Distributed Generation Facilities in Minnesota

Renewables on the Distribution Grid
Minnesota Public Utilities Commission
April 11, 2014

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Minnesota Department of Commerce
Division of Energy Resources
Cogenation & 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

Cogeneration & Small Power Production (MN Rules Chapter 7835)
- Requires cogeneration & small power production tariff; requires reporting

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)

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)

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

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 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

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

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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 ≥100kW
  – 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
- 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

<table>
<thead>
<tr>
<th>Net Metering¹</th>
<th>Retail Electricity Sales²</th>
</tr>
</thead>
<tbody>
<tr>
<td># Customers</td>
<td>kW Capacity</td>
</tr>
<tr>
<td>solar</td>
<td>wind</td>
</tr>
<tr>
<td>Investor Owned</td>
<td>934</td>
</tr>
<tr>
<td>Cooperative</td>
<td>234</td>
</tr>
<tr>
<td>Municipal</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>1,213</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Utility</th>
<th>Type</th>
<th># Customers</th>
<th>kW Capacity</th>
<th>Est. % of Retail Sales</th>
<th>Retail Sales All Sectors GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xcel Energy (NSP)</td>
<td>IOU</td>
<td>784</td>
<td>7840</td>
<td>0.036%</td>
<td>31,183,574</td>
</tr>
<tr>
<td>Steele Waseca</td>
<td>COOP</td>
<td>6</td>
<td>50</td>
<td>0.737%</td>
<td>248,290</td>
</tr>
<tr>
<td>Alliant / IPL</td>
<td>IOU</td>
<td>10</td>
<td>73</td>
<td>0.189%</td>
<td>839,466</td>
</tr>
<tr>
<td>Minnesota Power</td>
<td>IOU</td>
<td>138</td>
<td>568</td>
<td>0.011%</td>
<td>9,388,538</td>
</tr>
<tr>
<td>Runestone</td>
<td>COOP</td>
<td>7</td>
<td>50</td>
<td>0.379%</td>
<td>212,028</td>
</tr>
<tr>
<td>Dakota Electric</td>
<td>COOP</td>
<td>28</td>
<td>245</td>
<td>0.036%</td>
<td>1,874,804</td>
</tr>
<tr>
<td>Tri County</td>
<td>COOP</td>
<td>21</td>
<td>210</td>
<td>0.229%</td>
<td>259,225</td>
</tr>
<tr>
<td>East Central</td>
<td>COOP</td>
<td>25</td>
<td>147</td>
<td>0.070%</td>
<td>866,915</td>
</tr>
<tr>
<td>Stearns</td>
<td>COOP</td>
<td>8</td>
<td>91</td>
<td>0.126%</td>
<td>484,863</td>
</tr>
<tr>
<td>McLeod</td>
<td>COOP</td>
<td>2</td>
<td>30</td>
<td>0.349%</td>
<td>173,316</td>
</tr>
<tr>
<td>OtterTail Power</td>
<td>IOU</td>
<td>2</td>
<td>9</td>
<td>0.024%</td>
<td>2,084,513</td>
</tr>
<tr>
<td>Lake Region</td>
<td>COOP</td>
<td>5</td>
<td>33</td>
<td>0.113%</td>
<td>405,402</td>
</tr>
<tr>
<td>Agralite</td>
<td>COOP</td>
<td>1</td>
<td>11</td>
<td>0.212%</td>
<td>213,489</td>
</tr>
<tr>
<td>BENCO</td>
<td>COOP</td>
<td>8</td>
<td>32</td>
<td>0.167%</td>
<td>257,511</td>
</tr>
</tbody>
</table>

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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

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
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

Current capacity: 14,365 kW_{DC}

*Notes on large installations:
St. John's University installed 400 kW in 2009
Mpls Convention Center installed 600 kW in 2010
IKEA installed 1,014 kW in 2012
Slayton Solar installed 2,000 kW in 2013

Source: DOC Division of Energy Resources
# Largest Solar Installations - 2013

<table>
<thead>
<tr>
<th>City</th>
<th>Capacity ($kW_{DC}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slayton</td>
<td>2,000</td>
</tr>
<tr>
<td>Bloomington</td>
<td>1,014</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>600</td>
</tr>
<tr>
<td>St. Michael</td>
<td>400</td>
</tr>
<tr>
<td>Lakeville</td>
<td>200</td>
</tr>
<tr>
<td>Rochester</td>
<td>145</td>
</tr>
<tr>
<td>Woodbury</td>
<td>120</td>
</tr>
<tr>
<td>Vadnais Heights</td>
<td>100</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>100</td>
</tr>
<tr>
<td>Medina</td>
<td>97</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>City</th>
<th>Capacity ($kW_{DC}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arden Hills</td>
<td>89</td>
</tr>
<tr>
<td>New Ulm</td>
<td>83</td>
</tr>
<tr>
<td>Saint Paul</td>
<td>82</td>
</tr>
<tr>
<td>Elk River</td>
<td>70</td>
</tr>
<tr>
<td>Saint Michael</td>
<td>40</td>
</tr>
<tr>
<td>Bloomington</td>
<td>40</td>
</tr>
<tr>
<td>Fridley</td>
<td>40</td>
</tr>
<tr>
<td>Roseville</td>
<td>40</td>
</tr>
<tr>
<td>Oakdale</td>
<td>40</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>40</td>
</tr>
</tbody>
</table>
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/utilities/Annual-Reporting-Utility.jsp or search for: “MN Utility Annual Reporting”