



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

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Executive Summary

The Conservation Applied Research and Development program (CARD), Clean Energy Resource Teams (CERTs), and Sustainable Buildings 2030 (SB2030) that were established within the Conservation Improvement Program (CIP) through Minn. Stat. § 216B.241 subd. 9 are programs that originate from utility assessments to support achievement of Minnesota's statewide energy policy goals. Each program is uniquely positioned to continuously achieve energy efficiency savings 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 program overall include:

- Dissemination of CARD grant results to utilities and other stakeholders through project reports, articles, webinars, and at regional and national conferences.
- Enhancements to utility CIP offerings and energy savings achieved toward the 1.5% goal.
- Use of CARD project results and insights to inform policy decisions in Minnesota.

Specific accomplishments of the CARD program for calendar year 2019 include:

- One Request for Proposals (RFP) issued.
- One-hundred and eighteen (108) Letters of Intent reviewed with input from utility stakeholders.
- Forty-four (44) full proposals received and evaluated.
- Eleven (11) previously funded CARD projects completed.

- Twenty-two (22) pending new research projects soon to be added to the portfolio.
- Thirteen (13) CARD webinars conducted to more effectively gather stakeholder input or more broadly disseminate results of CARD projects.
- CARD RFP process successfully re-envisioned and integrated into the new grant interface webpage to improve grant application and tracking.

Clean Energy Resource Teams (CERTs)

Major accomplishments of the CERTs Partnership in 2020 include:

- Hosted 31 events with 1,161 attendees, connected with an additional 5,653 community members through 341 meetings, presentations and other outreach activities across the state;
- Saved or offset 63.2 billion BTUs over the past year as a result of CERTs' efforts; and
- Funded thirty-five community-based clean energy seed grants projects. The savings from these projects will be reported in 2021.
- A new request for proposals (RFP) for 2020 projects was launched. Sixty applications were received with thirty-five proposed projects awarded.

Sustainable Buildings 2030 (SB2030)

Major accomplishments of the SB2030 initiative through 2019 include:

- 197 buildings designed to the SB2030 Energy Standard are predicted to save approximately 1,351 million kBtus/year.
- To date, 88% of all building projects enrolled in the SB2030 program have documented designs that met or exceeded the SB2030 Energy Standard.
- Buildings designed to the SB2030 Energy Standard are predicted to save approximately \$22.1 million per year assuming an average cost of \$16.37 per mmBtu.
- Buildings designed to the SB2030 Energy Standard anticipate a reduction in carbon emissions of 119,000 tons of CO₂e annually.
- 151 completed SB 2030 projects are estimated to have saved 4,582 million kBtus, a reduction of 617,000 tons of CO₂e and a savings of \$75.0 million to-date.

Conservation Applied Research and Development (CARD)

Introduction

The Conservation Applied Research and Development (CARD) grant program is administered by the Department of Commerce, Division of Energy Resources. Approximately \$2.6 million is available annually for the program. The grant funds benefit the State of Minnesota and Minnesota ratepayers through the Conservation Improvement Programs (CIPs) that utilities operate.

Significant CARD program metrics since its start in 2008 and for calendar year 2020 are summarized in Table 1.

Table 1 CARD program metrics

Description of Metric	Since Start of Program	For Calendar Year 2020 ^a
Successful CARD grant funding cycles	12	1
Request for Proposals (RFP) issued by Department	24	1
Request for Information (RFI) issued by Department	2	0
Letters of Intent (LOI) to Propose submitted by Responders and reviewed by Department staff	537	118
Full proposals submitted by Responders and evaluated by Department staff	513	44
R&D projects funded through the CARD grant program	137	3
Pending CARD grants	22	22
Completed CARD grant projects	106	11

a. Includes activities through December 18, 2020 when this report was compiled.

Overview of Projects

CARD projects quantify the savings, cost-effectiveness and field performance of advanced technologies; characterize market potential of products or technologies within the state; study and characterize hard-to-reach market sectors; investigate and pilot innovative program strategies; and review and analyze relevant policy issues. Completed CARD projects provide utilities with informative and timely information to enhance energy efficiency program designs within their CIP portfolios.

Through 2020, the CARD program funded projects totaling about \$34 million. These projects received (or will receive) an additional \$8 million in matching funds (

Table 2).

Table 2 Summary of CARD program funding to date

Project Type	Number	% of Total Projects	Dollars Awarded¹	% of Awarded Dollars	Estimated Match²
<u>RFP Funded</u> Projects awarded through RFP process (includes 106 completed, and 15 ongoing projects)	121	76.6%	\$27,452,846	80.4%	\$7,053,064
<u>Pending RFP Funding</u> Projects anticipated as result of pending RFP evaluations (Approximations)	22	13.8%	\$4,467,715	13.1%	\$462,617
<u>Non-RFP Funded</u> Projects awarded outside of RFP process (includes 15 completed projects and 1 ongoing project)	16	10.1%	\$2,229,157	6.5%	\$496,605
All CARD Projects	159	100%	\$34,149,718	100%	\$8,012,286

As shown in

Table 2, the vast majority of CARD grants are funded through a competitive Request for Proposals (RFP) process (almost 90% of all projects and 94% of funding).

Based on a review of current CIP needs with input from utilities and other stakeholders, the Department 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).

¹ Award amounts shown in tables are based on initial awards and does not include additional amounts that might be added through amendments. To date additional funds added through amendments has totaled only 1.3% of initial awards. Amounts shown in the table also do not reflect funds left unspent after the close of contracts. To date, unspent money returned to the CARD fund has been about 2% of initially awarded funds.

² Matches shown in the tables are based on match commitments in initial grant contracts; collected matches often exceed what was committed in the contract. On average, matching funds are approximately 12% higher than initially estimated.

Table 3 and Table 4 list completed and ongoing CARD projects respectively that were funded to date through this RFP process, including details on each project.

Table 3 Completed CARD Projects Funded through RFP Process (as of December 2020)

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2008	1	Owatonna Public Utilities	Home Energy Reports Pilot Program	\$123,260	\$531,272
2008	1	Center for Energy and Environment	Actual Savings and Performance of Natural Gas Instantaneous Water Heaters	\$160,495	\$281,905
2008	1	U of MN - Sponsored Projects Admin. Grants & Contracts	Quantification of Changes in Residential/Multifamily Building Codes and Standards for Assessing Energy Conservation and Efficiency Impacts in a Cold Climate	\$90,606	\$15,912
2008	1	Great River Energy	Home Energy Reports Pilot	\$165,000	\$424,300
2008	1	Energy Center of Wisconsin	Plugging into Savings - Taming Home Electricity Use	\$285,700	\$60,000
2008	1	U of MN - Sponsored Projects Admin. Grants & Contracts	Researching Energy Conservation Potential for Minnesota Business and Industry	\$203,177	\$0
2008	1	Eugene A. Scales & Associates, Inc.	Quantification of Indirect Program Impacts (Re-Direct Program)	\$91,170	\$9,000
2008	1	Franklin Energy Services LLC (Glacier Consulting Group)	Research to Inform Design of Residential Energy Use Behavior Change Pilot	\$47,305	\$0
2008	1	Navigant Consulting (Summit Blue Consulting)	Demand Side Management (DSM) Potential Study	\$354,250	\$0
2009-10	2	Northwind Sailing, Inc.	Angry Trout Cafe Kitchen Exhaust HR	\$22,450	\$8,650
2009-10	2	Center for Energy and Environment	Capturing Energy Savings from Large Building Envelope Leakage Reduction	\$395,240	\$316,760
2009-10	2	Class 5 (Energy Efficiency Programs, Inc.)	Energy Efficiency in the Workplace (Health Care Facilities)	\$395,444	\$5,000
2009-10	2	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	2	Franklin Energy Services, LLC	Energy Management Teams - Coordinator Resource Pilot Study	\$340,464	\$76,284

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2009-10	2	Franklin Energy Services, LLC	Utility Infrastructure Improvements for Energy Efficiency: Best Practices Study	\$27,864	\$0
2009-10	2	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	\$1,500,000	\$511,250
2009-10	2	Franklin Energy Services, LLC	ASHP Efficiency Gains from Low Ambient Temperature Operation using Supplemental Electric Heating	\$55,792	\$0
2009-10	2	U of MN (Bioproducts & Biosystems Engineering)	Residential GSHP Study/Monitor and Analyze the performance of Installed residential GSHP in MN	\$780,816	\$89,738
2009-10	2	Neighborhood Recycling Corp., (The Green Institute)	Develop an Energy Efficiency Program Model for Small Businesses based on Low Cost Operations and Maintenance Conservation Measures	\$227,124	\$32,300
2011	3	Energy Center of Wisconsin	Field Test of Drainwater Heat Recovery in Commercial Buildings	\$138,294	\$5,000
2011	3	CLASS 5, Inc.	CLASS 5 Community (City-Wide)	\$162,226	\$146,000
2011	3	Center for Energy and Environment	Advanced Rooftop HVAC Unit Controls Pilot	\$408,108	\$417,865
2011	3	Energy Center of Wisconsin	Automatic Daylighting Control Commissioning in the Midwest	\$206,172	\$10,500
2011	3	Minnesota Project, The	LEDs: Energy Savings and Replicability in MN Livestock Facilities	\$185,130	\$75,000
2011	3	Franklin Energy Services, LLC	Technical Review of the Minnesota Deemed Savings Database	\$146,880	\$0
2011	3	Franklin Energy Services, LLC	The Energy Efficiency Potential in Minnesota's Multi-family Sector	\$599,056	\$0
2011	3	Energy Management Solutions, Inc.	Street Lighting	\$49,000	\$0
2011	3	Michaels Energy	Convenience Store Energy Efficiency	\$52,000	\$76,000
2011	3	Franklin Energy Services, LLC	Single Recommendation Strategy Study	\$11,380	\$0
2011	3	Minnesota Municipal Utilities Association	Smart Grid Technologies Installation & Assessment	\$283,825	\$283,825
2011	3	Energy Management Solutions, Inc.	Variable Refrigerant Technology in Cold Weather Climates	\$65,925	\$0

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2011	3	Michaels Energy	Energy Savings from Demand Response and Load Management	\$100,000	\$0
2011	3	Bright Power	Multi-family Energy Benchmarking with EnergyScoreCards	\$398,164	\$330,776
2012	4	Center for Energy and Environment	Saving Energy by Reducing Duct Leakage in Large Commercial & Institutional Buildings	\$380,155	\$189,045
2012	4	Center for Energy and Environment	Window Retrofit Technologies for Increased Energy Efficiency without Replacement	\$47,224	\$28,458
2012	4	U of MN - MnTAP	Researching Energy Conservation Potential at Minnesota Data Centers	\$46,781	\$0
2012	4	Weidt Group, The	Integrating Benchmarking and the Green Button Initiative into Utility CIP to Capture Greater Energy Savings	\$50,000	\$10,000
2012	4	Center for Energy and Environment	Condensing Boiler Optimization	\$209,232	\$105,488
2012	4	U of MN - MnTAP	Motivating Manufacturing Energy Efficiency: E2 Assessments and GreenLean(SM) Training with Directed Implementation Assistance	\$177,488	\$150,000
2012	4	Minnesota Project, The	Dairy Cooperative Partnerships for Improved Efficiency Program Adoption	\$210,232	\$5,557
2012	4	Center for Energy and Environment	Heat Pump Water Heaters: Savings Potential in Minnesota	\$25,941	\$17,294
2012	4	Center for Energy and Environment	Reducing the Energy Cost of Effective Ventilation in Multi-Unit Buildings	\$148,348	\$83,232
2012	4	Gas Technology Institute	Advanced Heat Recovery System Field Deployment	\$743,603	\$19,000
2012	4	Michaels Energy	Cost-Effective Recommissioning of Restaurants	\$276,410	\$12,600
2012	4	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
2013	5	FVB Energy Inc.	Combined Heat and Power (CHP) Policy Review and Potential	\$199,976	\$0
2013	5	Seventhwave, Inc.	Improving Installation & Maintenance Practices for Minnesota Residential Furnaces, Air Conditioners & Heat Pumps	\$437,950	\$52,175
2013	5	Seventhwave, Inc.	Commissioning of Demand Control Ventilation Systems in Cold Climates	\$265,000	\$7,500

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2013	5	Gas Technology Institute	Field Study of High Efficiency Heating & Cooling Mixed-air Rooftop Units (RTUs)	\$236,382	\$66,275
2013	5	Seventhwave, Inc.	Energy savings from Institutional Tuning in Minnesota	\$200,000	\$17,580
2013	5	Franklin Energy Services	Field Test of Large Battery Charging Technologies	\$67,512	\$10,210
2013	5	Center for Energy and Environment	Improving Effectiveness of Commercial Energy Recovery Ventilation Systems	\$379,478	\$100,101
2013	5	Center for Energy and Environment	Demonstrating the Effectiveness of an Aerosol Sealant to Reduce Multi-Unit Dwelling Envelope Air Leakage	\$280,996	\$74,549
2013	5	Michaels Energy	Mainstreaming Motel Optimization	\$335,024	\$14,850
2013	5	Seventhwave, Inc.	Research-based Design of a Residential High User Program	\$297,956	\$28,000
2013	5	Sustainable Engineering Group	The Energy Conservation Potential of Displacement Ventilation Technology in Minnesota Climate Conditions	\$90,170	\$0
2013	5	Outsourced Innovation	Improving Energy Efficiency and Crop Production in Controlled Environment	\$126,970	\$14,368
2013	5	Weidt Group	Net Energy Optimizer for Commercial New Construction	\$50,000	\$193,050
2013	5	Center for Energy and Environment	Optimized Operation of Indoor Public Pool Facilities	\$240,000	\$60,000
2013	5	Energy Center of Wisconsin	CIP: Stakeholder Meetings' Facilitator for Energy Savings Goal Study	\$59,978	\$0
2013	5	Strategen Consulting	CIP: White Paper Analysis of Utility-Managed, On-Site Energy Storage in Minnesota	\$99,781	\$0
2013	5	Meister Consultants Group	CIP: Value of Solar Thermal Study RFP	\$75,000	\$0
2013	5	U of MN (The Minnesota Project)	Maximizing Rural Electric Cooperative Farm Energy Efficiency Programming	\$74,993	\$5,195
2014	6	Burr Energy (Microgrid Institute)	Engagement Survey for CHP in MN	\$13,393	\$0
2014	6	Burr Energy (Microgrid Institute)	CHP Facilitator for Stakeholder Engagement	\$28,947	\$0

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2014	6	Center for Energy and Environment	Pilot Study of a Furnace Retrofit Device for High Efficiency Residential Heating and Humidification	\$401,201	\$93,373
2014	6	Gas Technology Institute	Advanced Commercial Clothes Dryer Technologies Field Test	\$193,756	\$14,500
2014	6	Center for Energy and Environment	Field Assessment of Cold-Climate Air Source Heat Pumps	\$201,445	\$103,155
2014	6	Seventhwave, Inc.	Commercial Roof-top Unit Characterization and Performance	\$419,714	\$35,104
2014	6	Center for Energy and Environment	Evaluation of New Domestic Hot Water System Controls in Hospitality and Commercial Buildings	\$200,599	\$42,235
2014	6	Center for Energy and Environment	Small Embedded Data Center Program Pilots	\$272,829	\$71,490
2014	6	Illume Advising, Inc.	Behavioral Programs Literature Review & Benchmarking Study, and Workshops	\$122,620	\$16,125
2014	6	Center for Energy and Environment (86778 NEC)	Quality Installation and Retrocommissioning of High Efficiency Condensing Boilers	\$220,250	\$48,600
2014	6	Seventhwave, Inc.	Assessments of Plug-Load Control Devices in Commercial Buildings	\$299,000	\$35,750
2014	6	Cadmus Group, Inc., The	Economic Impact Analysis of the Conservation Improvement Program	\$120,012	\$3,820
2014	6	Michaels Energy, Inc.	Continuous Commissioning for Small Outpatient Medical Clinics	\$220,296	\$33,700
2014	6	Center for Energy and Environment	Commercial Energy Code Compliance Pilot	\$354,525	\$45,200
2014	6	APPRISE, Inc.	Statewide Policy Analysis and Evaluation of Low-Income Programs in Minnesota Utility CIP Portfolios	\$245,096	\$23,760
2014	6	Seventhwave, Inc.	Minnesota Manufactured Homes Characterization and Performance	\$346,208	\$27,200
2014	6	Franklin Energy Services, LLC	MN Technical Reference Manual Update for 2017-2019	\$331,172	\$0
2015	7	GDS Associates, Inc.	Identify & recommend prescriptive EUI measures for inclusion in TRM	\$110,470	\$0
2015	7	Franklin Energy Services, LLC	T12 Socket Penetration Study	\$81,585	\$53,305
2015	7	Seventhwave, Inc.	Enhancing New Construction Programs with Performance-based Procurement and Design	\$314,904	\$73,390

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2015	7	Seventhwave, Inc.	Characterizing Opportunities for Small Commercial Energy Programs	\$437,589	\$24,860
2015	7	Illume Advising, LLC	Statewide Commercial Behavior Segmentation and Potential Study	\$448,022	\$14,578
2015	7	Gas Technology Institute	Field Study of An Intelligent, Networked, Retrofittable Water Heat Controller	\$281,852	\$20,000
2015	7	University of Minnesota	Industrial Compressed Air Demand Reduction through Air Tool Replacement	\$68,889	\$3,150
2015	7	GDS Associates, Inc.	Direct Cooling Retrofit for Server Racks	\$158,987	\$231,103
2015	7	GDS Associates, Inc.	Dairy Farm Precise Ventilation Control Electric Savings	\$36,867	\$56,153
2015	7	GDS Associates, Inc.	Whole-Farm Energy Management Valuation	\$203,415	\$59,844
2016	8	GDS Associates, Inc.	Electric Utility Infrastructure Potential Study	\$277,965	\$0
2016	8	Center for Energy and Environment	Natural Gas & Electric Potential Study	\$1,656,252	\$86,439
2017	8	Synapse Energy Economics, Inc.	Updating the energy efficiency cost-effectiveness framework in Minnesota	\$49,860	\$0
2017	8	Michaels Energy, Inc.	Stakeholder Views on the Emerging Intersection of Electrification, Efficiency & Decarbonization	\$44,462	\$8,283
2017	8	American Council for an Energy-Efficient Economy (ACEEE)	Prepaid Electricity Plans as Energy Efficiency Programs in Minnesota: Potential Savings and Concerns	\$49,998	\$2,751
2017	8	University of Minnesota	Driving Wastewater Treatment Energy Efficiency through a Cohort Training Model	\$50,000	\$7,980
2017	8	Seventhwave, Inc.	Field study of Tier 2 advanced power strips	\$105,978	\$7,703
2017	8	Center for Energy and Environment	Field Study of Stand-alone Dehumidification and Efficiency Opportunities in MN Single Family Homes	\$257,780	\$41,843
2017	8	Center for Energy and Environment	Pay-For-Performance: A Development Tool to Incentivize Ongoing Building Performance	\$49,334	\$8,706
2017	8	Evergreen Economics, Inc.	Future Emerging Technologies: Leveraging Public Research for Application in Minnesota	\$49,680	\$20,360

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2018	9	Slipstream, Inc.	MN Residential Energy Baseline & Market Characterization Study	\$299,390	\$18,527
2018	9	Slipstream, Inc.	MN Commercial Energy Baseline & Market Characterization Study	\$319,863	\$17,850
2018	10	The Cadmus Group, Inc.	Economic Impact of CIP	\$193,680	\$6,140
2018	10	Slipstream, Inc.	Light Level Characterization in Minnesota Commercial Buildings	\$169,488	\$8,476
2018	10	Slipstream, Inc.	Market Potential for Saving Energy and CO2 with Load Shifting Measures	\$170,134	\$14,348
2019	11	The Cadmus Group, Inc.	Understanding the Market Barriers & Opportunities for Cold Climate Air Source Heat Pumps in Residential Households	\$206,077	\$0
Totals:			106 completed projects	\$24,020,811	\$6,278,952

Table 4 Ongoing CARD Projects Funded through RFP Process (as of December 2020)

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2017	9	Gas Technology Institute	Demonstration of Packaged Central Condensing Tankless Water Heating Systems in Multifamily Buildings	\$334,667	\$20,555
2017	9	Center for Energy and Environment	Cooling Loads: The Diversity of Potential Residential Cooling Solutions and a Best Practices Guide	\$49,946	\$8,814
2017	9	Slipstream, Inc.	Field and market assessment of Heat Pump Clothes Dryers	\$376,598	\$45,620
2017	9	Center for Energy and Environment	Expanded Scope Commercial Boiler Tune Ups	\$250,960	\$38,605
2017	9	Center for Energy and Environment	The Operation and Control of Lighting, Plug Loads, and other Power over Ethernet (PoE) Technologies Using Network Switches in Small Commercial and Institutional Buildings	\$104,975	\$389,901
2018	10	Michaels Energy, Inc.	Energy Efficiency Potential of Nanofluids	\$266,837	\$89,680
2018	10	2050 Partners, Inc.	Minnesota Codes and Standards Program: Concept to Realization Roadmap	\$343,212	\$6,646
2018	10	Franklin Energy Services, Inc.	Energy Savings Potential of Networked Lighting Control Systems in Small Businesses	\$141,631	\$8,320

RFP Year	Fund Cycle	Grantee	Project Description	Dollars Awarded	Estimated Match
2018	10	Center for Energy and Environment	Revealing the Market for Strategic High-Performance Envelope Retrofits	\$120,170	\$21,206
2018	10	LHB, Inc.	Field Study of Phase Change Material (PCM) use for Passive Thermal Regulation	\$321,631	\$13,507
2018	10	University of Minnesota - MnTAP	Market Study to Determine the Energy Efficiency Opportunity Potential at Minnesota Drinking Water Utilities	\$70,000	\$7,845
2018	10	Center for Energy and Environment	Optimized Installations of Air Source Heat Pumps for Single Family Homes	\$360,707	\$52,007
2018	10	Center for Energy and Environment	Ductless Cold Climate Heat Pumps for Multifamily Applications	\$343,940	\$41,354
2018	10	Center for Energy and Environment	Commercial and Industrial Refrigeration Market Assessment	\$226,850	\$21,366
2019	11	Indian Land Tenure Foundation	CIP with Tribal Governments & Tribal Members	\$119,911	\$8,686
		Totals:	15 Ongoing projects	\$3,432,135	\$774,112

In addition to completed and ongoing projects funded through the RFP process (as listed in the previous two tables) at the end 2020 there are twenty-two (22) additional CARD projects approved for funding and are currently in contract negotiations. These additional projects represent about \$4.5 million in grants with more than \$400,000 in estimated matching funds.

Occasionally the Department will fund a CARD project outside of the competitive RFP process, in cases where an necessary project/service requires a sole source provider, or when the Department has the opportunity to leverage CARD funds for a project already underway or being funded from multiple sources. To date sixteen (16) such projects have been funded by this means, representing about \$2.2 million of total funds awarded through CARD since the program's start in 2008 (

Table 2). These non-RFP grants also represent nearly \$500,000 in matching funds.

Ongoing Efforts

Each year, the Department solicits input from utilities and other stakeholders to inform CIP needs and help develop appropriate topics for the RFPs. In 2020, this process was continued.

Starting in 2012 and continuing into 2020, the Department 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 2020, efforts in this direction focused on the implementation of a new grant interface website (GIW) that was first introduced in 2019. The interface has improved the application process for potential grantees and provided more consistent tracking and oversight of grantee applications for the Department.

The process was tested in late 2019 and early 2020 with a CARD specific-topic RFP that was relatively straightforward. Given the successful results from that test, in 2020 the GIW was first utilized for a much more complicated multi-topic general CARD RFP. This effort was also successful and involved a major re-envisioning of the CARD RFP process to interconnect with and conform to the GIW.

In 2013 a Letter of Intent (LOI) to propose procedure was added to the process for responding to general topic RFPs. This process allows the Department to review project ideas and recommend only certain projects to proceed to full proposal. Both potential grantees and utilities appreciated this improvement as it improved the efficiency of the evaluation process and allowed respondents to focus on proposals more likely to be successful.

In 2017, the Department improved the LOI process by inviting utility representatives to participate in it. This initiative was well-received and resulted in a more robust process, as well as recommendations for projects more in line with utility goals and needs. In 2018 and 2019, the Department further refined this process to make it more efficient and accessible to utilities. In 2020, the process was further updated and successfully incorporated into the GIW platform.

Starting in 2014, the Department improved public accessibility of grant proposals and evaluation files by making them available electronically on the Department website through the [Commerce Actions and Regulatory Document Search tool](https://www.cards.commerce.state.mn.us/CARDS/) (<https://www.cards.commerce.state.mn.us/CARDS/>). Previously, viewing these files required an appointment and in-person viewing of a hard copy of evaluation documents. In 2020, some minor improvements were made to the process of accessing these files.

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 2020. In addition, CARD results continue to be presented at local, regional and national conferences with very positive feedback.

Starting in 2016 and continuing in 2020, the Department improved stakeholder and public understanding of the CARD Grant Program's purpose and the role it plays in helping to achieve the State's 1.5% savings goal. The Department sought ongoing input from stakeholders regarding research needs, worked more collaboratively with utilities on ongoing CARD projects and encouraged grantees to seek more utility input and collaboration. Dissemination of CARD grant results have become more systematic, including writing regular articles for the CIP Newsletters, CIP Notifications and other publications, publicizing final CARD reports more broadly, holding webinars on CARD results and making the webinars available for download later.

In addition, the Department standardized CARD webinars to give them a consistent look and add an introduction by Department staff, which has raised the profile of the CARD program and received positive feedback from stakeholders. All of these efforts have improved the quality of CARD project proposals and CARD project results. In 2019, a project was begun to build a database of CARD projects that classifies projects according to the

results. Classification categories include market sector, technology type, research approach, as well as notes on applicability in CIP and next steps for effective application in CIP. In 2020, feedback on classifications was collected from CARD stakeholders. This classification project is ongoing but once complete is expected to provide utilities with another tool for assessing CARD project results and applicability in their portfolios.

Clean Energy Resource Teams (CERTs)

Prepared by the Clean Energy Resources Teams partnership.

Overview

The Clean Energy Resource Teams—or CERTs—is a statewide partnership³ 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 efficiency and renewable energy for their homes, businesses and local institutions, and increasingly to electrify select end uses through electric vehicles and air source heat pumps. CERTs works to impartially meet stakeholders where they are, convert learning into doing, and provide inclusive access to clean energy.

From hands-on assistance to educational forums and seed grants, CERTs' work is people- and place-based; key to it all is relationship and partnership building. Local, regional, and statewide connections allow CERTs to move clean energy forward. Regional steering committees, one in each of seven regions, ground and guide CERTs' work by: serving as key connectors in and to their communities; informing programming; and driving the seed grant process from priority setting to reviewing and awarding funds.

In January, CERTs announced the awards for the 2020 community-based clean energy Seed Grant projects (mncerts.org/2020grants). A total of \$140,000 in labor-only funding, \$20,000 for each CERT region, is supporting 35 local efficiency, renewable energy, electric vehicle, and battery storage projects in communities across the state. Savings from these projects will be reported in 2021.

CERTs hosts events, conferences, presentations, workshops, and tours to create learning and network building opportunities that catalyze action. CERTs hosted a total of 31 events, both in-person and online, with 1,161 attendees. CERTs connected with an additional 5,653 community members through 341 meetings, presentations and other outreach activities.

CERTs helps Minnesotans understand their clean energy options, utilize decision tools to determine how best to move forward, and see project models and examples that they can adapt and replicate. The CERTs website served 75,000 people in 2020 who accessed clean energy guides, jobs, stories, and events 160,000 times. CERTs'

³ The CERTs partnership joins the Minnesota State Energy Office, a unit of Commerce's Division of Energy Resources; the University of Minnesota Extension Regional Sustainable Development Partnerships; the Southwest Regional Development Commission; and the Great Plains Institute.

online tools and guides (mncerts.org/tools-guides), many new or updated in 2020, are central to providing people with the step-by-step guidance they need to move forward with projects. The Clean Energy Job Board, CERTs' most popular resource, hosted 305 postings.

CERTs stories and news posts—111 of them this year—provide peer examples and inspiration (mncerts.org/stories) and are distributed through the MN Energy Stories email newsletter digest, reaching over 14,000 Minnesotans. CERTs' programs and partnerships were featured in more than 125 stories from Minnesota media outlets in 2020 as well, expanding reach to people across the state. Energy Awareness Month in October alone garnered a dozen earned media stories by providing a media toolkit that included a tips article, social media posts, and graphics to publish in their own outlets (on.mncerts.org/winter).

CERTs provides hands-on assistance to spur Minnesotans to move forward on clean energy action. Overall, CERTs programming saved or offset 63.2 billion BTUs, or enough to power 1.8 million LED light bulbs annually. Table 5 details actions that resulted in energy savings or offsets in 2020.

The following sections detail CERTs work as it relates to partnership building, events, tools, storytelling, and projects with each of its five primary audiences: governmental units, utilities, small businesses, agricultural producers, and underserved communities.

Program Outcomes

Governmental Units

CERTs engaged hundreds of cities, counties, schools and tribal nations to help them advance their own energy efficiency and renewable energy projects through direct on-the-ground engagement with local staff and officials, energy networks, the GreenStep partnership, and newly launched CERTs efforts on advancing solar for schools and electric vehicles (EVs) for cities.

Partnership Building

Over the past year, CERTs worked closely with the Great Plains Institute to host the Renewable Energy Procurement Network—an effort that brought together 18 cities and counties to learn from one another and jointly pursue clean energy efforts. In fall 2020, the effort was re-launched as the Community Energy Network and expanded to encompass the broader interests of the group.

CERTs continues to support the 130+ GreenStep city and tribal nation participants with clean energy best practice actions. Direct support this past year included action on energy efficiency, on-site solar, community solar gardens, and EVs.

CERTs continued to work with tribal nations on energy education events, solar development, and energy-efficient housing. A new partnership in the past year was formed with the Prairie Island Indian Community as they launch their \$46 million Net Zero Energy project; CERTs helped scope the Request for Qualifications and

review proposals for technical advisors. CERTs also connected with the Shakopee Mdewakanton Sioux Community to explore potential project options geared toward tribal members.

Events

In conjunction with GreenStep, CERTs hosted 12 events this past year. CERTs kicked off 2020 with 10-year celebration events and listening sessions in Brainerd, Detroit Lakes, Duluth, Marshall, Rochester and St. Paul. In spring 2020, CERTs co-hosted a four-part series of workshops to help cities and tribal nations adapt during the COVID-19 pandemic. CERTs also hosted a forum on sustainability planning featuring city staff from Faribault, Northfield, Red Wing, and Rochester and co-hosted one of the monthly GreenStep workshops on energy-related behavior change best practices.

CERTs continues to build off of the 2019 success of the Cities Charging Ahead cohort that supported 28 communities with EV adoption. CERTs hosted a “Communities Charging Ahead Webinar: Resources for Electric Vehicle Readiness” to share resources generated during the year-long cohort including sample EV-ready ordinances, charging guidance, and procurement resources from the Office of Enterprise Sustainability. Cities Charging Ahead 2.0 launched in fall 2020 with four cohort meetings geared toward accelerating action on EVs.

Tools

- Minnesota Solar Schools (mncerts.org/solarschools): CERTs has been working with schools across the state to make solar a reality for years, and in the process, has developed unbiased tools and resources for schools to utilize free of charge, including tools for site selection, requests for proposals, State contracts, calculators, stories, and more.
- Public Solar Procurement (mncerts.org/public-solar-procurement): Whether it be to achieve environmental goals, reduce energy costs, create clean energy jobs, or show community leadership, solar can provide measurable benefits for state agencies, local governments, schools, and tribal nations, and CERTs provides step-by-step tools to help them move forward.
- Minnesota Solar Guide (mncerts.org/minnesota-solar-guide): This in-depth resource, created through the MN Solar Pathways project, supports local decision makers, developers, and other audiences in understanding various aspects of utility-scale solar development.

Storytelling

Over 20 stories about community energy and sustainability efforts provided tangible examples of communities taking action on energy efficiency, solar, EVs, and more (mncerts.org/cities-counties). A notable series celebrated 10 years of the Minnesota GreenStep program by highlighting several participants with interviews, infographics, and videos (mncerts.org/gsc10). For schools, two original videos featuring Pine River-Backus and Mounds View Schools drew in and inspired new school audiences, as did stories about efforts in Morris, Mankato, and Edina Schools (mncerts.org/schools).

Projects

CERTs worked one-on-one with Greater Minnesota communities in 2019 to achieve designation through SolSmart, a national program that provides free technical assistance with best practices and ordinances for solar energy development. In the year following their designations, Clay County had 5 community solar gardens installed, Carleton County had 6 solar systems installed, Crystal Bay Township had 1 installation, and the cities of Winona and La Crescent had 6 and 2 systems, respectively. (See row 1A in Table 5 for total energy generated.)

CERTs provided direct technical assistance to local governments working to understand their solar options, whether subscribing to a Community Solar Garden (CSG) or adopting onsite solar for their own facilities. For example, with CERTs' assistance, the City of St. Paul subscribed the Como Park Zoo & Conservatory to 1.8 MW of solar from a CSG and Hennepin County subscribed to 1.4 MW. Following CERTs assistance with a Solar Power Purchase Agreement, Maple Grove installed 600 kW of solar on their public works building and 304 kW at their water treatment plant. Edina Public Schools, a 2019 Solar Possible participant, installed an additional 240 kW of solar in 2020 on their transportation building. (See rows 1B and 1C in Table 5 for energy generated.)

Additional actions were attributed to Cities Charging Ahead that ended in 2019, including: Five cities (Eagan, Edina, Faribault, St. Louis Park, Woodbury) purchased or leased 10 EVs in 2020, 5 cities (Coon Rapids, Eagan, Fridley, Morris, St. Louis Park) installed 7 Level 2 charging stations in 2020, and 4 cities (Burnsville, Eagan, Elk River, Morris) installed 10 Level 2 and 1 DC fast charger in 2019. Three (3) EVs and 10 charging stations are powered by renewable energy. (See row 1E in Table 5 for net energy saved.)

CERTs refers cities, counties, and schools seeking financing to the Energy Saving Partnership (ESP), a municipal lease program for projects that incorporate renewable energy or result in energy savings. As a result of CERTs recommending ESP financing, Ivanhoe Public Schools was able to install a boiler system to replace costly infrared electric space heaters. (See row 1E in Table 5 for energy saved.)

Utilities

CERTs conducted business outreach to scale-up utilization of utility rebates and audit services; collaborated with utilities to carry out efforts to achieve Conservation Improvement Program savings; and facilitate cohort programs and peer learning sessions on electrification technologies.

Partnership Building

CERTs facilitated Powering Ahead with Vehicle Electrification (PAVE), a cohort of municipal utilities working on EVs, with the following five parts: Getting Up to Speed (overview/beginners), Charging Up (stations), Revving Up Utility Programs, Kicking the Tires (dealerships), and Hitting the Road (fleets). Participants were Austin, Brainerd, Chaska, Detroit Lakes, East Grand Forks, Grand Marais, Hutchinson, Lake City, Moorhead, New Ulm, Rochester, Roseau, Shakopee, and Wadena. In addition, CERTs connected with Northern Municipal Power Agency about

potentially replicating the programmatic approach Southern Minnesota Municipal Power Agency (SMMPA) took to EV charging with its members.

As part of a U.S. Department of Energy Solar Energy Innovation Network funded effort, CERTs is supporting the “Organizational Innovation for Equitable Solar Deployment with Electric Cooperatives” project led by the University of Minnesota and East River Electric Power Cooperative and its cooperative members through on-going process facilitation.

CERTs shared its Utility Menu of Services (mncerts.org/utilities) with Crow Wing Power, People’s Energy Cooperative, and municipal utilities of Chaska, Rushmore, Staples, and Litchfield. This led to a collaboration with People's Energy Cooperative to explore ways to support low-income customers with energy efficiency in advance of a rate hike. CERTs continued partnering with Willmar Municipal Utilities (WMU) to support its customers, including the Islamic Society, with the conversion away from central steam to other heating systems, just in time to meet their deadline this summer.

Events

CERTs hosted two (2) Utility-to-Utility forums on air source heat pumps (ASHPs) in March in Mt. Iron and Mahanomen. These sessions facilitated peer-to-peer conversations about ASHP rebate programs, marketing of ASHPs, contractor engagement and quality installation, benefits and barriers to ASHP adoption by customers/members, and ASHPs' effect on peak load and other utility operations. Participants included representatives from: Minnesota Power, Otter Tail Power, Xcel Energy, Lake Country Power, East Central Energy, Roseau Electric Cooperative, Lake Region Electric Cooperative, Beltrami Electric Cooperative, PKM Electric Cooperative, Minnkota Power Cooperative, Northern Municipal Power Agency, Minnesota Municipal Utilities Association, Energy Insight (provides services to many municipal utilities in northeast MN), and municipal utilities from Bagley, Detroit Lakes, East Grand Forks, Grand Marais, and Moose Lake.

Tools

Minnesota electric utilities customize these guides with their own brands and use them for customer, member, contractor, and business education:

- Air Source Heat Pump Guides (mncerts.org/ashp): These two guides introduce consumers and contractors to ASHP technology, including selection for cold climate and next steps for adoption. Debuted at the 2020 Energy Design Conference, the guides have been customized by Minnesota Power, Otter Tail Power, Todd-Wadena Electric Cooperative, and Lake Country Power.
- Right Light Guides (mncerts.org/lighting): These very popular guides to LED bulbs and tubes are an important resource for consumers and small businesses, and can be used alongside the companion app (rightlightapp.org). Over 70 Minnesota electric utilities have customized them.

Storytelling

Top utility stories this year include an update on Lake Region Electric Cooperative combining wind, solar, and thermal storage for beneficial electrification (mncerts.org/lrec), SMMPA doubling the availability of EV fast chargers in Greater Minnesota (mncerts.org/smmpa), MiEnergy Co-op's residential energy storage pilot (mncerts.org/mienergy), Barnesville Municipal Power's community solar garden (mncerts.org/barnesville), and utilities partnering with the communities they serve to reduce energy burden through LED light bulb donations (mncerts.org/peoples-bulbs & mncerts.org/xcel-bulbs).

Projects

CERTs coordinated 11 separate Saving Watts and Drops efforts with utilities to distribute energy saving items such as light bulbs, showerheads, and faucet aerators. Otter Tail Power distributed 27,648 LED bulbs and People's Energy Cooperative 270 bulbs to food shelves in their territories. CERTs also reached out to food shelves in Minnesota Energy Resources and Minnesota Power territories to offer conservation kits. Fairmont Municipal Utility, Worthington Public Utilities, People's Energy Cooperative, East Central Energy, Otter Tail Power, and Minnesota Energy Resources distributed nearly 2,000 items to five different manufactured home parks. Minnesota Energy Resources got 75 water conservation kits into the hands of Worthington Library patrons and Bemidji residents. Arrowhead Electric Co-op and Grand Marais Public Utility had LED bulbs installed into seniors' homes. (See Underserved Communities for additional details row 2A in Table 5 for energy saved.)

CERTs conducted two significant Business Blitz efforts, which includes direct outreach to businesses about utility programming:

- CERTs conducted door-to-door outreach to main street businesses and commercial districts to promote utility rebates and spur conversations about energy saving projects in collaboration with the Minnesota Municipal Power Agency (MMPA). CERTs visited 81 businesses in Arlington, 16 in Brownton, and 61 in Winthrop in 2019, all three of which are MMPA communities. Seven (7) businesses completed utility-rebated projects. (See row 2B in Table 5 for energy saved.)
- In lieu of door-to-door visits, CERTs called businesses to schedule free energy assessment visits by Otter Tail Power in 11 communities: Appleton, Browns Valley, Canby, Dawson, Graceville, Hendricks, Herman, Hoffman, Lake Benton, Minnesota, and Wheaton. Of the 604 businesses called, 331 received assessments that included installed energy-saving measures like LED bulbs, water-saving devices, and water heater insulation. (See row 2C in Table 5 for energy saved.)

CERTs offered a utility energy efficiency program idea of re-lamping as many businesses as possible through a cost-share approach. Lake Crystal Municipal Utility provided LED tubes for free and the businesses paid for the labor of local electricians to install. CERTs collected lighting data during a 2019 Business Blitz in Lake Crystal. A total of 2,500 linear LEDs were installed in 9 businesses, 1 apartment complex, and 6 city facilities by 3 local electricians (See row 2D in Table 5 for energy saved.).

CERTs provided Utility Program Support to Minnesota Energy Resources (MER) commercial and multifamily programs. As a result of outreach to 47 contractors about bonus rebates, three contractors that MER hadn't previously worked with completed projects in Rochester, Clarks Grove, Bemidji, Thief River Falls, Fairmont. As a result of CERTs outreach to 14 property management companies and housing and redevelopment authorities, three income-qualified properties in Detroit Lakes, Frazee, and Menahga participated in MER's Multi-Family Building Direct Install Program, two of which achieved electric savings through MER's partnership with Otter Tail Power and Minnesota Power (MP). Additional projects came through from CERTs promotion of MER and home energy assessments in Cloquet and Scanlon in 2019. (See row 2E in Table 5 for energy saved.)

Lastly, Detroit Lakes Public Utility supported the MAHUBE-OTWA Community Action Partnership's pilot on weatherizing three manufactured home parks by supplying light bulbs. (See Underserved Communities for more details and row 5A in Table 5 for energy saved.)

Small Businesses

CERTs supported small businesses in utilizing Property Assessed Clean Energy (PACE) financing and utility rebates and programs, connected businesses to free energy service providers for assessments, and collaborated with community-led organizations to advance local business clean energy actions.

Partnership Building

Metro CERT partners with the City of Minneapolis to advance its Green Cost Share Program focusing on making the city cleaner, healthier, and more sustainable through matching funds for commercial, industrial, multi-family, and single-family properties undertaking energy efficiency and solar projects. In 2020, Metro CERT received a partnership award from Minneapolis for its work conducting the technical review process for Green Cost Share projects along with its assistance promoting the request for proposals and developing case studies.

An effort coalesced during fall 2020 called Rebuild Resilient to support businesses and organizations with buildings affected by the civil unrest in the metro this year. Under the umbrella of the Twin Cities Small Business Energy Initiative, Metro CERT organized individuals, groups, and resources to support rebuild efforts including Lake Street Council, Hamline Midway Coalition, and West Broadway Business and Area Coalition to share information on utility rebates (including new rebates from Xcel Energy and CenterPoint Energy), PACE, Energy Smart, and other resources. African Economic Development Solutions has a rebuilding fund and has expressed interest in joining the conversation.

CERTs continues to partner with and refer organizations to the Minnesota Chamber of Commerce's Energy Smart program, the Minnesota Pollution Control Agency's Retiree Environmental Technical Assistance Program (RETAP), and the University of Minnesota's Minnesota Technical Assistance Program (MnTAP); all provide free energy assessment services to businesses and organizations. Over this past year, CERTs sought opportunities for Energy Smart to expand their service into Greater Minnesota, worked with RETAP on post-audit follow-up

around project funding options, and connected the Long Prairie Chamber of Commerce and small manufacturers in Fridley to MnTAP.

Events

Central CERT co-hosted an event "Energy Savings for Businesses in Fergus Falls" with the Fergus Falls Area Chamber of Commerce and Otter Tail Power. While hosted online, this event was similar to the in-person breakfast sessions the Chamber normally hosts and focused on how area businesses can improve their bottom line through energy savings opportunities (mncerts.org/fergus).

The Metro CERT Annual Event focused on metro area businesses and how energy efficiency and renewable energy fits into rebuild efforts across the Twin Cities. Speakers included a variety of community members and business leaders and highlighted the ways in which state and local entities can and are providing resources related to clean energy and resilience. The session also highlighted two Metro seed grant projects—Camp SEE Architecture and MN Renewable Now—and the work they are doing to educate young women of color about clean energy and to help North Minneapolis residents go solar, respectively (mncerts.org/metro-cert-annual-event).

Tools

- PACE Financing (mncerts.org/pace): Guide for businesses, nonprofits, farms, and other organizations looking to enhance their properties with clean energy and energy efficiency.
- Simple Steps to Solar (mncerts.org/simple-steps-solar): A step-by-step guide for organizations interested in solar, from site assessments through installation and telling their story.
- Air Source Heat Pump Contractor Guide (mncerts.org/ashp#contractors): A resource specifically for contractors to learn more about advances in cold climate air source heat pumps and gain confidence in offering the technology to their customers.

Storytelling

CERTs published many stories about business efforts in the past year, including:

- Businesses powering their operations with renewable energy, like steel processor Louis Industries in Paynesville, candy factory Maud Borup in Le Center, skid-steer attachment manufacturer Virnig in Rice, and Steffl Drilling & Pump in Willmar (mncerts.org/businesses);
- Organizations and businesses across the state using PACE financing for energy efficiency and solar in new and existing facilities (mncerts.org/pace); and
- Interviews with clean energy businesses leaders at Impact Power Solutions, Renewable Energy Partners, Center for Energy and Environment, 8th Fire Solar, and Footprint Project, among others (mncerts.org/stories).

Projects

CERTs outreach about Property Assessed Clean Energy (PACE) financing programs administered by the Rural Minnesota Energy Board and the St. Paul Port Authority included engaging 51 businesses directly, presenting 20 times about PACE, and exploring 52 partnering opportunities with cities, business organizations, and utilities to promote PACE. This engagement resulted in 3 businesses utilizing PACE for energy efficiency (e.g., lighting and HVAC) projects in Worthington and Anoka and 1 utilizing PACE for solar in Biwabik. One of these projects (a \$1.1 million project saving 5 billion BTUs) was the first project in Anoka County, for which CERTs worked with the county to take steps necessary to enable PACE financing. CERTs also assisted Freeborn and Watonwan Counties to enable PACE in the past year. (See Agricultural Producers for more PACE projects and row 3A in Table 5 for energy saved and generated.)

CERTs coordinated Business Blitzes, direct outreach to businesses about energy saving projects, in the following communities in collaboration with electric utilities (see Utilities):

- CERTs visited 81 businesses in Arlington, 16 in Brownton, and 61 in Winthrop in 2019. The seven (7) businesses that completed projects following the visits are saving \$30,500 each year. (See row 2B in Table 5 for energy saved.)
- Businesses, along with city buildings, schools, and other organizations, received free energy assessment visits by Otter Tail Power – 39 in Appleton, 20 in Browns Valley, 48 in Canby, 54 in Dawson, 21 in Graceville, 24 in Hendricks, 10 in Herman, 29 in Hoffman, 29 in Lake Benton, 26 in Minneota, and 31 in Wheaton. CERTs signed up 331 businesses to receive free assessments that included direct install of energy-saving items. (See row 2C in Table 5 for energy saved.)

Out of the 40 or so businesses in Lake Crystal, 9 businesses and 1 apartment complex were extensively retrofitted with LED tubes through a unique cost-share utility energy efficiency program suggested and supported by CERTs. The program supported four additional small businesses by leveraging the three local electricians to install the lamps and purchasing the lamps from a local retailer. (See row 2D in Table 5 for energy saved.)

Two additional small business projects were completed from CERTs direct technical assistance on solar. Spurring from a 2019 business blitz in Mille Lacs County, a Princeton business owner ultimately opted for 20 kW of solar on his home instead of his business. An electrical construction business in Winona received a U.S. Department of Agriculture Rural Energy for America Program (USDA REAP) grant for 37.5 kW with CERTs assistance on solar. (See row 3B in Table 5 for energy generated.)

Agricultural Producers

CERTs supported a range of agricultural producers through its continued one-on-one clean energy project assistance, including free solar site assessments, information about leasing land for solar, and guidance on funding options. CERTs also fielded questions about potential value-added opportunities with biomass,

biodigesters, and green hydrogen and ammonia and continued to partner with farmer-focused organizations to share actionable energy efficiency and clean energy information.

Partnership Building

CERTs partnered closely with MN Farmers Union and Citizens Utility Board throughout 2020 by collaborating on series of Public Service Announcement videos on farmstead weatherization and energy assistance on the farmstead and newsletter articles about LED lighting for farms and cold weather energy savings. In addition, CERTs expanded on its partnership with the MN Sustainable Farming Association through their Livestock Eco-services Network about grazing sheep under solar panels.

On solar siting, CERTs worked in collaboration with Murray County, Southwest Regional Development Commission, University of Minnesota Southwest Regional Sustainable Development Partnership, Great Plains Institute and University of Minnesota Institute on the Environment to solicit stakeholder feedback on siting solar in Murray County. The project is exploring how Geographic Information Systems mapping could be used to gather input and then identify solar siting “sweet spots” where solar could deliver energy locally, provide environmental co-benefits for water quality and habitat, and align with community interests.

Events

CERTs collaborated closely with Solar United Neighbors on events with the Driftless Area and Morris/Southwest Area cooperatives. CERTs presented “Going Solar on Your Farm or Rural Small Business” to get the word out about solar and USDA-REAP funding and provided one-on-one assistance following the events to farmers.

CERTs hosted “Energy Futures: The future of low-carbon transportation fuels” that covered how a technology/fuel-neutral approach could work and how it could facilitate emergence of new fuels as well as support existing biofuel infrastructure. The session included speakers who shared viewpoints about how farmers would benefit in this sort of future and how sustainable agriculture, water quality and soil organic carbon would be valued (mncerts.org/low-carbon-fuels).

Tools

- Energy Saving Equipment on the Farm (mncerts.org/energy-saving-equipment-farm): Covers energy assessments, general savings opportunities, and operation-specific efficiency ideas.
- Solar for your Farm (mncerts.org/solar-your-farm): Covers farm-specific opportunities for benefiting from solar energy, including siting, installers, grants, and financing.
- USDA REAP Grants for Farmers & Rural Businesses (mncerts.org/grants-farmers-rural-businesses): Covers the Rural Energy for America Program (REAP) from USDA Rural Development, a great opportunity for Minnesota farmers and rural businesses to save energy with efficiency work and add renewable energy systems.

Storytelling

Three in-depth stories shared Minnesota farmers' experiences with solar, including Heers family swine farm near Owatonna, Canosia Grove farm and cidery near Duluth, and Walkes family cattle and grain farm near Plainview. CERTs partnered with the Minnesota Farmers Union to publish a series on energy efficiency, covering lighting, operations, and farmhouses. CERTs was featured in an episode of the Field Work podcast about adding to farm income with wind and solar energy installations. These stories can be found at mncerts.org/farmers.

Projects

CERTs engages farmers about Property Assessed Clean Energy (PACE) financing programs administered by the Rural Minnesota Energy Board and the St. Paul Port Authority. As a result, five farms near Dodge Center, Fountain, Gary, and Mahanomen utilized PACE for solar. A farmer in Norman County used PACE for three projects, becoming the first PACE projects in that county; CERTs worked with the county to enable PACE financing. (See Small Businesses for more PACE projects and row 3A in Table 5 for energy saved and generated.)

Three additional solar projects in Mahanomen and Duluth were completed from the 34 farms and small businesses assisted through CERTs' USDA Rural Energy Development Assistance from 2017 to 2019 with solar site assessments and guidance on project funding programs like PACE and USDA REAP. Two of these projects received USDA REAP grants and the third was financed with PACE. (See row 4A in Table 5 for energy generated.)

Underserved communities

CERTs leveraged its Saving Watts and Drops programming to coordinate energy saving efforts with manufactured home communities and food shelves. The CERTs partnership also launched the Under 5% Energy Burden campaign to work toward ending energy poverty by facilitating a range of projects and developing partnerships to ultimately lower household energy bills and spur clean energy workforce development. "Energy Burden" is the percentage of household income spent on home energy bills. The nation's average energy burden is roughly 3.5%, but some Minnesotans spend 20-30% of their income on energy. Developed in collaboration with the Department of Commerce, this initiative seeks to reduce the energy burden of all households to under 5% of their household income by 2025 through a combination of energy assistance, weatherization, solar, household education, and community investment.

Partnership Building

Partnership building efforts through the "Under 5% Energy Burden" campaign have included work with community action agencies and other assistance providers, with local and regional Housing Redevelopment Authorities, and with local community organizations. This effort has also been a catalyst behind a collaboration with Serve Minnesota as they explore a potential new service initiative geared toward residential energy efficiency.

With the support of the McKnight and Carolyn Foundations, CERTs launched a dedicated effort geared toward energy efficiency in manufactured home parks across the state. This effort has helped grow a relationship with the North Country Foundation (a group of co-op owned manufactured home parks), forge a new collaboration with Growing Up Healthy in Rice County, and jump start a range of projects with communities across the state such as Pine City, Minneota, and Faribault.

Events

CERTs hosted “Energy Futures: Tackling Poverty with Community Energy Efforts,” which focused on the work of Ecolibrium3 in the Lincoln Park neighborhood of Duluth and how that approach could be scaled across other communities.

CERTs partnered with the Metropolitan Council to kick-start a new pilot program called “Solar for Vouchers” via two (2) workshops geared toward housing developers. This effort seeks to provide solar technical assistance to developers as a catalyst for securing additional affordable housing units.

Tools

- Renter & Landlord Energy Guides (mncerts.org/home): This is a series of guides designed for specific audiences to help them understand utility bills, get support, find energy-saving tips, and start conversations about energy. Guides for manufactured homes and homeowners will be released soon.
- Reducing Energy Burden Under 5% (mncerts.org/under5): This effort highlights resources, strategies, and partnerships for helping people in Minnesota reduce their energy burdens. It also features updated guides about Energy Assistance, Weatherization Assistance, Shut-off Protections, and COVID-specific support.

Storytelling

CERTs published a wide range of stories about clean energy supporting underserved communities in Minnesota in the past year. Top among them is a new video about a partnership with Growing Up Healthy to empower manufactured home residents in Northfield to make energy-saving improvements. Other stories include efforts to reduce poverty in Duluth through solar energy, train local people and install solar on the homes of low-income residents in Minneapolis, donate LED bulbs to those in need in Rochester, and make homes healthier and reduce energy burden with weatherization assistance across the state. These stories and more can be found at mncerts.org/underserved-communities.

Projects

CERTs facilitated four (4) Saving Watts and Drops efforts to help utilities distribute energy saving LED light bulbs to food shelves. Otter Tail Power distributed 27,648 LED bulbs to 21 food shelves in Argyle, Battle Lake, Bemidji, Browns Valley, Climax, Hallock, Fergus Falls, Fertile, Erskine, Mahnommen, Hoffman, Lake Bronson, Oklee,

Crookston, New York Mills, Pelican Rapids, Perham, Red Lake Falls, Morris, Strandquist, and Wheaton. People’s Energy Cooperative provided 270 bulbs to food shelves in Chatfield, Oronoco, and Plainview. CERTs also reached out to 31 food shelves in Minnesota Energy Resources and 21 food shelves in Minnesota Power territories to offer conservation kits. (See Utilities for additional details and row 2A in Table 5 for energy saved.)

CERTs also coordinated “Saving Watts and Drops” efforts with utilities to distribute energy saving items such as light bulbs, showerheads, and faucet aerators to 379 units within manufactured home parks in Fairmont, Minneota, Pine City, Rochester, and Worthington. In most cases, CERTs worked with the manufactured home park manager to deliver the items, educational materials, and utility rebate information to each unit’s door. (See Utilities for additional details and row 2A in Table 5 for energy saved.)

One “Saving Watts and Drops” effort involved a donation of 350 bulbs by an individual going to the Semcac community action agency in Northfield. (See row 2A in Table 5 for energy saved.)

CERTs conducted two (2) significant Manufactured Home Park Weatherization efforts:

- MAHUBE-OTWA community action partnership provided targeted energy saving upgrades to all households, not just those qualified for weatherization, in three manufactured home parks in Detroit Lakes. In total, 44 homes received upgrades to lighting, water heater pipe insulation, weather stripping, and furnace filter replacement. Detroit Lakes Public Utilities, a Missouri River Energy Services member city, provided LED bulbs. (See row 5A in Table 5 for energy saved.)
- Growing Up Healthy, a program of Northfield Healthy Community Initiative, provided additional home energy saving items beyond what was already received through the Home Energy Squad visits offered in partnership with Xcel Energy. Conservation kits containing window film insulation kits, insulating spray foam, caulk sealant, and caulking gun were distributed to 2 manufactured home parks in Northfield reaching 170 units and 5 parks in Faribault reaching 300 units. (See row 5B in Table 5 for energy saved.)

Cross-Cutting Efforts

Some of CERTs work spans across the five priority audience areas. A few highlights are described below.

Electrification

Aside from the air source heat pump (ASHP) efforts mentioned in Utilities and Small Businesses above, CERTs also addressed geothermal for electrification. Northwest CERT hosted an online event on "Geothermal for Local Governments & Utilities" to provide an overview of the technology and discuss how it can be used to increase the efficiency of heating and cooling new and retrofitted buildings.

In addition to efforts with cities and municipal utilities, CERTs, along with Drive Electric, hosted a statewide online event called, “Charging Up with Volkswagen Settlement Funds” to help communities, utilities, non-

profits, or businesses interested in hosting an electric vehicle charging station learn more about potential funding through the Volkswagen Settlement funds.

Workforce Development

The most accessed resource on the CERTs website in 2020 was the Clean Energy Job Board. Between job opportunities curated by CERTs staff and those added directly by hiring organizations, there were over 300 jobs featured (mncerts.org/job-board). To complement this resource, a new Careers, Workforce & Training page was added to the website to help people see what careers exist and how to get training for them, as well as interviews with industry leaders and training providers to offer context and inspiration (mncerts.org/careers).

Clean Energy Economy

The Power of Minnesota documentary (powerofmn.com), released in 2018, features stories of Minnesotans across the state who are building and participating in the clean energy economy. Over the past year, CERTs hosted two community clean energy events featuring the Power of Minnesota film, one with the Willmar Area Climate Action Group and one with Deep Portage Learning Center in Hackensack. Both events included a film screening and community discussion. In 2020, CERTs worked with partners to create and release three new videos through *The Power of Minnesota*: electric bus manufacturing at New Flyer in St. Cloud, solar at Pine River-Backus Schools, and solar for manufacturing at Louis Industries in Paynesville.

Clean Energy Impacts

Table 5 details efforts with energy savings or offsets in 2020⁴ as a result of CERTs work, including a row identifier, the corresponding audience narrative section(s) above, a description of the effort, and the actual BTUs saved or offset. Cost savings in Table 5 reflect savings from energy efficiency projects only.

Table 5 CERTs Impacts Summary

Row ID	Audience Narrative(s)	Effort Description	BTUs ⁵
1A	Governmental Units	SolSmart: Clay County had 5 community solar gardens (CSGs) installed totaling 5 MW. Other non-CSG installations occurred in Carleton County (6 systems installed totaling 50 kW), Crystal Bay Township (1 system, 6 kW), and cities of Winona (6 systems, 97 kW) and La Crescent (2 systems, 25 kW). From all, 6,805,337 kWh production annually.	23,219,809,844 Generated

⁴ Due to the timing of this report, data herein covers activities spanning November 1, 2019 – October 31, 2020.

⁵ Calculations include conversions as follows: 3,412 BTUs per kWh; 100,000 BTUs per therm; 91,333 BTUs per gallon propane; 114,000 BTUs per gallon gasoline

Row ID	Audience Narrative(s)	Effort Description	BTUs ⁵
1B	Governmental Units	CSG assistance: St. Paul designated to Como Zoo a 1.8 MW subscription, equivalent to 2,365,200 kWh. Hennepin Co. subscribed to 1.4 MW, equivalent to 1,898,073 kWh.	14,546,287,476 Generated
1C	Governmental Units	Onsite Solar for Jurisdictions: Maple Grove installed 904 kW total (600 kW on Public Works Building and 304 kW at Water Treatment Plant) and Edina Public Schools installed an additional 240 kW of solar (Transportation Building); totaling 1,550,520 kWh produced annually.	5,290,374,240 Generated
1D	Governmental Units	Cities Charging Ahead: Five cities purchased or leased 10 electric vehicles in 2020, 5 cities installed 7 charging stations in 2020, and 4 cities installed 11 charging stations in 2019, with 15,567 gallons gasoline avoided, 152,157 kWh used for charging, and \$15,000 net annual savings.	1,255,478,316 Net Saved
1E	Governmental Units	Energy Saving Partnership: Ivanhoe Public Schools installed a boiler system to replace costly infrared electric space heaters, saving \$13,000 annually.	116,000,000 Saved
2A	Utilities, Underserved Communities	Saving Watts and Drops: Distributed more than 30,000 energy saving items (light bulbs, showerheads, and faucet aerators) with 9 partnering utilities to 24 food shelves, 5 manufactured home parks, 9 seniors' homes, and others. One individual donation of 350 bulbs (not from a utility) went to a community action agency. In total, savings of 1,681,511 kWh, 8,483.9 therms, and \$158,200 annually.	6,585,705,532 Saved
2B	Utilities, Small Businesses	Minnesota Municipal Power Agency Business Blitz: Visited 81 businesses in Arlington, 16 in Brownton, and 61 in Winthrop in 2019. Seven businesses completed projects, resulting in 277,269 kWh and \$30,500 savings annually.	946,041,828 Saved
2C	Utilities, Small Businesses	Otter Tail Power Business Blitzes: Scheduled 331 assessments in 11 communities in western MN which included direct install of energy-saving measures like LED bulbs, water-saving devices, and water heater insulation, resulting in 412,466 kWh and \$33,000 annually.	1,407,333,992 Saved
2D	Utilities, Small Businesses	Lake Crystal Business Relamping: 2,500 linear LEDs for 9 businesses, 1 apartment complex, and 6 city facilities by 3 local electricians, resulting in 77,118 kWh and \$13,264 savings annually.	263,126,616 Saved

Row ID	Audience Narrative(s)	Effort Description	BTUs ⁵
2E	Utilities	Minnesota Energy Resources (MER) Utility Program Support: New contractors with commercial bonus rebates on furnaces, water heaters, and thermostats in Rochester, Clarks Grove, Bemidji, Thief River Falls, Fairmont with 1,307 therms and \$850 savings. Income-qualified housing with 39 units total in Detroit Lakes, Frazee, Menahga participated in MER Multifamily Building Energy Efficiency Program (with electric utilities for two properties) with 140 therms, 11,933 kWh, and \$1,500 savings. Five additional projects from home energy assessments in Cloquet and Scanlon with 709 therms and \$460 savings.	256,315,396 Saved
3A	Small Businesses, Agricultural Producers	Property Assessed Clean Energy (PACE) Financing: Three businesses in Worthington and Anoka financed energy efficiency (like lighting and HVAC), saving \$90,300 annually. A Biwabik business and farms near Dodge Center, Fountain, Gary, and Mahnommen financed 6 solar projects.	5,490,230,000 Saved 1,293,423,384 Generated
3B	Small Businesses	Solar Direct Technical Assistance: Princeton business owner installed 20 kW solar on home after 2019 Mille Lacs County business blitz. Electrical construction business in Winona received U.S. Dept. of Agriculture Rural Energy for America Program grant for 37.5 kW with CERTs solar assistance. From both, 90,922 kWh production annually.	310,225,864 Generated
4A	Agricultural Producers	USDA Rural Energy Development Assistance: Three additional solar projects were completed from the 34 farms and small businesses assisted from 2017 to 2019 with solar site assessments and funding guidance. These three projects are producing 129,575 kWh.	442,109,900 Generated
5A	Underserved Communities, Utilities	MAHUBE-OTWA Manufactured Home Park Weatherization: Served 44 homes in 3 parks with upgrades to lighting, water heater pipe insulation, weather stripping, and furnace filter replacement, resulting in 27,100 kWh, 5,730 therms, and \$6,500 savings annually.	665,465,200 Saved
5B	Underserved Communities	Growing Up Healthy Manufactured Home Park Weatherization: Conservation kits containing window film insulation kits, insulating spray foam, and caulk sealant were distributed to 170 units across 2 manufactured home parks in Northfield and 300 units across 5 parks in Faribault, resulting in 10,975 therms and \$7,100 annually.	1,097,500,000 Saved

Row ID	Audience Narrative(s)	Effort Description	BTUs ⁵
Total CERTs Program Savings			63.2 billion

Allocation of Legislative Funding Resources and Leveraged Resources

CERTs has 17 staffs who account for 12 full time employees (FTE), all of whom are paid in part via this legislative allocation. Staff are based across CERTs’ four (4) partner organizations and across all seven (7) 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. Seed grants 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 leverage additional support for its work. Funding and related programmatic efforts include U.S. Department of Agriculture Rural Energy Development Assistance funding to assist farms and rural small businesses with renewable energy assessments, McKnight Foundation funding to spur support of solar school efforts and storytelling, Carolyn Foundation funding to advance an energy efficiency model with manufactured housing, and several contracts for services for specific projects and efforts.

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

The Minnesota Department of Commerce submits this report pursuant to Minnesota Statutes 216B.241, subd. 9 (f), on the cost-effectiveness and progress of implementing the Minnesota Sustainable Building 2030 (SB2030) 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 2010 report concluded that SB 2030 would be cost-effective when meeting the targets for projects during the first phase of the program (between 2010 and 2015).

In the 2013 report, this conclusion was verified with data from the first 40 projects in the program designed to the SB2030 Energy Standard. As data has come in from projects in the last few years, the following savings have been reported, this trend continues for the subsequent phase of the project:

Table 6 SB2030 Estimated Cost Savings

Report year	Number of reporting projects	Estimated energy savings per year, mmBtu	Estimated cost savings per year, million \$	Estimated energy savings to-date, mmBtu*	Estimated cost savings to-date, million \$*
2013	40	250	3.25	--	--
2014	66	327	5.24	--	--
2015	78	490	7.04	--	--
2016	93	534	8.3	--	--
2017	126	634	9.8	--	--
2018	154	867	12.6	1,765	25.7
2019	166	923	14.8	1,817	29.1
2020	185	1,023	15.7	2,893	44.4
2021	197	1,067	17.5	2,789	75.0

*Note that savings to-date were not estimated prior to the 2018 report.

History of Minnesota Sustainable Building 2030

The SB2030 standards were enacted in 2008. The Center for Sustainable Research (CSBR) at the University of Minnesota was designated as the lead entity 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 SB2030 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. In 2020 this target moves to 80% better than a baseline building.

The SB2030 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 Statutes 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 SB2030 standards and the law made education and training a primary goal.

Expected Cost-Effectiveness of the SB2030 Program

The significant improvements in building performance required by the SB2030 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 2009⁶, 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 required by the SB2030 standards can be achieved cost-effectively for the overwhelming majority of building types and situations. This analysis has been updated in 2019 to reflect changes in utility pricing and will inform further implementation of cost-effectiveness for projects in the program. Through 2019, a 15-year simple payback period was also used as a measure of cost-effectiveness after an in-depth evaluation of societal, participant, and utility costs and using methodology consistent with Conservation Improvement Program (CIP) calculations. The measure was developed as a metric to be used by design teams and by the SB2030 Review Team when evaluating cost-effectiveness because implementing CIP-style calculations for individual strategies is not a viable approach.

During the last half of 2019, the cost-effectiveness evaluation was updated and concluded that a payback period of 12 years is an appropriate cost-effective boundary for measures under the SB2030 program, using the analysis method outlined above for updated utility factors. The SB2030 Project Team anticipates moving to a regular update of the cost-effectiveness evaluation, coordinated with triannual CIP filing schedule.

⁶ This document is available online through the Minnesota Legislative Reference Library at <http://www.leg.state.mn.us/docs/2009/mandated/090892.pdf>

Projects that demonstrate that they cannot meet the SB2030 standards cost-effectively using on-site measures (efficiency and renewable energy) are permitted to provide sufficient carbon-neutral renewable energy through off-site development or procurement of renewable energy sufficient to meet the SB2030 target. This process ensures that the SB2030 standards do not mandate energy efficiency upgrades that are not cost-effective for State-funded projects while at the same time achieving the increasingly stringent energy reduction targets mandated by the program. Projects may access these methods after a project team demonstrates that appropriate energy saving design options were investigated in an effort to achieve the SB2030 performance level and shown that on-site only options meeting the SB2030 standard are not cost-effective for the particular project.

An appropriate on-site energy standard is then set by evaluating the set of all cost-effective measures for that project. This path is anticipated to more often include on-site renewable generation as the cost-effectiveness of this strategy is improving. To ensure this cost-effectiveness is also present 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. Wastewater treatment facilities are also provided a pathway to document energy efficiency measures pursued and anticipated performance metrics.

State-Bonded Project Cost Effectiveness Actual Results

From 2009 through December 2020, 197 building projects have been involved in the *SB 2030* process and have reported Energy Standard and Design Energy Consumption values. Of these 197 projects, 136 of the 154 state-required building projects and 38 of 44 volunteer building projects have reported as on track to meet the required SB 2030 Energy Standard. To date, 88% of all buildings project enrolled in the SB2030 program have reported meeting or exceeded the SB2030 Energy Standard in design. On average, these projects have reported anticipated energy consumption of 31% less than their 2030 Energy Standard.

As new projects are added each year and projects meet the 2020-2025 energy standard, ongoing annual savings to the State and other building owners will increase. Based on submitted anticipated performance the 139 completed SB 2030 projects are estimated to have saved 2,789 million kBtu, avoided 403,000 tons of CO₂e and saved \$75.0 million as of January 1, 2020. The total cost of the program using CIP funds is approximately \$ 6.31 million through December 2019.

The buildings designed to the SB2030 Energy Standard are predicted to save approximately 1,067 million kBtu/year, a reduction in Carbon emissions of 119,000 tons of CO₂e, and a savings of \$17.5 million per year assuming an average cost of \$16.36 per mmBtu.

Example projects recently participating and contributing to this savings, and which were recognized as finalists at the [2018 Best of B3 Award Event](#)⁷ include:

⁷ These projects are the same that were listed in the prior year's report as the awards program has been put on hold during COVID-19. A 2021 awards program is planned for April.



Figure 1(*left*) & 2(*right*) Department of Natural Resources Glenwood Area Office Facility: 6,765 square foot (sf) building in Glenwood. Annual savings over code are estimated at 384 mmBtu, \$5,600 and 20 tons of carbon.



Figure 3(left) & 4(right) City of Mankato Transit Facility: 43,651 sf building in Mankato. Annual savings over code are estimated at 3,099 mmBtu, \$49,000 and 311 tons of carbon.



Figure 5(left) & 6(right) CHS Field: 80,349 sf building in Saint Paul. Annual savings over code are estimated at 603 mmBtu, \$9,660 and 60 tons of carbon.

SB2030 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, and the integration of SB2030 with the utilities' CIP programs, hosting education classes for designers and building operators, and assisting design teams in the integration of the SB2030 Energy Standards into projects. Several program updates were implemented for new projects participating in the program in 2020.

- **Case Studies Database**—as part of the program, predicted building performance has been documented for 151 SB2030 projects. Reported metrics may 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 SB2030 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 SB2030 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 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, and
 - Notifies facilities managers when tasks uncover malfunctioning systems.

Eight tasks are currently supported in the online tool. Two methods have been developed to check on correct operation of heat recovery devices, and one for demand controlled ventilation. The DCV module is undergoing refinement to make it more broadly applicable to numerous operation schemes that have been discovered during pilot projects. The Center for Energy and Environment has completed EEO manuals for three pilot buildings. CSBR is working with CEE on these pilots.

- **SB2030 Utility Programs**—as the SB2030 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 SB2030 standards. Priority items are listed below.
 - A) Comprehensive design assistance services.
 - B) Bonus incentives (per unit of savings) for achieving SB2030 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 which has assisted in streamlining submissions and program compliance verification.

- **Sustainable Building 2030 Education**—educational programs for the designers continue to be delivered. Presentations on the B3 Guidelines and SB2030 programs have been given at the AIA Minnesota Conference as a session outlining investigations of improving resilience in the program and a session working through the process of a project using the 80%-better program processes. The updated Energy

Standard Tool with improved energy modeling functionality was presented in October. A training on the B3 Sustainable Post-Occupancy process was developed and delivered in November. These and other presentations were recorded and are available online at the [B3 Guidelines Training page](#). A symposium on SB2030 will be held on January 26, 2021 in partnership with Science Museum of Minnesota. Throughout the year many individual team meetings were also held with design firms working on projects participating in the program—both to outline program requirements and to work through project-specific issues as they arise.

- **2020 Program Updates**—several program elements were updated in 2020, in part to accommodate the shift to 80%-better buildings. These updates include:
 - Meet both an energy and a carbon standard—This change emphasizes those cost-effective measures that would achieve immediate carbon savings, enables stakeholders to make informed decisions about the resources that their projects use, and further meets the intent of 16B.325: to achieve energy conservation and associated carbon emissions and lowest lifetime cost for new buildings and major renovations.
 - Expansion of available renewable energy implementation, based on a hierarchical approach—projects not cost-effectively able to achieve the SB2030 Energy and Carbon Standards with only energy efficiency measures are required to provide sufficient carbon-neutral renewable energy (RE) to meet the standards. SB2030 has developed a hierarchy of available options aligned with a National Renewable Energy Lab (NREL) classification system of on-site and off-site options.
 - Hold renovations to the same standard—Major Renovations were previously held to a more relaxed standard than new construction, consisting of half of the required reduction for energy consumption from the 2003 baseline building. As Minnesota’s Energy Code has been updated since the inception of the SB2030 Program, meaning these renovation projects represent a much less significant improvement over a code-base building than new construction projects in the program, as code advancements have achieved close to parity with the SB2030 renovation requirements.
 - Consider utility-specific emission factors—this update allows design teams to calculate the utility territory specific carbon intensity and baseline and enables better evaluation strategies given the specifics of their utility territory. Further, this allows the SB2030 Program to account for utilities’ efforts in decarbonizing the grid.

SB2030 Next Steps

All work on the SB2030 program completed to-date shows it is cost effective to meet the SB2030 target. Eighty eight percent of all buildings involved in the program were able to meet the SB2030 Energy Standard with little additional cost to the overall projects. Total project costs are \$6.31 million through December 2019.

The 197 buildings designed to the SB2030 Energy Standard are predicted to save approximately 1,067 million kBtu/year, 119,000 tons of CO₂e and a savings of \$17.5 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. The program has demonstrated the value of establishing customized performance targets early in the design process, which permits projects flexibility in how to best achieve those targets. The savings to-date reflect the significant energy, cost and carbon reductions achieved by the program. More educational opportunities are needed for architects and engineers to facilitate more SB2030 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 SB2030 programs.

Future areas of consideration in the SB2030 Program development include the consideration of time-of-day CO₂ emissions factors, which could allow the SB2030 Program to encourage strategies that decrease energy use when the grid is the most fossil fuel dependent, and could be used by design teams to accurately adjust the carbon intensity relative to the efficiency strategies that they select.

Work continues on the next stages of the SB2030 program to support the reduction requirement for new projects, which increased from a 70% to 80% reduction in January of 2020. Program updates as part of this transition included an expansion of renewable resources available for project teams to consider, elimination of a reduced standard for renovation projects, implementation of a parallel carbon and energy standard, improving carbon emissions factors for electric utilities, and expanding the cost-effectiveness test to include a hierarchy of renewable energy generation options. This and other program development efforts will require continued research from the project team led by the Center for Sustainable Building Research at the University of Minnesota, in order to ensure that projects are able to comply in a cost-effective manner with the SB2030 Standard while ensuring that the robust program goals are maintained.

Savings from the 151 SB2030 projects currently in operation are estimated at 4,528 million kBtu, 617,000 tons of avoided carbon at a cost savings of \$75.0 million.