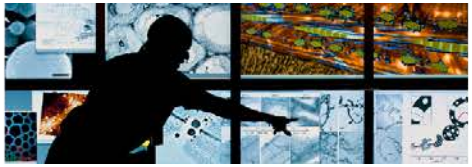
Distributed Generation Interconnection Collaborative (DGIC)



January 21, 2015
"NREL and SEPA Recent Analysis Findings"

Miriam Makhyoun, Solar Electric Power Association (SEPA)
Kristen Ardani, National Renewable Energy Laboratory (NREL)

NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

Purpose of Today's Meeting

- Hear results from SEPA's recent survey of utility interconnection practices.
  - SEPA finds that utilities confront common challenges as they move towards more streamlined interconnection application processing.

- Hear NREL results of forthcoming DGIC data collection and analysis, which measures the timeframes for discrete stages of the interconnection process.
  - sample contains more than 30,000 PV systems installed from 2012 to 2014, across 87 utility territories and 16 states.

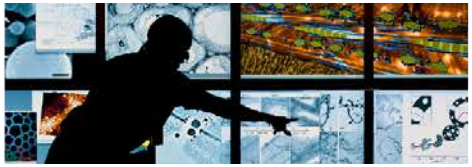
Speakers

Miriam Makhyoun
Research Manager
SEPA

Kristen Ardani
Solar Analyst (today's moderator)
NREL

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Distributed Generation Interconnection Collaborative (DGIC)



SEPA Report: Distributed Solar Interconnection Challenges & Best Practices

Miriam Makhyoun

January 21, 2015

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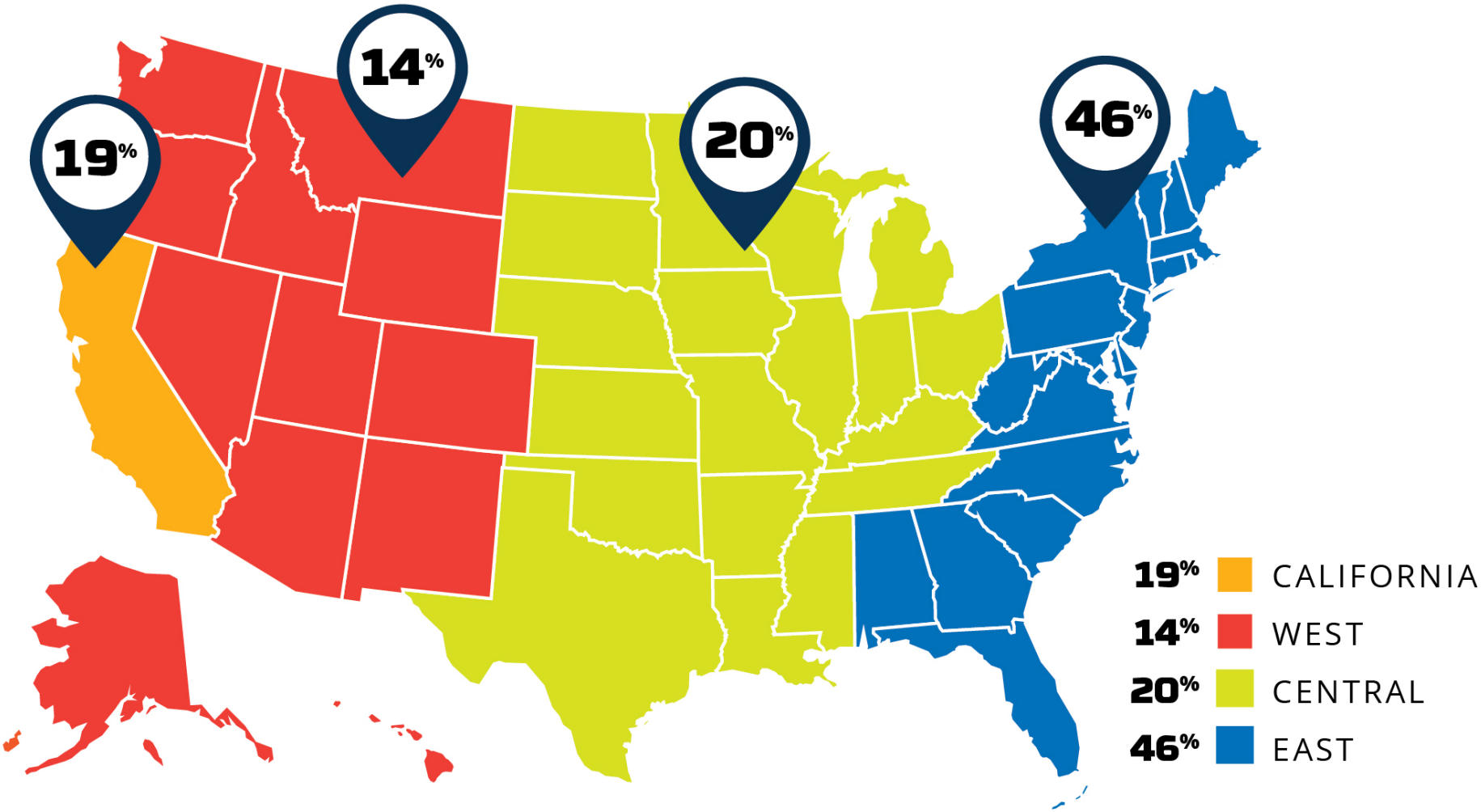
SEPA Report: Distributed Solar Interconnection Challenges & Best Practices

Where responding utilities operate.



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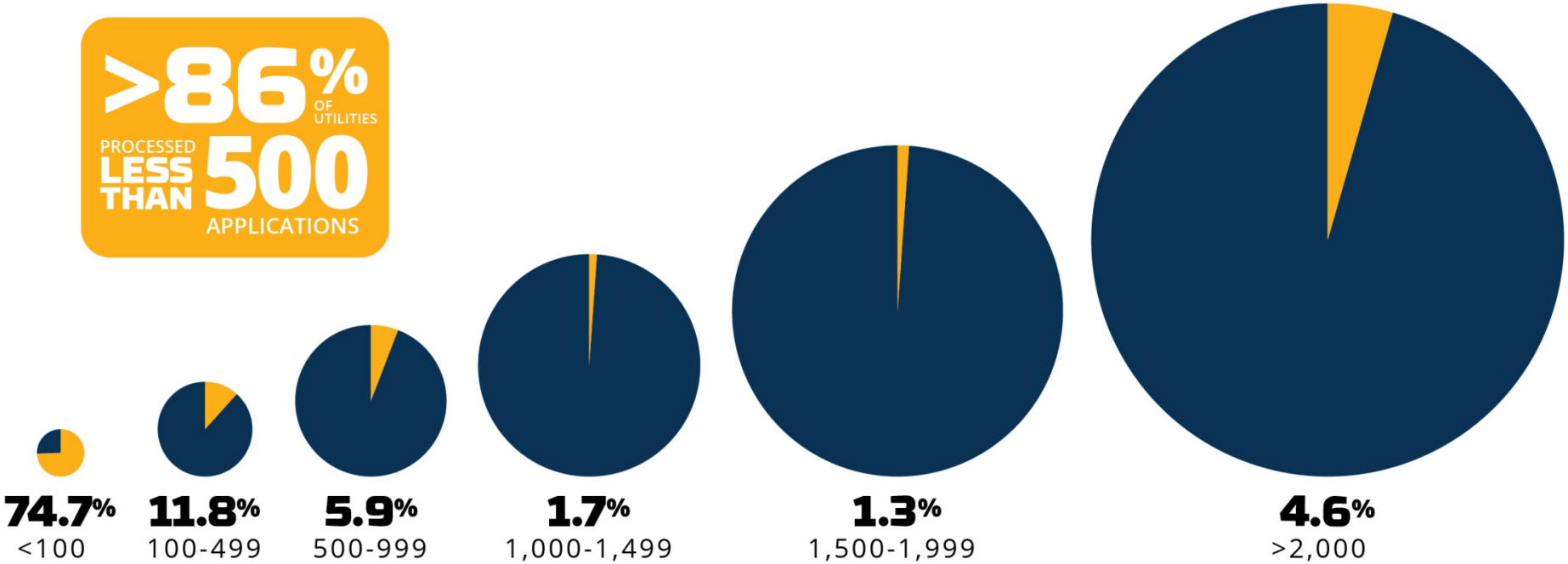
The solar market continues to grow.

78% OF INTERCONNECTIONS WERE PROCESSED BY **<5%** OF UTILITIES

1 MM Systems Estimated by 2017

How many solar interconnection applications did utilities process in 2013?

>86% OF UTILITIES PROCESSED LESS THAN **500** APPLICATIONS



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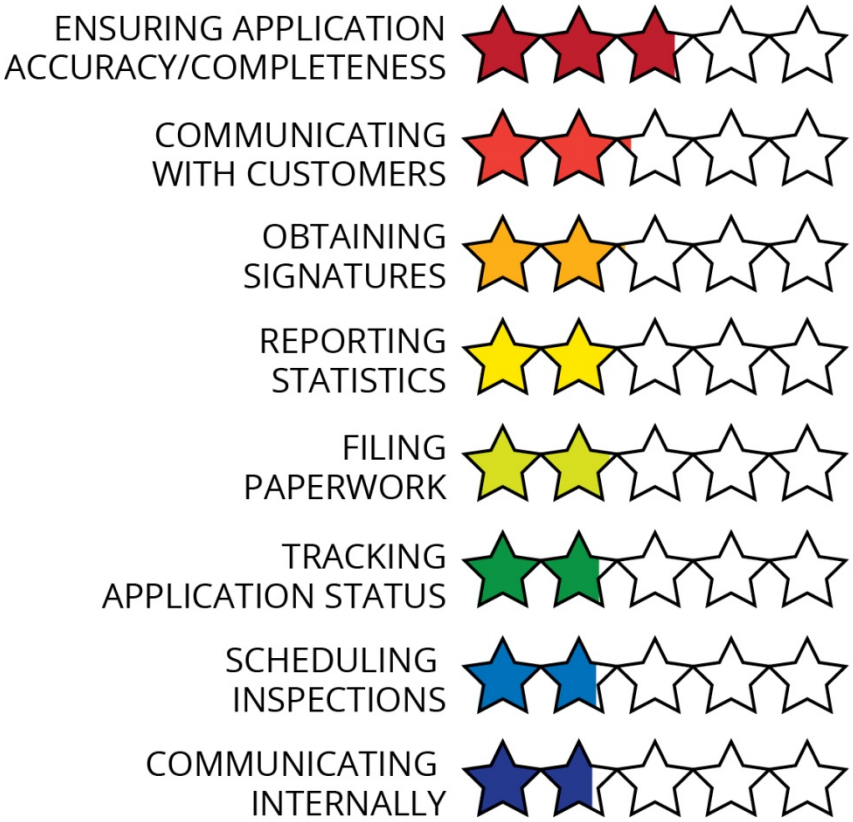
What are the challenges?

BIGGEST CHALLENGE:
ENSURING APPLICATION ACCURACY& COMPLETENESS

2ND BIGGEST CHALLENGE
FOR COMMERCIAL INSTALLATIONS
OBTAINING SIGNATURES

2ND BIGGEST CHALLENGE
FOR RESIDENTIAL INSTALLATIONS
COMMUNICATING WITH CUSTOMERS

Interconnection challenges



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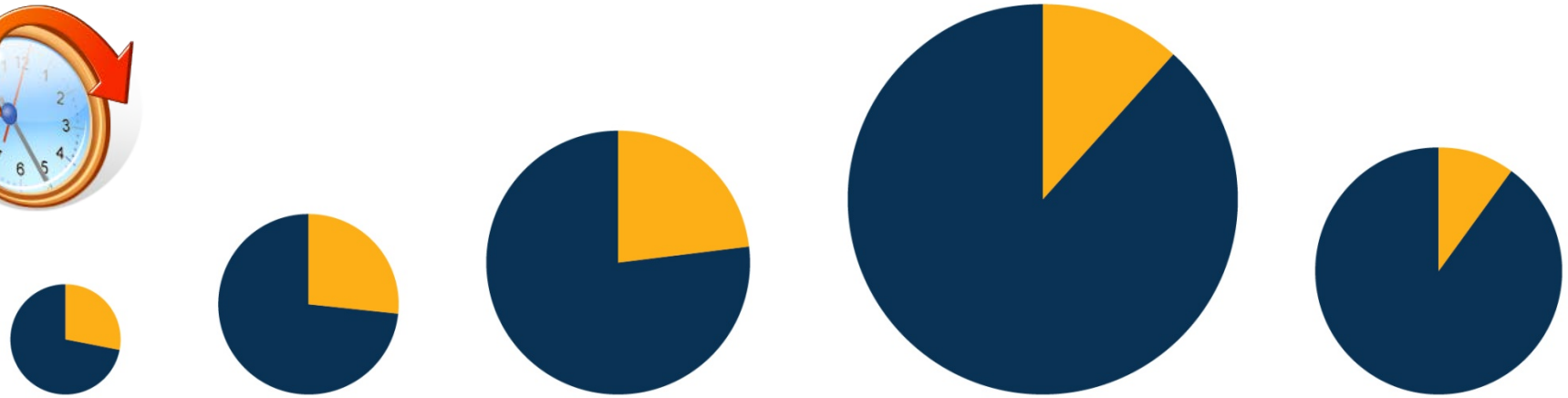
Time to Interconnect

How long, on average, utilities take to complete a residential interconnection—from application to approval.



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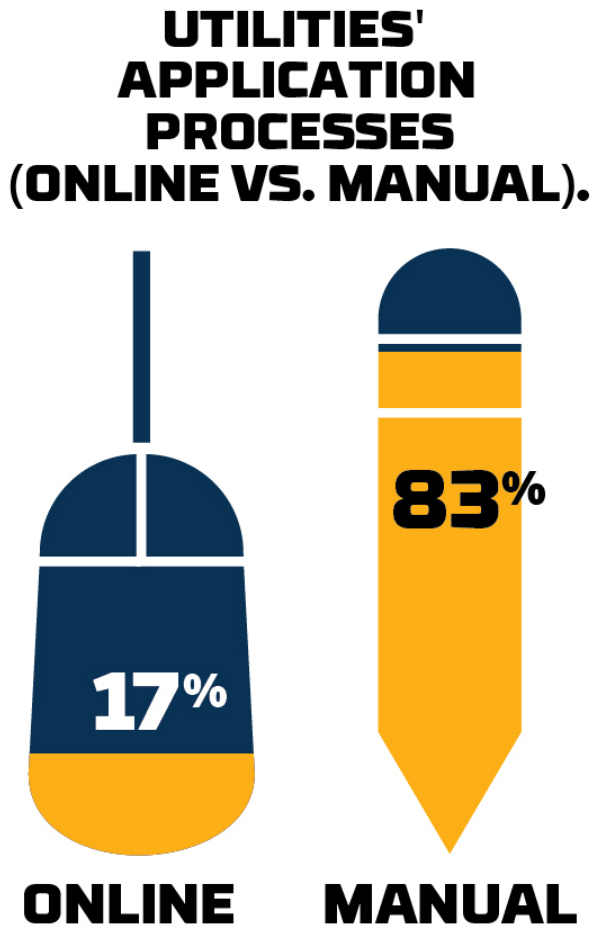
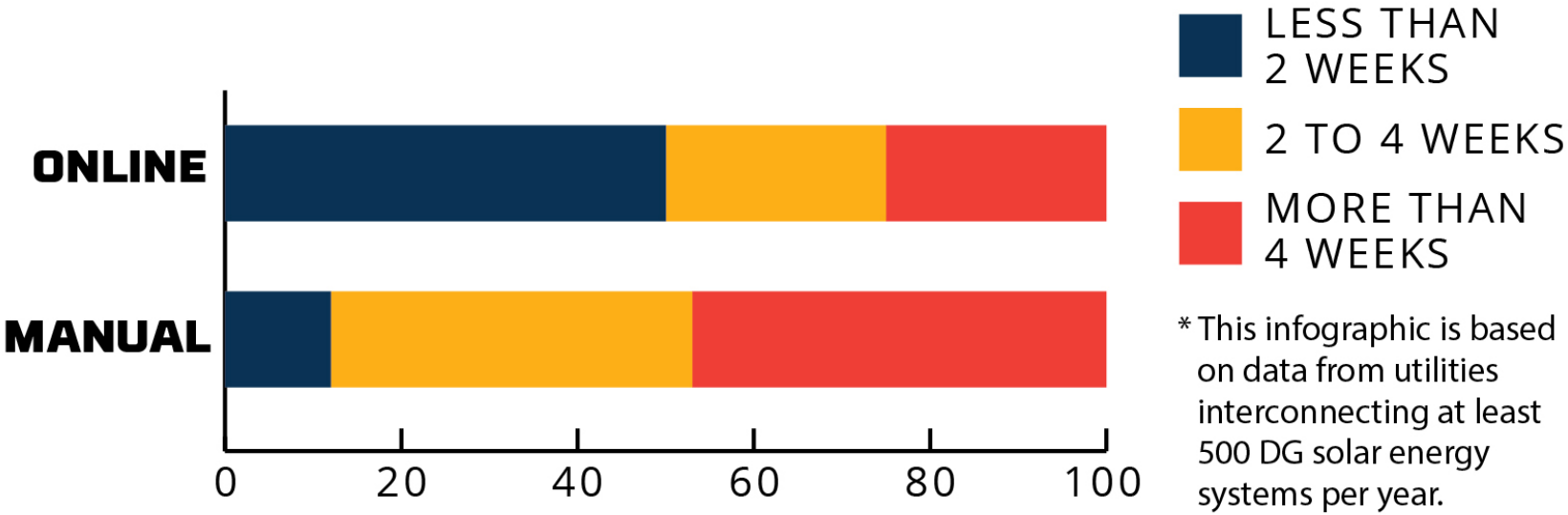
Online Applications win the Race!



Does the Medium Matter?

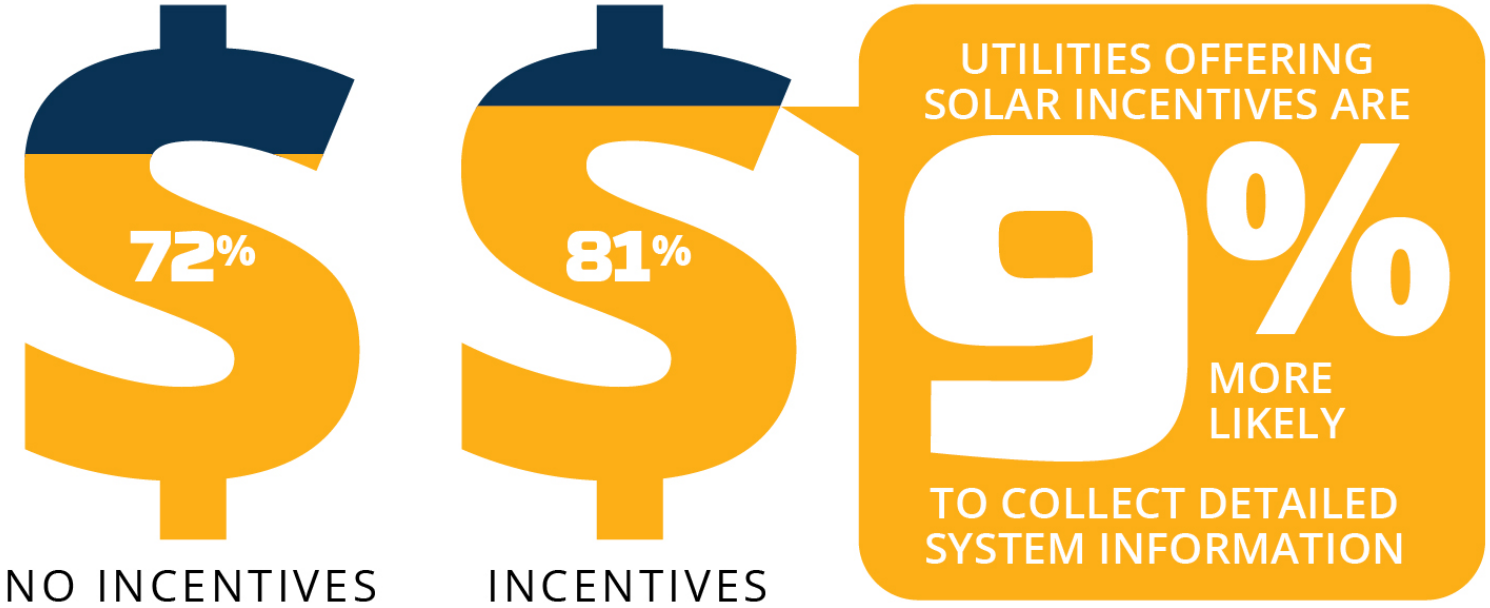
HOW LONG IT TAKES UTILITIES TO PROCESS AN INTERCONNECTION APPLICATION (ONLINE VS MANUAL)



* This infographic is based on data from utilities interconnecting at least 500 DG solar energy systems per year.

Information Collection and Incentives

Percentage of utilities collecting detailed system information by whether Incentives are offered.



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What utility customers say…

MOST NEEDED IMPROVEMENT:

APPLICATION STATUS TRANSPARENCY

WHAT CUSTOMERS WANT IN THE INTERCONNECTION PROCESS ▼

1. Simple Application Process
2. Good Comunication
3. Fast Process
4. Easy to Understand Guidelines

Interconnection Speed

< 4 WEEKS ⟷ > 4 WEEKS

Number of Applications per Year

> 500

< 500

15.1% of utilities have mastered the art of processing a larger than average number of interconnection requests within a quick timeframe.

In spite of having quick processing times, the majority of the utilities in this category agreed that an online application process would be on their list of top improvements.

9.4% of utilities process a larger than average number of interconnections request, but do so at a pace that demonstrates there is room for improvement.

The utilities in this category overwhelmingly supported the idea of moving toward an online application process—both to assist with streamlining and to improve transparency for the customer.

47.2% of utilities have fast interconnection times when processing a below average number of interconnection applications.

Several utilities in this category noted that process improvements had been optimized, while others expressed additional interest in increased customer transparency, online application processes, and a need to prepare for future increases in application volume.

28.3% of utilities are slow in processing a below average number of interconnection applications.

Utilities in this category acknowledged a need for streamlined processes and were interested in online application capabilities to improve the ease of tracking applications. Some also indicated a need for better coordination with local jurisdictions approving building permits.

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Distributed Solar Interconnection: Challenges and Best Practices

Miriam Makhyoun
Research Manager
SEPA

NREL
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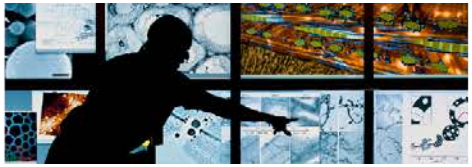
How Long Does Interconnection Take?

Understanding the Process for PV Deployment in the U.S.



Distributed Generation Interconnection Collaborative Webinar

Highlights of Forthcoming Report: A State-Level Comparison of Processes and Timelines for Distributed Photovoltaic Interconnection in the United States

Kristen Ardani

January 21, 2015

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Outline- NREL Data Collection and Analysis

- **Project Overview**
  - Purpose
  - Approach
  - PV Approval Processes Overview and Analysis Metrics
- **Analysis Results**
  - Total Days for Utility Interconnection
  - Business Days for Each Stage (overview)
    - Application Review and Approval
      - » Timeline Requirements
      - » State Level Findings
    - PV Construction and Final Building Inspection
    - Permission to Operate
      - » Timeline Requirements
      - » State Level Findings
  - High Level Conclusions

Project Purpose

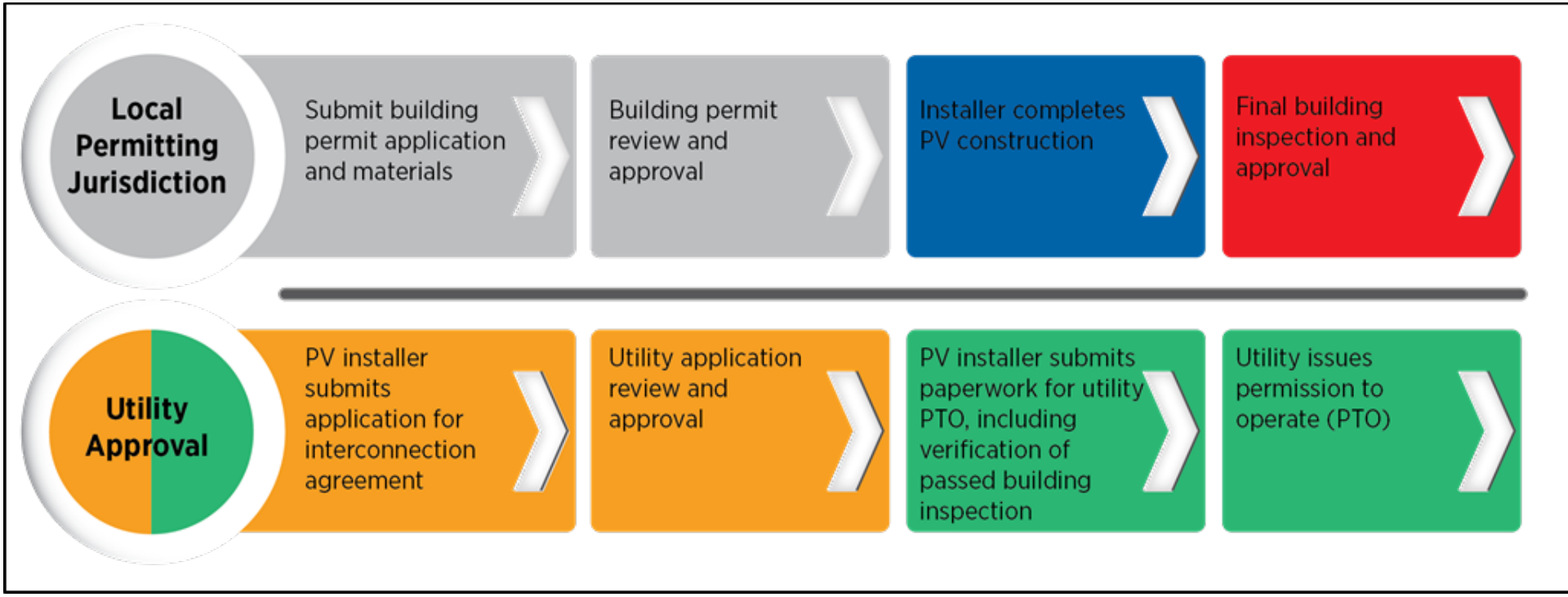
- **Understand interconnection and deployment timelines for distributed PV.**
  - Evaluate portion of projects that exceeded 1 month for application and final authorization
- **Compare State-level timeline regulations to actual data for installed PV.**
- **System level analysis on actual projects installed.**

Analysis Approach

- **System level data collected for more than 30,000 PV systems**
  - 87 utilities in 16 states
  - Projects mostly installed in 2013
    - Residential (up to 10kw)
    - Small Commercial (10- 50kW)

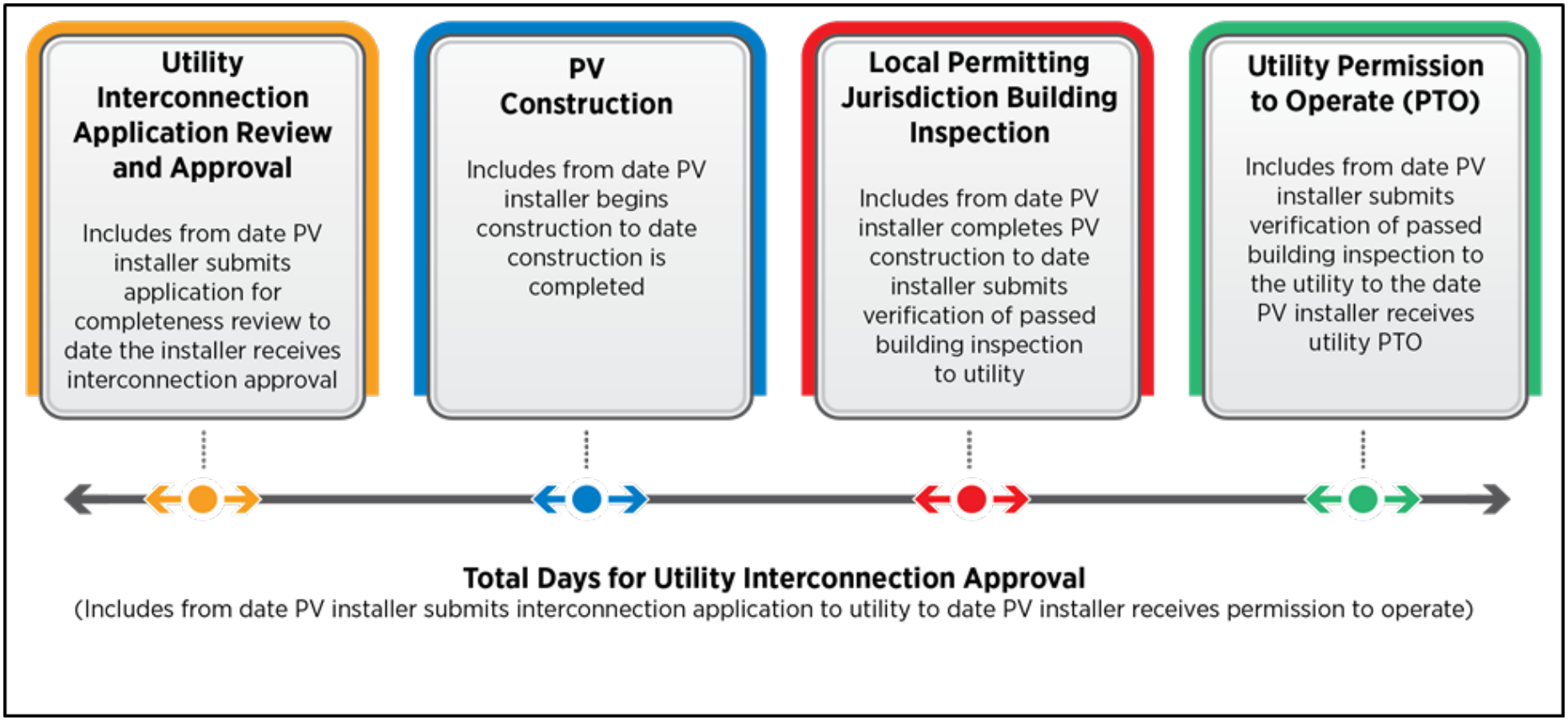
- **Quantify time duration for discrete stages of the interconnection process (business days)**
  - Total days for utility interconnection
  - Utility interconnection application review and approval
  - PV construction
  - Final building inspection and paperwork submittal to utility
  - Final utility authorization (permission to operate)

Parallel PV Approval Processes (AHJ and Utility)



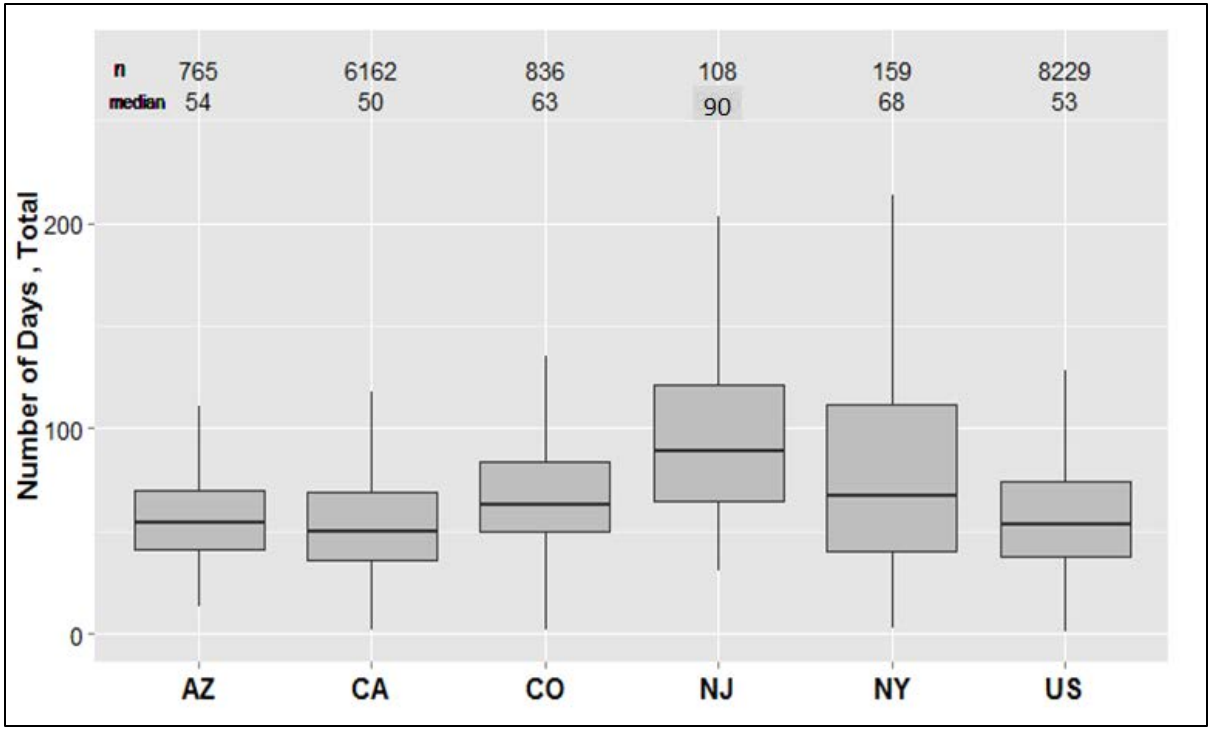
- Parallel, but separate, PV authorization processes.
  - Local permitting jurisdiction oversees building permitting and inspection (city, county, state, or city and county)
  - Electric utility approval for interconnection

Timeline Analysis Metrics



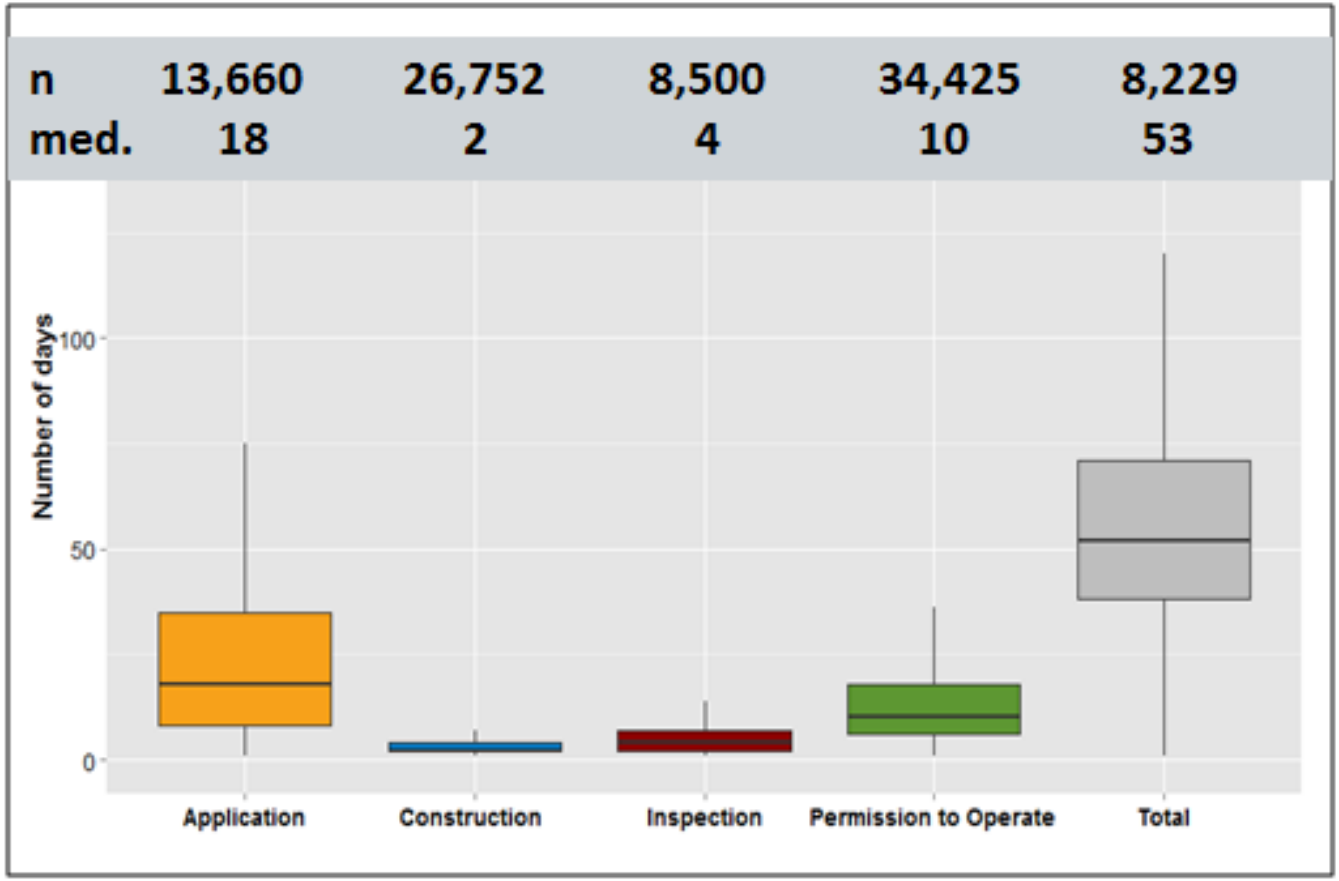
Full Sample Results- Total Days

- **Median: 53 days for full U.S. sample (up to 50kW)**
  - Median range of 50 to 90 days for the states examined
    - California: 50, Arizona: 54, Colorado: 63, New York: 68 New Jersey: 90



System Size	Mean	Median	Std. Dev	Sample Size
Residential (up to 10 kW)	60	52	39	7,489
Small Commercial (10–50 kW)	74	62	44	740
Full Sample (up to 50 kW)	63	53	41	8,229

Full Sample Results- Business Days for Each Stage Analyzed



<u>Application</u>: 44% residential and 50% small commercial projects took 20 business days or more (*approx. 1 month*)

- Median days for delayed projects:
  - 38 (up to 10kW)
  - 39 (10 to 50kW)

<u>Permission to Operate</u>: 17% residential and 25% small commercial projects took 20 business days or more (*approx. 1 month*).

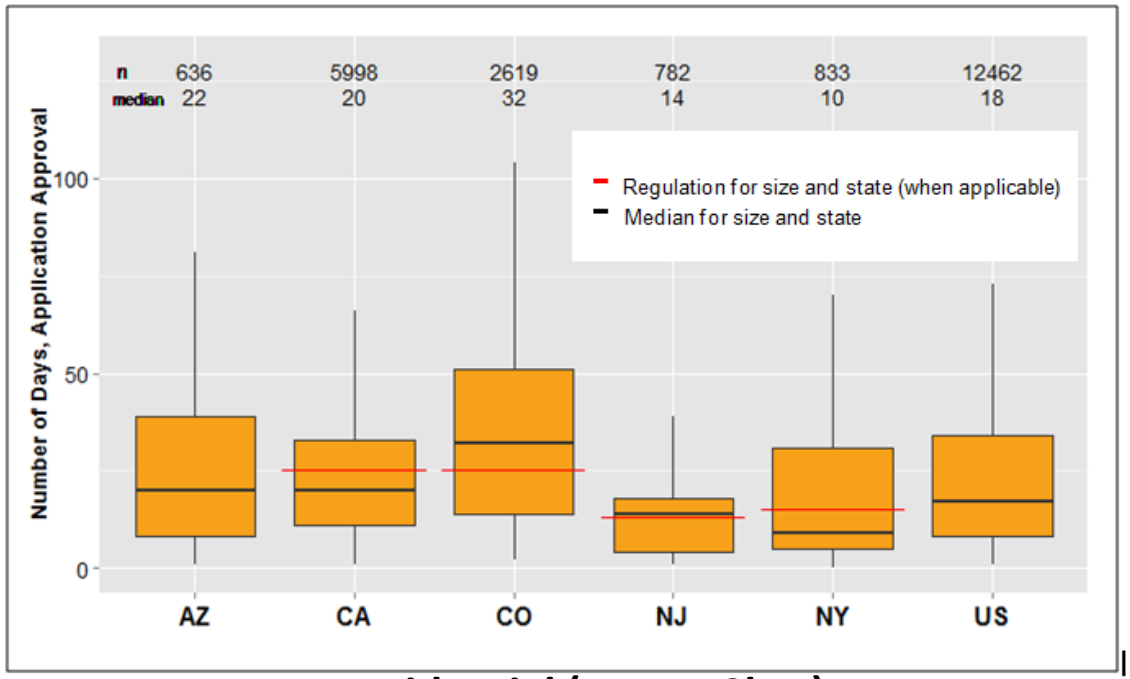
- Median days for delayed projects:
  - 28 (up to 10kW)
  - 29 (10 to 50kW)

State Timeframe Requirements for Application Review and Approval

State	System Size Eligibility	Days for Completeness Review	Days for Application Review (initial screens)	Total Days for Application Review and Approval
CA	up to 2 MW	10	15	25
NY	up to 50 kW	5	10	15
	up to 2 MW	5	15	20
NJ	up to 10 kW	3	10	13
	up to 2 MW	3	15	18
CO	up to 10 kW	10	15	25
	up to 2 MW	10	15	30
AZ	N/A. As of the writing of this report, Arizona has no standard timeframe requirements in place.			

Up to 10kW Results- Application Review and Approval

- **Most time of any process stage analyzed.**
  - New York lowest median (10), New Jersey (14), California (20), Arizona (22), and Colorado (32)
- **Results may indicate effectiveness of state-level regulations.**
  - NY regulations allow utilities 10 fewer days compared to CO
- **Many projects exceeded prescribed timeframes.**
  - 58% CO projects exceeded regulation of 25 days (*for these projects, median 50*)
  - 38% NY projects exceeded regulation of 15 days (*for these projects, median 49*)



Residential (up to 10kW)

PV Projects that Exceeded Application Review and Approval Time Requirement, by State and Size

	Residential (up to 10 kW)			Small Commercial (10–50 kW)		
State	Time Req. (business days)	Applications Exceeding Time Req. (%)	Median for Applications that Exceeded Time Req. (business days)	Time Req. (business days)	Applications Exceeding Time Req. (%)	Median for Applications that Exceeded Time Req. (business days)
CA	25	37%	38	25	47%	39
NY	15	38%	49	15	38%	60
NJ	13	52%	18	18	42%	27
CO	25	58%	50	30	45%	59
AZ	[20]*	53%	43	[20]*	54%	43

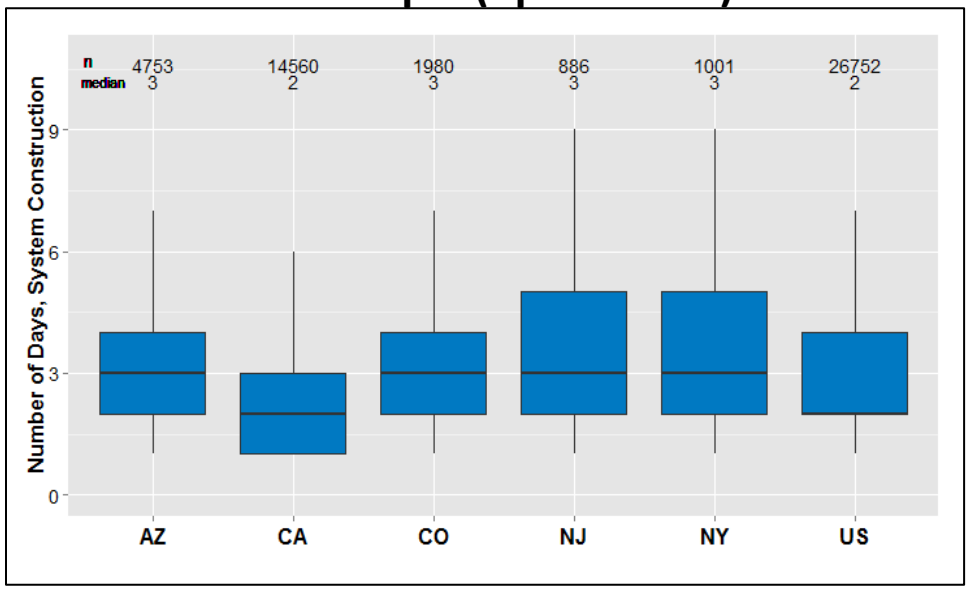
* 20-day threshold is assumed for analytic purposes, because Arizona has no interconnection timeframe requirements.

Results- Construction and Inspection

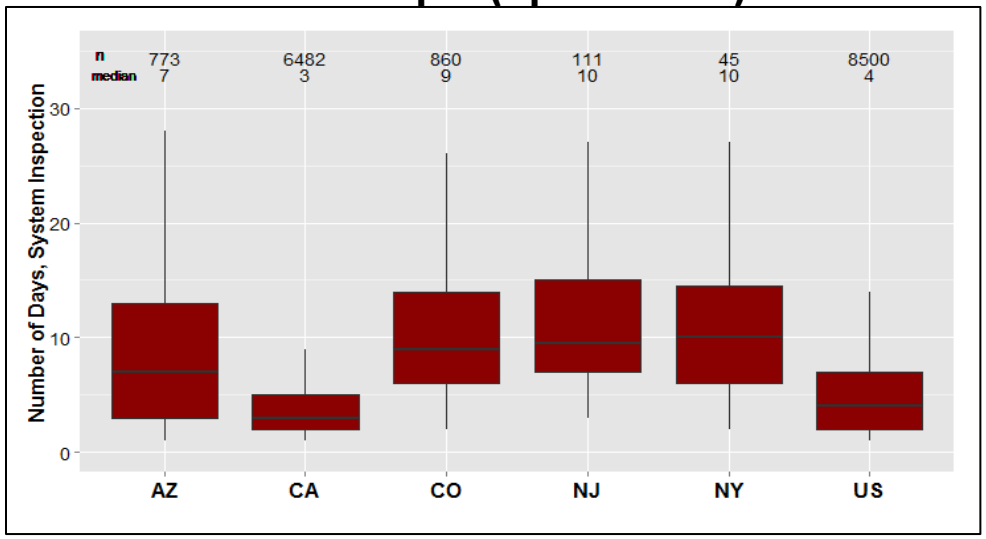
- **PV Construction**
  - Median: 2 days residential (up to 10kW), 4 days small comm. (10 - 50kW)

- **Final Building Inspection and Paperwork Submittal to Utility**
  - Includes time required to schedule and complete inspection and compile and send PTO paperwork to utility
  - Median: 4 days for both res. and small commercial

Full Sample (up to 50kW)



Full Sample (up to 50kW)

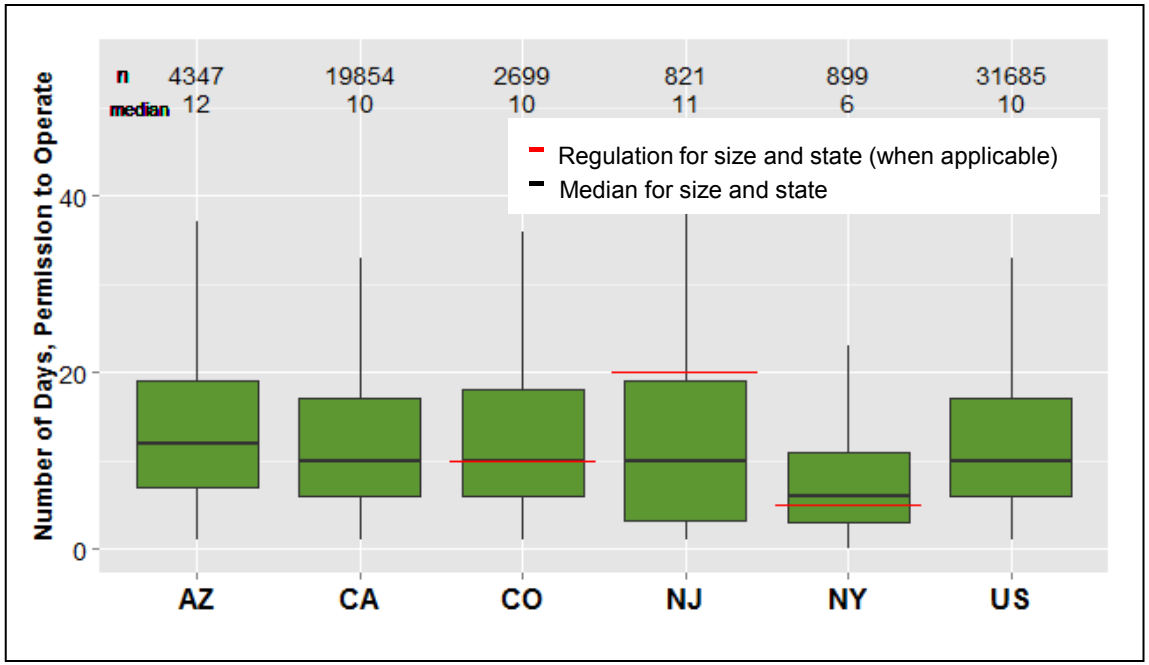


State Timeframe Requirements for PTO, by System Size and Interconnection Track

State	System-Size Eligibility	Days for PTO (if inspection, witness test waived)	Days for PTO (if inspection, witness test NOT waived)
CA	All net-metered PV systems must receive PTO within 30 days of receipt of a complete application.		
NY	up to 50 kW	5	5
	up to 2 MW	10	40
NJ	up to 10 kW	5	20
	up to 2 MW	10	25
CO	up to 10 kW	5	10
	up to 2 MW	5	10
AZ	N/A. As of the writing of this report, Arizona has no standard timeframe requirements in place.		

Up to 10kW Results- Final Authorization

- **Second longest process stage analyzed.**
  - New York lowest median (6), New Jersey (11), California (10), and Colorado (10), Arizona (12)
- **New York median lower than other states**
  - AZ longest median time frame; difference between AZ, CO, and NJ is not statistically significant
- **Many projects exceeded prescribed timeframes, except in CO (only 10% res.)**
  - 53% NY projects exceeded PTO regulation of 5 days (*for these projects, median of 11*)
  - 23% NJ projects exceeded PTO regulation of 20 days (*for these projects, median 28 days*)



Residential (up to 10kW)

PV Projects that Exceeded PTO Time Requirements, by State and Size

	Residential (up to 10 kW)			Small Commercial (10–50 kW)		
State	Time Req. (business days)	Applications Exceeding Time Req. (%)	Median for Applications that Exceeded Time Req. (business days)	Time Req. (business days)	ApplicationsExceeding Time Req. (%)	Median for Applications that Exceeded Time Req. (business days)
CA	[30]*	38%	44	[30]*	49%	50
NY	5	53%	11	5	58%	11
NJ	20**	23%	28	25**	9%	29
CO	10**	10%	38	10**	51%	19
AZ	[20]***	22%	28	[20]***	24%	28

***** While California does not have a specific PTO timeline requirement, it has a statutory requirement that all net-metered PV systems (up to 30 kW) be issued PTO within 30 days of application.
** We use the requirement upper limit for projects, which assumes the utility inspection and/or witness test are not waived.
*** A 20-day threshold is assumed for analytic purposes, because Arizona has no interconnection timeframe requirements.

High Level Conclusions

- **Regulations do not generally ensure projects meet targets specified, but may reduce overall completion times.**
- **Interconnection application and final authorization require most time of stages analyzed.**
- **Go/no-go market dynamic.**
  - Dichotomy between applications reviewed and approved quickly vs. delayed
    - approx. half of all systems sampled took 1 month or more for application review and approval.

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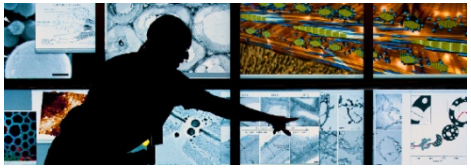
Questions?



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