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Xcel Energy®

414 Nicollet Mall Minneapolis, MN 55401

February 17, 2020

-Via U.S. Mail-

Minnesota Senate 75 & 100 Rev. Dr. Martin Luther King Jr. Blvd. St. Paul, MN 55155

Minnesota House of Representatives 100 Rev. Dr. Martin Luther King Jr. Blvd. St. Paul, MN 55155

(See attached service list for members served.)

RE: ANNUAL REPORT TO MINNESOTA STATE LEGISLATURE RENEWABLE DEVELOPMENT FUND

Dear Senators and Representatives:

Pursuant to the Minn. Stat. § 116C.779, enclosed is our Renewable Development Fund Annual Report. This report itemizes actual and projected financial benefit to Xcel Energy's electric ratepayers for each project that has received an RDF project grant administered by Xcel Energy.

If you have any questions regarding this filing, please contact me at (612) 330-6064 or <u>bria.e.shea@xcelenergy.com</u>.

Sincerely,

/s/

BRIA E. SHEA DIRECTOR, REGULATORY AND STRATEGIC ANALYSIS

Enclosures

Sen. David J. Osmek 2107 MN Senate Building St. Paul, MN 55155

Sen. Erik Simonson 2417 MN Senate Building St. Paul, MN 55155

Rep. Jean Wagenius 251 State Office Building St. Paul, MN 55155 Rep. Chris Swedzinski 245 State Office Building St. Paul, MN 55155

Legislative Reference Library Attn: Chris Steller 645 State Office Bldg 100 Rev. Dr. MLK Jr. Blvd St. Paul, MN 55155 **Xcel Energy** Renewable Development Fund (RDF)

Annual Report to the Minnesota State Legislature

February 17, 2020

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 \$391.95 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 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 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.

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 two 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.

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 2019 the RDF charge from January 1 to April 30 was \$0.001417 per kWh; and from May 1 to December 31, 2019, the RDF charge was \$0.001357 per kWh.

Since its inception, the RDF program has provided over \$350 million for renewable energy initiatives including \$93 million for Renewable Energy Production Incentive (REPI) payments, \$138 million for legislatively-mandated projects and programs, \$93 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), \$59 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, 69 legacy RDF projects have been completed and 12 are active. All Cycle 4 projects that have been awarded RDF grants; have executed grant contracts and project activity has begun.

Туре	Completed	Active as of 12/31/2019	Total
Energy Production	24	2	26
Research	45	7	52
Higher Education Block Grant	0	3	3
Total	69	12	81

Table 1: Summary of Project Status

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 \$93 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 \$20 million for the program thus far. The Minnesota Bonus provided roughly 6.4 MW of installed capacity from 138 projects.

b. Made in Minnesota (MiM) Solar Incentive Account

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 to 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 18 MW of solar capacity from more than 1,300 projects.

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. There have been several changes to this legislation over the years; we have summarized these below:

- 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.
- In 2019, 1st Special Session, Chapter 7, H.F. No. 2 revised the statutue to allow for up to 40 kWac rather than 40 kWdc which essentially increased the nameplate capacity of eligible systems.

Since this program's inception using RDF/RDA funding in 2014, 14.4 MW of solar have been installed (roughly 2,579 systems).

Grant-Funded RDF Projects

<u>Energy Production</u>: As shown in Table 2, the 31 electric production projects that received RDF grants have resulted in the installation of more than 30.7 MW of renewable energy nameplate capacity and have overall generated a total of 679,189 MWh of energy over the life of the facilities.

Туре	Investment	Facilities	Installed Capacity	Energy Production						
			(MW)	(MWh)						
Biomass	\$27,887,976	3	0.30	2,868						
Hydro	\$44,145,119	2	9.18	305,797						
Solar	\$47,489,743	22	11.26	70,193						
Wind	\$13,075,483	5	9.96	300,331						
Total	\$132,598,321	31	30.7	679,189						

Table 2: Electric Production Projects

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.

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

Technology	Total	Published	Presentations/	Patent				
07	Investment	Articles	Workshops	Applications				
Biomass	\$35,424,845	23	62	3				
Solar	\$8,357,259	10	27	1				
Wind	\$9,833,845	12	49	1				
Multiple Tech	\$21,898,047	14	58	3				
Total	\$75,513,995	59	196	8				

Table 3: Research and Development Projects

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	D & K Farma	Northfield,	Pilot demonstration of
Energy USA	Ракгания	Minnesota	biomass gasifier
University of	Pending	West Central	Pilot demonstration of
Florida	Research	Minnesota	anaerobic digester

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 2019.

RDF Annual Report to Legislature Attachment A Page 1 of 2

		Project S	ite									Fund	ing			Power Deve	lopment			Externalities		Intellectua	al Property
Project Name CENTRAL REGION	Contract	City	Zone	Project Enc Date	l Status	Туре	Cycle	Resource	Project Description	RDF Award	Grant Funds Disbursed	Leverage Funds	Total Costs	Current Grant Balance De	cobligated Funds	Capacity (kW)	Generation (MWh)	REC's	Enviro	Avoided Capacity	Avoided Energy A	rticles Presenta	tions Patent Apps
University of Minnesota (Dairy)	RD4-2	Morris	Central	2/28/20	current	RD	4	Solar/Win	Model a "net-zero" energy dairy parlor at the West Central Research and Outreach Center by	\$982,408	\$683,970	\$218,815	\$902,785	\$298,438	\$0								
City of Hutchinson	EP4-41	Hutchinson	Central	6/1/16	complet	e EP	4	Solar	Installed 400 kW photovoltaic fixed-tilt array on a capped municipal landfill and use the power at the	\$958,369	\$958,369	\$618,403	\$1,576,772	\$0	\$0	400	1.540	\$474	\$24	\$64,948	\$34,228	2	
Best Power Int'l (St. John's Expansion)	EP4-6	Collegeville	Central	3/16/15	complet	e EP	4	Solar	adjecent wastewater treatment facility. Installed a 182 kW photovoltaic fixed-tilt array at St. John's solar farm for a side-by-side comparison with the existing	\$172.213	\$172.213	\$363.613	\$535.826	\$0	50	182	1,195	\$567	\$16	\$37.675	\$34.965		
Dest Dower Intil (St. Johnson)	ED2 2	Callagavilla	Control	5/8/10	complet	- ED	2	Solar	400 kW single-axis tracking array. Installed a 400 kW photovoltaic facility at St. John's University to demonstrate commercial viability of	\$1,004,480	\$1,004,480	\$1 199 922	\$2 192 202	50	50	400	5.020	\$2.417	510	\$160.624	\$174.045		
Best Power Int I (St. John's)	EP3-3	Conegevine	Central	5/8/10	complet	e EP	3	Solar	solar power in Minnesota. Evaluated economic and technical issues related to biomass fuel and integrated gasification combined	\$1,994,480	\$1,994,480	\$1,188,823	\$3,183,303	30	50	400	5,930	\$3,417	\$51	\$109,024	\$174,045		
University of Minnesota (Biomass)	RD3-23	Morris	Central	8/1/11	complet	e RD	3	Biomass	cycle technology. Field demonstration of a hydrogen sulfide reduction process at the anaerobic divester on the 1 000-acre	\$819,159	\$729,717	\$0	\$729,717	\$0	\$89,442							6 28	
University of North Dakota (Digester)	RD3-68	Princeton	Central	4/30/12	complet	e RD	3	Biomass	Haubenschild Dairy Farm.	\$970,558	\$970,480	\$0	\$970,480	\$0	\$78							1	
Minnesota Valley Alfalfa Producers	RD3-69	Priam	Central	7/15/15	complet	e RD	3	Biomass	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	complet	e 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	complet	e 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								
NORTH REGION									Economic Benefits for West Central Region	\$7,923,586	\$7,354,993	\$4,673,759	\$12,028,752	\$304,562	\$270,155	981	8,665	\$4,458	\$91	\$272,247	\$243,238	6 32	0
University of Minnesota (Torrefaction)	RD4-11	Coleraine	North	6/3/2020	current	RD	4	Biomass	Demonstrate a prototypic torrefaction bioconversion process and distributed electric generation.	\$1,899,449	\$1,524,280	\$446,053	\$1,970,333	\$375,169	\$0								
West Central Telephone Assoc.	RD3-58	Menahga	North	5/12/10	complet	e RD	3	Wind/Sola	Designed and tested configurations and specifications of a hybrid wind/solar power system for distributed	\$137,000	\$137,000	\$96,926	\$233,926	\$0	\$0								
University of North Dakota (Liguifaction)	RD3-66	Duluth	North	4/10/12	complet	e RD	3	Biomass	Designed and demonstrated a mobile biomass liquefaction system that can utilize high moisture wood	\$999.065	\$998,697	\$995,800	\$1,994,497	S0	\$368							1	
Mesaba/Excelsion Energy	FP-43	Taconite	North	6/24/10	complet	e FP	2	Innovativ	To design the basis of a base load Integrated Gasification Combined-Cycle (IGCC) power generation	\$10,000,000	\$10,000,000	\$365.621	\$10.365.621	50	50								
CMEC	ED 44	Linla E-lla	Neeth	2/12/11	complex	- ED	2	Diamana	facility. Designed 959-kW gasification plant to utilized distillers grains and local biomass. Refractory issues	\$2,000,000	\$400,000	\$16 462 472	\$16 863 473	50	\$1.600.000								
U in or other in	DD 24	Little I ans	Nod	5/12/11	complet		2	Diomass	prevented completion of the facility. Demonstrated two-stage anaerobic digester at American Crystal Sugar in Moorhead, MN to generate	5000,000	\$400,000	\$10,402,472	510,002,472	30	\$1,000,000							2 1	
University of Florida	RD-34	Moorhead	North	5/16/09	complet	e RD	2	Biomass	methane for conversion to electricity. Developed a method to extract hydrogen from biomass easification using membrane senaration	\$999,995	\$996,875	50	\$996,875	\$0	\$3,120							3 1	1
Gas Technology Institute	RD-38	Coleraine	North	10/12/07	complet	e RD	2	Biomass	теchnologies. пізнан нос піліс пан 1,775 км от апесісситені (кмос) зона сарасну актіоризіс венооз ани піцієрії	\$861,860	\$861,860	\$3,121	\$864,981	\$0	\$0							1	
Region 5 Development Commissin	EP4-44	Staples	North	7/9/19	complet	e EP	4	Solar	community colleg campuses in Crow Wing and Todd Counties. It will include roof and ground mount	\$1,993,659	\$1,993,660	\$1,353,891	\$3,347,551	\$0	\$0								
ST & TEWIDE									Economic Benefits for Northeast Region	\$18,891,028	\$16,912,372	\$19,723,884	\$36,636,256	\$375,169	\$1,603,488	0	0	\$0	\$0	\$0	\$0	3 3	1
Bergey Windpower Company	EP4-24	St. Cloud/ Marshall	Statewide	11/24/20	current	EP	4	Wind	Install 500 kW small wind capacity in the jurisdictions of Benton, Lincoln, Meeker, Murray, Nobles,	\$1,106,600	\$0	\$2,085,145	\$2.085.145	\$1,106,600	\$0	10	23	\$0	\$1	\$328	\$602		
Minnarota Stata Collagas & Universitias	HEA 1	areas St Paul bdotr	Statawida	5/31/20	current	UE	4	A11	Pipestone, and Steams counties by constructing 50 distributed 10 kW microturbines. Created a research program to stimulate the development of renewable electric energy technologies within	\$5,500,000	\$5 500 000	50	\$5 500,000	\$0	50								
Minicola State Coneges & Oniversities	TD2 12	Afton, Ft. Snelling,	Statewide	3/31/20	current	TD	7	2.1	Minnesota. Installed 114 kW of solar photovoltaic generation at various state parks and developed a renewable	33,300,000	\$5,500,000		35,500,000	30			1022	0.000		600.000	000.175		
MN DNR	EP3 - 13	Lake Shetek, Lac	Statewide	3/12/13	complet	e EP	3	Solar	energy strategy for future DNR facilities. Economic Benefits for Stratewide Projects	\$894,000	\$878,966	\$39,312	\$918,278	\$0	\$15,034	114	1022	\$699	\$9	\$39,933	\$29,165	0 0	0
SOUTHEAST REGION									Exonomic benefits for Statewide Projects	37,500,000	30,370,700	32,124,437	30,000,420	31,100,000	315,054	124	1,045	3077	35	340,201	327,700	0 0	0
Coaltec Energy USA	RD3-77	Northfield	Southeast	4/22/18	complet	e RD	3	Biomass	Demonstrated the feasibility of biomass gasification on a commercial turkey farm to generate electricity and best	\$1,000,000	\$850,000	\$274,511	\$1,124,511	\$150,000	\$0								
Dragonfly Solar	EP4-29	Dodge Center	Southeast	5/8/18	complet	e 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	998	948	\$0	\$21	\$99,176	\$27,715		
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	complet	e EP	2	Biomass	Installed a 300 kW of biomass generated and anaerobic digester at the Diamond K Dairy in Winona	\$936,530	\$936,530	\$2,688,974	\$3,625,504	\$0	\$0	300	2,870	\$2,640	\$980	\$38,962	\$73,325		
AnAerobics, Inc	AB-07	Montgomery	Southeast	6/3/03	complet	e EP	1	Biomass	Was to instal a 1.7 MW genset and study removal of hydrogen sulfide created during anaerobic digestion	\$1,300,000	\$1,100,000	\$6,300,000	\$7,400,000	\$0	\$200,000								
									but had site control issues. Economic Benefits for Southeast Region	\$6,886,030	\$4,536,530	\$13,167,836	\$17,704,366	\$2,149,500	\$200,000	1,298	3,818	\$2,640	\$1,001	\$138,138	\$101,040	0 0	0
SOUTHWEST REGION																							
Best Power Int'l (School Sisters)	EP4-5	Mankato	Southwest	10/28/15	complet	e 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	4,380	\$1,426	\$72	\$163,349	\$128,045		
Outland Renewable Energy	EP3-10	Slayton	Southwest	4/1/13	complet	e 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	16,575	\$10,699	\$175	\$549,221	\$501,089		
Xcel Energy	RD3-12	Beaver Creek	Southwest	12/19/11	complet	e 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	complet	e EP	2	Wind	Installed a 1.5 MW General Electric wind turbine in Lyon County with 100 percent of the electricity sold to Xaol Energy	\$1,200,000	\$1,200,000	\$2,670,126	\$3,870,126	\$0	\$0	2,000	37,057	\$18,660	\$270	\$213,458	\$988,872		
St. Olaf	EP-39	Northfield	Southeast	4/30/07	complet	e 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	28,921	\$17,100	\$130	\$208,201	\$875,604		
Rural Advantage	RD-27	Luverne	Southwest	4/12/09	complet	e 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	complet	e 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	complet	e EP	1	Wind	Installed 5.4 MW of wind energy with a new landowner investment model that limits development risk of	\$900,000	\$900.000	\$2,700,000	\$3,600,000	\$0	\$0	5,400	204,766	\$116,170	\$1,134	\$860,881	\$5,729,260		
Pipestone Jasper School	AW-10	Pipestone	Southwest	12/31/04	complet	e EP	1	Wind	community shareholders. 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	33,100	\$0	\$244	\$203,313	\$1,053,581		
									Economic Benefits for Southwest Region	\$9,331,635	\$9,331,635	\$15,896,906	\$25,228,541	\$0	\$0	12,799	324,798	\$164,055	\$2,025	\$2,198,423	\$9,276,451	1 31	1
METRO REGION																							
Crown Hydro	AH-01	Minneapolis	Twin Cities	9/1/18	Terminat	ed 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	0	\$3,561,409	0.00				000 000	0110 001		
Innovative Power Systems	EP4-11	St. Paul	Twin Cities	4/12/18	complet	e 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	50	50	968	5,121	\$0	\$111	\$/8,/8/	\$149,704		
Menopointain Airports Commission	EP4-13	Bioonington	Twin Citles	2/1/20	complet	C EP	4	Solar	Installed a 1-971 www.inxed-int solar facinty on the Blue parking ramp at Terminal One of MPS airport. Install both a rural and urban solar garden totaling 1.0 MW of photovoltaic capacity to observe	52,022,507	\$2,022,307	\$5,590,574	\$7,015,081	50	50	1,471	2,001	\$7	334	\$255,495	\$65,554		
Target Corporation	EP4-15	Minneapolis	Twin Cities	3/1/20	current	EP	4	Solar e-1	differences in subsciber interest.	\$2,661,320	\$511,229	\$847,867	\$1,359,096	\$2,150,091	50	429	1.040	\$202	622	852 660	856 700		
Minneapolis Park & Rec. Board	EP4-20 EP4-22	Minneapolis	Twin Cities	7/15/18	complet	c EP	4	Solar	Install 200 kW of PV capacity at seven locations within the Minneapolis park system to demonstrate the	\$969.741	\$969,741	\$727,305	\$1,000,934	50	50	420	1,940	\$128	\$32	\$22,797	\$30,729		
City of St. Paul	EP4-34	St. Paul	Twin Cities	10/27/17	complet	e EP	4	Solar	ettectiveness of alternative solar designs. Install a 105 kW fixed-tilt photovoltaic facility at CHS Field.	\$555,750	\$555,750	\$40,886	\$596,636	\$0	\$0 \$0	104	351	\$18	\$7	\$6,841	\$10,259		
Universisty of Minnesota (Gasification)	RD4-1	Minneapolis	Twin Cities	5/4/20	current	RD	4	Biomass	Development and fabrication of a gasification method based on microwave heating for distributed generation of electricity from biomass and at the site of biomass generation	\$999,999	\$758,690	\$0	\$758,690	\$241,309	\$0							3	
Universisty of Minnesota (Noise)	RD4-12	Minneapolis	Twin Cities	11/5/19	complet	e RD	4	Wind	Research the sources and quality of wind turbine sound and the thresholds of potential health impacts on	\$625,102	\$625,102	\$0	\$625,102	\$0	\$0							4	

University of Minnesota (VWS)	RD4-13	Minneapolis	Twin Cities	6/2/20	curren	t RD	4	Wind	Augment the predictive capabilities of the Virtual Wind Simulator by adding an aeroelastic model and	\$1.391.684	\$1,201,889	\$0	\$1,201,889	\$189.795	\$0							1		
Barr Engineering	RD4.14	Minneapolis	Twin Cities	3/4/19	comple	te RD	4	Wind	Develop portable sensors to assess the health and life expectancy of wind turbine towers and	\$161.081	\$147 309	\$0	\$147 309	\$13.772	\$0									
Lairenite of St. Thomas	1154.2	Chinese City	Twin Citian	12/12/10	compie		4	S alan/Win	foundations. Install a 0.25 MW peak, multi-purpose microgrid in Chisago City to establish an Engineering Senior	\$2 157 215	\$147,507	50	\$2 157 215	515,772	50									
University of St. Thomas	HE4-2	Chisago City	Twin Cities	12/12/19	curren	t KD	4	Solar/ wind	Design Clinic for microgrid research and testing. Create Renewable Electricity for Minnesota's Future ("REMF") which will fund and support research in	\$2,157,215	\$2,157,215	\$0	\$2,137,213	30	50								5	
University of Minnesota (REMF)	HE4-3	Minneapolis	Twin Cities	2/20/20	curren	t RD	4	All	renewable electric energy generation.	\$3,000,000	\$3,000,000	\$0	\$3,000,000	\$0	\$0							14	53	3
Oak Leaf Energy	EP4-48	Shakopee	Twin Cities	10/26/16	comple	te EP	4	Solar	Installed a 1,000 kW fixed-tilt photovoltaic facility at the Blue Lake Wastewater Treatment Plant.	\$2,000,000	\$2,000,000	\$673,736	\$2,673,736	\$0	\$0	970	5,853	\$279	\$92	\$128,764	\$133,210			
Merrick	EP3-2	Vadnais Heights	Twin Cities	12/22/08	comple	te EP	3	Solar	Installed a roof-mounted 100 kW solar photovoltaic facility on a non-profit adult day training and habilitation center.	\$735,000	\$735,000	\$52,000	\$787,000	\$0	\$0	100	980	\$583	\$8	\$47,380	\$28,328			
City of Minneapolis	EP3-11	Minneapolis	Twin Cities	1/15/13	comple	te EP	3	Solar	Installed a 600 kW photovoltaic facility on the Minneapolis Convention Center. Installed 280 kW photovoltaic canacity through a leasing and service package for residential and small	\$2,000,000	\$2,000,000	\$1,096,756	\$3,096,756	\$0	\$0	600	6,255	\$4,051	\$53	\$229,045	\$183,827			
freEner-g	EP3-12	Metro Area	Twin Cities	2/17/11	comple	te EP	3	Solar	businesses. Development of a nigh-density solar energy system as part of redevelopment of Old Florine white Data	\$1,488,922	\$1,488,922	\$777,170	\$2,266,092	\$0	\$0	280	1,991	\$1,260	\$17	\$108,522	\$58,581			
Aurora St. Anthony Limited , LLC	EP4-42	St. Paul	Twin Cities	8/30/19	comple	te EP	4	Solar	property. Aurora and primary project partner (St. Paul Housing Group) are proposing to construct and	\$239,994	\$239,994	\$203,083	\$443,077	\$0	\$0	252								
		Project	Site	Project End	d		6.1				Grant Funds	Fundi	ng			Power Develo Capacity G	opment Generation	REC's		Externalities		Inte	ellectual Proper	rty
Project Name	Contract	City	Zone	Date	Status	Гуре	Cycle	Resource	Project Description Development of a production, pre-processing and delivery system for biomass feedstock's from prairie at	KDF Award	Disbursed	Leverage Funds	I otal Costs C	urrent Grant Balance Dec	obligated Funds	(kW)	(MWh)		Enviro	woided Capacity	Avoided Energy	Articles P	resentations	Patent Apps
University of Minnesota (Koda)	RD3-1	Shakopee	Twin Cities	1/22/15	comple	te RD	3	Biomass	grasslands. Researched the growth of slove fed on CO2 from flue gas and extracted the slove oils for conversion into	\$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	comple	te RD	3	Biomass	a marketable biodiesel product.	\$350,000	\$350,000	\$0	\$350,000	\$0	\$0									
Bepex International	RD3-4	Minneapolis	Twin Cities	7/28/11	comple	te RD	3	Biomass	Demonstrated torretaction and densitication 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	comple	te 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	comple	te 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	comple	te 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	comple	te 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	305,797	\$204,833	\$2,861	\$1,598,540	\$7,834,522			
University of Minnesota	RD-29	Minneapolis	Twin Cities	9/24/08	comple	te 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	comple	te 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	comple	te 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	comple	te RD	2	Biomass	Developed two web-based programs for planning and development 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	comple	te 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	15,037	\$0	\$93	\$508,225	\$552,223			
Science Museum	AS-06	St. Paul	Twin Cities	12/31/03	comple	te 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	\$2,524	\$5,430			
Sebesta Blomberg	BB-03	Roseville	Twin Cities	9/30/03	comple	te 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	comple	te RD	1	Biomass	Conversion design of the NSP Granite Falls coal-fired facility to a biomass system capable of utilizing	\$266,508	\$257,247	\$85,056	\$342,303	\$0	\$9,261									
University of Minnesota	CW-06	Minneapolis	Twin Cities	12/31/06	comple	te 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
Minneapolis Public Schools	EP4-3	Minneapolis	Twin Cities	5/17/19	comple	te EP	4	Solar	Install 485.78kW of photovoltaic capacity arrays using a combination of roof-mounted solar technologies	\$917.250	\$917.250	\$251.150	\$1.168.400	\$0	\$0									
									at Edison High School Economic Benefits for Metro Region	\$41,899,469	\$35,662,034	\$54,730,051	\$90,392,085	\$2,594,967	\$3,642,468	15,495	347,714	\$211,361	\$3,335	\$3.018.589	\$9,137,497	41	105	4
DUT OF STATE																								
InterPhases Solar	RD4-7	Moorpark, CA	Out of State	1/12/20	curren	t 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	\$585,019	\$0	\$585,019	\$414,981	\$0								2	
Northern Plains Power Tech.	RD3-21	Brookings, SD	Out of State	11/11/12	comple	te 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	RD3-55 RD3-71	Grand Forks ND	Out of State	3/22/12	comple	te RD	2	Diomacr	Demonstrated a tharmally integrated biomass ancification sustance with a 20 kW law. Bu ass turbina	\$1,000,000	\$1,000,000	\$000,021	\$1,666,021	\$0 \$0	\$290							1	5	
	RD5-71			5/25/12	compic		,	Diomass	Researched processes to reform bio-ethanol and bio-methanol into hydrogen for use in a fuel cell or gas	\$777,728	\$777,430	30	3777,456	30	3270								1	
Energy Conversion Devices	RD-22	Kochester Hills, M	Out of State	10/12/07	comple	te RD	2	Biomass	turbine to generate electricity. Studied handling, performance and emissions to assess feasibility of poultry waste as a sustainable	\$900,000	\$900,000	\$1,390,015	\$2,290,015	\$0	50								0	
Coaltec	RD-26	Carterville, IL	Out of State	1/12/07	comple	te RD	2	Biomass	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	comple	te RD	2	Biomass	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	comple	te 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	comple	te 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	12/0/08	comple	te RD	2	Solar	Designed and developed a thin-tilm solar cell that will use a direct-write inkjet printing process. Overcome limitations in organic-based solar cells by developing low band gap (red light absorbing)	\$1,000,000	\$949,005	\$0	\$949,005	\$0	\$50,995								2	
NREL-Low Band Gap-Solar	KD-107	Golden, CO	Out of State	12/9/08	compie	te KD	2	Solar	materials. Performance testing of a particulate filtration clean-up system for the producer gas from a biomass	\$1,000,000	\$944,452	50	\$944,452	50	\$22,248							0	2	
Iowa State University	RD-110	Ames, IA	Out of State	7/12/07	comple	te RD	2	Biomass	gasifier. Measured operational and component impacts of co-firing biomass with coal in an indirect fired combine	\$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	comple	te RD	1	Biomass	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	comple	te RD	1	Biomass	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	comple	te 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	comple	te 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	comple	te RD	1	Biomass	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	comple	te 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	comple	te 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	Gainesvile, FL	Out of State	3/23/21	curren	t RD	4		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	\$71,411	\$0	\$71,411	\$1,038,127	\$1,038,127									
									Economic Benefits for Out of State Area	\$14,476,234	\$12,507,999	\$5,444,105	\$17,952,104	\$1,861,402	\$1,553,254	0	0	\$0	\$0	\$0	\$0	8	27	2
									TOTAL ALL PROJECTS	\$106,908,582	\$92,684,530	\$115,760,998	\$208,445,528	\$8,392,199	\$7,284,399	30,698	686,040	\$383,214	\$6,461	\$5,667,657	\$18,787,993	59	198	8

RDF Annual Report to Legislature Attachment A Page 2 of 2

RENEWABLE DEVELOPMENT FUND FINANCIAL STATEMENT As of December 31, 2019

	2001 - 2018	2019	Since RDF Inception (2001-2019)				
Total RDF Credits *	\$359,450,000	\$32,500,000	\$391,950,000				
Excelsior	\$10,000,000	\$0	\$10,000,000				
Energy Production Grants	\$32,337,417	\$3,662,133	\$35,999,550				
Research Grants	\$44,016,174	\$2,668,717	\$46,684,891				
Total RDF Grant Payments	\$86,353,591	\$6,330,850	\$92,684,441				
Administrative Costs	\$2,299,756	\$0	\$2,299,756				
University of Minnesota	\$25,000,000	\$0	\$25,000,000				
REPI	\$92,640,169	\$516,297	\$93,156,466				
Solar Rebates	\$57,125,947	\$2,856,688	\$59,982,635				
Other Legislative Mandates	\$52,946,817	\$25,895,720	\$78,842,537				
Total RDF Costs	\$316,366,280	\$35,599,555	\$351,965,835				

SUMMARY OF RDF PROGRAM FUNDS

Total Amount Credited to RDF	\$391,950,000
Total RDF Payments	\$351,965,835
Total Amount of Grant Awards	\$100,670,278
Amount of Grant Awards Paid	\$92,684,441
Cumulative Cask Credits Uncollected and Unexpended	\$31,998,328 ⁽¹⁾
Balance of RDF	- 0 -

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

\$31,998,328

RDF advisory group

- Lise Trudeau, engineer
 Minnesota Division of Energy Resources
 Representing residential customers
- Samuel Harper¹, regional energy manager Gerdau Representing commercial and industrial customers
- Heather Westra
 Representing Prairie Island Indian community
- Kevin Schwain, manager emerging customer program NSP-Minnesota Representing NSP-Minnesota
- Tami Gunderzik, senior manager product portfolio NSP-Minnesota Representing NSP-Minnesota
- Mike Bull, Director of Policy and Communications MN Center for Energy and Environment

RDF Administration

- Bria Shea, program manager
- Pamela Gibbs, grant administrator

¹ In February 2017 Mr. Harper was selected to fill the vacancy created when Cam Winton resigned in December 2016.