Grow Solar
A Midwest Partnership to Move Markets
Powered by SunShot
U.S. Department of Energy

SunShot – RSC II Current State Utilities Report

Interconnection and Net Metering

January 2015

BUSINESS CONSULTANTS

DEEP TECHNOLOGISTS

westMONROE

Table of Contents

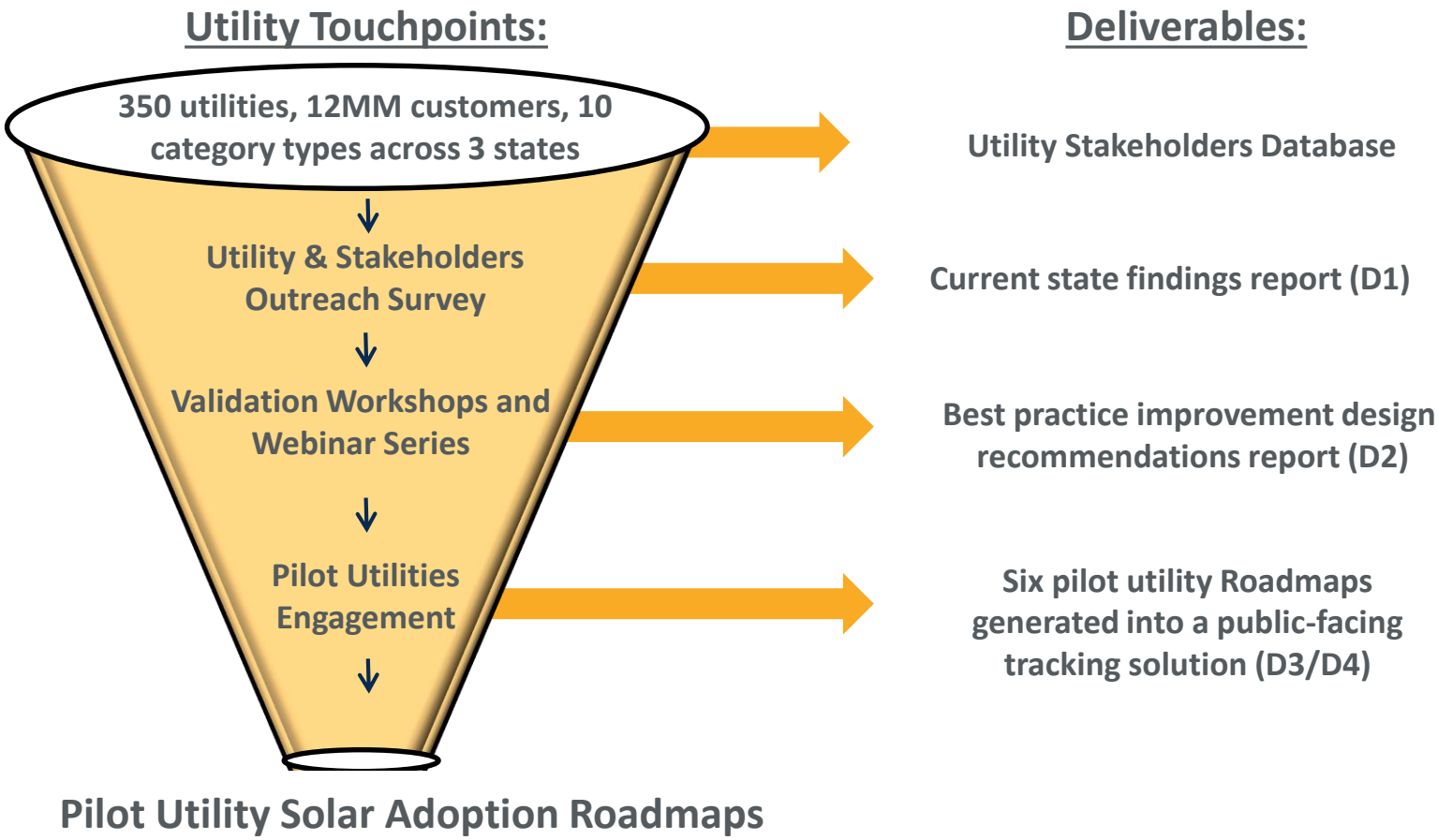
Grow Solar
A Midwest Partnership to Move Markets
Powered by SunShot
U.S. Department of Energy

Department of Energy
SunShot Initiative
Rooftop Solar Challenge II

Current State Findings
Executive Summary Report

westMONROE

Task 4 Overview: Budget Period 1 Activities and Deliverables

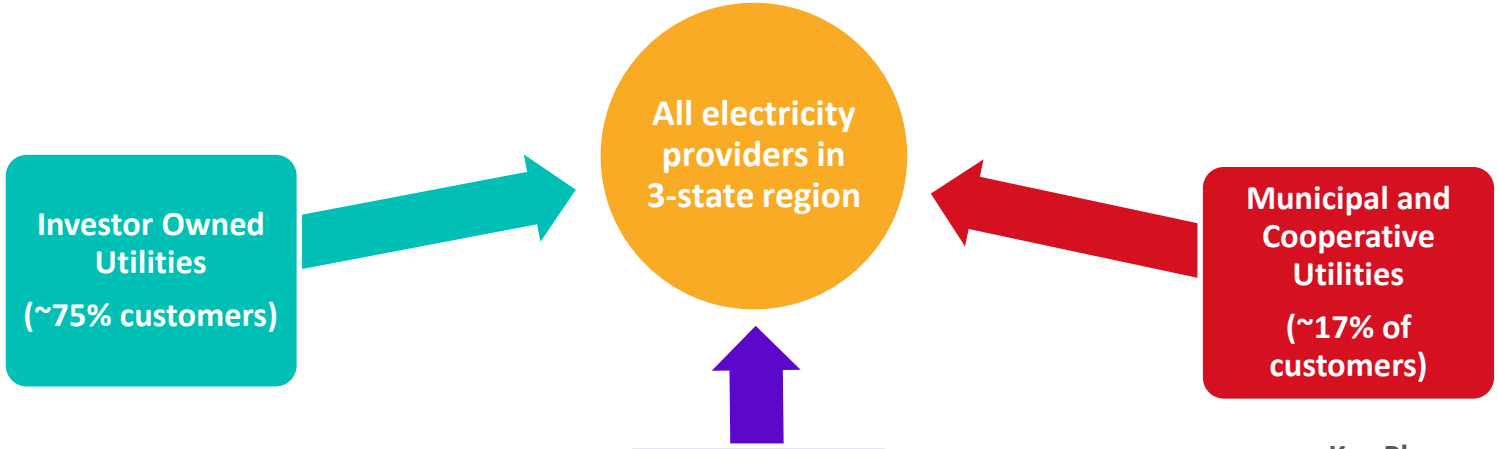


Ownership Landscape

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

Ownership Type	Number of Customers Served (2012, EIA)	Percent of Total Served	Number of Utilities
Investor-Owned	9,042,032	**75%**	21 *(top 10 serve 97%)*
Cooperative	1,288,454	11%	95
Municipality	760,160	6%	199
Retail Power Marketer (ARES)	1,022,193	8%	28
Total	**9 MM customers**	100%	**343 Utilities**
Total Population (2012, USCB)	**24 MM Population**		

A majority of customers in the 3-state region are served by a small number of electricity providers



Key Players:

Illinois	Minnesota	Wisconsin
ComEd	Xcel Energy MN	We Energies
Ameren	MN Power	Alliant
MidAmerican		WI PSC
		MG&E

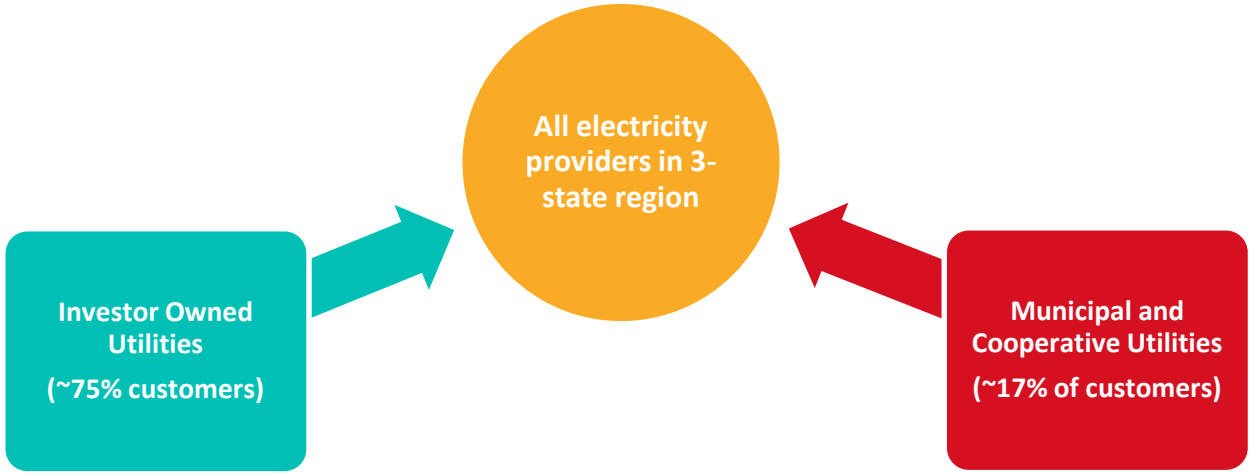
Key Players:

Integrys
Ameren Energy Marketing
First Energy Solutions Corp.
Direct Energy Services
Constellation New Energy

Key Players:

Large utilities	Generations & Transmission Providers
Conexus Energy	Southern MN Municipal Power Agency
Dakota Electric	Great River Energy
City of Springfield	Dairyland Power Cooperative
East Central Energy	WPPI Energy

A majority of customers in the 3-state region are served by a small number of electricity providers



Key Players

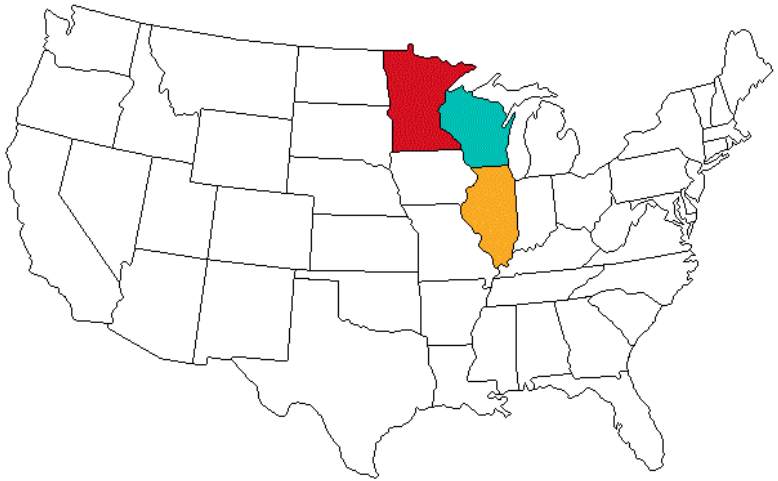
Illinois	Minnesota	Wisconsin
ComEd	Xcel Energy MN	We Energies
Ameren	MN Power	Alliant
MidAmerican		WI PSC
		MG&E

Key Players

Utilities Serving >100,000 Customers	Generations & Transmission Providers
Conexus Energy	Southern MN Municipal Power Agency
Dakota Electric	Great River Energy
City of Springfield	Dairyland Power Cooperative
East Central Energy	WPPI Energy

Regulatory Landscape

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*

	Regulated	Unregulated
Illinois	• IOUs • Alternative retail electric suppliers	• Cooperatives • Municipals
Minnesota	• IOUs • Cooperatives Municipals	• None
Wisconsin	• IOUs • Municipals	• Cooperatives

The DOE's Interconnection Process Metrics can be scored using FERC and IREC best practices

Grow Solar — A Midwest Partnership to Move Markets — Powered by SunShot U.S. Department of Energy

DOE Success Metrics

	Regulated Group Coverage	Application	Information Access	Process Time (Level 1 systems)	Inspection (Level 1 systems)
Best Practices	Percent of customer base served by regulated utility: 100%	State-level application forms (required) Online submission & tracking required Tiered technical screens/forms by size and network type	Online information / FAQs, customer information requests and sharing study results	≤3 days for Application receipt confirmation ≤10 days for technical review 10 day buffer window for incomplete applications	No additional cost to customer <10 days from customer request Standard inspection contract Coordination with City
Improved Practices	Percent of customer base served by regulated utility: 90-99%	State-level application forms (recommended) No Tiered technical screens/forms by size only	Response required for customer application requests and sharing study results	Defined, but >3 days for Application receipt confirmation Defined, but >10 days for technical review Defined, but <10 day buffer window for incomplete applications	Potential additional costs to customer (capped) Defined, but >10 days from customer request No standard inspection contract or coordination with City
Undefined Practices	Percent of customer base served by regulated utility: <90%	No state-level application forms Required: No Shared technical screens/forms for all systems	No information access rules	Time allowed for recognition of application receipt: Not specified Time allowed for application review: Not specified Time until restart occurs for incomplete applications: Not specified	Potential additional costs to customer (uncapped) No standard inspection contract, coordination with City, or time reqt

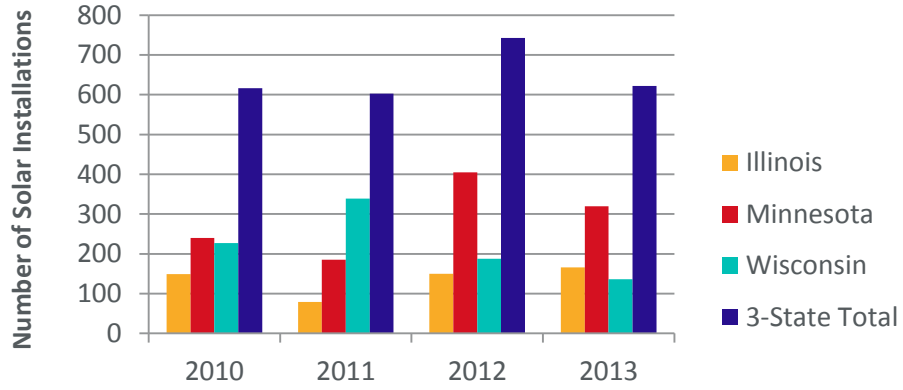
westMONROE

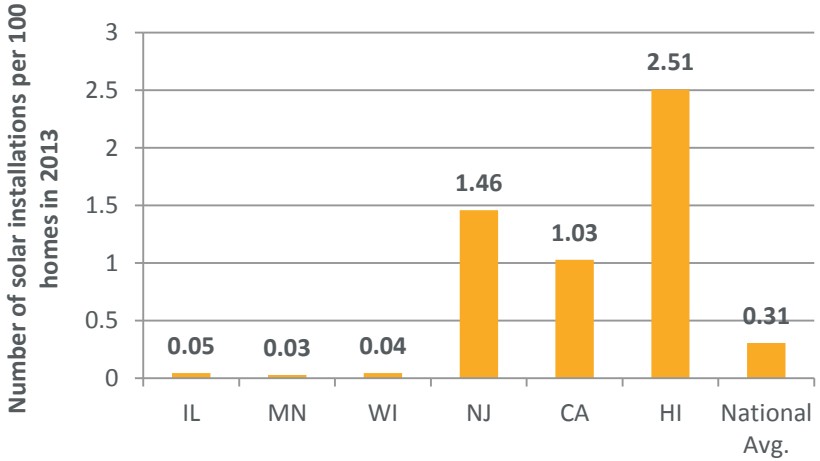
State-level scorecards show that each state currently requires some, but not most, of the best practices

State	Freeing the Grid Score (Interconnection/ Net Metering)	Regulated Group Coverage	Application	Information Access	Process Time	Inspection
Illinois	B / B	Investor owned, alternative retail electric suppliers Percent of customer base served by regulated utility: 93%	Standard application forms developed: Yes No online submission / tracking reqt Tiered Screens: Yes; 4 tiers based on system size, network connection, and component certification	Required Provided Information: The electric distribution company shall provide the applicant copies of any studies performed in analyzing the applicant's interconnection request upon applicant request	Time allowed for recognition of application receipt: 7 days Time allowed for application review: 15 days Time until restart occurs for incomplete applications: 10 days	Maximum cost: not specified Maximum time: not specified Standard contract provided: yes
Minnesota	C / B	Investor owned, cooperative, municipal Percent of customer base served by regulated utility: 100%	Standard application forms developed: Yes Required: No Tiered Screens: No	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	Time allowed for recognition of application receipt: 10 days Time allowed for application review: 15 days Time until restart occurs for incomplete applications: none	Maximum cost: $0 Maximum time: 20 days Standard contract provided: yes
Wisconsin	D / D	Investor owned, municipal Percent of customer base served by regulated utility: 91%	Standard application forms developed: Yes No online submission / tracking reqt Tiered Screens: Yes, 4 tiers based on system size	Required Provided Information: None	Time allowed for recognition of application receipt: 10 days Time allowed application review: 10 days Time until restart occurs for incomplete applications: none	Maximum cost: $0 Maximum time: • Engineering review (to be completed within 10 working days of agreement to proceed) • Distribution system study (to be completed within 10 working days of agreement to proceed) • Required distribution system upgrades (to be completed within time frame mutually agreed upon) Standard contract provided: yes

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
  - Illinois: Illinois Department of Commerce & Economic Activity, Solar and Wind Energy Rebate Program
  - 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

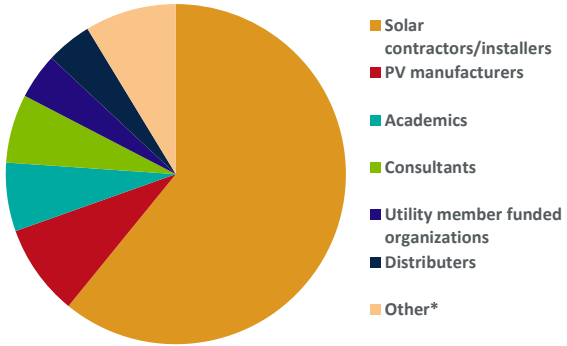




Online Surveys were circulated to utility contacts and additional DG stakeholders to harvest information about current solar enrollment processes

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



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

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

State	IOUs	Muni's /Coops
WI	3	13
MN	2	2
IL	1	0

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

Grow Solar — A Midwest Partnership to Move Markets
Powered by SunShot U.S. Department of Energy

Pain Point	Observed Best Practice
Paper forms or semi-electronic applications	*Adoption of online tools endorsed by customers and installers*
Unclear interconnection policies and application instructions	*Adoption of standardized forms and having someone and dedicated to answering customer questions*
Unnecessarily complicated applications for small systems	*Creation of simplified, 1-2 page applications for small systems*

"An online automated system should be truly automated. An applicant should not have to 'babysit' an application."

"ComEd is good example [of a utility with improved interconnection processes] in the Midwest."

"____ 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."

"Bayfield Electric cooperative has improved its customer interface to solar relations. The liaison is active and positive about embracing solar systems"

"Utilities requiring engineering review should only do so on projects greater than 10kW."

"MN Power [has] a 2 page form and is approved very quickly."

westMONROE

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

Grow Solar — A Midwest Partnership to Move Markets
Powered by SunShot U.S. Department of Energy

Pain Point	Observed Best Practice
Lack of transparency in how to access and submit applications	***Providing online application materials***
No visibility into where application is in approvals process	***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***

"Some utilities don't even have an interconnection application available unless you specifically request it."

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

"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."

"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."

"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"

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

westMONROE

Grow Solar A Midwest Partnership to Move Markets
Powered by SunShot U.S. Department of Energy

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

Pain Point	Observed Best Practice
Inconsistencies in application approval timings (even among regulated utilities)	*Standardizing the time for individual portions of the overall application review*
Lengthy application reviews resulting from multiple returns of an application for being incomplete	*Providing clear, user-friendly instructions and identifying a utility contacts to answer questions*
Slow review times due to limited staff	*Creating streamlined review processes for small systems*

"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.

westMONROE

Inspections: having ***defined procedures*** and ***City coordination*** allows customers to efficiently complete their system go-live

Grow Solar — A Midwest Partnership to Move Markets
Powered by SunShot U.S. Department of Energy

Pain Point	Observed Best Practice
A lack of communication exists between solar installers and utility engineers	*Providing interface for communications or providing standardized checklist to both parties*
Unnecessary precautions required for small systems	*Creating less stringent inspection requirements based on system size*
Redundancies exist in paperwork required by utilities, cities/ municipalities, and states (for federal grant applications)	*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."

westMONROE

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

Grow Solar — A Midwest Partnership to Move Markets
Powered by SunShot U.S. Department of Energy

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

westMONROE

Looking ahead, The Grow Solar Partnership will focus on three trends influencing Utility solar enrollment processes

Grow Solar A Midwest Partnership to Move Markets
Powered by SunShot U.S. Department of Energy

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 Illinoi 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

westMONROE

Grow Solar

A Midwest Partnership to Move Markets

Powered by SunShot

U.S. Department of Energy

westMONROE