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Protecting the Midwest's Environment and Natural Heritage

Interconnection Standards

Best Practices and Recommendations

Michigan Distributed Generation Working Group
August 15, 2017

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So, why are we talking about interconnection again?

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Public Act 342, Part 5

Distributed Generation

Sec. 173(6)(a)

The distributed generation program created under subsection (1) shall include … Statewide uniform interconnection requirements for all eligible electric generators.

Sec. 175(3)

The interconnection requirements shall require all eligible electric generators, alternative electric suppliers, and electric utilities to comply with all applicable federal, state, and local laws, rules, or regulations, and any national standards as determined by the commission.

What are interconnection standards?

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Interconnection standards specify the technical engineering requirements, timelines, fees, and standardized procedures to determine whether customer generation can be safely interconnected to the utility transmission or distribution system.

But doesn't Michigan already have interconnection requirements?

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- Yes, but they're no longer consistent with industry standards.

- Outdated requirements will likely result in lengthy interconnection queues, delays, and disputes as the Michigan solar market grows.

So what should the MPSC do?

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- Don't try to reinvent the wheel. States are converging on a set of standard best practices.

- Michigan should move quickly to adopt revisions based on the FERC SGIP and other state and national best practices.

Interconnection History

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- FERC Order 888 (1996): "open access"
- FERC Order 2000 (1999): RTOs
- FERC Order 2003 (2003): LGIP pro forma
- IEEE 1547 technical standards (2003)
- FERC Order 2006 (2005): SGIP
- 2005 Energy Policy Act: "Consider" stds
- FERC Order 792 (2013): "SGIP 2.0"

FERC Order 2003 (July 2003)

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- Pro forma LGIP
- Intended for large generators (> 20 MW)
- Provides requirements for RTO tariffs
- Establishes classic tiered "study process"
  - Feasibility study
  - System Impact study
  - Facilities study

FERC Order 2006 (May 2005)

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- Pro forma SGIP
- Intended for small generators (<20 MW)
- Introduces "fast track" review based on technical screens.
- Intended as a model for states to follow.

Flowchart of screening process

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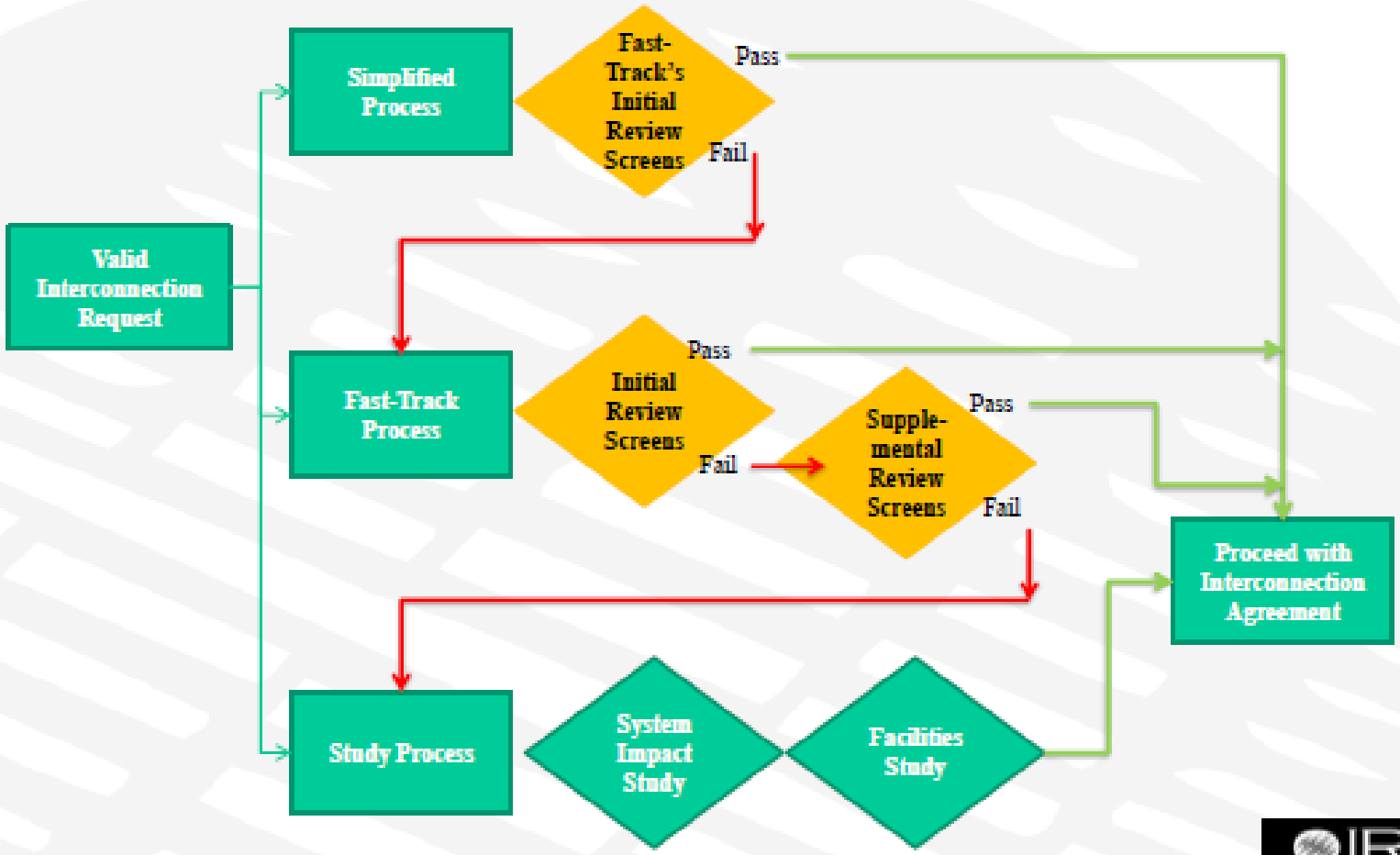

Example of fast track screens
(from IREC model rules)

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a. Facility Size: The Facility has a Generating Capacity not greater than 25 kW.

b. For radial distribution circuits, the Generating Facility aggregated with all other generation capable of exporting energy on a Line Section will not exceed 15 percent of the Line Section's annual peak load …

c. If the Generating Facility is to be interconnected on single-phase shared secondary, then the aggregate generation capacity on the shared secondary, including the Generating Facility, will not exceed 20 kilovolt-amps (kVA)

d. If the Generating Facility is single-phase and is to be interconnected on a transformer center tap neutral of a 240-volt service, its addition will not create an imbalance between the two sides of the 240-volt service of more than 20 percent of nameplate rating of the service transformer.

e. For interconnection of a Generating Facility within a Spot Network or Area Network, the aggregate generating capacity including the Generating Facility may not exceed 50 percent of the Network's anticipated minimum load.

FERC Order 792 (2013)

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- Reforms and updates the SGIP
- Enhances transparency and efficiency by adopting pre-application reports
- Minimizes unnecessary studies by:
  - Increasing fast-track size limits
  - Creating supplemental review.

Pre-application reports

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- Provides snapshot in time of grid conditions at proposed point of interconnection.
- Not a guarantee of successful interconnection review.
- Creates more efficient process.

Example of fast track size limits
(from IREC model rules)

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Line Voltage	Level 2 (Fast Track) Eligibility	
	Regardless of Location	On ≥ 600 amp line and ≤ 2.5 miles from substation
≤ 4 kV	≤ 1 MW	≤ 2 MW
5 kV – 14 kV	≤ 2MW	≤ 3 MW
15 kV – 30 kV	≤ 3 MW	≤ 4 MW
31 kV – 60 kV	≤ 4 MW	≤ 5 MW

Supplemental review

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- Allows a "second look" if project fails initial screens to avoid full study process.
- Consists of three screens:
  - aggregate generation < 100% of min. load;
  - voltage and power quality maintained;
  - safety and reliability maintained.

Other considerations:

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- Rules should explicitly cover energy storage.
- Utilities should consider developing electronic submittal/tracking portals.
- Grid mapping / hosting capacity can increase efficiency and reduce application volume.

What are Midwest states doing?

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- Many of them are updating their standards to incorporate national best practices:
  - Ohio (2013)
  - Iowa (2016)
  - Illinois (2016)
  - Minnesota (in process)

A tale of two states … Part 1

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BUSINESS

Minnesota solar energy development caught in delays

Problems persist in hooking into grid, but Xcel says build-out is at hand.

By Mike Hughlett Star Tribune | JULY 2, 2016 — 3:22PM

BUSINESS

Headway made in solar garden disputes between Xcel, developers

However, it's still uncertain how many gardens will be online by the end of 2016.

By Mike Hughlett Star Tribune | SEPTEMBER 21, 2016 — 10:21AM

Some headway was made Tuesday in settling long-running disputes between solar developers and Xcel Energy, a quarrel that has helped delay the rollout of one of the nation's most ambitious solar garden projects.

A tale of two states … Part 2

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In Illinois, new rules expected to make solar faster and cheaper

WRITTEN BY

Kari Lydersen
October 19, 2016

PHOTO BY

santontcady / Creative Commons

Illinois lawmakers have adopted new interconnection standards that will make the solar siting and installation process significantly quicker and cheaper, clean energy advocates and utilities say.

The Illinois state standards, adopted Oct. 11, are based on a rule establishing best practices that the Federal Energy Regulatory Commission (FERC) adopted in late 2013. The standards are being held up as a model for other states, including Iowa and Minnesota, which are currently going through interconnection rule-making processes.

http://midwestenergynews.com/2016/10/19/in-illinois-new-rules-expected-to-make-solar-faster-and-cheaper/

PV growth can happen quickly …

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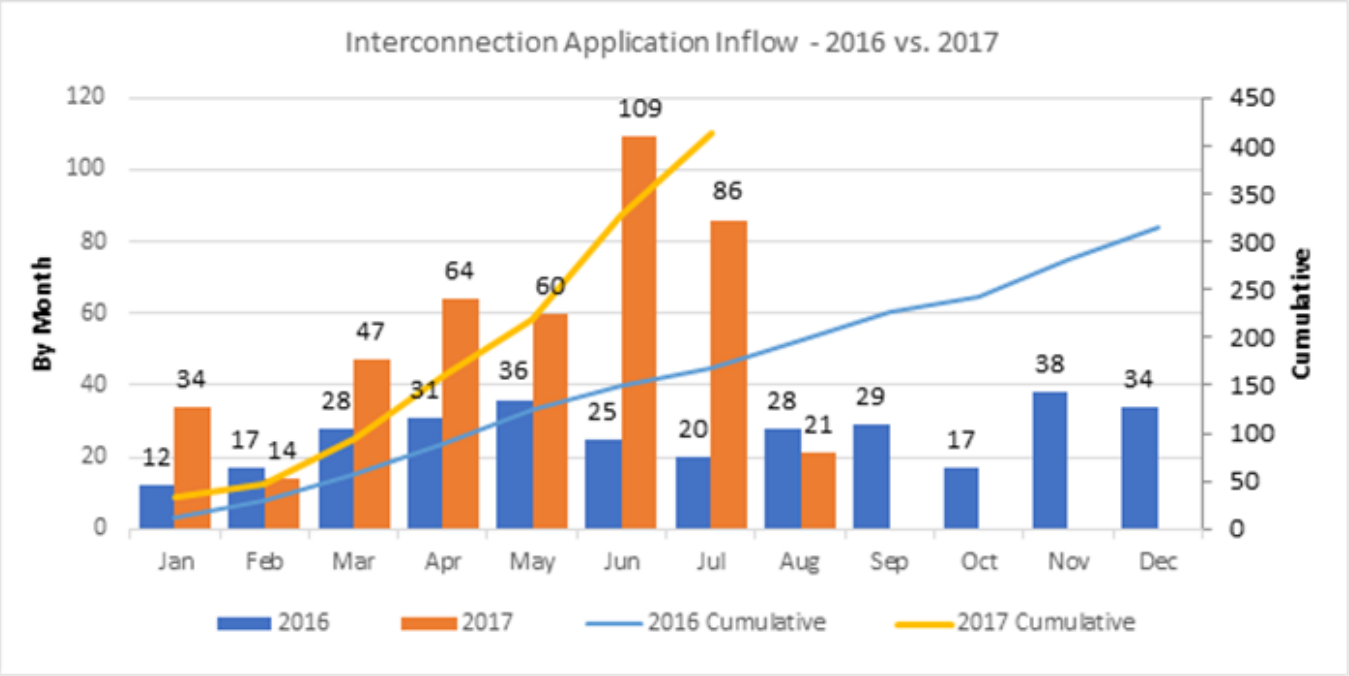

*As of August 4, 2017

Applications are expected to double this year

ComEd
An Exelon Company

PV growth is happening now!

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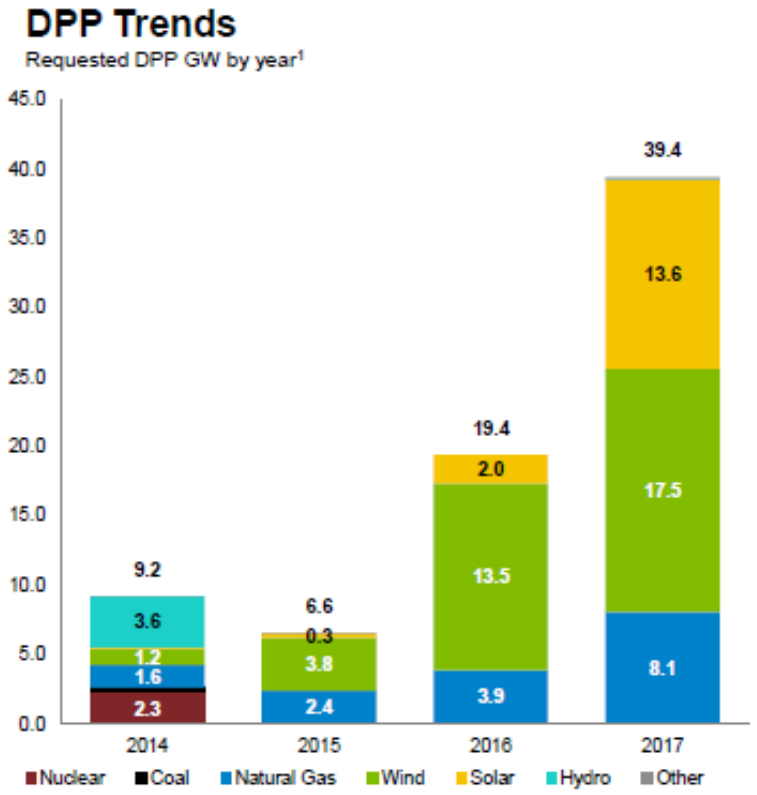
MISO Generator Interconnection Queue Trends

- MISO has seen a vast increase in requested generation
- Latest Queue Cycle: 191 projects totaling 31 GW
- High concentration on renewable development
- Key drivers:
  - Renewable Production tax credits
  - State renewable portfolio standards
  - Retirement of aging coal generation



Conclusion

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- It's better to be prepared for solar market growth than to be forced to react to delays and disputes.

- Michigan should act as quickly as possible to update its interconnection standards.

Resources

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- Interstate Renewable Energy Council, *Model Interconnection Procedures,* (April 2013), available at: http://www.irecusa.org/publications/model-interconnection-procedures/

- Interstate Renewable Energy Council, *Priority Interconnection Considerations Memo* (June 2017), available at http://www.irecusa.org/wp-content/uploads/2017/06/IREC_Priority-Interconnection-Considerations-Memo_FINAL_062217.pdf