



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

2016 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 section 216B.241 in the Conservation Improvement Program (CIP). These funds originate from utility assessments that provide resources to the Minnesota Department of Commerce (“Commerce” or “Department”) 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 2015 include:

- Seven successful RFPs resulting in over 480 project ideas and 334 full proposals;
- Completion of 53 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;
- Commitments to 34 ongoing CARD grant projects which, when completed, will further enhance utility CIP offerings and energy savings achieved toward the state’s 1.5% energy efficiency goal.
- Nine pending CARD grant projects in negotiation from the FY2015 Request for Proposals.

Clean Energy Resource Teams (CERTs)

Major accomplishments of the CERTs Partnership in 2015 include:

- Hosted 24 events with 1,582 attendees, connecting with an additional 11,057 community members through 271 meetings, presentations and other outreach activities across the state;
- Saved or offset 17 billion BTUs over the past year as a result of CERTs efforts (equivalent to heating 213 Minnesota homes for an entire winter);
- Wrapped up funding for the thirty-eight 2014 community-based clean energy seed grants projects. Released the RFP for 2016 projects and selected thirty-nine projects for funding.

Sustainable Buildings 2030 (SB2030)

Major accomplishments of the SB2030 initiative include:

- 93 buildings designed to the SB 2030 Energy Standard are predicted to save approximately 534 million kBtus/year;
- 90% 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 \$8.3 million per year assuming an average cost of \$15.54 per kBtu;
- Buildings designed to the SB 2030 Energy Standard anticipate a reduction in carbon emissions of 58,000 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, Subd. 1e. Applied research and development grants.

(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 the Minnesota Department of Commerce, Division of Energy Resources

Overview of Projects

Through December 2015, the Conservation Applied Research and Development (CARD) grant program, administered by the Department of Commerce, Division of Energy Resources, has funded projects totaling over \$23 million, projects which 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;
- Project budget (which often includes matching funds from the responder).

Table 1 and Table 2 below list completed and ongoing CARD projects funded through this RFP process, including details on each project. Through December 2015 projects funded with RFPs total more than \$19 million or about 84.55 of total CARD funds awarded to date.

Table 1. COMPLETED CARD Projects Funded through RFP Process

RFP Cycle	Grantee	Project Description	Award	Est Match ¹
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	Home Energy Reports Pilot	\$165,000	\$424,300

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

RFP Cycle	Grantee	Project Description	Award	Est Match ¹
	Energy			
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
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

RFP Cycle	Grantee	Project Description	Award	Est Match ¹
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
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

RFP Cycle	Grantee	Project Description	Award	Est Match ¹
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
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
2012	Center for Energy & Environment	Heat Pump Water Heaters: Savings Potential in Minnesota	\$25,941	\$17,294
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
2013	FVB Energy Inc.	Two Combined Heat and Power (CHP)	\$199,976	\$0

RFP Cycle	Grantee	Project Description	Award	Est Match ¹
		research projects - Policy & Potential		
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
2014	Cadmus Group, Inc., The	Economic Impact Analysis of the Conservation Improvement Program	\$120,012	\$3,820
	Totals:	44 completed projects	\$9,051,282	\$3,575,157

Table 2. ONGOING CARD Projects Funded through RFP Process

RFP Cycle	Grantee	Project Description	Award	Est Match ^{Error!} Bookmark not defined.
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
2011	CLASS 5, Inc.	CLASS 5 Community (City-Wide)	\$162,226	\$146,000
2011	Minnesota Municipal Utilities Association	Smart Grid Technologies Installation & Assessment	\$283,825	\$283,825
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	Advanced Heat Recovery System	\$743,603	\$19,000

RFP Cycle	Grantee	Project Description	Award	Est Match <small>Error! Bookmark not defined.</small>
	Technology Institute	Field Deployment		
2012	U of MN - MnTAP	Motivating Manufacturing Energy Efficiency: E2 Assessments and GreenLean(SM) Training with Directed Implementation Assistance	\$177,488	\$150,000
2013	Center for Energy & Environment	Demonstrating the Effectiveness of an Aerosol Sealant to Reduce Multi-Unit Dwelling Envelope Air Leakage	\$280,996	\$74,549
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	Seventhwave, Inc.	Research-based design of a residential high user program	\$297,956	\$28,000
2013	Seventhwave, Inc.	Improving installation & maintenance practices for Minnesota residential furnaces, air conditioners & heat pumps	\$437,950	\$52,175
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	Sustainable Engineering Group	The Energy Conservation Potential of Displacement Ventilation Technology in Minnesota Climate Conditions	\$90,170	\$0
2013	U of MN	Maximizing Rural Electric Cooperative Farm Energy Efficiency Programming	\$74,993	\$5,195
2013	Weidt Group	Net Energy Optimizer for Commercial	\$50,000	\$193,050

RFP Cycle	Grantee	Project Description	Award	Est Match <small>Error! Bookmark not defined.</small>
		New Construction		
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

RFP Cycle	Grantee	Project Description	Award	Est Match <small>Error! Bookmark not defined.</small>
2014	Seventhwave, Inc.	Minnesota Manufactured Homes Characterization and Performance	\$346,208	\$27,200
Totals:		30 ongoing projects	\$8,448,944	\$2,162,418

In addition to completed and ongoing projects, at the end 2015 there were nine CARD projects in negotiation amounting to roughly \$2 million more in CARD funding that has been allocated and nearly \$400,000 of additional matching dollars.

Occasionally, Commerce will fund a CARD project outside of the competitive RFP process, either for cases in which a project requires a sole source provider, or in cases which DER 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 \$3.6 million or 15.5% of total CARD funds awarded to date. These projects have leveraged nearly \$700,000 in additional matching funds.

Ongoing Efforts

The FY2016 RFP is currently under development with anticipated expenditures of \$2.5 million. The RFP will be posted in the first quarter of 2016. As with every funding round, Commerce solicits input from utilities and other stakeholders in order to inform CIP needs and to help develop appropriate funding topics for this RFP.

Starting in FY2012 and continuing into FY2016, 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 is that this has improved the process by reducing wasted effort and allowing respondents to focus on proposals more likely to be successful. It has also improved the efficiency of the review process. Another improvement that was 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 web site through our standard documents search tool. Previously viewing the files required an appointment since they were only available in hard copy format.

During the last year, Commerce continued to work to improve the 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 improved 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. In addition, CARD results were presented at two regional conferences in 2015: a panel of three projects at the Duluth Energy Design Conference, and a poster session of 13 projects at the Clean Energy Resource Teams conference. Feedback on these conference sessions was very positive.

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;

² The CERTs partnership joins the Minnesota State Energy Office, within the Minnesota Department of Commerce, Division of Energy Resources; the University of Minnesota Extension's Minnesota's Regional Sustainable Development Partnerships (UM RSDP); the Southwest Regional Development Commission (SRDC); the Great Plains Institute; and the Minnesota Project.

- Offers tools for energy efficiency implementation through campaigns, decision tools, and direct assistance, geothermal 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.

Throughout this work, CERTs partners with local utilities, local units of government, local organizations and community members to ensure that efforts help advance and utilize utility energy efficiency and renewable energy programs while drawing on local assets, expertise, and interests. This statewide, but community-grounded approach, builds networks across utility territories and across interest groups to increase energy savings and improve the effectiveness of existing energy conservation programs.

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:

- **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. Over the past year, CERTs has published 151 new stories to its Minnesota Energy Stories blog. These stories have included case studies on [CERT seed grant projects](#) and highlights of successful projects such as farm energy efficiency projects like the [Hoffman Farms' dairy efficiency upgrades](#). In addition, CERTs continued to provide information on Community Solar Gardens, including [educational resources](#), [decision tools](#), and [interviews with participating subscribers](#). Over the past year, CERTs has published 145 new stories to its [Minnesota Energy Stories blog](#). These stories have included case studies on CERT seed grant projects, highlights of successful projects such as a series of [interviews with EV owners](#), educational tools such as the recent [suite of consumer resources for Community Solar Garden projects](#), and summaries of tours and events such as the Northwest CERT Meeting in [Red Lake Falls that focused on biomass heating opportunities](#).
- **Connect** frames the work CERTs does via events, conferences, presentations, workshops and tours. Since January 1, 2015, CERTs has hosted 24 events with 1,582 attendees. Since December 2014, CERTs connected with an additional 11,057 community members through 271 meetings, presentations and other outreach activities across the state. Following events, summaries are posted to the

CERTs Blog. A 2015 highlight was the [Southeast CERT event in Austin](#) that included a ribbon cutting (and [earned media coverage](#)) for the Austin Municipal Utilities' EV Charging Station.

- **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. This past year CERTs continued two CERTified Campaigns “Light Up your Station and Save” to assist independently-owned Convenience Stores with LED lighting retrofits in their canopies (<http://www.cleanenergyresourceteams.org/ledcanopy>) and “Gobble Up Savings” to assist turkey farmers with securing funding for LED lighting retrofits in their barns (<http://www.cleanenergyresourceteams.org/turkeys>).

Overall, CERTs programming saved or offset 17 billion BTUs over the past year as indicated in Table 3 below. This is equivalent to heating 213 Minnesota homes for an entire winter.

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Table 3 CERTs Programming Summary

Type	Program Description	BTUs Saved/Offset
Utility Support	Kasson Public Utilities – Community Energy Services Audit Program: CERTs assisted with outreach to residents in Kasson by door knocking to invite people to a workshop. As a result, six additional residents completed home energy audits and received coupons for an LED bulb. Residents are saving 3,930 kWh, 210 therms, and \$600 annually.	34,404,042
Utility Support	Minnesota Energy Resources – Water Conservation Kits: In August 2015, CERTs tailored press releases to all major media outlets in the service area to help promote MER’s free water and energy savings kit program. In the six weeks following the media release, 190 kits were distributed, which reduced natural gas use by 16,363 therms and \$12,272 annually.	1,636,300,000
Utility Support	Buffalo Utilities – Commercial LED Lamp Kit: From September to December 2015, CERTs collaborated with the utility and its vendor to assist with kit development, mailings, and fulfillment, as well as staffed door-to-door delivery of lamps. A total of 300 kits were distributed, containing two LED linear T-8 replacement lamps each. Businesses are saving 38,415 kWh and \$3,707 annually.	131,071,857
Utility Support	Southern Minnesota Municipal Power Agency (SMMPA) – Business Rebate Community Blitzes: From May 2014 through September 2015, CERTs assisted 15 SMMPA utilities with outreach on business rebates. From November 2014 to September 2015, CERTs visited nearly 700 businesses, 90 of which requested follow-up from an Energy Services Representative. Seventeen businesses moved forward on a project and received rebates in 2014. Twenty-four additional business took action in 2015, saving 725,911 kWh and \$70,000 annually.	2,476,808,332
Seed Grants	2014 CERTs Seed Grants: CERTs funded 38 projects across the state for a total of \$140,000 dollars. These projects leveraged \$927,766 from other sources and involved or reached nearly 110,000 Minnesotans. Twenty-one projects specifically included implementation (rather than research or education) clean energy, including eight projects producing	2,643,691,523

Type	Program Description	BTUs Saved/Offset
	renewable energy that displaces existing energy use and 15 energy efficiency projects.	
CERTified Campaign	Gobbling Up Savings - LED Lighting in Turkey Barns: CERTs helped Minnesota turkey farmers learn about LED lighting, navigate available funding resources, and connect with their utility rebates. Fifteen turkey farmers upgraded to LED lighting in 25 barns, saving 553,023 kWh and \$58,165 annually.	1,886,914,476
CARD Grant	Hastings Creamery Dairy Cooperative: CERTs studied an innovative approach to program delivery, including surveying, farm energy audits, recommendations, pointing farmers to funding options and ultimately to implementation of energy efficiency measures. Three farms implemented energy efficiency measures, saving 30,550 kWh and \$2,900 annually.	104,232,951
Collaborated Campaign	"Recycle Your Holidays" – Holiday Lights Recycling Campaign 2014-2015: CERTs partnered with the Recycling Association of Minnesota that collected 105,000 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 promoted, resulting in 959,000 kWh and \$115,000 saved annually.	3,273,358,395
Collaborated Campaign	MN GreenCorps – Energy Conservation Members’ Projects: CERTs mentored five 2014-2015 energy conservation members. One member’s project resulted in giving away approximately 300 LED light bulbs to Minnesota Interfaith Power and Light congregations, with direct assistance by CERTs and resulted in saving 14,536 kWh and \$1,744 annually.	49,598,867
Collaborated Campaign	Retired Engineers Technical Assistance Program (RETAP): CERTs connected 11 cities, organizations, businesses and first nations with 24 buildings to RETAP to receive free resource management assessments. Those taking action have savings that amount to 75,900 kWh, 12,600 therms, 375 gallons of propane, and \$17,200 annually.	718,329,291

Type	Program Description	BTUs Saved/Offset
Project Assistance	Bemidji State University (BSU) Solar: Stemming from the Northwest Regional Session at the 2013 CERTs Conference, BSU installed a 786 square foot solar transpired air system to serve the kitchen air handling unit in Lower Hobson Hall, saving \$1,983 annually.	183,700,000
Project Assistance	Hutchinson Brownfield Solar: Stemming from the West Central Regional Session at the 2013 CERTs Conference, the City of Hutchinson installed the largest brownfield solar project in Minnesota. Sized at 400 kW, this system generates 525,600 kWh annually.	1,793,347,200
Project Assistance	Rural Energy for America Program (REAP): CERTs guided three farms through USDA's REAP and offered other help. Farms upgraded to LED lighting saving 191,136 kWh, installed a 20 kW solar system generating 26,280 kWh, and pioneered use of a waste heat recovery system on a poultry barn saving up to 18,000 gallons of propane.	1,535,050,497
Project Assistance	Property Assessed Clean Energy (PACE): CERTs worked with county officials to implement PACE financing in Meeker and Cottonwood Counties. As a result, farmers in Dassel and Mountain Lake utilized PACE to install two dual-axis tracking 39.6 kW solar systems, generating 152,403 kWh annually.	520,000,000
Total CERTs Program Savings		17 billion

Ongoing Efforts

- 2015 CERT Conference:** On March 10 and 11, 2015, CERTs hosted its 2015 Community-Driven Clean Energy Conference in St. Cloud, Minnesota. The CERTs 2015 Conference, the sixth conference CERTs has hosted, was attended by 550 people including attendees from all seven CERT regions. The CERTs 2015 Conference was supported by 72 sponsors and exhibitors. The conference agenda included twelve break-out sessions, in addition to seven regional sessions, and four 3-hour workshops, including a workshop dedicated to highlighting CARD Grant projects and their findings. There were also nine lightning talks focusing on clean energy projects and big ideas. Presentations and photos from the conference are available at <http://2015.mncerts.org>.

- **2016 Seed Grants:** In anticipation of the 2016 seed grants, CERTs released its request for proposals (RFP) in August 2015. In response to the RFP, CERTs received a total of 57 applications requesting \$331,511 across its seven regions. Thirty-nine (39) grants were awarded by Steering Committees. Project details and information will be released in January 2016 when projects officially start work.
- **Energy Efficiency Assistance:** CERTs provided assistance to Lake Street (Minneapolis) businesses through a partnership with the Lake Street Business Council and an innovative train-the-trainer program model. CERTs also assisted with outreach to hotels as part of a Michael's Energy CARD grant. Savings will be reported on these two efforts in 2016.
- **Clean Energy Project Builder:** This website connects people with companies that can help them plan, implement, and manage solar and wind energy projects. A category for community solar was recently added to highlight companies working in this emerging space. See the website at <http://theCleanEnergyBuilder.com>.
- **MN Energy Stories:** CERT Blog, called MN Energy Stories, is a leading source for renewable energy and energy efficiency news, project examples, and opportunities in Minnesota. A regular MN Energy Stories e-blast delivers this content to over 10,000 subscribers across Minnesota and the Upper Midwest. You can read stories and subscribe at <http://blog.mncerts.org>.
- **Minnesota Solar Suitability App:** CERTs has facilitated the transfer of this tool from U-Spatial to the Minnesota Department of Commerce. Upon re-launch in 2016, it will be used as the virtual site assessment tool for the Made in Minnesota Program. The tool continues to provide a map of solar potential for every square meter of Minnesota using Lidar data and GIS technology. With additional updates, the tool will provide an improved user interface, easy to download solar resource potential reports, and assist potential solar adopters with understanding the process and economics of going solar. <http://solar.maps.umn.edu>.
- **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.
- **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. The initiative has the potential to help local units of government (cities, counties, schools), State Colleges and Universities, Tribes and State Agencies implement deep energy retrofits and thus reduce their thermal

and/or electric energy usage and do so in a budget neutral manner. This year the City of Bemidji kick-started a [\\$2 million project](#) to upgrade buildings and streetlights using GESP.

- **Community Solar Gardens (CSG):** CERTs continued to support consumers making informed choices about how and whether to participate in a CSG project. CERTs released a series of interviews with community solar garden subscribers participating in cooperative utility CSGs, hosted and presented at numerous community solar garden events, and released a number of CSG calculator tools.

Allocation of Legislative Funding Resources and Leveraged Resources

In total, CERTs is comprised of 16 staff who account for 11.5 full time employees (FTE), 8 of whom are paid via our legislative allocation. Staffs are based across CERTs' four partner organizations and across all seven regions. Given the nature of CERTs work, staff are critical to carrying out CERTs clean energy work across the State and thus represent 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 that enables CERTs solar financing work as part of the Midwest Grow Solar initiative. Activities have included development of [educational resources](#) for both the St. Paul Port Authority PACE program and the Rural Minnesota Energy Board program and development of a variety of community solar garden resources. CERTs garnered the Minnesota Solar Electric Industries Association 2015 Partners Award in large part because of this and related solar work.
- McKnight Foundation funding that launched the Metro CERT Clean Energy [Accelerator](#) program and related assistance to over 30 local units of government on a joint community solar garden subscription effort and that spurred commercial energy efficiency assistance to three Northeast Minnesota GreenStep Cities: Grand Marais, Mountain Iron and Pine City.
- U. S. Department of Agriculture Rural Energy Development Assistance funding which catalyzed CERTs' [Renewable Energy for Greater Minnesota](#) program assisting farms and rural small business with renewable energy assessments.

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

Sustainable Buildings 2030 (SB2030)

Prepared By Center for Sustainable Buildings Research (CSBR)

Overview

In the spring of 2008, the Governor 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). 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.

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 section 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

From 2009 through 2015, 93 building projects have been involved in the *SB 2030* process and have reported Energy Standard and Design Energy Consumption values. Of these 93 projects, 60 of the 65 state-required building projects and 24 of 28 volunteer building projects have reported as on track to meet the required *SB 2030* Energy Standard. To date, 90% of all buildings project enrolled in the *SB 2030* program have reported meeting or

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

exceeded the *SB 2030* Energy Standard in design. On average, these projects have reported anticipated energy consumption 26% less than their 2030 Energy Standard.

The majority of these projects have not yet been operating long enough to determine actual annual energy use; 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.

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 534 million kBtus/year, a reduction in Carbon emissions of 58,000 tons of CO₂e, and a savings of \$8.3 million per year assuming an average cost of \$15.54 per kBtu.⁴ As new projects are added each year and projects meet the new 2015 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 \$3.87 million through December 2014.

Ongoing Efforts

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 57 *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 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

⁴ The average cost per kBtu from the B3 Benchmarking database is \$0.01554 for the most recent available estimate (assuming a mix of electricity, gas, and other fuels).

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.

- **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.

The project team will continue to support existing utility programs that aid in the accomplishment of *SB 2030* Energy Standard performance and encourage further cost-effective program development to achieve optimal services and financial support for building owners and design teams.

- **Sustainable Building 2030 Education** – Educational programs for the designers continue to be delivered. In 2015, an intense 40-hour seminar was conducted for the fourth year to introduce best practices when creating low energy buildings. Over 45 building designers participated in this educational event. 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. Over 80 participants attended this session in November 2015. A two hour webinar was conducted for the second time in December 2015 for facility managers and agency contacts of the Minnesota State Colleges and Universities. For the first time, a four hour presentation for the Associated Contractors Association of Minnesota was conducted in February 2015. This education session will be repeated in 2016. A series of presentations at facilities conferences for the University of Minnesota and Minnesota State Colleges and Universities have also been conducted. In September 2015 a two - one hour presentation to the Engineering Guild of Minnesota was conducted. In October 2015 a one hour presentation was given to the American Council of Engineering Companies of Minnesota. A two hour presentation was given at the November 2015 American Institute of American Minnesota State Convention. Throughout the year several “lunch and learns” were 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 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 \$3.87 million through December 2015.

The 93 buildings designed to the SB 2030 Energy Standard are predicted to save approximately 534 million kBtus/year, 58,000 tons of CO₂e and a savings of \$8.3 million per year. When new projects are added each year and as projects meet the new 2015 standard 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.