



Conservation Applied Research and Development (CARD), Clean Energy Resource Teams (CERTs), and Sustainable Buildings 2030 (SB2030)

Pursuant to Minnesota Statute § 216B.241 Subdivision 1e

2017 Report

Executive Summary

Funding for the Conservation Applied Research and Development program (CARD), Clean Energy Resource Teams (CERTs), and Sustainable Buildings 2030 (SB2030) has been established through Minnesota Statute § 216B.241 in the Conservation Improvement Program (CIP). These funds originate from utility assessments that provide resources to the Department of Commerce and other legislatively named entities to support achievement of Minnesota's statewide energy policy goals. Each of these programs is uniquely positioned to help continuously achieve energy efficiency and renewable energy project implementation throughout the state. The following report details the activities of each of these programs.

Conservation Applied Research and Development (CARD)

Major accomplishments of the CARD Grant Program for calendar year 2016 include:

- Nine successful RFPs (Request for Proposals) resulting in over 480 project ideas and over 340 full proposals;
- Completion of 59 CARD grant projects, results of which have been disseminated to utilities and other stakeholders through project reports, newsletter articles, webinars, and at regional and national conferences (e.g. Energy Design Conference, American Council for Energy Efficient Economy Summer Study);
- Commitments to 33 ongoing CARD grant projects which, when completed, will further enhance utility CIP offerings and energy savings achieved toward the 1.5% goal;
- Two CARD grant projects currently in final evaluation from the FY2017 Request for Proposals.

Clean Energy Resource Teams (CERTs)

Major accomplishments of the CERTs Partnership in 2016 include:

- Hosted 48 events with 7,359 attendees, connecting with an additional 7,117 community members through 294 meetings, presentations and other outreach activities across the state;
- Saved or offset 210.5 billion BTUs over the past year as a result of CERTs efforts;
- Funded thirty-nine community-based clean energy seed grants projects. The savings from these projects will be reported in 2017.

Sustainable Buildings 2030 (SB2030)

Major accomplishments of the SB2030 initiative include:

- 126 buildings designed to the SB 2030 Energy Standard are predicted to save approximately 634 million kBtus/year;
- 94% of all buildings projects enrolled in the SB 2030 program have documented designs that met or exceeded the SB 2030 Energy Standard to-date;
- Buildings designed to the SB 2030 Energy Standard are predicted to save approximately \$9.8 million per year assuming an average cost of \$15.48 per mmBtu;

- Buildings designed to the SB 2030 Energy Standard anticipate a reduction in carbon emissions of 71,000 tons of CO2 annually.

Statutory Reference

Below is the statutory reference establishing funding sources for each of the programs as well as the legislative reporting requirements. The following report details the activities and performance of each of these programs:

Pursuant to Minnesota Statutes, section 216B.241, Subdivision 1e.

(a) The commissioner may, by order, approve and make grants for applied research and development projects of general applicability that identify new technologies or strategies to maximize energy savings, improve the effectiveness of energy conservation programs, or document the carbon dioxide reductions from energy conservation programs. When approving projects, the commissioner shall consider proposals and comments from utilities and other interested parties. The commissioner may assess up to \$3,600,000 annually for the purposes of this subdivision. The assessments must be deposited in the state treasury and credited to the energy and conservation account created under subdivision 2a. An assessment made under this subdivision is not subject to the cap on assessments provided by section 216B.62, or any other law.

(b) The commissioner, as part of the assessment authorized under paragraph (a), shall annually assess and grant up to \$500,000 for the purpose of subdivision 9.

(c) The commissioner, as part of the assessment authorized under paragraph (a), each state fiscal year shall assess \$500,000 for a grant to the partnership created by section 216C.385, subdivision 2. The grant must be used to exercise the powers and perform the duties specified in section 216C.385, subdivision 3.

(d) By February 15 annually, the commissioner shall report to the chairs and ranking minority members of the committees of the legislature with primary jurisdiction over energy policy and energy finance on the assessments made under this subdivision for the previous calendar year and the use of the assessment. The report must clearly describe the activities supported by the assessment and the parties that engaged in those activities.

Conservation Applied Research and Development

Prepared By Minnesota Department of Commerce, Division of Energy Resources

Overview of Projects

Through December 2016, the Conservation Applied Research and Development (CARD) grant program, administered by the Department of Commerce, Division of Energy Resources, funded projects totaling over \$23 million. These projects received an additional \$6.8 million in matching funds. The vast majority of CARD grants are funded through a competitive Request for Proposal (RFP) process. Based on a review of current Conservation Improvement Program (CIP) needs with input from utilities and other stakeholders, Commerce issues an RFP, and reviews and evaluates each submitted proposal based on specific criteria including:

- CIP priorities;
- Proposal’s content, scope of work and work plan;
- Responder’s qualifications, skills and experience;
- Anticipated impacts of the project outcomes; and
- Project budget (which often includes matching funds from the responder).

Table 1 and

RFP Cycle	Grantee	Project Description	Award	Est Match
2014	Cadmus Group, Inc., The	Economic Impact Analysis of the Conservation Improvement Program	\$120,012	\$3,820
2013	FVB Energy Inc.	Two Combined Heat and Power (CHP) research projects – Policy & Potential	\$199,976	\$0
2013	Michaels Energy	Mainstreaming Motel Optimization	\$335,024	\$14,850
2013	Outsourced Innovation	Improving Energy Efficiency and Crop Production in Controlled Environment	\$126,970	\$14,368
2013	Seventhwave, Inc.	Energy savings from institutional tuning in Minnesota	\$200,000	\$17,580
2013	Seventhwave, Inc.	Commissioning of demand control ventilation systems in cold climates	\$265,000	\$7,500
2013	Seventhwave, Inc.	Improving installation & maintenance practices for Minnesota residential furnaces, air conditioners & heat pumps	\$437,950	\$52,175
2013	Seventhwave, Inc.	Research-based design of a residential high user program	\$297,956	\$28,000
2013	Sustainable Engineering Group	The Energy Conservation Potential of Displacement Ventilation Technology in Minnesota Climate Conditions	\$90,170	\$0
2012	Center for Energy & Environment	Heat Pump Water Heaters: Savings Potential in Minnesota	\$25,941	\$17,294

RFP Cycle	Grantee	Project Description	Award	Est Match
2012	Center for Energy & Environment	Window Retrofit Technologies for Increased Energy Efficiency without Replacement	\$47,224	\$28,458
2012	Center for Energy & Environment	Reducing the Energy Cost of Effective Ventilation in Multi-Unit Buildings	\$148,348	\$83,232
2012	Michaels Energy	Cost-Effective Recommissioning of Restaurants	\$276,410	\$12,600
2012	Minnesota Project, The	Dairy Cooperative Partnerships for Improved Efficiency Program Adoption	\$210,232	\$5,557
2012	University of Illinois at Chicago, Energy Resources Center	Increasing CHP Opportunities to Aid Minnesota's Energy Savings Goal: Analyzing Net Metering Rules and Standby Rates	\$23,040	\$7,680
2012	U of MM - MnTAP	Researching Energy Conservation Potential at Minnesota Data Centers	\$46,781	\$0
2012	Weidt Group, The	Integrating Benchmarking and the Green Button Initiative into Utility CIP to Capture Greater Energy Savings	\$50,000	\$10,000
2012	U of MN - MnTAP	Motivating Manufacturing Energy Efficiency: Lean Training with Directed Implementation Assistance	\$177,488	\$150,000
2011	Bright Power	Multi-family Energy Benchmarking with EnergyScoreCards	\$398,164	\$330,776
2011	Center for Energy and Environment	Advanced Rooftop HVAC Unit Controls Pilot	\$408,108	\$417,865
2011	Energy Center of Wisconsin	Automatic Daylighting Control Commissioning in the Midwest	\$206,172	\$10,500
2011	Energy Center of Wisconsin	Field Test of Drainwater Heat Recovery in Commercial Buildings	\$138,294	\$5,000
2011	Energy Management Solutions, Inc.	Street Lighting	\$49,000	\$0
2011	Energy Management Solutions, Inc.	Variable Refrigerant Technology in Cold Weather Climates	\$65,925	\$0
2011	Franklin Energy Services, LLC	Single Recommendation Strategy Study	\$11,380	\$0
2011	Franklin Energy Services, LLC	Technical Review of the Minnesota Deemed Savings Database	\$149,580	\$0
2011	Franklin Energy Services, LLC	The Energy Efficiency Potential in Minnesota's Multi-family Sector	\$599,056	\$0
2011	Michaels Energy	Convenience Store Energy Efficiency	\$100,000	\$76,000

RFP Cycle	Grantee	Project Description	Award	Est Match
2011	Michaels Energy	Energy Savings from Demand Response and Load Management	\$100,000	\$0
2011	Minnesota Project, The	LEDs: Energy Savings and Replicability in MN Livestock Facilities	\$185,130	\$75,000
2011	CLASS 5, Inc.	Community (City-Wide) Energy Efficiency Pilot	\$162,226	\$146,000
2011	Minnesota Municipal Utilities Association	Smart Grid Technologies Installation & Assessment	\$283,825	\$283,825
2009-10	Center for Energy & Environment	Capturing Energy Savings from Large Building Envelope Leakage Reduction	\$395,240	\$316,760
2009-10	Class5 (Energy Efficiency Programs, Inc.)	Energy Efficiency in the Workplace (health care facilities).	\$395,444	\$169,584
2009-10	Energy Platforms, LLC	Energy Savings Platform (ESP) Creation of a standards-based Info Technology platform enabling MN utilities to design, implement, administer, & report on CIPs.	\$1,533,890	\$511,250
2009-10	Franklin Energy Services, LLC	Utility Infrastructure Improvements for Energy Efficiency: Best Practices Study	\$27,864	\$0
2009-10	Franklin Energy Services, LLC	Emerging Energy Efficiency Financing Mechanisms - provide analysis of emerging energy eff financing models and assess the applicability and attractiveness to MN	\$46,284	\$0
2009-10	Franklin Energy Services, LLC	ASHP Efficiency Gains from Low Ambient Temperature Operation using Supplemental Electric Heating	\$55,792	\$0
2009-10	Franklin Energy Services, LLC	Energy Management Teams - Coordinator Resource Pilot Study	\$340,464	\$76,284
2009-10	Neighborhood Recycling Corporation, The DBA Eureka Recycling	Restaurant Energy Conservation O&M project. Develop an energy efficiency program model for small businesses based on low cost operations and maintenance conservation measures.	\$227,124	\$32,160
2009-10	Northwind Sailing, Inc.	Angry Trout Cafe Kitchen Exhaust HR	\$22,450	\$8,650

RFP Cycle	Grantee	Project Description	Award	Est Match
2009-10	U of MN (Bioproducts & Biosystems Engineering)	Residential GSHP Study. Monitor and analyze the performance of installed residential GSHP in MN.	\$840,939	\$89,738
2008	Center for Energy & Environment	Actual Savings and Performance of Natural Gas Instantaneous Water Heaters	\$160,495	\$281,905
2008	Energy Center of Wisconsin	Plugging into Savings - Taming Home Electricity Use	\$285,700	\$60,000
2008	Eugene A. Scales & Associates, Inc.	Quantification of Indirect Program Impacts (ReDirect Program)	\$91,170	\$9,000
2008	Franklin Energy Services LLC	Research to Inform Design of Residential Energy Use Behavior Change Pilot	\$47,305	\$0
2008	Great River Energy	Home Energy Reports Pilot	\$165,000	\$424,300
2008	Navigant Consulting	Demand Side Management (DSM) Potential Study	\$354,250	\$0
2008	Owatonna Public Utilities	Home Energy Reports Pilot Program	\$123,260	\$531,272
2008	U of MN	Quantification of Changes in Residential/Multifamily Building Codes and Standards for Assessing Energy Conservation and Efficiency Impacts	\$90,606	\$15,912
2008	U of MN - Sponsored Projects Admin. Grants & Contracts	Researching Energy Conservation Potential for Minnesota Business and Industry (PI: William Toscano Jr)	\$203,177	\$0
Totals:		51 completed projects	\$11,341,836	\$4,324,895

Table 2 below list completed and ongoing CARD projects funded through this RFP process. Through December 2016 projects funded through RFPs total more than \$19 million or about 83.4% of total CARD funds awarded to date (not including funds awarded through legislative directives).

Table 1. Completed CARD Projects Funded through RFP Process

RFP Cycle	Grantee	Project Description	Award	Est Match ¹
2014	Cadmus Group, Inc., The	Economic Impact Analysis of the Conservation Improvement Program	\$120,012	\$3,820
2013	FVB Energy Inc.	Two Combined Heat and Power (CHP) research projects – Policy & Potential	\$199,976	\$0
2013	Michaels Energy	Mainstreaming Motel Optimization	\$335,024	\$14,850
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2012	University of Illinois at Chicago, Energy Resources Center	Increasing CHP Opportunities to Aid Minnesota's Energy Savings Goal: Analyzing Net Metering Rules and Standby Rates	\$23,040	\$7,680
2012	U of MM - MnTAP	Researching Energy Conservation Potential at Minnesota Data Centers	\$46,781	\$0

¹ Matches shown in the tables are based on match commitments in contracts; collected matches often exceed what was committed in the contract.

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2012	Weidt Group, The	Integrating Benchmarking and the Green Button Initiative into Utility CIP to Capture Greater Energy Savings	\$50,000	\$10,000
2012	U of MN - MnTAP	Motivating Manufacturing Energy Efficiency: Lean Training with Directed Implementation Assistance	\$177,488	\$150,000
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2009-10	Northwind Sailing, Inc.	Angry Trout Cafe Kitchen Exhaust HR	\$22,450	\$8,650
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2008	Energy Center of Wisconsin	Plugging into Savings - Taming Home Electricity Use	\$285,700	\$60,000
2008	Eugene A. Scales & Associates, Inc.	Quantification of Indirect Program Impacts (ReDirect Program)	\$91,170	\$9,000
2008	Franklin Energy Services LLC	Research to Inform Design of Residential Energy Use Behavior Change Pilot	\$47,305	\$0
2008	Great River Energy	Home Energy Reports Pilot	\$165,000	\$424,300

RFP Cycle	Grantee	Project Description	Award	Est Match ¹
2008	Navigant Consulting	Demand Side Management (DSM) Potential Study	\$354,250	\$0
2008	Owatonna Public Utilities	Home Energy Reports Pilot Program	\$123,260	\$531,272
2008	U of MN	Quantification of Changes in Residential/Multifamily Building Codes and Standards for Assessing Energy Conservation and Efficiency Impacts	\$90,606	\$15,912
2008	U of MN - Sponsored Projects Admin. Grants & Contracts	Researching Energy Conservation Potential for Minnesota Business and Industry (PI: William Toscano Jr)	\$203,177	\$0
Totals:		51 completed projects	\$11,341,836	\$4,324,895

Table 2. Ongoing CARD Projects Funded through RFP Process

RFP Cycle	Grantee	Project Description	Award	Est Match ^{Error!} <small>Bookmark not defined.</small>
2015	Franklin Energy Services, LLC	T12 Socket Penetration Study	\$81,585	\$5,305
2015	Seventhwave, Inc.	Enhancing New Construction Programs with Performance-based Procurement and Design	\$314,904	\$73,390
2015	Seventhwave, Inc.	Characterizing Opportunities for Small Commercial Energy Program	\$437,589	\$24,860
2015	Illume Advising, LLC	Statewide Commercial Behavior Segmentation and Potential Study	\$448,022	\$14,578
2015	Gas Technology Institute	Field Study of An Intelligent, Networked, Retrofittable Water Heat Controlle	\$281,852	\$20,000
2015	University of Minnesota	Industrial Compressed Air Demand Reduction through Air Tool Replacemen	\$68,889	\$3,150
2015	GDS Associates, Inc.	Direct Cooling Retrofit for Server Rack	\$108,987	\$131,10

RFP Cycle	Grantee	Project Description	Award	Est Match <small>Error!</small> <small>Bookmark not defined.</small>
2015	GDS Associates, Inc.	Dairy Farm Precise Ventilation Control Electric Savings	\$36,867	\$56,153
2015	GDS Associates, Inc.	Whole-Farm Energy Management Valuation	\$203,415	\$59,844
2014	APPRISE, Inc.	Statewide Policy Analysis and Evaluation of Low-Income Programs in Minnesota Utility CIP Portfolios	\$245,096	\$23,760
2014	Center for Energy & Environment	Small Embedded Data Center Program Pilots	\$272,829	\$71,490
2014	Center for Energy & Environment	Commercial Energy Code Compliance Pilot	\$354,525	\$45,200
2014	Center for Energy & Environment	Field Assessment of Cold-Climate Air Source Heat Pumps	\$201,445	\$103,155
2014	Center for Energy & Environment	Evaluation of New Domestic Hot Water System Controls in Hospitality and Commercial Buildings	\$200,599	\$42,235
2014	Center for Energy & Environment	Pilot Study of a Furnace Retrofit Device for High Efficiency Residential Heating and Humidification	\$401,201	\$93,373
2014	Gas Technology Institute	Advanced Commercial Clothes Dryer Technologies Field Test	\$193,756	\$14,500
2014	Illume Advising, Inc.	Behavioral Programs Literature Review & Benchmarking Study, and Workshops	\$122,620	\$16,125
2014	Michaels Energy, Inc.	Continuous Commissioning for Small Outpatient Medical Clinics	\$220,296	\$33,700
2014	Neighborhood Energy Connection	Quality Installation and Retro-commissioning of High Efficiency Condensing Boilers	\$220,250	\$48,600
2014	Seventhwave, Inc.	Commercial Roof-top Unit Characterization and Performance	\$419,714	\$35,104
2014	Seventhwave, Inc.	Assessments of Plug-Load Control Devices in Commercial Buildings	\$299,000	\$35,750
2014	Seventhwave, Inc.	Minnesota Manufactured Homes Characterization and Performance	\$346,208	\$27,200
2013	Center for Energy & Environment	Demonstrating the Effectiveness of an Aerosol Sealant to Reduce Multi-Unit Dwelling Envelope Air Leakage	\$280,996	\$74,549

RFP Cycle	Grantee	Project Description	Award	Est Match ^{Error!} Bookmark not defined.
2013	Center for Energy & Environment	Optimized Operation of Indoor Public Pool Facilities	\$240,000	\$60,000
2013	Center for Energy & Environment	Improving Effectiveness of Commercial Energy Recovery Ventilation Systems	\$379,478	\$100,101
2013	Franklin Energy Services	Field Test of Large Battery Charging Technologies	\$66,012	\$9,785
2013	Gas Technology Institute	Field Study of High Efficiency Heating & Cooling Mixed-air Rooftop Units (RTUs)	\$236,382	\$66,275
2013	U of MN	Maximizing Rural Electric Cooperative Farm Energy Efficiency Programming	\$74,993	\$5,195
2013	Weidt Group	Net Energy Optimizer for Commercial New Construction	\$50,000	\$193,050
2012	Center for Energy & Environment	Saving Energy by Reducing Duct Leakage in Large Commercial & Institutional Buildings	\$380,155	\$189,045
2012	Center for Energy & Environment	Condensing Boiler Optimization	\$209,232	\$105,488
2012	GTI - Gas Technology Institute	Advanced Heat Recovery System Field Deployment	\$743,603	\$19,000
Totals: 32 ongoing projects			\$8,140,500	\$1,801,064

In addition to completed and ongoing projects, at the end 2016 there are two new CARD projects that are expected to result from evaluations now in progress with anticipated expenditures of \$2.5 million if awarded.

Occasionally Commerce will fund a CARD project outside of the competitive RFP process, in cases where a project requires a sole source provider, or when Commerce has the opportunity to leverage CARD funds for a project already underway or being funded from multiple sources. To date, nine such projects have been funded by this means (eight completed and one ongoing), representing about \$3.9 million or 16.6% of total CARD funds

awarded to date (not including funds awarded through legislative mandates). These projects have also leveraged nearly \$700,000 in additional matching funds.

Ongoing Efforts

Each year, Commerce solicits input from utilities and other stakeholders to inform CIP needs and help develop appropriate topics for the RFP.

Two RFPs have been issued for FY2016-17 and evaluations are underway on the proposals. Additional RFPs are currently under consideration for FY2017

Starting in FY2012 and continuing into FY2017, Commerce has been reviewing current policies and practice for CARD grant contract negotiation and project management in an effort to improve the quality and consistency of CARD project reporting and monitoring and to produce deliverables that are more accessible to utilities and other stakeholders. In addition, a more efficient RFP process was instituted in FY2013 which added a notice of intent to propose procedure that allows Commerce to review project ideas and select only certain projects to proceed to full proposal. Feedback from both potential grantees and utilities indicated this was an improvement by reducing wasted effort and allowing respondents to focus on proposals more likely to be successful while also improving the efficiency of the review process.

Also completed in FY2014 was improved accessibility of grant proposals and evaluation files. Starting with proposals from FY2014 and going forward, these files are available electronically on Commerce's website through our standard documents search tool (<https://mn.gov/commerce/industries/energy/utilities/cip/card-grant-search/>). Previously, viewing the files required an appointment since they were only available in hard copy format.

During the past year, Commerce continued to improve public understanding of the CARD Grant Program's purpose and the role it can play in helping to achieve the 1.5% savings goal, encouraging better input from stakeholders regarding research needs. In addition, Commerce improved CARD grant RFP publicity and as a result obtained higher quality proposals in response.

Commerce continues to improve the connection between utilities and grantees for ongoing projects by communicating about new projects more directly, writing mid-project articles, and through other means. Dissemination of CARD grant results have become more systematic, including writing regular articles for the CIP Newsletter and other publications, publicizing final CARD reports more broadly, holding webinars on CARD results and making the webinars available for download later.

In 2015 an updated CARD website was rolled out which includes a search tool for CARD projects allowing users to quickly obtain a list of past and ongoing CARD grants, search or sort by market sectors or targeted technology, obtain more details on specific projects of interest and link to available final reports. The website underwent additional updates and improvements in 2016 and more are planned for 2017. In addition, CARD results continue to be presented at local, regional and national conferences with very positive feedback.

Clean Energy Resource Teams (CERTs)

Prepared by Clean Energy Resources Teams Partnership

Overview

The Clean Energy Resource Teams—or CERTs—is a statewide partnership² with a shared mission to connect individuals and their communities to the resources they need to identify and implement community-based clean energy projects. CERTs empowers communities and their members to adopt energy conservation, energy efficiency, and renewable energy technologies and practices for their homes, businesses, and local institutions.

From seed grants to campaigns and educational forums, CERTs' work is place and people-based. Overall, CERTs:

- Works to advance projects identified as priorities by regional teams;
- Offers tools for energy efficiency implementation through campaigns, decision tools, and direct assistance;
- Connects individuals and organizations to clean energy financing tools and incentives including utility rebates, Property Assessed Clean Energy (PACE), and Rural Energy for America Program (REAP);
- Provides limited financial assistance to projects through Seed Grants;
- Supports local government clean energy work through the Minnesota GreenStep Cities program, Guaranteed Energy Savings Program, and beyond; and
- Works directly with utilities to support their energy efficiency and renewable energy efforts.

Program Outcomes

To integrate CERTs work around the State, CERTs aligns its programming and documents its success within three major categories: learn, connect and act. Highlights from the past year in each of these categories include:

² The CERTs partnership joins the Minnesota State Energy Office, part of the Minnesota Department of Commerce, Division of Energy Resources; the University of Minnesota Extension Regional Sustainable Development Partnerships; the Southwest Regional Development Commission; and the Great Plains Institute.

- **Learn** describes the variety of work CERTs does to help Minnesotans understand their clean energy options, identify project models, and see the range of projects underway around the State. The most popular learning resources from CERTs this year have been about solar energy (mncerts.org/solar) and efficient lighting (mncerts.org/lighting). Over the past year, CERTs has published 169 new stories to its Minnesota Energy Stories blog (mncerts.org/blog) reaching over 12,000 subscribers via bi-weekly emails. These stories have included case studies on farms and rural small businesses (mncerts.org/greatrenewables), financing projects with PACE (mncerts.org/pace), Twin Cities businesses working with Energy Coaches (mncerts.org/energy-coaching), a series featuring women leading on clean energy (mncerts.org/women-in-energy), tips for consumers (mncerts.org/blog-series/get-answers), and stories about local governments taking action (mncerts.org/blog-series/govt-action).
- **Connect** frames the work CERTs does via events, conferences, presentations, workshops and tours. In 2016, CERTs hosted 48 events with 7,359 attendees. CERTs connected with an additional 7,117 community members through 294 meetings, presentations and other outreach activities across the state. Following events, summaries are posted to the CERTs Blog. Two 2016 highlights were the West Central CERT event in Sauk Centre that featured tours of farms and businesses using LED lighting (mncerts.org/wc-led) and a Central CERT clean energy tour of Camp Ripley (which earned media coverage) including a visit to their new, nearly completed, 10 MW solar PV array (mncerts.org/ripley).
- **Act** describes the range of work CERTs does to spur Minnesotans to take clean energy action. This includes *Utility Support* in which CERTs partners with Minnesota utilities to help them meet their energy savings goals, *CERTified Campaigns* that provide Minnesotans with clear and actionable ways to implement quantifiable energy efficiency efforts in their communities, and *Project Assistance* to spur on-the-ground projects with motivated community partners. CERTs conducted business-to-business outreach to raise awareness about utility rebates and uncover recent or upcoming projects in 11 communities for 4 utilities. CERTs also piloted a new CERTified Campaign effort called Saving Watts and Drops, which helps Minnesota community and youth groups conduct fundraisers with plug-and-play energy and water saving products in collaboration with their electric or natural gas utilities. The pilot worked with three youth teams to sell LED light bulbs as a fundraiser while delivering energy savings for the local electric cooperative. CERTs plans to expand on this pilot in 2017.

Overall, CERTs programming saved or offset 210.5 billion BTUs over the past year as indicated in Table 3 below.

Table 3 CERTs Programming Summary

Type	Program Description	BTUs Saved/Offset
Utility Support	<p>People’s Energy Cooperative and South Central Electric Cooperative – LED Lighting Distribution: While visiting 146 businesses to raise awareness about rebates, CERTs hand-delivered 34 LED bulbs and 155 linear LED lamps to businesses with compatible light fixtures. Businesses are saving 20,500 kWh and \$1,800 annually.</p>	69,786,421
CERTified Campaign	<p>Light Up Your Station and Save – LED Lighting in Gas Station Fuel Canopies: CERTs helped independent gas station owners learn about quality LED lighting for their canopies and connect with their utility rebates. Thirty-one (31) stations upgrading to LED canopy lighting and 19 non-canopy lighting projects resulted in saving 1,354,433 kWh and \$148,987 annually.</p>	4,621,325,396
CERTified Campaign	<p>Milk the Savings – Energy Efficient Dairy Production: CERTs collaborated with People’s Energy Cooperative to engage dairy farmers. Hosted a Dairy Lunch ‘n Learn event (with additional partners including Dairy Herd Improvement Association, Minnesota Milk Producers Association, and University of Minnesota Extension) that drew 45 attendees from 19 farms. As a result of the event and additional follow-up 6 farms upgraded circulation fans, lighting, energy management systems, variable frequency drives, and livestock waterers for a total of 654,415 kWh annual savings, \$21,246 in one-time utility rebates, and \$62,170 annual savings.</p>	2,232,863,980
CERTified and Collaborated Campaigns	<p>Ripple Effects: CERTs helped a turkey farmer receive REAP funding for LED lighting well after Gobbling Up Savings ended. One of the five hotels referred to the Hotels CARD grant completed a large LED lighting project. Interest from a warehouse and a condominium resulted in two LED lighting projects during Light Up Your Station and Save.</p>	988,105,373
Collaborated Campaign	<p>"Recycle Your Holidays" – Holiday Lights Recycling Campaign 2015-2016: CERTs partnered with the Recycling Association of Minnesota that collected 110,116 lbs of electrical cordage from holiday lights for recycling from across the state. Approximately half of the lights recycled are replaced with LED holiday lights, which CERTs heavily promoted, resulting in 1,007,300 kWh and \$120,900 saved annually.</p>	3,437,038,800
Collaborated Campaign	<p>Regional Sustainable Development Partnerships (RSDP) – Rural Grocery Energy Efficiency: In conjunction with RSDP’s efforts to improve produce handling and economic stability of</p>	1,573,091,625

Type	Program Description	BTUs Saved/Offset
	rural grocers, CERTs provided technical assistance with energy efficiency projects, including navigating funding options such as REAP and utility rebates. Four (4) stores took action, resulting in \$35,800 annual savings.	
Collaborated Campaign	MN GreenCorps – Energy Conservation Members’ Projects: CERTs trained ten (10) 2015-2016 members on behavior change science and offered project mentorship. Two (2) members’ projects resulted in installing 71 vending misers, resulting in saving 103,660 kWh and \$9,300 annually.	353,687,920
Collaborated Campaign	Retired Engineers Technical Assistance Program (RETAP): CERTs connected 25 cities, organizations, and businesses to RETAP to receive free resource management assessments. Those taking action have savings that amount to 66,600 kWh, 1,250 therms, and \$8,820 annually.	352,019,637
Project Assistance	2014-2015 Metro CERT Accelerator: Metro CERT provided technical assistance to support 12 projects including public building energy benchmarking, neighborhood community solar garden workshops, and a local government community solar garden subscriber collaborative. The subscriber collaborative engaged 30 jurisdictions, 22 of which signed contracts with one or more solar developers to offset energy usage for their publicly-owned buildings, plants, and streetlights through solar garden subscriptions.	124,866,282,168
Project Assistance	Property Assessed Clean Energy (PACE): CERTs engages communities and businesses in PACE programs administered by the Rural Minnesota Energy Board and the St. Paul Port Authority. Twenty-one (21) businesses utilized PACE financing for energy efficiency (e.g., lighting and HVAC) and solar projects.	54,249,959,048
Project Assistance	Guaranteed Energy Savings Program (GESp): CERTs serves as the local unit of government outreach arm for the State’s initiative to advance the utilization of performance contracting through GESp. City of Bemidji completed deep energy retrofits on their buildings and streetlights, a \$2 million project .	14,098,000,000
Project Assistance	Small Business Energy Coaching: From July 2014 to December 2015, Metro CERT partnered with the Lake Street Council and Energy Smart to conduct free energy site visits and provide one-on-one assistance for 19 businesses’ energy efficiency projects, resulting in savings of 1,092,473 kWh and \$113,079 annually.	3,727,517,876
Total CERTs Program Savings		210.5 billion BTUs

Ongoing Efforts

- **E3A Solar PV Curriculum:** CERTs published a new series of solar factsheets, called [Solar Electricity for the Home, Farm, and Business](#), to help consumers determine if a solar electric system would work for them. This resource was adapted from the series, E3A: Exploring Energy Efficiency & Alternatives, specifically the section “Solar Electricity for the Home, Farm, and Ranch” originally developed by University of Wyoming Cooperative Extension Service, Montana State University Extension, and Western Sustainable Agriculture Research & Education (SARE).
- **2016 Seed Grants:** CERTs provided funding to 39 community-based clean energy seed grants projects in 2016. These projects cover a wide array of clean energy technologies and applications ranging from lighting upgrades at the Willmar Community Theatre (also known as “The Barn Theatre”) and Lake Crystal Municipal Utilities’ voluntary “Beat the Peak” community engaged peak energy conservation program. The majority of projects will wrap up at the end of December 2016. CERTs will report on project outcomes in 2017. Read about all of the funded projects here: <http://www.cleanenergyresourceteams.org/blog/certs-announces-seed-grant-funding-clean-energy-projects-across-minnesota>
- **Utility Conservation Improvement Program Support:** This past year, CERTs partnered with Federated Rural Electric (in the cities of Sherburn, Heron Lake, Welcome, Okabena and Granada), People’s Energy Cooperative (Chatfield and Stewartville), South Central Electric Cooperative (Storden, Jeffers and Trimont), and Proctor Public Utilities to conduct door-to-door outreach to main street businesses and commercial districts about utility efficiency programming. In Federated’s communities, rebate information was shared. With South Central and People’s, LED lighting was distributed in addition to sharing rebate information. In Proctor, businesses were scheduled to receive energy assessments from Energy Insight. CERTs also tailored press releases to all major media outlets in Minnesota Energy Resources’ service area with extra outreach to newly acquired, former-Alliant cities to help promote their water conservation kits. Savings will be reported on these utility efforts in 2017.
- **GreenStep Cities:** CERTs continues to support city-level actions on clean energy best practices through the GreenStep Cities program. This support includes providing direct assistance to cities as they pursue energy-related best practices and connecting cities with interns, where possible, for assistance in adopting the program and taking action on the program best practices.

- **Community Solar Gardens (CSG):** CERTs has continued to develop community solar garden educational resources. New this past year is “[Tips for Subscribing to a Community Solar Gardens](#)” fact sheet to help consumers better understand key subscription agreement provisions. In addition, CERTs hosted two utility-to-utility community solar garden sessions (one in Little Falls and one in Mankato) as an opportunity for cooperative and municipal utility staff and board / commission members to share lessons learned about how they have approached community solar garden development. Over 70 utility representatives attended these sessions.
- **Right Light Guide:** Since 2012, this guide has offered information about understanding brightness, color, costs, and other features when selecting new energy efficient LEDs and CFLs. The guide was updated in 2016 to reflect changing prices and technology advancements. Over 65 Minnesota utilities have customized the Right Light Guide to include their own branding and over 90,000 copies have been distributed by utilities to their customers and by CERTs partners at events like the Minnesota State Fair. An “app” of the guide is currently under development.

Allocation of Legislative Funding Resources and Leveraged Resources

In total, CERTs is comprised of 16 staff who account for 11.5 full time employees, 8 of whom are paid via our legislative allocation. Staff is based across CERTs’ four partner organizations and across all seven regions in the state. Given the nature of CERTs work, staff is critical to carrying out CERTs clean energy work across the State and represents the largest share of CERTs spending followed by seed grants. These funds catalyze local projects, connect communities to clean energy efforts, and attract other dollars to further clean energy around the State.

Beyond the legislatively appropriated dollars, CERTs continues to garner additional support for its work. Funding and related programmatic efforts include U.S. Department of Energy SunShot II funding to advance solar financing, McKnight Foundation funding to spur community energy projects, and U.S. Department of Agriculture Rural Energy Development Assistance funding to assist farms and rural small businesses with renewable energy assessments.

These leveraged dollars reflect the value of the CARD investment in CERTs and how those dollars have spurred and accelerated additional programming through complementary investments.

Sustainable Buildings 2030 (SB2030)

Prepared by Center for Sustainable Buildings Research (CSBR)

Introduction

The Minnesota Department of Commerce (Commerce) submits this report pursuant to Minnesota Statutes, Section 216B.241, subd. 9 (f), which provides that a report to the legislature shall be submitted annually, beginning January 15, 2014, on the cost-effectiveness and progress of implementing the SB 2030 performance standards and shall make recommendations on the need to continue the program. In 2013, the reporting requirements were changed to require an annual report to the legislature every January. The conclusion of the report in 2010 was that SB 2030 would be cost-effective when meeting the targets for projects starting between 2010 and 2015, which is the first phase of the SB 2030 program. In the 2013 report, this conclusion was verified with data from the first 40 projects in the program designed to the SB 2030 Energy Standard. As data has come in from projects in the last few years, the following savings have been verified:

- 2013 Report: 40 projects save \$3.25 million per year (250 million kBtus/year) in energy for operations.
- 2014 Report: 66 projects save \$5.24 million per year (327 million kBtus/year) in energy for operations.
- 2015 Report: 78 projects save \$7.04 million per year (490 million kBtus/year) in energy for operations.
- 2016 Report: 93 projects save \$8.3 million per year (534 million kBtus/year) in energy for operations
- 2017 Report: 126 projects save \$9.8 million per year (634 million kBtus/year) in energy for operations

History of Minnesota Sustainable Building 2030

In 2008, Governor Pawlenty signed into law Chapter 278, which created the *Minnesota Sustainable Building 2030 (SB 2030)* standards. The law designated the Center for Sustainable Research (CSBR) at the University of Minnesota as the lead to develop a Minnesota program reflecting the goals of the national *Architecture 2030* program. *Architecture 2030* establishes the goal of achieving net-zero energy use in buildings by 2030 and outlines specific incremental performance targets in order to meet this goal. Every five years, total carbon output due to energy use in buildings is to be reduced by an additional 10% compared to the average energy use of existing buildings in 2003. Reflecting this national program, the *Minnesota Sustainable Building 2030 (SB 2030)* program requires all state-bonded projects that began schematic design after August 1, 2009 to meet an energy reduction of 60% compared to the average building. Starting in 2015, projects have begun to meet the 70% reduction standard. By 2030, the Energy Standard will require a 100% reduction (net zero carbon).

The SB 2030 legislation requires CSBR, in cooperation with Commerce, to “establish cost-effective energy-efficiency performance standards for new and substantially reconstructed commercial, industrial, and institutional buildings that can significantly reduce carbon

dioxide emissions by lowering energy use in new and substantially reconstructed buildings.” All program elements are to be based on scientific or real world experience in building energy conservation, and all buildings are to be scientifically benchmarked and real reduction in energy consumption measured.

The energy standards for all types of buildings are to be comprehensive, reliable and equitable and provide procedures for the ongoing monitoring of energy use in buildings that have adopted the performance standards. Minnesota Statute § 216B.241 also requires that utilities develop and implement programs that help building owners achieve the energy savings goals through design assistance, incentives and verification.

Finally, continuing education and training programs for Minnesota designers, engineers and building operators are fundamental to the initiation of the *SB 2030* standards and the law made education and training a primary goal.

Expected Cost-Effectiveness of the Sustainable Building 2030 Program

The significant improvements in building performance called for by the *SB 2030* energy performance standards must be achieved in a cost-effective manner. Projects and activities are generally considered cost-effective if the project or activity results in a net benefit to the consumer or society. In the case of utility-administered conservation programs, benefits are based on the energy savings over the assumed lifetime of a particular measure.

In 2009³, the Center for Energy and the Environment (CEE) performed a preliminary cost-effectiveness analysis on a set of 115 buildings in the region. This initial review shows that the energy performance level called for by the *SB 2030* standards can be achieved cost-effectively for the overwhelming majority of building types and situations.

The required level of energy efficiency will be adjusted for the small minority of projects that cannot meet the *SB 2030* standards cost-effectively. This process ensures that the *SB 2030* standards do not mandate energy efficiency upgrades that are not cost-effective for state-bonded projects. Such adjustments are granted after a project team demonstrates that appropriate energy saving design options were investigated in an effort to achieve the *SB 2030* performance level, that these design options are not cost-effective for the particular project, and that all cost-effective measures were implemented in the project. To ensure this cost-effectiveness for projects where energy modeling may place a significant burden, smaller projects and those with limited mechanical upgrades are afforded a path to compliance through comprehensive prescriptive efficiency requirements.

State-Bonded Project Cost Effectiveness Actual Results

³ This document is available online through the Minnesota Legislative Reference Library at <http://www.leg.state.mn.us/docs/2009/mandated/090892.pdf>

From 2009 through October 2016, 126 building projects have been involved in the SB 2030 process and have reported Energy Standard and Design Energy Consumption values. Of these 126 projects, 86 of the 91 state-required building projects and 32 of 35 volunteer building projects have reported as on track to meet the required SB 2030 Energy Standard. To date, 94% of all buildings project enrolled in the SB 2030 program have reported meeting or exceeded the SB 2030 Energy Standard in design. On average, these projects have reported anticipated energy consumption 27% less than their 2030 Energy Standard.

The majority of these projects have not yet been operating long enough to determine actual annual energy use or have not reported complete consumption to the program; however, the conclusions drawn are supported by a set of 12 non-SB 2030 case studies designed between 1997 and 2006, which show an average actual energy use within 5% of the 2030 Energy Standard and an average construction cost within 2% of a typical building. Energy consumption data from these building's operation is anticipated to be included in subsequent reports.

When compared to buildings that just met the minimum energy code requirements, the buildings designed to the SB 2030 Energy Standard are predicted to save approximately 634 million kBtus/year, a reduction in Carbon emissions of 71,000 tons of CO₂e, and a savings of \$9.8 million per year assuming an average cost of \$15.48 per mmBtu.⁴ As new projects are added each year and projects meet the 2015-2020 energy standard, ongoing annual savings to the State and other building owners will increase. The total cost of the program using CIP funds is approximately \$5.35 million through December 2016.

SB 2030 Program Progress

Initial efforts have focused on the development of the tool that will be used to establish customized Energy Standards and development of the administration of the program. Ongoing efforts include the creation of a case study database, the development of a sustainable building operations system, the integration of SB 2030 with the utilities' CIP programs, hosting education classes for designers and building operators, and assisting design teams in the integration of the SB 2030 Energy Standards into projects.

- **Case Studies Database** - As part of the program, predicted building performance has been documented for 75 SB 2030 projects. Reported metrics include predicted energy use, carbon emissions and construction costs, along with several water, waste, and indoor environmental quality metrics. These case studies, which are in various stages of the design process or operation, are displayed online on the B3 Case Studies Database, where owners and project teams can market their

⁴ The average cost per kBtu from the B3 Benchmarking database is \$0.01548 for the most recent available estimate (assuming a mix of electricity, gas, and other fuels).

successes, and design teams can search for strategies that may help them reach the SB 2030 Standards. As operations data is collected for these projects the case studies database will update, allowing the evaluation of their actual performance.

- **Sustainable Building Operations** - It is essential that SB 2030-designed buildings are operated at the energy standards that they were designed to achieve. To do this, building operators need methods to ensure that each significant energy consuming device is using only as much energy as needed to perform its intended function. A web-based application has been developed to enable building operators to perform this function, by completing occasional routine checks on large energy consuming equipment in the building. This application performs four critical functions: enables users (typically commissioning agents or design engineers) to create a customized set of tasks for a particular building, notifies building operators when tasks are due to be completed, supplies detailed instructions on how to perform the task, and tracks completion and status of tasks for a building. In addition, the application notifies facilities managers when tasks uncover malfunctioning systems.

Seven tasks are currently supported in the online tool, and a task for heat recovery is under development. Ten buildings are currently enrolled. Center for Energy and Environment is working to develop a simplified energy allocation method to enable setup agents to identify what systems to monitor, through the deployment of two pilot buildings. CSBR is working with Minnesota Green Corps members to deploy simplified versions of the Operations procedures in buildings at their sites. There are currently ten buildings enrolled in the online tool.

- **SB 2030 Utility Programs** - As the SB 2030 energy performance standard has been implemented, the project team has worked cooperatively with utilities to develop and/or modify CIP programs to encourage new buildings to meet the SB 2030 standards. Priority items are listed below.
 - A) Comprehensive design assistance services.
 - B) Bonus incentives (per unit of savings) for achieving SB 2030 standards.
 - C) Comprehensive whole-building performance program for small buildings.

No utilities have yet provided financial incentives related specifically to achieving the SB2030 Energy Standard. New construction programs do provide incentives based on energy savings for performance over and above the energy code, as well as no-cost services for projects committing to a high level of savings, including reporting of the SB2030 Energy Standard, and B3 Guidelines tracking tool entry of data and submittals.

- **Sustainable Building 2030 Education** – Educational programs for the designers continue to be delivered. In 2016 for the fourth year, a series of 3 topic related educational seminars were conducted to introduce best practices when creating low energy buildings. Over 360 building designers participated in each of these 12-hour educational events. In addition, an introductory four-hour education session was created and conducted for design firm leaders to expose them to the variety of tools and strategies available to create low energy building design. A two-hour presentation was conducted for the second time in May 2016 for facility managers and agency contacts of the Minnesota State Colleges and Universities. Over 80 participants attended this session in November 2016. A series of presentations at facilities conferences for the University of Minnesota and Minnesota State Colleges and Universities have also been conducted. A two-hour presentation was given at the November 2016 American Institute of Architects Minnesota State Convention. Also in November 2016, a short 15-minute presentation was made at the First Annual Clean Energy Community Awards Conference. Other presentations in 2016 include: NASEO National Meeting, ACEEE Summer Study, the Blue Flame Association energy efficiency conference, and the National Association of College and University Business Officers' (NACUBO) Annual Meeting. Throughout the year several “lunch and learns” were also presented to design firms.

Conclusion

All work on the SB2030 program completed to-date shows it is cost effective to meet the 2010 target. Ninety-three percent of all buildings involved in the program were able to meet the SB 2030 Energy Standard with little additional cost to the overall project. Total project costs are \$4.35 million through December 2015.

The 126 buildings designed to the SB 2030 Energy Standard are predicted to save approximately 634 million kBtus/year, 71,000 tons of CO₂e and a savings of \$9.8 million per year. When new projects are added each year, the annual savings to the State and other building owners will continue to grow.

The Sustainable Building 2030 Standards program should continue. More educational opportunities are needed for architects and engineers to facilitate more SB 2030 designs. The building operator training program has been developed and is being applied to pilot projects. Two of the three largest electric investor owned utilities have developed comprehensive design assistance services, but not all utilities have fully integrated SB 2030 programs into their CIP as required by statute. Finally, work must continue on the next stages of the SB 2030 program to support the reduction requirement for new projects, which have increased from 60% to 70% reduction as of January 2015. This will require continued research from the project team lead by the Center for Sustainable Building

Research at the University of Minnesota.