SunShot – RSC II Current State Utilities Report
Interconnection and Net Metering
January 2015
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Department of Energy
SunShot Initiative
Rooftop Solar Challenge II

Current State Findings
Executive Summary Report
Task 4 Overview: Budget Period 1 Activities and Deliverables

**Utility Touchpoints:**
- 350 utilities, 12MM customers, 10 category types across 3 states
- Utility & Stakeholders Outreach Survey
- Validation Workshops and Webinar Series
- Pilot Utilities Engagement

**Deliverables:**
- Utility Stakeholders Database
- Current state findings report (D1)
- Best practice improvement design recommendations report (D2)
- Six pilot utility Roadmaps generated into a public-facing tracking solution (D3/D4)

Pilot Utility Solar Adoption Roadmaps
Ownership Landscape

Approximately 9 million customers are served by electric utilities in the 3-state region and 75% of those customers are served by investor-owned utilities.

<table>
<thead>
<tr>
<th>Ownership Type</th>
<th>Number of Customers Served (2012, EIA)</th>
<th>Percent of Total Served</th>
<th>Number of Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor-Owned</td>
<td>9,042,032</td>
<td>75%</td>
<td>21 (top 10 serve 97%)</td>
</tr>
<tr>
<td>Cooperative</td>
<td>1,288,454</td>
<td>11%</td>
<td>95</td>
</tr>
<tr>
<td>Municipality</td>
<td>760,160</td>
<td>6%</td>
<td>199</td>
</tr>
<tr>
<td>Retail Power Marketer (ARES)</td>
<td>1,022,193</td>
<td>8%</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>9 MM customers</td>
<td>100%</td>
<td>343 Utilities</td>
</tr>
<tr>
<td>Total Population (2012, USCB)</td>
<td>24 MM Population</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A majority of customers in the 3-state region are served by a small number of electricity providers.

Key Players:

**Investor Owned Utilities (~75% customers):**
- Illinois: ComEd, Ameren, MidAmerican
- Minnesota: Xcel Energy, MN Power
- Wisconsin: We Energies, Alliant, WI PSC, MG&E

**Municipal and Cooperative Utilities (~17% of customers):**
- Conexus Energy
- Dakota Electric
- City of Springfield
- Dairyland Power Cooperative
- Great River Energy

**Alternative Retail Electric Suppliers (~8% of customers):**
- Integrys
- Ameren Energy Marketing
- First Energy Solutions Corp.
- Direct Energy Services
- Constellation New Energy
- WPPI Energy

**Key Players:**
- Integrys
- Ameren Energy Marketing
- First Energy Solutions Corp.
- Direct Energy Services
- Constellation New Energy
- WPPI Energy
A majority of customers in the 3-state region are served by a small number of electricity providers

**Key Players**

<table>
<thead>
<tr>
<th>Illinois</th>
<th>Minnesota</th>
<th>Wisconsin</th>
</tr>
</thead>
<tbody>
<tr>
<td>ComEd</td>
<td>Xcel Energy MN</td>
<td>We Energies</td>
</tr>
<tr>
<td>Ameren</td>
<td>MN Power</td>
<td>Alliant</td>
</tr>
<tr>
<td>MidAmerican</td>
<td>WI PSC</td>
<td>MG&amp;E</td>
</tr>
</tbody>
</table>

**Utilities Serving >100,000 Customers**

- Conexus Energy
- Dakota Electric
- City of Springfield
- East Central Energy

**Generations & Transmission Providers**

- Southern MN Municipal Power Agency
- Great River Energy
- Dairyland Power Cooperative
- WPPI Energy
A utility’s obligation to follow standard rules regarding solar enrollment processes varies by state and ownership type

Regulated utilities: subject to regulation by state legislature

Unregulated utilities: not subject to regulation by state legislature, these entities may follow individual/member-organization/regulated procedures
The DOE’s Interconnection Process Metrics can be scored using FERC and IREC best practices

<table>
<thead>
<tr>
<th>Regulated Group Coverage</th>
<th>Application</th>
<th>Information Access</th>
<th>Process Time (Level 1 systems)</th>
<th>Inspection (Level 1 systems)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of customer base served by regulated utility: 100%</td>
<td>State-level application forms (required)</td>
<td>Online information / FAQs, customer information requests and sharing study results</td>
<td>&lt;3 days for Application receipt confirmation</td>
<td>No additional cost to customer</td>
</tr>
<tr>
<td></td>
<td>Online submission &amp; tracking required</td>
<td></td>
<td>&lt;10 days for technical review</td>
<td>&lt;10 days from customer request</td>
</tr>
<tr>
<td></td>
<td>Tiered technical screens/forms by size and network type</td>
<td></td>
<td>10 day buffer window for incomplete applications</td>
<td>Standard inspection contract</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coordination with City</td>
</tr>
<tr>
<td>Percent of customer base served by regulated utility: 90-99%</td>
<td>State-level application forms (recommended)</td>
<td>Response required for customer application requests and sharing study results</td>
<td>Defined, but &gt;3 days for Application receipt confirmation</td>
<td>Potential additional costs to customer (capped)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td>Defined, but &gt;10 days for technical review</td>
<td>Defined, but &gt;10 days from customer request</td>
</tr>
<tr>
<td></td>
<td>Tiered technical screens/forms by size only</td>
<td></td>
<td>Defined, but &lt;10 day buffer window for incomplete applications</td>
<td>No standard inspection contract or coordination with City</td>
</tr>
<tr>
<td>Percent of customer base served by regulated utility: &lt;90%</td>
<td>No state-level application forms</td>
<td>No information access rules</td>
<td>Time allowed for recognition of application receipt: Not specified</td>
<td>Potential additional costs to customer (uncapped)</td>
</tr>
<tr>
<td></td>
<td>Required: No</td>
<td></td>
<td>Time allowed for application review: Not specified</td>
<td>No standard inspection contract, coordination with City, or time reqt</td>
</tr>
<tr>
<td></td>
<td>Shared technical screens/forms for all systems</td>
<td></td>
<td>Time until restart occurs for incomplete applications: Not specified</td>
<td></td>
</tr>
</tbody>
</table>
State-level scorecards show that each state currently requires some, but not most, of the best practices

<table>
<thead>
<tr>
<th>State</th>
<th>Freeing the Grid Score (Interconnection/ Net Metering)</th>
<th>Regulated Group Coverage</th>
<th>Application</th>
<th>Information Access</th>
<th>Process Time</th>
<th>Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>B / B</td>
<td>Investor owned, alternative retail electric suppliers</td>
<td>B / B</td>
<td>Time allowed for recognition of application receipt: 7 days</td>
<td>Time allowed for application review: 15 days</td>
<td>Maximum cost: not specified</td>
</tr>
<tr>
<td></td>
<td>Percent of customer base served by regulated utility: 93%</td>
<td>Percent of customer base served by regulated utility: 93%</td>
<td>No online submission / tracking reqt</td>
<td>Time until restart occurs for incomplete applications: 10 days</td>
<td>Time until restart occurs for incomplete applications: none</td>
<td>Maximum time: not specified</td>
</tr>
<tr>
<td>Minnesota</td>
<td>C / B</td>
<td>Investor owned, cooperative, municipal</td>
<td>C / B</td>
<td>Time allowed for recognition of application receipt: 10 days</td>
<td>Time allowed for application review: 15 days</td>
<td>Maximum cost: $0</td>
</tr>
<tr>
<td></td>
<td>Percent of customer base served by regulated utility: 100%</td>
<td>Percent of customer base served by regulated utility: 100%</td>
<td>Required Provided Information: Each utility must publish statement of rates, terms, and conditions of interconnections; a statement of technical requirements; a sample contract containing the applicable terms and conditions; pertinent rate schedules; and the contact information of the person to which inquiries should be directed upon request</td>
<td>Time until restart occurs for incomplete applications: none</td>
<td>Time until restart occurs for incomplete applications: none</td>
<td>Maximum time: 20 days</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>D / D</td>
<td>Investor owned, municipal</td>
<td>D / D</td>
<td>Time allowed for recognition of application receipt: 10 days</td>
<td>Time allowed for application review: 10 days</td>
<td>Maximum cost: $0</td>
</tr>
<tr>
<td></td>
<td>Percent of customer base served by regulated utility: 91%</td>
<td>Percent of customer base served by regulated utility: 91%</td>
<td>Standard application forms developed: Yes</td>
<td>Time until restart occurs for incomplete applications: none</td>
<td>Time until restart occurs for incomplete applications: none</td>
<td>Maximum time:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No online submission / tracking reqt</td>
<td>Tiered Screens: Yes, 4 tiers based on system size</td>
<td>Engineering review (to be completed within 10 working days of agreement to proceed)</td>
<td>Engineering review (to be completed within 10 working days of agreement to proceed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Required Provided Information: None</td>
<td>Required distribution system upgrades (to be completed within time frame mutually agreed upon)</td>
<td>Distribution system study (to be completed within 10 working days of agreement to proceed)</td>
<td>Distribution system study (to be completed within 10 working days of agreement to proceed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard contract provided: yes</td>
<td>Standard contract provided: yes</td>
<td>Standard contract provided: yes</td>
<td>Standard contract provided: yes</td>
<td></td>
</tr>
</tbody>
</table>

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In recent years, utilities in the 3-state region have annually interconnected between 600 and 750 systems

- No existing public record of number of solar systems installed annually for Midwest states

- Data collection methodology varied between states
  - Minnesota: MN Department of Commerce, Division of Energy Resource
  - Wisconsin: Focus on Energy solar rebate applications

- The estimated cumulative number of solar installations per 100 customers in the 3-state region was far below that of the national average as of 2014

### Number of Solar Installations per 100 Homes in 2013

<table>
<thead>
<tr>
<th>State</th>
<th>Number of Installations</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL</td>
<td>0.05</td>
</tr>
<tr>
<td>MN</td>
<td>0.03</td>
</tr>
<tr>
<td>WI</td>
<td>0.04</td>
</tr>
<tr>
<td>NJ</td>
<td>1.46</td>
</tr>
<tr>
<td>CA</td>
<td>1.03</td>
</tr>
<tr>
<td>HI</td>
<td>2.51</td>
</tr>
<tr>
<td>National Avg.</td>
<td>0.31</td>
</tr>
</tbody>
</table>

### 3-State Total

**Graph:**
- Y-axis: Number of Solar Installations (0 to 800)
- Colors: Yellow (Illinois), Red (Minnesota), Green (Wisconsin), Blue (3-State Total)

**Legend:**
- Illinois
- Minnesota
- Wisconsin
- 3-State Total
Online Surveys were circulated to utility contacts and additional DG stakeholders to harvest information about current solar enrollment processes

Stakeholder Survey

- Almost 50 contractors have participated in the stakeholder survey to-date and report working with 8 of the 10 largest investor owned utilities in the region.

- Surveyed groups included:
  - Solar Minnesota, MnSEIA
  - WI SEIA
  - ISEA
  - Clean Energy Project Builders (through CERTS)
  - MREA solar contractors
  - IGEN contractors

Utility Survey

- 21 utilities have participated in the survey to-date and serve approximately 51% of total customer base:
  - Regulated: 20 participants
  - Unregulated: 1 participant

*Other: government employee, solar advocacy group employee, PV solar owner, solar developer

60% of respondents were Contractors with direct utility application experience.
Stakeholder Survey themes were broken down by application, information access, processing time, and inspections

**Application:** standardized and automated applications can save customers, contractors, and utilities time and energy.

**Information Access:** customers would like to see transparency in application requirements and tracking throughout the process.

**Processing Time:** Timely application processing depends on established utility review and customer response expectations.

**Inspections:** having defined procedures (forms, cost, time) and City coordination allows customers to efficiently complete their system go-live.
Application: *standardized* and *automated* applications can save customers, contractors, and utilities time and energy

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**Pain Point**

- "An online automated system should be truly automated. An applicant should not have to 'babysit' an application."
- "____ has a lot of good info on their website - but they just link to the PSC. For an installer, that might be ok. For a homeowner it seems confusing."
- "Utilities requiring engineering review should only do so on projects greater than 10kW."

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**Observed Best Practice**

- "Adoption of online tools endorsed by customers and installers"
- "ComEd is good example [of a utility with improved interconnection processes] in the Midwest."
- "Bayfield Electric cooperative has improved its customer interface to solar relations. The liaison is active and positive about embracing solar systems"
- "MN Power [has] a 2 page form and is approved very quickly."

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- Paper forms or semi-electronic applications
- Unclear interconnection policies and application instructions
- Unnecessarily complicated applications for small systems
- Adoption of standardized forms and having someone and dedicated to answering customer questions
- Creation of simplified, 1-2 page applications for small systems
Information Access: customers would like to see transparency in application requirements and tracking throughout the process

**Pain Point**

“Some utilities don’t even have an interconnection application available unless you specifically request it.”

“My engineering fee can take anywhere from one day to a week or more to be acknowledged. Engineering review can take a week to a month. Signing of the interconnection from the Utility can take 24 hours to a week.”

“Utility engineers sometimes arbitrarily require transformer and other upgrades that are not necessary and won’t explain why. This…costs between $5000 and $10,000”

**Observed Best Practice**

“Providing online application materials

“If the rural cooperatives had an online interconnection application that could be downloaded along with instructions that would be helpful.”

“Multiple states have a program Power Clerk that streamlines the process and allows you to check the status of your application. No wondering if something was received.”

“The review process [for systems less than 10kW] should be less than 7 days or no review, just automatically approved for interconnection.”

Lack of transparency in how to access and submit applications

Creation of online tracking system or more frequent communication between utility liaison and applicant

Unexplained required system testing and costs

Required documentation of when and why additional tests/costs are incurred

No visibility into where application is in approvals process
Processing Time: Timely application processing depends on established utility review and customer response expectations

Pain Point

- Inconsistencies in application approval timings (even among regulated utilities)
- Lengthy application reviews resulting from multiple returns of an application for being incomplete
- Slow review times due to limited staff

Observed Best Practice

- Standardizing the time for individual portions of the overall application review
- Providing clear, user-friendly instructions and identifying a utility contacts to answer questions
- Creating streamlined review processes for small systems

Quotes:

- "Eliminate the need for so much applicant participation. I hate having to log on daily to make sure my applications are progressing or approved. Eliminate the uneven amount of time processes take."
- "On many jobs, our costs double because we are not allowed to deal directly with engineering. They expect us to make submittal after submittal until it matches their approval. Sometimes they are wrong and we need to start all over again."
- "Capacity for application processing is not keeping pace with the number of applications."

- "I like working with Connexus. Very straight-forward. Communicated well through email and phone calls."
- "The more applications the slower the process. A large percentage of applications are for less than 10kW, so utilities could eliminate the review process for such systems and save time and money for everyone."
Inspections: having **defined procedures** and **City coordination** allows customers to efficiently complete their system go-live

**Pain Point**

- A lack of communication exists between solar installers and utility engineers
- Unnecessary precautions required for small systems
- Redundancies exist in paperwork required by utilities, cities/municipalities, and states (for federal grant applications)

**Observed Best Practice**

- Providing interface for communications or providing standardized checklist to both parties
- Creating less stringent inspection requirements based on system size
- Creation of integrated application for different entities or a scheduling tool to better coordinate site visits

*“The installers must be able to interact with engineering! If there are conditions that are attached to an interconnection approval, make sure that they are presented along with the approval.”*

*“For [my utility], 3 utility representatives usually come to the commissioning (meter tech, interconnection engineer and application coordinator).”*

*“Eliminate redundancy; in MN we have just about everyone, state, city and utility and inspectors all wanting paperwork and info about the system, so paperwork time and costs are about 40 hours + per system installed.”*

*“Having a standard application form and a standard checklist for inspections would greatly improve the [solar enrollment] process.”*

*Other utilities do not require as many man hours and will come and swap out the meter without any interconnection verification, requirement/request of the homeowner or installer to be present, and paperwork can be signed at some point by the owner prior to the meter being swapped out.”*

*“If we could have city inspection and commissioning be scheduled on same day - that’d be amazing.”*
Stakeholder Survey themes were broken down by application, information access, processing time, and inspections

**Administrative Challenges:** processing increased numbers of solar applications may cause a burden to utility staff

**Technical Challenges:** more grid interconnections is a concern for ensuring safe and reliable grid operations

**Legislative Challenges:** many utilities are facing new legislative mandates related to distributed generation requiring them to set up additional programs and track regulatory compliance
Utilities anticipate administrative, technical, and legislative challenges when responding to increased solar applications and grid installations

**Administrative Challenges**

- Having staff in adequate number to process applications in a timely manner
  - 67% of respondents reported that they expect the **administrative burden** on staff to review applications to be a **high or medium concern** for their company in coming years
- Developing **online tools** to efficiently manage applications
  - Only 38% of utility survey respondents make applications available online and **10% have an online submission processes in place**

**Technical Challenges**

- Technical evaluation of the system/grid conditions
- Responding to grid operation impacts of distributed generation (power flows, load forecasts, etc.)
- Ensuring **safe operation** of installed systems
- Adjusting **billing software/meter reading system** to handle net metering issues

**Legislative Challenges**

- Responding to **legislative carve out** requirements
- Creating **shared solar** programs (legislative or voluntary)
- Creating appropriate applications and paying structures for self-regulated utilities
- Regulatory reporting on application timeframes and approvals
Looking ahead, The Grow Solar Partnership will focus on three trends influencing Utility solar enrollment processes

**Trend #1: Increased Distributed Solar Applications**

- Customers driven to install PV by decreases in cost of PV and greater interest in environmental matters
- 65% of utility survey respondents are anticipating increased solar applications in the next 3 years
- State-level rebate and performance-based incentive program adoption

**Trend #2: Increased Distributed Solar Grid Penetration**

- Legislative mandate: Minnesota’s 2013 legislation requires 1.5% of electricity be generated by solar by 2020
- Legislative mandates: 6% of annual generation must be supplied by solar PV in Illinois in year 2015-2016 and thereafter (1.5% of total sales in compliance year 2025-2026)

**Trend #3: Utility-enabled Shared Solar Programs**

- Minnesota: Xcel’s Community Solar Gardens ([Article 10, Section 2](#))
- Illinois: possible community solar carve out in Supplemental Photovoltaic Procurement Plan
- Cross-Collaboration with multiple DOE-funded Solar Market Pathways grants
Grow Solar
A Midwest Partnership to Move Markets

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