ENERGY CENTER
OF WISCONSIN

ENERGY EFFICIENCY AND CUSTOMER-SITED RENEWABLE RESOURCE POTENTIAL IN WISCONSIN
For the years 2012 and 2018

PUBLIC COMMENT APPENDIX

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This Appendix addresses the comments on the draft potential study that were received during the public comment period (PSCW Docket 5-UI-115). This Appendix includes the Energy Center's responses to all substantive comments and questions about the study methodology and findings. The responses indicate areas where revisions to the report were made as a result of comments received. A copy of the comments is provided in Attachment A, with reference numbers for comments and questions addressed in the Energy Center's response.

In the course of reviewing feedback on the draft study we identified several errors that were made in transposing data from the energy efficiency potential model into the body of the report. The original values, as presented in the public comment draft, are summarized below, along with the corrected values which appear in the final report. Values that changed between the two versions are highlighted in red. These corrections improve the accuracy of the report; they do not result in any material change to the Energy Center's findings.

TABLE 1: SUMMARY OF CORRECTIONS TO REPORTED RESULTS

	2012 GWh		2012 potential (% of GWh sales)		2012 MW		2012 therms (1000)		2012 potential (% of therm sales)	
	Draft	Final	Draft	Final	Draft	Final	Draft	Final	Draft	Final
Residential	233	233	1.0%	1.0%	35	35	3,296	3,296	0.2%	0.2%
Commercial	500	500	2.0%	2.0%	147	147	9,609	9,609	1.0%	1.0%
Industrial	437	437	1.6%	1.6%	63	63	22,184	24,220	1.7%	1.8%
Agriculture	36	26	2.4%	1.7%	4	3	243	118	0.9%	0.4%
Total 2012 Potential	**1,206**	**1,196**	**1.6%**	**1.6%**	**249**	**248**	**35,332**	**37,243**	**0.9%**	**1.0%**
Cumulative 2018 Potential	**10,976**	**10,889**	**13.1%**	**13.0%**	**2,259**	**2,249**	**311,030**	**327,309**	**8.3%**	**8.7%**

	Draft	Final
Total Resource Cost	$400 million	$418 million
Estimated Program Cost	$339 million	$353 million

We would like to express our gratitude for the time and effort that all commenters undertook in reviewing the draft study and providing feedback. We feel the study is improved as a result of your efforts.

RESPONSE TO COMMENTS SUBMITTED BY THE CITY OF FITCHBURG RESOURCE CONSERVATION COMMISSION

No response necessary.

RESPONSE TO COMMENTS SUBMITTED BY THE JOINT PUBLIC INTERVENORS (Citizens Utility Board, Clean Wisconsin, and RENEW Wisconsin)

Reference	Response
JPI1	To clarify an issue raised in JPI's comment, we did not estimate program costs for the Environmental Scenario (referred to as the "Sensitivity Scenario" in the public comment draft). Rather, we evaluated such costs from a total resource perspective only, which includes participant costs as well as program administrative costs. That said, JPI is correct in noting that program cost estimates (which were developed in connection with the Base Scenario) could very likely be overstated. As our primary directive from the PSCW was to evaluate costs from a total resource perspective, our study did not involve a thorough assessment of costs from a program administrator perspective. We developed a very rough approximation of what energy efficiency programs might have to spend to reach estimated achievable potential by making a blanket assumption that programs would set incentives at 50-90% of the incremental cost. As JPI and other commenters noted, higher incentives do not necessarily represent the most cost-effective or best strategy to reach achievable potential, and other strategies could achieve similar results at significantly lower cost. This is a critical point, and we have edited the study to make this issue clear to the reader. (See response to comment JPI 2 for additional discussion of important cost-related issues.)
JPI 2	JPI is correct in noting that under the Environmental Scenario, projected savings increase by ~20-30%, while projected total resource costs increase by around 95%. This is because the savings increase under the Environmental Scenario is entirely the result of bringing in technologies that were not cost-effective under the Base Scenario; by their nature these are more expensive technologies. For example, the average TRC for commercial sector measures under the Base Scenario is around 5.0. The average TRC of new commercial measures that were added in the Environmental Scenario is around 1.0. So in general, these new measures are five times more expensive than the measures in the Base Scenario. To address requests from JPI and other respondents for additional details illustrating the differences between the two scenarios, in Chapter EE-3 we have provided additional narrative discussing which measures are responsible for the majority of the increased savings (and cost) under the Environmental Scenario. We have also added a table to Appendix E presenting costs and savings data for the measures responsible for the majority of increased savings under the Environmental Scenario.
JPI 3	The report has been corrected to reflect the fact that for Focus on Energy, limited evaluation funding is allocated to estimating spillover effects. Therefore, "verified net savings" estimates as reported in evaluation studies do not generally include spillover effects.
JPI 4	JPI is correct—the Environmental Scenario does not include the impact of a "stronger weatherization" effort, as all weatherization measures were cost-effective under the Base Scenario. This correction has been made to the report.

RESPONSE TO COMMENTS SUBMITTED BY THE INDUSTRIAL CUSTOMER GROUPS (Wisconsin Industrial Energy Group, Wisconsin Manufacturers and Commerce, Wisconsin Paper Council)

Reference	Response
ICG 1	The PSCW tasked the Energy Center with estimating achievable energy efficiency potential in Wisconsin, and estimating costs from a total resource perspective (total resource costs include participant costs as well as program administrative costs). Therefore, this study did not involve a thorough assessment of costs from a program administrator perspective. We developed a very rough approximation of what energy efficiency programs might have to spend to reach estimated achievable potential by making a blanket assumption that programs would set incentives at 50-90% of the incremental cost. We acknowledge that such costs could be overstated. This is a critical point, and we have edited the study to make this issue clear to the reader.
ICG 2	ICG's comment highlights an important distinction between estimating energy efficiency *potential* (as defined in the study) and developing forecasts of future conditions. The objective of the study was to develop an outer-bound estimate of what could be achieved under an aggressive energy efficiency effort with a substantial commitment on the part of policymakers to achieve that goal, rather than forecasting what is likely to occur under continuation of current policies and market conditions. On page EE-4 of the study, we note that Wisconsin may not attain these levels of energy savings"...if policymakers do not fund energy efficiency programs at the levels suggested by this study, if energy efficiency program practices are not revised, *or if consumer interest in energy efficiency wanes over time*" (emphasis added). Our outer bound potential estimate (assuming no behavior change or rate design innovations) is unlike a mid-point forecast. It stays the same regardless of economic conditions because it represents what could be achieved under an aggressive policy push. The potential estimate also reflects what can be achieved in 2012, and not in 2009. It is difficult to know what economic conditions will be over the next several years. That said, even if the economy remains weak, the outer bound potential estimate is not likely to change substantially. Though we present raw numbers in the report, our emphasis is on presenting potential estimates in terms of percentage reductions in future energy sales. So if the economy slows the rate of growth in industrial sales, the percentage savings available are likely to be largely the same, even though the absolute changes in energy consumption are likely lower than they would be if the economy were more robust.
ICG 3	The study reflects the outer bound estimate (assuming no behavior change or rate design innovations) and as such is akin to an upper limit of the confidence interval.
ICG 4	We acknowledge that the Executive Summary text addressed in ICG's comment was potentially confusing and have made modifications to clarify the issue. The main conclusion of the study is that by 2012, Wisconsin could obtain annual energy savings equivalent to 1.6% of electric sales, 1.6% of peak demand, and 1.0% of gas sales. Additional savings could be delivered through behavior-based approaches and advanced rate design.

Reference	Response
ICG 5	ICG's request for inclusion of historical and current load profiles for Wisconsin points out a key area where further research is needed. In the course of our research, we reviewed a Wisconsin load shape database which is now many years old, and also consulted national sources for this type of information. There is a need for new research on end use load shapes across all sectors in Wisconsin, and how such load shapes are affected by current and emerging energy efficient technologies. We added load shape data to the list of potential areas for future research discussed in Chapter EE-6.
ICG 6	The Energy Center agrees all sectors would benefit from program strategies that capture energy savings from retrofit opportunities. As other commenters noted, the potential study is not intended to provide a blueprint for energy efficiency program design. The study discusses a few innovative program strategies for illustrative purposes, but does not involve a comprehensive assessment of program opportunities. However, ICG's point is well made, especially given the magnitude of energy efficiency potential in the commercial and industrial sectors. The report has been modified to address this point, and a brief discussion of one innovative program opportunity for the industrial market has been added (i.e., energy efficiency program funding to support energy management staff positions at manufacturing facilities).
ICG 7	The Delphi process is designed to reflect the subjective judgment of experts, which we would argue is the essence of most public policy decision-making processes. There can never be factual certainty about future conditions, and the results are offered as opinion, rather than facts. We do not see a significant drawback in this approach.
ICG 8	The Energy Center conducted a no-carbon scenario analysis, and results are presented in Energy Efficiency Appendix E.
ICG 9	Our analytical approach did not involve an assessment of gross energy efficiency potential, and then conducting a free-ridership adjustment to reach a net potential estimate. Rather, we asked Delphi experts to estimate the net effect that aggressive energy efficiency programs could achieve within a specified time horizon, above what would be achieved by naturally-occurring efficiency under a no-program scenario. Delphi responses were used to develop the "achievable factors" used in the model, and thus achievable potential estimates represent net estimates.
ICG 10	We agree that there are a number of complex issues surrounding the question of avoided costs, and issues around the use of LMPs as the basis for avoided costs are among them. Since LMPs are market-clearing prices there is no accounting for the magnitude of individual cost elements within the LMP, so we're not able to definitively conclude whether ICG's contention (that the marginal loss component of LMPs generally results in over-collection of losses) is correct. However, we can get a general idea of how sensitive potential study results are to changes in avoided cost assumptions by comparing the base and no-carbon scenario results (see Appendix E). Removing the carbon adder reduces avoided costs by between 25% (on-peak) and 40% (off peak) for electricity, and 17% for gas. This change decreases electricity and gas savings potential by around 20%. These results suggest that the issue raised in ICG's comments—approximately a 5% adjustment to account for possible over-collection of line losses—would have a negligible effect on potential estimates.
ICG 11	The dataset we used to develop administrative cost factors included a range of program types, some of which provide a fairly high level of technical support and assistance to program participants. However, we agree that some aggressive and innovative program strategies could potentially require higher levels of administrative investment per kWh and per therm than programs have historically required, particularly in the case of

Reference	Response
	comprehensive retrofit initiatives like the "neighborhood blitz." As previously noted, the potential study is not intended to provide a blueprint for program design, and program cost estimates are intended as a rough approximation of necessary program investments.
ICG 12	We acknowledge that upstream incentive strategies present challenges to successful implementation. As to the willingness of suppliers to share sales data, we believe suppliers are more likely to share data if data-sharing is a precondition for receiving incentive payments. We also point out that if particular program models are found not to be workable for Wisconsin, it is highly likely that program administrators will find other, better approaches for capturing energy savings. We do not see any evidence that retrofit opportunities will be fully exploited within three years.

RESPONSE TO COMMENTS SUBMITTED BY ORION ENERGY SYSTEMS

Reference	Response
OES 1	We agree that using natural sunlight to illuminate building spaces represents an important energy- and money-saving opportunity for Wisconsin businesses. Our analysis broadly addresses daylighting measures within the energy efficiency component of the study, rather than in the renewable energy component. There is likely some overlap between the savings potential associated with daylighting measures and that of solar light pipe technology. However, we did not specifically model solar light pipe technology as part of this study.

RESPONSE TO COMMENTS SUBMITTED BY WE ENERGIES

Reference	Response
WE 1	The study addresses energy savings potential that could be achieved by energy efficiency programs in Wisconsin. This includes energy efficiency programs administered by the State of Wisconsin, voluntary programs administered by Wisconsin utilities, or self-directed initiatives undertaken by large energy users. The study has been revised to address any ambiguity on this point.
WE 2	The fact that the study projects a greater amount of potential energy savings than what most other states have historically achieved is in keeping with our goal of finding a "reasonable upper limit" for what energy efficiency programs could achieve by 2012. With respect to the cost of achieving such levels of energy savings, We Energies is correct to note that our program cost estimates are high. Our primary directive from the PSCW was to evaluate costs from a total resource perspective, so the study did not involve a thorough assessment of costs from a program administrator perspective. We developed a very rough approximation of what energy efficiency programs might have to spend to reach estimated achievable potential by making a blanket assumption that programs would set incentives at 50-90% of the incremental cost. Other program strategies could likely achieve similar results at a lower cost. This is a critical point, and we have edited the study to make this issue clear to the reader. Discussion of these and other program design issues will be an important part of the PSCW's quadrennial planning process.
WE 3	We agree that ARRA will very likely prove to be a "game changer" in the realm of energy efficiency. As noted above, the focus of the study was to define a reasonable upper limit for energy savings potential. In that light, we view ARRA as primarily a mechanism for funding and resources that will broaden the reach of energy efficiency programs, rather than fundamentally changing the magnitude of energy efficiency potential.
WE 4	For natural gas avoided costs, we relied on a document provided by Focus on Energy evaluators: "Final Assumptions for Focus BC Analysis and Measure Screening, 2/6/07." We Energies' policy point is nevertheless on track. Natural gas prices are volatile and one can easily overstate or understate those prices. While the avoided costs used in the study may understate natural gas avoided costs vis-à-vis values used in recent Focus on Energy evaluations, such costs are likely overstated vis-à-vis current market prices. The $30 per kW-yr is the levelized long-run cost of avoided transmission and distribution costs. We Energies raises an important policy point with respect to electric avoided costs. The PSCW directed the Energy Center to base electric avoided costs on LMPs from the Midwest Independent System Operator (MISO). MISO prices represent avoided energy and generation capacity costs. Focus on Energy evaluations use a different approach—one that includes a separate avoided capacity payment that includes generation. It is not clear which approach is more reasonable, or whether another approach might be preferred. We suggest the PSCW take a closer look at a range of issues pertaining to valuation of avoided costs, ideally through a collaborative process with stakeholders.
WE 5	Administrative cost factors refer to cost per lifetime kWh and lifetime therm. We have modified the table headings to make this clear to the reader.

Reference	Response
WE 6	We Energies' comment is well-taken. In keeping with our goal of identifying the outer bound of potential, limited effort was devoted to developing potential estimates that fall short of this outer bound. Instead, we conducted scenario analysis to test the outer bound. Thus, the references to "sensitivity analysis" in the draft report were potentially misleading, and we have changed those references to "scenario analysis."
WE 7	We are aware of upstream incentive strategies that are being employed by California utilities, but we believe that improvements are possible that have the potential to reduce free-ridership rates (for example, taking baseline sales into account, and awarding incentives on the basis of market "lift" rather than on every unit of product sold). That said, we acknowledge that upstream incentive strategies present challenges to successful implementation. We also point out that if particular program models are found not to be workable for Wisconsin, it is likely that program administrators will find other, better approaches for capturing energy savings.
WE 8	We assume a single family home has an average of 40 CFL-eligible sockets. As the WI weatherization program currently averages installation of 25 CFL bulbs per home, we feel the estimate of 30 bulbs per home is reasonable under an aggressive program scenario.
WE 9	Under the no-carbon scenario, the 13 MW drop in residential peak demand reduction potential (as compared with the base scenario) is largely due to three measures affecting cooling efficiency that are no longer cost-effective: (1) the weatherization package as modeled (a secondary fuel effect associated with a natural gas-saving measure); (2) whole-house energy feedback displays (eliminates savings from behavioral actions such as turning up thermostats in summer); and (3) ECM furnaces (reducing the efficiency of furnace air handlers servicing central air conditioning systems).

RESPONSE TO COMMENTS SUBMITTED BY WISCONSIN ENERGY CONSERVATION CORPORATION

Reference	Response
WECC 1	WECC is correct in noting that the potential study is not intended as a roadmap for program design. We have added that disclaimer to the report as suggested.
WECC 2	This correction has been made to the report.
WECC 3	WECC is correct in noting that the only behavior-change measures included in the Base and Environmental Scenario modeling efforts are programmable thermostats and home energy displays.
WECC 4	The same number of retrofits is modeled under the Base and Environmental Scenarios, and we have corrected the report to reflect the fact that the Environmental Scenario does not include the effects of a "stronger weatherization effort."
WECC 5	We agree that it is important to note that cost-effectiveness analysis was only conducted at the measure level, and cost-effectiveness analysis at the program level could yield different results. We have added this caveat to the Methodology section of the report.
WECC 6	Throughout the study, references to natural gas savings potential include natural gas and propane savings resulting from installation of energy efficient technologies. The table below summarizes the estimated portion of therm savings that comes from propane-fueled equipment.

Propane estimates	% of total therms	Est. 2012 therms from propane
Residential	11.6%	382,354
Commercial	2.0%	192,177
Industrial	1.0%	242,197
Agricultural	80.0%	94,374

WECC 7	Given the scope limitations for this project, we are not able to provide a complete summary of the program-specific recommendations made by Delphi participants within the timeframe available, though input from Delphi participants was critical in crafting the discussion in Chapter EE-5. However, Energy Efficiency Appendix I and Renewable Energy Appendix E contain a full transcript of participant responses.
WECC 8	WECC is correct in pointing out that Energy Efficiency Appendix A was mis-labeled. This section has been renamed "Key Modeling Assumptions."
WECC 9	Administrative cost factors refer to cost per lifetime kWh and lifetime therm. We have modified the table headings to make this clear to the reader.
WECC 10	This Table was inadvertently omitted from the draft appendices, and has now been added to Appendix F.

WECC 11 We acknowledge that Delphi participants provided a wide range of estimates for the renewable energy technologies addressed in the study. The range of values for each technology is presented in Renewable Energy Appendix C.

RESPONSE TO COMMENTS SUBMITTED BY WISCONSIN PUBLIC SERVICE CORP. AND WISCONSIN POWER AND LIGHT COMPANY

Reference	Response
WPS/WPL 1	Improvements to utility distribution infrastructure were outside the scope of this study, as defined by the PSCW.
WPS/WPL 2	As our primary directive from the PSCW was to evaluate costs from a total resource perspective, the study did not involve a thorough assessment of costs from a program administrator perspective. We developed a very rough approximation of what energy efficiency programs might have to spend to reach estimated achievable potential by making a blanket assumption that programs would set incentives at 50-90% of the incremental cost. As WPS, WPL and other commenters noted, higher incentives do not necessarily represent the most cost-effective or best strategy to reach achievable potential, and other strategies could achieve similar results at significantly lower cost. This is a critical point, and we have edited the study to make this issue clear to the reader.
WPS/WPL 3	The potential estimates include the expected future results that will be achieved through current program activities. For example, the 1.6% electric savings potential is relative to a "no program" scenario. Currently, Wisconsin programs are achieving around 0.5% of electric sales. Assuming these results continue through 2012, this 0.5% would be part of the 1.6% total.
WPS/WPL 4	The new federal efficiency standards for residential general purpose light bulbs as enacted under EISA begin on January 1, 2012, and phase in through January 1, 2014. The phase-in starts with 100-Watt bulbs in 2012 and ends with 40-Watt bulbs in 2014. There is also a "backstop requirement" that stipulates by 2020, residential general purpose light bulbs must be 60 more efficient than today's incandescents—a threshold that CFL bulbs already meet. Since the new federal standards will not be fully enacted by 2012, our 2012 potential estimates include savings from purchased replacement of CFL bulbs. Our 2018 potential estimates do not include any CFL savings.
WPS/WPL 5	The PSCW provided specific guidance to the Energy Center in determining the avoided costs to be used in this study. As reflected in other comments, there are many differences in opinion on what approach for valuing avoided costs is most appropriate. We suggest stakeholders may benefit from a consensus-building process to address the numerous issues and concerns on this front.
WPS/WPL 6	As noted above, the avoided cost issue is complicated, with no clear indication as to which approach is correct/preferable. While WPS/WP&L argue that the T&D costs are overstated, others suggest that we should be using much higher capacity costs, such as the Focus on Energy all-in avoided capacity cost of approximately $100 per kW-year. Again, this issue may warrant discussion in a group session with all interested parties.
WPS/WPL 7	Societal discount rates, rather than consumer discount rates, are the appropriate values to use in a public policy analysis (see Weimer & Vining (1989), *Policy Analysis Concepts and Practice*). In fact, this is one of the reasons that markets fail to deliver optimal levels of energy efficiency—the discount rates that consumers use understate the long-run societal benefits of any public policy program. The 5% real rate used in this study is consistent with other public policy analyses and with Focus on Energy evaluations.

Reference	Response
WPS/WPL 8	The Rate Impact Test has a place in public policy discussions, but is not the appropriate test to use for energy efficiency potential studies. The test does not measure the cost-effectiveness of energy efficiency measures. Rather, the Rate Impact test is a distributional test that is best-suited in assessing the equity (fairness) impacts of energy efficiency programs. While such a test is relevant in helping to determining the impact of energy efficiency programs, it cannot help us estimate energy efficiency potential.
WPS/WPL 9	Using a 0.75 benefit-cost ratio as we have is consistent with the Energy Priorities statute. In all cases, the benefit-cost ratio we are interested in is above 1.00. The 0.75 threshold is the *reported* benefit-cost ratio, not the *true* ratio. 1. Any measure has a range of benefit-cost ratios that vary from application to application. A measure that has an average benefit-cost ratio of 0.75 would likely achieve a benefit-cost ratio of 1.50 in some applications, and a benefit-cost ratio of 0.25 in other applications. (Consider, for example, a high-efficiency HVAC system that would be cost-effective if installed in a large, leaky home, but would not be cost-effective if installed in a small, air-tight home.) Our analysis was designed to show the effect of including some measures that have an average benefit-cost ratio below 1.00, but which are very likely to be cost-effective in some applications. This scenario is designed to determine how much hidden cost-effective energy efficiency lies buried in measures with average benefit-cost ratios below 1.00. 2. The total resource cost test used in the study does not account for non-energy benefits, which can be substantial. A measure with a reported benefit-cost ratio of 0.91 might have a true benefit-cost ratio of 1.4 if we were able to value and account for non-energy benefits. The Environmental Scenario is designed to provide a rough approximation for capturing the value of non-energy benefits.
WPS/WPL 10	This is an important equity issue, but it does not affect estimates of energy efficiency *potential*. It deserves consideration, but such a discussion is not appropriate in this venue. See the discussion of the Rate Impact Test (WPS/WPL-8).
WPS/WPL 11	We believe that this comment is primarily relevant to the retrofit market. In the equipment replacement market, programs seek to influence consumers who are in the market for replacing a given technology at a certain point in time. If a new state or federal efficiency standard is enacted, it does not affect the people who replaced a failed product just before the new standard took effect, and who—in the absence of the program—would have purchased a less-efficient product that would operate inefficiently over the full course of its lifetime. Where we knew of impending standards (e.g., the EISA requirements for bulbs), we incorporated the effect of such standards into the analysis. In the retrofit market, it is possible to argue that program efforts only accelerate adoption by a few years, but we feel the evidence is inconclusive at this point. Past residential market studies the Energy Center has conducted indicate that most people are not even aware of many of the retrofit opportunities that they have, and without program guidance they tend to implement sub-optimal retrofits.
WPS/WPL 12	WPS/WPL are correct in noting that under the Environmental Scenario, projected savings increase by ~20-30%, while projected total resource costs increase by around 95%. This is because the savings increase under the Environmental Scenario is entirely the result of bringing in technologies that did not pass the cost-effectiveness screen under the Base Scenario. By their nature these are more expensive technologies. For example, the average benefit/cost ratio for commercial sector measures under the Base Scenario is around 5.0. The average benefit/cost ratio of new commercial measures that were added

Reference	Response
	in the Environmental Scenario is around 1.0. So in the commercial sector, these new measures are five times more expensive than the measures in the Base Scenario. To address requests from WPS/WPL and other respondents for additional details illustrating the differences between the two scenarios, we have provided additional discussion in Chapter EE-3 describing which measures are responsible for the majority of the increased savings (and cost) under the Environmental Scenario. We have also added a table to Appendix E presenting costs and savings data for the measures responsible for the majority of increased savings under the Environmental Scenario.
WPS/WPL 13	With this comment, the utilities raise what is probably the most critically important point that follows from this study. If one looks at energy efficiency program investments in isolation, paying 90% of the incremental cost of an energy efficiency measure may seem excessive. But a potential study reflects comparisons, not isolated views. Paying high incentives looks quite inexpensive if one compares the cost of the energy efficiency resource with the cost of supply-side alternatives. The primary issue that potential studies are concerned is not how much of the measure cost the program pays for, but rather how much less expensive energy efficiency is than conventional supply-side resources. We point out that the energy efficiency potential presented in our study can be achieved at a cost of conserved energy of under $0.04/kWh—significantly less than most supply-side alternatives. (This estimate assumes 1200 GWh of first year savings, an average savings-weighted measure life of 12 years, and total resource costs of $420 million). In addition, while we agree that new codes and standards can play a critical role in increasing the efficiency of the new construction and equipment replacement markets, we note that codes and standards have little effect on the retrofit market. As discussed in the study (Figure EE-34), the retrofit market represents 83% of the energy efficiency potential we have identified. The utilities' point is well taken and we believe this issue warrants further discussion within the context of the PSCW's quadrennial planning process.
WPS/WPL 14	As noted in response to previous comments, the potential study is not intended to provide a roadmap for energy efficiency program design, and costs were primarily evaluated from a total resource perspective rather than a program administrator perspective. To provide a rough estimate of program costs, we applied a 50-90% incentive level across all technologies. But we agree that higher incentives do not necessarily represent the most cost-effective or best strategy to reach achievable potential, and other strategies could likely achieve similar results at significantly lower cost.
WPS/WPL 15	We agree that several important issues related to free-ridership evaluation warrant further investigation and discussion at the policy level, and the implications for behavior-oriented program strategies are among them.
WPS/WPL 16	The Delphi process represents an input to the potential study. It reflects the opinions of energy efficiency experts. Policymakers can give those opinions as much weight as the policymakers deem to be appropriate.

RESPONSE TO COMMENTS SUBMITTED BY XCEL ENERGY

No response necessary.

ATTACHMENT A

Samuel L. Cooke III, P.E.
5267 Lacy Road
Fitchburg, WI 53711

May 26, 2009

Carol Stemrich
Public Service Commission
610 N. Whitney Way
P.O. Box 7854
Madison, WI 53707-7854

Re: **Docket 5-UI-115 Potential Study Comments**
Energy Efficiency and Customer-Sited Renewable Resource Potential in WI

Dear Ms. Stemrich:

This letter presents the comments of the City of Fitchburg Resource Conservation Commission (RCC) regarding the subject study. The RCC is a mayoral appointed commission of seven Fitchburg citizens who advise Fitchburg's mayor and Common Council on, among other things, environmental issues and greenhouse gas emission reduction initiatives.

I want to point out that the RCC recently worked with City of Fitchburg staff to complete a GHG emission inventory for City of Fitchburg operations as well as the broader community, including Fitchburg businesses and residents. This involved obtaining energy usage information and a myriad of other inputs to our study. The RCC also developed a list of 90 recommendations that would decrease Fitchburg's energy usage and greenhouse gas emissions, as part of Fitchburg's commitment under the U.S. Mayors Climate Protection Agreement.

In conducting the Fitchburg study, several issues became very clear that are pertinent to our review of the subject study, as follows:

- Implementing energy efficiency methods and installation of renewable energy resources were viewed as essential for the long-term reduction of GHG emissions.
- Energy efficiency and renewable energy resources were among the most effective ways to reduce Fitchburg's greenhouse gas emissions.
- Widespread energy efficiency efforts and installation of customer-sited renewable energy resources were viewed as being among the important initiatives that would assist Fitchburg in meeting its stated goal of GHG emission reductions.
- As was found in your study, "business-as-usual" with its relatively slow increases in energy efficiency and renewable energy installations, is not expected to meet Fitchburg's goal of GHG emission reductions. Ultimately, enhancement of Wisconsin-wide initiatives for increased energy efficiency and renewable energy

installations was viewed as being necessary for the wide-spread and more rapid attainment of our local GHG emission reductions.

When reviewing the subject study, as was found when conducting our own study in Fitchburg, it is apparent that the aggressive efforts projected in the study are necessary for the amount of energy usage and GHG emission reductions that needs to occur. While, at the same time, the projected job growth and long-term cost savings would be a benefit to Wisconsin's (and Fitchburg's) citizens.

Elements of the subject study that were found to be particularly interesting included:

- The use of life-cycle cost analysis, which showed that, for example, if $340 million is spent in one year on efficiency programs Wisconsin will obtain $1.3 billion in lifecycle energy savings.
- Behavior-based programs for increasing energy efficiency were not quantifiable but were thought, based on some studies, to affect as much as a 20% reduction in energy use.
- "If Wisconsin can achieve the energy savings levels set forth in this study, in 2012 it will reduce CO2 emission by 1.3 million tons per year, reduce SO2 emission by 12 million pound per year, and reduce NOx emissions by 2.4 million pounds per year."
- Utility load growth is predicted to stabilize and the electricity usage would start to decrease in 2010/2011 if the aggressive energy efficiency policy were implemented. If not implemented, then a 15% increase in state-wide electricity sales is predicted to occur by 2018.
- Natural gas usage is already in decline, due to current energy efficiency programs. The rate of decline would increase if the aggressive energy efficiency policy were implemented.

In summary, the RCC fully supports increasing energy efficiency and customer-sited renewable energy resources in Fitchburg and throughout Wisconsin. We applaud the efforts of the Energy Center of Wisconsin and everyone who participated in conducting the subject study. Obviously a lot of time and effort went into preparing such a comprehensive report and all involved should be commended for those efforts.

Thank you for this opportunity to provide comments on reviewing the subject study and please contact me at (608) 444-5339 with any questions you have.

Regards,

Samuel L. Cooke III, P.E.
Chairperson, City of Fitchburg Resource Conservation Commission

BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Investigation into the Adoption and Achievement of
Increased Conservation and Energy Efficiency Goals — Docket No. 05-UI-115

DOCKET 5-UI-115 POTENTIAL STUDY COMMENTS OF THE JOINT PUBLIC INTERVENORS

I. INTRODUCTION.

The Citizens Utility Board, Clean Wisconsin, and RENEW Wisconsin, collectively the Joint Public Intervenors (JPI), appreciate the opportunity to comment on the draft study submitted by the Energy Center of Wisconsin (ECW), Energy Efficiency and Customer-Sited Renewable Resource Potential in Wisconsin (ECW Study), in the above-captioned docket. The ECW Study provides valuable information to the Commission to help establish overall program targets and budgets for energy efficiency and customer-sited renewable resources efforts over the next three to four years. The study also presents a number of important issues that deserve near-term consideration to improve the estimate of economic and achievable potential, allow for better targeting of cost-effective program efforts, and develop a better integrated framework for program planning, design, and evaluation that would enhance the practical ability to achieve the identified achievable potential.

These comments will focus on the findings and methodology of the study rather than on the broader issues and future determinations the study will help inform (*e.g.*, future levels of energy efficiency funding). It is the understanding of JPI that these broader issues will be thoroughly considered in future proceedings by the Commission.

II. ENERGY EFFICIENCY POTENTIAL.

The ECW Study recognizes that an energy efficiency potential study is more than merely a set of outputs. Rather, the purpose and the methodology of a study are important in shaping the information and approaches that are needed to provide useful information to decision-makers regarding the level of cost-effective savings opportunities and the extent to which that cost-effective potential may be captured as achievable potential.

The ECW Study establishes an appropriate purpose, a reasonable approach, and useful, albeit understated, estimates of achievable potential from voluntary energy efficiency programs. JPI will briefly comment on each of these aspects of the ECW Study.

A. ECW Identifies the Appropriate Purpose of a Potential Study.

Cost-effective energy efficiency is the least-cost resource to (1) meet future energy needs, (2) meet a Renewable Portfolio Standard (RPS), and (3) implement a cap-and-trade system or other means to mitigate climate change. Indeed, the Commission, in its recent Strategic Energy Assessment (SEA), concluded that:

> The importance of energy efficiency, conservation, and load control to reducing Wisconsin's energy costs and environmental impacts is highlighted by the findings of the GWTF, as well as by analysis in the SEA. These energy management strategies also keep more money in the state and produce more Wisconsin jobs.

Final Report at 50, Docket No. 05-ES-104 (April 3, 2009) (PSC REF# 110982).

The ECW Study appropriately reflects the importance of these demand-side opportunity benefits by recognizing that a potential study should (1) focus on "what *could* be achieved if we *change* policies relating to energy efficiency, and not what one would expect to occur under current policies" (ECW Study at EE-4) and (2) prudently include a reasonable value for carbon costs, especially given the recent SEA statement that Wisconsin's energy future will be

influenced by three forces: climate change, federalization of the electric system, and increasing energy costs. (ECW Study at EE-11; SEA at 50).

Determining the economic (*i.e.*, cost-effective) and achievable potential for demand-side management resource options may be better viewed as an "efficiency resource assessment" similar to those conducted for supply-side options. The SEA candidly acknowledges that "[i]n the past there has been inadequate energy efficiency funding, resulting in a less than desirable level of energy efficiency savings." (*See* SEA at 48). While the ultimate level of spending on energy efficiency efforts is a distinct policy decision that is informed, in part, by a potential study, the potential study should provide a reasonable estimate of the opportunities available and achievable if energy efficiency benefits are considered with utmost importance.

B. ECW Used a Reasonable, Albeit Improvable, Study Methodology.

The ECW Study develops economic and achievable potential estimates. (*See* ECW Study at EE-5). The inclusion of reasonable carbon cost mitigation values in the economic potential estimates and the use of an expert "Delphi" process to help assess achievable potential estimates are appropriate and consistent with the identified purposes of the study. The inclusion of a key, expected future cost or current risk (or, in this case, avoided cost) ensures its recognition in valuing the benefits of cost-effective energy efficiency. Failing to include such a reasonable value for carbon mitigation would inappropriately undervalue energy efficiency (and customer-sited renewable resources) efforts to utility customers and the public. The "Delphi" approach uses expert opinion to help address the question of what amount of cost-effective potential is achievable in recognition that achievable energy efficiency is primarily an issue of "how much energy efficiency we want to obtain." (ECW Study at EE-4 (emphasis omitted)).

JPI agree with the ECW Study that achievable energy efficiency potential estimates should attempt to represent the "*reasonable upper limit* by assuming that policymakers want to achieve high levels of energy efficiency." (*See* ECW Study at EE-4). If one does not estimate such potential, there is little likelihood that policymakers will consider it in setting future goals and savings targets. However, while the ECW Study is appropriately premised on this perspective, it acknowledges that the estimates of achievable potential understate the real "reasonable upper limit." (ECW Study at EE-4-5). This is due to limited information to reasonably quantify certain additional savings and, for its "base case," the potential need for methodological improvements, especially to assess cost-effectiveness. (*Id*.) This is not a criticism of the ECW Study, rather a recognition that energy efficiency potential is dynamic, rather than static, in nature.

C. The Estimate of Achievable Potential Savings is Understated.

The ECW Study indicates that there is significant cost-effective energy efficiency potential in Wisconsin that can be captured through aggressive, well-designed and administered voluntary program efforts. The ECW Study provides two distinct scenarios to estimate achievable potential and the benefits from attaining that potential: a "base case" and an "environmental sensitivity case." The "base case" analysis estimates that at least 1.6 percent of annual electric demand and usage and 0.9 percent of annual natural gas and propane usage can be cost-effectively saved by and beyond 2012. (ECW Study at EE-1-2). However, the study also recognizes that this estimate does not include all expected achievable savings:

> These energy efficiency potential estimates do not include the full effect of new behavior-based efficiency programs, or the effect of advanced utility rate designs. The former could increase the energy savings potential and the latter could lead to greater reductions in peak electric demand.

(ECW Study Abstract).

The "environmental sensitivity" analysis (which also does not include the additional savings noted above) further demonstrates that potential improvements to the assessment of cost-effectiveness would increase an estimate of achievable potential to 1.9 percent annually for electric and 1.2 percent annually for natural gas and propane. (ECW Study at EE-2).

The ECW Study recognizes the possibility that different inputs to assess cost-effectiveness may be more appropriate than those used in the "base case." These inputs include (1) the level of the discount rate used, (2) the treatment of long-lived savings opportunities, especially in the retrofit market, and (3) improved avoided costs by including the impact of pending mercury abatement requirements or using a non-carbon mix of resources rather than the carbon-heavy mix underlying MISO generation. (*See* ECW Study at EE-38-39, 43-45, 54-57).

While JPI agree with the justifications provided in the ECW Study for the use of the improved cost-effectiveness inputs, even in the "base case," there are additional compelling economic arguments to support such changes. *See, e.g.*, FRANK ACKERMAN, CAN WE AFFORD THE FUTURE? chs. 2, 9 (2009); RICHARD B. HOWARTH, DISCOUNTING, UNCERTAINTY, AND CLIMATE CHANGE (April 2009), *available at* http://www.e3network.org/ briefs/Howarth_Discounting.pdf. These comments do not include an extensive substantive discussion of these important issues. Even without such improvements, the "base case" achievable potential estimates and other information in the study appear adequate to allow the Commission to increase current program efforts to far more appropriate and aggressive overall program targets and budgets for the next three- to four-year period. However, the issues raised in improving cost-effectiveness analysis going forward should be addressed in the near-term due to their potential impact. For example, the ECW Study, Appendix E, Table E-2 illustrates that using a two-percent discount rate rather than a five-percent value results in an increase in net

present value benefits of approximately $285,000,000 through additional energy savings. A similar result is attained if more appropriate avoided cost values are used. (*See* ECW Study, Appendix E, Table E-3).

There are also other important issues raised by the "environmental sensitivity" analysis beyond the appropriate discount rate or appropriate calculation of avoided costs. For example, one of the modifications to the "base case" is the use of a "relaxed" TRC threshold of 0.75%; this is intended to address the fact that the use of averages to compute cost-effectiveness will likely result in some applications of a measure being cost-effective even though, on "average," the measure is identified as not cost-effective. (ECW Study at EE-38). The apparent impact of including costs with a TRC less than 1.0 in the "environmental sensitivity" analysis is to increase savings, but also to produce an excessively high estimate of incremental program costs to capture the incremental savings above the "base case." (*See* ECW Study at EE-3). JPI 1

Because of time constraints, JPI were unable to fully evaluate how this incremental program cost estimate was derived. Nevertheless, there is no compelling reason why such a level of additional program costs would be necessary to capture most or all of the incremental savings above the "base case," especially by including all of the non-cost-effective measures and their attendant program costs. While it is reasonable to expect that at some point incremental program costs will rise to achieve incremental savings, there are effective ways to capture cost-effective segments of measures that are not cost-effective on "average" without including the costs of the non-cost-effective measures (*e.g.*, targeted program analysis and design). In addition, measures with a TRC just below 1.0 may be misleading about whether they are in fact likely to be cost-effective (*e.g.*, measures early in their commercialization are likely to have higher initial costs than life-cycle costs, which may be a more appropriate focus for assessing

cost-effectiveness). Also, more effective program design can improve the cost-effectiveness of capturing specific measures or efforts than is shown in a broader potential study (*e.g.*, a "run with the meter" financing program for retrofit efforts, in whole or in part, may achieve high participation and savings rates with greatly mitigated program costs).

Further analysis is needed and desirable to both assess the extent of the additional incremental cost-effective savings over those identified in the ECW Study "base case," as well as the potential means and costs to attain those incremental savings. This analysis should be the primary focus of the next energy efficiency potential study to inform overall program targets and budgets after the next three- to four-year program period. Thus, it would be valuable if the final ECW study report provides further information on the "environmental sensitivity" analysis that includes (1) a breakdown of the specific impact on incremental program costs for each of the three major modifications of the "base case" and (2) information on whether there are specific measures or programs that contribute more significantly to the estimate of incremental program costs.

JPI 2

Regardless of these concerns, the ECW Study provides useful information to help the Commission establish overall savings targets and budgets for the next three- to four-year period. For example, the study allows the Commission to consider the reasonableness of the Governor's Task Force on Global Warming recommendation to establish a 1.5 percent annual electric savings target and a 1.0 percent annual natural gas and propane savings target by 2012 for statewide voluntary energy efficiency programs.

D. Additional Improvements.

In addition to the improvements in terms of the discount rate and avoided costs used to assess cost-effectiveness raised in Chapter EE-3, the ECW Study raises other issues that are

important to improve the estimation of overall achievable potential and to improve the ability for the capture of such potential. (*See* ECW Study at EE-54-58). Chapter EE-5 highlights the critical importance of the appropriate assessment of the cost-effectiveness of long-lived measures, which are especially represented by building shell retrofit improvements. The use of a high discount rate and/or an inappropriate truncated useful life fails to value significant benefits. The failure to appropriately value these benefits could result in (1) the measures being inappropriately assessed as not cost-effective and/or (2) the value of the savings being understated, which could inappropriately restrict the effective implementation of programs to capture the full savings available. (*See* ECW Study at EE-54-56). The ECW Study also notes that there are some evaluation issues related to attribution that merit near-term reassessment. (ECW Study at EE-57-58).

Accordingly, the following list of issues merit near-term reassessment and consideration: (1) the appropriate discount rate, (2) the calculation of appropriate avoided costs, (3) the appropriate valuation of long-lived measures, and (4) the appropriate evaluation approach(es) needed to convert gross to net savings.

E. Application of the Potential Study for Specific Program Planning.

The ECW Study provides useful and important information for establishing overall program savings targets and budgets for the next three to four years of voluntary energy efficiency efforts. However, the study does not generally provide an adequate basis for specific program planning, design, costs, or savings targets. Indeed, as noted earlier, specific program design and budgets can improve the cost-effectiveness of measures and provide the most effective means to actually capture the overall cost-effective energy efficiency potential.

F. Technical Corrections.

On EE-6, it may be useful to clarify the comment about the treatment of free riders and spillover effects. For the Focus on Energy program, while free rider adjustments are made, spillover effects have not typically been included in the determination of net savings, primarily due to limited evaluation resources. The impact of this issue on potentially understating actual net savings is raised on EE-57-58. JPI 3

On EE-42, one reason stated for the high incremental program costs in the "environmental sensitivity" analysis is "a stronger weatherization effort." This does not appear to be correct, as the weatherization program has a TRC over 1.0 in the "base case" rather than less than 1.0. JPI 4

G. Summary on Energy Efficiency Potential.

The ECW Study indicates there is substantial cost-effective potential that can be achieved annually and cumulatively that would provide significant economic, environmental, and societal benefits to Wisconsin. It further indicates that with additional analysis and/or improvements to assessing cost-effectiveness, there is even more annual achievable potential than indicated in the "base case." While continued efforts should be taken to assess the "reasonable upper limit" of achievable savings, the ECW Study provides valuable and useful information for the Commission to use in planning for the next three to four years.

Experience with prior energy efficiency potential and actual efforts to capture achievable potential reflects that achievable potential is primarily a product of (1) consistent public policy commitment, (2) adequate resources, (3) appropriate analytic, administration, and program delivery frameworks and policies, and (4) innovative and effective programs subject to independent measurement and evaluation. These factors are integral to overall success, as

innovative and effective programs over time are unlikely to be present unless the preceding factors are in place. Innovative, effective programs require adequate resources and time as well as a public policy commitment that is designed to promote innovation. While the ECW Study appropriately defines achievable potential as "what might happen if we change our energy policy to be as supportive as possible of energy efficiency," (*See* ECW Study at EE-4), it is important to recognize that the presence of all of the above factors is necessary to actually achieve identified potential in the real world.

III. CUSTOMER-SITED RENEWABLE ENERGY RESOURCES.

JPI agree with the general discussion of cost-effectiveness results in the ECW Study that (1) the application of the Total Resource Cost (TRC) test is inadequate to properly assess the value of customer-sited renewables by failing to recognize the option value, energy security benefits, and risk reduction value (including ability to mitigate fuel costs) of such resources, and (2) that setting the level of funding for future efforts needs to recognize the potential significant role that such resources may play in the development of the future electric grid. (*See* ECW Study at RE- 10).

The failure of the TRC test to provide an adequate economic assessment of the value is compounded by the use of MISO costs as the basis for avoided costs in that valuation. MISO avoided costs are based on the heavily carbon-based generation mix within MISO. Yet a primary value of renewable resources underlying the adoption of renewable portfolio standards is that carbon (and other) emissions are avoided. If climate change is a state, federal, or global objective, what sense does it make to value renewable resources based on a future scenario that assumes the continued extensive use of carbon-based fuels? Even if a carbon mitigation value is included, the resulting avoided costs will still undervalue renewable resources. There is a

compelling need for a new assessment to develop a different and more appropriate analytic tool to value renewable resources, including customer-sited options. The Commission should undertake this effort in a convenient, near-term forum.

While the ECW Study notes that some renewable resource applications in fact do pass the TRC test now, many customer-sited renewable energy projects are similar to emerging energy efficiency technologies that need economies of scale (and potentially scope) to drive continued technological improvement and lower life cycle unit prices. To abandon or reduce the effort to achieve these trigger points on the basis of a static and incomplete cost analysis would not be good public policy. This seems especially true given the focus of the energy industry on the development of a future "smart grid" in which distributed resources are the backbone of the system due to their ability to mitigate fossil fuel prices and climate change impacts.

Thus, the ECW Study highlights the correct policy issues (including the value of an improved cost-benefit analysis) that should shape the Commission's consideration of the continued funding support and direction for customer-sited renewable energy resources. (*See* ECW Study at RE-19). The consideration of these issues requires a consistent vision of both near-term and long-term objectives and a recognition of the value of renewable resources in reaching these objectives.

BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN

Investigation into the Adoption and Achievement of Increased Conservation and Energy Efficiency Goals	**Docket No. 05-UI-115**

COMMENTS OF THE INDUSTRIAL CUSTOMER GROUPS

WISCONSIN INDUSTRIAL ENERGY GROUP (WIEG)
WISCONSIN MANUFACTURERS & COMMERCE (WMC)
WISCONSIN PAPER COUNCIL (WPC)

I. Introduction & Intervenor Interest

The Wisconsin Industrial Energy Group, Inc., Wisconsin Manufacturers & Commerce, and the Wisconsin Paper Council (together, the "Industrial Customer Groups" or "ICG"), appreciate the opportunity to provide comments in the Public Service Commission of Wisconsin's ("PSCW") Investigation into the Adoption and Achievement of Increased Conservation and Energy Efficiency Goals (the "Energy Efficiency Investigation"). As part of this investigation, PSCW contracted with the Energy Center of Wisconsin ("ECW") to prepare the Energy Efficiency and Customer-Sited Renewable Resource Potential study (the "ECW Study"). PSCW has requested comments on the draft ECW Study.

The Wisconsin Industrial Energy Group, Inc. ("WIEG") represents over 30 large companies with operations in Wisconsin, which employ approximately 50,000 people. WIEG members represent many of the states largest energy consumers including paper, malting, automobile, food processing, chemical, metal casting, and fabricating companies.

Wisconsin Manufacturers & Commerce ("WMC")[1] is the statewide, non-profit business association representing Wisconsin business. Currently, the association has nearly 4,000 members that include both large and small manufacturers, service companies, local chambers of commerce and specialized trade associations. Promoting a healthy business climate since 1911, it is a merger of the Wisconsin

[1] While WMC generally supports these comments, it should be noted that several Wisconsin utilities, who are also members of WMC, are submitting their own comments on the potential study

Manufacturers Association, the State Chamber of Commerce, and the Wisconsin Council of Safety.

The Wisconsin Paper Council ("WPC") is the trade association representing the pulp, paper and allied industry. WPC's membership is comprised of 21 Regular Members, which are manufacturers of pulp, paper and paperboard products, and more than 100 Converter and Associate Members, which are suppliers of goods and services to the industry. Wisconsin is the nation's leading paper manufacturing state. The WPC was formed in 1950.

Since the ECW Study may affect Wisconsin energy policy for many years to come and, as a consequence, energy program design and priorities, energy costs, and benefit impacts for all energy customers, including Wisconsin industrial and other businesses, ICG members have an acute interest in this Energy Efficiency Investigation. The ICG recognizes the ECW Study as a potentially important document, as it likely will be used by many stakeholders as a platform and framework with which to begin the construction of Wisconsin's energy efficiency initiatives.

As a departure from past studies where the objective has been to identify energy efficiency potential given a certain amount of funding, the Global Warming Task Force ("GWTF") recommendations modified the scope of the study to determine the savings potential and then identify the resulting funds needs to support such a potential. The GWTF recommendations also identified savings potential goals (ramping up to 2% of annual usage by 2015; 2016-2020 savings target levels to remain at 2015 levels unless changed by the Commission). ICG understands that the

energy efficiency potential study was required to be conducted in order to verify if the savings goals were achievable.

Because of the extraordinary costs, potential benefits, and significant policy changes that are likely to follow the final ECW Study, ICG believes it absolutely critical that

(a) A range of balanced sensitivities (i.e., not just biased on the aggressive side) be provided

(b) The methodology used to identify potential energy savings is intellectually rigorous and unbiased

(c) The assumptions and cost benefits estimates used in preparing those potential savings are realistic and

(d) An outcome is not pre-supposed.

To this end, with these comments, the ICG focuses on evaluating the methodology and assumptions used in the study, and identifies those issues and concerns that need to be addressed prior to finding the ECW Study results valid.

II. Brief Description of ECW's Energy Efficiency and Renewables Potential Draft Study Report

PSCW contracted with the ECW to conduct an energy efficiency potential study. ECW's energy efficiency potential study assumes an aggressive policy will be the basis for implementation of energy efficiency initiatives. It differs from the 2005 energy efficiency potential study in that it does not assume continuation of current policies to promote, implement and expand energy efficiency (i.e.," business as usual" policies). Rather, ECW states that this study focuses on what theoretically might be obtained if

policies were significantly changed. ECW views its "energy efficiency potential estimates as representing the *reasonable upper limit* by assuming that policymakers want to achieve high levels of energy efficiency."

It is ICG's understanding that ECW utilized the Delphi method primarily to estimate an achievable potential energy efficiency and renewables factor, which becomes the primary mechanism for estimating savings that could be achieved through aggressive approaches to energy efficiency. It utilized the Total Resource Cost (TRC) test, which compares the net present value of benefits achieved over the lifetime of the measure to the costs incurred by the program and the participant. For the purposes of this analysis, quantified benefits include the avoided cost of conserved energy as the value of avoided carbon emissions. Benefits presented were netted for free riders.

ECW estimates the achievable energy efficiency potential (that adjusts economic potential for timing considerations and budget constraints) for 2012 and 2018. By 2012, ECW estimates that Wisconsin could obtain annual energy savings equivalent to:

- 1.6 percent of total electricity sales
- 1.6 percent of electricity peak demand
- 0.9 percent of total natural gas sales

According to ECW, achieving these results would require investing $340 million annually (2008 dollars) in state-sponsored energy efficiency programs. If savings continue at these rates, ECW estimates that by 2018 the cumulative efficiency savings impact will amount to:

- 13.1 percent of total electricity sales
- 12.9 percent of electricity peak demand

- 8.3 percent of total natural gas sales

ECW estimates that 83% of the energy efficiency potential is in the retrofit market, 12% in equipment replacement and 5% in new construction. Accordingly, approximately the same percentage of the total investment is allocated to each market. It was assumed that upstream incentives would be used to pay to retailers and distributors on an incremental basis. ECW used similar methodology to estimate the potential for renewables.

ECW states that increased spending alone will not deliver these savings and states that changes will also be required in the following areas:

- "Innovation in energy efficiency program design, including aggressive strategies for capturing neglected opportunities through large-scale retrofits, the expansion of behavior-based approaches to motivating energy efficiency improvement, and deployment of advanced rate designs to reduce peak electric demand.

- Within equipment purchase markets, a shift in program emphasis from downstream consumer incentives to upstream incentives for distributors and retailers to affect net increases in the market share for efficient products without diverting large amounts of funding for purchases that would have occurred without program influence." (EE-3)"

III. ICG's Assessment of the Draft ECW Study on Energy Efficiency and Customer-Sited Renewable Resource Potential

As noted above, ICG has narrowly focused its Comments on the methodology and assumptions the ECW Study uses in estimating energy efficiency and renewable potential. It has done so because it understands that policy-related aspects of energy efficiency and renewable potential are also to be addressed in two future Comment requests in this Energy Efficiency Investigation. Therefore, to the extent that the ECW Study addresses energy policy, the ICG does not comment at this time. Rather, the ICG

will comment on the energy policy implications of energy efficiency and renewable potential when the PSCW solicits comments on those matters. At that time, ICG will comment on the ECW Study's policy discussions. Therefore, these comments should not be construed as ICG's acceptance or endorsement of the ECW Study as it pertains to Wisconsin's energy policy. However, should the PSCW decide not to implement its recently announced two-phased review of policy, ICG requests that it then be allowed the opportunity to supplement these Comments to address energy policy.

Overall, it appears that ECW's potential study follows the approach and scope identified in the Global Warming Task Force report (Section 1: Pages 68-74). The GWTF recommended that a spending target be replaced by a savings goal and that efforts be ramped up in an effort to achieve 2% savings by 2015. ECW's energy efficiency potential results closely coincide to the GWTF's growth by 2012 at 1.5%.

It should be noted that ECW's current potential estimates are roughly three times greater than those estimated in the 2005 study. The estimates appear very ambitious and aggressive on this basis alone. It is challenging to find these estimates, as well as estimates related to net benefits, credible as they are unprecedented and based on key assumptions, which if erroneous, could result in ineffective outcomes. It should not be taken as a given that aggressive policies lead to an equally aggressive response from the market and customers. ICG believes that several issues and concerns need to be addressed prior to finding the ECW's study results valid:

1. Funding levels should be "solved for" after identifying the potential
2. Sensitivity analysis should be conducted that also provides results assuming a "business as usual" policy in a slow (versus vibrant) economy to give an indication of the *practically* achievable potential and provide a proxy for

situations in which market forces or other factors do not respond or perform as expected.

3. The study needs to identify Wisconsin and Sector load profiles in order to reasonably assess and verify the validity of the results

4. ECW identifies "Neighborhood Blitz" as an innovative strategy for the residential market but is silent on what strategy it believes might be effective for the industrial market – this needs to be addressed

5. Delphi method has drawbacks.

6. Additional discovery and clarification of assumptions is needed in calculating benefits

7. Administrative factors need to be revisited:

8. Validity of assumptions related to upstream incentive strategy is needed

1. **Estimate funding levels exogenously.** It is the ICG's understanding that the GWTF recommendation was to identify the savings goal, which was to be used to identify the required funding levels. ECW's energy efficiency potential study appears to have utilized incentive levels to determine the savings and in doing so, has *solved* for the funding levels endogenously as opposed to exogenously. For example, the assumption, that the incentives for the retrofit market would cover 90% of the installation costs, appears to drive the potential. Shouldn't the funding level be identified independent of the savings goal? ICG 1

2. **Additional sensitivities and clarifications are needed regarding achievable potential.** ECW notes that the market dynamics have changed since its last potential study. In fact, market dynamics have changed since ECW conducted the majority of its research. The current recession has resulted in demand destruction and therefore slowed, if not negated, load growth. While the rationale exists to

focus only on energy efficiency potential that is driven by aggressive policies, current market conditions cannot be ignored. ECW needs to address the pace of achievable potential given the existing economic slowdown, as there have been several facility shutdowns, which likely affects potential. In addition, ICG believes that sensitivities need to be conducted using the "business as usual" policy under a slow, versus a vibrant, economy. Although it could be assumed that the 'business as usual" policy may have a low likelihood of occurrence, these sensitivities will be a proxy for situations in which market forces or other factors do not respond or perform as expected. It should not be taken as a given that aggressive policies lead to an equally aggressive response from the market and customers. ICG believes that it makes sense to also identify scenarios, for contingency and reasonability considerations, where market forces do not respond as anticipated. ICG 2

Related to the economic downturn scenario, segregating its effects from energy efficiency impacts also must be addressed.

ECW has identified in several instances in which its potential results are understated due to the exclusion of efforts that are not readily quantifiable, or because of assumptions using backward looking locational marginal prices or LMPs. In a similar fashion, ECW needs to identify instances where its results may be overstated. ICG also recommends that ECW identify confidence bounds for the base case and various sensitivities conducted. ICG 3

Although ECW states that the achievable potential will not be delivered without strategies for innovative rate design and behavior-based programs, it also

states that it has not included savings associated with such strategies in their estimates. Therefore, ECW's position is unclear regarding this matter and should be clarified. ICG 4

3. **Need to identify Wisconsin and Sector load profiles.** ECW needs to provide a discussion of Wisconsin's historical and current load profiles from an overall and a sector-by-sector basis. This information will help assess energy and demand growth rates and thus more reasonably help verify targeted strategies. ICG 5

4. **Need discovery on "Neighborhood Blitz" equivalent for industrial sectors given that the potential rests in the retrofit market.** The strategy of focusing on the retrofit market presumes incentives of 90% of installation costs, which implies that the funding is driving the savings potential and rather than the other way around. ECW cites the "neighborhood blitz" as one example of conducting retrofits for residential customers. Since the majority of the potential appears to lie in the retrofit market, at a minimum, ECW needs to specifically and explicitly identify what strategy would be used to focus on the retrofit market in the commercial and industrial sectors as well. Also, ECW needs to clarify that the 50% to 90% incentives apply to all sectors and identify whether it applies to all the stated technologies. ICG 6

5. **Delphi method has drawbacks.** Although there is attractiveness to using the Delphi method for forecasting under various scenarios, this method also presents serious drawbacks. For example, it is subjective and suffers from the biased sampling of experts – a serious drawback. The judgments are those of a select

group of people and may not be representative. There is also the danger of regarding results as facts. ICG 7

6. **Need additional discovery and clarification of assumptions:** ECW needs to provide the cost/benefit and achievable potential results without assumptions related to carbon emissions. As ECW notes, "costs associated with carbon emissions are not currently a direct cost." (EE-11) While such costs could exist in the future, it is neither known nor predictable when this might occur. Consequently, the benefits calculation is accordingly impacted and should be realistically represented. At the very least, such assumptions should be used for a later time period than currently assumed. Additionally, ECW also needs to identify the gross results and provide greater clarity regarding how they were converted to net results. It appears that this was accomplished by simply assuming incentives upstream. ECW needs to clarify this point. Furthermore, LMPs have a marginal losses component that generally ends up in over-collection of losses. This must be accounted for in the assumptions. ICG 8 ICG 9 ICG 10
7. **Administrative factors need to be revisited**: Since the primary focus is on the retrofit market, the ICG is uncertain whether using historical data from established programs in Wisconsin and elsewhere are reasonable proxies for implementing the aggressive policy. As ECW attests, the retrofit market will be relatively more resource intensive and, therefore, will likely require more resources than those established in existing programs. (EE-20) These factors need to be adjusted accordingly. ICG 11

8. **Demonstrate validity of assumptions related to upstream incentive strategy.** Notwithstanding the aggressive incentives (covering 90% of installation costs), it is also uncertain whether the retrofit market, where achievable potential is perhaps the most uncertain, will deliver the results expected, on a net benefit basis. ECW assumes that shifting the incentives upstream to retailers and distributors and linking payment of these incentives on incremental sales of energy efficiency products will produce the desired results. For this strategy to work, it is apparently assumed that the suppliers will provide existing market share information in order to formulate a baseline. But, suppliers are typically unwilling to provide such information, which they hold as confidential and proprietary. The reasonableness of the ECW's assumption needs to be tested. ICG also finds it hard to believe that the retrofit market will continue to deliver consistent results year after year, especially after 2012. ICG 12

ECW observes that estimating free riders is a major challenge for the current evaluation methodology and framework; it recommends that a technical conference be held to address this issue. We support this recommendation.

The ICG has made efforts to provide an assessment of ECW's methodology of the draft energy efficiency and renewables potential report and in doing so, has identified gaps and issues of concern that need to be addressed. ICG is hopeful that that the Commission will find our comments insightful and respectfully urges the PSCW staff to get these issues addressed in the final report. We welcome the opportunity to provide further assistance and feedback as this investigation progresses.

Dated May 29, 2009

Sincerely,

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Docket 5-UI-115 Potential Study Comments
Orion Energy Systems

Orion Energy Systems appreciates the work the Energy Center of Wisconsin has done to analyze the energy efficiency and customer-sited renewable resource potential in Wisconsin. Orion is concerned that the Center missed a significant renewable energy option: customer-sited direct solar applications such as solar light pipe technology. Direct solar applications allow Wisconsin utility customers to harvest and focus solar radiation and use it to illuminate their facilities.

OES 1

Direct solar illumination technology is important for a number of reasons:

1. While direct solar applications do not directly 'spin a meter,' the technology completely displaces fossil fuel consumption, just like solar water heating (which was covered in the Center's analysis). Direct solar applications use a renewable resource to displace fossil fuel consumption and serve an essential facility function: illumination.

2. Direct solar applications are proven and reaching commercialization. Coca-Cola Enterprises, Miller Brewing, Festival Foods, Lakeshore Technical College and Orion Energy Systems have all installed the technology in their Wisconsin facilities. Additionally, the Wisconsin Office of Energy Independence has provided a renewable energy technology demonstration grant to further foster the commercialization of this innovative customer-sited renewable technology.

3. Direct solar applications can deliver measurable results. Using a very conservative operation profile and installation expectations for the state of Wisconsin, Orion estimates that direct solar can deliver 250 MW of peak capacity and 390,000 MWh of energy displacement. The full impact of the technology, including the environmental benefits of installing this direct solar renewable technology, can be seen in the table that was provided as an appendix to Orion's comments.

In addition to the practical benefits described above, direct solar applications are local opportunity makers. Not only is direct solar technology manufactured in Wisconsin by a Wisconsin based company; the technology will be installed at customer sites in Wisconsin. This means the expenditures on renewable energy will stay in Wisconsin, helping the state retain existing jobs and create new 'green jobs.'

WISCONSIN SOLAR LIGHT PIPE POTENTIAL

Analysis based on 6 Hours of Operation, 5 Days per Week, 52 Weeks per Year

500	MW - Wisconsin Commercial/Industrial Illumination Load
50%	Light Pipe Capacity as Percent of Commercial/Industrial Illumination Load
250	MW - Wisconsin Peak Load Relief Potential (Light Pipes)
6	Hours/Day Fixture is shut down via Light Pipe (WI)
5	Days/Week Fixture is shut down via Light Pipe (WI)
52	Weeks/Year Fixture is shut down via Light Pipe (WI)
1,560	Total Annual Hours Fixture is shut down
390,000	Light Pipe Energy Savings (MWh)

Economic Impact Analysis	
$2,000,000	Investment per MW
$500,000,000	Total Investment
$0.07875	Average Commercial and Industrial Electric Rates
$30,712,500	Projected Annual Reneawable Energy Savings
1	Average Economy Job Creation per $92,000 Spent per DOE (EECBG Program)
5,435	Total Jobs Created by Project

Environmental Analysis	
390,000.0	Light Pipe Energy Savings (MWh)
390.0	Light Pipe Energy Savings (GWh)
335,425	Carbon Dioxide (CO_2) Removed (tons)
1,198	Sulfur Dioxide (SO_2) Removed (tons)
469	Nitrogen Oxides (NO_X) Removed (tons)
5.0	Methane (CH_4) Removed (tons)
5.5	Nitrous Oxide (N_2O) Removed (tons)
14.5	Mercury (Hg) Removed (pounds)

Environmental Equivalencies	
71,560	Acres of Trees Planted
62,985	Cars Removed from the Road
32,194,890	Gallons of Gas Saved
766,545	Barrels of Oil Saved

Health Equivalencies	
2.5	Fewer Premature Deaths Occurred
1.3	Fewer Chronic Cases of Bronchitis Were Found
1.2	Fewer Hospital Visits Occurred
357.2	Fewer Work Days were Lost

Emissions Values	
$16,771,268	$50/Ton - CO_2
$46,243	$38.60/Ton - SO_2
$703,521	$1500/ton - NO_X

we energies

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Milwaukee, WI 53203
www.we-energies.com

May 26, 2009

Ms. Sandra J. Paske
Secretary to the Commission
Public Service Commission of Wisconsin
Post Office Box 7854
Madison, WI 53707-7854

Dear Ms. Paske:

Potential Study Comments – PSCW File 5-UI-115

Attached are comments on the public draft of the Energy Efficiency and Customer-Sited Renewable Resource Potential in Wisconsin for years 2012-2018 prepared by the Energy Center of Wisconsin (ECW). We agree with many of the findings of this thorough study with an aggressive approach.

We have reviewed the joint utility letter in response to the survey and we agree with their responses.

Sincerely,

Judy Mathewson
Manager Energy Efficiency

cc: Mr. Robert Norcross – PSCW
Ms. Carol Stemrich - PSCW

We Energies Comments on ECW's 2009 WI Energy Efficiency Potential Study

1. *The Study should include utility sponsored programs in its savings and cost estimates.*

   State-sponsored programs in WI are funded by utilities; please change all references to "state-sponsored energy efficiency programs" to statewide efficiency programs. WE 1

   The Study states (in the Abstract) that, "Achieving [the 2012 potential] results would require investment in state-sponsored energy efficiency programs at $340 million per year." Our reading is that the estimates in this study exclude utility-funded programs. If this is the case, the authors failed to include unique and significant energy efficiency opportunities that Wisconsin's electric and gas utilities offer to their customers. Unique in that utilities have customer relationships and access to customer billing and metering data that put them in an excellent position to market programs, especially innovative initiatives such as dynamic rates and in-home displays. Significant in that We Energies, consistent with Wisconsin Act 141 and the PSCW's Order in dockets 05-CE-130 and 05-AE-118, provided mandatory energy efficiency programs, which resulted in nearly 200,000 MWh and 64 MW in savings by the end of January of this year.

   State-sponsored programs alone are not sufficient to meet either the federal goals for energy efficiency stipulated in the American Reinvestment and Recovery Act (ARRA), nor the aggressive "achievable" potential estimated by this Study.

2. *The potential estimates are very high when compared savings achieved nationally by "best practice" states (including WI). Please explain.*

   WE 2

   The Energy Center's "achievable" scenario is very aggressive by national standards–3.1% of electric and gas revenues; saving annually 1.6% of kWh sales, and 0.9% of gas sales by 2012. ACEEE, in March 2009, released a report titled, "Meeting Aggressive New State Goals for Utility-Sector Energy Efficiency: Examining Key Factors Associated With High Savings" (ACEEE Report Number U091). In this report, ACEEE includes the following statistics for 14 "best-practice" states, including Wisconsin, as identified by energy experts. By way of comparison, Vermont – the state with the highest proportion of savings (1.8% of annual sales)--did so for 3.5% of revenue, at a cost of $38 per capita. The ECW study is proposing that WI can achieve *less* savings at $60 per capita.

Metric	ECW 2009 Potential Study	ACEEE Study
EE Spending as % of Revenues	3.10%	Range: 0.2% - 3.5%
		Median: 1.7%
		WI 2007: 1.4%
EE Spending per capita ($340 million per year; WI population of 5,628,000)	$60	Range: $3.36 - $37.78
		Median: $17.58
		WI 2007: $14.32
EE Savings as % of Energy Sales	1.60%	Range: 0.1% - 1.8%
		Median: 0.7%
		WI 2007: 0.7%

3. *The Study should include a discussion of how energy efficiency-related funding through ARRA may impact potential estimates.*

   According to the US DOE's Funding Opportunity Announcement (FOA)for State Energy Program (SEP) funding through ARRA, WI's allocation for programs is $55.8 million; this is only a fraction of the Stimulus dollars that will be allocated to WI for energy efficiency related endeavors. WE 3

   The WI Potential Study's release is somewhat commensurate with the release of the FOA so it is understandable that ECW did not discuss the impact of ARRA on potential in WI. However, the ARRA funds are potentially a "game changer" for energy efficiency in WI, as they will be in many states; therefore a discussion of the impact of ARRA funds on energy efficiency potential in WI should be included in the final report.

4. *The analysis requires avoided costs estimates that align with the PSCW's current understanding of such costs.*

   On page EE-11 the Study, the assumption for avoided cost of natural gas is stated as $0.84 per therm, "…which is also consistent with values used in Focus on Energy program planning and evaluation." This is not the case. The table below is from p. 2-27 in the latest Focus on Energy Semi-Annual Evaluation Report (April 2009). According to this table, the Potential Study is undervaluing the avoided cost of natural gas from 5% - 20%. WE 4

   The avoided capacity value used in the Energy Center's analysis is $30 per kW-year. This is 28% of the avoided capacity value shown in the table below. Further, please clarify – is $30 per kW-year assumed to be a long- or short-term capacity value?

Table 2-20. Utility Avoided Costs

Sector	kW	kWh	Therms
Schools/Government	$104.00	$0.056	$0.917
Commercial/Agriculture			$0.987
Industrial			$0.878
Residential			$1.061

WE 4

5. *Please clarify program administrative cost assumptions in Table EE-5.*

   It is unclear if the values in this table refer to first-year energy savings or lifetime energy savings for measures.

WE 5

6. *The sensitivity analysis should account for downside uncertainty values.*

   The "sensitivity analysis" in the draft Study is not a sensitivity analysis, rather it is a "very high potential" case scenario analysis. A sensitivity analysis should account for a range of values (both higher *and* lower than the base achievable case described in the Study) for key assumptions in the Potential study around which there is significant uncertainty. The results of such an analysis under most feasible circumstances would also result in potential estimates *lower* than the aggressive "achievable" scenario that the Energy Center considers its "base" case in its sensitivity analysis. As stated on page EE-4, "This study focuses on estimates *of achievable efficiency potential*, defined as 'the amount of energy use that efficiency can realistically be expected to displace assuming the most aggressive program scenario possible.'" We suggest, if the budget permits, conducting a more realistic sensitivity analysis, or if this not possible, re-characterizing the "sensitivity analysis" as defined in the draft Study as a "very high potential" case scenario, or something similar.

WE 6

7. *There is insufficient evidence to support the claim that moving CFL programs upstream will decrease free-ridership.*

   On pages A-1 and A-2, the analysis state that CFLs, "…will likely require upstream market approaches to avoided significant free freeridership issues associated with consumer incentives." Recent experience demonstrates that upstream CFL programs in California have resulted in higher market penetration, but high free-ridership rates.

WE 7

8. *Potential savings from CFLs for Non-Low Income Home Improvements are overstated*

   The authors assert that Non-Low Income Home Improvements could save 15% of household energy use, with 2/3 of that coming from CFLs. This assumes that 10% of an average household's energy could be saved through the direct install of

CFLs. If a single family homes' electricity consumption is about 12,000 kWh per year; according to the Study CFLs could save 1,200 kWh per year for the average We Energies customer. CFL savings are typically between 25 and 40 kWh per year depending on the incremental wattage (i.e. 40 W to 13W, 60W to 15W, 100W to 23W); to save 1,200 kWh/year per home would necessitate the installation of about 30 CFLs per home. Please consider additional evaluation of this issue. WE 8

9. Page E-3 Scenario 5, the omission of the Carbon Adder results in a significant drop in achievable energy efficiency (i.e. From 32 MW to 19 MW in the residential sector, over 33% reduction). Please explain. WE 9

May 26, 2009

To: Carol Stemrich, Public Service Commission

From: Wisconsin Energy Conservation Corporation

Re: 2009 Wisconsin Potential Study Draft

As the current administrator of the Focus on Energy's Business, Residential and Renewable Energy Programs, we are very cognizant of the importance of this study. We appreciate the opportunity to comment on this important document and look forward to participating in the next phase of this effort when stakeholders discuss how this estimate, along with other input, might be used to create a roadmap toward greater energy independence for Wisconsin.

Our specific comments on the document are provided below. We have separated these comments into two sections, one regarding energy efficiency and the second on renewables. If you have any questions about these, please call Rick Winch here at WECC (249-9322 ext. 189).

Energy Efficiency Potential

1. We concur with the Energy Center's general approach to "potential" as well as the overall study results suggesting that, under an "aggressive" program effort Wisconsin can achieve annual energy savings equivalent to at least 1.6% of total electric sales, 1.6% of electricity peak demand, and 0.9% of total natural gas sales. We also agree that what is estimated in this study, as ECW points out on page EE-4, is "what might happen if we change our energy policy to be as supportive as possible of energy efficiency." We believe the study methodology and methods used do provide us with a reasonable estimate of the amount of energy use that can be displaced assuming a significantly more aggressive program scenario. It is noteworthy, however, that the study suggests that there could be more achievable potential than shown in the Base Case (or Sensitivity Analysis), including the impacts of behavioral change.
2. We believe we have a good understanding of the Center's methodology including the bottom-up approach across residential programs and a top down approach in other sectors. Given that many of the estimates were not generally arrived at through specific program designs (with exceptions such as the neighborhood blitz), we think it is important to clarify that the study should not be viewed as a roadmap for program planning and design. Much of the modeling was completed at a technology level. While respondents were asked to estimate levels of market penetration under various scenarios, including what could be achieved under the most aggressive program approaches and funding levels, stakeholders did not always fully articulate a well constructed program theory and corresponding design. This is decidedly different than modeling through the development and deployment of specific program approaches. Of particular note are the brief statements and two bullet points under the heading of "ENERGY EFFICIENCY PROGRAM CHANGES" on page EE-3. While we agree with the statements, it seems reasonable to include a disclaimer that this potential study does not provide the roadmap of exactly "how" to address the challenges listed (e.g., innovative program design, large scale

retrofits, expansion of behavior based approaches, advanced rate designs, shift to upstream incentives, etc.).

3. Page EE-6 notes that net savings estimates exclude freeriders and include spillover effects. It goes on to state that "These estimates are comparable to the 'verified net savings' results reported on Energy evaluations." While the Focus on Energy net savings estimates, in nearly all cases, do exclude freeriders they rarely (with the possible exception of the retail-based CFL program) provide any measureable credit for spillover. We think it is important to clarify that the potential study includes credit for spillover effects and that Focus on Energy programs have rarely been given credit for these effects under the current evaluation regimen. We recommend that the study acknowledge that net results should include spillover but that at present Focus on Energy is not currently funding research to quantify the effects of spillover and, therefore, energy savings that might be realized from these effects are not (with the possible exception of retail-based CFL programs) being credited to programs. WECC 2
4. It would be helpful if the Center could more fully articulate what is (and is not) included in the Base Case with respect to behavior change. It would be helpful, for example, to more fully articulate on page EE-5 what is meant by the inclusion of "some impacts of behavior-based program approaches." Our understanding is that In-Home Monitors/Displays and Programmable Thermostats are included in the Base Case and, therefore, also included in the sensitivity analysis. It is also our understanding that other behavioral based programs/efforts are not included in either the Base Case or the Sensitivity Analysis. As stated in the report, this is because approaches to quantifying the energy savings impacts of behavior change efforts are still in their infancy. Finally, we think it would be helpful to exclude decisions that result in the purchase of more energy-efficient equipment from the definition of behavior change. From our perspective, this categorization is confusing because it blurs the line between measures for which we know how to quantify energy savings (like equipment purchases) and those measures (like changing business practices about turning off computers) where there is less certainty about the energy savings. While we understand that inducing someone to purchase a more energy-efficient piece of equipment (as compared to a standard efficiency piece of equipment) can be considered a "behavior change," and that some in our industry are trying to define behavior change more broadly, we think this approach confounds the issue and thus recommend some clearer distinctions. We think this will help eliminate confusion regarding what is (and is not) included in the Base Case. WECC 3
5. We think it is important to clarify that, in general, the number of "retrofits" (be it homes, buildings, etc.) do not increase (from the Base Case) in the Sensitivity Analysis. Our understanding is that the same assumptions with regard to "capacity" to deliver "retrofits" apply to both the Base Case and Sensitivity Analysis. In other words, the Sensitivity Analysis assumes that we effectively reached a "capacity ceiling" in the Base Case. Therefore, it seems appropriate to eliminate the reference on page EE-42 that essentially states that more energy-efficiency was achieved in the Sensitivity Analysis "due to a stronger weatherization effort…". We also think it is important to clarify that the shift from Base Case to Sensitivity Analysis only adds new measures—it does not grow the volume of any of the measures included in the Base Case. While we agree that this is one reasonable approach to increasing savings, we think there WECC 4

might well be more cost efficient opportunities to grow the volume of the measures included in the base case, thus yielding more cost effective energy savings.

6. We think it is important to put in a disclaimer that the TRCs were effectively done at an individual measure level and we could see improved or different results when conducting such analysis at a program level. It may be, for example, that a measure included as part of an aggressive and innovative program approach, could be modeled and shown to have a TRC that differs from that found in the appendix. We very much support the current Focus protocols to consider TRC at the program level rather than the measure level and we would not want to see this study used to determine whether particular measures should or should not be included in programs. Given the very generic assumptions the Center had to use regarding program costs it would be inappropriate to assume individual TRC results from this document are definitive. As the report authors note early in the document the study results work in aggregate, some estimates will be low while others are high; individual measure TRCs should be considered illustrative, not definitive. WECC 5
7. On page EE-62, it is stated that "The difference between the two studies (2005 vs. 2009) is partly due to the inclusion of the cost of carbon emissions. The more important driver, however, is the impact of innovative program strategies." We think that an important driver (if not, the most important driver) is the fact that the study assumes that over multiple years there will be both consistent goals and consistent public support.
8. We support the inclusion of propane but think it would be useful to know what percentage of therm savings (by sector) is represented by propane. WECC 6
9. The study asked Delphi respondents to "provide input on policy and programmatic changes that would be necessary to achieve this aggressive energy efficiency future in Wisconsin" (Page EE-7). The study appears to suggest that a new paradigm may be needed with respect to the inclusion of new benefit/cost drivers, innovation, R&D, and evaluation. We think it would be interesting to summarize what the specific suggestions were as they appear to, at least in part, impact what respondents thought could be achieved under an aggressive programming effort. At a minimum, a summary of the discussion in Chapter EE5 (Energy Efficiency Program Challenges) should be included in the Executive Summary. In particular, the chapter addresses important topics regarding 1) appropriate avoided cost values; 2) measure lifetimes; 3) discount rates; and 4) the evaluation construct. WECC 7
10. We support the conclusion that the TRC framework has significant shortcomings in terms of assessing the viability of renewable energy resources. In particular, the intangible benefits (such as energy security and the expanded opportunity to transition to a new energy economy) associated with renewable energy development.
11. Appendix A – Detailed Methodology is just 1 ½ pages in length. We are guessing that this was mislabeled and or most of the content was moved or inadvertently left out. WECC 8
12. Table EE-5 ADMINSTRATIVE PROGRAM COST FACTORS appears to be a "lifetime" value, not first year. It would be helpful to include this clarification in the table heading. WECC 9
13. Appendix F, p. F5 (220 of pdf) refers to "the specific list of behavior-oriented items included in the Behavior Continuum for this study is provided in Table 1 (see attached)." We cannot locate that table in the appendices, or in the report itself and would like to request a copy. WECC 10

Renewable Energy Potential

1. As with the efficiency section, we think the aggregate results here are reasonable but we are cautious about some of the specifics and thus want to re-iterate that we think the study is a good starting point for an analysis of overall potential but should not be used as a roadmap for program planning. We believe, as an example, that changes in specific technologies as well as the evolution of some markets might mean dramatic changes in potential over the next decade. As a result, we view this study as a good first step and look forward to the PSC's Quadrennial Planning Process as an opportunity to further flesh out program options.
2. On the specifics, we believe that the study's estimate of electric potential is reasonable but that the mix of technologies may overstate the role of community based wind. On the electricity and therm side we think the study may understate the potential for biomass CHP. The estimate for non-residential combustion also seems to be low based on the information presented in the document, likely resulting in an underestimation of the total therm potential. WECC 11
3. We appreciated the discussion in Appendix A regarding the valuing of renewable energy resources. We concur that Wisconsin should explore alternatives to the TRC for renewable energy programs and we believe that the discussion in this appendix is a good starting point for exploring those issues. Again, we would hope that there could be more attention to these issues as part of the Quadrennial Planning.
4. We also appreciated Chapter RE-4: INTEGRATION OF EFFICIENCY AND RENEWABLE ENERGY STRATEGIES. Over the last few years Focus has developed several incentive offers to facilitate greater integration and we encourage this integration in much of our marketing materials. That said, we are also sensitive to the realities of customer choices. We can lead customers to the logic of efficiency first but some will choose renewables before they pursue efficiency. Increasingly we are looking at ways to facilitate customers choosing efficiency after renewables as well as before. (The logic here is that the renewable system might prompt a customer to be more aware of usage—making them a prime candidate for increased efficiency investments.) We think there's substantial opportunity for more integration but want to also acknowledge that some of the integration will not be linear.

Wisconsin Public Service

ALLIANT ENERGY

May 26, 2009

Mrs. Carol Stemrich
Demand Side Management, Gas & Energy Division
Public Service Commission of Wisconsin
610 North Whitney Way
P.O. Box 7854
Madison, WI 53707-7854

Re: Potential Study Comments- Reference Docket No. 5-UI-115

Dear Mrs. Stemrich:

The purpose of this letter is to comment on study scope and methodology concerns with the Energy Center of Wisconsin Report Number 244-1; Energy Efficiency and Customer-Sited Renewable Resource Potential in Wisconsin. This letter is a joint response on behalf of the following Wisconsin Utility Companies: Wisconsin Public Service Corp., and Wisconsin Power and Light Company.

Our companies acknowledge the study's findings for potential and assumed ramp-up efforts are very aggressive – the efforts project the upper bound-"potential" in the truest sense of the word. We have some comments and concerns about the scope and methodology used to establish the potential estimates. Of particular concern are the cost calculations of the potential impacts resulting from the methodology. Further details regarding our concerns are offered in the comments below.

Our companies believe that, given the proposed legislation at the federal level regarding energy efficiency, it would make more sense to adopt the federal standard as opposed to a more restrictive state standard that could disadvantage Wisconsin industry in both the national and international marketplace.

We would also like to note that the comments below are based on limited review due to a very short comment period and are therefore focused on just scope and methodology comments to the study. Additional review and comments will be considered for participation with the Quadrennial Planning Process.

Comments on study scope

A. As stated in the study, the full effect of new behavioral-based efficiency programs, or the effect of advanced utility rate designs are not included. We are concerned with this gap in the study, as the efficiency levels and cost effectiveness of these programs could provide significant energy savings with lower program costs than program methods examined in the potential study.

B. More consideration should be provided to non-rebate related areas of opportunity such rate design changes and operational energy efficiency improvements to utility infrastructure (i.e., distribution, transmission and power plant). WPS/WPL 1

C. The foundation of the potential estimates is based on the singular approach of expanding technology rebates to 90% of incremental cost and assumes customer willingness to retire outdated and functional equipment, which has no basis in fact. Stakeholders, including the Commission, must remain open to various methods, sources and strategies to obtain cost effective energy efficiency. WPS/WPL 2

D. The review of incremental increase in efficiency potential requires additional analysis and consideration for the existing levels of efficiency already included in individual utility load forecast. Existing company forecasts may include forecasts for efficiencies from both statewide and utility voluntary programs and should be counted toward achievement of goals. It is crucial this is considered in setting and measuring potential efficiency levels. WPS/WPL 3

Comments on general methodology used in study

A. There appears to be double counting of compact fluorescent light bulb (CFL) impact in the study. For example; Wisconsin Public Service Corporation's current load forecast already accounts for the federal standard where CFL's replace incandescent bulbs by 2012, yet the Energy Center of Wisconsin charts show significant energy savings coming from CFL's. It appears that the forecasted CFL savings shown in the report are incremental impacts beyond those mandated by the Energy Independence and Security Act (EISA) of 2007. The Energy Center of Wisconsin estimate of additional CFL savings beyond the EISA of 2007 CFL mandates seem inconsistent with the intent of the EISA. WPS/WPL 4

B. The study uses a historic 2005-2008 LMP as the avoided energy cost for the economic evaluation. LMP values should be forecasted rather than historic values. WPS/WPL 5

C. The study uses $30/kw-yr and 8% transmission and distribution losses. Transmission losses are already included in LMP, therefore transmission losses are double counted. Additionally, it is unclear in the study why Wisconsin should expect the impact of energy efficiency on its transmission and distribution to be equivalent to Iowa's at $30/kw-yr WPS/WPL 6

D. The discount rate used, does not track with the customer's discount rate, even at 5%/yr. Therefore, the study's low discount rates are disconnected from the ratepayers' discount rate. WPS/WPL 7

E. The value demonstrated by the sensitivity case is beyond the point of diminishing returns, given that the sensitivity case increases the 2012 Gwh reduction from 1.6% to 1.9% but the investment in energy efficiency doubles.

Comments on cost-effectiveness methodology

A. Multiple Cost-effectiveness tests should be considered with the study. Economics are examined on the "Total Resource Cost" with no mention of any analysis being done using the "Rate Impact Test". With Total Resource Cost, the dollar amounts that flow between the utility and the ratepayers are ignored since they are treated as "transfer payments". WPS/WPL 8

B. The Basis for using a 0.75 Benefit/Cost ratio is unsupported and violates the Priorities Law which requires that the Commission consider energy efficiency only when it is technically feasible and cost effective. Further, Act 141 specifies "Studies of potential energy efficiency improvements that could be made in this state, including at least one study completed in the preceding 2 years, provide a prospective 5-year and 10-year estimate of such potential that is cost effective." WPS/WPL 9

C. This study does not account for what the financial impact will be to industries that have already maximized their process efficiency without extensive use of rebates, only to face higher per-unit costs for electricity. WPS/WPL 10

D. It appears the evaluation of the potential for expanded energy efficiency was based on life cycle economics as opposed to differences in the timing of implementation of energy efficiency improvements. Specifically, are the incentive payments justified, if all one is doing is advancing by a number of years the introduction of the next generation of energy efficiency that results from new codes/standards? WPS/WPL 11

E. The future benefit estimates for the environmental analysis needs to be more detailed. The results of the electric energy efficiency potential study shows limited return on energy efficiency investment in terms of actual energy reductions even though the benefit/cost ratios remain relatively constant.

WPS/WPL 12

Appendix E starting with Table E-6 (no CO2 adder) to Table E-5 (Environmental Scenario – higher avoided costs, 0.75 benefit/cost and 2% discount) shows there are significant increases in cost to achieve additional nominal Gwh sales reductions relative to the "no CO2 adder" scenario.

The assumptions like CO2 adder, avoided energy cost and discount rate that are made in the various scenarios drive the benefits associated with energy efficiency. This results in benefit/cost ratios increasing slightly even though the ratio of "% Cost increase"/"% Gwh Reduction" is increasing from 2.7 to 4.9 going from the "No CO2 Adder" scenario to the "Base" scenario and going from the "Base" scenario to "Environmental" scenario respectively.

Scenario	Gwh Reduced	Total Cost - Millions	Total Benefit - Millions	Benefit/Cost Ratio
No CO2 Adder	938.8	$171.6	$586.6	3.42
Base	1,130.4	263.0	940.3	3.58
Environmental Scenario	1,323.5	483.3	1,791.2	3.71

Scenario	**Delta** Gwh Reduced	**Delta** Total Cost - Millions	**% Cost/ % Gwh Reduce**
"No CO2 Adder" to "Base"	191.6 (20%)	91.4 (53%)	**2.7**
"Base" to "Environmental Scenario"	193.1 (17%)	220.3 (84%)	**4.9**

Comments on program methodology

A. The program methodology of providing incentives that equate to 50% rebates for new equipment and 90% rebates for retrofit equipment is

not sustainable. These expenditures are excessive, given the focus on changes in building codes and efficiency standards at both the state and federal level. This investment in incentive payments is simply advancing the timing of something that will be done from necessity once the new codes and standards are in place.

WPS/WPL 13

B. Given that the implementation of more energy efficient building codes and standards rest on the near term horizon, it is not economically sensible to give an incentive in terms of a 50% rebate for a new equipment and 90% rebate for retrofit. In the near future, no options will exist for new equipment decisions but the high efficiency device.

C. An addition concern resulting from the proposed rebate structure is the high risk of "leakage", meaning that an industrial customer may apply a 90% rebate incentive to retrofit its equipment – only to close its Wisconsin facility and move the equipment to another plant elsewhere after a few years.

WPS/WPL 14

D. The impact of supply and demand on retrofit technologies subject to a 90% rebate must be evaluated. Such a robust incentive may cause, at least initially, a supply/demand mismatch, causing prices for new equipment to rise until supply matches demand.

E. Current evaluation of free-ridership conflicts with potential behavioral change programs. If customer behavior is modified to install energy efficiency equipment, by current evaluation criteria free-ridership may increase. Free-ridership definition and evaluation need to be clarified to distinguish between the different drivers that impact due to the co-existing of behavior change programs and direct incentive programs.

WPS/WPL 15

Comments on the Delphi process

A. The Delphi Process generates what is a consensus of informed opinion of what may be achievable. This process may be too general a method for developing and justifying an energy policy for the state.

WPS/WPL 16

B. Experts each made assumptions as to what comprises a program, without concern of the program cost to achieve the potential. This could lead to an overstatement of potential, when programs are tied to a realistic program budget.

C. The Delphi questions did not supply the current status of equipment currently in use. Example, if T12 lights currently in use at a company site are at the end of their useful life, replacement is likely. However, if the T12 lighting has a remaining 10 year equipment life, customers are

unlikely to replace now. Companies will not be driven to retrofit solely due to energy efficiency. A company will look at several metrics, such as downtime costs; install costs, cash flow and product life cycle, along with energy efficiency. The Delphi process does not examine all of the true drivers of retrofit, which may results in an overstatement of the energy efficiency potential.

Thank you for this opportunity to provide comments on the Energy Center of Wisconsin energy efficiency potential study dated April 2009.

Any questions please comment:

Dennis Derricks – Wisconsin Public Service Corp. or
Andrew Burch- Wisconsin Power & Light Company

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May 26, 2009

Ms. Carol Stemrich
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RE: Potential Study Comments – Reference Docket No. 5-UI-115

Dear Ms. Stemrich

The purpose of this letter is to comment on the Wisconsin Potential Study results released on May 5, 2009. Xcel Energy supports the Governor's Global Warming Task Force (GGWTF) results and the commitment to reduce Wisconsin's carbon footprint. The potential study completed by the Energy Center of Wisconsin is a critical tool to complete this initiative.

Due to the limited time to review this technical report, the Company is not submitting detailed comments at this time. Rather, the Company would like to express concerns on a few key topics. Xcel Energy acknowledges the need to ramp-up efforts and identify Wisconsin's upper bounds for the potential of energy efficiency and customer-sited renewable resources. Xcel Energy agrees with the definition of potential as "existing in possibility, not in actuality." And, believes that aggressive goals will need to be set to achieve the GGWTF goals. However, as mentioned in the study, reaching these aggressive goals that this study states are "achievable" will depend on: 1) much higher levels of funding, 2) revised energy efficiency policies and program practices, and; 3) consumers' continued and sustained interest in investing in energy efficiency. The study's estimates of achievable efficiency potential are assuming the "most aggressive program scenario possible". We want to make sure that in choosing the eventual goals for the state, the stakeholders strikes a balance between the goal objectives and the eventual impacts to Wisconsin utilities and customers, especially in terms of the price increases that would be required.

Xcel Energy believes it reasonable for the Public Service Commission to use these results to begin the Quadrennial Planning process in order to "set, or revise goals, priorities and measureable targets for the Programs" (known as Focus on Energy).

In a May 20, 2009 letter from the Public Service Commission, utilities have been asked to comment on Phase One broader policy issues which need to be decided before more detailed programmatic issues can be addressed in Phase Two (i.e. funding levels, goals, and targets). At that time it would be appropriate to comment on the amount of funding, goals and targets that should be set based on realistic and achievable potential in Wisconsin for energy efficiency and customer-sited renewables.

If you have any questions regarding this data, please do not hesitate to contact me at 715-737-5632.

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