

Evaluating Pre-application Reports

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Distributed Generation Interconnection Collaborative

Distributed Generation Interconnection Collaborative (DGIC)



Established in 2013, Distributed Generation Interconnection Collaborative (DGIC) provides a forum for the exchange of best practices for distributed photovoltaic (PV) interconnection between electric utilities, solar industry participants, and other stakeholders.

NREL facilitates the DGIC with support from the Smart Electric Power Alliance (SEPA) and the Western Area Power Administration (WAPA) and delivers webinars,

Recent Blog Post

[Mitigating Impacts of High DPV Penetrations – Insights from Australia \(August 2018\)](#)

Recent Webinar

[Upgrading the Distribution System to Integrate Distributed Energy Resources \(August 2018\)](#)

DGIC

- Publications, webinars, blogs, and working sessions
- An Overview of Distributed Energy Resource (DER) Interconnection: Current Practices and Emerging Solutions
- EPRI leading DGIC starting in 2019



Evaluating the Role of Pre-Application Reports in Improving Distributed Generation Interconnection Processes

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Pre-application Reports

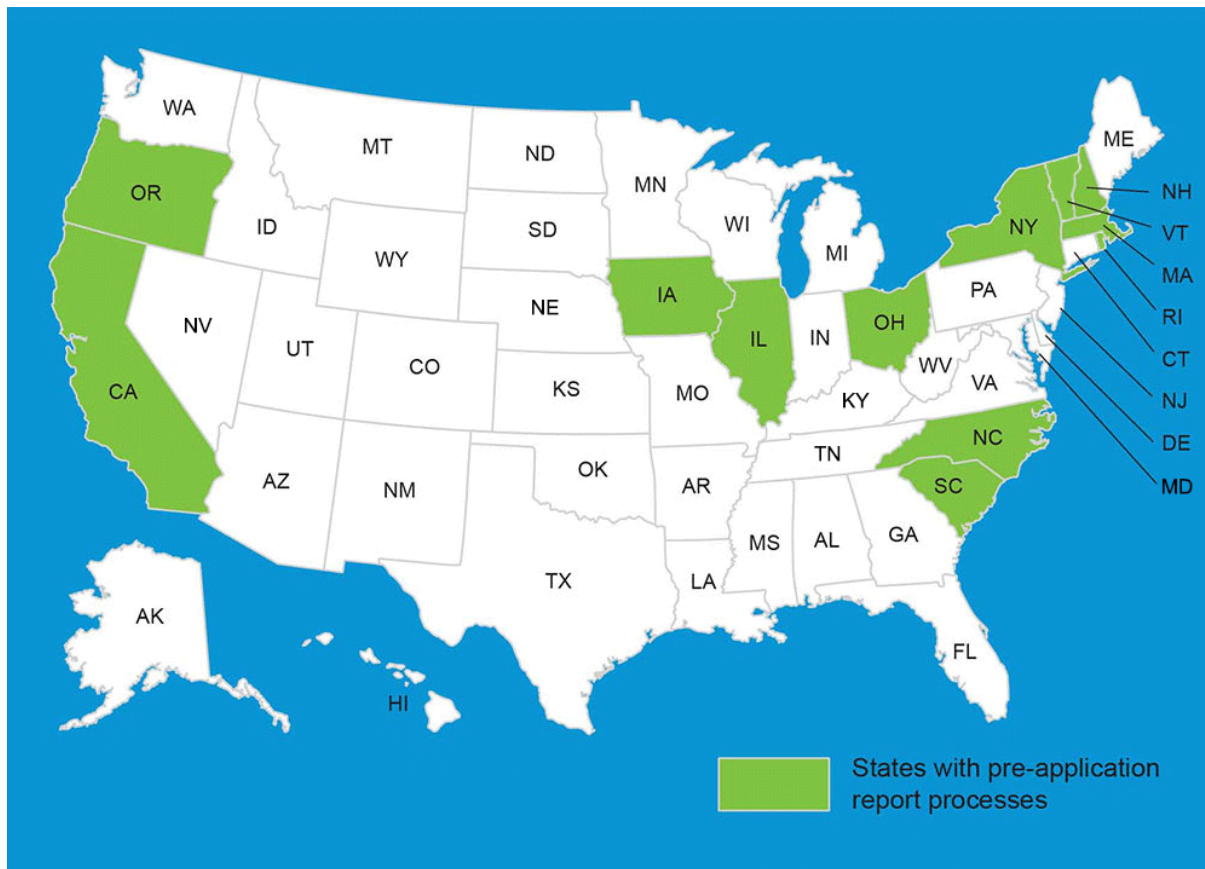
What is a Pre-application Report

- A formal report that provides technical information about a specific point of interconnection
- Generated by a utility at the request of prospective interconnection applicants
- Based on data readily available to the utility but typically unknown to applicants

Goals

- Provide data transparency
- Enables applicants to become aware of limitations early
- May encourage developers to avoid problematic locations
- Reduce the amount of applications utilities have to process

States with Pre-Apps January 2018



Pre-application Report Content

FERC SGIP Pre-App Criterion	CA	IA	IL	NC	OH	SC	VT	RI	NY	MA	NH	OR	No. of States
Existing Generation Capacity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	10
Queued Generation Capacity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	10
Distribution Circuit Voltage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	10
Number of Phases	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	10
Substation Distribution Voltage	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	No	8
Total Capacity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	8
Circuit Distance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	8
Peak/Minimum Load Data	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	8
Constraints	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	8
System Configuration	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	7
Protective Devices	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	7
Limiting Conductor Ratings	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	7
Available Capacity	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No	No	No	5
SGIP Criteria Adopted	13	13	13	12	12	12	11	7	7	6	0	0	

Fees and Timelines

State	Fee (\$)	Timeline (business days)
CA	300	10
IA	300	20
IL	300	20
MA	0	10
NC	300	10
NH	--	--
NY	750	10
OH	300	10
RI	0	10
VT	300	10
OR	*	--
SC	500	20
FERC	300	20

-- None specified

* Per OR legislation: "A person requesting information [under section (1)] must reimburse the public utility for the reasonable costs of gathering and copying the requested information."

Expanded Role

- Massachusetts and Rhode Island – required for projects 500 kW and larger.
- California – supplementary pre-application reports

A. Standard Pre-Application Report:

- Provides a readily available level of Distribution System data that requires little to no analysis on the part of distribution engineer providing the report.

B. Enhanced Pre-Application Report - Primary Service Package:

- Provides a detailed level of Distribution System data that requires analysis on the part of the distribution engineer providing the report.

C. Enhanced Pre-Application Report - Behind the Meter (BTM) Interconnection Package:

- Provides distribution system level data that is relevant to a “Behind the Meter” interconnection, as well as Secondary or Primary service characteristics that are confirmed in the field.

Package Option	Cost
A	\$300
B*	\$325
C*	\$900
AB	\$525
AC	\$1,100
BC*	\$1,125
ABC	\$1,325

Methodology

Data Selection & Processing

- Comprehensive data which enables quantification
- Nearly 8,000 DG applications (~5.8 GW) submitted between January 2009 and April 2018

Distributed Generation and Interconnection in Massachusetts Updated null
Distributed Generation and Interconnection in Massachusetts

USE TEMPLATE

The screenshot displays the MassDGIC website interface. At the top, there is a navigation bar with links for Home, MassDGIC: Interconnection in Massachusetts (selected), Net Metering, and Frequently Asked Questions. A search bar is located on the right. The main content area features a heading 'MassDGIC: Interconnection in Massachusetts' followed by a paragraph explaining the interconnection process. Below this, a section titled 'Utility Reporting & Circuit Analysis for Locational Value' provides information about monthly reporting requirements. A yellow callout box at the bottom states that raw data from January 2019 is being released. On the right side, there are two sidebars: 'Additional Information' with links to FAQ's, Assistance, Workshops, Technical Standards Review Group, Distributed Generation Working Group, and Grid Modernization and Integrating DG; and 'Utility Tariffs' with links to National Grid, Eversource Website, NSTAR Tariff, and WMECo Tariff.

Home | MassDGIC: Interconnection in Massachusetts | Net Metering | Frequently Asked Questions

[Home](#) >

MassDGIC: Interconnection in Massachusetts

Interconnection is the process of connecting a distributed generation system to the electric grid. Prior to connecting, the distributed generation system owner *must* obtain written approval from the local utility in the form of an Interconnection Service Agreement and subsequent Authorization to Connect. While emergency generators are not required to follow this process, customers installing emergency generation should contact their utility.

The interconnection process is necessary to protect the reliability and safety of the electric grid. The Massachusetts Department of Public Utilities (DPU) regulates this process by requiring utilities to have standardized interconnection tariffs (*links to the Interconnection Tariffs in effect as of March 15, 2017, are available at the right of the page*).

Utility Reporting & Circuit Analysis for Locational Value

In compliance with [DPU Order 11-75-E](#) and consistent with the DG Working Group Report filed in that proceeding, on the 15th of each month the electric utilities provide monthly reporting on projects following the Expedited and Standard processes (this data does not include projects following the Simplified process). The links below take users to a preview screen on Google Drive (*choose "file" and "download" for the entire file*):

- [Download the RAW DATA set through January 2019](#) (posted 2/26/19; Unitil was 10 days late). We are now releasing the raw data as soon as it's produced while the Full Data with circuit analysis is in

Additional Information

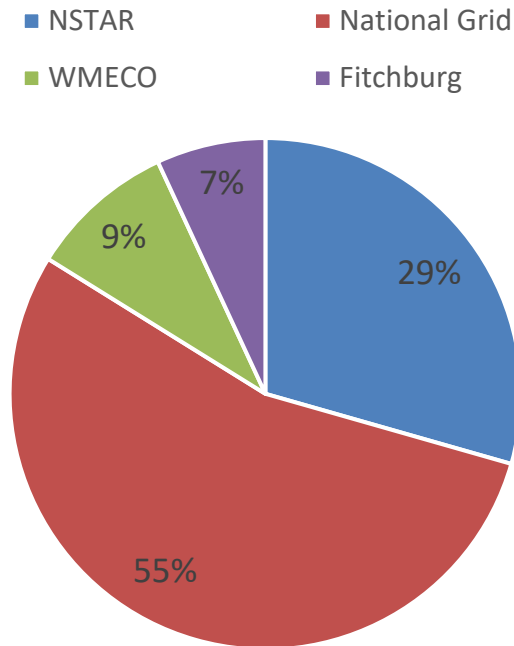
- [FAQ's](#)
- [Assistance](#)
- [Workshops](#)
- [Technical Standards Review Group](#)
- [Distributed Generation Working Group](#)
- [Grid Modernization and Integrating DG](#)

Utility Tariffs

- [National Grid](#)
 - [Introduction to DG page](#)
 - [Net Metering page](#)
- [Eversource Website](#)
 - [NSTAR Tariff](#)
 - [WMECo Tariff](#)

Data Selection & Processing

- PV projects (93% of applications) and PV-plus-battery projects (2% of applications)
- Data grouped into four project status categories: Authorized, Process Complete, In-Progress, and Canceled
- In-Progress applications were omitted from the analysis.

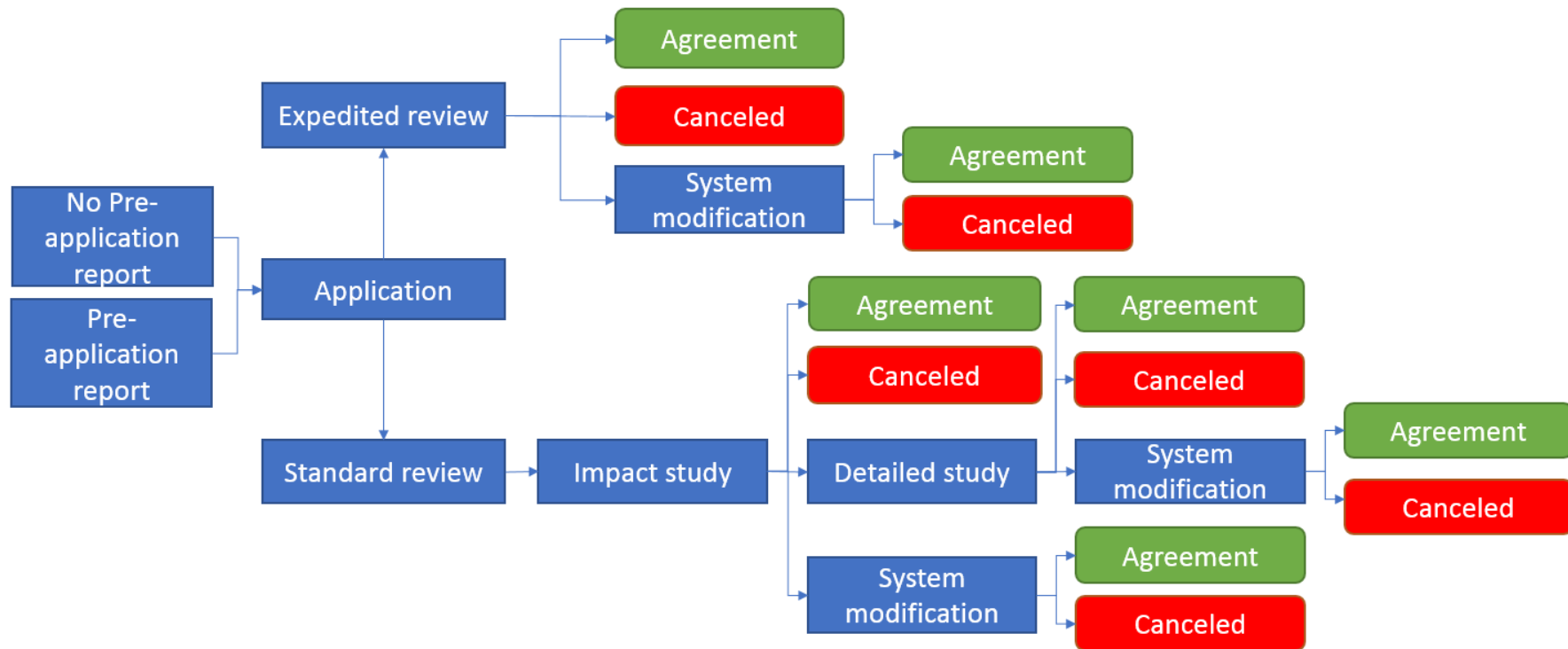


Pathway Analysis

Hypothesis: Pre-application report processes decrease the percentage of canceled projects

- Identified the different review pathways
- Applications tracked to determine the percentage reaching either ISA or cancellation

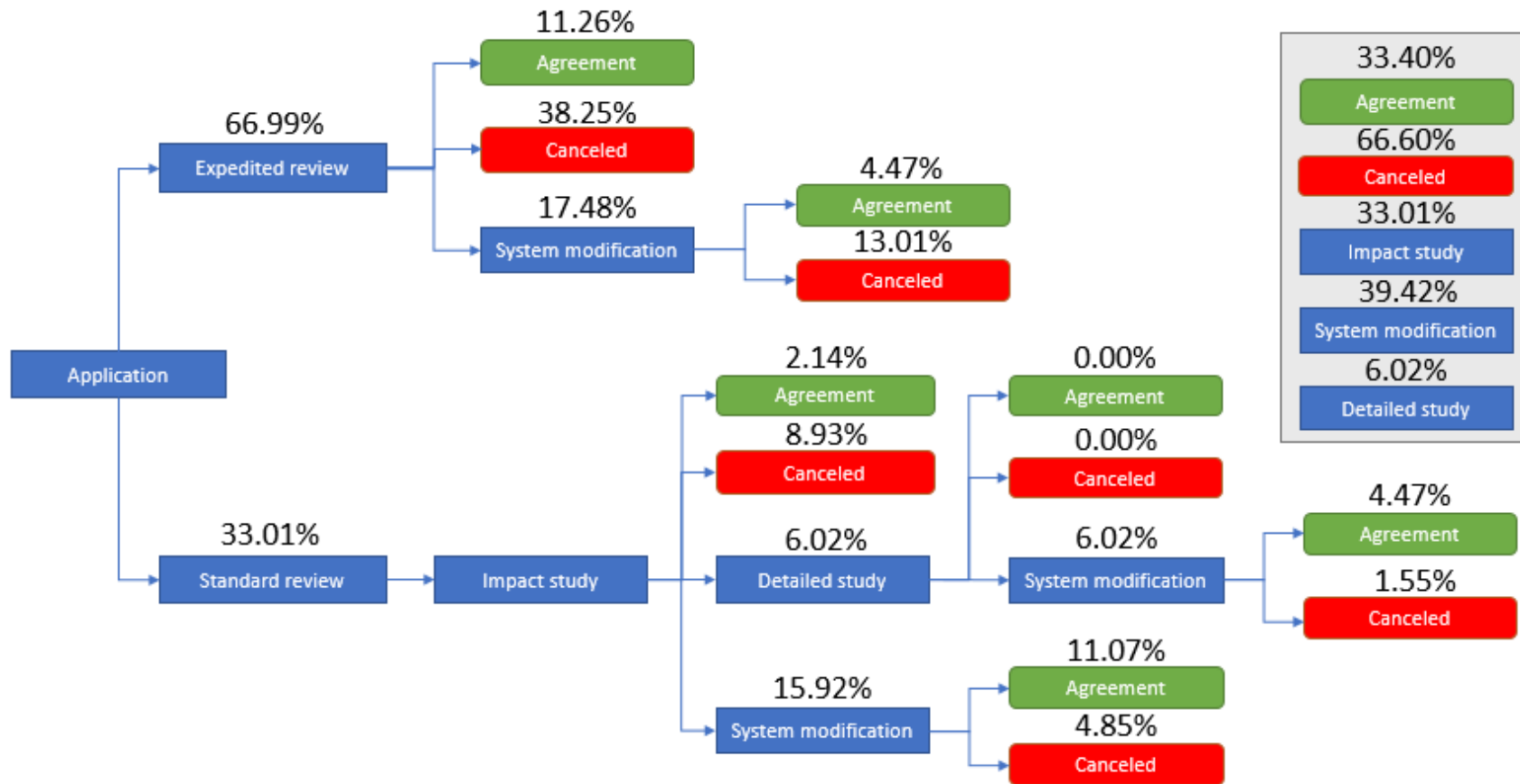
Pathway Analysis



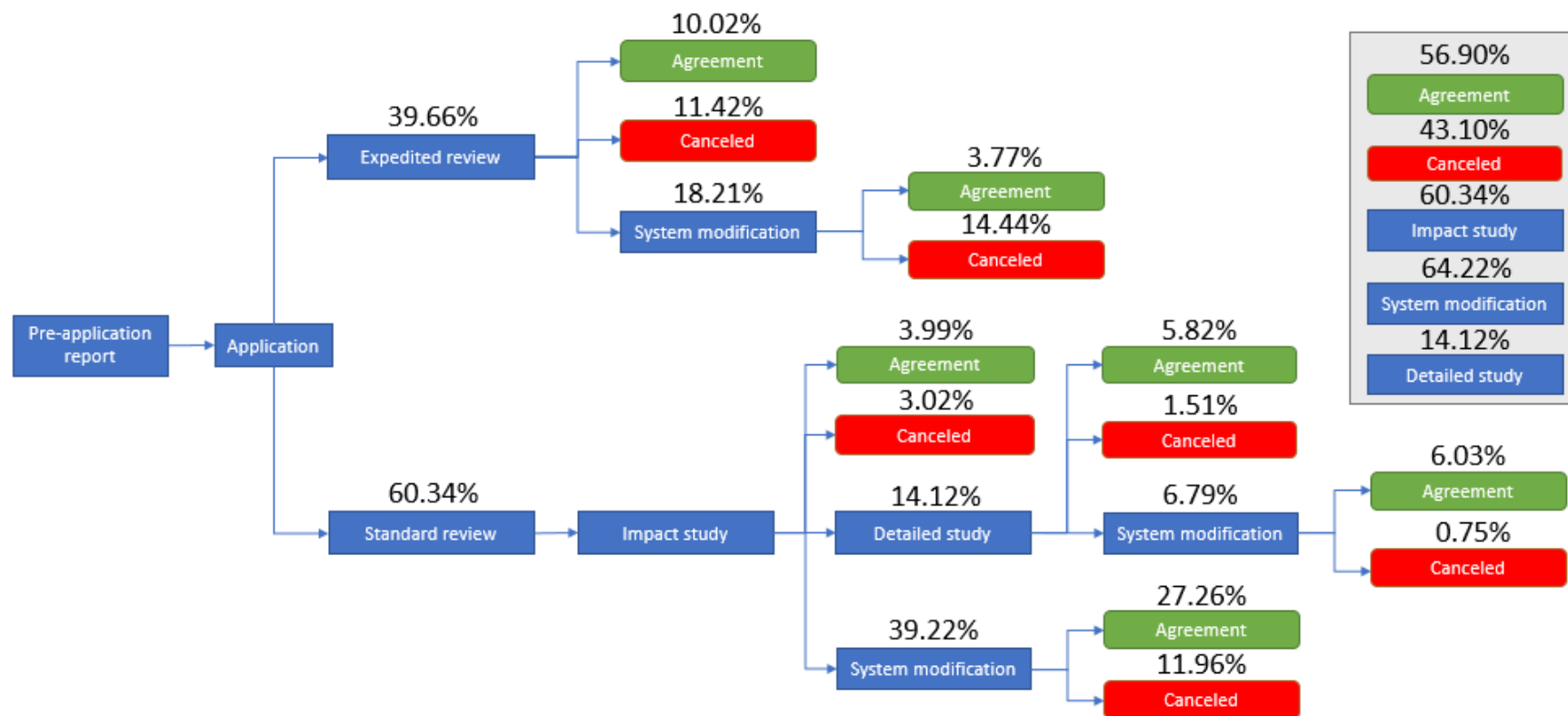
Pathway Analysis

- Projects 500 kW or larger without a pre-application report (submitted on or before May 1, 2013): 515 applications, 822 MW
- Projects 500 kW or larger with a pre-application report (submitted after May 1, 2013): 928 applications, 1,673 MW

Interconnection pathways for projects 500 kW and larger with no pre-application report (N=515, January 2009-May 2013)



Interconnection pathways for projects 500 kW and larger with a pre-application report (N=928, May 2013-April 2018)



Summary Statistics

	Without pre- application report (%)	With pre- application report (%)	Difference ("with" minus "without") (%)
Agreement	33.40	56.90	+23.50
Canceled	66.60	43.10	-23.50
Impact Study	33.01	60.34	+27.34
System Modification	39.42	64.22	+24.81
Detailed Study	6.02	14.12	+8.10

Year-to-Year Change in Percentage of Approved Applications

Year to Year	Change
2009 – 2010	+9%
2010 – 2011	-21%
2011 – 2012	-9%
2012 – 2013	+10%
2013 – 2014	+4%
2014 – 2015	-5%
2015 – 2016	+4%
2016 – 2017	+11%
2017 – 2018	+14%

Other trends

- Decrease in applications receiving expedited review
- Increase in applications requiring detailed study
- Increase in applications requiring system modification

Data Needs for Further Analysis

- First step in analyzing the impact of pre-application reports
- a lack of data identifying if an application received a pre-application report
- a lack of data linking applications to the developers that submit them

Data Needs for Further Analysis

- Circuit-level data
- Utility and developer attributes
- Interconnection costs
- National interconnection data

Conclusions

- Pre-application reports are **correlated** with an increase in application approval rate
 - Percentage of projects 500 kW and larger being canceled decreased 24%
- Unable to conclude direct **causation** between pre-application reports and the increased application approval rate
 - Additional data and analyses are needed to better characterize this relationship
- Pre-application report processes are one method to improve interconnection processes and the transparency of grid integration

Feedback?

- Questions unanswered by existing research?
- Gaps in industry knowledge?
- Real-world experiences?
- Community needs?
- Potential challenges or opportunities?

Thank you!

Contact me:

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Resources:

- [Evaluating the Role of Pre-Application Reports in Improving Distributed Generation Interconnection Processes](#)
- [Distributed Generation Interconnection Collaborative](#)

Extra Slides

FERC Order 792: Small Generator Interconnection Procedures (SGIP)

Total capacity (in megawatts [MW]) of substation/area bus, bank, or circuit based on normal or operating ratings likely to serve the proposed POI

Existing aggregate generation capacity (in MW) interconnected to a substation/area bus, bank, or circuit (i.e., amount of generation online) likely to serve the proposed POI

Aggregate queued generation capacity (in MW) for a substation/area bus, bank, or circuit (i.e., amount of generation in the queue) likely to serve the proposed POI.

Available capacity (in MW) of substation/area bus or bank and circuit likely to serve the proposed POI (i.e., total capacity less the sum of existing aggregate generation capacity and aggregate queued generation capacity).

Substation nominal distribution voltage and/or transmission nominal voltage, if applicable.

Nominal distribution circuit voltage at the proposed POI.

Approximate circuit distance between the proposed POI and the substation.

FERC Order 792: Small Generator Interconnection Procedures (SGIP)

Relevant line section(s) actual or estimated peak load and minimum load data, including daytime minimum load and absolute minimum load, when available.

Number and rating of protective devices and number and type (standard or bi-directional) of voltage regulating devices between the proposed POI and the substation/area. Identify whether the substation has a load tap changer.

Number of phases available at the proposed POI. If a single phase, distance from the three-phase circuit.

Limiting conductor ratings from the proposed POI to the distribution substation.

Whether the POI is located on a spot network, grid network, or radial supply.

Based on the proposed POI, existing or known constraints such as, but not limited to, electrical dependencies at that location, short circuit interrupting capacity issues, power quality or stability issues on the circuit, capacity constraints, or secondary networks.

Figure 7. Changes in percentages of applications along each pathway after pre-application report processes were implemented (percentage in the pre-application case minus percentage in the no-pre-application case) for projects 500 kW and larger

