



Energy Savings Goal Study & Stakeholder Process Legislative Report

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Submitted by
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Submitted by 1

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Executive Summary

House File 729 (H.F. 729), 4th Engrossment, Article 12 Section 8 was passed in 2013 establishing the Energy Savings Goal Study (ESG). This legislature directed the Department of Commerce, Division of Energy Resources (Commerce) to conduct meetings with stakeholders and members of the public to produce a report on findings and legislative recommendations.

This executive summary includes a set of recommendations for consideration by the legislature and other stakeholders. Further recommendations and next steps are also described in more detail as part of the main report. Based on the findings of the ESG stakeholder process, Commerce established the following set of recommendations and next steps.

Summary Recommendations

- 1) State Energy Policy Objectives:** Commerce recommends that the legislature further explore and define the primary objective of Minnesota's state energy efficiency policy goals.
- 2) Combined Heat and Power Policy Objective:** Commerce recommends that the legislature explore and define a more specific policy objective behind CHP development in the state. Commerce recommends continued engagement of stakeholders in 2014 to clarify policy regarding the incorporation of CHP into existing policy frameworks and, more specifically, its inclusion in CIP.
- 3) Industrial Energy Efficiency Risk Reduction:** To bring more energy efficiency measures to the forefront in Minnesota industrial facilities, actions are needed to help reduce the risk to industrial firms when choosing whether or not to invest in efficiency improvements.
- 4) Energy Metering and Measurement:** Inclusion of sub-metering and ISO 50001 (an international standard developed specifically for industrial energy management) as a component of Minnesota's energy plan or as part of CIP could potentially help promote data-driven decisions and identification of potential energy efficiency improvements for an industrial customer.
- 5) State Effort to Promote E3 Framework:** Consider opportunities to use the E3 framework (a federal effort using energy efficiency to positively impact 1) Economy 2) Energy 3) Environment) to provide energy efficiency assistance to industrial customers that are within CIP and/or those that have opted out of CIP.
- 6) Financing for Energy Efficiency:** Commerce recommends further exploration of new financing programs through existing efforts with stakeholders such as financial institutions, non-profits, regional economic development agencies, local units of government, utilities, and others to determine the most effective financing tools available and the feasibility of implementing these tools within the current regulatory framework.

Introduction and Background

In 2013, House File 729 (H.F. 729), 4th Engrossment, Article 12 Section 8 was passed, establishing the Energy Savings Goal Study (ESG). This legislation directed the Department of Commerce, Division of

Energy Resources (Commerce) to conduct public meetings with stakeholders and members of the public and produce a report on findings and legislative recommendations to accomplish the following purposes:

- Clarify statewide energy-savings policies and utility energy-savings goals;
- maximize long-term cost-effective energy savings and minimize energy waste;
- maximize carbon reductions and economic benefits by increasing the efficiency of all sectors of the state's energy system;
- minimize total utility costs and rate impacts for ratepayers in all sectors;
- determine appropriate funding sources for non-conservation projects and programs, cogeneration, and combined heat and power projects;
- determine the appropriate consideration in the integrated resource planning and certificate of need processes of the requirements to meet the state's energy conservation and renewable energy goals; and
- provide the utility the appropriate incentives to meet the state's energy conservation and renewable energy goals.¹

To address the statutory requirements listed above, Commerce conducted two large stakeholder meetings that addressed the general topics listed and four technical workgroups focused on combined heat and power (CHP) and industrial energy efficiency (IEE) to engage stakeholders and solicit their feedback.

This report presents Commerce's findings, and subsequent recommendations to the legislature, of the ESG stakeholder process that was implemented between October 8 and November 25, 2013. The lessons learned from the stakeholder process highlight important opportunities and barriers in achieving statewide energy savings goals and provide a foundation from which specific policy details and next steps can evolve.

Energy Efficiency as a Priority

Minnesota has a long-standing history of developing and implementing energy-efficiency initiatives through a progressive regulatory framework. The efficient use of energy in all sectors is vital to the health of Minnesota's economy and environment. Using energy more efficiently can help consumers lower their costs and remain competitive in global markets while also reducing carbon dioxide emissions and other pollutants. Energy efficiency improvements also benefit ratepayers by reducing the need for new utility infrastructure, lowering energy costs, and reducing emissions.

During the 2013 legislative session, the legislature further established energy conservation and efficiency as a priority through the revised Energy Savings Policy Goal in Minnesota Statute Section 216B.2401:

The legislature finds that energy savings are an energy resource, and that cost-effective energy savings are preferred over all other energy resources. The legislature further finds that cost-effective energy savings should be procured systematically and aggressively in order to reduce utility costs for businesses and residents, improve the competitiveness and profitability of businesses, create more energy-related jobs, reduce the economic burden of fuel imports, and reduce pollution and emissions that cause

¹ House File 729, 4th Engrossment Article 12 Section 8

climate change. Therefore, it is the energy policy of the state of Minnesota to achieve annual energy savings equal to at least 1.5 percent of annual retail energy sales of electricity and natural gas through cost-effective energy conservation improvement programs and rate design, energy efficiency achieved by energy consumers without direct utility involvement, energy codes and appliance standards, programs designed to transform the market or change consumer behavior, energy savings resulting from efficiency improvements to the utility infrastructure and system, and other efforts to promote energy efficiency and energy conservation.

Minnesota's Conservation Improvement Program

The Conservation Improvement Program (CIP) is a significant source of energy efficiency activity in Minnesota and a cornerstone for achieving the state's energy savings goals. Since the establishment of CIP over thirty years ago, there have been a number of fundamental policy changes that have affected the program's structure. This section provides a brief overview of some of these key changes affecting CIP, and subsequently, the state's movement toward achievement of the 1.5 percent demand-side management goal.

Originally, each natural gas and electric utility were required by law to spend between 0.5 percent and two percent of its gross operating revenues annually on conservation improvement projects to improve energy efficiency.

These requirements changed with the passage of the Next Generation Energy Act (NGEA). The NGEA was passed in 2007 to strengthen Minnesota's commitment to energy conservation and efficiency. NGEA established an annual energy savings goal of 1.5 percent of average retail sales for electric and natural gas utilities beginning in 2010. While the original spending goal still exists, the savings goal has driven the utilities to become significantly more aggressive in their conservation efforts.

As part of Commerce, CIP regulates Minnesota electric and gas utility conservation programs and ensures that progress is made toward achievement of the 1.5 percent energy savings goal and that rate payer dollars are effectively used in achievement of the goal. CIP actively works with eleven investor owned utilities (representing 66 percent of electricity sales and the majority of gas sales in the state), 44 distribution cooperatives (twenty percent of electricity sales), and 130 municipal utilities (fourteen percent of electricity sales). CIP program activities have resulted in a wide range of benefits to the state including but not limited to:

- Improved awareness and adoption of energy efficiency technologies
- Reduced energy costs for Minnesota households and businesses
- Increased profitability for Minnesota companies and industries
- Deferred utility infrastructure investments
- Decreased greenhouse gas emissions
- Conservation of energy and demand resources

CIP program activities include technical assistance and outreach, regulatory compliance, policy development, evaluation, measurement and verification (EM&V) activities and conservation applied research and development (CARD). Examples of CIP programs that are run by the utilities include

custom and prescriptive incentives and industrial process efficiency project identification, technical assistance and/or funding for engineering assessments and studies, and assistance in developing long-term energy management plans through efficiency programs.

In 2010, the first year that utilities were required to meet the increased energy savings goal, Minnesota's utilities devoted approximately \$224 million to CIP activities and achieved a total annual energy savings of 900,000 MWh of electricity and 2.6 million MCF of natural gas, resulting in approximately 978,000 tons of avoided carbon dioxide emissions.² Utilities have continued their upward trend in energy savings since 2010: Minnesota electric utilities collectively exceeded the 1.5 percent standard in 2011, and natural gas utilities collectively achieved the 0.75 percent and one percent minimum savings standards.³

Energy Savings Goal Study and Stakeholder Process Methodology

For Minnesota to maintain its position as a leader in energy efficiency and to ensure that ratepayer dollars are used effectively, it is vital that state energy savings goals and programs evolve while also establishing regulatory certainty for stakeholders involved in achieving Minnesota's policy objectives. Stakeholder engagement is a critical tool to better understand complex policy issues and inform this continued evolution.

There were many complicated policy questions that needed clarification as part of the H.F. 729 Article 12 Section 8 requirements. In order to gain the specific insights that Commerce required to make informed legislative recommendations, it was necessary to methodically plan each step of the stakeholder process. As this section highlights, determining how to approach meeting facilitation, designing the meeting style and structure, and selecting discussion topics were all important aspects of the stakeholder process methodology.

Meeting Facilitation

As a first step in the stakeholder process, Commerce worked to determine the most effective way to approach meeting facilitation. Hiring a third-party moderator to facilitate discussions during the stakeholder engagement process was an important strategic decision. A third-party moderator would not have a direct stake in the outcome of the process and would, therefore, be better suited to provide a more neutral perspective during the discussions. Having a neutral facilitator helped make meeting discussions more open and productive and allowed Commerce staff to participate in and more closely observe the stakeholder process.

Ultimately, Commerce hired the Energy Center of Wisconsin (ECW) as the meeting facilitator to help organize, facilitate, document, and report on the results of these stakeholder meetings and process. ECW is a non-profit organization dedicated to wise use of energy resources. ECW's mission focuses on providing information on energy impacts, ideas on reducing energy use, and solutions to energy and

² The Minnesota Conservation Improvement Program Energy and Carbon Dioxide Savings Report for 2009-2010 may be viewed at: <http://mn.gov/commerce/energy/images/CIPCO2Rpt2012.pdf>.

³ Minn. Laws 2009, Ch. 110 Sec. 32 permitted the Commissioner to approve an average savings goal of 0.75% over the 2010-2012 triennial period for gas utilities party to a gas conservation potential study completed in 2009. This provision was invoked for some utilities, while others were approved at the 1.0% minimum standard specified in Minn. Stat. §216B.241, subd. 1c (d).

environmental challenges. ECW's energy policy expertise and successful facilitation track record made it the top choice as a stakeholder meetings facilitator.⁴

Determining how to design the stakeholder meetings was another critical aspect of the overall process. As the next sections show, finding a logical progression of presentations and discussion topics and the best style to engage and effectively solicit stakeholder input were critical determinants in how the meetings were designed and carried out.

Meeting Style

Six stakeholder meetings were designed to focus on information sharing between stakeholders, defining opportunities and barriers to achieving state energy efficiency savings goals, and identifying alternate mechanisms to incentivize industrial energy efficiency. The meetings were not meant to define specific programmatic details, but to gather diverse feedback from stakeholders from which to inform Commerce's legislative recommendations and through which specific policy details could continue to evolve.

It was important to hear from a wide variety of stakeholder perspectives in order to gain a holistic view of the policy issues and arrive at sound conclusions. To help achieve this goal, Commerce reached out to a diverse set of potential participants within regulatory agencies, utilities, industry trade, environmental advocacy groups, consumers/ratepayers, and industrial organizations.⁵

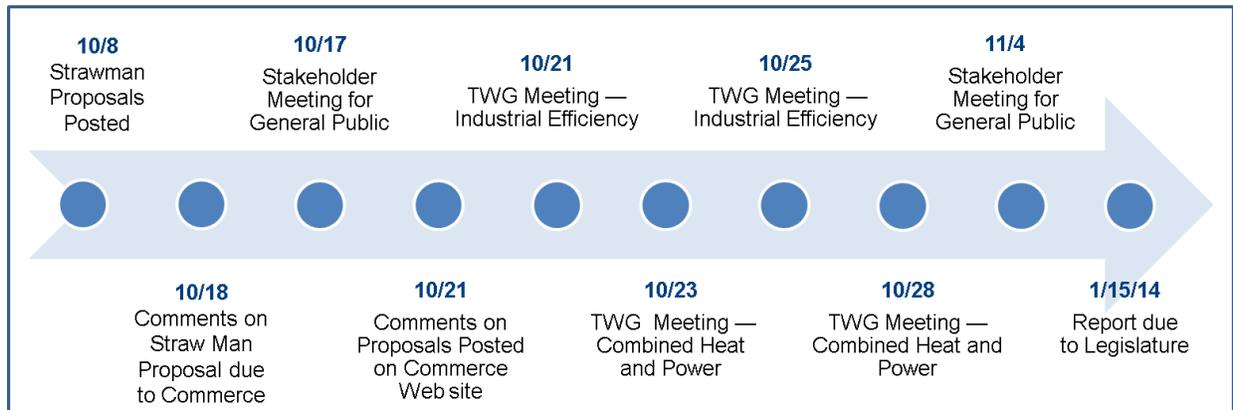
Commerce also tried to ensure that the same set of stakeholders attended all six of the stakeholder meetings. Each of the meeting topics and discussions were interconnected (especially the two technical workgroups) and each meeting built upon the content presented in the last. Having the same group of people at all the meetings promoted relationship building, trust, and more open discussions among stakeholders. Having the same participants throughout the process was also important so that the group's understanding of the complex issues could evolve over time and discussions could be as productive as possible.

⁴ For more information, see Energy Center of Wisconsin's website: <http://www.ecw.org/whowere.php>

⁵ For a list of meeting attendees, see Appendix B-E.

Meeting Structure

The diagram below provides a graphical summary of the stakeholder process that was followed:



Two of the stakeholder meetings were specifically focused on addressing general, high-level policy issues. The first general stakeholder meeting was held on October 17, 2013 and included a panel discussion that addressed each of the overarching policy goals laid out in H.F. 729 Article 12 Section 8. Additionally, the second general stakeholder meeting was held on November 4, 2013 and synthesized issues discussed during the entire stakeholder process and delved into common threads and opportunities to inform Commerce’s legislative recommendations. High priority was given to gaining insight into the policy issues presented in H.F. 729, Article 12, Section 8—especially given that industrial companies represent a large share of Minnesota’s energy mix and the need to better understand those customers that have opted out of CIP.

An additional four technical workgroups were also conducted and centered on a narrower set of issues. Two of the technical workgroup meetings focused on barriers and opportunities to IEE and the conceptual introduction of a Standard Offer Power Purchase Agreement Program (SOPPA), a financial mechanism to incent IEE improvements. The goal of these two technical workgroup meetings was to identify opportunities to overcome barriers in implementing additional IEE to help achieve state energy savings goals.

The other two technical workgroup meetings explored opportunities and barriers to CHP implementation in Minnesota, how this technology could be integrated within the CIP framework, and how it could be leveraged as part of the state’s energy savings goals. Commerce chose to focus on CHP because recent studies indicated untapped potential for CHP implementation in Minnesota⁶, favorable market dynamics (e.g. lower natural gas prices), and new legislative language introduced during the 2013 session allowing waste heat recovery to count toward meeting utility energy savings goals.

⁶ See Appendix K for more information about the CHP studies.

Straw Man Proposals to Facilitate Discussion

In order to define and gather feedback on issues that would be covered during the four technical workgroup meetings, two Straw Man proposals were developed and distributed to stakeholders on October 8, 2013 followed by a ten day public comment period. One proposal addressed the treatment of energy-saving goals and incentives for IEE; the other straw man focused on the treatment of energy-savings goals for non-conservation measures, in particular CHP. Specific topics presented in the proposals included:

- CHP issues: Energy savings credit toward the 1.5% utility energy savings goal, cost effectiveness evaluation of waste heat to power systems and programs, fuel neutrality and fuel switching, stand-by rates, and financial incentives;
- IEE and the concept introduction of SOPPA.

These two Straw Man proposals helped facilitate and focus discussion during the four technical workgroup meetings. Providing the proposals in advance of the actual meetings helped gather feedback on the proposed topics, prime the meeting discussions, and ensure that Commerce would gain useful input during the meetings.⁷

Findings, Recommendations, and Next Steps

The six stakeholder meetings produced valuable insights from which to address the policy questions that Commerce was tasked with addressing. They also provided good direction regarding key issues and questions that need further examination. This section provides a summary of the stakeholder engagement findings, legislative recommendations, and potential next steps.

General Stakeholder Meeting Findings

There were a number of key findings that resulted from the October 17th stakeholder meeting. This meeting included a panel discussion to gather input on the specific policy areas outlined in H.F. 729 Article 12 Section 8. The following table highlights the names and organizational affiliations of the panelists:

Panelist Name	Organization
Deb Sundin	Xcel Energy
Nick Mark	CenterPoint Energy
Jeff Haase	Great River Energy
Bob Jagusch	Minnesota Municipal Utility Association (MMUA)
Erin Strojjan-Ruccolo	Fresh Energy
Andrew Moratzka	Stoel Rives, LLP (on behalf of the Large Industrials Group)
Jessica Burdette	Minnesota Department of Commerce
Marty Kushler	American Council for an Energy Efficient Economy

⁷ See Appendices I-J and pages 31-33 of the Energy Center's ESG report for additional details about the Straw Man proposals.

	(ACEEE)
Steve Kihm (Moderator)	Energy Center of Wisconsin (ECW)

The sections below provide an overview of the October 17th discussion panel findings.⁸ The points outlined below are generalized statements and themes that resulted from the discussion with panelists and participants in the audience. These statements are not necessarily recommendations that require legislative action, but should be viewed as areas in need of continued evaluation and development within the existing regulatory framework and for consideration in potential adjustments to Minnesota’s policy goals in the future.

1. Strategies to Maximize Long-Term Cost-Effective Energy Savings and Minimize Energy Waste

The first panel discussion focused on how to maximize energy savings and minimize energy waste. A summary of the insights and recommendations that were discussed can be found below:

- Collectively, there is a need to find a balance between the cost of energy efficiency and the potential for achievement of energy savings through efficiency and conservation.
- Standards for different technologies like lighting and furnace standards play a large role in achieving energy savings goals. A better understanding is needed of how changing codes and standards impact energy efficiency programs and cost effective achievement of savings.
- There are opportunities for significant energy savings related to CHP and IEE. Stakeholders and regulatory agencies need to work with utilities to look at the types of opportunities related to these two areas.
- Decoupling could help align energy efficiency improvements with investor-owned utility interests.
- Smarter program design and new programs/proposals are needed throughout Minnesota’s efficiency programming.
- Appropriate price signals to customers could help maximize energy savings. Using the right price signals as part of an overall program design could be a cost-effective way to achieve greater energy savings.
- Lighting standards could lower the amount of achievement electric utilities (specifically Xcel) can claim toward achievement of their CIP goal from lighting programs by thirty percent.
- There is a need to move away from technology-based solutions to an information-sharing solution with end-users for energy efficiency improvements. Information-sharing and performance based achievements can lead to deeper efficiency retrofits that can achieve greater energy savings.
- Municipal utilities can adapt and can shift market focuses rapidly among customers. Many of municipal utilities offer internal financing to commercial and industrial customers. What works in one part of the state may not work in another part.

⁸ See pages 25-26 and 38-40 of the Energy Center’s ESG report for more detail about the general stakeholder meetings.

2. Strategies to Maximize Carbon Reductions and Economic Benefits Through Increased Efficiency in All Market Sectors

The second panel discussion centered on ways to maximize carbon reductions and economic benefits through increased efficiency. Below is a summary of the panel discussion:

- Maximizing energy efficiency will lead to carbon savings (linear relationship).
- There is an identified need to convert generation to options that produce less carbon and have less consumption.
- Technology changes can/will provide additional opportunities (e.g., heat pump technologies can act as a less carbon intense energy efficiency opportunity). Staying on the front end of new technology development and deployment is a critical component of continued progress toward maximizing carbon reductions.
- Better system controls in generation facilities can lead to higher energy output for less resource input. Developing policies around utility generation efficiency and understanding the potential for increased infrastructure efficiency could help achieve higher savings targets.
- A carbon reduction goal should be a separate target from energy efficiency even though there is a direct relationship.
- Avoided future costs (e.g. potential future cost of carbon) are an economic benefit associated with carbon reductions and energy efficiency. Further evaluation of the cost of carbon and economic benefits of reducing carbon emissions is needed.
- Minnesota needs to explore new financing mechanisms to increase implementation of energy efficiency and conservation projects.
- Further examination of trends using data across utility demand side management programs could be used as a way to measure impact of energy efficiency on Minnesota's economy.

3. Strategies to Minimize Utility Costs and Rate Impacts for Ratepayers in All Market Sectors

The third panel discussion focused on approaches to minimize utility costs and rate impacts. The following bullet points highlight issues that were discussed:

- Looking at average electric or natural gas rates can be problematic; average rates might go up but overall costs are going down. Utilities should focus on achievement of cost-effective energy savings through ensuring robust program participation, breaking down identified barriers to participation, and offering a variety of consumer choices to meet the needs of the ratepayer base.
- Rates and utility costs are especially large issues for municipal utilities and their customers based on challenges that are specific to a municipal utility service territory, overall rate structures and utility models of service.
- There is a need to explain to ratepayers that EE slows the rate of service cost increases (infrastructure improvements also cause cost increases and demand-side management defers costs for building additional generation and infrastructure); it is critical that we document and

communicate the ways in which different rate classes for different utility types benefit from energy efficiency and conservation investments.

- It is not always possible for energy efficiency to meet customer needs; customers need choices such as time-of-use rates which also make them aware of costs and help encourage behavior changes in how energy is consumed or demanded.
- There is a disconnect between what is technically achievable for cost-effective energy savings and what is realistically achievable as a result of project implementation barriers. It makes more sense to first maximize the benefits of existing programs before going after all cost-effective measures—when some may not yet be viable programs.
- Increased energy efficiency program costs have caused a movement toward large industrial customers opting out of the Conservation Improvement Program. There is a sticker shock with program costs from a commercial and industrial customer perspective.
- The ratepayer impact cost benefit test should not be the primary factor in determining the overall costs and benefits of efficiency programs on ratepayers. Financial incentives provide upfront assistance in cash flowing a project, but the long term benefits are not fully realized in this analysis. An alternative means of determining ratepayer impact may benefit a more thorough evaluation of this issue.

4. How Achievement of State Energy Conservation and Renewable Energy Goals Are Considered in the Existing Integrated Resource Planning and Certificate of Need Processes

The fourth panel topic examined how achievement of state energy conservation and renewable energy goals are considered in the existing integrated resource planning and certificate of need processes. Below is a summary of the panel discussion:

- The two processes should use the same language and the same data for looking at efficiency as a resource.
- Energy efficiency is being achieved outside of utility actions (energy codes, appliance standards, etc.), which do not currently count towards CIP but they are appearing in load projections. Incorporating EE into projects is a new art and everyone is struggling with how fully understand the impact of efficiency and its role as a supply-side resource.
- While current CIP goals focus on first year savings, sustained achievement of the energy efficiency resource standards needs to have both short-term and long-term plans.
- A better understanding is needed regarding how the resource planning and the certificate of need processes are intertwined and what their respective impacts are on the state's energy policy objectives.

5. Determining Appropriate Utility Financial Incentive Levels

The fifth and final panel discussion focused on the determination of appropriate utility financial incentive levels to meet the state's energy conservation and renewable energy goals. The section below provides an overview of the topics and stakeholder perspectives that were discussed during this panel:

- Incentives can reduce shareholder discomfort with asking customers to reduce energy consumption that could lead to a loss of revenues and that continued effort to bring the level of incentives into balance is necessary.
- Incentives help facilitate upper management attention and buy-in for increased energy efficiency investments.
- Currently there is a mechanism in place with the Department of Commerce and the Public Utilities Commission for periodic review and adjustment of financial incentives to ensure adequate, but not excessive, financial incentives are provided to utilities.
- Overall, stakeholders indicated that Minnesota has adopted a good approach in determining appropriate financial incentives. Specifically, Minnesota’s focus on promoting an evolving process and emphasizing collaboration with utilities was seen as effective. There is a need to find the right incentive balance and that is something that the Department of Commerce, in conjunction with the Public Utilities Commission, continues to evaluate in terms of both structure and level.

Technical Workgroup Key Findings

In addition to the general stakeholder meetings that addressed the above topics, four technical work group meetings were also conducted focusing on a narrower set of issues that have been identified as priorities in achieving the state’s energy policy objectives. Below is a summary of the key findings that resulted from the two technical workgroups on CHP and the two technical workgroups focused on IEE.

The findings outlined below are brief; further discussion can be found in the Energy Center of Wisconsin’s report following the Department of Commerce’s recommendations. Commerce’s recommendations capture future work that needs to be done to address issues raised during the technical work group process.

Combined Heat and Power – Summary of Key Findings⁹

- The policy objective for greater CHP implementation needs to be defined along with this technology’s eligibility in CIP. For example:
 - Is CHP an eligible technology in CIP? There are advantages and disadvantages to eligibility or ineligibility that need further exploration.
 - How are energy savings counted?
 - Who gets energy savings credit?
 - Should fuel switching be allowed?
 - Net BTU reduction as goal instead of kilowatt hours or therms? Savings based on net energy reductions within one facility or across property lines?
 - What are the impacts of greater CHP implementation on CO2 emissions?
- Gas/electric utilities will consider collaboration on specific CHP projects:
 - How can this collaboration be fostered?
- Stand-by rates have been collectively identified as a barrier to increasing CHP implementation and a priority issue for consideration.

⁹ See pages 36-38 of the Energy Center’s ESG report for more details about CHP findings

- There are some questions of CHP system ownership. Who should own a large scale CHP system?
 - Customer barriers: Businesses are focused on production, require short payback times, and higher profile capital improvement projects compete for same funds.
 - Utility opportunity: long-term investment opportunity, less expensive cost of capital, additional supply-side resource.
- Any type of dedicated CHP program or standard must:
 - work to reduce risk for customers and for utilities, and
 - it needs to have long-term achievement objectives that focus on system reliability and utility/operator relationships.
- There is a need for more detailed data on CHP potential in MN:
 - What is the viability of implementation at a customer level?
 - What is the economic potential versus the technical potential for implementation?
 - Size and location of CHP potential – where should the state’s efforts be focused?

CIP statutory language was also recently expanded to include waste heat recovery. New language was introduced and passed in H.F. 729, Article 3, Section 4, Subd. 10 states that “natural gas or electric energy displaced by waste heat recovery and used as thermal energy can now count towards utility energy savings goals, subject to Department approval.”¹⁰ The legislation specifically cites recovered thermal energy from cogeneration or CHP as eligible. Further review needs to be conducted to understand the impact of this new language in CIP and to develop policies regarding project eligibility and energy savings credits.

Industrial Energy Efficiency – Key Findings¹¹

- Risk is a big issue—are there ways to reduce the risk of efficiency investments for industrial customers?
- Standard Offer Power Purchase Agreement program (SOPPA) – this concept requires additional follow-up. For example:
 - Further analysis is needed on program examples and successes in other states.
 - How would SOPPA programs be funded for non-CIP customers?
 - More specificity as to language that would be part of the contract agreement is needed.
- There is a collective agreement that measuring data is important for industrial customer energy efficiency. Possible opportunities include:
 - Build on current utility activity that assists customers with customer end use data analysis for the purpose of efficiency project identification and implementation.
 - Expand programs to meet underserved customer needs—specifically small to mid-size industrial entities. Use facility end use data to facilitate projects.
 - Is there a role for sub-metering assistance in existing utility efficiency programs?
- There are indications from stakeholders that there is a need for utilities (or other efficiency implementers) to facilitate greater adoption of ISO 50001 in the industrial sector. Other considerations include:

¹⁰ <http://wdoc.house.leg.state.mn.us/leg/LS88/HF0729.4.pdf>

¹¹ See Energy Center’s ESG report pages 31-36 for more information about IEE findings

- Are there opportunities to leverage/piggy back energy efficiency on ISO 50001 efforts through utility programs?
- Is ISO 50001 required to encourage efficiency? It may not be necessary to wait for ISO 50001 adoption to implement efficiency.
- ISO 50001 will become important to smaller/medium size manufacturers if and when the large industrials start to incorporate ISO 50001 and push it down the supply chain.
- Incorporate any ISO 50001 activity into existing utility process efficiency programs; do not replace or create parallel programs.
- Behavior changes and whole plant efficiency are important for program implementation in this sector. How can the state and/or other stakeholders utilize existing technologies and deploy new technologies that facilitate behavior change and holistic approaches to efficiency in the industrial sector?
- Trust between an industrial customer and its utility and related efficiency experts is critical.
- Up-front costs and competing capital projects are the greatest barriers to project implementation. Is there a role for on-bill financing to help remove these barriers?
- Consider opportunities to use E3 framework (a federal effort using energy efficiency to positively impact 1) Economy 2) Energy 3)Environment) to provide energy efficiency assistance to industrial customers that are within CIP and/or those that have opted out of CIP.

Recommendations and Next Steps

Based on the findings of the ESG stakeholder process, Commerce and ECW independently established a set of recommendations and next steps to present to the Minnesota Legislature. These recommendations are meant to be holistic in nature; some will require legislative action while others will aid Commerce’s strategic planning and help guide its next steps. Due to the complex nature of these topic areas many of the recommendations will require further analysis and follow-up to fully flesh out critical paths in overall efficiency activity and achievement of the goals.

The following section presents the Department of Commerce’s recommendations based on the ESG’s findings. The recommendations are organized into several broad categories (ESG, CHP, IEE, financing, and EE/DSM Programs) and include potential next steps that can be taken to achieve these goals.

Department of Commerce’s Recommendations

Energy Savings Goal:

- Further definition of the state’s energy policy objectives should be explored. Based on feedback from stakeholders throughout the engagement process, there appears to be some question about the overarching objective of Minnesota’s energy efficiency policy goals – is the objective to reduce carbon emissions as a result of electricity and natural gas efficiency and conservation, or is the objective solely to reduce energy consumption and demand through efficiency and conservation? The answer to this question could potentially impact how Commerce evaluates net benefits of EE activity, the impact of certain technologies on emissions, the overall cost-effectiveness of energy savings, the performance metrics used to demonstrate goal achievement, and other possible impacts.

- The impacts of incorporating CHP savings as part of the CIP 1.5% energy savings goal warrants further study. CHP systems are generally large capital investments and one system could lead to a significant amount of savings for an individual utility customer and for the utility itself. As a result of the potentially large impact greater CHP implementation could have on a utility's CIP portfolio, there is a need to carefully determine how inclusion of this technology could affect other CIP DSM programs, measures, and savings achievements.
- Rate design and decoupling are two mechanisms that could potentially help overcome key barriers to utility investment in energy efficiency. Such mechanisms could help remove disincentives for utility to invest in greater DSM activity. As the current regulatory framework allows rate design to be considered as part of Minnesota's overall toolbox to achieve its energy policy goals, further evaluation is needed to determine the appropriate use of rate design to increase efficiency activities as well as how decoupling could achieve the same end.¹²

Recommendations and next steps:

Commerce recommends that the legislature further explore and define, through stakeholder engagement and/or studies, the primary objective of Minnesota's state energy efficiency policy objectives. Clarified policy objectives will allow for greater refinement of policies associated with statewide EE programs. This clarification will also allow for a clearer path forward for next steps toward continued achievement of the goals.

Commerce should continue to study how CHP could be incorporated into the statewide and CIP energy savings frameworks. Currently, Commerce has two studies underway that will help further the effort to increase CHP implementation in Minnesota – a study evaluating the state's regulatory framework and how it creates opportunities and/or barriers for greater adoption of this technology, and a study evaluating the economic and technical potential study of CHP in Minnesota. Commerce recommends that the organizations conducting these studies be asked to present the findings and next steps to the members of the House and Senate Energy Committees, the Legislative Energy Commission (LEC), and continue to engage stakeholders on this issue. The end result of these studies should provide supporting information to develop a critical path forward for inclusion of CHP in Minnesota's portfolio of efficiency and conservation activity.

Commerce, in conjunction with the Public Utilities Commission, is working to understand how decoupling and rate design can aid in the achievement of the state's energy goals. There are currently proposed and approved decoupling rate structures for three utilities in Minnesota. Commerce recommends that evaluations of these proposed and approved rate structures' impact on EE be reviewed, following approval and implementation by the PUC of the proposed decoupling rate structures.¹³

¹² See Minnesota Statute 216B.2401 ENERGY SAVINGS POLICY GOAL regarding inclusion of rate design as an energy conservation activity.

¹³ More information regarding the details of the proposed decoupling rate structures can be found in the following dockets: Xcel Energy Rate Case #13-868, Minnesota Energy Resources Corporation Rate Case #13-617, and

Combined Heat and Power:

- Based on ECW's recommendation number three, it was widely agreed that there is a need for a more specific policy objective behind CHP promotion in the state in order to select the most effective mixture of technology and application priorities. This issue is similar to the above mentioned issues regarding Minnesota's overarching policy objective for general efficiency and conservation activities, but specific to CHP.
- During the CHP technical workgroup meetings, stakeholders expressed that standby rates are a major impediment to CHP development and need to be addressed.

Recommendations and next steps:

Commerce recommends that the legislature explore and define a more specific policy objective behind CHP development in the state. Clarifying whether the objective is energy savings, emissions reductions, or both will help Commerce determine the most appropriate set of CHP technologies and applications to incorporate into its framework.

Regarding standby rates, Commerce is currently funding a study conducted by the Energy Resources Center, University of Illinois at Chicago to analyze the effects of Minnesota's existing net metering rules and standby rates on distributed generation from CHP and Waste Heat to Power (WHP) projects. The results of this study will help guide what next steps should be taken to address this issue. Commerce recommends that the organization conducting this study be invited to present the findings and next steps to the members of the House and Senate Energy Committees, and the LEC.

Commerce recommends continued engagement of stakeholders in 2014 to clarify policy grey areas regarding the incorporation of CHP into existing policy frameworks and, more specifically, its inclusion in CIP. Commerce was recently awarded a U.S. Department of Energy grant that will build on the important issues and input discussed during the ESG stakeholder meetings and narrow in on more specific policy details and recommendations. Commerce will consider engaging stakeholders in a process to develop an action plan that will provide a roadmap for reforming Minnesota's regulatory framework and transforming the market to facilitate greater implementation of CHP projects throughout the state, especially in the industrial sector. The study period begins in January of 2014 and continues through the end of 2015. Commerce recommends regular updates on the progress of this study be provided to the legislature upon request.

Industrial Energy Efficiency:

- To bring more energy efficiency measures to the forefront in Minnesota industrial facilities, actions are needed to help reduce the risk to industrial firms when choosing whether or not to invest in efficiency improvements.¹⁴ Risk reduction can come in the form of capital improvement financing opportunities, financial incentives from utility demand-side management programs, options for loan repayment through property tax

CenterPoint Energy Rate Cases #13-316 and #08-1075 (approved).

¹⁴ For more discussion on risk associated with efficiency projects, see pages 26-31 of the Energy Center of Wisconsin's report in the appendix.

assessments or utility bills, utility ownership/investment in customer efficiency projects, to name a few.

- The SOPPA concept is one that has generated some interest among stakeholders and utilities, including large industrial customers. The concept, as presented during this stakeholder process, needs to be further developed to determine viability and placement in the existing regulatory framework for efficiency activity in Minnesota. If developed to meet the needs of an underserved subset of customers while avoiding competition with or cannibalization of existing efficiency programs, more energy savings could be achieved than would otherwise have occurred.
- During the stakeholder engagement process, numerous stakeholders discussed that “you can’t manage what you can’t measure” in terms of energy consumption and determining effective efficiency improvements. There is a need to better measure and evaluate energy consumption at industrial facilities. Developing programs for ISO 50001 or industrial facility/process/equipment sub-metering could help industrial customers have access to more granular information that can help identify and justify the implementation of EE measures.

Recommendations and next steps:

To help address the issue of measuring and evaluating energy consumption and energy savings potential at the facility level and at the state level, Commerce believes that stronger reporting from industrial customers is needed in addition to the development of new programs that can aid in facilitating efficiency project implementation. Commerce concurs with the Energy Center that utilities should work 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.

Commerce agrees with ECW that further investigation is needed to flesh out the design of SOPPA, and Commerce will continue to work on this mechanism’s design and gather further stakeholder input.

Inclusion of sub-metering and ISO 50001 as a component of Minnesota’s energy plan or as part of CIP could potentially help promote data-driven decisions and identification of potential energy efficiency improvements. These are programs that Commerce will evaluate going forward.

Financing:

- There is a need to help industrial customers deal with up-front costs and competing capital projects (both are major barriers to IEE investments). Developing and implementing new programs, such as On-Bill Repayment could help mitigate the risk associated with project implementation and provide an avenue for customers to pay for efficiency projects.
- Other financing programs that are under consideration including PACE (Property Assessed Clean Energy) and an expansion of the St. Paul Port Authority’s Trillion Btu program to a statewide program. Efforts throughout the state are currently under way to develop these types of programs.

Recommendations and next steps

Commerce continues to work with stakeholders in the development of new financing programs that can help facilitate more energy efficiency. While Commerce and the stakeholders of this process recognize that financing is not the proverbial “silver bullet” to achieving vastly greater energy savings, it is another tool that helps Minnesota residents and businesses consume less energy.

Commerce recommends further exploration of new financing programs through existing efforts with stakeholders such as the Center for Energy and Environment, the Blue Green Alliance, the St. Paul Port Authority, regional economic development agencies, local units of government, utilities, and others, to determine the most effective financing tools available and the feasibility of implementing these tools.

Energy Center of Wisconsin’s Recommendations

ECW’s recommendations are as follows:

- 1) Order Commerce to establish a technical working group to develop a recommendation as to whether a Standard Offer Power Purchase Agreement program for energy efficiency is likely to produce additional energy savings, and 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.”

Conclusion

The ESG stakeholder process generated valuable feedback that addressed the priorities outlined in H.F. 729 and helped clarify productive next steps that Commerce can take to improve the state’s programs and policies going forward. While grey areas remain that require further exploration and discussion, the ESG process acted as an important step in laying the foundation from which specific policy details can continue to evolve. Commerce will continue to engage stakeholders in the development of new policies and programs that can help achieve progress toward the state energy policy objectives.

The remainder of this report was prepared by the Energy Center of Wisconsin for the Department of Commerce. Based on their role as a third-party facilitator, the Energy Center’s report provides an additional perspective on the ESG results and includes their own set of findings and recommendations.

Commerce looks forward to working with the legislature to present the concepts and ideas that came out of the stakeholder process and provide recommendations for any necessary action by legislature.

PREPARED BY
Energy Center of Wisconsin

PREPARED FOR

Minnesota Department of
Commerce, Division of
Energy Resource

**Energy Center of Wisconsin:
Minnesota Stakeholder Meetings
for Energy Savings Goals
October – November 2013**

December 20, 2013

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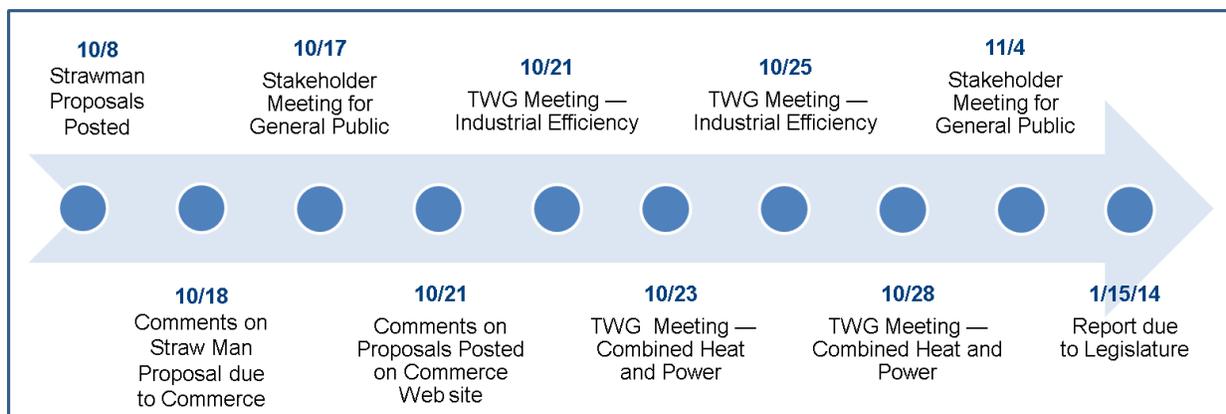
The Energy Center promotes sustainability through research, education, demonstration and hands-on work in buildings nationwide. Services include energy design consulting, continuing education for architects engineers and builders, and field research to provide insight on improving the performance of new and existing buildings. We help regulators, legislators and utilities determine the potential for energy savings in states and utility service areas. And, we design programs, recommend policy strategies and offer technology improvements to help meet statewide energy efficiency goals. The Energy Center has offices in Madison, Minneapolis and Chicago.

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 (IEE)

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 IEE. 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.”

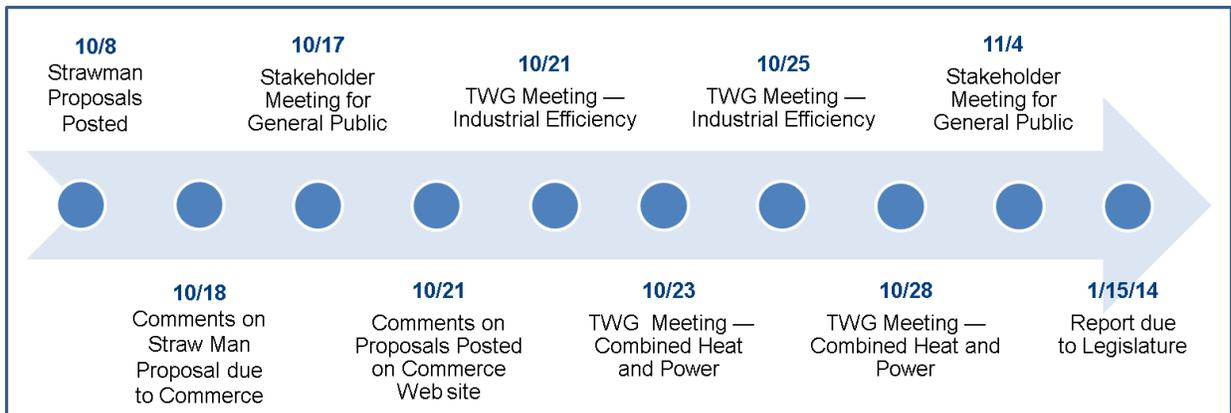
(End of Executive Summary)

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 CHP, 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 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 IEE including standard offer power purchase agreements (SOPPA); and the second the treatment of energy-savings goals for non-conservation measures, in particular CHP. The content of these proposals, as well as the posted comments received online, served as additional input to the technical working groups.¹⁵

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

¹⁵Minnesota Department of Commerce Web Site to Energy Savings Goal Study information: <http://mn.gov/commerce/energy/topics/resources/energy-legislation-initiatives/studies-and-reports/energy-savings-goals-study.jsp>

technical working group meetings focused on CHP, due to broad stakeholder interest in this technology, and opportunities in IEE, 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, Straw Man proposals, 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. The discussion panel was composed of the following stakeholders:

- Deb Sundin (Xcel Energy)
- Nick Mark (CenterPoint Energy)
- Jeff Haase (Great River Energy)
- Bob Jagusch (MMUA–Minnesota Municipal Utility Association)
- Erin Strojjan-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 IEE and CHP 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 perception.

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

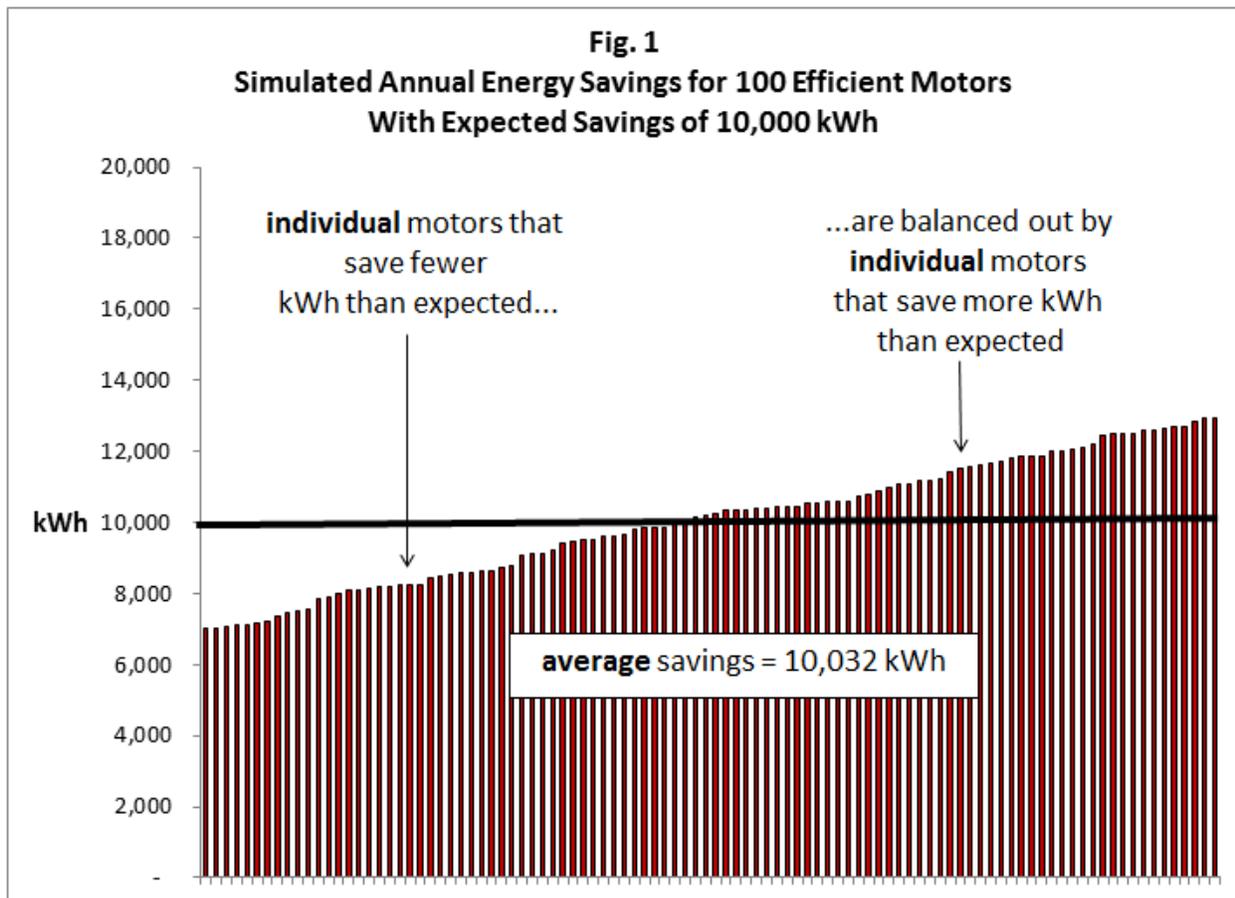
Those conducting energy efficiency and CHP potential studies are concerned with how a measure or technology will perform *on average* across all customers. That is, will widespread implementation of a particular measure or technology likely produce savings that cost less to procure than the cost of meeting 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) mid-point 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 others 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 that 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 fore-front 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.¹⁶ 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:

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

¹⁶ 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.

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 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.¹⁷

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.

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.

¹⁷ MN Statute 216B.241 Subdivision 1a. (b) and (c).

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 IEE 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 sub-meters, 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:

- Energy Efficiency and Renewable Energy Information Center, *Nissan North America: How Sub-Metering Changed the Way a Plant Does Business*, U.S. Department of Energy, June 2011.
- Vestal Tutterow, et al., *Making the Case for Energy Metering and Monitoring at Industrial Facilities*, 2011 ACEEE summer study on industrial efficiency.

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 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.¹⁸

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 deserves 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?

¹⁸ http://www.iso.org/iso/catalogue_detail?csnumber=51297

2. Can the E3 (economy, energy and environment) sustainable strategy be applied in Minnesota's industrial sector?¹⁹
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.

Combined Heat and Power

Standard industrial processes typically generate substantial amounts of waste heat. 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 IEE carry over to the CHP discussion:

- It would be helpful to define more precisely what types of projects qualify as CHP.

¹⁹ <http://www.e3.gov/sustainability/energy.html>

- 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

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

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.

Elliott, R. Neal and Nate Kaufman, *Barriers to energy efficiency investments and energy management in the U.S. industrial sector*, American Council for an Energy-Efficient Economy, 2010.

Haefke,Cliff *Combined Heat & Power: Policies and Projects*,
<http://mn.gov/commerce/energy/images/DG-Haefke-CHP.pdf>, September 29, 2011.

Graham, John *et al.*, "How do CFOs make capital budgeting and capital structure decisions?" *Journal of Applied Corporate Finance*, Spring 2002.

Kihm, Steve *et al.*, *Uncertainty, Real Options, and Industrial Energy Efficiency Decisions*, 2009 Summer Study on Energy Efficiency in Industry.

Thibodeau, Rick, *Applying Data Analytics to Overcome Efficiency Measure Implementation Barriers in an Industrial Production Facility: A Case Study*, 2013 ACEEE Summer Study on Energy Efficiency in Industry.

Appendix A: October 17, 2013, General Energy Savings Goal Study Stakeholder Meeting #1

Meeting Agenda



85 7th Place East, Suite 500, St. Paul, MN 55101-2198

Main: 651.539.1500

Fax: 651.539.1549

mn.gov/commerce/energy

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

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

Break

III. Moderated Panel Discussion

Panelist	Organization
Deb Sundin	Xcel Energy
Nick Mark	CenterPoint Energy
Jeff Haase	Great River Energy
Bob Jagusch	Minnesota Municipal Utility Association (MMUA)
Erin Strojjan-Ruccolo	Fresh Energy
Andrew Moratzka	Stoel Rives, LLP
Jessica Burdette	Minnesota Division of Energy Resources (DER)
Marty Kushler	ACEEE
Steve Kihm (Moderator)	Energy Center of Wisconsin (ECW)

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

Meeting Presentations

- ACEEE - Marty Kushler Presentation: <http://mn.gov/commerce/energy/images/ACEEE-Marty-Kushler-Pres.pdf>
- Minnesota Department of Commerce - Jessica Burdette Presentation: <http://mn.gov/commerce/energy/images/ACEEE-Marty-Kushler-Pres.pdf>
- Energy Center of Wisconsin - Steve Kihm and Charles Dufesne Presentation: http://mn.gov/commerce/energy/images/Energy-Center-Wisconsin-S_Kihm-C_Dufresne_Pres.pdf

Energy Center of Wisconsin Meeting Notes

Welcome/Introductions²⁰

Presentations

- Ideas for Energy Efficiency Improvements in Minnesota, Marty Kushler, ACEEE²¹
- Overview of Energy Efficiency in Minnesota, Jessica Burdette, Department of Commerce²²

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

²⁰ See Energy Center of Wisconsin's PowerPoint presentation for more details:

http://mn.gov/commerce/energy/images/Energy-Center-Wisconsin-S_Kihm-C_Dufresne_Pres.pdf

²¹ See Marty Kushler's PowerPoint presentation for more details: <http://mn.gov/commerce/energy/images/ACEEE-Marty-Kushler-Pres.pdf>

²² See Jessica Burdette's PowerPoint presentation for more details:

http://mn.gov/commerce/energy/images/MNCommerce_J_Burdette_Pres.pdf

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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
Municipal utilities (munis) 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 investor-owned utility (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
Massachusetts' energy savings goal is currently 2% and they are moving to 2.5%; politically acceptable in Massachusetts

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
Property Assessed Clean Energy (PACE) financing 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 Conservation Improvement Program (CIP)

Carbon reduction and energy efficiency are already aligned in MN

187 demand-side management 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

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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 wide choices 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 integrated resource planning (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
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?

Appendix B: October 21, 2013, Industrial Energy Efficiency Technical Workgroup Meeting #1

Meeting Agenda



85 7th Place East, Suite 500, St. Paul, MN 55101-2198

Main: 651.539.1500

Fax: 651.539.1549

mn.gov/commerce/energy

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)

Meeting Participants

Organizations in Attendance

Applied Energy

Blue-Green Alliance

Minnesota Center for Energy and the Environment

CenterPoint Energy

Energy Center of Wisconsin

Energy Insight, Inc.

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

Meeting Presentations

- Energy Center of Wisconsin - Steve Kihm and Charles Dufresne Presentation:
http://mn.gov/commerce/energy/images/Energy-Center-WI-S_Kihm-C_Dufresne-Pres.pdf
- Minnesota Technical Assistance Program (U of M) - Laura Babcock Presentation:
http://mn.gov/commerce/energy/images/Minnesota-Technical-Asst-Program-U-of-M-L_BabcockPres.pdf
- Minnesota Department of Commerce - Jessica Burdette Presentation:
http://mn.gov/commerce/energy/images/Commerce-J_Burdette_Pres.pdf

Energy Center of Wisconsin Meeting Notes

Q & A for L. Babcock Presentation – Comments from Laura and attendees²³

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

²³ See Laura Babcock's PowerPoint presentation for more details:

http://mn.gov/commerce/energy/images/Minnesota-Technical-Asst-Program-U-of-M-L_BabcockPres.pdf

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

Q & A for S. Kihm Presentation—Comments from Steve and attendees²⁴

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.

²⁴ See Energy Center of Wisconsin's PowerPoint presentation for more details:
http://mn.gov/commerce/energy/images/Energy-Center-WI-S_Kihm-C_Dufresne-Pres.pdf
Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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 factor in the payback calculation?

Steven Kihm—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 time of use 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:²⁵

About 5 attendees supported proceeding with Standard Offer Purchase Program (SOPPA)—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 SOPPA work; evaluate on savings?

If evaluated and big enough and real---integrate in integrated resource plan (IRP)

SOPPA is another tool in the Conservation Improvement Program (CIP) toolbox which is good; are there potential tax issues?

Using CIP \$ for SOPPA may be a real big issue

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

Who pays for SOPPA? 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

²⁵ For more details about the Straw Man proposal, see: http://mn.gov/commerce/energy/images/IEE-Proposal%20v7_Burdette_Final.pdf

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

SOPPA 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

SOPPA should not be for gas customers

Appendix C: October 23, 2013, Combined Heat and Power Technical Workgroup Meeting #1

Meeting Agenda



85 7th Place East, Suite 500, St. Paul, MN 55101-2198

Main: 651.539.1500

Fax: 651.539.1549

mn.gov/commerce/energy

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

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

- 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

Meeting Participants

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

Meeting Presentations

- University of Minnesota CHP - Jerome Malmquist Presentation:
http://mn.gov/commerce/energy/images/U-of-M_CHP-J_Malmquist-Pres.pdf
- RockTenn CHP - Gary Myhrman Presentation:
http://mn.gov/commerce/energy/images/RockTenn_CHP-G_Myhrman-Pres.pdf
- Minnesota Department of Commerce Presentation - Jessica Burdette:
http://mn.gov/commerce/energy/images/Commerce-Pres-J_Burdette.pdf
- Evergreen Energy - Ken Smith: <http://mn.gov/commerce/energy/images/Evergreen-Energy-Ken-Smith.pdf>
- Energy Center of Wisconsin - Steve Kihm and Charles Dufresne Presentation:
http://mn.gov/commerce/energy/images/Energy-Center-WI-S_Kihm_C_Dufresne_Pres.pdf

Energy Center of Wisconsin Meeting Notes

Presentation by Ken Smith Ever-Green Energy²⁶

Resiliency of the system increased by having combined heat and power (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

²⁶ See Ken Smith's PowerPoint presentation for more details: <http://mn.gov/commerce/energy/images/Evergreen-Energy-Ken-Smith.pdf>

Jerome Malmquist- U of M²⁷

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 – RockTenn²⁸

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:²⁹

Minnesota Power (MP) owns and operates sites in conjunction with 3 paper mills; much of the low hanging fruit has been 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.

Ottetail Power had numerous policy questions.

Do they see CHP potential?—Some; no major push from their customers.

²⁷ See Jerome Malmquist's PowerPoint presentation for more details: http://mn.gov/commerce/energy/images/U-of-M_CHP-J_Malmquist-Pres.pdf

²⁸ See Gary Myhrman's PowerPoint presentation for more details:
http://mn.gov/commerce/energy/images/RockTenn_CHP-G_Myhrman-Pres.pdf

²⁹ See Energy Center of Wisconsin's PowerPoint presentation for more details:
http://mn.gov/commerce/energy/images/Energy-Center-WI-S_Kihm_C_Dufresne_Pres.pdf

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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

Municipal utilities (munis) 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 Conservation Improvement Program (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 had the 2700 number which included 150 MW of small 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 investor owned utilities; 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.

Group Discussion - As a stakeholder, list the 5 issues on the critical path for 1000MW of additional CHP in MN:

Small Group 1 Critical Path Issues:

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)

Small Group 2 Critical Path Issues:

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

Small Group 3 Critical Path Issues:

Need better defined policy objective (legislatively?)

Incentives \$\$\$ (align customer and utility)

Fuel switching (full fuel cycle analysis)

Net metering and Stand by rates

Small Group 4 Critical Path Issues:

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

Small Group 5 Critical Path Issues:

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

Appendix D: October 25, 2013, Industrial Energy Efficiency Technical Workgroup Meeting #2

Meeting Agenda



85 7th Place East, Suite 500, St. Paul, MN 55101-2198

Main: 651.539.1500

Fax: 651.539.1549

mn.gov/commerce/energy

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**

Meeting Participants

Organizations in Attendance

Blue-Green Alliance

CenterPoint Energy

Central Minnesota Municipal Power Agency

Energy Center of Wisconsin

Energy Insight, Inc.

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

Meeting Presentations

- Energy Center of Wisconsin - Charles Dufresne Presentation:
http://mn.gov/commerce/energy/images/Energy-Center-WI-C_Dufresne_Pres.pdf
- Energy Center of Wisconsin - Steve Kihm Presentation:
http://mn.gov/commerce/energy/images/Energy-Center-WI-S_Kihm_Pres.pdf

Energy Center of Wisconsin Meeting Notes

Recap of 1st Meeting:

It's too dismissive to toss out the Standard Offer Power Purchase Program (SOPPA) concept

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:³⁰

Charles Dufresne: 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

³⁰ See Energy Center of Wisconsin's PowerPoint presentation for more details:
http://mn.gov/commerce/energy/images/Energy-Center-WI-C_Dufresne_Pres.pdf
Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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/Conservation Improvement Program (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 municipal utilities 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 Department of Energy'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 (commercial and industrial); 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 Ottetail 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.

Ottetail 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 customer's 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-metering³¹

Steve Kihm-ACEEE paper Nissan/3M, measurement is helpful

With stability in prices energy costs become less important; price signal is driver

Internal champion is important; best if in upper management--not a plant manager; need internal education for success

When prices are not stable, company looks more at reducing energy costs

Vice 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

³¹ See Energy Center of Wisconsin's PowerPoint presentation for more details:
http://mn.gov/commerce/energy/images/Energy-Center-WI-S_Kihm_Pres.pdf
Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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 measurement and verification (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 managers were focused on finding savings over a 2 year 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 be 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

Charles Dufresne-- Summary:

-Industrials may have other financing options available to them

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

- 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

Appendix E: October 28, 2013, Combined Heat and Power Technical Workgroup Meeting #2

Meeting Agenda



85 7th Place East, Suite 500, St. Paul, MN 55101-2198

Main: 651.539.1500

Fax: 651.539.1549

mn.gov/commerce/energy

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
- “Combined Heat and Power: Risk, Real Options, and Economic Potential,” Steve Kihm, Energy Center of Wisconsin

IV. Discussion – Energy Center of Wisconsin

- CHP inside CIP vs. out-of-CIP

V. Wrap-up & key take-aways

Meeting Participants

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

Meeting Presentations

- University of Illinois – Energy Resource Center - Cliff Haefke Presentation: http://mn.gov/commerce/energy/images/U-of-Illinois-Energy-Resource-Center-C_Haefke-Pres.pdf
- FVB Energy - Mark Spurr Presentation: http://mn.gov/commerce/energy/images/FVB-Energy-M_Spurr_Pres.pdf
- Energy Center of Wisconsin - Charles Dufresne Presentation: http://mn.gov/commerce/energy/images/Energy-Center-WI-C_Dufresne_Pres01.pdf
- Energy Center of Wisconsin - Steve Kihm Presentation: http://mn.gov/commerce/energy/images/Energy-Center-WI-S_Kihm-Pres.pdf

Energy Center of Wisconsin Meeting Notes

Charles Dufresne³²

Slides of process and takeaways from prior meeting

Cliff Haefke Comments and Q & A³³

Illinois -has goal and spending cap

-wanted to promote geothermal heat pumps, so allowed as energy efficiency resource standard technology (gas boiler to electric motor with geothermal heart pump)

-self direct is only allowed on the gas side

-Combined heat and power (CHP) topping and bottoming are eligible for EERS

-Request for proposals 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

³² See Energy Center of Wisconsin's PowerPoint presentation for more details:

http://mn.gov/commerce/energy/images/Energy-Center-WI-C_Dufresne_Pres01.pdf

³³ See Cliff Haefke's PowerPoint presentation for more details: http://mn.gov/commerce/energy/images/U-of-Illinois-Energy-Resource-Center-C_Haefke-Pres.pdf

-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

Iowa - 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 Presentation³⁴

-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

Steve Kihm--(net present value slide) consistent with Mark Spurr and Cliff Haefke's comments

Utilities like working with their industrial customers; how can they best engage with them?

³⁴ See Mark Spurr's PowerPoint presentation for more details: http://mn.gov/commerce/energy/images/FVB-Energy-M_Spurr_Pres.pdf

--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?

--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

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

Small Group Discussion of Straw Man Proposal Questions³⁵

Should CHP be included in CIP?

Pros:

There is an existing regulatory frame work for CIP (groups 1 & 3)

Utility will have the motivation to pursue potential

CHP is another tool to obtain resources (groups 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 (groups 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)(groups 1,2,&3)

CHP projects could cannibalize CIP demand side management (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 (groups 2 , 3 & 4)

³⁵ See Energy Center of Wisconsin's PowerPoint presentation for more details:
http://mn.gov/commerce/energy/images/Energy-Center-WI-C_Dufresne_Pres01.pdf
Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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

Steve Kihm--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); micro turbines & 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 Discussion Themes

1. Define policy objective. Define CHP eligibility.

- How are savings counted? CO2? Energy savings?
- Who gets credit?
- Should fuel switching be allowed?
- New or old?

2. Utilities will consider collaboration

3. CHP in CIP vs. out-of-CIP

- Where does funding come from?
- Incentives for customer? For utilities?

4. Stand-by rates as impediment to more CHP

5. Ownership: Customer? Utility?

6. Reducing risk (customers vs. portfolio)

7. Long-term: relationships/ reliability

8. Need more detailed data on CHP potential in MN

- E.g. viability at customer level
- Size and location of CHP potential

Appendix F: November 4, 2013, General Energy Savings Goal Study Stakeholder Meeting #2

Meeting Agenda



85 7th Place East, Suite 500, St. Paul, MN 55101-2198

Main: 651.539.1500

Fax: 651.539.1549

mn.gov/commerce/energy

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

Panelist	Organization
Will Nissen	Fresh Energy
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 Energies
Steve Kihm (moderator)	Energy Center of Wisconsin

Meeting Presentations

- Key CHP Take-Aways: <http://mn.gov/commerce/energy/images/KeyCHPTakeAways.pdf>
- Key IEE Take-Aways: <http://mn.gov/commerce/energy/images/KeyIEETakeAways.pdf>

- Energy Center of Wisconsin - Steve Kihm and Charles Dufesne Presentation:
<http://mn.gov/commerce/energy/images/Energy-Center-Wisconsin-Steve-Kihm-Charles-Dufesne-Pres.pdf>

Energy Center of Wisconsin Meeting Notes

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 Discussion³⁶

Steve Kihm: range of energy efficiency 9-24%

Xcel has been able to capture a lot of efficiency improvements for \$0.05/kwh

Midwest Independent System Operator (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 Conservation Improvement Program customers)? Can opt-out customers participate? Conclusion is that we need more details; see what other states have done and learn from their experiences.

³⁶ See Energy Center of Wisconsin PowerPoint presentation for more details:
<http://mn.gov/commerce/energy/images/Energy-Center-Wisconsin-Steve-Kihm-Charles-Dufesne-Pres.pdf>
Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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 Conservation Improvement Program (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 muni'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

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. Center for Energy and Environment 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 integrated resource plan 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 /gross domestic product is flat (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 Property Assessed Clean Energy (PACE) financing

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 American Recovery & Reinvestment Act (AARA) 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 (CHP) discussion

Need to define what CHP is and what is eligible

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

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 (Illinois 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

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

Municipal utilities 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 statute CHP is a demand-side management (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 cost/benefit (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 Burdette Meeting Closing

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 G: All Meeting Presentations

Presentations can be found on the Energy Savings Goal (ESG) Study website:

<http://mn.gov/commerce/energy/topics/resources/energy-legislation-initiatives/studies-and-reports/energy-savings-goals-study.jsp>

Appendix H: Summary of Stakeholder Comments



85 7th Place East, Suite 500, St. Paul, MN 55101-2198

Main: 651.539.1500

Fax: 651.539.1549

mn.gov/commerce/energy

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

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder Process

- 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 I: Straw Man Proposals

Straw man proposals can be found on the Energy Savings Goal (ESG) Study website:

<http://mn.gov/commerce/energy/topics/resources/energy-legislation-initiatives/studies-and-reports/energy-savings-goals-study.jsp>

Appendix J: Comments on Straw Man Proposals

Industrial Energy Efficiency Straw Man Proposal – Major comments

**SOPPA – Standard Offer Power Purchase Agreement*

Major themes from comment on the straw man 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 straw man 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

Energy Center of Wisconsin, Energy Savings Goal & Stakeholder 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 K: Previous and Current COMM CHP Studies

Previous Studies

Over the past two decades, numerous studies have been conducted to assess CHP technical potential and regulatory barriers in Minnesota. Examples of past CHP studies include:

- In 1996, the Center for Energy and Environment (CEE) developed a study entitled “Opportunities to Expand Cogeneration in Minnesota.”³⁷ CEE’s feasibility assessment found that the best near-term applications for CHP in Minnesota were likely to be found in pulp and paper mills, refineries, food processing, and district or campus heating systems.
- In 2000, Onsite Sycom Energy Corporation studied the potential for combined heat and power in the commercial and industrial sectors for the U.S. Department of Energy in “The Market and Technical Potential for Combined Heat & Power in the Commercial/Industrial Sector.”³⁸
- In 2001, the Minnesota Environmental Quality Board focused on the potential for cogeneration in the state with “Inventory of Cogeneration Potential in Minnesota.”³⁹ The study identified 1,600 to 2,100 MW of technical potential for new 1 MW and larger CHP systems, and 842 MW of technical potential for commercial applications less than 1 MW.
- In 2010, the Minnesota Technical Assistance Program conducted a Conservation Applied Research and Development (CARD) funded study to identify and analyze the energy conservation potential of manufacturing sectors and subsectors within investor owned utility service territories in Minnesota. The study identified CHP as an underutilized energy conservation opportunity that offers to help achieve the state’s 1.5% statewide energy savings goal.
- In 2011, using Recovery Act funds, Commerce sponsored several workshops on the state of CHP in Minnesota. At one of the workshops, Cliff Haefke, from the Midwest Clean Energy Application Center, provided the details on the number of CHP sites and capacity in Minnesota. In 2011 there were 51 sites in Minnesota, providing a total of 765MW of power via CHP plants, and there was potential for over 2,750MW of new CHP capacity for commercial, industrial and agriculture applications in the state.⁴⁰
- In 2013, ICF International conducted a national study on behalf of the American Gas Association and found a total technical potential of 2,557 MW in Minnesota under base case energy prices, though the majority (87 percent) of the potential was in applications with a payback of more than ten years. This finding suggests that incentives and/or financing options are needed to drive development of CHP in Minnesota.⁴¹

³⁷ Hewett, Martha J., Linner, Karen L., Briefer, Anton, Strom, Sheldon, Sundberg, Ronald E. 1996. *Opportunities to Expand Cogeneration in Minnesota*. Prepared for Minnesotans for an Energy Efficient Economy. <http://www.cleanenergyresourceteams.org/files/mncee_cogeneration_report.pdf>.

³⁸ http://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/chp_industrial_market_potential.pdf

³⁹ Minnesota Planning, Minnesota Environmental Quality Board. 2001. *Inventory of Cogeneration Potential in Minnesota*. <<http://www.eqb.state.mn.us/pdf/2001/CogenInventory.pdf>>.

⁴⁰ <http://mn.gov/commerce/energy/images/DG-Haefke-CHP.pdf>

⁴¹ Hedman, Bruce, Hampson, Anne, Darrow, Ken. 2013. *The Opportunity for CHP in the United States*. Prepared for American Gas Association.

While these previous studies are useful, half of them are over ten years old and the landscape for CHP in Minnesota has since shifted, including changes in the available technologies, regional electric markets, and fuel prices. Additionally, the previous potential studies looked primarily at physical and technical potential for large industrial applications, but did not address small to mid-size applications or the economic feasibility of CHP in Minnesota. Despite the age of the studies, their results demonstrate that Minnesota has significant growth potential for CHP under the right mix of policies, programs, and rate structures.

Current/Recent Studies

In addition to the Energy Savings Goal Study (ESG), which is the focus of this report, the state of Minnesota is currently undergoing a series of studies regarding statewide policies on energy efficiency, conservation, and distributed generation. The overarching objective of the studies is to ensure that related regulatory frameworks do not obstruct implementation of technologies that provide cost-effective energy savings while achieving state mandated goals and carbon emission reductions. The results of these studies will provide policy makers and other stakeholders with information on the current status of statewide energy efficiency and distributed generation programs, a regulatory review of policies related to CHP, and a technical potential study of CHP. The following paragraphs provide a brief overview of each study.

Evaluation of Net Metering and Standby Rates (Final Paper Due November 2013)

Utility standby rates and state net metering rules have been acknowledged as two major energy policies that if modified could substantially improve the market penetration of distributed generation technologies like CHP. The State Energy Office is currently funding a study conducted by the Energy Resources Center, University of Illinois at Chicago to analyze the effects of Minnesota's existing net metering rules and standby rates on distributed generation from CHP and Waste Heat to Power (WHP) projects.

Regulatory Framework Review (Research Brief and White Paper Due Early 2014)

Although Minnesota has well-established programs for Energy Efficiency Resource Standards (EERS) and Renewable Energy Standards (RES) goals, the state needs a better understanding of how CHP might fit within this current framework. As a result, a CARD grant was awarded to FVB Energy to evaluate Minnesota CHP regulatory issues and policies and produce a white paper that addresses inclusion of CHP in EERS, RES, and potentially other regulatory statutes, the implications of each approach, and options for financial incentives within each approach.

Energy Savings Goal Study (Final Legislative Report Due January 15, 2014)

H.F. 729 established the Energy Savings Goal Study, directing the Department of Commerce, Division of Energy Resources (Commerce) to conduct public meetings with stakeholders and members of the public and produce a report on findings and legislative recommendations.

Technical Potential Study (Final Report and Research Brief Due May 2014)

As described earlier, there are existing research studies that include estimates for CHP potential in Minnesota; however, many of the studies are well over ten years old. As a result, a CARD grant was awarded to FVB Energy to assess CHP potential in Minnesota based on physical and technical

characteristics. The study will determine the economic feasibility and technical/physical potential for CHP in Minnesota over a range of projected future spark spreads, within both the current regulatory framework and in the absence of regulatory barriers identified in the regulatory white paper.