

Xcel Energy
Renewable Development Fund (RDF)

Annual Report to the Minnesota State Legislature

February 15, 2019

Background

The Renewable Development Fund (RDF) program was first authorized by the Minnesota Legislature in 1994 in conjunction with legislation regarding the Prairie Island nuclear generating plant in Red Wing, Minnesota. As a condition of storing spent nuclear fuel in dry casks at Prairie Island, the RDF statute required Xcel Energy to transfer \$500,000 per year for each dry cask containing spent fuel to a renewable energy fund, which amounted to \$9 million annually. In 2003, this statute was amended to extend the life of the nuclear-waste storage at the Prairie Island plant; at that time the amount to be transferred into the RDF was increased to a fixed sum of \$16 million annually. In 2007, the statute was further amended to add an additional assessment for dry casks stored at our Monticello nuclear generating plant in Monticello, Minnesota. The annual amount set aside for RDF funding has increased throughout the years as the Company has placed in service more dry cask storage at its Prairie Island and Monticello nuclear generating plants. A cumulative total of \$307,548,394 million has been set-aside in the RDF since inception.

2017 Minnesota Session Laws Chapter 94, Article 10, Section 3 (the 2017 Legislation) made various changes to the the RDF program including, among other things

- the creation of a new Renewable Development Account (RDA) in the special revenue fund in the state treasury, which is administered by the Commissioner of Management and Budget (whereas the monies collected under previous versions of the statute were known as the RDF, and administered by Xcel Energy);
- changes to the purposes for which RDA funds can be expended in future funding cycles;
- the creation of a new RDA advisory group (though the existing RDF advisory group remains for the purposes of oversight over the RDF's prior funding cycles);
- changes to the process for soliciting, selecting and awarding RDA funds in future funding cycles; and
- changes in reporting requirements
 - a RDA advisory group must submit this annual report on the projects funded by the RDA for the prior year and all previous years (whereas previous versions of the annual report were submitted by Xcel Energy).
 - the commissioner of management and budget will report to the legislature on the availability of funds in and obligations of the RDA.

Essentially, the 2017 Legislation created two types of programs under the statute—the legacy RDF legislative mandates and grants (which continue to be referred to as the

RDF) and the new RDA, which is funded by the annual transfer to the Minnesota Management Budget (MMB).

Due to Xcel Energy's familiarity with the projects funded previously under the legacy RDF, its continuing obligation for annual reporting with the Minnesota Public Utilities Commission, and that RDA advisory group process has not yet been established, Xcel Energy is submitting this report on behalf of the RDA advisory group.

RDA Grant Program Summary

As required by Minn. Stat. § 116C.779 (1)(p), since the 2017 Legislation was enacted in May 2017, no projects have been funded by the newly-created RDA fund in the prior year or any previous year.

RDF Grant Program Summary

For informational purposes, Attachment A includes a complete list of projects for all years that have been awarded RDF grant awards, prior to the enactment of the 2017 Legislation.

The costs of RDF program expenses allocated to Minnesota are recovered through a surcharge on our customer bill statements as part of their monthly charges for electricity. In 2018 the RDF charge was \$0.001318 per kWh.

Since its inception, the RDF program has provided over \$300 million for renewable energy initiatives including \$92.6 million for Renewable Energy Production Incentive (REPI) payments, \$126.5 million for legislatively-mandated projects and programs, \$86.3 million which has been awarded over four grant cycles (see Attachment B - Financial Statement), and \$2.3 million for general program support. Mandated programs have included the appropriation of \$25 million to the University of Minnesota for the Initiative for Renewable Energy and Environment (IREE), and \$57.1 million for the Minnesota Bonus Solar Rebate and Solar Energy Incentive Programs.

In 2012, \$120 million had been appropriated for the Made In Minnesota Solar Energy Production Incentive Account. The 2017 Legislation rescinded this appropriation on a going forward basis. A total of \$48 million was paid into the Made In Minnesota Solar Energy Production Incentive Account. Additional appropriations in 2018 also include \$20 million to the City of Benson and \$34 million to the Laurentian Power Authority.

These additional appropriations will be paid out over the next several years in a manner consistent with newly enacted Minnesota law.

As Table 1 below shows, 65 legacy RDF projects have been completed and 16 are active. All Cycle 4 projects that have been awarded RDF grants; have executed grant contracts and project activity has begun.

Table 1: Summary of Project Status

Type	Completed	Active as of 12/31/2018	Total
Energy Production	22	4	26
Research	43	9	52
Higher Education Block Grant	0	3	3
Total	65	16	81

Xcel Energy has responsibility for the day-to-day administration of the legacy RDF. A seven-member advisory group, representing the interests of various stakeholder groups, assisted Xcel Energy in evaluating and making recommendations on grant project proposals to Xcel Energy and the Commission. Further details on the members of the RDF advisory group can be found in Attachment C.

The 2017 Legislation struck a provision that referenced the Company’s management of the RDF. Under the 2017 Legislation, there is no entity that “manages” the RDA, but the MMB does “administer” the RDA. The 2017 Legislation also seems to contemplate a new RDA advisory group, potentially with different composition than the legacy RDF advisory group, with more responsibility for preparing the requests for proposals and making funding recommendations to the Company. Because of the lack of clarity, no one has been appointed to the RDA advisory group thus far.

Legislatively Directed RDF Projects

Legislation in 2003 created the Renewable Energy Production Incentive (REPI) program to provide production incentives for electricity generated by wind, biogas, and hydro. The Minnesota Department of Commerce administers this program. REPI payments since program inception have totaled approximately \$92.6 million.

a. RDF Solar Rebates (Minnesota Bonus)

In 2010, the Minnesota Legislature approved a measure to utilize \$21 million from the RDF program for solar rebates called Minnesota Bonus. This program was available to customers for incentives awarded from 2011 to 2013. The legislation specifies that Xcel Energy would administer the RDF rebates for solar photovoltaic (PV) systems less than 40 kW installed by customers in the Company's Minnesota service territory. The RDF solar rebates were only available for systems that use solar modules manufactured or assembled in Minnesota. Minnesota Bonus rebates were first disbursed in 2011. No additional capacity was awarded since the program closed in 2014. Most of the projects were installed during 2014 and 2015, however a very small number of additional projects continued to be completed. Payments have continued for a total reimbursement of over \$19 million for the program thus far. The Minnesota Bonus provided roughly 3.8 MW of installed capacity from 138 projects.

Minnesota legislation, Minn. Stat. §216C.417, established a "Made in Minnesota" solar energy production incentive account as a separate account in the special revenue fund in the state treasury in 2013. Beginning January 1, 2014 and each January 1 thereafter, through 2023, for a total of ten years, each electric public utility subject to Conservation Improvement Program (CIP) requirements must annually pay to the Commissioner of Commerce five percent of the minimum amount it is required to spend on CIP. Affected utilities are Xcel Energy, Minnesota Power and Ottertail Power. Funds from the RDF, when added to the total amount paid by the three affected utilities, totals a combined annual payment of \$15.0 million. In 2017, the annual payment obligation under Minn. Stat. §216C.417 was terminated on a going forward basis. The Made in Minnesota program led to an installation of roughly 17.4 MW of solar capacity from more than 1,300 projects.

b. Made in Minnesota (MiM) Solar Incentive Account

In 2013, Minn. Stat. §116C.7792 approved a measure to establish a solar energy incentive program to be operated for five consecutive calendar years beginning in 2014 with no specifications around where panels are manufactured. Minn. Stat. §116C.7792, as revised by S.F. 1456 in 2017, extended the program through 2021. In 2018, H.F. 3232 further revised this statute and increased allowable name plate capacity from 20 kWdc to 40 kWdc. This revision also allows for more than one solar system per premise to be eligible for this incentive program, subject to an aggregate cap of no more than 40 kWdc. Further, the solar system eligible for incentive must be sized to less than 120 percent of the customer's on-site annual energy consumption when combined with other distributed generation resources. Since this program's inception in 2014, 14.4 MW of solar have been installed (roughly 1,500 systems) using RDF/RDA funding.

Approximately, \$600,000 has been disbursed in the form of customer production incentives.

According to Minn. Stat. § 116C.779 subdiv (1)(c), (d) and (e), Xcel Energy must annually transfer funds to the RDA, but the Company can withhold from that transfer RDF payments for ongoing legislative programs previously enacted and the three additional expenditures approved by the legislature in the 2017 Legislation. First, an appropriation of \$34,000,000 over a five year period (fiscal years 2018-2022) to the Laurentian Energy Authority, LLC to assist the transition required by the termination of a PPA. Second, an appropriation of \$20,000,000 over a four year period (fiscal years 2018-2021) to the City of Benson for purposes of economic development. Finally, an appropriation of \$1,000,000 during fiscal year 2018 to the DEED 21st Century Minerals Fund.

Grant-Funded RDF Projects

Energy Production: As shown in Table 2, the 31 electric production projects that received RDF grants have resulted in the installation of more than 29.7 MW of renewable energy nameplate capacity and have generated a total of 631,330 MWh of energy over the life of the facilities.

Table 2: Electric Production Projects

Type	Investment	Facilities	Installed Capacity (MW)	Energy Production (MWh)
Biomass	\$27,887,976	3	0.30	2,868
Hydro	\$44,145,119	2	9.176	277,846
Solar	\$44,104,631	22	10.27	61,372
Wind	\$10,990,338	4	9.95	289,243
Total	\$127,128,064	31	29.7	631,330

The environmental benefits from these investments are recognized in marketable Renewable Energy Credits (RECs) from qualifying facilities, emission reductions, avoided costs to build conventional facilities, and avoided costs to replace the electricity generated. RDF projects have generated RECs which can be used to meet Xcel Energy’s renewable energy goals and requirements to the benefit of its electric customers.

Research and Development: As shown in Table 3, research and development projects contributed to the development of articles, workshops, and patent applications.

Table 3: Research and Development Projects

Technology	Total Investment	Published Articles	Presentations/ Workshops	Patent Applications
Biomass	\$35,662,853	23	62	3
Solar	\$8,345,591	10	29	1
Wind	\$10,306,447	12	49	1
Multiple Tech	\$7,557,215	14	58	3
Total	\$61,872,106	59	198	8

It should be noted that two out-of-state research projects are using a Minnesota project host located in the NSP-Minnesota service area. These projects' association to an in-state host keeps the research relevant to Minnesota and directs additional RDF funds to businesses and organizations in the state.

Grantee	MN Host	Host Location	Host Activity
Coaltec Energy USA	P & K Farms	Northfield, Minnesota	Pilot demonstration of biomass gasifier
University of Florida	Pending Research	West Central Minnesota	Pilot demonstration of anaerobic digester
Oak Leaf Energy	Met Council	Shakopee, Minnesota	Install 970 kW photovoltaic array

Conclusion

Xcel Energy appreciates this opportunity to provide this report summarizing the projects funded by the RDA, and also providing information about the projects funded by the RDF for informational purposes, through 2018.

Project Name	Contract	Project Site		Project End Date	Status	Type	Cycle	Resource	Project Description	RDF Award	Grant Funds Disbursed	Funding				Current Grant Balance	Deobligated Funds	Power Development		REC's	Enviro	Externalities		Intellectual Property				
		City	Zone									Leverage Funds	Total Costs	Capacity (kW)	Generation (MWh)			Avoided Capacity	Avoided Energy			Articles	Presentations	Patent Apps				
CENTRAL REGION																												
University of Minnesota (Dairy)	RD4-2	Morris	Central	1/31/20	current	RD	4	Solar/Wind	Model a "net-zero" energy dairy parlor at the West Central Research and Outreach Center by integrating 20 kW wind and 54 kW solar with storage.	\$982,408	\$656,396	\$218,815	\$875,211	\$326,012	\$0													
City of Hutchinson	EP4-41	Hutchinson	Central	6/1/16	complete	EP	4	Solar	Installed 400 kW photovoltaic fixed-tilt array on a capped municipal landfill and use the power at the adjacent wastewater treatment facility.	\$958,369	\$958,369	\$618,403	\$1,576,772	\$0	\$0	400	1,253	\$401	\$10	\$38,563	\$15,108			2				
Best Power Int'l (St. John's Expansion)	EP4-6	Collegetown	Central	3/16/15	complete	EP	4	Solar	Installed a 182 kW photovoltaic fixed-tilt array at St. John's solar farm for a side-by-side comparison with the existing 400 kW single-axis tracking array.	\$172,213	\$172,213	\$363,613	\$535,826	\$0	\$0	182	961	\$523	\$6	\$25,681	\$22,558							
Best Power Int'l (St. John's)	EP3-3	Collegetown	Central	5/8/10	complete	EP	3	Solar	Installed a 400 kW photovoltaic facility at St. John's University to demonstrate commercial viability of solar power in Minnesota.	\$1,994,480	\$1,994,480	\$1,188,823	\$3,183,303	\$0	\$0	400	5,044	\$3,290	\$23	\$143,223	\$135,134							
University of Minnesota (Biomass)	RD3-23	Morris	Central	8/1/11	complete	RD	3	Biomass	Evaluated economic and technical issues related to biomass fuel and integrated gasification combined cycle technology.	\$819,159	\$729,717	\$0	\$729,717	\$0	\$89,442								6		28			
University of North Dakota (Digester)	RD3-68	Princeton	Central	4/30/12	complete	RD	3	Biomass	Field demonstration of a hydrogen sulfide reduction process at the anaerobic digester on the 1,000-acre Haubenschild Dairy Farm.	\$970,558	\$970,480	\$0	\$970,480	\$0	\$78										1			
Minnesota Valley Alfalfa Producers	RD3-69	Priam	Central	7/15/15	complete	RD	3	Biomass	Researching application of kinetic disintegration technology to produce biomass pellets from feedstocks with varying levels of moisture.	\$1,000,000	\$825,489	\$286,499	\$1,111,988	\$0	\$174,511													
Energy Performance Systems	RD-50	Graceville	Central	2/19/13	complete	RD	2	Biomass	Built and demonstrated equipment for an integrated system to supply farm grown trees as a biomass feedstock to a power plant.	\$957,929	\$957,929	\$1,997,606	\$2,955,535	\$0	\$0										1			
Blattner and Sons	BW-06	Avon	Central	12/15/02	complete	RD	1	Wind	Developed a platform that would climb the tower to eliminate that need for crane to construct very tall wind turbines.	\$68,470	\$62,346	\$0	\$62,346	\$6,124	\$6,124													
Economic Benefits for West Central Region										\$7,923,586	\$7,327,419	\$4,673,759	\$12,001,178	\$332,136	\$270,155	981	7,259	\$4,213	\$39	\$207,467	\$172,800	6	32	0				
NORTH REGION																												
University of Minnesota (Torrefaction)	RD4-11	Coleraine	North	10/3/2019	current	RD	4	Biomass	Demonstrate a prototypic torrefaction bioconversion process and distributed electric generation.	\$1,899,449	\$943,933	\$446,053	\$1,389,986	\$955,516	\$0													
West Central Telephone Assoc.	RD3-58	Menahga	North	5/12/10	complete	RD	3	Wind/Solar	Designed and tested configurations and specifications of a hybrid wind/solar power system for distributed generation in remote locations.	\$137,000	\$137,000	\$96,926	\$233,926	\$0	\$0													
University of North Dakota (Liguifaction)	RD3-66	Duluth	North	4/10/12	complete	RD	3	Biomass	Designed and demonstrated a mobile biomass liquefaction system that can utilize high moisture wood waste.	\$999,065	\$998,697	\$995,800	\$1,994,497	\$0	\$368										1			
Mesaba/Excelsior Energy	EP-43	Taconite	North	6/24/10	complete	EP	2	Innovative	To design the basis of a base load Integrated Gasification Combined-Cycle (IGCC) power generation facility.	\$10,000,000	\$10,000,000	\$365,621	\$10,365,621	\$0	\$0													
CMEC	EP-44	Little Falls	North	3/12/11	complete	EP	2	Biomass	Designed 959-kW gasification plant to utilize distillers grains and local biomass. Refractory issues prevented completion of the facility.	\$2,000,000	\$400,000	\$16,462,472	\$16,862,472	\$0	\$1,600,000													
University of Florida	RD-34	Moorhead	North	5/16/09	complete	RD	2	Biomass	Demonstrated two-stage anaerobic digester at American Crystal Sugar in Moorhead, MN to generate methane for conversion to electricity.	\$999,995	\$996,875	\$0	\$996,875	\$0	\$3,120								3	1	1			
Gas Technology Institute	RD-38	Coleraine	North	10/12/07	complete	RD	2	Biomass	Developed a method to extract hydrogen from biomass gasification using membrane separation technologies.	\$861,860	\$861,860	\$3,121	\$864,981	\$0	\$0										1			
Region 5 Development Commission	EP4-44	Staples	North	3/30/18	current	EP	4	Solar	Install 114 kW of solar photovoltaic generation at various state parks and developed a renewable energy strategy for future DNR facilities.	\$1,993,659	\$0	\$0	\$0	\$0	\$0													
Economic Benefits for Northeast Region										\$18,891,028	\$14,338,365	\$18,369,993	\$32,708,358	\$955,516	\$1,603,488	0	0	\$0	\$0	\$0	\$0	3	3	1				
STATEWIDE																												
Bergey Windpower Company	EP4-24	St. Cloud/ Marshall areas	Statewide	6/30/24	current	EP	4	Solar	Install 500 kW small wind capacity in the jurisdictions of Benton, Lincoln, Meeker, Murray, Nobles, Pipestone, and Stearns counties by constructing 50 distributed 10 kW microturbines.	\$1,106,600	\$0	\$2,085,145	\$2,085,145	\$1,106,600	\$0	10	23	\$0	\$1	\$16	\$602							
Minnesota State Colleges & Universities	HE4-1	St. Paul - hdqtr	Statewide	5/31/20	current	HE	4	All	Created a research program to stimulate the development of renewable electric energy technologies within Minnesota.	\$5,500,000	\$2,400,000	\$0	\$2,400,000	\$3,100,000	\$0													
MN DNR	EP3 - 13	Afton, Ft. Snelling, Lake Shetek, Lac	Statewide	3/12/13	complete	EP	3	Solar	Installed 114 kW of solar photovoltaic generation at various state parks and developed a renewable energy strategy for future DNR facilities.	\$894,000	\$878,966	\$39,312	\$918,278	\$0	\$15,034	114	937	\$677	\$5	\$32,409	\$23,347							
Economic Benefits for Statewide Projects										\$7,500,600	\$3,278,966	\$2,124,457	\$5,403,423	\$4,206,600	\$15,034	124	960	\$677	\$5	\$32,425	\$23,949	0	0	0				
SOUTHEAST REGION																												
Coaltec Energy USA	RD3 - 77	Northfield	Southeast	4/22/18	current	RD	3	Biomass	Demonstrated the feasibility of biomass gasification on a commercial turkey farm to generate electricity and heat.	\$1,000,000	\$850,000	\$274,511	\$1,124,511	\$150,000	\$0													
Dragonfly Solar	EP4-29	Dodge Center	Southeast	5/8/18	complete	EP	4	Solar	Install a fixed-tilt 997.5 kW solar array within the footprint of several existing wind farms.	\$1,650,000	\$1,650,000	\$607,191	\$2,257,191	\$0	\$0													
City of Red Wing	RD4-8	Red Wing	Southeast	2/6/21	current	RD	4	Biomass	Research will provide operational and performance data to improve the cost effectiveness and reduce potential environmental contaminants in the processing of refuse derived fuels.	\$1,999,500	\$0	\$3,297,160	\$3,297,160	\$1,999,500	\$0													
Diamond K	EP-51	Altura	Southeast	5/18/14	complete	EP	2	Biomass	Installed a 300 kW of biomass generated and anaerobic digester at the Diamond K Dairy in Winona County, Minnesota.	\$936,530	\$936,530	\$2,688,974	\$3,625,504	\$0	\$0	300	2,870	\$2,640	\$980	\$26,058	\$73,325							
AnAerobics, Inc	AB-07	Montgomery	Southeast	6/3/03	complete	EP	1	Biomass	Was to install a 1.7 MW genset and study removal of hydrogen sulfide created during anaerobic digestion but had site control issues.	\$1,300,000	\$1,100,000	\$6,300,000	\$7,400,000	\$0	\$200,000													
Economic Benefits for Southeast Region										\$6,886,030	\$4,536,530	\$13,167,836	\$17,704,366	\$2,149,500	\$200,000	300	2,870	\$2,640	\$980	\$26,058	\$73,325	0	0	0				
SOUTHWEST REGION																												
Best Power Int'l (School Sisters)	EP4-5	Mankato	Southwest	10/28/15	complete	EP	4	Solar	Installed a 849 kW solar facility at the Mankato campus of the Central Pacific Province of the School Sisters of Notre Dame.	\$900,000	\$900,000	\$681,901	\$1,581,901	\$0	\$0	849	3,333	\$1,210	\$27	\$107,305	\$68,201							
Outland Renewable Energy	EP3-10	Slayton	Southwest	4/1/13	complete	EP	3	Solar	Installed 2 MW photovoltaic facility near Slayton, MN to demonstrate the benefits of utility scale use of photovoltaics in Minnesota.	\$2,000,000	\$2,000,000	\$4,972,605	\$6,972,605	\$0	\$0	2,000	14,566	\$10,221	\$80	\$417,216	\$372,513							
Xcel Energy	RD3-12	Beaver Creek	Southwest	12/19/11	complete	RD	3	Wind	Installed a 1.0 MW sodium sulfur battery adjacent a wind farm to validate the value of energy storage for greater wind energy penetration.	\$1,000,000	\$1,000,000	\$3,247,181	\$4,247,181	\$0	\$0								1	31				
Hilltop	EP-26	Edgerton	Southwest	3/2/09	complete	EP	2	Wind	Installed a 1.5 MW General Electric wind turbine in Lyon County with 100 percent of the electricity sold to Xcel Energy.	\$1,200,000	\$1,200,000	\$2,670,126	\$3,870,126	\$0	\$0	2,000	34,689	\$20,274	\$147	\$151,164	\$841,767							
St. Olaf	EP-39	Northfield	Southeast	4/30/07	complete	EP	2	Wind	Installed a 1.65 MW Micon wind turbine on campus.	\$1,500,000	\$1,500,000	\$1,063,377	\$2,563,377	\$0	\$0	1,650	27,721	\$20,469	\$86	\$156,808	\$823,727							
Rural Advantage	RD-27	Luverne	Southwest	4/12/09	complete	RD	2	Biomass	Demonstrated the commercial production of Miscanthus as a biomass fuel for electric generation.	\$318,800	\$318,800	\$348,887	\$667,687	\$0	\$0											1		
Ag. Utilization Research Institute	RD-69	Beaver Creek	Southwest	9/8/08	complete	RD	2	Biomass	Conducted a feasibility study to couple bio-diesel and wind generation systems to "firm" wind power.	\$760,000	\$760,000	\$8,829	\$768,829	\$0	\$0													
Project Resource Corp	AW-03	Chandler	Southwest	5/31/06	complete	EP	1	Wind	Installed 5.4 MW of wind energy with a new landowner investment model that limits development risk of community shareholders.	\$900,000	\$900,000	\$2,700,000	\$3,600,000	\$0	\$0	5,400	184,480	\$142,503	\$694	\$692,686	\$5,205,172							
Pipestone Jasper School	AW-10	Pipestone	Southwest	12/31/04	complete	EP	1	Wind	Installed a 900 kW wind turbine adjacent to the Pipestone-Jasper Public High School.	\$752,835	\$752,835	\$204,000	\$956,835	\$0	\$0	900	29,100	\$0	\$157	\$175,280	\$950,241							
Economic Benefits for Southwest Region										\$9,331,635	\$9,331,635	\$15,896,906	\$25,228,541	\$0	\$0	12,799	293,888	\$194,678	\$1,192	\$1,700,459	\$8,261,622	1	31	1				
METRO REGION																												
Crown Hydro	AH-01	Minneapolis	Twin Cities	1/20/20	current	EP	1	Hydro	Install 3.2 MW of hydroelectric capacity on the Mississippi River in downtown Minneapolis.	\$5,100,000	\$1,538,591	\$2,612,647	\$4,151,238	\$3,561,409	\$0													
Innovative Power Systems	EP4-11	St. Paul	Twin Cities	4/12/18	complete	EP	4	Solar	Install 967 kW of solar capacity at four sites within the Innovative Energy Corridor.	\$1,850,000	\$1,850,000	\$1,191,162	\$3,041,162	\$0	\$0	968	1,431	\$0	\$15	\$14,923	\$19,901							
Metropolitan Airports Commission	EP4-13	Bloomington	Twin Cities	6/10/16	complete	EP	4	Solar	Installed a 1,471 MW fixed-tilt solar facility on the Blue parking ramp at Terminal One of MPS airport.	\$2,022,507	\$2,022,507	\$5,590,574	\$7,613,081	\$0	\$0	1,471	2,851	\$5	\$33	\$136,406	\$83,013							
Minnesota Renewable Energy Society	EP4-15	Minneapolis	Twin Cities	3/1/20	current	EP	4	Solar	Install both a rural and urban solar garden totaling 1.0 MW of photovoltaic capacity to observe differences in subscriber interest.	\$2,661,320	\$0	\$847,867	\$847,867	\$2,661,320	\$0													
Target Corporation	EP4-20	St. Paul	Twin Cities	10/1/17	complete	EP	4	Solar	Install a 350 kW roof-mounted, fixed-tilt photovoltaic facility on the Target Superstore.	\$583,513	\$583,513	\$477,421	\$1,060,934	\$0	\$0	428	1,521	\$112	\$13	\$25,406	\$31,265							
Minneapolis Park & Rec. Board	EP4-22	Minneapolis	Twin Cities	7/15/18	complete	EP	4	Solar	Install 200 kW of PV capacity at seven locations within the Minneapolis park system to demonstrate the effectiveness of alternative solar designs.	\$969,741	\$969,741	\$727,305	\$1,697,046	\$0	\$0	178	798	\$26	\$3	\$11,055	\$8,431							
City of St. Paul	EP4-34	St. Paul	Twin Cities	10/27/17	complete	EP	4	Solar	Install a 105 kW fixed-tilt photovoltaic facility at CHS Field.	\$555,750	\$555,750																	

Aurora St. Anthony Limited , LLC		EP4-42	St. Paul	Twin Cities	current	EP	4	Solar	Development of a high-density solar energy system as part of redevelopment of the home care facility property. Aurora and primary project partner (St. Paul Housing Group) are proposing to construct and operate a roof-mounted solar energy system.	\$239,994	\$203,083					252												
Project Name	Contract	Project Site			Project End Date	Status	Type	Cycle	Resource	Project Description	RDF Award	Grant Funds Disbursed	Funding				Power Development		Externalities			Intellectual Property						
		City	Zone	Zone									Leverage Funds	Total Costs	Current Grant Balance	Deobligated Funds	Capacity (kW)	Generation (MWh)	REC's	Enviro	Avoided Capacity	Avoided Energy	Articles	Presentations	Patent Apps			
University of Minnesota (Koda)	RD3-1	Shakopee	Twin Cities	1/22/15	complete	RD	3	Biomass	Development of a production, pre-processing and delivery system for biomass feedstock's from prairie and grasslands.	\$992,989	\$976,743	\$1,391,643	\$2,368,386	\$0	\$16,246									1	4			
SarTec Corporation	RD3-2	Anoka	Twin Cities	7/11/11	complete	RD	3	Biofuel	Researched the growth of algae fed on CO2 from flue gas and extracted the algae oils for conversion into a marketable biodiesel product.	\$350,000	\$350,000	\$0	\$350,000	\$0	\$0													
Bepex International	RD3-4	Minneapolis	Twin Cities	7/28/11	complete	RD	3	Biomass	Demonstrated torrefaction and densification as processes to reduce transportation and storage costs associated with biomass feedstock.	\$924,671	\$924,671	\$0	\$924,671	\$0	\$0													
University of Minnesota (Nanocrystals)	RD3-25	Minneapolis	Twin Cities	12/26/11	complete	RD	3	Solar	Developed techniques for controlling microstructures of hydrogenated silicon and improving the grain size of microcrystalline silicon PV films.	\$732,032	\$732,032	\$0	\$732,032	\$0	\$0									3	8			
University of Minnesota (Cropping)	RD3-28	St. Paul	Twin Cities	9/22/13	complete	RD	3	Biomass	Developed guidelines for accurate management of biomass removal and maintenance of soil quality.	\$979,082	\$979,048	\$0	\$979,048	\$0	\$34										5	7		
University of Minnesota (Wind)	RD3-42	Minneapolis	Twin Cities	8/7/13	complete	RD	3	Wind	Developed and tested a Virtual Wind Simulator to provide accurate wind turbulence predictions.	\$999,999	\$999,598	\$286,199	\$1,285,797	\$0	\$401									10	13			
Lower St. Anthony Falls	EP-34	Minneapolis	Twin Cities	1/31/12	complete	EP	2	Hydro	Restored 9.176 MW hydroelectric generating capacity at the Lower St. Anthony Falls by using run-of-river technology.	\$2,000,000	\$2,000,000	\$37,993,881	\$39,993,881	\$0	\$0	9,176	277,846	\$203,637	\$1,337	\$1,203,854	\$6,033,513							
University of Minnesota	RD-29	Minneapolis	Twin Cities	9/24/08	complete	RD	2	Biomass	Researched operation of turbo-generators using biomass-derived oils.	\$299,284	\$299,284	\$0	\$299,284	\$0	\$0													
University of Minnesota	RD-56	St. Paul	Twin Cities	4/16/08	complete	RD	2	Biomass	Developed model to evaluate options to optimize combustion and electricity generation in ethanol plants.	\$858,363	\$803,246	\$0	\$803,246	\$0	\$55,117									7	7			
Windlogics	RD-57	St. Paul	Twin Cities	11/11/08	complete	RD	2	Wind	Defined, designed, built and demonstrated a complete wind power forecasting system.	\$997,000	\$997,000	\$141,437	\$1,138,437	\$0	\$0											1		
Center for Energy Environment	RD-94	Minneapolis	Twin Cities	10/12/07	complete	RD	2	Biomass	Developed two web-based programs for planning and identification of biomass resources in Minnesota.	\$397,500	\$397,500	\$42,115	\$439,615	\$0	\$0													
MN Dept. of Commerce	AS-05	St. Paul	Twin Cities	9/1/08	complete	EP	1	Solar	Provided rebates of up to \$8,000 for small photovoltaic installations that are wired into the electrical grid.	\$1,150,000	\$1,150,000	\$0	\$1,150,000	\$0	\$0	960	14,115	\$0	\$73	\$444,862	\$525,254							
Science Museum	AS-06	St. Paul	Twin Cities	12/31/03	complete	EP	1	Solar	Installed a 9 kW solar roof to demonstrate a Zero Energy Building for the Minnesota Science Museum.	\$100,000	\$100,000	\$63,300	\$163,300	\$0	\$0	9	124	\$0	\$0	\$1,930	\$5,430							
Sebesta Blomberg	BB-03	Roseville	Twin Cities	9/30/03	complete	RD	1	Biomass	Examined the feasibility of a gasification system using the byproducts of an ethanol facility to provide heat and power.	\$738,654	\$738,654	\$184,663	\$923,317	\$0	\$0													
Energy Performance Systems	BB-06	Rogers	Twin Cities	12/15/02	complete	RD	1	Biomass	Conversion design of the NSP Granite Falls coal-fired facility to a biomass system capable of utilizing whole trees.	\$266,508	\$257,247	\$85,056	\$342,303	\$0	\$9,261													
University of Minnesota	CW-06	Minneapolis	Twin Cities	12/31/06	complete	RD	1	Wind	Designed a flywheel battery system to enhance the ability to dispatch wind energy with inertial storage.	\$654,309	\$654,309	\$0	\$654,309	\$0	\$0											1		
Economic Benefits for Metro Region										\$40,982,219	\$33,228,550	\$54,478,901	\$87,504,368	\$7,432,616	\$81,059	15,495	311,876	\$209,494	\$1,552	\$2,223,452	\$6,985,829	41	105	4				
OUT OF STATE																												
InterPhases Solar	RD4-7	Moorpark, CA	Out of State	1/12/20	current	RD	4	Solar	Development commercial production process of a thin-film technology by combining all the electrodeposition processes into a single manufacturing process.	\$1,000,000	\$410,345	\$0	\$410,345	\$589,655	\$0												2	
Northern Plains Power Tech.	RD3-21	Brookings, SD	Out of State	11/11/12	complete	RD	3	Solar	Developed a loss-of-mains detection based on harmonic signature and synchrophasor data.	\$493,608	\$493,608	\$240,665	\$734,273	\$0	\$0												4	1
InterPhases Solar	RD3-53	Moorpark, CA	Out of State	7/20/12	complete	RD	3	Solar	Demonstrated a manufacturing process to produce lightweight, thin-film solar cells.	\$1,000,000	\$1,000,000	\$666,021	\$1,666,021	\$0	\$0									1	5			
University of North Dakota	RD3-71	Grand Forks, ND	Out of State	3/23/12	complete	RD	3	Biomass	Demonstrated a thermally integrated biomass gasification systems with a 30 kW low-Btu gas turbine.	\$999,728	\$999,438	\$0	\$999,438	\$0	\$290									1	1			
Energy Conversion Devices	RD-22	Rochester Hills, MI	Out of State	10/12/07	complete	RD	2	Biomass	Researched processes to reform bio-ethanol and bio-methanol into hydrogen for use in a fuel cell or gas turbine to generate electricity.	\$900,000	\$900,000	\$1,390,015	\$2,290,015	\$0	\$0											6		
Coaltec	RD-26	Carterville, IL	Out of State	1/12/07	complete	RD	2	Biomass	Studied handling, performance and emissions to assess feasibility of poultry waste as a sustainable feedstock for a fixed-bed gasifier.	\$450,000	\$450,000	\$378,500	\$828,500	\$0	\$0													
Production Specialties	RD-72	Oklahoma City, OK	Out of State	11/16/09	complete	RD	2	Biomass	Investigated a technology to selectively remove hydrogen sulfide (H2S) from biogas without generating a waste stream.	\$228,735	\$228,735	\$263,767	\$492,502	\$0	\$0											1		
Interphases Solar	RD-78	Moorpark, CA	Out of State	10/14/08	complete	RD	2	Solar	Developed a concept to manufacture flexible photovoltaic modules in a continuous roll-to-roll electro-deposition process.	\$1,000,000	\$1,000,000	\$821,700	\$1,821,700	\$0	\$0											6		
Global Energy Concepts	RD-87	Lowell, MA	Out of State	5/7/09	complete	RD	2	Wind	Analyzed and developed advanced methods for reducing uncertainty in wind power estimates.	\$370,000	\$370,000	\$28,236	\$398,236	\$0	\$0													
NREL - Inkjet Solar Cells	RD-93	Golden, CO	Out of State	11/11/08	complete	RD	2	Solar	Designed and developed a thin-film solar cell that will use a direct-write inkjet printing process.	\$1,000,000	\$949,005	\$0	\$949,005	\$0	\$50,995													
NREL-Low Band Gap-Solar	RD-107	Golden, CO	Out of State	12/9/08	complete	RD	2	Solar	Overcome limitations in organic-based solar cells by developing low band gap (red light absorbing) materials.	\$1,000,000	\$944,452	\$0	\$944,452	\$0	\$55,548									6	2			
Iowa State University	RD-110	Ames, IA	Out of State	7/12/07	complete	RD	2	Biomass	Performance testing of a particulate filtration clean-up system for the producer gas from a biomass gasifier.	\$405,000	\$98,343	\$0	\$98,343	\$306,657	\$306,657													
University of ND - Cofiring	BB-09	Grand Forks, ND	Out of State	3/31/05	complete	RD	1	Biomass	Measured operational and component impacts of co-firing biomass with coal in an indirect fired combined-cycle pulverized-coal furnace.	\$444,478	\$444,443	\$296,219	\$740,662	\$35	\$35													
Community Power Corp.	BB-10	Littleton, CO	Out of State	3/24/05	complete	RD	1	Biomass	Designed, developed, and tested a centrifugal filter capable of removing sub micron particles and aerosols from a hot producer bio-gas stream.	\$638,635	\$548,692	\$133,054	\$681,746	\$89,943	\$89,943													
University of ND - SCR Performance	BB-12	Grand Forks, ND	Out of State	6/30/06	complete	RD	1	Biomass	Examined the rates and mechanisms of catalyst deactivation within the emissions from a biomass co-fired utility boiler.	\$60,000	\$59,973	\$340,000	\$399,973	\$27	\$27													
Colorado School of Mines	CB-07	Golden, CO	Out of State	12/31/07	complete	RD	1	Biomass	Developed a fuel cell prototype for use in ambient or high temperatures.	\$1,116,742	\$1,116,742	\$0	\$1,116,742	\$0	\$0													
University of ND - SOFC	CB-08	Grand Forks, ND	Out of State	10/31/07	complete	RD	1	Biomass	Incorporated solid oxide fuel cells (SOFCs) and gasification into one integrated system to produce electricity.	\$1,250,142	\$1,250,142	\$885,928	\$2,136,070	\$0	\$0											1		
NREL	CS-05	Golden, CO	Out of State	7/9/07	complete	RD	1	Solar	Design and develop of solutions and techniques to use an inkjet printing process for the manufacturing of thin-film solar cells.	\$934,628	\$924,757	\$0	\$924,757	\$9,871	\$9,871													
Global Energy Concepts	CW-02	Lowell, MA	Out of State	10/1/03	complete	RD	1	Wind	Translated the effects of a turbine's rotating flexible blades into a linear model for use in wind turbine design software.	\$75,000	\$73,239	\$0	\$73,239	\$1,761	\$1,761													
University of Florida	RD4-5	Gainesville, FL	Out of State	3/23/21	current	RD	4	Biofuel	3 year research project to demonstrate biogasification of organic wastes. Mobile, self contained flexible design, pilot scale digester will be constructed and operated at two sites in western MN.	\$1,109,538	\$0	\$0	\$1,109,538	\$0	\$0													
Economic Benefits for Out of State Area										\$14,476,234	\$12,261,914	\$5,444,105	\$18,815,557	\$997,949	\$515,127	0	0	\$0	\$0	\$0	\$0	\$0	8	27	2			

RENEWABLE DEVELOPMENT FUND FINANCIAL STATEMENT
As of December 31, 2018

	2001 - 2017	2018	Since RDF Inception (2001-2018)
Total RDF Credits *	\$326,950,000	\$32,500,000	\$359,450,000
Excelsior	\$10,000,000	\$0	\$10,000,000
Energy Production Grants	\$29,718,293	\$2,619,741	\$32,338,034
Research Grants	\$38,841,944	\$5,174,230	\$44,016,174
Total RDF Grant Payments	\$78,560,237	\$7,793,971	\$86,354,208
Administrative Costs	\$2,299,756	\$0	\$2,299,756
University of Minnesota	\$25,000,000	\$0	\$25,000,000
REPI	\$91,799,763	\$840,405	\$92,640,168
Solar Rebates	\$54,749,130	\$2,376,200	\$57,125,330
Other Legislative Mandates	\$25,451,809	\$18,677,123	\$44,128,932
Total RDF Costs	\$277,860,695	\$29,687,699	\$307,548,394

SUMMARY OF RDF PROGRAM FUNDS

Total Amount Credited to RDF	\$359,450,000
Total RDF Payments	\$307,548,394
Total Amount of Grant Awards	\$104,381,687
Amount of Grant Awards Paid	\$86,354,208
Cumulative Cask Credits Uncollected and Unexpended	\$33,874,127 ⁽¹⁾
Balance of RDF	- 0 -

⁽¹⁾ Cask credits that were not collected from customers and not obligated prior to law change

RDF Congressional Districts (1/1/2018 - 12/31/2018)

RDF Contract	Grant	Type	Cycle	Renewable Category	Host Site		Project Sponsor		
					District	Location	District	Organization	
District 1									
EP4-24	\$1,106,600	EP	4	Solar	MN06	Lincoln, Lyon, Pipestone Co.	OK	Bergey Windpower, Norman	
EP4-29	\$1,650,000	EP	4	Solar	MN01	Dodge City	MN03	Dragonfly Solar, Lakeville	
HE4-1	\$5,500,000	HE	4	All	MN01	Minnesota State, Mankato	MN04	U of M, St. Paul	
RD4-14	\$161,081	RD	4	Wind	MN01	Grand Meadows, Nobles Co.	MN05	Barr Engineering, Minneapolis	
District 2									
RD3-77	\$1,000,000	RD	3	Biomass	MN02	P & J Farms, Northfield	IL	Coaltec Energy USA, Carterville	
EP4-15	\$2,661,320	EP	4	Solar	MN02	Northfield	MN05	MRES, Minneapolis	
EP4-29	\$1,650,000	EP	4	Solar	MN01	Dodge City	MN03	Dragonfly Solar, Lakeville	
RD4-2	\$982,408	RD	4	Solar/Wind	MN02	WCROTC, Morris	MN05	U of M, Minneapolis	
RD4-8	\$1,999,500	RD	4	Biomass	MN02	MSW Campus, Red Wing	MN02	City of Red Wing	
District 4									
EP4-11	\$1,850,000	EP	4	Solar	MN04	EIC, St. Paul	MN05	IPS, Minneapolis	
EP4-20	\$583,513	EP	4	Solar	MN04	Midway Superstore, St. Paul	MN05	Target, Minneapolis	
EP4-34	\$555,750	EP	4	Solar	MN04	CHS Field, St. Paul	MN04	U of M, St. Paul	
HE4-1	\$5,500,000	HE	4	All	MN05	Century College	MN04	MnSCU, St. Paul	
HE4-2	\$2,157,215	HE	4	All	MN05	UST, St. Paul	MN05	UST, St. Paul	
HE4-3	\$3,000,000	HE	4	All	MN05	U of M, Minneapolis	MN04	U of M, St. Paul	
District 5									
AH-01	\$5,100,000	EP	1	Hydro	MN05	Crown Hydro, Minneapolis	MN05	Crown Hydro, Minneapolis	
EP4-11	\$1,850,000	EP	4	Solar	MN04	EIC, St. Paul	MN05	IPS, Minneapolis	
EP4-15	\$2,661,320	EP	4	Solar	MN05	North Minneapolis	MN05	MRES, Minneapolis	
EP4-20	\$583,513	EP	4	Solar	MN04	Midway Superstore, St. Paul	MN05	Target, Minneapolis	
EP4-22	\$969,741	EP	4	Solar	MN05	MPRB, Minneapolis	MN05	MPRB, Minneapolis	
RD4-1	\$999,999	RD	4	Biomass	MN05	U of M, Minneapolis	MN05	U of M, Minneapolis	
RD4-2	\$982,408	RD	4	Solar/Wind	MN02	WCROTC, Morris	MN05	U of M, Minneapolis	
RD4-7	\$1,000,000	RD	4	Solar	CA/MN05	InterPhases/U of M	CA	InterPhases, Moorpark	
RD4-11	\$1,899,449	RD	4	Biomass	MN08	NRRI, Coleraine	MN05	U of M, Minneapolis	
RD4-12	\$625,102	RD	4	Wind	MN05	U of M, Minneapolis	MN05	U of M, Minneapolis	
RD4-13	\$1,391,684	RD	4	Wind	MN05	U of M, Minneapolis	MN05	U of M, Minneapolis	
RD4-14	\$161,081	RD	4	Wind	MN01	Grand Meadows, Nobles Co.	MN05	Barr Engineering, Minneapolis	
HE4-3	\$3,000,000	HE	4	All	MN05	U of M, Minneapolis	MN04	U of M, St. Paul	
District 6									
EP4-24	\$1,106,600	EP	4	Solar	MN06	Stearns, Sherburne, Meeker	OK	Bergey Windpower, Norman	
HE4-1	\$5,500,000	HE	4	All	MN05	St. Cloud State, St. Cloud	MN04	U of M, St. Paul	
District 8									
RD4-11	\$1,899,449	RD	4	Biomass	MN08	NRRI, Coleraine	MN05	U of M, Minneapolis	