

Distributed Generation Facilities in Minnesota

Renewables on the Distribution Grid
Minnesota Public Utilities Commission
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Lise Trudeau
Senior Engineering Specialist
Minnesota Department of Commerce
Division of Energy Resources



Timeline - Minnesota DG

Cogeneration & Small Power Production (MN Statute 216B.164)

- Requires Net Metering for qualifying facilities < 40 kW
- Required purchase of all energy& capacity at Avoided cost for all facilities > 40 kW

Interconnection of On-Site DG (MN Statute 216B.1611)

- Established the terms and conditions that govern the interconnection and parallel operation of on-site distribution generation
- Required DG tariffs & annual reporting

Commission Order Establishing Standards for Interconnection & Operation of DG (MN PUC Docket E-999 / CI-01-1023)

FERC Standard Interconnection Agreements & Procedures for Small Generators (Docket RM-12-002)

MN 2013 Legislature

- Established a Solar Energy Standard
- Updated the state's 30 year old net metering law
- Established Production Based and Made in MN Incentives
- Provided opportunities for Community Solar Gardens
- Established a process for a Value of Solar Tariff

MN Value of Solar (VOS) Methodology Development

1981

1983

2001

2003 / ongoing

2004

2005

2006

2009

2011 – 2013

2013 – 2014

Cogeneration & Small Power Production (MN Rules Chapter 7835)

- Requires cogeneration & small power production tariff; requires reporting

IEEE 1547 Technical specifications and requirements for interconnecting distributed resources

Opportunities for Distributed Generation (MN Statute 216B.2426)

Commission shall ensure that opportunities for DG are considered in Resource Planning (216B.2422), State Transmission Plan (216B.2425), Certificate of Need for Large Energy Facility (216B.243)

Distributed Energy Resources (MN Statute 216B.2411)

- MN utilities may spend 5% of approved energy conservation spending requirement on DG
- May request permission for up to 10% for qualifying solar energy projects (<100 kW)

MN DER engaged stakeholders to review and assess distributed resources

- Workshops on DG technologies, contractual issues, net metering, interconnection, baseline & benchmarks, impacts & fees, value of solar

Net Metering

- All utilities, net metering <40 kW is unchanged
- **Public utilities only:**
 - Net metering cap raised to 1 MW
 - Single-customer meter aggregation on contiguous property
 - No standby charges < 100kW,
 - PUC to review standby charges $\geq 100\text{kW}$
 - Systems 40 kW - 1,000 kW
 - Solar & other DG: sized 120% to **energy**
 - wind: sized 120% to **load**



Solar Energy Standard

1.5% solar by 2020

- Applies to Public Utilities (IOUs)
- Mining & Paper Mills exempted
- Approx. 400 MW by 2020 (estimate)
- 10% carve out for smaller solar (< 20 kW)

Goal of 10% solar by 2030



Community Solar Garden

- Xcel filed program on **Sept. 30, 2013**
- Docket: 13-867
- Projects <1MW
- Subscribers may live in a contiguous county
- Subscribers receive on-bill credit.



Made in Minnesota (MiM)

- Available to Xcel Energy, MN Power, Alliant, & Otter Tail Power Customers
- 10 year performance based incentives
- \$15 M/yr for 2014 - 2023 from CIP and RDF
- Includes \$250k for Solar Thermal
- Residential and commercial systems <40kW
- **Applications due Feb 28**





Xcel Solar*Rewards

- Starting spring 2014 for systems <20kW
- 10 year performance based incentives
- Proposed 8 cents/kWh for 2014
- \$5 M/yr for 2014 - 2018.
- Shifts funding from CIP to RDF.





2020: MiM and Solar*Rewards Program Capacity Estimates

- Made in Minnesota 2,700 systems: 40 MW
- Solar*Rewards 1,600 systems: 24 MW
- 4,300 New Small PV Systems under 40 kW
- 1.5% Standard to achieve 400 MWs



Minnesota DG - 2011

- Electric Utility Qualifying Facilities *Reported 2011*
 - **Net Metering DG (<40 kW):**
 - **Approximately 11.8 MW in 989 Facilities**
 - 7.84 MW wind, 3.98 MW solar
 - **NM total generation: ~0.03% of annual retail electric energy sales (estimated)**
 - **NM excess generation: <0.01% of annual retail electric energy sales (reported)**



Minnesota DG - 2013

- Electric Utility Qualifying Facilities *Reported 2013*
 - **Net Metering DG (<40 kW):**
 - **Approximately 19.8 MW in 1,553 Facilities**
 - 9.27 MW wind, 10.48 MW solar
 - **NM total generation: ~0.04% of annual retail electric energy sales (estimated)**
 - **NM excess generation: ~0.01% of annual retail electric energy sales (reported)**



DG Interconnections - 2011

Distributed Generation Interconnections *Reported 2011*

- **~250 DG applications were received by MN Utilities**
 - Solar: ~74% of applications
 - Wind: ~ 17% of applications
 - Steam / Biomass / Other: ~9% of applications
 - Xcel: ~ 70% of applications



DG Interconnections - 2013

Distributed Generation Interconnections *Reported 2013*

- **~400 DG applications were received by MN Utilities**
 - Solar: ~80% of applications
 - Wind: ~ 9% of applications
 - Steam / Biomass / Other: ~11% of applications
 - Xcel: ~ 60% of applications

Net Metering in Minnesota

	Net Metering ¹				Est. % of Retail Sales ³	Retail Electricity Sales ²		
	# Customers		kW Capacity			Entities #	Customers #	Retail Sales GWh
	solar	wind	solar	wind				
Investor Owned	934	81	8490	1782	0.033%	5	1,488,323	43,496,657
Cooperative	234	244	1689	5456	0.085%	46	761,601	13,996,721
Municipal	45	7	299	171	0.010%	124	250,183	6,937,459
Total	1,213	332	10,478	7,409	0.042%		2,500,107	64,430,837

Notes: 1. Minnesota Qualifying Facilities Reports 2013 (E999/PR-14-09)

2. MN Rule 7610 Electric Utility Data Reporting, 2012

3. Annual energy produced (gross) by net metering projects divided by annual utility electric energy sales; based on estimated annual capacity factors for net metering projects (est. 15% solar, 20% wind)

Top MN Net Metering Utilities

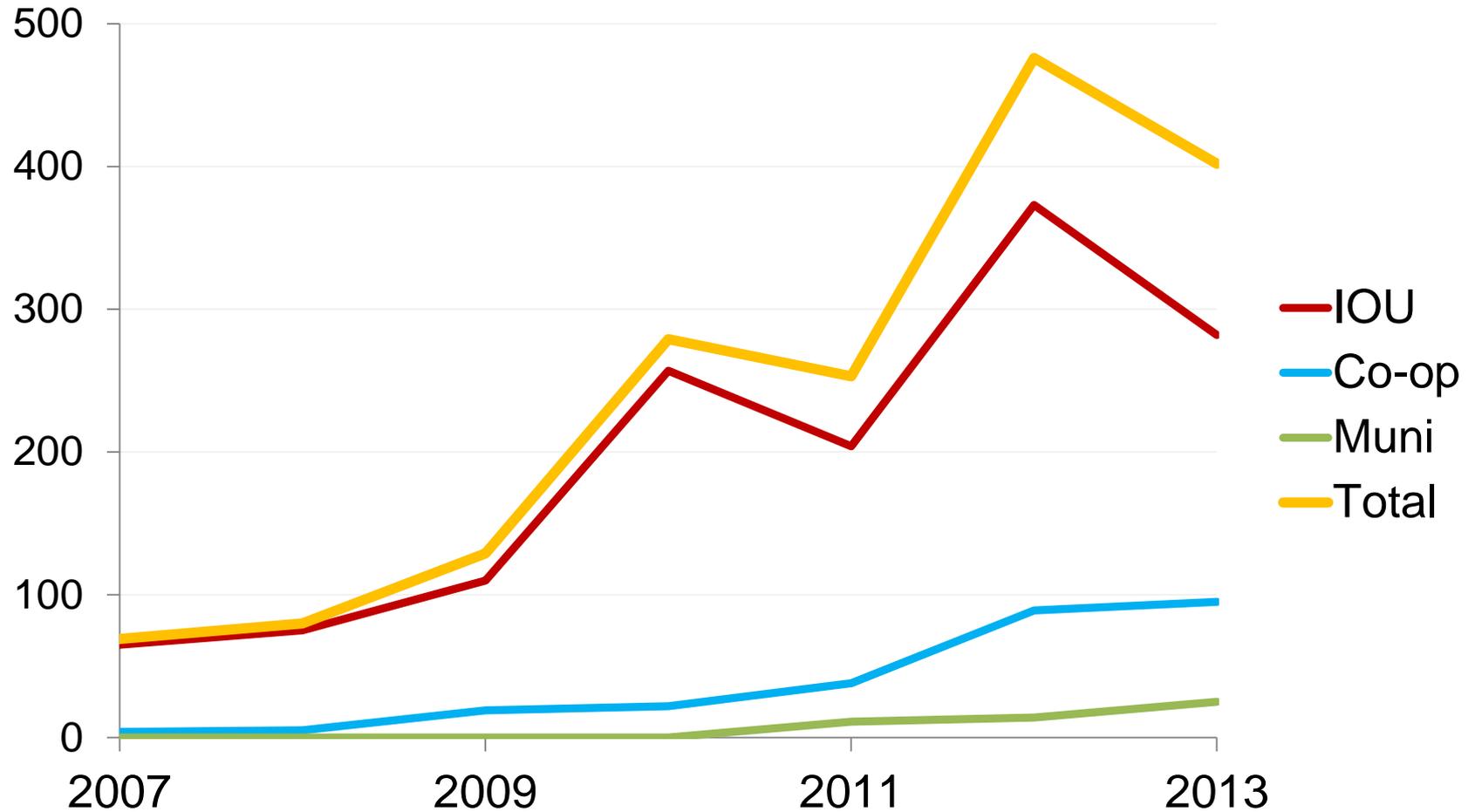
	Net Metering ¹					Retail Sales ² All Sectors GWh	
	# Customers		kW Capacity				Est. % of Retail Sales ³
	solar	wind	solar	wind	total		
Xcel Energy (NSP) IOU	784	32	7840	480	8320	0.036%	31,183,574
Steele Waseca COOP	6	30	50	1006	1056	0.737%	248,290
Alliant / IPL IOU	10	23	73	850	923	0.189%	839,466
Minnesota Power IOU	138	15	568	175	743	0.011%	9,388,538
Runestone COOP	7	16	50	422	472	0.379%	212,028
Dakota Electric COOP	28	9	245	206	451	0.036%	1,874,804
Tri County COOP	21	12	210	182	392	0.229%	259,225
East Central COOP	25	12	147	238	385	0.070%	866,915
Stearns COOP	8	12	91	279	370	0.126%	484,863
McLeod COOP	2	11	30	323	353	0.349%	173,316
OtterTail Power IOU	2	11	9	277	321	0.024%	2,084,513
Lake Region COOP	5	18	33	237	270	0.113%	405,402
Agralite COOP	1	12	11	250	261	0.212%	213,489
BENCO COOP	8	8	32	222	254	0.167%	257,511

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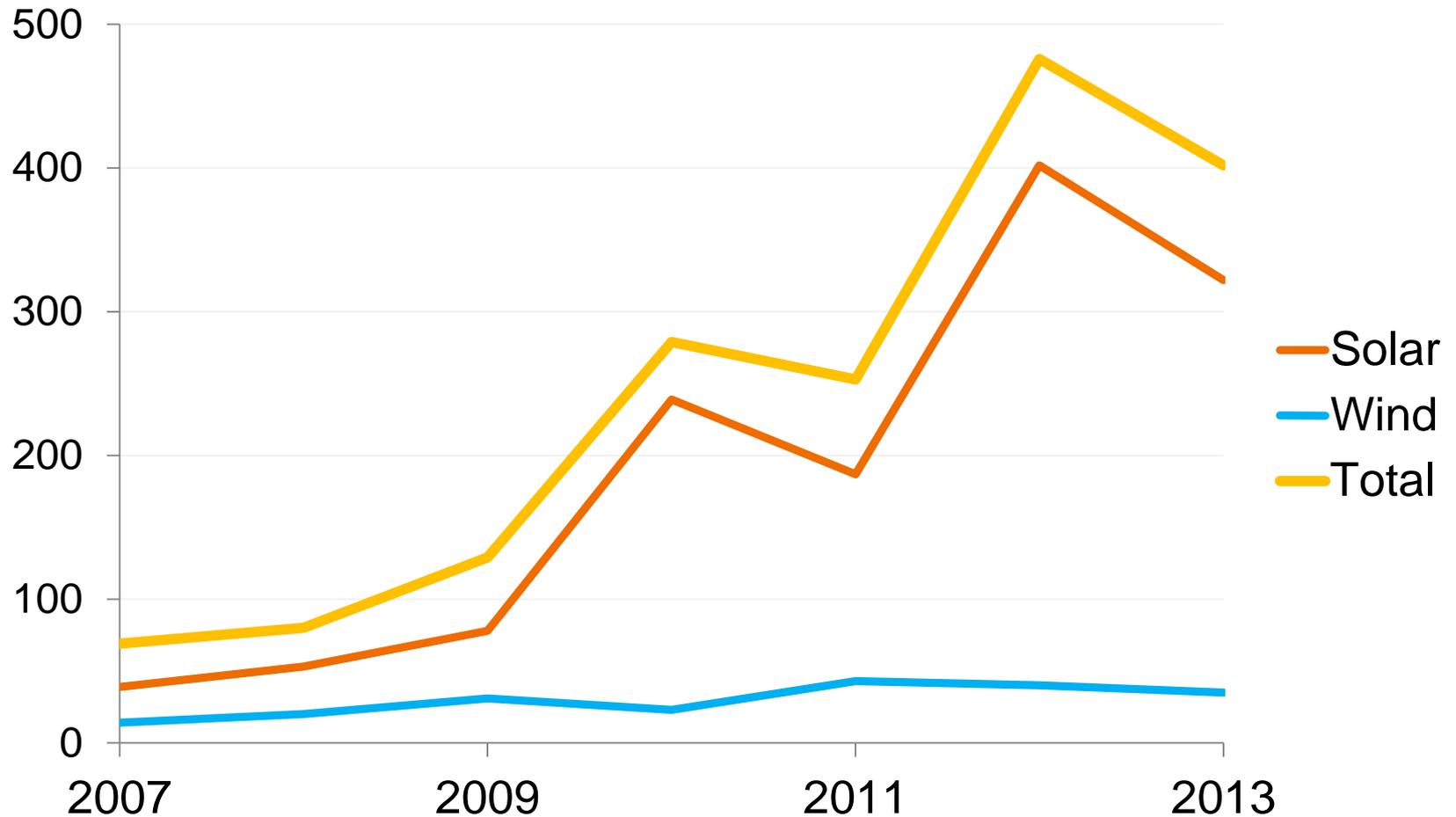
Applications for Interconnection



Source: Minnesota Distributed Generation Interconnection Annual Reports; E999/PR-14-10, 13-10, 12-10, 11-10, 10-55, 09-46, and E002/M-04-2055



Applications for Interconnection



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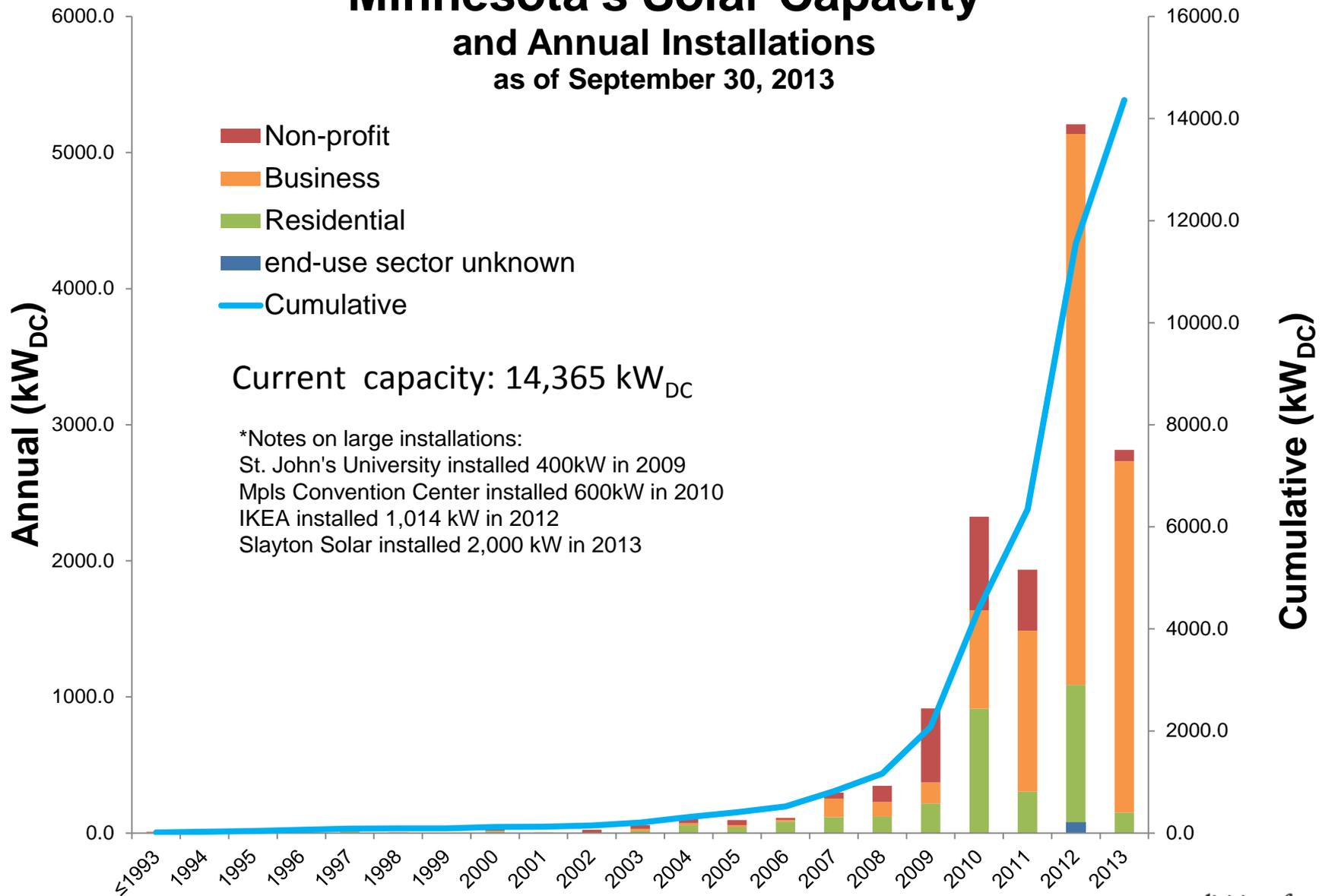
Solar Electricity in Minnesota

- In 2002...
 - 50 solar electric installations in MN
- Today...
 - Over 1,200 solar electric installations
- systems are getting bigger
- increasing number of installations at commercial sites





Minnesota's Solar Capacity and Annual Installations as of September 30, 2013



Source: DOC Division of Energy Resources

Largest Solar Installations - 2013

City	Capacity (kW _{DC})
Slayton	2,000
Bloomington	1,014
Minneapolis	600
St. Michael	400
Lakeville	200
Rochester	145
Woodbury	120
Vadnais Heights	100
Minneapolis	100
Medina	97

City	Capacity (kW _{DC})
Arden Hills	89
New Ulm	83
Saint Paul	82
Elk River	70
Saint Michael	40
Bloomington	40
Fridley	40
Roseville	40
Oakdale	40
Minneapolis	40

Thank You.
Questions?



MN DG Resources

Reports, presentations, data, and dockets:

<http://mn.gov/commerce/energy/topics/clean-energy/distributed-generation/> or search for: “MN distributed generation”

<http://mn.gov/commerce/energy/topics/resources/energy-legislation-initiatives/> or search for: “MN Energy Legislation Initiatives”

<http://mn.gov/commerce/energy/utilities/Annual-Reporting-Utility.jsp> or search for: “MN Utility Annual Reporting”