



PROTECTING THE WEST'S LAND, AIR, AND WATER

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# Arizona Interconnection Workshop

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# Context

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- Arizona needs approved interconnection rules and standards
- Staff's draft proposed rules are a good starting point
- FERC has proposed guidelines
- WRA is proposing edits to Staff's draft proposed rules based on
  1. FERC final Rules
  2. IREC model rules
  3. NREL recommendations

WRA filed Comments and edits to Staff's draft proposed rules in July 2015. My comments today are based on that filing.

WRA would like to thank the Interstate Renewable Energy Council (IREC) for assistance in developing our positions

# Screening Requirements – Level 1

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## Level 1 – Super Fast Track

### Proposal: Raise the 10 kW limit to 25 kW

- Limited to inverters that meet UL 1741
- Systems required to pass Screens (E) and (F)
- Also required to meet Screens (A) through (D) and (J)
- Screen (A) sets a limit on peak generation on the feeder (more on this later)
- Screen (B) sets a limit on Fault Current at any point on the Distribution System
- Screen (C) addresses short circuit interrupting capability
- Screen (D) sets interconnection type
- Screen (G) addresses a 10 MW limit in areas with transient stability limitations

# Screening Requirements – Level 2 Fast Track

The 2 MW limit is too high in some cases and too low in others. The FERC recommendation is the following:

<u>Fast Track Eligibility for Inverter-Based Systems</u>		
<u>Line Voltage</u>	<u>Fast Track Eligibility Regardless of Location</u>	<u>Fast Track Eligibility on a Mainline<sup>1</sup> and <math>\leq 2.5</math> Electrical Circuit Miles from Substation<sup>2</sup></u>
<u><math>&lt; 5</math> kV</u>	<u><math>\leq 500</math> kW</u>	<u><math>\leq 500</math> kW</u>
<u><math>\geq 5</math> kV and <math>&lt; 15</math> kV</u>	<u><math>\leq 2</math> MW</u>	<u><math>\leq 3</math> MW</u>
$\geq 15$ kV and $< 30$ kV	$\leq 3$ MW	$\leq 4$ MW
$\geq 30$ kV and $\leq 69$ kV	<u><math>\leq 4</math> MW</u>	<u><math>\leq 5</math> MW</u>

## Screen A – Feeder Loading Criteria

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FERC recommends maintaining the 15% of peak load criterion for aggregated generation on a feeder, which is included in the proposed rule.

FERC has added a Supplemental Review process when feeders are at or near the 15% threshold. Many states have found that forcing small systems to go through lengthy study processes cause large backlogs that are burdensome to all parties.

WRA has added language for a Supplemental Review process to our suggested revisions to staff's suggested rules.

WRA suggests deleting the final sentence from the Screen A criteria as the concern is better addressed with the Supplemental Review

## Screen E – Capacity limitation on Small Systems

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WRA recommends changing the 10 kW limit for small systems to 25 kW

NREL recommends a 25 kW limit

IREC recommends a 25 kW limit and many states have adopted this limit.

FERC recommendations include a 20 kW limit, but the issue was not addressed in the proceeding.

The 25 kW limit could probably be raised – but discussion would be needed with the utilities.

## Screen I – Generation Facility capacity

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Screen I states that a generation facility cannot exceed the capacity of the customer's existing electric service.

WRA recommends adding the following language:

“... unless there is a simultaneous request for an upgrade to the Customer's electrical service commensurate with the capacity of the Generating Facility or if the Generating Facility is configured to never inject power onto the feeder that exceeds the capacity of the electrical service.”

This additional language still prevents the injection of more net power onto the Distribution Grid than the customer's service capacity.

## Supplemental Review

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FERC recognized the need for a supplemental review process when an application fails the Super Fast Track and Fast Track approvals due to high penetrations of DG.

Situations can occur when DG penetration is such that new systems fail the 15% criteria, but the feeder can easily host additional DG.

Small system applications are then unnecessarily put into the lengthy study process, creating backlogs.

Arizona should incorporate the FERC SGIP language for Supplemental Review. This language has been included in WRA's markup rules.

# External Disconnect Switches

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External Disconnect Switches are not necessary for inverter-based systems smaller than 25 kW.

This type of switch is redundant for certified inverter-based equipment

There is little record of these switches actually being used

NREL and IREC do not believe that external Disconnect Switches are necessary on small systems with certified inverters.

WRA has added language in the Disconnect Switch definition to implement this change.

# Required use of Advanced (Smart) Inverters

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Smart Inverters have features that are beneficial to the Distribution Grid

- Ride Through capability
- Voltage and frequency support
- Improved VAR support
- Remote shut down of the DG system when necessary for grid protection

Arizona should require smart inverters on all systems over 10 kW after some date certain.

Arizona should initiate a separate proceeding at an appropriate time in the future to investigate control functions and communications standards for smart inverters.

# Pre-application Reporting and Mapping

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Many states and utilities have found it advantageous to provide information to prospective solar customers and providers on grid conditions that could limit the hosting ability of feeders

This could be done with reports or maps or both

The ACC should require utilities to provide reports and/or maps that give interested parties enough information to determine where limitations are occurring or will occur in the near future.

Rules and standards will need to be updated and revised from time to time

Many states convene technical working groups to cover emerging issues

- Problems with existing rules
- Problems with the interconnection process
- Changes to national standards (IEEE, FERC, etc.)
- Need to more extensive rules for control of smart inverters
- Etc.

# Energy Storage Issues and Considerations

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Behind the meter battery storage associated with DG is immanent.

Arizona needs to have rules in place that provide surety for both the utilities and customers who want to install battery storage.

WRA believes that behind the meter battery storage should be treated in the same way that DG is treated with respect to basic interconnection.

Smart inverters should be required on all installations.

Communication standards should be quickly addressed so utilities can communicate with behind the meter battery storage systems.

It may be most efficient for utilities to have the ability to control charge and discharge of battery storage systems.

# Microgrids

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Interconnection of customer owned microgrids that have the ability to fully “island” will need to be addressed by utilities in the future.

Except in limited “campus” type situations, true microgrids are beyond the scope of the currently proposed interconnection rules.

Large customers, such as universities and military bases, can negotiate microgrid interconnection directly with utilities.

More general interconnection of microgrids will be informed by rules that are developed for the interconnection of smart inverters on DG systems and smart inverters that control DG/Battery Storage systems.

## Technical Issues Related to Safety

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The safety standards that are required for new DG and DG/Battery Storage systems, whether UL listing or IEEE standards, along with the proposed interconnection rules that we are addressing in this proceeding, should provide adequate safety standards for interconnection.

If additional safety issues arise, they should be addressed in a speedy manner.