Minnesota Stakeholder Meetings for Energy Savings Goals

October – November 2013

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EXECUTIVE SUMMARY

In late October and early November 2013, the Department of Commerce (Commerce) held two stakeholder meetings and four technical workgroup meetings with identified parties to gather input on the state’s energy savings goals. These meetings were held pursuant to a directive from the Minnesota Legislature. (HF 729, 4th Engrossment, Article 12, Section 8.)

Commerce retained the Energy Center of Wisconsin (Energy Center) to help prepare for and to moderate the stakeholder meetings and technical workgroups. Discussion in the stakeholder meetings focused on higher level issues outlined in HF 729 Article 12 Section 8 while more specific topics were discussed in the technical workgroups. The technical workgroup discussions focused on two key areas that potentially offer significant amounts of untapped energy savings that could contribute to achieving statewide energy policy objectives: industrial energy efficiency and combined heat and power. This report presents background information, a summary of the stakeholder comments and recommendations from Energy Center staff to the Department of Commerce for consideration in achieving statewide energy goals.

A summary and timeline of the stakeholder process follows.

STAKEHOLDER MEETINGS

The general stakeholder meetings addressed the overarching issues set forth in Minnesota HF 729 Article 12 Section 8:

- Current and future strategies to maximize long-term cost-effective energy savings and minimize energy waste
- Current and future strategies to maximize carbon reductions and economic benefits through increasing efficiency in a market sectors
- Current and future strategies to minimize utility costs and rate impacts for ratepayers in all market sectors
- Determination of how achievement of the state’s energy conservation goals and renewable energy goals are considered in the existing integrated resource planning and certificate of need processes
- Determination of the appropriate utility financial incentive levels to meet the state’s energy conservation and renewable energy goals.
A study by the American Council for an Energy-Efficient Economy (ACEEE), which was presented at the meeting, found that Minnesota has made better-than-average progress in promoting efficiency than has the typical state. That report also found that the industrial sector in Minnesota may have additional energy efficiency opportunities. There was substantial discussion in the meeting of the role that incentives, both for the customer and for the utility, play in facilitating the capture of energy efficiency resources in the state. Distinctions were made between the utility types in that organizational incentives can benefit investor-owned utilities, but offer little to municipal utilities and cooperatives.

**Industrial Energy Efficiency**

Prior to convening the technical workgroup meetings the Department issued a straw man proposal that set forth the concept of a standard offer purchase agreement for industrial energy efficiency. Such an approach is intended to capture additional energy efficiency resources from customers inside or outside the conservation improvement program (CIP). Under this approach utilities would purchase incremental energy efficiency resources (over and above what customers would do on their own) from large industrial customers. The major takeaways from the discussion of that issue are:

- It would be premature to draw a conclusion as to the reasonableness of implementing a standard offer purchase program for energy efficiency. Most parties suggested a need for more details.
- It is unclear whether such a new approach is necessary as offering greater incentives through the CIP program may achieve the same end.
- The addition of this program might cannibalize existing CIP programs if this option were open to both CIP customers and customers who have opted out of CIP.

Another major issue evolved from the discussion. Industrial customers expressed interest in means of obtaining more-frequent and more-detailed energy use data for their operations. Key policy questions emerged from this discussion:

- What can or should the utilities do to help industrial customers gather the data?
- Are such activities reasonably included in CIP?
- If the activities are not properly part of CIP, should the utilities provide this assistance outside the program?
- If so, how should the activities be funded?

**Combined Heat and Power (CHP)**

Before CHP opportunities can be considered in resource acquisition plans, some policy clarifications are necessary:

- The policy objective being pursued through CHP development needs to be made explicit (e.g., encouraging more efficient use of energy resources versus reducing greenhouse gas emissions).
- CHP needs to be clearly defined as a concept as parties disagreed on which projects might qualify under that classification.
• The funding source for CHP programs needs to be determined—is it appropriately part of CIP, or is it a separate effort?

• The accounting for energy savings needs to be determined—should the waste heat recovery savings from CHP count toward the energy savings goals?

In terms of barriers and opportunities:

• The obvious low-hanging fruit for CHP has already been captured. The next level of opportunities will likely be at smaller-scale facilities or in other sectors, such as public buildings.

• The standby rate is a significant barrier to CHP adoption (this issue is addressed in a separate Commerce report).

• Power plant siting should consider CHP possibilities, where consistent with the policy objective for such resources (see above).

RECOMMENDATIONS

The Energy Center recommends that Commerce make the following suggestions to the Minnesota Legislature. The Legislature should:

1) Order Commerce to establish a technical working group to develop a recommendation as to whether a standard offer purchase program for energy efficiency is likely to produce additional energy savings, and if so to develop the details for such a program. The group should also make recommendation as to how such a program would or would not be integrated with the CIP program in terms of funding and energy savings accounting.

2) Require the state’s utilities to file comments with Commerce regarding the desirability of implementing programs designed to help industrial customers gather data related to energy use so that additional efficiency opportunities can be identified.

3) Determine the policy objective behind CHP promotion.

4) Define CHP as a concept. The Energy Center recommends the definition suggested by the U.S. Department of Energy, which is “The concurrent production of electricity or mechanical power and useful thermal energy (heating and/or cooling) from a single source of energy.”

(End of Executive Summary)
STAKEHOLDER MEETINGS

The Division of Energy Resources of the Minnesota Department of Commerce (Commerce) conducted a series of six four-hour meetings, two with general stakeholders and four with technical experts on industrial efficiency and combined heat and power, to comply with Minnesota legislation (Article 12, Section 8) requiring public meetings with stakeholders and members of the public addressing a set of issues related to Minnesota’s energy-savings goal and to produce a report on findings and legislative recommendations.

After a competitive bidding process, the Commerce contracted with the Energy Center of Wisconsin to help organize, facilitate, document and report on the results of these stakeholder meetings and process. The Energy Center leads for this project were Steve Kihm, Director of Market Research and Policy, and Charles Dufresne, Director of Education.

The diagram below illustrates the stakeholder process that was followed.

As the diagram illustrates, the process consisted of one initial stakeholder meeting for the general public, four technical working group meetings focusing on the two sub-topics, and a final wrap-up meeting for the general public, all of which took place between October 17, 2013 and November 4, 2013.

To complement these meetings, the Division of Energy Resources also provided stakeholders the chance to review and post comments online on the two straw man proposals that served as the subtopics for the technical working groups. The first of these addressed the treatment of energy-saving goals for industrial energy efficiency (IEE) including standard offer power purchase agreements (SOPPA); and the second the treatment of energy-savings goals for non-conservation measures, in particular combined heat and power (CHP). The content of these proposals, as well as the posted comments received online, served as additional input to the technical working groups.¹

The first meeting for the general public explored broad opportunities for future energy savings and addressed the various issues outlined in the Article 12, Section 8 legislation. The sub-topics for the technical working group meetings focused on combined heat & power, due to broad stakeholder interest in this technology, and opportunities in industrial energy efficiency, due to the significant impact that savings in this sector could have on achievement of energy savings goals of the 1.5 percent of gross annual retail energy sales for all utilities in Minnesota. The final stakeholder meeting for the general

public on November 4, 2013, served as an opportunity to report back on the discussions in the technical working groups and for additional comment and feedback from the public on the Article 12, Section 8 legislation.

The appendices provide descriptions of the meeting agendas, presentations and attendees.

**INITIAL STAKEHOLDER MEETING**

The aim of this meeting was to conduct a high level discussion of what is currently being implemented in the State, introduce the stakeholder input process described above, draw attention to some priority areas for potential energy efficiency improvement in Minnesota, and give stakeholders an opportunity to respond to a set of issues highlighted in Article 12, Section 8.

The meeting was attended by approximately ninety people representing Minnesota investor owned utilities, cooperative utilities, municipal utilities, environmental and energy-oriented non-profits, large energy use customer representatives, non-profit organizations, the University of Minnesota, and the Division of Energy Resources of the Minnesota Department of Commerce.

After the opening and introductions, Marty Kushler, Ph.D., Senior Fellow, American Council for an Energy-Efficient Economy, made a presentation on “Some ideas for potential energy efficiency improvements in Minnesota: A high level view from a national perspective.”

Following his presentation, Jessica Burdette presented an overview of Energy Efficiency in the State of Minnesota, highlighting the history of the Conservation Improvement Program, its accomplishments and key areas of focus.

To tee up the panel discussion, Steve Kihm of the Energy Center gave a short presentation on the issues highlighted in Article 12, section 8. These issues included:

- Current and future strategies to maximize long-term cost-effective energy savings and minimize energy waste
- Current and future strategies to maximize carbon reductions and economic benefits through increasing efficiency in a market sectors
- Current and future strategies to minimize utility costs and rate impacts for ratepayers in all market sectors
- Determination of how achievement of the state’s energy conservation goals and renewable energy goals are considered in the existing integrated resource planning and certificate of need processes
- Determination of the appropriate utility financial incentive levels to meet the state’s energy conservation and renewable energy goals

Following Steve’s presentation, panelists were given a chance to share their perspective on these issues and other concerns they have related to the future of Minnesota Energy Efficiency Goals.

- Deb Sundin (Xcel Energy)
- Nick Mark (CenterPoint Energy)
- Jeff Haase (Great River Energy)
- Bob Jagusch (MMUA–Minnesota Municipal Utility Association)
- Erin Strojan-Ruccolo (Fresh Energy)
- Andrew Moratzka (Stoel Rives, LLP)
- Jessica Burdette (Minnesota Department of Commerce)
• Marty Kushler (ACEEE)

Following the moderated discussion, and before concluding, the audience was given the floor to make comments or ask questions of the panelists. The key takeaways from the general meeting starts with the ACEEE report that found that Minnesota has made better-than-average progress in promoting efficiency than has the typical state. That report also found that the industrial sector in Minnesota may have additional energy efficiency opportunities.

The panelists discussed each of the issues set forth in the statutes. Much of the conversation centered on incentives for not only the customer, but also for the utility. The basic thrust is that providing incentives to both parties increases the likelihood that energy efficiency opportunities will be captured. Utilities, though, are not monolithic in this respect. Distinctions were made between the utility types in that organizational incentives can benefit investor-owned utilities, but offer little to municipal utilities and cooperatives.

ENERGY-SAVING OPPORTUNITIES IN THE INDUSTRIAL SECTOR

Before discussing the stakeholder comments in detail, it may be useful to provide some background as to the nature of the opportunity to save energy through industrial energy efficiency and combined heat and power projects. A 2010 study conducted by the Minnesota Technical Assistance Program (MnTAP) found that installation of cost-effective energy efficiency measures could reduce annual industrial energy use in the state by 9 to 24 percent (DeWahl 2010). Minnesota is not unusual in this respect—Midwest studies, as well as those conducted across the country, suggest that substantial untapped efficiency opportunities exist in the industrial sector (Bradbury 2011). Other studies suggest that some CHP applications also are not implemented, even though they are cost-effective (Haefke 2011).

The magnitude of these savings estimates may surprise some policy makers. Why would firms operating in competitive industrial markets, entities heavily driven by economics and headed by rational decision makers, consistently pass up cost-effective energy-saving opportunities? There is a rich literature that attempts to explain the gap between what studies find and what industrial firms actually do in this regard (see for example, Elliott 2010). This report will not discuss all aspects of those findings, but rather will address one particular factor that was mentioned by numerous participants in the stakeholder meetings—risk.

Stakeholder Comments on Risk

The stakeholder meetings produced many comments about how risk considerations affect various parties involved in industrial efficiency decisions. The following statements paraphrase stakeholder comments in this regard:

• Any efficiency measure that could negatively affect plant productivity will be considered too risky.

• There is a concern among plant workers and management that if an energy efficiency investment doesn’t work as well as expected, they are at risk for losing their jobs. They feel personal risk.

• Big financing projects are risky.

• Utilities should offer guaranteed energy savings contracts to reduce customer risk. (This raised a parallel concern that utilities could be at risk if the savings don’t materialize.)
Similar comments were raised in the discussion of combined heat and power. Given the significance of this issue some further discussion is warranted.

**Portfolio Risk and Individual Risk for Energy Efficiency Resources**

Those conducting energy efficiency and CHP potential studies are concerned with how a measure or technology will perform on average across all customers. That is, will widespread implementation of a particular measure or technology likely produce savings that cost less to procure than the cost of meeting customer needs with utility supply-side assets?

Note not every application of an efficiency measure must turn out to be cost effective. For example, consider a CFL program. While in most cases replacing an incandescent bulb with a CFL is a cost-effective step, in some cases it might not be. For example, if the incandescent light is on only for an hour a day, there might not be enough time for the savings to accrue to be sufficient to offset the upfront cost difference between the inefficient and efficient bulbs. This sort of situation is balanced out, however, by other situations in which the bulb burns for seven hours, for example, thereby saving much more energy than would a typical lighting application, which is usually about four hours per day in a residential application.

For the resource planner, it is not the specific CFL savings that matter, but rather the average savings for all CFLs. If the average bulb is on for four hours, the mathematical end result is the same in terms of energy savings whether all bulbs burn for four hours or if half burn for one hour and half burn for seven hours. The aggregate energy savings is exactly the same in either case.

The diversification effect of a portfolio is the concept in play here. There is uncertainty as to how an individual efficiency measure or CHP project will perform. Nevertheless, overestimated savings for some installations wash out the effects of underestimated savings for other installations leaving a fairly stable (i.e., more-certain) midpoint estimate of average savings.

Figure 1 shows the distribution of simulated savings for 100 efficient motors, each with an expected savings of 10,000 kWh per year relative to the electric consumption of the motor it replaces. The distribution reveals that some motors save noticeably more than expected while other save noticeably less. Yet, because higher-than-expected savings offset lower-than-expected savings, the average result for the measures when viewed as a portfolio is quite close to the expected level.
Exploring this further, assume that to be cost-effective the efficient motor must save at least 9,000 kWh per year. Thinking about these data in terms of statistical confidence, one could ask what the probability is that the average annual savings from these efficient motors could be less than 9,000 kWh. That is a straightforward statistical problem.

The data suggests that the probability of the average savings from 100 motors of this type falling below 9,000 kWh is almost negligible (less than one percent). Thirty independent simulations, each containing results for 100 motors, produced average results ranging from 9,600 to 10,300 kWh, demonstrating that the chance of the average result for a portfolio of efficient motors falling below the critical cost-effectiveness threshold is essentially zero.

The answer is quite different, however, if we want to know the probability that an individual motor will save less than 9,000 kWh per year. The simulation data suggest that there is a 31 percent chance than any individual motor will achieve a result below that threshold. So what looks like a sure thing in the potential study looks much less attractive to the firm thinking about installing one of the motors.

Therefore, while on average installing the efficient motors will almost certainly be cost-effective, in about one-third of the individual cases the motor will fail the cost-effectiveness test. That is a risky proposition for the plant manager. And this is more than about just investment risk. Recall the following stakeholder comment:

- There is a concern among plant workers and management that if an energy efficiency investment doesn’t work as well as expected, they are at risk for losing their jobs. They feel personal risk.
This risk profile casts a shadow on all efficiency measures, even those that on average cost noticeably less than utility supply-side assets on a life-cycle basis. To bring more energy efficiency measures to the forefront in Minnesota industrial facilities, policy makers will have to take actions that either explicitly or implicitly reduce the risk industrial firms face when investing in those measures.

The Payback Method—A Proxy for Risk

The differences in risk perception carry over in determining the tools of analysis. Statewide resource planners tend to determine cost-effectiveness using life-cycle cost analysis tools. That is the appropriate tool for the resource planner. Industrial customers, on the other hand, tend to rely on a different approach, as is appropriate in their circumstance.

This difference in method explains part of the gap between what resource planners find to be cost-effective, and what customers actually implement. Because the risks are different, the analytical methods are different. This leads to different conclusions about cost effectiveness. Note that neither party is incorrect—what is a risky venture for an individual customer actually represent a low-risk, cost-effective resource for the state. The issue is whether one is looking at a single motor (risky) or a portfolio of 1,000 motors (much less risky). The market will not deliver the cost-effective portfolio to the state because the individuals whose motors would make up the portfolio do not get the benefit of diversification. Only the state can capture that benefit.

Looking at efficiency opportunities from the individual firm’s specific leads us to the payback method. The payback method tells the plant manager how long it will take for the firm’s energy bill savings to recover the upfront incremental investment for the efficiency measure. For example, if an efficiency measure has an incremental cost of $1,000 and it saves $300 per year in electricity bills, the payback period is:

$$ \text{payback} = \frac{\$1,000}{\$300/\text{yr}} = 3.3 \text{ years} $$

If the firm strictly applies a 1.5 year payback period maximum, it will not install this efficiency measure. Some energy analysts have been highly critical of the payback method, suggesting that it ignores both risk and the timing of the cash flows. While that appears to be true on its face, the corporate finance literature notes that the payback method may actually produce results that mirror those produced by complex risk analysis of uncertain investments.

As a number of finance scholars have pointed out, the answers provided by crude rules of thumb such as payback often resemble the solutions produced by optimal decision rules that account for the option-like features of many investments, particularly in the evaluation of highly uncertain investments (Graham 2002, emphasis added).

Thus, rather than ignoring the impact of risk, the payback method actually may produce results that better reflect risk than does the conventional life-cycle cost approach (Kihm 2009).

The payback method has intuitive appeal for risk-averse plant managers. One way to limit one’s risk is make sure that a measure pays for itself quite quickly. Thus, in general, projects that will likely pay back the upfront investment in short order tend to create less risk exposure for the firm. There is not a one-for-one relationship here (a project with a long payback period could be low-risk if the savings were guaranteed), but requiring quick paybacks is generally a step in the right direction for those concerned about risk.
This analysis provides the foundation for using the payback method as a reasonable metric to guide public policy development regarding energy efficiency. An unscientific poll taken at the industrial efficiency stakeholder meetings suggests that Minnesota firms today typically require paybacks on energy efficiency investments to be no longer than 2.5 years, with many participants suggesting that firms require paybacks of one year or less.\(^2\) In this environment energy efficiency measures with five- to ten-year paybacks have little chance of being implemented no matter how long the associated savings would accrue to the firm.

Public policies that shorten the individual firm’s payback period on efficiency investments can encourage investment. Providing payments to customers reduces the payback period. If, for example, the program provides $600 of the incremental cost of the hypothetical measure, the payback period becomes:

\[
\text{payback} = \frac{($1,000 - $600)}{$300/yr} = 1.3 \text{ years}
\]

With the program covering part of the cost, the measure now meets the firm’s capital budgeting threshold of no more than 1.5 years. This analysis reveals that intervention into the marketplace can spur additional efficiency investment.

Capturing More Energy Efficiency Resources in Minnesota’s Industrial Sector

The example just discussed provides the basis for the incentive payments offered through Minnesota’s Conservation Improvement Programs (CIP). Utilities make such payments to persuade customers of all sorts to make efficiency improvements. But many of the industrial customers have opted out of the CIP program.\(^3\)

The fact that firms have opted out of CIP does not mean that there are no efficiency opportunities that utilities can capture within those firms’ operations. The utility can apply the portfolio approach to analyzing demand-side resources, one not available to the individual firm. What the firm sees as risky—and it is risky to the firm—is not nearly as uncertain when considered in a portfolio setting. Therefore, the way to bridge this gap is to have the utility, with its lower-risk position, “purchase” efficiency from industrial customers, which are in a higher-risk position. The incentive payment is one way of building that bridge.

But the fact that many industrial customers have opted out of CIP suggests that the current program structure is not attractive enough for them to participate in the program. If policy makers want utilities to capture energy efficiency resources from the firms that have opted out, they appear to have two choices:

1. Increase incentive payments available within CIP
2. Develop a new programmatic approach

The Department of Commerce has proposed such a new approach, the standard offer purchase agreement concept, which it set forth in its straw man proposal.

\(^2\) One stakeholder suggested that focusing exclusively on payback requirement oversimplifies the complex decision making process that industrial firms use. In some cases a firm with multiple plants may pass up an efficiency measure in one location that has a one-year payback to implement a project in another plant that has a five-year payback. The latter plant may have overall production cost advantages that justify investing in that facility while the former facility may have an overall cost structure that it makes it a less attractive investment site.

\(^3\) MN Statute 216B.241 Subdivision 1a. (b) and (c).
Industrial Energy Efficiency—The Straw Man Proposal

Utilities regularly purchase power on the supply side. The straw man proposal suggests that utilities might develop a similar approach to procure energy efficiency resources on the demand-side.

The Department of Commerce describes the basic concept as follows:

The utility… makes a “standard offer” to “purchase” energy efficiency resources from its customers. A utility offers pre-established cash payments (i.e., X cents per kWh) for energy efficiency projects involving the installation of new, high-efficiency equipment or systems in customer facilities. The Standard Offer program is a utility-administered resource acquisition program intended to enable completion of new, cost-effective energy efficiency projects.

The Department envisions that standard offer program will be available to all large, industrial companies, including those in CIP and those who have opted out of the CIP.

The straw man proposal describes the key aspects of the program as follows:

Companies who have identified eligible projects under the Standard Offer program would need to work with the individual utility to negotiate terms such as sufficient annual energy savings, measure lifetime criteria, and cost-effectiveness of project for both the facility and utility. Additionally, a measurement and verification plan must be established to ensure accuracy of realized energy savings resulting from the project. Distributed and renewable energy projects could also be part of the program as long as energy savings were tracked.

The straw man proposal does not go into greater detail as it is conceptual in nature, and not a specific program design.

Stakeholder Comments on the Standard Offer Idea

The following are paraphrases of the principal stakeholder comments on the straw man proposal to purchase efficiency resources through the standard offer approach:

- Is there a need for the standard offer approach?
- The idea seems worthy of further consideration, but it is difficult to assess the reasonableness of the approach without seeing the details.
- Has the approach worked in other states?
- How would the program be funded?
- How would utilities dispatch the energy efficiency resources procured under this approach? (There was consensus at the meetings that the resources procured under this approach would not be dispatchable.)

The comments suggest mixed reviews on the straw man proposal in large part due to a lack of detailed information. While there is some interest in the standard offer approach, other parties have initial reservations. It is clear that the value of such an approach rests with the program details and at this point the proposal is still conceptual in nature. This suggests a series of next steps that need to be taken to determine whether the concept has merit and if so how the details should be developed.
The first issue that seems worthy of consideration is the need for the new approach:

1. Could CIP incentive payments for large-scale efficiency projects simply be increased to the point that not only would CIP customers undertake more efficiency projects, but some customers that have currently opted out would return to the program?

2. Is modifying CIP a more cost-effective way of capturing additional efficiency resources than is creating a new program approach (i.e., could the utilities simply increase rebate levels)?

3. What evidence is there that the standard offer approach will attract projects that a standard efficiency program, even a custom program, cannot?

4. If the current regulatory framework for CIP cannot be modified to capture more industrial efficiency, is there a need for a statewide self-direct approach for customers that have opted-out of CIP?

The second group of questions asks for details and evidence of the effectiveness of the standard offer approach:

1. What other states have implemented this sort of approach?

2. How has the approach worked?

3. What are the program details?

The third group of questions relates to program cost recovery:

1. Which customers would be responsible for covering the cost of the program?

2. How would the charges be assessed?

The fact that we have identified nine follow-up questions speaks to the need for additional research on the standard offer approach.

**Industrial Energy Efficiency—The Need for Better Energy Use Information**

After discussing the standard offer approach, the discussion turned to the need for industrial customers to have better information about the way their facilities use energy. This in turn led to discussion of sub-metering of industrial processes and ISO 50001 Certification.

The earlier discussion on the riskiness of industrial energy efficiency investments assumed that the firms know about all of their efficiency opportunities, but concerns about risk limit them to some extent from pursuing them. We note that this perfect-information assumption is not consistent with what we observe in real markets.

In real markets, which contain noticeable imperfections, information is often a scarce resource and gathering it can be expensive. While large-scale operations are more likely to have the staff and resources to analyze energy use in their organizations, the combination of complex processes and the fact that energy billing data is often not shared in a timely way with plant managers means that those managers sometimes operate at an information deficit with regard to facility energy use. Smaller firms often simply do not have the staff necessary to analyze energy use.
This calls into question the claim of some parties that industrial customers invest in all cost-effective efficiency measures on their own because they operate in competitive markets. It is more likely the case that in real, imperfect markets some firms have only limited knowledge of their efficiency opportunities. This suggests that there could be a sizeable pool of yet-to-be discovered energy efficiency opportunities at some industrial firms. But before we can tap those resources someone must first identify them.

Case studies reveal that sub-metering of industrial processes can identify energy-saving opportunities and lead to efficiency improvements. Industrial processes are often made up of many energy-consuming parts. Examining monthly bills for electricity and natural gas typically provide few insights as to where within the process efficiency opportunities might lie. More detailed information, which can be obtained by measuring energy use within portions of the process with submeters, allows for greater understanding of the energy use of the process. This level of knowledge about a process within a facility can lead to greater identification of opportunities for efficiency improvements.

Following up on the initial discussion in the first meeting, two studies of sub-metering in industrial facilities were discussed in the second stakeholder meeting:


These papers describe not only how installing sub-metering provided industrial firms with better information, but once that information started to flow the employee culture within the plants tended to change. Interest in identifying energy-saving process improvements increased substantially.

To be clear, sub-metering is but one means to gathering information about energy use of industrial processes. In-depth analytics applied to whole-plant interval data can also reveal energy-saving opportunities (Thibodeau 2013). So can improving the energy use data collection and decision-making process. This leads to a discussion of ISO 50001.

ISO 50001 is an international standard that requires continual process improvement in terms of measuring and using energy. Energy efficiency is one of the factors that firms must consider if they are to receive this certification.

ISO 50001:2011 specifies requirements for establishing, implementing, maintaining and improving an energy management system, whose purpose is to enable an organization to follow a systematic approach in achieving continual improvement of energy performance, including energy efficiency, energy use and consumption.4

Such an in-depth review of energy use may identify energy efficiency opportunities.

The discussion in the stakeholder meetings suggested that ISO 50001 certification to date (the standard was issued in 2011) has been achieved by only a limited number of large multinational firms. It was unclear whether this includes any Minnesota firms. The largest firms are unlikely to need assistance from utilities in implementing ISO 50001.

But if the certification requirement works their way down the supply chain, smaller firms may need to be certified as well. Some of those firms might benefit from assistance from utilities in developing processes to help them understand their energy use.

While sub-metering and achievement of ISO 50001 certification could lead to substantial efficiency improvements, predicting actual savings from such activities involves speculation. But as a stakeholder mentioned in the meetings this may be no different from portions of complex custom efficiency improvements that utilities conduct today. Some custom projects require funding of upfront engineering studies. Those studies proceed under CIP even though the benefits are unclear at the outset.

This leads to several questions regarding the issues related to sub-metering and ISO 50001 compliance that deserve greater attention:

1. What role could or should utilities play in helping industrial firms with sub-metering activities? With ISO 50001 compliance?
2. If utilities do have a role to play, would it be an appropriate CIP-related activity?
3. If they are to be part of CIP, should these activities be treated similarly to preliminary engineering studies currently included in CIP?
4. Since the benefits of these activities are difficult to estimate, can a benefit-cost test be applied? Should such a test be applied for these activities?

**Other Industrial Energy Efficiency Issues**

At the culmination of the technical workgroup meetings, a series of issues were identified that were offered for future consideration:

1. What role can project financing play in promoting industrial efficiency? Should utilities offer on-bill financing or on-bill repayment to industrial customers?
2. Can the E3 (economy, energy and environment) sustainable strategy be applied in Minnesota’s industrial sector?
3. Can utilities pay the salaries of energy managers who work in an industrial facility? (This would address issues of limited resources, time constraints and the lack of in-house champions for efficiency.)
4. Is there a role for behavior-based efficiency programs in the industrial sector?

Each of these issues could be explored in depth. Initial discussions suggest that there is no consensus position on these items, although there may be situations in which they would have merit.

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COMBINED HEAT AND POWER

Standard industrial processes typically generate substantial amounts of waste heat. Combined-heat-and-power (CHP) systems convert some of that waste heat to productive purposes. The typical system produces both heat and electricity. The overall efficiency of such a joint system is noticeably more efficient than the combined efficiency of separate heat and electric generation facilities.

While we won’t repeat the discussion here, the analysis of risk applies in the CHP arena as well. Those looking at resources in the aggregate can count on a portfolio diversification effect—some CHP facilities will save more than expected; others will save less. In the aggregate, though, it is the average savings that matter. But the individual project results matter greatly to the individual CHP owner. For an individual for whom a CHP project fails to deliver as promised in terms of savings, it does that individual no good if some other individual has a successful CHP project. Again, the risk can be high for individual project, even though the risk of a portfolio of such assets is much lower. This is the essence of diversification.

A recent study of certain aspects of CHP in Minnesota suggests that there is 2,750 MW of capacity that could be captured by using this technology (Haefke 2011). But that figure represents technical potential, not that which is economic. The stakeholder meetings suggest that there is a large difference between technical and economic potential estimates. That is, what appears to be a relatively large CHP resource potential in a theoretical, technical sense is in practice but a small fraction of that figure.

Stakeholder Comments on CHP Potential

The following are paraphrases of comments offered at the stakeholder meetings on CHP. Reading these comments suggests that many of the issues raised in the discussion of industrial energy efficiency carry over to the CHP discussion:

- It would be helpful to define more precisely what types of projects qualify as CHP.
- The purpose for promoting CHP is unclear—is it to save energy? Or to reduce carbon emissions?
- Gas and electric utilities are more likely to collaborate on CHP projects if each can get some of the credit for the project in terms of meeting CIP targets and perhaps in the way of financial incentives.
- Fuel switching policies must be revisited in the context of CHP.
- The low-hanging fruit has already been captured at the large facilities.
- There may be opportunities for smaller-scale CHP.
- University and municipal operations offer greater potential for CHP projects because those entities do not require quick paybacks.
- Projects are easier to implement when there is only one party (such as a utility) making all the arrangements and then selling the electricity and the steam.
- CHP risks must be shared among participating parties.
- Utilities need incentives to encourage their involvement.
• Utility standby rates represent a big barrier to CHP project development.

• Customers today seem more interested in solar photovoltaic systems than CHP.

• Utilities should consider locating new power plants near a facility that can use waste heat as part of a CHP process.

• Should CHP-related energy savings count toward CIP goals?

• Should CHP projects be funded through CIP?

• If costs of promoting CHP are not covered by CIP what is or what should be the funding mechanism?

Most of these comments and/or questions are straightforward on their face and need little elaboration. The general tenor is that while the CHP concept has merit, aligning all the interests in such a way to make the projects is for the most part an elusive goal. The barriers to CHP implementation appear to be huge. However, there may be pockets of opportunity. Those opportunities may increase if policies change (e.g., regarding whether utilities can promote fuel switching) and if rate design issues (e.g., expensive standby charges) can be overcome.

**Critical Path Discussion**

Participants in the meetings were asked to work in groups to develop a list of items that they believe are on the critical path if the state is to effectively promote CHP. Table 2 is a list of those items and the number of groups that identified the issue as critical. Items identified by more than one group are highlighted.

The need to look at standby rates was the most-frequently-cited issue. The Department has retained the University of Illinois-Chicago – Energy Resource Center to study this issue. The study has been completed and the final paper can be found in Appendix H.

Two of the next three most-frequently-cited priorities are policy issues: determining the funding source for CHP-related activities and defining the objective for promoting CHP. These questions may fall within the purview of the Minnesota Legislature to decide.

The other high-priority item is identifying potential sites for CHP facilities. The Department has retained FVB Energy to conduct a CHP economic and technical potential study along with a regulatory review of CHP related rules and statutes, but it seems unlikely that the study would provide specific sites. Further work would then be required to identify such locations.
### Table 2: Actions on the Critical Path to greater CHP Implementation

<table>
<thead>
<tr>
<th>Action</th>
<th>No. of Groups That Identified That Action</th>
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<tbody>
<tr>
<td>Re-evaluate standby rates</td>
<td>4</td>
</tr>
<tr>
<td>Identify opportunities to use waste heat</td>
<td>3</td>
</tr>
<tr>
<td>Determine the CHP program funding source</td>
<td>3</td>
</tr>
<tr>
<td>Define CHP objectives (save energy vs. save carbon)</td>
<td>3</td>
</tr>
<tr>
<td>Re-evaluate fuel switching policies</td>
<td>2</td>
</tr>
<tr>
<td>Increase CHP incentives for utilities and customers</td>
<td>2</td>
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<tr>
<td>Determine who gets credit for CHP-related energy savings</td>
<td>2</td>
</tr>
<tr>
<td>Understand system-wide costs and benefits</td>
<td>1</td>
</tr>
<tr>
<td>Raise electric rates (&amp; lower gas rates)</td>
<td>1</td>
</tr>
<tr>
<td>Address internal financial hurdles</td>
<td>1</td>
</tr>
<tr>
<td>Create economic development zones for district heating</td>
<td>1</td>
</tr>
<tr>
<td>Provide technical assistance to develop optimal CHP configurations</td>
<td>1</td>
</tr>
<tr>
<td>Develop plug-and-play CHP technologies</td>
<td>1</td>
</tr>
<tr>
<td>Identify barriers and driver for private firms</td>
<td>1</td>
</tr>
<tr>
<td>Address concerns about cross-subsidies</td>
<td>1</td>
</tr>
<tr>
<td>Address regulatory concerns, such as need for air permits</td>
<td>1</td>
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</tbody>
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### FINAL STAKEHOLDER MEETING

This was the second of the two meetings open for general public input and the last meeting held as part of this stakeholder process.

The agenda for this meeting is included in Appendix A. Approximately seventy-five people attended this meeting including representatives of investor owned utilities, cooperative utilities, municipal utilities, non-profit organizations, energy consulting groups, a manufacturer of cogeneration systems, the University of Minnesota and the Division of Energy Resources of the Minnesota Department of Commerce. See Appendix B for a list of organizations that participated.

Bill Grant, Deputy Commissioner at the Division of Energy Resources, opened the meeting by welcoming participants and reminding them of the purpose for conducting these stakeholder meetings.

After this introduction, the Energy Center reviewed the stakeholder meeting purpose and process and then proceeded to moderate two stakeholder panel discussions based on the issues and conclusions which emerged from the four technical working group meetings. A diverse set of panelists representing different stakeholder interests were chosen from among those who had attended the technical working groups. The panelists were:

- Jesse Petersen  Xcel Energy
- Sheldon Strom, Center for Energy and Environment
- Nick Mark , Center Point Energy
- Jeff Haase, Great River Energy
- Laura Babcock, Minnesota Technical Assistance Program
- Bob Jagusch, Minnesota Municipal Utility Association (MMUA)
- Terryl Clark, Blue Green Alliance
- Ken Smith, Ever-Green Energy
- Steve Kihm (moderator), Energy Center of Wisconsin

The comments from the panelists are summarized as follows:
• Energy efficiency opportunities still abound in all sectors, but customers need programs to help them identify and implement the appropriate measures.

• CEE is willing to work on the standard offer purchase power approach to provide some more specificity.

• Need to know what are the strategies for the state—is it energy savings or carbon reduction?

• Municipal utilities are in a different situation from investor-owned utilities and that needs to be recognized in policy development.

• The situation is different for gas versus electric utilities. There is no IRP and no deferred investment in generation.

• The industrials need a safe place to talk about energy efficiency.

• The nexus between energy savings and water savings needs to be addressed.

• From a policy perspective need to look at non ratepayer funding mechanisms.

• To mitigate risk on projects customers need data. With no metering or data things go unnoticed.

• Trust is critical in working with industrial customers.

• A trend analysis with energy use and economic activity would be helpful as a reference point.

• More work could be done in developing partnerships with Minnesota colleges and universities.

• Need to include to include environmental factor (include non-quantifiables) in efficiency policy assessments.

After the panel, the floor was opened to the public to ask questions or offer additional comments. Jessica Burdette of the Division of Energy Resources concluded the meeting by providing an update on next steps leading up to the report to the legislature on January 15, 2014.
RECOMMENDATIONS

The Energy Center examined the numerous comments received in the two general sessions and the four technical meetings with an eye toward recommendations to improve the review of the issues discussed in this report. We focus on definitional and process recommendations, rather than providing substantive policy advice.

There are several items that appear to be critically important in terms of advancing the efficiency of energy use in Minnesota. We suggest that Commerce make the following suggestions to the Minnesota Legislature in an effort to achieve that end.

We recommend that Commerce bring these suggestions to the Legislature:

1) Order Commerce to establish a technical working group to develop a recommendation as to whether a standard offer purchase program for energy efficiency is likely to produce additional energy savings, and if so to develop the details for such a program. The group should also make recommendation as to how such a program would or would not be integrated with the CIP program in terms of funding and energy savings accounting.

2) Require the state’s utilities to file comments with Commerce regarding the desirability of implementing programs designed to help industrial customers gather data related to energy use so that additional efficiency opportunities can be identified.

3) Determine the policy objective behind CHP promotion.

4) Define CHP as a concept. The Energy Center recommends the definition suggested by the U.S. Department of Energy:

   The concurrent production of electricity or mechanical power and useful thermal energy (heating and/or cooling) from a single source of energy.

Implementing these changes should have a beneficial impact on Minnesota’s energy policy.
REFERENCES

Bradbury, James, A New Snapshot of Energy Use in Midwest Manufacturing, World Resources Institute, February 27, 2012.

DeWahl, Karl et al., Energy Conservation Market Analysis: A study to identify energy conservation opportunities for Minnesota’s manufacturers, Minnesota Technical Assistance Program, November 19, 2010. The range reflects the fact some sectors have more energy-saving potential than others.


APPENDIX A: MEETING AGENDAS

October 17 Initial General Public Meeting
October 21 IEE Technical Workgroup
October 23 CHP Technical Workgroup
October 25 IEE Technical Workgroup
October 28 CHP Technical Workgroup
November 4 Final General Public Meeting
Energy Savings Goal Study and Stakeholder Process

(HF 729 4th Engrossment, Article 12 Section 8)
Meeting Agenda

When: October 17, 2013, 8:30am – 12:30pm
Where: Amherst Wilder Foundation
451 Lexington Parkway North
St. Paul, MN 55104

Topic: General public meeting

Agenda:

I. Welcome
Minnesota Department of Commerce, Division of Energy Resources
Deputy Commissioner William Grant
Introduction of the Energy Center of Wisconsin
- Charles Dufresne, Education Director
  - Steve Kihm, Research Director

Stakeholder Meeting Facilitation, Moderated Discussion, Process Overview and Study Goals

II. Presentations
Ideas for Energy Efficiency Improvements in Minnesota
Marty Kushler
American Council for an Energy Efficiency Economy (ACEEE)
Update on Energy Savings Goal Achievement in Minnesota
Jessica Burdette
Department of Commerce, Division of Energy Resources

Break
III. Moderated Panel Discussion

<table>
<thead>
<tr>
<th>Panelist</th>
<th>Organization</th>
</tr>
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<tbody>
<tr>
<td>Deb Sundin</td>
<td>Xcel Energy</td>
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<tr>
<td>Nick Mark</td>
<td>CenterPoint Energy</td>
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<td>Jeff Haase</td>
<td>Great River Energy</td>
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<td>Bob Jagusch</td>
<td>Minnesota Municipal Utility Association (MMUA)</td>
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<td>Erin Strojan-Ruccolo</td>
<td>Fresh Energy</td>
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<tr>
<td>Andre Moratzka</td>
<td>Stoel Rives, LLP</td>
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<tr>
<td>Jessica Burdette</td>
<td>Minnesota Division of Energy Resources (DER)</td>
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<tr>
<td>Marty Kushler</td>
<td>ACEEE</td>
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<tr>
<td>Steve Kihm (Moderator)</td>
<td>Energy Center of Wisconsin (ECW)</td>
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Topics for Discussion

**Topic 1:** Current and future strategies to maximize long-term cost-effective energy savings and minimize energy waste

**Topic 2:** Current and future strategies to maximize carbon reductions and economic benefits through increasing efficiency in all market sectors

**Topic 3:** Current and future strategies to minimize utility costs and rate impacts for ratepayers in all market sectors

**Topic 4:** Determination of how achievement of the state’s energy conservation goals and renewable energy goals are considered in the existing integrated resource planning and certificate of need processes

**Topic 5:** Determination of the appropriate utility financial incentive levels to meet the state’s energy conservation and renewable energy goals

V. Questions and Answers with Audience (40 minutes)

VI. Conclusion: Next Steps
Energy Savings Goal Study and Stakeholder Process

IEE Technical Workgroup: Meeting Agenda

When: October 21, 2013, 1:00pm – 5:00pm

Where: Minnesota Department of Commerce, Division of Energy Resources
- Check-in at 5th Floor Reception. Staff will escort meeting attendees to meeting room

Topic: Energy Efficiency Purchased Through Utility Resource Acquisition Process
(Meeting 1 of 2)

Agenda:

I. Welcome - Minnesota Department of Commerce, Division of Energy Resources
   Introduction of the Energy Center of Wisconsin – Stakeholder Process Facilitator
   - Charles Dufresne, Director of Education and
   Steve Kihm, Director of Market Research and Policy

II. Presentations
   - Industrial Energy: Profile & Potential in Minnesota, Laura Babcock University of Minnesota
   – MnTAP
   - Industrial Energy Efficiency Investments and Risks, Steve Kihm, Energy Center of Wisconsin
   - Discussion/ Comments

III. Case Studies of Industrial Efficiency in Minnesota
   - Patricia Clark, Energy Efficiency Facilitator, Gerdau Ameristeel
   - Discussion/ Comments

IV. Straw Man Proposal Discussion – Concept Challenges and Opportunities
   - Strawman Proposal, Jessica Burdette, Department of Commerce, Division of Energy Resources
   - Summary of online stakeholder comments, Steve Kihm, Energy Center of Wisconsin
   - Discussion/ Comments

V. Conclusion and priorities for 10/25 meeting (Charles)
Energy Savings Goal Study and Stakeholder Process

CHP Technical Workgroup: Meeting Agenda

When: October 23, 2013, 1:00pm – 5:00pm

Where: Minnesota Department of Commerce, Division of Energy Resources
- Check-in at 5th Floor Reception. Staff will escort meeting attendees to meeting room

Topic: Combined Heat and Power (non-conservation projects)
(Meeting 1 of 2)

Agenda:

I. (1:00) Welcome - Minnesota Department of Commerce, Division of Energy Resources
   Introduction of the Energy Center of Wisconsin – Stakeholder Process Facilitator
   - Charles Dufresne and Steve Kihm, Energy Center of Wisconsin (ECW)

II. (1:10) Combined Heat & Power: Overview & case study
   - Overview of Combined Heat & Power, Ken Smith, Ever-Green Energy
   - Case study: Jerome Malmquist from the University of Minnesota
   - Case study: Gary Myhrman, RockTenn
   - Q&A

---Break---

III. (2:15) CHP strawman proposal
   - Update, Jessica Burdette, Department of Commerce, Division of Energy Resources
   - Submitted comments, Steve Kihm, Director of Market Research and Policy, ECW

IV. (3:15) CHP issues and critical path
   - Identify key issues and critical path if CHP is to be part of energy savings goals
   - Structured discussion based on issues identified and questions in the strawman proposal

V. (4:45) Conclusion and priorities for 10/28 CHP Meeting #2
Energy Savings Goal Study and Stakeholder Process

IEE Technical Workgroup: Meeting Agenda

When: October 25, 2013, 08:30AM – 12:30PM

Where: Minnesota Department of Commerce, Division of Energy Resources
- Check-in at 5th Floor Reception. Staff will escort meeting attendees to meeting room

Topic: Continuation of 10/23 IEE Technical Working Group Meeting
(Meeting 2 of 2)

Agenda:

I. Welcome - Minnesota Department of Commerce, Division of Energy Resources

II. Recap of 10/21 TWG meeting - Energy Center of Wisconsin

III. Presentations
   • Overview of Xcel Energy’s self-direct program – Jessica Peterson
   • Fresh Energy? Will Nissen, Fresh energy

Break

IV. Leveraging ISO 50001 – Charles Dufresne, Energy Center of Wisconsin
   • To consider if ISO 50001 leads to energy savings and if so, what is utilities’ role in it

V. Industrial Sub metering – Steve Kihm, Energy Center of Wisconsin
   • To look at potential opportunities for sub-metering to contribute to energy efficiency savings

VI. Other recommendations or comments

VII. Wrap-up
Energy Savings Goal Study and Stakeholder Process

CHP Technical Workgroup: Meeting Agenda

When: October 28, 2013, 1:00pm – 5:00pm

Where: Minnesota Department of Commerce, Division of Energy Resources
- Check-in at 5th Floor Reception. Staff will escort meeting attendees to meeting room

Topic: Combined Heat and Power (non-conservation projects)
(Meeting 2 of 2)

Agenda:

I. Welcome - Minnesota Department of Commerce, Division of Energy Resources

II. Recap of 10/23 TWG meeting - Energy Center of Wisconsin

III. Presentations
- “CHP Policy Activity Status of the Midwest States,’ Cliff Haefke, University of Illinois, Midwest Clean Energy Application Center
- “Combined Heat and Power Policies and Potential In Minnesota Overview of Study in Progress,” Mark Spurr, FVB Energy

IV. Discussion – Energy Center of Wisconsin
- CHP inside CIP vs. out-of-CIP

V. Wrap-up & key take-aways
Energy Savings Goal Study (HF 729 4th Engrossment, Article 12 Section 8)

Minnesota Department of Commerce – Division of Energy Resources

When: November 4, 2013, 1:00 – 5:00pm (4 hours)
Where: Wilder Foundation, St. Paul
Topic: Final stakeholder meeting for the general public

Agenda:

I. Introduction (30 minutes)
   • Welcome / purpose of stakeholder process, Deputy Commissioner William Grant, Minnesota Department of Commerce, Division of Energy Resources
   • Recap of the first stakeholder meeting held on October 17th, Charles Dufresne, Director of Education, Energy Center of Wisconsin
   • Summary of the technical workgroups’ purpose and process, Charles Dufresne

II. Presentation/Discussion #1 - Industrial Energy Efficiency (90 minutes)
    Steve Kihm, Director of Market Research & Policy, Energy Center of Wisconsin
    • Presentation: “Industrial Energy Efficiency” proposal and results of technical working group (Steve Kihm, Energy Center of Wisconsin)
    • Comments by stakeholder panel
    • Questions and answers with audience

III. Break (10 minutes)

IV. Presentation/Discussion #2 - Combined Heat and Power (90 minutes)
    Steve Kihm, Director of Market Research & Policy, Energy Center of Wisconsin
    • Presentation: “Combined Heat and Power” proposal and results of technical working group (Steve Kihm, Energy Center of Wisconsin)
    • Comments by stakeholder panel
    • Questions and answers with audience

V. Conclusion (20 minutes)
• Wrap-up, Charles Dufresne
• Next steps (legislative report development/publishing), Jessica Burdette, Supervisor, Conservation Improvement Program

Stakeholder Panelists

<table>
<thead>
<tr>
<th>Panelist</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Will Nissen</td>
<td>Fresh Energy</td>
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<tr>
<td>Jesse Petersen</td>
<td>Xcel Energy</td>
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<td>Sheldon Strom</td>
<td>Center for Energy and Environment</td>
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<td>Nick Mark</td>
<td>Center Point Energy</td>
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<td>Jeff Haase</td>
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<td>Laura Babcock</td>
<td>Minnesota Technical Assistance Program</td>
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<td>Bob Jagush</td>
<td>Minnesota Municipal Utility Association (MMUA)</td>
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<td>Terryl Clark</td>
<td>Blue Green Alliance</td>
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<td>Ken Smith</td>
<td>Ever-Green Energies</td>
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<tr>
<td>Steve Kihm</td>
<td>Energy Center of Wisconsin</td>
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<td>(moderator)</td>
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APPENDIX B: ORGANIZATIONS PARTICIPATING IN TECHNICAL WORKGROUPS
INDUSTRIAL ENERGY EFFICIENCY MEETING #1 – 10-21-13

Organizations in Attendance
Applied Energy
Blue-Green Alliance
Minnesota Center for Energy and the Environment
CenterPoint Energy
Energy Center of Wisconsin
Energy Insight
Franklin Energy
Fresh Energy
Gerdau Ameristeel
Great River Energy
Kroger
Minnesota Department of Commerce
Minnesota Municipal Utility Association
Minnesota Power
Otter Tail Power
Sheet Metal Workers
Southern Municipal Power Group Agency
St. Paul Port Authority
Stoel Rives, LLP
University of Minnesota - MnTAP
Xcel Energy
INDUSTRIAL ENERGY EFFICIENCY MEETING #2 – 10-25-13

Organizations in Attendance
Blue-Green Alliance
CenterPoint Energy
Central Minnesota Municipal Power Agency
Energy Center of Wisconsin
Energy Insight
Franklin Energy
Fresh Energy
Great River Energy
Minnesota Center for Energy and the Environment
Minnesota Department of Commerce
Minnesota Municipal Utility Association
Minnesota Power
Otter Tail Power
Southern Minnesota Municipal Power Agency
St. Paul Port Authority
Stoel Rives, LLP
University of Minnesota - MnTAP
Xcel Energy
COMBINED HEAT AND POWER MEETING #1 – 10-23-13

Organizations in Attendance

Applied Energy Group
Blue Green Alliance
CenterPoint Energy
Central Minnesota Municipal Power Agency
Cummins
Energy Center of Wisconsin
Energy Systems Consulting
Ever-Green Energy
Great Plains Institute
Great River Energy
Minnesota Center for Energy and Environment
Minnesota Department of Commerce
Minnesota Municipal Utility Association
Minnesota Pollution Control Agency
Minnesota Power
Minnesota Project
Otter Tail Power
Grassroots Solutions
RockTenn
St. Paul Port Authority
University of Minnesota
University of Minnesota - MnTAP
Xcel Energy
COMBINED HEAT AND POWER MEETING #2 – 10-28-13

Organizations in Attendance
Blue Green Alliance
CenterPoint Energy
Central Minnesota Municipal Power Agency
Cummins
Energy Center of Wisconsin
Energy Systems Consulting
Ever-Green Energy
Franklin Energy
Fresh Energy
Great Plains Institute
Great River Energy
Minnesota Department of Commerce
Minnesota Pollution Control Agency
Minnesota Power
Otter Tail Power
St. Paul Port Authority
University of Illinois
University of Minnesota
University of Minnesota - MnTAP
Xcel Energy
APPENDIX C: MEETING PRESENTATIONS

Pdf versions of the presentations for each meeting can be viewed and downloaded here.
APPENDIX D: ENERGY CENTER MEETING NOTES

Pdf versions of the strawman proposals can be viewed and downloaded here.
INITIAL STAKEHOLDER MEETING – 10-17-13

Panel Discussion: Topic 1--Maximize energy savings and minimize energy waste

Have problems with focus on increasing of goals
Need balance of achieving goals, minimize cost
Free riders are a big concern---standards achieve significant savings (lighting)
No silver bullet; need silver buckshot to achieve goals

Standards play a significant role in achieving energy savings (lighting, furnace standards)
Gas prices have big impact on cost effectiveness tests
Need to get smarter on program design--not many new programs/proposals lately
More creative programs are often more expensive

Decreased consumption is good--codes, standards and new technology have played a role
Who judges how much a customer should be using? Where is the final point?
Seem to be moving away from technical solutions towards sharing useful information

Muni's are different--they can adapt quicker and shift market focus
Also must deal with big regional differences (i.e. gas availability) because of large area they cover in the state
Able to offer options to industrial customers such as financing
Muni's use "all of the above" approach to see what works with their customers
Education is a big issue--older people are now beginning to understand the changes occurring

Need to build on 20 years of progress in MN; how can we maintain this because we still have a long ways to go
Good news is that there are lots of opportunities in CHP and energy efficiency for industrials
Need to align IOU interests with efficiency gains; decoupling critical

Acknowledged that utilities work hard to comply with state standards
Maximize savings using correct price signals
Rate setting is complex but rate must reflect cost of service

MN has not yet bumped into the ceiling of what is achievable for energy efficiency
What is politically possible is likely the more relevant question
Technology continues to change and provide more low hanging fruit
Gas prices will increase create more room for more savings
MA energy savings goal is currently 2% and they are moving to 2.5%; politically acceptable in MA

Panel Discussion: Topic 2--Maximize carbon reductions and economic benefits

It is linear---save gas and you save carbon emissions

In rural MN there are a lot of deliverable fuels (60% of energy use)
Increase electricity and reduce carbon due to technology changes such as the heat pump which is more efficient
There are operational challenges to integrating renewables on the supply side
Need to convert generation to options that produce less carbon and have less consumption

Generation now has improved controls, more efficient equipment resulting in higher output for less input
They have lots of distribution only companies (muni's) that can focus on voltage reduction, better voltage regulation and capacitor controls. Delivered fuels are also a big factor in their areas; beginning to see winter peaking with low income buying space heaters because of increased prices of delivered fuels. Must look at all buckets for opportunities.

Financing as a mechanism to expand energy efficiency should be expanded. PACE only in one muni. Offer standard power purchase agreement to industrial customers. To achieve retrofits need more on-site energy managers.

Carbon reduction is noble but not the same as increased energy efficiency. As renewable generation increases, coal generation will decrease; it is happening now. Energy storage is very important; makes use of renewables more reliable. Wind is really becoming more cost competitive. Need to target technologies with free fuel costs and this issue is automatically addressed.

There is no current cost for CO2 emissions. Some states are doing it to meet social obligations. Two economic reasons to reduce CO2 emissions: 1. most believe there will be cost in the future and reduction now is a hedge toward future costs. 2. energy efficiency is cheaper on its own and carbon reductions are frosting. Need to translate long term energy efficiency savings into short term carbon savings and incorporate into CIP.

Carbon reduction and energy efficiency are already aligned in MN. 187 DSM programs are being evaluated; will have lots of data to identify trends. Need to work with utilities and have utilities work with each other for improved decisions to reduce carbon. Need better non-quantifiable data when looking at energy efficiency.

**Panel Discussion: Topic 3 -- Minimize utility costs and rate impacts**

Averaging can be problematic; if not a participant you will be impacted. Utilities need to focus on ensuring participation; need to break down barriers. Can't always do energy efficiency to meet customer needs; customers need choices such as time of use rates which also make you aware of costs and may encourage behavior changes.

Rates and costs are paramount; huge issue for muni’s; huge issue for them. Need to Partner with local and national organizations for energy efficiency. Rate increases are very negative.

Need to leverage outside 3rd party resources to increase availability of capital. Rates are important but what is the real value of energy efficiency? Need to look at water and health impacts in the process of cost/benefit tests.

Critical to have incentives for energy efficiency; even with doing energy efficiency rates still go up. Need education that the rates are going up less. Other costs such as pollution technology and infrastructure are important.
Consumers need to be able to participate

Rates in general are going up for many reasons; energy efficiency is the only thing that helps customers reduce bills
Long term hopefully rates will increase less; don't get overly obsessed with rates
Non-participants should not be an issue if a wide choice of programs are offered; then non-participant is a cost causer

Have ignored the ratepayer impact test for several years because portfolio if programs easily passed the RIM; however most recently have failed
Average costs are being reduced due to reduced natural gas costs/ combustion turbines
Large industrials say rate increases for renewables and infrastructure in result in rate impacts
Need a balance in MN

What is politically achievable and acceptable is important
Make sure to go after energy efficiency that is cost effective; not all of it is cost effective in 2007 $9 million budget; in 2013 $27 million budget
Increased costs have caused industrials to opt out; there is sticker shock with program costs

RIM should not be used alone; rates important but need to use total cost test
Instantaneous cost recovery is nice for utilities but efficiency savings over longer years is important

**Panel Discussion: Topic 4 --Relationship to IRP and Certificate of Need**

Just do it--include in IRP

Important that the same language is used throughout the process for all resources
Long range planning horizons need to be recognized

This is where the rubber meets the road
Good IRP is essential

Use/customer is decreasing
Need to include how efficiency is being acquired
How should utilities claim it in the process?
Need long term perspective albeit it is a bit of an art
Population and economic growth can't always be mitigated
LED street lighting helps meet the goal but how does it really affect residential sector need?

**Panel Discussion: Topic 5 --Determine appropriate utility financial incentive levels**

MN has done it right; it has collaborated with the utilities so that top executives now support energy efficiency programs and planning

Monetizing incentives is in process; some challenges

Careful--incentives may be the golden egg that kills the goose

MN has a continuous process that evaluates the incentive levels for utilities

Incentives are key---gets management attention

*Energy Center of Wisconsin*
Policies on incentives in MN are the right way to go

**Q & A With Audience**

Heat pumps target only new construction or it becomes a fuel switching issue
Finance programs are not affordable for a small muni utility and difficult because of limited staffing
How can muni’s get incentives

Heat pumps and fuel switching issue needs to be addressed

Not a major issue...yet. IRP stat. refers to net lifecycle savings. Environmental benefits need to be incorporated

There are some technical limiting factors right now and climate issues. Seems to be effective for shoulder seasons and then it competes with wind resource

There need to be some transparencies of the data for customers that opt out; information for the public is absent

Opt out has been available since the 90’s; available only to big customers. In theory they have internalized energy costs by having experts to do their own efficiency improvements. Reports are required to opt out—although there is redacting of information. to protect the competitive nature of the industrial customers

Large corporations require a 1-2 year payback; how much efficiency is missed? Buy down with utility potential for these customers

There are many large industrials that use a greater than 1 year payback. Industrials look at the whole process and need to reduce costs and be more efficient with everything----not just energy.

There are regulatory hurdles and rate/price signals

Tremendous amount of data collect from homes may help evaluate potential of time of use rates

Are enabling technologies there? AMI is beginning to be available. Need to be able to send information to customers to elicit correct actions

Great discussion

With declining growth, how should the change in the load curve be addressed and affected by energy efficiency programs. Energy efficiency has been used to mitigate growth, but it is different with negative growth. Load management helps utilities operate more efficiently

Would like to see the standard offer option

With DSM bidding the utility would do IRP and would then issue an offer at X cost to acquire energy efficiency from a large customer.

How do you know it is not a free rider? When the project has more than a 2-year payback
What are the natural gas cost projections?

Predict that gas prices will increase significantly. (Will send paper to Division?) Stay the course with programs---customers do not react well with stop/start. Total resource cost test is imbalance; includes all customer costs but only utility costs(???)

Have concern with how greenhouse gases are incorporated in the decision process; needs to be part of the discussion

MN will miss its first goal; how will IRP incorporate?
INDUSTRIAL ENERGY EFFICIENCY MEETING #1 – 10-21-13

Q & A for L. Babcock Presentation – Comments from Laura and attendees
Facilities plant design – weren’t designed to maximize energy efficiency
Utilities were also critical players in the projects with interns
Confidentiality of industry information is critical
Financing is a challenge
Small to medium companies are short of engineering staff that can focus on energy efficiency
Rebates are good but companies need initial dollar investment
More low or 0% interest loans need to be offered
Local resources should be tapped; business associations, trade groups
Need more visibility of demonstration projects
Size of loans needed? In the range of $50,000 to 100,000
Paybacks of 2 years are optimistic—more like 1 year payback needed

Q & A for S. Kihm Presentation—Comments from Steve and attendees
What other alternate recipe for achieving energy efficiency for this sector other than transfer of funds?
Instead of having industrials wait to see what will be offer, we need to ask them what efficiency they would do and what will it take to move; they don’t like mandates
Offer guaranteed savings contract; utilities offer this to reduce the risk
Often hear there are data needs; utilities should be able to offer more diversifies options because they have a portfolio
Some operational efficiency savings can be simple; some 5-10 years
Give company incentive to the top few options; too many are not good
How do guaranteed savings programs work? It is an efficiency investment that reduces the risk of the investment; one of several tools to get things moving
Several low cost/no cost measures, were behavioral but there was significant pushback from the customer—those working in the facility.
Companies are not always entrenched and they can’t often explain why they don’t make the changes that will improve efficiency. Why not bring in crews to make the change that will result in energy savings?
Incentives are for the company to make a product, not save energy
Behavioral issues are challenging. There is the need to produce and save energy and very little overlap

With some efficiency programs there the potential for other benefits/costs; should utilities include labor and water savings when they develop program proposals? Note that non-energy benefits to the customer may help persuade the company to do the project. How can we include in the calculus?
They are now doing some package projects that include both energy and environmental improvements (save energy and reduce waste)

One of the biggest reasons projects aren’t done is that they lack an internal champion. There is a concern by plant workers/mgmt. that if it doesn’t work as well as expected, there are at risk for losing their jobs. They feel personal risk.

Wall graph with necessary payback:
4 at .5 yr.
5 at 1 yr.
5 at 1.5 yrs.
8 at 2 yrs.
3 at 2.5 yrs.

Plant location and age affect the needed payback for an efficiency program.
Length of the project is another factor. This is a multi dimensional problem
Risk and payback are defined differently by each customer. Some look at labor, will sales happen?
Emphasizes the need to be able to customize programs.

Need to focus on how to get over the hurdles but ultimately the customer will decide what is needed to participate in a program. Cost/benefit is still paramount; payback is very important.

Businesses in Europe and Japan do projects that require 3-10 yr. payback; finds 2 years troubling; to be more competitive industries need to look at the bigger picture; need to look at best practices of successful companies
Or do case studies?
Some companies do some efficiency programs largely based on good PR

How do changing energy prices facto in the payback calculation?
SK—identify energy price as a risk; option value—the more volatility the more likely to wait until there is more certainty

Patricia Clark-Gerdau Ameristeel presentation—was Cargill owned now owned by Brazilian co.; 99.9 % recycle (melt and shred facilities); 20 plants competing for capital improvements; use curtailment load mgmt. extensively in 2 facilities; 68-75% of energy used by furnace; only 25% available to use efficiency options.

Participate in ISO 500001 continuous improvement program which focuses on standardization, sustainability and stability.

Important to Know Your Customer; need deep and sustained engagement by the utility; need to trust the energy efficiency staff in the utility
Need measurement tools---metering equipment; metering equipment is first to get cut in capital budgeting process; can’t tell from bills how much energy is used in one day much less hourly. In TX get bills for 3 to 6 mos. Impossible to figure out what is going on in the plant and where operational/equipment changes can reduce energy use. Canada can get hourly data on-line. Even difficult to know how much the company used in one month because the utility billing month and the production month for the company don’t match (and the utility is often a rolling 28 days) Need to know how much it cost to produce that piece of steel

Use net present value; don’t use simple cost benefit analysis; need to also factor in the time and costs to install efficiency equipment.

Q & A

Unclear about availability of TOU rates in MN
Interruptibles get credits but cost of lower rates is spread across all customers (including the interruptible customers)
Capital costs are less so fewer interruptibles
Install interval meters; buy OS computers if industrial customer promises 1. to train someone to use the equipment; 2. The customer will free up capital to install more meters downstream
Discussion of Straw man Proposal:
About 5 attendees supported proceeding with SOPP—lukewarm support at best. One utility had no objection to it but needs to understand it better first.
Important to share information; the challenge is to not stop the conversation after the report is issued.
Seems premature to decide to proceed; need more metering data and evaluation of that data
Clear that better data is needed
General issues: How do we evaluate programs; how do we know it is real? Load mgmt. vs/and efficiency
What is the trend in the industrial sector; trend is 1.5% goal; is an intervention needed for public policy changes. Need trend analysis
What about long term (3-5 years) trends; to deal with confidentiality issues can aggregate data
What are the impacts of code changes and standard changes; can (does) a utility program drive some of those changes?
We know efficiency is important in MN; how can we engage the 39 opt out customers in energy efficiency programs? We need to get their interest on their terms.
Evaluations are needed to establish a good baseline
Use load management on making SOPP work; evaluate on savings?
If evaluated and big enough and real---integrate in IRP

SOPP is another tool in the CIP toolbox which is good; are there potential tax issues?
Using CIP $ for SOPP may be a real big issue

Conceptually would like to offer to both CIP and opt out customers; large industrials may view SPP as bureaucratic; need to bundle programs

Who pays for SOPP? Is it dispatchable? If energy efficiency is a priority how is it used as a resource?

We need production curves of equipment; more efficiency programs may consume more???
1.5% savings from trend

Do we need to provide more incentives to industrial customers

CIP customers want more financial help up front without the paper hassles

Need customer grant programs that have a lot of flexibility
Different rebate amounts—tied back to IRP
Offer financing
Incorporate 1.5% in IRP
SOPP redundant to CIP customers

Offering new programs have the risk of cannibalizing other programs; Need to ID the incremental gain by new programs

SOPP would have to compete with other resources in IRP

Companies need time to get dollars in capital budgets to get efficiency equipment
need a 3-year plan/perspective

SOPP should not be for gas customers
COMBINED HEAT AND POWER MEETING #1 – 10-23-13

Presentation by Ken Smith Ever-Green Energy (see PowerPoint slides)
Resiliency of the system increased by having CHP as part of the mix

Q&A-Berlin example is process and heat facility; the city is putting in lots of infrastructure
Need to size to the trough of the thermal load; what need is driving it?
Technologies exist to enable use of low quality heat to produce power & higher quality waste heat for cooling

Jerome Malmquist- U of M (see Power Point slides)
Decisions for the University driven by reliability, sustainability and cost effectiveness
Need to look at all aspects of the resource needs of the system/plant (water/sewage, etc)
Need to balance electric and thermal needs
Need right size for the project to achieve thermal balance
Important how power is used behind the meter—some technical issues arise
Other issues—permits, training and contracts
Plant is dual fuel---oil also
CHP is viewed as a stepping stone for the next 25-30 years until other cleaner options are available
Xcel provides backup—they have worked out the economics

Q & A – U of M is putting in wire for backup and selling
No storage is available onsite as of yet
Discussion on technical aspects of which boilers were coal/gas/oil; some were idle; some easy to peak; difficult to use steam pipes for hot water

Gary Myhrman – RockTenn (see Power Point slides)
Process load gas fired with fuel oil back up
Superheat used in lumber

Q & A –Down time twice per year with major shut down every 3 years. Few unplanned outages
Generating steam is primary product—electricity is the by product.
No incentives but benefitted from engineering studies

Discussion of comments submitted:
MP owns and operates sites in conjunction with 3 paper mills; much of the low hanging fruit has be captured; continue to look at CHP but there are risks
A dozen mining and paper customers make up significant part of their load and most compete in the global marketplace so need to make strong economic decisions; potential for utility CHP at existing sites;
Customer projects need a 3-5 year payback; they generate the electricity and the host uses the steam
Time horizon for the industrial customers and payback are shorter; many also are disinterested—too many other issues with higher priority.

Ottertail Power had numerous policy questions.
Do they see CHP potential?—Some; no major push from their customers.

Great River Energy—greatest potential CHP has been done; they have one project with a customer that has opted out

Muni’s are probably in the best position to have CHP projects; they will be around—industrial customers are more risky; never know if they will exist in the long term
Having multiple parties involved in projects may make the project more complex but maybe more cost effective.

Can a manure digester that produces electricity be included under CHP?

CHP preserves the use of carbon fuels for generation
Helps some companies survive because they now have a new revenue stream
If no electric generation—steam/hot water are produced—is it CHP?

Have done some projects thru CIP—capture gas from waste to replace natural gas
Important to have single decision-maker for projects

In other states waste to steam projects are included in a different category

Where is the additional 2700 MW of additional CHP?
Payback of 10 years in the report that hat the 2700 number which included 150 MW of sm to medium projects; need a 4-5 year payback

Standby rate is the biggest barrier.

If less backup is provided the fee could be less.
Use diesel generator as backup

What policies are needed to make CHP more viable; need more win-win on smaller projects.

Who owns the facility and the risk associated with that? Need cost recover for equipment if utility owns it; financial arrangement concerns; not sure of the economics
Need to provide an incentive to the utilities; to get them on board the risk needs to be shared
Try to site facilities at locations where there is less risk
Neighbor wanted to buy steam from them but there was no time to pull the project together; utilities are not always aware of the potential opportunities
Cooperatives often are dealing with a different situation
If CHP is all behind the meter and all the heat is used can a utility claim savings? It is a lost sales issue for IOUs; decoupling and incentives need to be considered

What is the goal? Carbon reduction or CIP goals?
Is a more explicit carbon policy objective needed?
Customers are now looking at solar; CHP does not fit neatly in short term plans
Solar PV on campus was heavily subsidized to get it installed. Factors playing in were current electric and gas costs, difficulty of installing in a university setting.
As a stakeholder, list the 5 issues on the critical path for 1000MW of additional CHP in MN:

Group 1:
Understand system-wide costs and benefits (for typical case)
Identify current waste heat opportunities
Create new funding pot (not CIP)
Re-evaluate stand-by rates
Raise electric rates (& lower gas)

Group 2:
Clearly define what CHP/waste recovery is (carbon reduction vs energy waste reduction)
Clearly define potential markets or opportunities and sell it!
Address internal financial hurdles
Economic development zones for district energy (near load or opportunity—new or existing)
Assistance with project development and project identification/best available technology per fuel source/streamline permitting to = Plug and Play CHP

Group 3:
Need better defined policy objective (legislatively?)
Incentives $$$ (align customer and utility)
Fuel switching (full fuel cycle analysis)
Net metering and Stand by rates

Group 4:
Identify where savings are counted and where funding comes from (CIP, RES, Other)
Identify Drivers and barriers for private firms
Restructure standby rates
Fuel switching
Cross subsidy

Group 5:
Risk Mitigation: Regulatory approvals—CN, EAW, PPA, Air
Standby rates
Electric Service agreement
Examine new planned generation for opportunities to site near a location for a portion of thermal load
Funding and incentives
Who takes credit? CO2? Energy savings?

General policy among groups:
Siting issues—ability to seize the opportunity to site where thermal load is
Standby rates
Risks
Funding sources
Where do CHP credits count (some could see it in CIP but fuel switching issues would need to be addressed

The utility that is helping the customer save energy should claim the credit; need to be careful about increasing load; need to be a net savings

Check into AZ policy that a BTU saved is a BTU saved

Believe there is room in CIP for projects that result in a large decrease in one fuel but a small increase in another

Electricity saved is more valuable than gas but with renewables increasing is electricity becoming more benign?

Smart Grid needed with the ability to dispatch load for carbon purposes
Increased funding for programs through CIP or another mechanism, is essentially another tax and is detrimental for companies dealing with the global marketplace. Actual CIP costs saved all ratepayers money when compared to additional generation; people don’t see the specific costs for generation because there is no surcharge for generation.

**Take Aways from the CHP Stakeholder Meeting**

Need to clearly define CHP including in or out of CIP

Need more detailed data on CHP potential in MN including information on size, location and timing.

Look at ways to reduce risk for investing in CHP for the utility

Stand by rates are an impediment to more CHP

Should fuel switching be allowed for CHP
INDUSTRIAL ENERGY EFFICIENCY MEETING #2 – 10-25-13

Recap of 1st Meeting:
It's too dismissive to toss out SOPPA
Will spend no more time at meetings discussing SOPPA, but will include it in the report and there can still be follow-up
Intend to still have some follow-up looking at other program successes without the time constraints of this process.

ISO 50001 Energy Mgmt:
Charles--(see slides) launched a couple of years ago; international
Energy teams are developed across operational lines; at least 1 team member reports to top mgt.; energy goals are established; there is clear mgmt. involvement
Performance indicators are established using metrics/data
With external certification, need recertification every 3 yrs.; use outside auditors; track energy use and production
1100 companies are certified; 18 in the US (including Bridgestone and Cooper Tire)
Energy Trust of Oregon--done as test; not full program
To implement ISO 50001 internal marketing is needed; need to ID costs and funding sources; incentives for energy savings; both equipment and behavioral looked at(operational and process changes)

Production is king; ISO 9001 morphed into 14001; has environmental and energy waste component; reducing waste and saving energy important
A lot of companies are doing it but do not get certified
GM does it; forces it down the supply chain; great stuff---it works; ask utilities to help

Can this be a component of MN energy plan/CIP? Lay this on top of what utilities are doing?
How to force down the process through the supply chain
Don't ignore what is happening through the marketplace
ISO 9001 certification is viewed as a badge of honor

Utilities may be able to help smaller entities embark on ISO process; larger companies have their own internal staff and consultants to do this; smaller entities need tools, staffing help and time; need help learning how to look at processes in their production

Small muni's don't always have the support

Attendees at classes get fired up with how ISO works and bring enthusiasm back to the company; should also look at DOE's Save Energy Now
This program is now over; now Better Plants; Better Production; looks at best practices from big plants to little plants; 3M has tried this; having trouble getting little plants to participate
Federal goals with Better Plants...; not a substitute for ISO 50001, but complements; focused on good mgmt and with that energy savings develop

ISO 50001 is very customizable to each firm; not prescriptive; helps make better energy decisions; the actual certification isn't the focus; doesn't save anything but the commitment to rigorous process improvement does

Challenge from the state policy perspective - cost effectiveness test is hard to do and then deal with the regulatory setting;
Are any companies in MN participating in ISO?
Yes, one company; how close would energy savings have to be to when ISO development costs are spent? Conceptually --utility involvement would mean offsetting the cost of personnel dedicated to building data structure and operational reviews.

There is no clear answer; a process efficiency program builds on top of something else; expect long term efficiency improvements with the company.
There are upfront costs but savings will phase in over time
From a regulatory perspective, savings and costs were approved as part of the segment level (C&I); bundled as a group can carry costs in the short run to see savings accrue later; can carry others in the long run

One sophisticated customer of Ottertail uses Power Profiler (did on their own)
It can ID how much energy is used and how much was used the previous day; worked with utility to see how to use; utility provided consulting and expert advice.
Ottertail has the system --others could have it for $50/mo. for yesterday's data; for $30/mo. can go online to get energy use data but it is not as immediate

SMMPA had very sophisticated automated system 10 years ago--only one company stuck with it; NB90 systems upload automatically energy at meter level; difficult because of time and staffing needs; worked with glass manufacturer extensively; how to transfer knowledge and experience to others?

Most systems are customized; look at customers needs; Certification is not the main product; getting out there with the customer is the effective tool; are implementing elements of it

Utility can step in and help

From regulator standpoint, need different evaluation than simple cost/benefit analysis
Need to be able to look at incremental success (singles add up; don't always need a home run); motivation helps getting started; commitment gets it done

Using the data approach helps maintain commitment; sometimes no one has time to use tools available to them; know work needs to be done later (tag motor) intend to change out motor but never get it done.

Commitment really means more support and more hounding

Role of the utility is to show customers data; how much processes costs them; need more granularity of data; cooperation between the customer and utility is paramount

Need memorandum of understanding between utility and customer; support and helping with investments; need expectations to be clear regarding what rebates they can get; this makes customers willing to talk to the utility about innovative ideas

Make sure the right person at the plant is getting the data; often goes to staff that don't need it or use it; often person getting the bill gets this information
What is the right "hook" to keep clients talking to utilities? Give them money in an account that is seed money available for implementing new ideas

Sub-metering
SK-ACEEE paper Nissan/3M--(see slides)--measurement is helpful
With stability in prices energy costs become less important; price signal is driver
Internal champion is important; best if in upper mgmt--not a plant manager; need internal education for success
When prices are not stable, company looks more at reducing energy costs
Vise president for the Americas for Nissan was their internal champion--showing commitment at the top
Meaningful savings--firms often didn't like to reveal; would for cost/benefit for decision makers/regulators
Metering/data need to tie to energy savings

Should utility pay for sub-metering? Possibly offer temporary installation to customer.
Who pays varies; can be part of the energy efficiency project or research budget; many have data loggers that are used; MB-90 data--metering and billing software

Bought bigger meter for large customer with long term commitment; the company bought sub-meters; 1-2 are still functioning; hard to provide support for utility; used utility data loggers for lighting and run-time on motors;
Part of shared concept to provide partial financial support; web portal provided at utility cost; blocks of client metering to lower cost
Budget for CIP--program delivery costs water down savings but are included in project cost

What could regulators do?

Culture change; draw a box around equipment and sub-metering for the project to be included in CIP; look at projects more holistically; unsure how to fit behavior changes in projects; there are institutional issues related to accounting and regulatory treatment of expenditures

Need to figure out how to send data to customers in a picture so more usable

Like the MOU concept to get everyone on the same page; having metering part of a project gives support to projects

Robust system of baseline meter data for 24 mos. (Xcel pilot project) small industrial customer focus

Need to benchmark facilities

Processes are sometimes hard to change but small changes do add up; need to also look at non-process changes

Need meters for measuring energy intensity; do rebates for that; is there room for entertaining other rebates; good thing about performance based metrics and goals; good for long term view---can set goals

If you can estimate that this is an efficient industry, allows you to do economic development

How do we not penalize them for what they do? erosion of credit

Self Direct Program-- Xcel
10 years ago customer efficiency programs focused on technologies
5 years ago began to look at processes and a longer term focus
Started in Colorado; when started in MN CIP customers, started with self direct with process hadn't been as successful to date; Xcel helps with the metering; not through the whole process yet; part of the tool box to offer to companies and hope it will result in savings; allows the companies to do long term planning with the utility
Self direct has no upfront money to customer.
Four phases in the self direct process--1. preliminary screening (customer begins pursuing idea), 2. investigation (utility approves), 3. implementation (utility steps away; customer must have M & V plan, 4. Final --customer receives incentives (rebates)
Opt out customers need to opt in to participate;
Program is flexible--the company leads the project, develops the scope and is at their initiative; their engineers lead
Focusing on training now; trying to get customers to understand ; company has to get their own meters

**Fresh Energy-- Programs and Discussion**
NW pilot--on-site utility Mgrs. with Xcel; spent 20% of their time with each of 5 customers; energy mgrs were focused on finding savings over a 2 yr time period; successful
Offer customized energy improvement projects
Need clearly established M&V
Muni's need local government support
Commercial customers like schools more behavioral-focused

North Branch School District project; establish a rigorous baseline; look at asset based and behavioral measures; pay on a kwh basis for savings; goes into an escrow acct; have to deal with annual M&V; what kind of intervention is needed to meet annual savings goals?

With 5 clients began to see changes in after two years; clients thought they did a lot--really needed to educate them; time spent working with them was too short; key is the long term relationship needed
Problem with first year savings under CIP and being able to count the savings

While there may be a need for a long term program, also need to have a turn it off point; is it cost effective if the energy savings staff isn't hired by the company after 4-5 years?
A weaning process is needed as part of the program

Muni's do programs like these on a contract basis

Leveraging non-CIP customers; need off balance sheet financing; on bill repayment mechanisms

Large industrials have own resources available to them often quite favorable financing

Very large industrials in MN (mills, mines, food) operate in international marketplace; internal financing hurdles are high; competing with many other projects or plant locations; more competitive; always looking what they can do to keep jobs here
Finding available capital varies; what is in the company budget? ability to pay on the bill varies by utility; often more acceptable if industry can pay for project on the energy bill

1/2 billion BTU's saved over 3 years with energy project; in the capital budget but realize that energy projects will push other projects out and vice versa; some non-energy projects are more attractive for a variety of reasons

Varies by company if the cost of energy efficient equipment appears on or off the balance sheet

Need to also consider what if any regulatory/financial reporting requirements there are for this type of financing; there is a capital budget limit for all companies

Leases are also put on the balance sheet at times
Needs to truly be off the balance sheet—debt worries companies; they do a lot to keep debt from having to be reported.

For mining companies competing for capital for projects is a very common problem; if project makes sense they seem to find the money. If the utility provides a loan--do they really want to carry that loan?

Big multi nationals have trouble pulling the trigger on projects; need champion in the company to push; 2-3 year payback not being done.

Capital does not necessarily need to come from the utilities; should also be looking at the state and other resources for money.

Don't have utility do direct lending; have it done through reduction of bill/ debt service. No money upfront for the customer; but immediate positive cash flow; see all savings later when project paid off; debt on balance sheet (esp. hospitals); use outside financing.

The threat of competition moves capital in a company around; companies generally want new modern equipment to compete, but energy is not always the focus.

State Energy Office needs to be involved; looking at utilities to squeeze all inputs in the process for energy costs and rates. MN needs to focus on staying competitive. Throughput is the most important issue for these companies.

Industry has aging facilities; there needs to me a nexus between economic development and energy management.

Rural and urban issues need to be considered.

For muni's; even with % financing, customers still didn't do the project; still find excuses.

Any uncertainty about a project affecting productivity and the project will be considered too risky; big financing projects are risky.

For one small muni, one big customer can consume the whole CIP budget; need to remember to balance needs of all customers--residential, commercial and industrial.

Energy efficiency is not the single focus for companies; lots of competing components; need to explore how to incorporate in state programs.

E3 Federal program; in some states the program is utility led--most effective; MN one of the last states to adopt; it is Federal investment in the state and brings money into the state.

C. Dufresne--Summary:
- Industrials may have other financing options available to them
- Upfront costs can be a problem
- When competing with other projects in a company, it is difficult to push energy projects; driving force is competitiveness
- Consider development of a revolving capital fund from the state for funding industrial energy projects
- Need an internal company champion for energy efficiency projects
-find ways to keep investment off the balance sheet may work for some but not all
-Tie nexus between energy efficiency and economic development
-Getting more product out the door is key; but energy cost is the key driver for some products
-Need ways to achieve multiple goals-competitiveness, economic development, jobs and efficiency for both companies and utilities
COMBINED HEAT AND POWER MEETING #2 – 10-28-13

Charles Dufresne
Slides of process and takeaways from prior meeting

Cliff Haefke (see slides) Comments and Q & A
IL -has goal and spending cap
-wanted to promote geothermal heat pumps, so allowed as EERS technology (gas boiler to electric motor with geothermal heart pump)
-self direct is only allowed on the gas side
-CHP topping and bottoming are eligible for EERS
-RFP for spring 2014 for $750/kw of CHP installed capacity (60% efficiency required with 20% from the thermal side and 80% from the electric side; program capped at $2 million or 50% of total project cost whichever comes first
-Production incentive for one year of $0.08/kwh
-Design and construction incentive capped at $650,000
One third of incentive is given upfront
Project has to pass the total resource cost test

IL- Mid-America addressed standby rates so more transparent; no hidden charges
-Use avoided rate metric, fair and reasonable
-Includes facilities affected by boiler MACT (lg. AQ sources)
Standby rates differ based on technology
ICF study is full technical potential, not economic potential; does not include potential growth
Energy resiliency a positive factor for CHP; especially notable on the east coast due to natural disasters;
CHP can help areas ride out an outage; not prevalent in the Midwest
Shale gas and industrial potential driving CHP development in IL and OH; also need capacity due to coal plants retiring

Mark Spurr (see slides)
-looking at policies and programs for CHP and recommendations for financial incentives and what is the economic potential of CHP
-needed payback is daunting for the industry
--customer will ask--will it cost me and will it mess up my process? If either answer is yes the project will not proceed
-second part of the study is the CHP potential which will be detailed and based on industrial sector code
--review by private and public sector; look at unique financial arrangements

S. Kihm--(NPV slide) consistent with Mark and Cliff
Utilities like working with their industrial customers; how can they best engage with them?
-weighted cost of capital for utilities is about 10%; have utilities invest their capital in CHP and put the electricity on the grid and sell steam to industrial company; this way utilities can earn a return on their investment

--we need to engage in planning with customers; it takes time for these projects to develop; go after individual projects rather than a whole state approach to make changes that will capture the market
we already have some development in MN; how did it happen?; what occurred; can we-- learn from those?

Energy Center of Wisconsin
--OH numbers include 2 very large facilities; TX & LA facilities have good load factor on heat; huge potential in their facilities
--new installations have different economics than retrofits
--need carrot (incentive) for utilities to get into this
--have not looked at incentives for utilities; was not on the radar in OH; had to include in plan
--federal tax credit helps for small facilities as well as green goals; on the west and east coast more activity for small units--partially due to hurricane Sandy
--thermal loads drive decisions for CHP not electricity
--the facility should be thermal load following;; need to recognize "public good" in CHP
--reminder that incentives are costs for the customers
--yes pursuing CHP projects are a hassle but our job is to deliver KWH
--fan of incentives but they need to be stable and reliable; frustrating when they are dialed back

SK--if NPV shows CHP is cheaper it should be built; utilities should provide service at lowest cost

Questions in Straw man Proposal--Should CHP be included in CIP

Pros:
There is an existing regulatory frame work for CIP (1 & 3)
Utility will have the motivation to pursue potential
CHP is another tool to obtain resources (Tables 1, 2 &3)
Lower cost of capital for CHP projects
May result in "source" reductions
Adding CHP is well established
Adding CHP can avoid infrastructure building
Existing funding sources are set up
They are big projects---could add large amounts of energy

Cons:
Risks with uncertainty surrounding fuel switching; define the issue to know what does and does not count (Table 1, 2, 3& 4)
Risks with project size--large projects will need to be absorbed into the system
Risk with rebates given to large CHP projects; one customer could dominate rebate pot;
CHP projects could overwhelm other CIP resources (could manage this issue)(Tables 1,2,&3)
CHP projects could cannibalize CIP DSM (CHP should be on parallel path)
Risk of uncertainty of savings
Risk of causality of savings
Risk of unknown process
Risk with the uncertainty of timeline
Opt out customers that may be the best match can't participate (Tables 2 , 3 & 4)
Cost effectiveness may be difficult to determine

Notes from Charles/AS side conversation:
Go to the industry to get involvement in CHP planning
Utilities/commerce need to go to industrial sector conferences for outreach/education focus
Offer education programs to sectors
Go to companies one-on one

--Cons are largely barriers that can be overcome; from gas perspective, big projects do not come along very often, so should not be a big problem. Need incentives to keep projects going; need to be flagship programs
SK--If CHP is part of CIP, would it crowd out DSM (about 40% raised their hands)

--CHP is a different resource; support but it should work on its own (between utility and customer); with incentive it becomes everyone's project; start with benefits to the state. If standby rate is the problem--deal with that. Is CIP a convenient way to get $ for CHP and utilities? Encourage CHP in right situations.

--don't want additional tax for CHP and not in CIP; CHP should rely on its cost effectiveness; MAYBE include a bit of CHP for special CHP project. Pros are there; cons can be overcome. If a project makes thermal sense, tie it to a carbon reduction goal.

--With CHP lumpiness, also comes the issue of staffing shortages (which is another con); not a lot of potential; but if a big opportunity develops, difficult to go after it.

Provide standard offer for CHP if it is the lower cost resource. How to capture it? Buy it. If no longer serving load (CHP project); utility will go after it.

--Xcel did have CHP project about 5 years ago (no natural gas included); microturbines & waste fuel.

Who is our target?

Fuel Switching
--willing to look at all types of fuel switching; net BTU basis is the goal; save on a net energy basis

--interested in net BTU basis
CIP credit/air quality emissions credit? How will externalities be taken into account?

--fuel switching for CHP not as big as other options; carbon credit with net BTU
If a lot of renewables---what is the goal? With 10-12% wind, CHP still has value as a resource.
On the grid--the first dispatched is renewables

Geothermal heat pump and CHP need to be in sync regarding fuel switching
--electric heat not as bad as it used to be because of renewables
--distributed generation meets objectives of energy policy

MACT compliance with fuel switching--all support

---Key themes (see slides)
FINAL STAKEHOLDER MEETING – 11-4-13

Welcome to meeting by Bill Grant

Recap of 1st meeting and the process and brief summary of the work groups’ purpose and process by Charles Dufresne

This is final meeting; last point of the process is a final report due to the legislature

Industrial Energy Efficiency discussion

S. Kihm- (see slides) range of energy efficiency 9-24%
Xcel has been able to capture a lot of efficiency improvements for $0.05/kwh
MISO energy purchases cost is typically about 2 to 3 cents/kwh; all-in (capacity and energy) combined cycle costs are about 6 to 7 cents/kwh and all-in costs from an advanced coal plant would be over 12 cents/kwh
Resource planners consider systematic risks when determining how to meet demand
Individual firms consider the total risk and are unable to diversify risk
In trying to bridge the gap the reality is that industry faces more risk than resource planners see
Utility could purchase efficiency like power; one difference is that energy efficiency is not dispatchable

"Take aways” from the Discussion Group meetings:
Is a standard offer needed or can utilities amp up customer rebates (for CIP customers)? Can opt-out customers participate? Conclusion is that we need more details; see what other states have done and learn from their experiences.
Can't avoid risk; need to find different ways to deal with risk; utilities need to be able to recover costs
Risk of policy changes--should we deal with this head on?
To identify more energy efficiency opportunities need to consider more measurement and sub-metering so we are able to have data-driven decisions
You can't manage what you can't measure
Some utilities have provided customers with assistance in metering and sub-metering; could be very useful
ISO 50001 is the standard for energy management; well-developed and documented energy data and participation of clear decision-making person at the top level of management; can utilities help firms implement? As this gets pushed down the supply chain, utilities might be especially helpful to small to medium size firms
Challenge is that sub-metering and ISO do not save energy directly; how would they be considered in any cost/benefit test?
Utilities may want to think hard about looking at sub-metering and ISO 50001 even outside of CIP

Other ideas the Discussion Group meetings:
Behavior-based programs
On bill financing - good fit for some utilities/customers
E3 framework- energy, environment and the economy
On-site efficiency managers (may be difficult for mini's)

Panel comments:

Having worked with a number of firms, energy efficiency is everywhere; all sizes of companies; different parts of the state; variety of uses/targets; need to turn knowledge into action; timeline can be long; need to hold the customers hand through the process

Energy Center of Wisconsin
Have a number of process improvement efficiency programs; like them - works for Xcel; some concern of utility staff at companies--who should pay for them? Have done self-direct and not yet seen much success; have a portfolio of programs for customers works

Likes utility programs such as customer rebates and process efficiency improvements; will look at the concept of a standard offer and how it would work for the opt-out customers; if utility needs additional resources to meet demand it could offer bids for efficiency to opt out customers; the concept needs a lot of work; would not force it; could also include cogeneration? need to ask opt out customers what they think; it would be good to provide additional opportunities for efficiency gains but realize it may not yield anything. CEE will work on the issue; need to know what are the strategies for the state; carbon reduction? need to factor load shape of the resource

Municipal utilities are in a different situation; they subcontract and have other power agreements; legalities of the agreements could complicate things; have found that when doing training for efficiency managers in the companies, they will not drive more than about 15 miles

If standard offer is a resource, how would it look? what kind of load shape? how long would the resource be available to meet demand; capital expenditures could be a challenge; if utility pays for the project it will have a better chance; need to be using the same language if viewed as a resource

It is different for gas utilities; there is no IRP and no deferred investment in generation; there is potential for possible enhancements of existing programs; there is very little gas sub-metering but some steam sub-metering; there is "No Road to Damascus"; engineering and planning is needed upfront along with some upfront funding for study

Need to try to find the "sweet spot" of projects; need a safe place for large industrials to talk about energy efficiency; issues industrials are dealing with most is wanting efficient production to "stay alive." Biggest issue is internal vs. external financing; upfront capital is needed; debt and lines of credit are barriers especially for big industry.

There is recognition that industrial customers are not monolithic

Need to also combine with water, etc. savings (nexus) need to look at revolving loan funds--the bigger picture, not just the utility as a source of funding; need state/legislature involvement

Many industrial customers lack tools, staffing and time; there is no one size fits program all for customers; from a policy perspective need to look at non ratepayer funding mechanisms; have had success with this in the NW; Federal govt. pushes to do more with less; with E3 you can bring more tools to a company at the same time; this framework uses pieces that work for MN; MN coming in late; 39 other states have used; brings a holistic approach to bring assistance to sites.

To mitigate risk on projects need data; with no metering or data things go unnoticed; attitude exists that if it is working just keep it going; trust is critical as well as customer relations.

Has interviewed numerous clients and billing often comes up; facility manager often does not see the energy bill; it is sent to accounting---sometimes out of the state; metering can drive behavioral change--example of meter by the door; last one out made sure nothing was left on; they go back to turn things off for the weekend

Reiterate that we've heard companies say I'm doing everything I can but they do not know how much their energy bills are
Need trend analysis; what is happening with state industrial energy use; depends on metrics; CA energy use /GDP is plat (when normalized; how would information like that guide you Do we need to expand programs? Competition in a global economy is what drives companies; need to wrestle with how to evaluate programs and need.

Energy partnerships with colleges is a good option; MN colleges are offering engineering /energy classes

Need to include environmental factor (include non-quantifiables)

Cost effective non energy benefits don't accrue to industry investing in equipment; get rebate from water co. for decreasing water usage

Q & A with attendees

Will bill loan payment work? Yes it will work if loan repayment is on the bill; no capital partners; may need legislation to work it out; doing in the residential sector right now; looking at new program in 2016

Issue is are they required to get a bond; go to bank for line of credit; companies unwilling to do because the loan is on their "books"

Lots of low interest financing is available; if on the bill have the utility collect the money and provide servicing function only

Others may need outside capital; run risk if processes can't operate; use on-bill financing--need simpler process than PACE

Energy decision making is multi-faceted; need a champion; need to recognize other factors such as competing globally and also within the organization; will on bill payment work---"it depends"; payback is sticky

We want companies to do projects in MN

The industry is in a global marketplace with energy costs both higher and lower depending on where you are; need to look at some of those areas with higher energy costs and see what they are doing with energy efficiency; need to benchmark with other areas

How can we make it easier for industry?

Wanted to use ARRA funding but there were restrictions

Money seems to be out there; funding is useful; it is complimentary but not a game changer

Need to look at best practices on sub-metering; need accurate information of what works; state could play a role in getting accurate information

Regarding need for financing help--"It depends"

Financing need doesn't seem to be a big problem; maybe for smaller customers

Have done some; used some alternative approaches
Have had no customer ask for programs

It's a quandary; utilities don't make 2-year payback decisions; need a way to make longer term energy efficiency decisions—longer payback

Utility has been doing on-bill financing since 1992; have caps and lien in place (only 2 have defaulted over that time period); interest rate from 1.9 to 0%

Need on-line continuous commissioning; do it constantly; really good management programs incorporate safety, higher quality products, energy efficiency and lower costs in their programs; they are starved for workforce talent in the industry to do good projects; need to bill customers directly; want to respond to bills but some customers getting jaded

Industry appears to be in 2 camps: 1. give customer the tools to let them do energy efficiency 2. provide the help/programs to do the efficiency

Yes both are needed; industry needs a suite of offerings

**Combined Heat and Power discussion**

S. Kihm (slides)

Need to define what CHP is and what is eligible
What is the objective—save BTU’s or carbon reduction or?
How much is out there (technical and economic—final study on this will be done in June 2014
Location for new facilities may be changing—urban or rural?
Does CHP help a utility meet the CIP goal? Can CIP funding be used?

**Collaboration** may help resolve issues:
- who gets the energy savings credit (IL splits between electric and gas utilities)?
- who gets the incentive payment (customer/gas or electric utility)?
- who should own the equipment? (if utilities own it can be another supply side asset; there are challenges if it owns equipment in a customer’s facility)
- can fuel switching count? Should we look at the project as a whole or do we need to look at the individual gas and electric utility involvement?
- standby rates/net metering—who should pay what? (report out in late 2013)

Panel discussion:
Understand definition of CHP but need to define what is eligible through CIP
Nick - definitions are important; should not gloss over

Anaerobic digester could be a good thing; call the program something else to be able to include projects like this

Clarity is needed and could help

For any large CHP project, both electric and gas utilities will be involved; can see both getting savings and incentives; some are 80% electric and 20% gas;; need to look at systemic level - at BTU basis; need to find equitable basis; CHP is essential for meeting energy goals
It is common sense to be looking at urban sites and look at BTU's saved; need to define objective because the portfolio will be different depending on the objective; beginning to look at moving thermal BTU to use elsewhere - look at other countries (Denmark); small size CHP to use in the community

Muni's looking at biomass facilities; some are smaller; bio-fuels in Hibbing; one city uses corn cobs; Austin 1.25 MW facility; cities are looking to use CHP within the city; electricity and district heat; gets complicated when trying to sell electricity

Need to co-locate facilities; no near term need for power; if the utility owns the ethanol CHP plant, it makes it easier

Risks can be showstoppers;

Not very active with CHP, but some interest; not much currently on their system

Utility has 3-4 projects of substantial size; there is a mix of how much they own

CHP potential has an economic continuum; could crown out energy efficiency but really depends on cost effectiveness of both; let them compete

It is important for them to co-exist; maybe the goals need to be higher

Don't modify the goals; how to incent a project that makes up a big chunk of the goal is an issue; devil is in the details; CHP is easier to treat as a resource

CHP is more of a resource - not efficiency; to help projects develop depends on the specifics such as location; space is an issue in urban locations

By statutes CHP is a DSM program; but it is treated and used as more of a supply side resource with a number of DSM-like components. Use as little energy as possible (efficiency programs) and when you need to generate, do that as efficiently as possible

Need to again note what the objective is--carbon reduction?

Location on the grid is also important for CHP; monetize CHP over time; stream of CHP power over life of facility

If customer is using 100% of power and steam can be used in CIP

Didn't get to that kind of level

Need to factor in how CHP fits as a dispatchable load

Again easier to dispatch if the utility owns

Should CIP programs be measured in BTU’s?

It depends; how would renewable projects fit in? Could open the door to a lot of fuel switching

The purchase power question then comes up; how do you measure that? what is the source?
Requirements in purchase contracts; problems for muni's and coops? Right of first refusal?

CHP can cause a real unbalance among customers; there is not a single CHP answer statewide; very specific to customers, location and other factors

Should you do a CHP project if it does not pass the C/B test?

Energy efficiency programs take care of themselves; if steam is needed location is critical; huge benefit to use electricity behind the meter.

Mandates are a huge concern; what if the projects are not really good?

Fuel source is an issue especially for Xcel because of their nuclear resources; not all projects will pass a C/B test

Don't limit CHP projects to all "behind the fence"; look at all of them

Need to look at the results of the study on potential; all of this discussion is too conceptual; need to look at customers needs and don't push customers out of the state

Appears that utilities would have a problem with a CHP target

There are some industries with more risk than others; look at facilities for CHP that will be there in the long run - U of M campuses, hospitals; this will reduce the risk

CHP study is twofold; first is policy alternatives (with ACEEE) due in January and second is quantifying technical and economic potential (with ICF international) due in June.

Jessica closed the meeting--Standby rates report due by the end of the year. Invite comments on the report that will be sent to the legislature; not sure if there will be a draft to comment on---timing is very tight the report will cover the process used in the stakeholder meetings; all slides, notes, etc. will be posted soon; also want to know---was anything missed? Most importantly---don't stop the conversations; we need to have more follow up conversations about these issues.
APPENDIX E: SUMMARY OF STAKEHOLDER COMMENTS
Energy Savings Goal Study & Stakeholder Process
Summary of Stakeholder Comments
December 6, 2013

Background
In 2013, House File 729 was passed and the Minnesota Department of Commerce, Division of Energy Resources (DER) was directed to host a series of public meetings to gather stakeholder input between October and November, 2013. The primary focus of the stakeholder meetings was to bring together a diverse set of interests and discuss how combined heat and power (CHP) and industrial energy efficiency (IEE) resources could be better leveraged and integrated into the state’s energy policy framework.

Near the end of this public process, stakeholders were asked to submit comments regarding the stakeholder process, concepts and ideas generated from the stakeholder process, and general commentary on achievement of Minnesota’s Energy Policy Goals. Reoccurring themes from the comments include: CHP policy and regulatory barriers, inclusion of CHP as part of the Conservation Improvement Program (CIP), adjustments to Minnesota’s Energy Policy Goals, the Standard Offer program proposal, and determining appropriate cost-effectiveness tests for CHP systems. The following sections provide a summary of the issues and recommendations presented in the stakeholder comments.

Cummins Power Generation Comments
- Structure of standby fees limit small-to-medium sized CHP projects; net metered systems should be excluded from standby fees
- The Environmental Protection Agency’s CHP definition and other industry definitions do not specify fuel type; CHP incentive eligibility should not be limited to renewably fueled systems
- REC energy credit ownership should be established for CHP generators
- Regulatory issues facing CHP should be addressed first and then address CHP inclusion in CIP

Energy Resources Center Comments
- Fuel switching should not be prohibited in CIP; a net savings methodology should be used for accounting
- Utilize societal cost test to evaluate cost-effectiveness of CHP projects
- Treat CHP as equal to other traditional energy efficiency measures within efficiency programs
- Some utility standby rates do not encourage efficient consumer rationing/consumption choices
  - Recommendations: 1) Remove grace periods excepting demand usage fees, 2) standby demand usage fees should only apply during on-peak hours and be charged on a daily basis, 3) standby energy usage fee should reflect time-of-use cost drivers, 4) the Forced
Outage Rate should be used in the calculation of a customer’s reservation charge, 5) and standby rates should be transparent, concise and easily understandable.

Fresh Energy Comments
- Short investment payback requirements and competitive capital budgets are barriers to some efficiency measures
- Individual industrial customers have unique set of needs and circumstances; need a variety of tools help them achieve energy savings
- Difficult to find single policy solution to remove CHP implementation barriers
  - CHP does not fit neatly into supply-side or demand-side categorization
  - Efficiency and cost-effectiveness of CHP depends on project location and customer needs
  - CHP fuel source can affect state objectives (i.e. environmental or CO2 emissions)
- Standby rates are a large impediment to CHP development
- Fresh Energy has concerns about including CHP as part of CIP

Great Plains Institute Comments
- Should rely on standard definitions of CHP set by agencies such as the DOE and EPA and other states
- Need a clearer policy objective; policy focus on GHG reductions could lead to greatest amount of CHP implementation in Minnesota
- There are pros and cons of including CHP as part of CIP; should address regulatory barriers first:
  - Standby rate design,
  - interconnection standards,
  - excess power sales,
  - clean energy portfolio standards,
  - and output based emissions
- Develop CHP potential data:
  - Economic/technical potential for CHP in MN,
  - facilities that may be impacted by EPA’s Boiler MACT rule,
  - and identification of sites with significant waste heat

Great River Energy Comments
- Use common metrics to assess industrial sector efficiency
- Traditional view of energy efficiency in residential programs might not be a realistic metric for the industrial sector; adoption of ISO 50001 standard for industrial customers is recommended
- New policies/programs should not be considered until FVB potential studies are completed
- GRE believes that CHP projects should not be included as part of CIP because of potentially unequitable incentives, limited CHP applications, and the complexity in determining CHP energy savings; metering and sub-metering can change consumer behavior and achieve energy savings

Minnesota Power Comments
• State-by-state energy savings comparisons can be useful indication of progress, but can also “penalize early adopters such as Minnesota”; consider state energy savings comparisons in context to help identify continued savings opportunities
• A solution for customers outside of CIP should be developed with their feedback
• There are issues related to “investment, trade secret data, allocation of limited resources, and other marketplace realities...” that merit further discussion
• Low energy market pricing, alternative renewable generating sources, risk of stranded investment, and site-specific economics present challenges to CHP development

Otter Tail Power Company Comments
• Concern about the economic cost of higher energy efficiency goals; need to balance effective annual energy efficiency goals while maintaining reasonable rates
• Some utilities already offer programs that are similar to the Standard Offer concept for CIP customers. Question is how to count opt-out customer energy savings.
• Offering opt-outs incentives outside of CIP presents challenges
• OTP does not support fuel switching with CHP or CIP incentives for fuel switching
• Changes to standby rates could create cross subsidies
• OTP opposed to using CIP electric funding for new fossil fuel resources

Xcel Energy Comments
• Minnesota’s 1.5% energy savings goal is an aggressive standard for the foreseeable future
• New equipment standards/best practices are improving customer energy efficiency, but market transformation is reducing CIP attributable impacts. Should work to determine what types of programs/opportunities can be included as part of CIP
• Standard Offer program proposal is similar to Xcel’s self-direct program; questionable whether it would offer additional benefit
• Pre-established cash payments for efficiency might conflict with intent of statutory language for exemption and regarding fund recovery
• There are no current rules for how to claim industrial customer behavioral items
• How to measure and track behavior items through sub-metering?
• There are limited resources for implementing process-oriented opportunities identified through ISO 50001; Xcel already offers similar services to industrial customers
• New natural gas CHP should not be included as part of Xcel’s CIP portfolio; Xcel views this as generation asset, not a conservation source.
• Need clearer policy definition/objective
• Current CIP cost-effectiveness methodology might not present CHP systems as beneficial
APPENDIX F: STRAWMAN PROPOSALS
Industrial Energy Efficiency Strawman Proposal – Major comments

*SOPPA – Standard Offer Power Purchase Agreement*

Major themes from comment on the strawman proposal

Slide 1
- Do we need a Standard Offer Purchase Program?
- How do we evaluate it?
- Should it involve load management as well as efficiency?
- How do we integrate it into IRP processes?

List of comments on the strawman proposal

Slide 2
- Both CIP custom program and SOPPA buy down the payback period
- SOPPA would not be able to capture all of the ways in which conservation can occur
- SOPPA price should be limited by MISO price
- Industrial energy efficiency needs to reflect changes in firm output
- Should consider standards set forth in ISO 50001

Slide 3
- Participate in both CIP and SOPPA?
  - Yes and No
- Both energy savings and peak demand reductions should be considered
- SOPPA make work better for capacity
- Need to have reasonable certainty that savings (reductions) will occur
- Meeting an energy efficiency goal and acquiring resources to meet demand are different processes
- Not clear how SOPPA would fit into IRP process

Slide 4
- Savings from SOPPA should count toward the utilities’ CIP goals
- Measures procured under SOPPA should be subject to utility cost test
- Use same measurement and verification standards as used for other industrial measures
- Measurement and evaluation may be problematic
- Processes for procuring gas and electric efficiency should be similar

Slide 5
- Not sure if SOPPA is necessary with CIP and self-direct efforts
- What is the source of the funding for SOPPA?
  - SOPPA could involve cross-subsidies
- Need to focus on commissioning and recommissioning efforts
- How would we set baselines and track progress?

Slide 6
- Similar to Citizens League (CL) Electrical Energy Project—need to coordinate programs
- SOPPA reporting should go to the DER, not the utilities
- Need to consider greenhouse gas emissions
- Need to consider agricultural efficiency opportunities
- Consider offering more attractive CIP incentives to keep customers in the program
- There should be minimum size requirements
- Evaluation should be done by a third party
- If project is within CIP, then savings should count toward goal. If not, they are separate savings.
APPENDIX H: CHP POLICY WHITE PAPER

CHP Policy White Paper

November 2013

Policy Recommendations to Improve Standby Rate Structures in Minnesota

By: John Cuttica, Cliff Haefke, & Graeme Miller, Energy Resources Center

This White Paper focuses on the standby rates of the two largest investor owned utilities in Minnesota – Xcel Energy and Minnesota Power – and provides a brief summary of the policy recommendations provided in the "Analysis of Standby Rates and Net Metering Policy Effects on Combined Heat and Power (CHP) Opportunities in Minnesota" paper published November 22, 2013 by the Energy Resources Center (ERC), prepared for the Minnesota Department of Commerce Division of Energy Resources.

What is the Summarized Issue?

Electric utility standby rates in Minnesota have historically been perceived as a significant barrier to combined heat and power (CHP) project development. The high costs associated with standby rates have frequently prevented CHP systems from becoming financially viable investments. The electric standby consumption of a customer has often not been fairly tied to the rate pricing of the utility. For example, standard practice of Minnesota investor owned utilities requires standby customers to purchase a predetermined level of electric service even though many CHP generators would require significantly fewer hours of actual standby service. By connecting the price of standby service to a customer’s actual use of delivered standby power, restructured standby rates could greatly increase operating CHP systems to avoid unwarranted and unnecessary utility charges. Proposed standby rate restructuring would help enhance individual CHP project economics and overall project development throughout the state. The addition of new, clean, and energy efficient CHP generation systems could assist the state in reaching the annual Conservation Improvement Program (CIP) energy saving goals.

What is Combined Heat and Power (CHP)?

CHP is a form of distributed generation (DG) that generates at least a portion of the electricity requirements of a building, facility, and/or campus while recycling the thermal energy that would typically be exhausted from the electric generation process. CHP systems utilize commercially available state of the art technologies, and if properly sized and installed can provide reduced energy costs, improved power and power quality, increased energy efficiency, and improved environmental quality.

What is the technical potential in terms of CHP electric generating capacity?

Today, there are 55 installed CHP systems operating in Minnesota totaling 918 MW and representing 5.5% of the state’s total electric nameplate generating capacity. Results from the ERC study show a technical potential of 1,975 MW found within the four investor owned utilities in Minnesota, representing 11.9% of the state’s overall generating capacity. The Top 5 industrial sectors in Minnesota in terms of CHP technical potential of generating capacity are paper, chemicals, food processing, petroleum refining, and lumber and wood facilities. The Top 5 commercial sectors are commercial buildings, college/universities, multi-family buildings, hospitals, and hotels.

Summary of Policy Recommendations to Improve Standby Rates

1. Grace periods exempting demand usage fees should be removed where they exist.
2. The standby demand usage fees should only apply during on-peak hours and be charged on a daily basis.
3. Standby energy usage fee should reflect time-of-use cost drivers.
4. The Forced Outage Rate should be used in the calculation of a customer’s reservation charge.
5. Standby rates should be transparent, concise and easily understandable.
What are Standby Rates?
Standby rates, otherwise known as partial service rates, constitute a subset of retail electric tariffs that are designed for customers with on-site, non-emergency distributed generation. Standby rates ensure electric service from the utility to customers with on-site generation (ex: CHP) during generator outages. These rates provide for:
- backup electricity and demand during both scheduled and unscheduled outages
- additional “supplemental” service to serve the portion of a customer’s load above what is generated on-site

The points below detail the general structure in standby rates of: 1) reservation charges, 2) standby usage charges, and 3) supplemental service and standby from Minnesota’s two largest electric utilities as well as the issues these rates have in fulfilling the rate functions stated above.

What are Reservation Charges?
Reservation charges are a monthly $/kW charge for the amount of standby capacity a distributed generation customer requires during an outage. The reservation charge is considered akin to an insurance monthly premium. This reserved standby capacity might be the nameplate capacity rating of the generator or it might be a lesser amount dependent on the customer’s requirements.

What are Standby Usage Charges?
Standby Usage Charges comprise the set of charges that the utility issues when the customer takes standby service. This usually includes a demand charge (kW) and an energy charge (kWh) but sometimes a utility will employ one over the other. There are two types of usage charges: those for scheduled outages (maintenance work) and those for unscheduled outages (forced outage). Unscheduled standby usage rates are generally priced higher because of the abrupt nature of the service. Since scheduled standby service can be planned for in advance the price is usually far less.

What is Supplemental Service?
Supplemental Service provides for all energy and demand required by the customer above that generated on-site. For example, if a customer generates 1,000 kW but consumes 1,500 kW, the additional 500 kW would be billed on a supplemental rate. Some utilities create separate supplemental rates whereas others require DG customers to take supplemental service through customer’s otherwise applicable rate.

Table 1: Summary of Standby Rate Utility Structures within Xcel Energy and Minnesota Power

<table>
<thead>
<tr>
<th>Utility</th>
<th>Xcel Energy</th>
<th>Minnesota Power</th>
</tr>
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<tbody>
<tr>
<td><strong>Reservation Charges</strong></td>
<td>Provides two separate reservation tiers, one covering unscheduled outage and one covering scheduled outages. A customer wanting both services would need to pay both reservation charges.</td>
<td>Customers have the option of paying a reservation charge exempting them from additional usage charges when standby is taken; or, they may pay a higher charge when standby is used. This second option may be interrupted by the utility during peak periods.</td>
</tr>
<tr>
<td><strong>Standby Usage Charges</strong></td>
<td>Exempts 964 hours of unscheduled standby demand usage and all scheduled standby demand from additional charges. This exemption does not include the charges for kWhs used during an outage.</td>
<td>Does not state how many hours are exempted from standby demand usage charges if the customer pays the monthly reservation charge.</td>
</tr>
<tr>
<td><strong>Supplemental Service</strong></td>
<td>Bill all supplemental service through regular rates within their electric tariffs.</td>
<td>Bill all supplemental service through regular rates within their electric tariffs.</td>
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</tbody>
</table>
What are the Structural Issues with Standby Rates in Minnesota?
The standby rates of both Xcel Energy and Minnesota Power do not encourage efficient consumer rationing or efficient consumption decisions – two important functions of utility rates. Both of these concepts are rooted in the idea that a consumer will make efficient decisions when they are able to acquire the amount of a good or service needed and no more. While this simple explanation seems to exist in almost every economic transaction it does not exist in Minnesota standby rates. The grace period from demand usage charges is an example of a rate structure that does not allow a consumer to effectively ration themselves. To wit, the grace period is arbitrary and provided in entirety no matter the customer’s actual need for standby service. Under such a structure a customer may not avoid charges for using fewer hours than those allotted. This incentivizes well working systems to go offline more often than they otherwise would so that they may benefit from demand exemption.

Another issue, specific to Xcel Energy, is the use of two separate reservation charges for scheduled and unscheduled standby service. The reservation charge should be used to recover the utility’s investment in dedicated infrastructure to serve the outage capacity. Since the utility is not building separate infrastructure to serve scheduled and unscheduled outages there need only be one reservation charge.

What are Policy Recommendations to Improving Standby Rates?
Though the standby suggestions for each utility are somewhat unique and are further explored in the full paper developed by ERC, Table 2 identifies the most reoccurring suggested standby modifications for IOUs in Minnesota. While the financial effects these modifications might have are largely dependent on customer specific metrics including CHP capacity, operating hours, voltage classification, reliability, etc., it can be assumed that a well running system would be able to save a greater portion of their electric bill with these modifications in place.

Table 2: Policy Recommendations to Standby Charges

<table>
<thead>
<tr>
<th>Topic</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Removal of Grace Periods exempting Demand Usage Fees</td>
<td>Grace periods exempting demand usage fees should be removed where they exist. Exempting an arbitrary number of hours against demand usage charges sends inaccurate prices signals about the cost to provide this service. Standby demand usage should be priced as-used on a daily and preferably an on-peak basis. This method directly ties the standby customer to the costs associated with proving standby service.</td>
</tr>
<tr>
<td>2. On-Peak Standby Demand Usage Fees</td>
<td>The standby demand usage fees should only apply during on-peak hours and be charged on a daily basis. This rate design would encourage DG customers to shift their use of standby service to off-peak periods when the marginal cost to provide service is generally much lower. Furthermore, this design would allow customers to save money by reducing the duration of outages.</td>
</tr>
<tr>
<td>3. Implementing Time-of-Use Cost Drivers</td>
<td>Standby energy usage fee should reflect time-of-use cost drivers. Time-of-use energy rates send clear price signals as to the cost for the utility to generate needed energy. This would further incentivize the use of off-peak standby services.</td>
</tr>
<tr>
<td>4. Calculating Reservation Charge using Forced Outage Rate</td>
<td>The Forced Outage Rate should be used in the calculation of a customer’s reservation charge. The inclusion of a customer’s forced outage rate directly incentivizes standby customers to limit their use of backup service. This further ties the use of standby to the price paid to reserve such service creating a strong price signal for customers to run most efficiently.</td>
</tr>
<tr>
<td>5. Transparency and Understandable</td>
<td>Standby rates should be transparent, concise and easily understandable. Potential CHP customers should be able to accurately predict future standby charges in order to assess their financial impacts on CHP feasibility.</td>
</tr>
</tbody>
</table>
Background on the Function of Electric Rates

Regulators use the cost of service standard most often to calculate "fair and reasonable" rates because its methodology directly ties consumers to the cost of producing those goods and services consumed (in this case, electricity). Furthermore, the Public Utility Regulatory Policies Act of 1978 mandates that electric rates shall be designed, to the maximum extent practicable, to reflect the cost of service. A cost based approach achieves at least three important functions of public utility rates: consumer rationing, capital attraction, and compensatory income transfers.

1. Under the principle of cost rationing, consumers are free to take service (whatever kind in whatever amounts), "as long as they are ready to indemnify the producers...for the costs of rendition," thereby rationing themselves to only what is needed and no more.
2. To ensure service now and in the future, capital attraction guarantees the service provider a funding source for both operating and capital expenses that are necessary to sustain grid infrastructure.
3. Lastly, the compensatory income transfer function requires those seeking a service to account for the use of the service through a monetary expenditure.

These three functions are important to recreate competitive market conditions in a situation devoid of competing market forces (i.e. Minnesota electric utility monopoly). Economists and rate theorists use competitive markets as guidelines for the regulation of monopolistic prices. The cost of service methodology is the approach that best simulates competitive market conditions.

General rate function can be classified into three overarching attributes: revenue, cost, and practicality.

1. Revenue related concerns include achieving the total revenue requirement predictably and stably through rates that are themselves stable and predictable.
2. Cost related concerns include promoting economically efficient consumption through portioning costs fairly among customers and avoiding discriminatory rates.
3. Practical concerns include attributes of payment collection, rate simplicity, and ease of understanding.

These attribute categories are important for shaping the context of this rate analysis. Rates that fail to clearly display these attributes might also fail at achieving the functions mentioned above, which, in turn, could allow for claims of unfair or non-cost based rates. The cost attribute is the most important in this discussion as it specifically addresses the issue of fair cost allocation. The role of a cost of service methodology is to bind customers and customer classes to the specific costs they impose on utility.

4. Id.
5. Id.