



Minnesota Combined Heat and Power Action Plan Case Study



*National Association of
State Energy Officials*

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Summary

The state of Minnesota developed a CHP Action Plan, finalized late in 2015, that built on earlier steps to explore combined heat and power (CHP) and broader energy efficiency opportunities under existing energy efficiency policies, including its utility-focused Conservation Improvement Program (CIP). These early steps included several studies of CHP potential and impediments in Minnesota. These activities showed the state's serious consideration of CHP, placing it in a good position to win a U.S. Department of Energy (DOE) State Energy Program (SEP) award that allowed it to engage in an inclusive stakeholder process and perform additional studies resulting in a more thorough CHP Action Plan.

The CHP Action Plan established a set of six priority near-, intermediate-, and long-term action items, including developing utility program CHP energy savings attribution models, quantifying CHP potential in water and wastewater facilities, education and training, leveraging existing financing programs, examining options for CHP to be counted as utility infrastructure resources, and continuing discussion of standby rate structures in a Public Utility Commission (PUC) generic proceeding. The state is in the process of pursuing these priority areas.

The main lessons of the Minnesota experience are (1) to take a broad approach to CHP that goes beyond any particular program or agency jurisdiction and (2) to have a robust stakeholder process. The state built on prior broad energy efficiency and well as CHP-specific work to become well positioned to win a DOE award. This enabled it to pursue a CHP Action Plan that integrated DOE SEP-supported and non-supported (e.g., the PUC proceeding) elements to develop a short list of actionable priority activities that transcend any particular program or agency jurisdiction. This case study emphasizes the importance of Minnesota's robust stakeholder engagement process, which provided multiple and iterative stakeholder input options and opportunities.

This case study recounts the Minnesota CHP Action Plan experience and lessons that it offers. This document also offers recommendations and resources for State Energy Offices and others either seeking more detail on the Minnesota CHP Action Plan or considering engaging in similar CHP or broader energy action plan or roadmap exercises.

Introduction

Energy efficiency has been a key component of Minnesota's strategy to achieve statewide energy and economic development goals. The potential of CHP systems to help further Minnesota's energy objectives has been studied and strategic goals developed to further the use of CHP in Minnesota's energy efficiency initiatives. In 2013, the U.S. DOE, Office of Energy Efficiency and Renewable Energy provided SEP funding to the Minnesota Department of Commerce (Commerce), Division of Energy Resources (DER) for a project designed to plan, coordinate, and execute a stakeholder engagement process that results in a guide to help policy makers, utilities, industries, and trade allies make informed decisions that lead to greater CHP implementation in Minnesota.

The purpose of this case study is to provide an overview of the Minnesota CHP Action Plan that was developed through a strategic stakeholder process managed by Commerce.¹ While the particular CHP opportunities and impediments identified and explored in the Minnesota CHP Action Plan will be useful for many states, this paper emphasizes the processes and approaches pursued by Minnesota to gather and disseminate up-to-date information about CHP. Lessons and best practices discerned from the Minnesota experience of stakeholder engagement, CHP Action Plan development,

¹ Zoet, Adam, and Jessica Burdette. "Unabridged Final Combined Heat and Power Action Plan." *Minnesota Department of Commerce*, Oct. 2015. <http://mn.gov/commerce-stat/pdfs/CHP%20pdfs/final-unabridged-chp-action-plan-2015.pdf>

and communications and outreach are broadly applicable across the states. The processes and approaches used by Minnesota can inform other states wishing to develop CHP and broader energy action plans and roadmaps that are tailored to their own particular contexts, including their own economic, policy, administrative, and utility regulatory environments.

Minnesota Energy Efficiency Resource Standard

Minnesota has established significant energy efficiency policies and goals to support state objectives of reducing energy costs for homes and businesses, enhancing business profitability and competitiveness, deferring costly utility infrastructure upgrades, reducing air emissions, and conserving resources.

The centerpiece of Minnesota's energy efficiency policy portfolio is the Conservation Improvement Program (CIP). The CIP is a statewide program administered by over 180 electricity and natural gas utilities that helps Minnesota households and businesses use electricity and natural gas more efficiently. The Next Generation Energy Act of 2007 (NGEA) established energy-savings goals of 1.5 percent of average retail sales starting in 2010 for all (investor-owned, municipal, and cooperative) electric and natural gas utilities operating in Minnesota.² Minnesota Statutes §216B.241 provides certain stipulations on types and amounts of program spending and qualifying energy savings, including delineating amounts that may be spent on renewable and distributed generation projects (which can be pertinent to CHP), research and development, and low-income customer programs. Utility CIPs are overseen by the Commerce DER which reviews and approves utility CIP plans, utility CIP spending, and energy savings calculations.³

The CIP is supplemented by a number of other state energy efficiency programs, including the following finance programs, some of which may be applicable for CHP projects:⁴

- Guaranteed Energy Savings Program (state administered energy savings performance contracting (ESPC) program),
- Local Energy Efficiency Program (state administered design-bid-build program for local government entities),
- Energy Savings Partnership (lease purchase agreements),
- Trillion Btu Program (revolving loan fund),
- Commercial - Property Assessed Clean Energy (C-PACE) Program, and
- Rev It Up Program (revenue bond financing program).

Further, the state has adopted complementary renewable energy and greenhouse gas mitigation goals that can also be supported through greater CHP implementation. Minnesota adopted a goal of using renewable resources to meet 25 percent of electric utilities' total retail sales to retail customers by 2025.⁵ It also adopted objectives of reducing greenhouse gas emissions by 15 percent by 2015, 30 percent by 2030, and 80 percent by 2050 relative to year 2005 emissions.⁶

² Utilities are able to petition Commerce DER to adjust their goals downward to a minimum of 1 percent based on certain factors and 2009 legislation established an interim 0.75 percent savings goal for qualifying natural gas utilities during 2010-12.

³ <https://mn.gov/commerce/industries/energy/utilities/cip/>

⁴ <http://mn.gov/commerce-stat/pdfs/chp-financing-programs-table.pdf>

⁵ Minnesota Statutes §216B.1691 Renewable Energy Objectives
<https://www.revisor.mn.gov/statutes/?id=216B.1691#stat.216B.1691.1>

⁶ Minnesota Statutes §216H.02 Greenhouse Gas Emissions Control <https://www.revisor.mn.gov/statutes/?id=216H.02>

Pre-Action Plan Efforts and CHP Potential in Minnesota

Pursuant to a state legislative requirement, Commerce engaged in an Energy Savings Goal Study in 2013. Part of the study and two of the multiple stakeholder meetings associated with the study focused on CHP as a potential cost-effective approach to further energy savings under the 2007 NGEA and to meet the state's broader energy objectives. The study produced findings and recommendations for the legislature and stakeholders.⁷ The key CHP-related findings were:⁸

- The policy objective for greater CHP implementation and eligibility under the CIP needed to be better defined.
- Stand-by rates were identified as a barrier to increased CHP implementation.
- More detailed data was needed on CHP potential in Minnesota.
- Any CHP program or standard should reduce risk to customers and utilities and should have long-term objectives focused on system reliability and utility/operator relationships.
- CHP system ownership structures engendered questions from both utility and customer perspectives.

This work was then followed by two studies funded through the CIP-supported Conservation Applied Research and Development (CARD) program that addressed certain CHP-relevant regulatory issues and CHP potential in the state.^{9, 10, 11}

The standby rate and net metering study examined Minnesota's context, provided examples from other states, and identified best practices for standby rate design to promote transparency, flexibility, and economic efficiency. The study also modeled how certain standby rate design changes could improve the economic potential of CHP in Minnesota investor-owned electric utility territories. A set of findings served as recommendations for modifying standby rate design.

Another CARD study evaluated Minnesota's CHP regulatory issues and policies and presented an up-to-date analysis of CHP technical and economic potential in the state. In summary, the study found that:¹²

- Significant CHP potential exists in Minnesota: The study estimated a technical potential of 3,049 MW of which the economic potential (a payback period of under 10 years under current market and regulatory conditions) was 984 MW.
- Utility investment will be required to significantly grow CHP in Minnesota: Utilities have a sufficiently low weighted average cost of capital to make many CHP projects cost-effective; implementation of CHP will be facilitated if electric utilities are motivated and incentivized; and CHP has the potential to help utilities comply with regulations on GHG emissions from power plants.

⁷ Burdette, Jessica and Adam Zoet (2015) "Energy Savings Goal Study and Stakeholder Process Legislative Report," Minnesota Department of Commerce, April 2014 http://mn.gov/commerce/energy/images/ESG-Legislative-Report_Final.pdf

⁸ Final CHP Action Plan (2015) p. 5.

⁹ Miller, Graeme, Cliff Haefke, and John Cuttica (2014) "Analysis of Standby Rates and Net Metering Policy Effects on CHP Opportunities in Minnesota" by the Energy Resources Center. <http://mn.gov/commerce-stat/pdfs/CHP%20pdfs/SRNMPE-CHP-Opportunities.pdf>

¹⁰ Spurr, Mark and Anne Hampson (2014) "Assessment of the Technical and Economic Potential for CHP in Minnesota" by FVB Energy and ICF International <http://mn.gov/commerce-stat/pdfs/CHP%20pdfs/CHPTechnicalandEconomicPotential.pdf>.

¹¹ Spurr, Mark. "Minnesota Combined Heat and Power Policies and Potential." FVB Energy, Jul. 2014. <http://mn.gov/commerce-stat/pdfs/CHP%20pdfs/CHPRegulatoryIssuesandPolicyEvaluation.pdf>

¹² Drawn from Final CHP Action Plan (2015) pp. 7-9.

- The CIP program provides advantages as a policy vehicle for advancing CHP: CIP is an established program for reductions in electricity and natural gas consumption that is familiar to most stakeholders; and it provides opportunities for incentives for utility adoption of CHP.
- There are important issues and ratepayer risks that must be considered for utility CHP investment: Ratepayer risks if CHP host goes out of business; risk profiles of potential thermal hosts vary dramatically; consider CHP risks in context of existing risks to ratepayers; and potential ratepayer risks could be addressed through range of mechanisms.
- Integrated Resource Planning can support consideration of CHP benefits and opportunities: Consideration of potential benefits of CHP that currently do not have a market value; and analysis of CHP opportunities in the utility service area in comparison with other resources.

Existing federal funding and the award of the aforementioned DOE grant allowed Commerce to build on these studies and activities to develop and implement a strategic stakeholder engagement process with an end goal of developing an action plan to increase CHP deployment in Minnesota.

U.S. DOE CHP Award, Engagement Process and Action Plan Development

The work described above put Minnesota in a good position to apply for and win a competitive award under the U.S. DOE State Energy Program, enabling the state to build momentum in its CHP planning process. The grant funded engagement activities, supported by a contractor, Microgrid Institute, to administer pre- and post-engagement stakeholder surveys, facilitate four stakeholder meetings, collect and analyze public comment, provide webinars, and develop the CHP Action Plan. The purpose of the public meetings was to:¹³

- Inform stakeholders about activities to evaluate CHP and potential implementation,
- Facilitate discussion on CHP opportunities and barriers,
- Solicit ideas for solutions to overcome CHP challenges, and
- Provide information on steps needed to increase CHP in Minnesota

The following figure encapsulates the process, activities, and timeline for the DOE grant-funded work.¹⁴



¹³ Paraphrased from Final CHP Action Plan, p. 12.

¹⁴ Final CHP Action Plan, Fig. 3, p. 12.

The engagement process was extended to diverse stakeholder types including utilities, independent power producers, advocacy groups, commercial and institutional customers, industry, consulting/legal/financial professionals, government, and others.

A series of findings were derived from each of the project’s stakeholder engagement components. In addition, public comment received under a Minnesota Public Utility Commission (PUC) Generic Proceeding on Standby Rates provided additional pertinent input. Findings were developed for each of the following engagement components:

- Pre-Engagement Stakeholder Survey: Gauging Stakeholder Perspectives
- Stakeholder Meetings One and Two: Presentation of Key Background Information
- Comment Period One: Stakeholder Feedback on CHP Barriers and Opportunities
- Minnesota PUC Generic Proceeding on Standby Rates
- Stakeholder Meetings Three and Four: Stakeholder Discussions and Path Forward
- Post-Engagement Stakeholder Survey: Identifying Stakeholder Priorities for CHP Action Plan
- Comment Period Two: Stakeholder Feedback on Draft CHP Action Plan Recommendations

The findings are too numerous to list here but range across utility regulatory and business case matters, CHP economics, adapting the CIP to be more supportive of CHP, opportunities and perceived risks for utility and non-utility CHP investment, and training and education needs, among others. The main point here is that Commerce and its contractor went through an extended stakeholder engagement process with multiple, varied (surveys, meetings, and comment solicitation), and iterative elements (including feedback/review of draft recommendations) to elicit broad and deep input. Multiple reports and presentations were developed over the course of the project.

Stakeholder input was gathered, analyzed, and synthesized into a draft CHP Action Plan. Following additional comment opportunity, a final CHP Action Plan with recommendations and next steps was issued. Beyond web-based publication of the Action Plan and associated materials (e.g., interim presentations and reports, one-pagers, and survey and meeting summaries), two webinars were offered to share project results.

Based on widespread input and supporting analyses, the CHP Action Plan, which was finalized in October 2015, identified six priority areas for advancing CHP in Minnesota. Each priority area was then assigned action items/objectives with an accompanying time range (near-term [2015-16], intermediate term [2016-17], long-term [2015-onward]). The priority areas, action items, and timing adopted by the Final CHP Action Plan are as follows:¹⁵

Priority Number	Priority Area	Action Items/Objectives	Timing
I	CHP Evaluation Methodology and Criteria: Establishing an approach for fair, accurate, and comprehensive assessment and valuation of CHP projects	Establish CHP Energy Savings Attribution Model and Project Evaluation Criteria	Near-Term
II	Mapping CHP Opportunities: Conducting an empirical study and granular analysis of opportunities for topping-cycle and bottoming-cycle CHP projects.	Map CHP Opportunities at Wastewater Treatment Facilities and Public Facilities	Intermediate-Term

¹⁵ Final CHP Action Plan, “Summary of Recommendations,” pp. 29-30 and Minnesota CHP Action Plan Webinar #2: Presenting the Final Action Plan, October 27, 2015

III	Education and Training Needs and Options: Addressing knowledge gaps and defining options for CHP education and training.	Expand Education and Training on Commerce’s Website	Near-Term
IV	CHP Ownership Problems and Solutions: Addressing issues and options involving utility resource planning, ratepayer risks, market power, and behind-the-meter operations.	Leverage Existing Financing Programs Applicable to CHP	Near-Term
V	CIP CHP Supply-Side Investments: Exploring CHP as an eligible electric utility infrastructure resource under CIP.	Examine Electric Utility Infrastructure Policy	Long-Term
VI	Standby Rates: Introducing transparent, unbundled pricing for standby rates	Continue Discussion Through PUC’s Generic Proceeding	Long-Term

Activities with appropriately associated tasks and milestones were developed for each of the priority action items/objectives. For example, the CHP Evaluation Methodology and Criteria area and its objective was divided into four major activities (scoping, subcommittee meetings, model and criteria drafting, and finalization and issuance of the model and criteria by Commerce) with related tasks and milestones. The number and detail of the activities varied by priority area, depending on what was deemed as needed to fulfill objectives. In the case of the Standby Rate priority area, the action item was to recommend the PUC establish a pertinent proceeding.

Minnesota is now taking the next steps to act on the Action Plan.

Lessons from the Minnesota CHP Action Plan Experience

Minnesota’s CHP Action Plan experience provides a good example for other states considering development of analogous planning and road-mapping exercises. The state developed a robust process that built on existing policies and programs, linked multiple state objectives, integrated extended and repeated stakeholder engagement, enlisted experts, and emphasized open and transparent processes and communications.

Among pertinent features of Minnesota’s experience:

- State energy savings policies and complementary renewable energy and emissions goals, along with broader considerations of reducing energy costs, supporting business competitiveness, mitigating utility infrastructure costs, and conserving environmental resources, brought attention to CHP as a useful approach for supporting these multiple objectives.
- The CHP effort had its origins in a legislatively mandated Energy Savings Goal Study addressing broader state energy policies and objectives. This effort also including stakeholder engagement and public input.
- The Energy Savings Goal Study led to additional, more focused studies on CHP potential and selected regulatory matters funded through existing state mechanisms (in this case the CIP Conservation Applied Research and Development program).
- These activities positioned Minnesota well to compete for and win competitive federal funding for a deeper, more focused stakeholder engagement effort and study leading to the CHP Action Plan.
- Complementary activities were leveraged, including a pertinent PUC proceeding as part of the input and Action Plan development process.

- Stakeholder engagement and communication was central to the process; multiple, persistent, and varied engagement and communication opportunities were provided, including surveys, public meetings, comment opportunities, webinars, and web publications.
- While emphasizing stakeholder engagement and public input, the process also relied on research and analytical support of state staff and contracted experts.
- The Plan reported on diverse and sometimes diverging views to accommodate the range of input. Its findings and recommendations built off of existing Minnesota policies, programs, and institutions.
- Plan development was disciplined in identifying a short list of priority areas, assigning to each realistic objectives and time frames to be accomplished through a limited number of delineated tasks with identified milestones.

While some of these features are specific to Minnesota’s context and experience, they signal generalizable lessons for effective state energy-related planning and road-mapping.

Recommendations for State Energy Offices

The Minnesota approach comports well with many of the best practices the National Association of State Energy Officials (NASEO) reported in its “State Energy Planning Guidelines.”¹⁶ While the Guidelines document is oriented to comprehensive state energy plan development, the approaches and steps discussed are applicable to more specific energy planning and road-mapping exercises where complex technical, economic, regulatory, legal, and policy matters interplay and where diverse stakeholders are critical not only for obtaining information and perspective but also for “buy-in” and success of the process and achievement of next steps and objectives.

The following lists major steps recommended for state energy planning but has been modified and generalized for the context of developing a CHP Action Plan or similar energy plan or roadmap.¹⁷

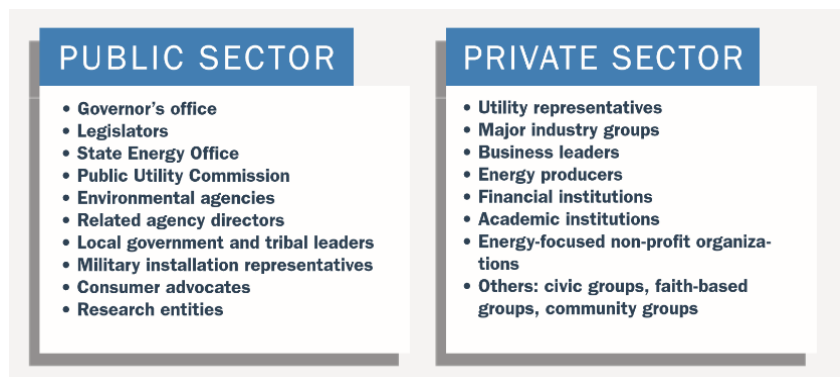
- Step 1: Establish a requirement and scope for the plan.
- Step 2: Convene the planning team.
- Step 3: Collect and analyze data on current conditions/status; assess potentials, impediments, and opportunities; and project future scenarios.
- Step 4: Develop a vision for the plan.
- Step 5: Garner public input and feedback.
- Step 6: Outline goals and recommended actions to meet the vision.
- Step 7: Draft the plan.
- Step 8: Finalize and adopt the plan.
- Step 9: Conduct outreach and marketing.
- Step 10: Monitor progress and update the plan.

While these items are presented as steps in a linear fashion, in fact, good practice, as exemplified by the Minnesota experience, provides for flexibility and iteration. For example, research and analytical work occurred at multiple points across the process. Importantly, Minnesota’s process emphasized multiple opportunities and approaches (surveys,

¹⁶ National Association of State Energy Officials (nd), “State Energy Planning Guidelines: A Guide to Develop a Comprehensive State Energy Plan Plus Supplemental Policy and Program Options” <http://www.naseo.org/data/sites/1/documents/publications/NASEO-State-Energy-Planning-Guidelines.pdf>

¹⁷ Derived and modified from NASEO, “State Planning Guidelines” Fig. 1, p. 11.

meetings, and comment periods) for outreach and communication and for soliciting stakeholder and broader public input. The following figure lists pertinent stakeholders that states should engage when developing plans and roadmaps.



Source: NASEO, "State Energy Planning Guidelines," Fig. 2, p. 20.

Further, Minnesota sought to leverage and build upon preceding and complementary work and activities. As noted previously, the CHP Action Plan had its genesis as a portion of a preceding Energy Savings Goal Study which was followed by Conservation Applied Research and Development program studies. Also a PUC proceeding was incorporated as a component in Commerce-led CHP Action Plan development. The lesson offered is that states should not view plan or roadmap development as a one-off, discrete, and separate effort but should seek to take advantage of preceding, parallel, and complementary work, including work performed by other agencies and institutions.

Conclusion

Minnesota developed a CHP Action Plan identifying the status of CHP and its potential for expansion in the state to help meet multiple state energy, environmental, and economic objectives. The plan identifies technical, economic, and regulatory opportunities and challenges as well as options and recommendations to address hurdles that impede greater CHP implementation in the state. The plan presents a set of six priority areas for attention and identifies a set of realistic objectives and tasks to address these areas.

Although many of the business, economic, regulatory, and technical challenges and opportunities identified in the plan are widely pertinent across the states, Minnesota's experience offers an exemplary case because of the process it followed to develop the CHP Action plan, a process that emphasized robust stakeholder engagement and public outreach and leveraged preceding and ongoing complementary efforts and initiatives.

Resources

Minnesota Department of Commerce

- Combine Heat & Power Action Plan Implementation
<http://mn.gov/commerce/industries/energy/distributed-energy/chp-action-plan-implementation-.jsp>
- Combined Heat & Power Stakeholder Engagement
<http://mn.gov/commerce/industries/energy/distributed-energy/combined-heat-power.jsp>
- Final CHP Action Plan
<http://mn.gov/commerce-stat/pdfs/CHP%20pdfs/final-unabridged-chp-action-plan-2015.pdf>

NASEO

- Combined Heat and Power: A Resource Guide for State Energy Officials
<https://www.naseo.org/data/sites/1/documents/publications/CHP-for-State-Energy-Officials.pdf>
- State Energy Planning Guidelines: A Guide to Develop a Comprehensive State Energy Plan Plus Supplemental Policy and Program Options
<https://www.naseo.org/data/sites/1/documents/publications/NASEO-State-Energy-Planning-Guidelines.pdf>

U.S. Department of Energy

- CHP Deployment
<http://www.energy.gov/eere/amo/chp-deployment>
- CHP Technical Assistance Partnerships
<http://energy.gov/eere/amo/chp-technical-assistance-partnerships-chp-taps>

U.S. Environmental Protection Agency

- CHP Partnership
<http://www.epa.gov/chp>

