4 is not currently subject to a NAAQS attainment plan. If that were to change, the Project would help address any NAAQS issues that might arise in the future in Minnesota given its impact on reducing emissions of SO_2 and PM.

Regional Haze

The federal Regional Haze Rule requires states to submit State Implementation Plans to the EPA to address regional haze visibility impairment in 156 federally-protected parks and wilderness areas. Under the first phase of the Regional Haze Rule, certain large stationary sources, put in service between 1962 and 1977, with emissions contributing to visibility impairment, are required to install emission controls, known as Best Available Retrofit Technology ("BART"). BEC4 is not subject to the BART requirements. However, every 10 years, states must review the Regional Haze plan and put in place additional requirements to achieve further reductions in PM, SO_2 and NO_x which contribute to haze. The next review of the Regional Haze Rule is expected to take place in 2018. The reduction in emissions of SO_2 and PM provided by the Project would help ensure compliance with any future restrictions placed on these emissions as a result of rule changes to meet Regional Haze Rule requirements.

Regulation of Coal Combustion Residuals

On June 18, 2010, the EPA proposed regulations for CCR generated by the electric utility sector. The proposal sought comments on three general regulatory approaches for coal ash including: regulation as a hazardous waste under Subtitle C of the Resource Conservation and Recovery Act ("RCRA"); regulation under Subtitle D of RCRA as a non-hazardous waste; and regulation under Subtitle D of RCRA, but only at the end of a current ash storage facility's (i.e., impoundment or landfill) useful life (so-called "D-Prime" option). It is expected that the final rule will be published in late 2012 or early 2013. The CCR rule will likely require dry handling of coal ash. Coal ash from BEC4 is currently managed in a wet onsite impoundment (ash pond). By converting to dry handling of fly ash, the Project would better position BEC4 for compliance with the requirements of the CCR rule.

Steam Electric Power Generating Effluent Guidelines

On September 15, 2009, the EPA announced its decision to proceed with information collection and advance rulemaking to revise regulations of wastewater discharges from steam electric generating plants. EPA plans to propose a rulemaking for the steam electric power generating industry in November 2012 and take final action by April 2014. The final effluent guidelines will likely require dry handling of fly ash and FGD solids, which would be provided by the Project. Additionally, the Project's CDS system would be a net consumer of water/wastewater. This water-consumptive property has obvious benefits in a regulatory future where stringent metals- or salts-based limits for wastewater discharges might otherwise require significant capital and operation and maintenance ("O&M") investments.

Minnesota Power Notice of Violation

It may also be noted that in August 2008, Minnesota Power received a Notice of Violation ("NOV") from the EPA asserting violations of the New Source Review ("NSR")

requirements of the Clean Air Act at Boswell Energy Center Units 1-4. WPPI has not received such an NOV. The NOV asserts that certain projects undertaken at the Boswell Energy Center facility between 1981 and 2000 should have been reviewed under the NSR requirements, and that the BEC4 Title V permit was violated. Minnesota Power believes the projects identified in the NOV were in full compliance with the Clean Air Act, NSR requirements and applicable permits. While Minnesota Power is engaged in discussions with the EPA regarding resolution of these matters, it is unable to predict the outcome of these discussions and therefore their effect on BEC4. Nonetheless, it is reasonable to assume that any settlement would require SO_2 and PM reductions on BEC4.

4.0 PROJECT COST AND FINANCING METHOD

4.1 Estimated Project Cost

As a minority owner of BEC4, WPPI is responsible for its pro-rata 20 percent share of the costs associated with the Project. WPPI's estimated share of the capital cost of the Project is approximately $96 million, including financing costs and interest during construction. The total capital cost reflects WPPI's 20 percent ownership interest in the equipment and facilities that comprise the Project. The Project cost estimates have been developed based on consulting engineers' like-kind project experience and vendor proposals, as well as Minnesota Power engineering resources and experience. A Project cost breakdown is shown in Table 4-1.

Table 4-1 - Project Cost Breakdown – WPPI's Share

	Capital (000s)
CDS/ Fabric Filter	$ 69,060
PAC System	$ 2,525
Ductwork	$ 9,570
Ash Handling Systems	$ 14,785
Total	**$ 95,940**

4.2 Financing Approach

It is anticipated that all or a large majority of WPPI's costs associated with the Project will be financed by WPPI through a combination of short-term and long-term fixed-rate tax-exempt bonds designed to minimize financing costs within risk tolerances. The ultimate financing chosen will be determined based on then-current market conditions and an assessment of the benefits and risks associated with different financing options. The earliest WPPI expects to issue debt to finance this Project is early 2013.

4.3 Project Operating Cost

WPPI Energy's portion of the incremental O&M expense for the Project is estimated to be approximately $3.125 million for the twelve-month period ending June 30, 2017, as shown in Table 4-2.

Table 4-2 - O&M Cost Breakdown – WPPI's Share

	Annual Incremental O&M (000s)
CDS/ Fabric Filter	$ 2,275
PAC System	$ 75
Ash Handling Systems	$ 775
Total	**$ 3,125**

This cost is an initial first year estimate provided by CDS vendors to Minnesota Power and is based upon the cost to operate similar facilities at a capacity factor of approximately 85 percent.

5.0 DESCRIPTION AND COST OF PROPERTY BEING REPLACED

Equipment with a total WPPI net book value of $4,275,069 would be replaced as part of the Project. A list of equipment, by FERC account, is provided in Table 5-1.

Table 5-1 - Cost of Equipment Being Replaced – WPPI's Share

	FERC Acct. 3121	FERC Acct. 3151	FERC Acct. 3111
Absorber Building			$929,792
Absorber System	$1,235,474		
AQCS MCC Building		$20,332	
Ash Water Return	$164,687		
Dry Fly Ash Handling	$18,067		
Fly Ash Slurry	$29,085		
Lime System	$12,322		
Lime System Foundation	$108,390		
Precipitator Enclosure	$96,092		
Recycle Tanks	$195,978		
Electrostatic Precip	$313,604		
Reheat System	$216,277		
Supernate System	$275,573		
Venturi System	$659,395		
Total	**$3,324,945**	**$20,332**	**$929,792**

6.0 ALTERNATIVE ENVIRONMENTAL COMPLIANCE TECHNOLOGIES

A number of alternatives to the Project for compliance with the MERA and MATS emission limits have been considered, including (i) PAC injection without a fabric filter system, (ii) installation of a fabric filter and wet FGD system, (iii) installation of a fabric filter and upgrade of the existing FGD system, and (iv) installation of the proposed fabric filter and CDS system. Each of these alternatives is discussed in more detail below.

PAC Injection without Fabric Filter System

The injection of halogenated activated carbon along with a solution of calcium bromide in conjunction with the existing wet venturi and FGD scrubber was evaluated. Limited testing of this option was conducted in 2011. Results were generally promising, with mercury removal rates averaging 65-75 percent, and up to 90 percent for short periods of time. However, based on the testing, it is likely that the average removal rate over time would be significantly less than required to meet the MATS mercury limit. In addition, this approach alone would not address

the PM limit in the MATS rule and would create unacceptable opacity standards compliance limitations. For these reasons, this alternative was eliminated.

As a result of the testing of PAC injection with the existing AQCS, it was determined that the installation of a fabric filter system is the only viable option in order to meet the mercury and PM limits in MATS. However, the installation of a fabric filter completely changes the operation of the existing spray tower absorber, by removing the fly ash that is currently utilized for SO_2 capture. Therefore, in addition to installing a fabric filter, the spray tower absorber system would need to either be upgraded or replaced. The CDS option has been chosen to address this issue.

Wet FGD

This option would include the installation of a wet limestone forced oxidation FGD system, along with a fabric filter and activated carbon injection system. This option would meet MATS requirements and would provide Best Available Control Technology ("BACT")-level reduction of SO_2, PM, and mercury. The wet FGD option would require new ID fans as well as a substantial amount of ductwork to connect the new fabric filter, wet FGD and ID fans into the existing plant and chimney. This option would require overcoming substantial site constraints including demolition and relocation of the Boswell Energy Center's administrative building and warehouse. This option would help in meeting anticipated CCR rules in that the fly ash would be dry. However, the wet FGD would still produce a wet slurry. Because of its high cost, site constraints caused by the large footprint, high annual O&M requirements, and the inability to fully comply with potential future CCR regulations due to the wet FGD slurry, this option was dismissed.

Upgrade to Existing FGD System

Under this option, the existing FGD system would be upgraded to meet current technology removal efficiencies. New ID fans, fabric filter, and activated carbon injection system would be installed as part of the project. As with the previous option of installing a new wet FGD system, this option would meet MATS requirements and provide BACT-level reduction of SO_2, PM and mercury. However, this was determined to be the most expensive option because it would require major modifications to the existing FGD system, installation of new ID fans, and a large amount of ductwork to connect a new fabric filter ahead of the FGD. Additionally, this option would require a number of outages to tie in the new and/or upgraded components. This option would help in meeting future CCR rules in that the fly ash would be dry. However, the FGD would still produce a wet slurry. This option was dismissed due to the high cost to retrofit a 30-year old scrubber that would be more expensive and less efficient to operate than the proposed CDS system, site constraints caused by the large footprint, high annual O&M requirements, and the inability to fully comply with potential future CCR regulations due to the wet FGD slurry.

CDS System

Minnesota Power determined that the proposed CDS system, along with a fabric filter and PAC injection system, is the best available option for meeting the requirements of MERA, MATS and other pending and potential environmental requirements. By incorporating a fabric filter, the proposed system would consistently provide a high level of mercury reduction. The CDS option would have a lower capital and operating cost than either the option of installing a new wet FGD system or the option of upgrading the existing FGD system. Unlike either of these options, the CDS option would provide for dry handling of FGD solids, easing compliance with the forthcoming CCR rule and steam electric power generating effluent guidelines. The

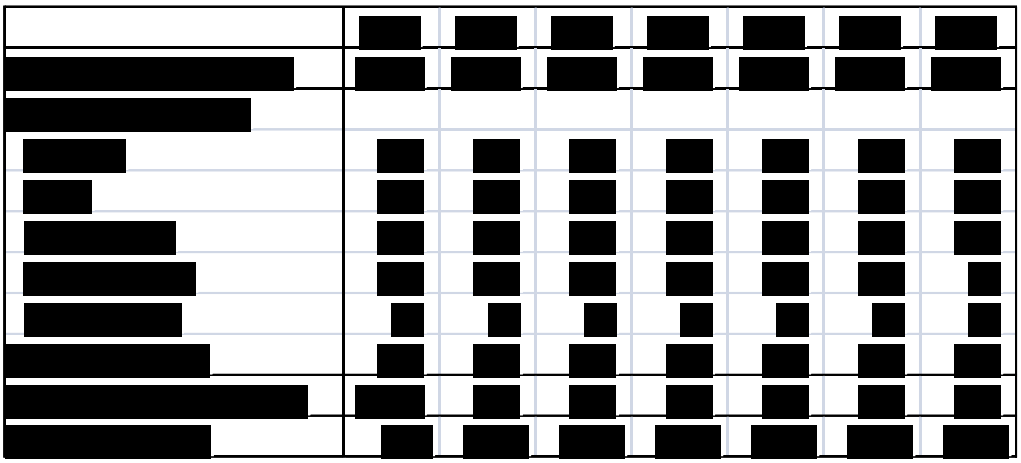
installation of a wet FGD system and the upgrade of the existing spray tower absorbers were considered and dismissed, as discussed below.

7.0 ALTERNATIVES TO CONTINUED OPERATION OF BEC4

Unless the Project or some other option for compliance with the MATS emissions limits is completed, BEC4 will not be able to continue operating beyond the MATS compliance date of April, 2015, at which time WPPI then would be immediately short of baseload capacity by 117 MW from its lowest cost baseload resource. If Minnesota Power receives its requisite approvals and installation of the Project proceeds, WPPI is contractually obligated as minority co-owner of BEC4 to contribute its pro-rata share of the cost of the Project. However, this Application clearly demonstrates that even if WPPI were not constrained by the requirements of the BEC4 Ownership Agreement, installation of the Project and continued operation of BEC4 is the best option for WPPI and its members as compared to any of the potential alternatives available to replace BEC4.

Table 7-1 shows WPPI's current projected capacity position. It illustrates the importance of BEC4 in meeting WPPI's future capacity requirements and maintaining a diverse portfolio. Without WPPI's continued ownership and the operation of BEC4, WPPI would be significantly short of capacity resources immediately and the loss of this resource would exacerbate its existing need for additional capacity resources starting in 2017.

Table 7-1 Resources Owned or Under Contract to WPPI (2016 – 2022)
Including Continued Ownership and Operation of BEC4 (all numbers in MW)



WPPI's comparison of alternatives to the Project and continued generation of BEC4 considered conservation and demand side management, renewables, purchases from other utilities and natural gas-fired generation. WPPI considered these options in light of the provisions of the Energy Priorities Law ("EPL"), Wis. Stats. §1.11, and concluded that the higher priority alternatives in the EPL are not cost effective and technically feasible to meet WPPI's need for baseload capacity.

Conservation and Demand Side Management

WPPI manages a variety of conservation and demand side management programs and services available to its members and their customers to reduce the consumption of electricity and to provide for curtailment of load. These consumption efforts are accounted for in WPPI's load forecast and reflected in Table 7-1 above. While pursuit of these efforts will continue in the future, they are not currently a practical or cost effective replacement for WPPI's baseload energy from BEC4. WPPI's energy conservation program continues to be effective, but WPPI does not have enough additional energy conservation potential to replace BEC4, an existing significant source of energy serving WPPI load. This is especially true given that without its existing BEC4 resource, WPPI's need for baseload capacity would be immediate. Moreover,

while successful and continuing demand side management programs such as an interruptible program can be effective at reducing peak demand, they have little effect on reducing around the clock energy need that is met with production by baseload resources such as BEC4.

Renewable Energy

WPPI owns and purchases renewable energy from a number of sources to satisfy its members' obligations to meet their renewable portfolio standards ("RPS") requirements. Renewable resources supply over 14 percent of WPPI member energy needs, which exceeds the Wisconsin RPS standard of 10 percent by 2015. These resources are not as cost effective as BEC4 in meeting WPPI's baseload need. The majority of WPPI's renewable energy comes from wind generation. The intermittent nature of wind makes the availability of wind generation unpredictable and unreliable for meeting around the clock energy needs. Currently, the annual average capacity factor of WPPI's wind resources is about 30 percent, with the least amount of energy being produced during the peak summer season.

WPPI continues to pursue renewable resource alternatives to augment and diversify WPPI's sources of renewable energy and to meet its energy needs. However, as is the case with wind generation, other types of renewable resource alternatives are not as economical in meeting WPPI's long-term baseload resource needs as compared to the Project, even when including a significant adder for greenhouse gas emissions.

Purchases from Other Utilities

WPPI continues to pursue a diversified portfolio of resources, including long-term purchases from other utilities, which WPPI views as an important component of its portfolio. However, most long term purchases will likely continue to be priced at the selling utilities' average cost, which are significantly above the cost of the Project. WPPI believes this trend will continue. Further, WPPI does not want to become overly reliant on long term purchases from

other utilities as a significant portion of its portfolio. A balance of purchases and WPPI-owned resources provides diversification and flexibility so that one fuel type, supplier or resource does not make up a significant portion of WPPI's portfolio.

Natural Gas-Fired Generation

WPPI compared BEC4 with the cost of constructing and owning a 126.5 MW natural gas-fired combined cycle plant utilizing two GE LM6000 turbines, two heat recovery steam generators and a single steam-turbine generator ("LM6000 Plant"). This combined cycle option is essentially a direct capacity replacement for WPPI's proportionate share of BEC4 and is a reasonably sized project that WPPI could develop for itself.

An ownership share of a larger combined cycle plant would offer efficiencies and economies of scale but would depend on WPPI finding one or more partners to take the majority ownership share. WPPI has no such ownership opportunity currently available, and such opportunities are scarce if not nonexistent given the current excess capacity positions of most utilities. Because it is simply too speculative to assume that WPPI could acquire a minority share of a large combined-cycle plant in the time frame necessary to replace BEC4, WPPI does not regard ownership participation in a large combined cycle plant as a realistic alternative to the Project. Nonetheless, WPPI provides a comparison of the large combined cycle costs for reference.

The detailed power cost comparison for each resource alternative uses a pro forma spreadsheet economic model that provides the estimated capital costs, annual busbar cost of power and the levelized average power cost. Several alternative assumptions such as high and low natural gas fuel prices and an adder for green house gas emissions were considered to capture a range of potential outcomes. Not included in natural gas fuel price assumptions is the incremental cost of hedging natural gas costs. If WPPI were to build a combined cycle plant, it

would examine fuel procurement and hedging options to minimize exposure to price volatility.[7] A full description of the analysis and underlying assumptions is provided in Appendix A to this Application.

This analysis demonstrates that investing in the Project and continuing to operate BEC4 is more cost effective than the LM6000 Plant option and the large combined cycle reference for meeting WPPI's future baseload requirements. Figure 7-2 compares the levelized power cost of the Project to the cost of the LM6000 Plant under the base assumptions and under the alternative assumptions.

Figure 7-2 Levelized Busbar Cost Comparison Project vs. LM6000 Plant

[7] WPPI's revenue bonds are given ratings by the three major national credit ratings agencies, Standard & Poor's Corp., Moody's Investors Services and Fitch Ratings. At the 2012 American Public Power Association's Business and Financial Conference, a representative of Standard and Poor's noted that any utility that relies on natural gas should be ready to discuss its fuel procurement strategies and hedging options, exposure to fuel cost volatility and risk management policies. Clearly, this is a factor in rating agency analysis, and can affect credit ratings and financing costs for gas projects, and more generally for utilities reliant on natural gas generation.

Small Combined Cycle Alternative

As shown in Figure 7-2, WPPI's investment in the Project outperforms the LM6000 Plant in all scenarios. Under base assumptions, the levelized power cost (in 2016 dollars) of BEC4 at [redacted] is less than the projected cost from the LM6000 Plant at [redacted] by [redacted]. Assuming off-peak market energy substitution for the LM6000 Plant, BEC4 is still cheaper by [redacted]

Figure 7-3 shows the breakdown of the levelized operational costs of BEC4 compared to the LM6000 Plant. [redacted]

Figure 7-3 Operational Cost Comparison Project vs. LM6000 Plant

[redacted]

Large Combined Cycle Reference

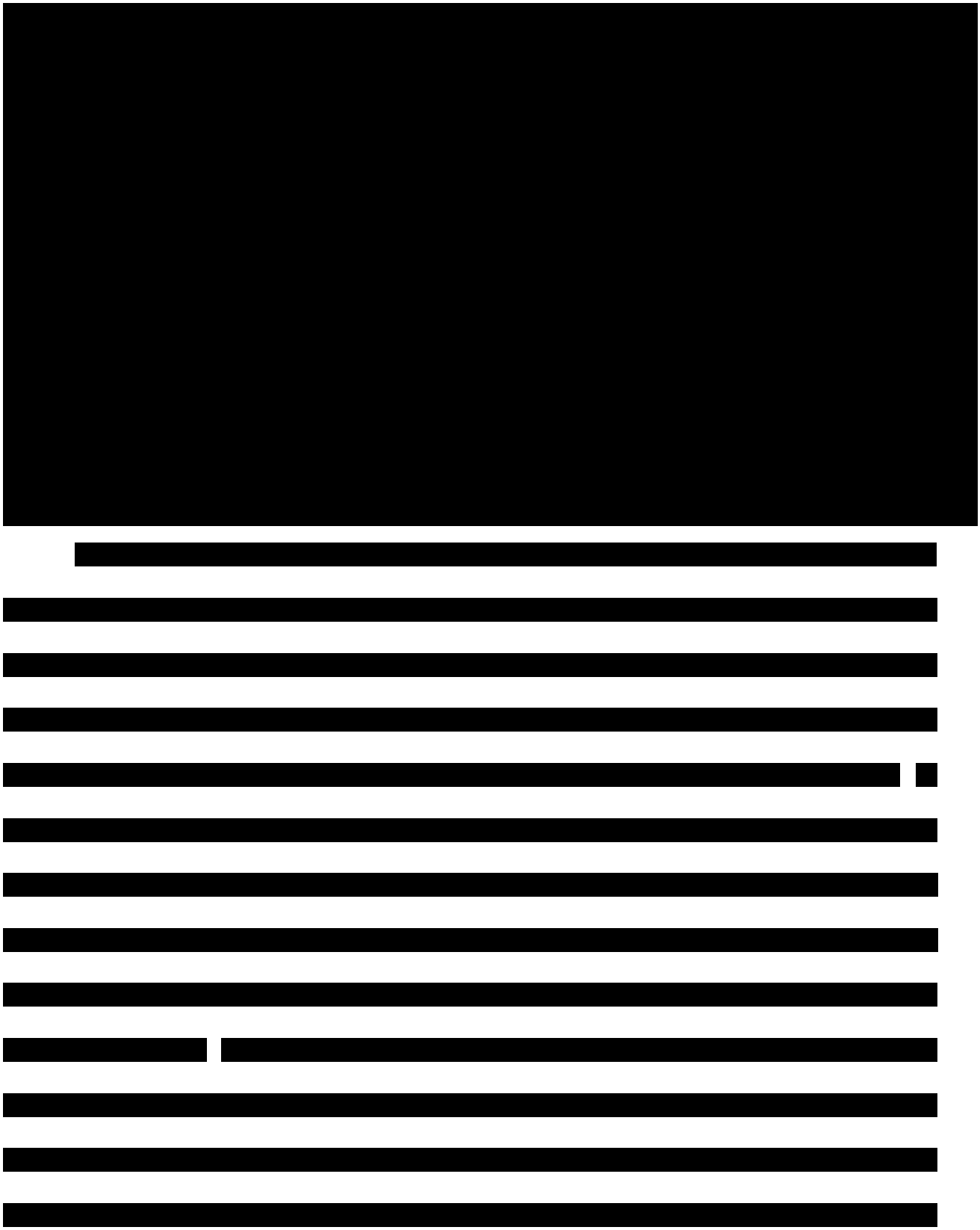
A larger combined cycle plant would offer improved economies of scale and higher efficiency than the LM6000 Plant. For reference purposes WPPI evaluated the cost of ownership of a portion of a larger combined cycle plant. The plant used in the evaluation was a 644.4 MW combined cycle plant utilizing two GE 7FA.05 combustion turbines, two heat recovery steam generators and a single steam-turbine generator.

Figure 7-4 compares the levelized cost of BEC4 with the large combined cycle option under the same scenarios as the small combined cycle alternative.

Figure 7-4 Levelized Busbar Cost Comparison Project vs. Large Combined Cycle

Figure 7-5 shows the breakdown of the levelized operational costs of BEC4 compared to the large combined cycle option.

Figure 7-5 Operational Cost Comparison Project vs. Large Combined Cycle



[redacted]

Conclusions on Alternatives to Continued Operation of BEC4

As explained above, none of the Project's alternatives can reasonably be considered as an alternative to continued operation of BEC4. WPPI has pursued, and continues to pursue, various renewable resources, both combustible and noncombustible, as well as energy conservation and efficiency programs. These programs, while reducing the growth in energy consumption of WPPI's members and providing renewable energy for WPPI's member communities, do not provide sufficient amounts of baseload capacity and energy to meet WPPI's needs as a power supplier to its member utilities.

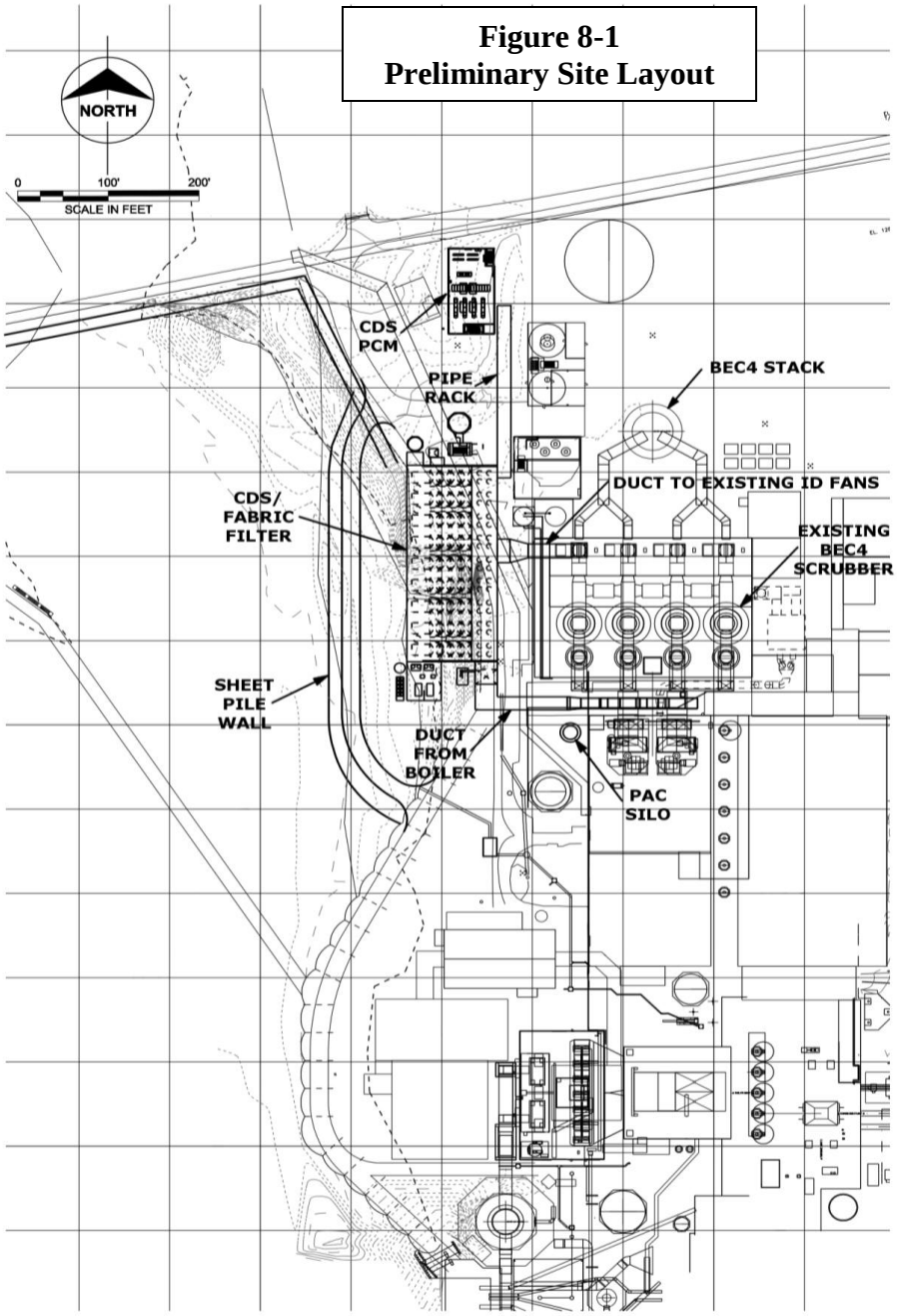
In terms of the non-renewable combustible energy resources listed in the EPL, WPPI believes natural gas generation is not a viable alternative to BEC4. Natural gas prices are extremely low at the present time, which makes gas generation more competitive. However, the volatility of natural gas prices and the rate at which prices change in the future depends on a number of factors. Even if one could assume natural gas prices would remain low in the future, WPPI would still not replace BEC4 with a combined cycle resource because of the fuel diversity BEC4 provides to WPPI's power supply resource portfolio, which in turn allows WPPI to provide reliable, economic and stable-priced power supply to its member utilities.

8.0 ENVIRONMENTAL IMPACTS AND PERMITTING

8.1 Maps and Drawings of the Proposed Project and Site

The proposed location and preliminary site layout of the Project is shown in Figure 8-1.

Figure 8-1
Preliminary Site Layout



8.2 Proximity to Floodplains

The proposed location of the Project is not within a floodway or 100-year floodplain.

8.3 Information on Applicable Environmental Factors

Given BEC4's location, the Project's environmental factors will be evaluated under authority of Minnesota law. In Wis. Admin. Code § PSC 4, the Commission has categorized the types of actions it undertakes for purposes of complying with the EPL. Consistent with this rule, and due to the fact that the Project, which was planned, developed, and will be permitted for construction in a state other than Wisconsin, it is appropriate that the Commission categorize the Project as a Type III action.[8] As the Commission has recently concluded in approved applications for similar environmental improvement projects at generation facilities located within Wisconsin, the Project is unlikely to have a significant impact on the quality of the human environment. Thus, neither an environmental impact statement nor an environmental assessment is necessary.

Rivers, Streams and Wetlands

The preferred layout for the CDS system would involve filling a small portion of Blackwater Lake, located on the west side of the BEC4 site, subject to regulatory approvals in Minnesota. Minnesota Power is evaluating a number of different layouts and siting arrangements to minimize the environmental impact to the lake, while avoiding major additional construction expenses and providing the best layout for ongoing operation and maintenance of the system.

Threatened and Endangered Species

There would be no impacts to any threatened or endangered species as a result of the Project.

[8] See Wis. Admin. Code § PSC 4.10(1).

Historical and Archaeological Resources

There are no known historical or archaeological resources in the area of the proposed location of the Project.

8.4 Permits or Approvals Required by Other Units of Government

WPPI would not require any permits or approvals from any other unit of government to participate in the proposed Project.

9.0 PUBLIC UTILITIES AND OTHERS AFFECTED BY THE PROJECT

Minnesota Power, the majority owner and operator of BEC4, would be the only other entity affected by the Project.

REDACTED VERSION

APPENDIX A – RESOURCE PLANNING ANALYSIS

This Appendix provides documentation of the detailed assumptions, evaluation methodology and the results used to assess the economics of the Project compared to a new gas fired generation project. The cost estimates for the comparison are based on a technology assessment recently completed for WPPI by Burns and McDonnell Engineering Company ("Burns and McDonnell"). WPPI narrowed its analysis down to this replacement alternative after screening various alternatives in accordance with the EPL.

Resource Alternative Assumptions

This section provides detail on the assumed operating and financing parameter values for each of the power supply alternatives. [redacted]

- [redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

- [redacted]

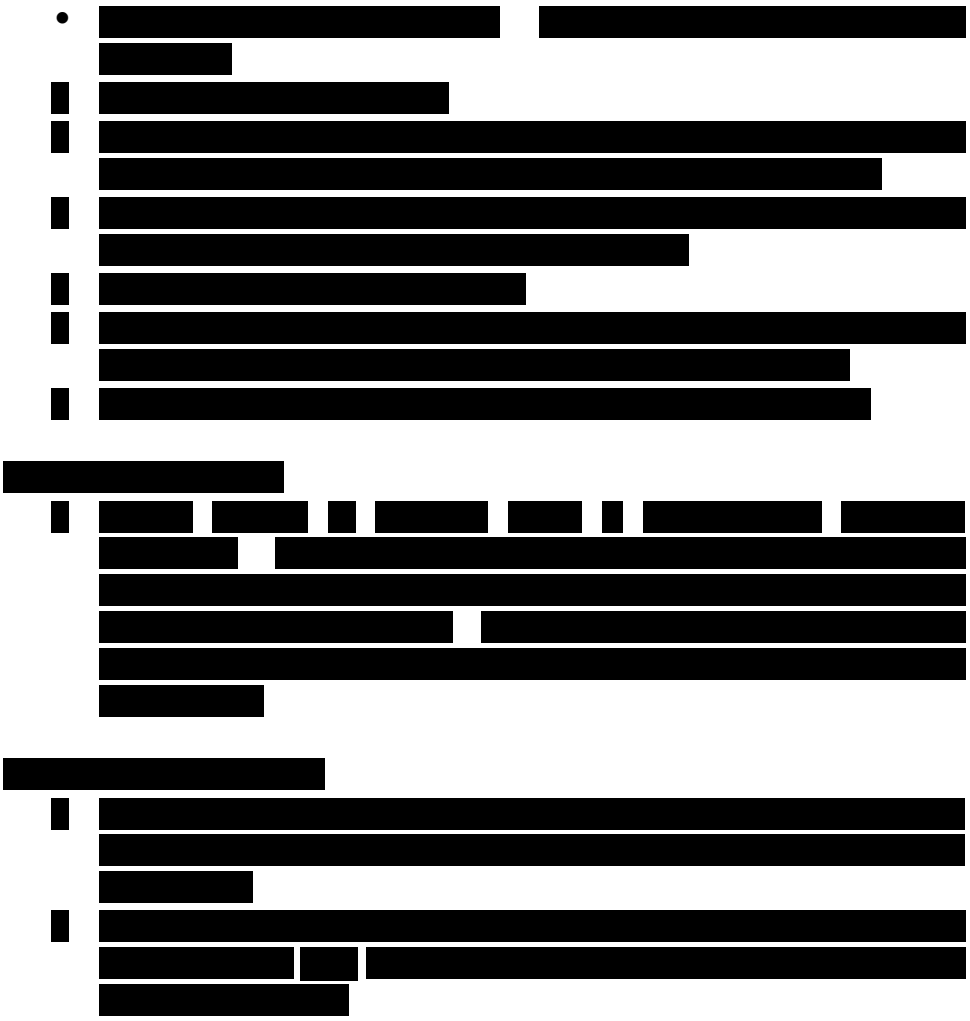
[redacted]

- [redacted]
- [redacted]

[redacted]

[redacted]

- [redacted]



Economic Analysis of Alternatives

WPPI projected lifecycle power costs beginning in 2016 for each resource alternative using a pro forma spreadsheet economic model that determines the estimated annual busbar cost of power and the levelized average power cost. Using estimates of capital cost and O&M for various alternatives provided by Burns and McDonnell, present value levelized power cost were calculated over the period 2016 – 2037 to be consistent with the remaining years on WPPI members' power supply contracts. Alternative assumptions on fuel cost, CO_2 and the potential impact of adding SCR at BEC4 were considered to capture uncertainty range of potential outcomes.

Analysis Approach

After screening several resource alternatives in accordance with the EPL, WPPI concluded two natural gas resources could reasonably be considered as potential alternatives to BEC4, a small combined cycle and an ownership share of a large combined cycle.

[redacted]

Table A-1 Levelized (2016$) Busbar Cost of LM6000

Table A-2 Levelized (2016$) Busbar Cost of Large CC

Table A-3 Levelized (2016$) Busbar Cost of BEC4