

SOUTH DAKOTA INTERCONNECTION WORKSHOP

OVERVIEW OF INTERCONNECTION ISSUES AND BEST PRACTICES

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Lack of Consistent Interconnection Approach By States is a Barrier for DG

- States individually implementing policies
- Until recently, no mandate for uniform implementation -- Federal 2005 EPACT *Sec 1254 Interconnection*: utilities required to consider IEEE 1547, and promote agreements/procedures via current best practices
- Different ways of interpreting & implementing IEEE 1547
- How to ensure validity, quality and consistency?
 - Technical Standards?
 - Equipment testing approval & certification?
 - Standardized statewide interconnection rules/procedures?
 - Standardized statewide interconnection agreements?

DOE/NREL Activities in Support of Adoption of IEEE 1547 Standards

Goal: Provide Neutral Support to States to Help Ensure Consistent Implementation of Both Interconnection Technical Standards & Administrative Procedures

DOE/NREL support of standards adoption & best practice procedures, including model codes developed by state regulatory agencies, includes:

- PJM Small Generator Based Technical Requirements (based on IEEE 1547 and agreed to by all 17 PJM transmission owners - accepted by FERC in 2005)
- MADRI Model Interconnection Procedures (2005)
- Maryland statewide interconnection procedure (March 2007)
- Oregon statewide interconnection procedure (2006/2007)
- Support for state EPACT interconnection activities (ongoing)

State Implementation Support

Lessons Learned: *When Existing Technical Requirements Were Examined, They Were Found to not be Consistent With IEEE 1547*

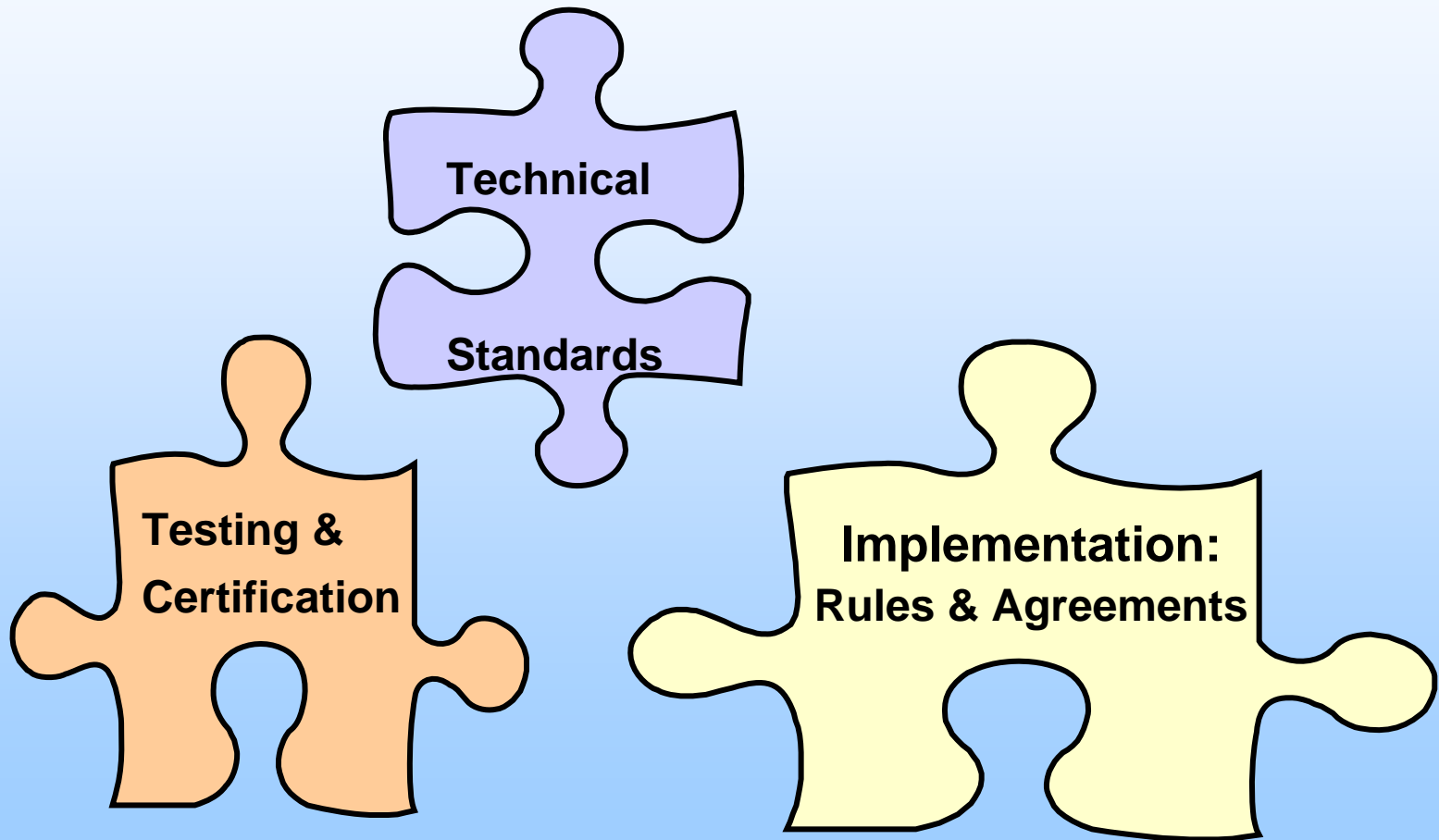
PJM/NREL Audit Results

(*Blue Font underlined indicates IEEE 1547 requirements that may be pre-certified)		
IEEE Std 1547 Clause	IEEE Std 1547 Requirement	PJM/TO Std Requirement
4.1 General Requirements	(heading only)	N/A
4.1.1 Voltage Regulation	DR shall not actively regulate voltage; not cause the Area EPS voltage at other PCCs to go outside requirements of ANSI C84.1 Range A.	No
4.1.2 Integration with Area EPS grounding	Grounding scheme shall not cause overvoltages that exceed rating of the equipment connected to the Area EPS	No
	Shall not disrupt coordination of Area EPS ground fault protection	Yes
<u>4.1.3* Synchronization</u>	<u>Not cause Area EPS prevailing voltage at PCC to exceed +/- 5% fluctuation</u>	No
	<u>Shall meet clause 4.3.2 flicker requirements</u>	No
4.1.5 Inadvertent Energization of the Area EPS	Shall not energize a de-energized Area EPS	Yes
4.1.6 Monitoring	Aggregate gen > 250 kva shall have provisions for monitoring (connection status, KW, KVAR, & voltage) at the DR connection	Yes, but size varies (often more data required by TO)
4.1.7* Isolation Device	When required by TO, shall provide readily accessible, lockable, visible-break isolation device	Yes
<u>4.1.8 Interconnect Integrity</u>	(heading only)	N/A
<u>4.1.8.1* EMI</u>	<u>EMI withstand shall meet C37.90.2</u>	No
<u>4.1.8.2* Surge Withstand</u>	<u>Shall meet C62.41.2 or C37.90.1 V&I withstand capability</u>	No
<u>4.1.8.3* Paralleling Device</u>	<u>Shall be capable of withstanding 220% of system rated V</u>	No
4.1.4 DR on distribution secondary grid and spot networks. (heading only)		N/A
4.1.4.1 Distribution secondary grid networks. (Under consideration for future revisions of std.		No
4.1.4.2 Distribution secondary spot networks (multiple requirements in 1547)		No

Summary Conclusions

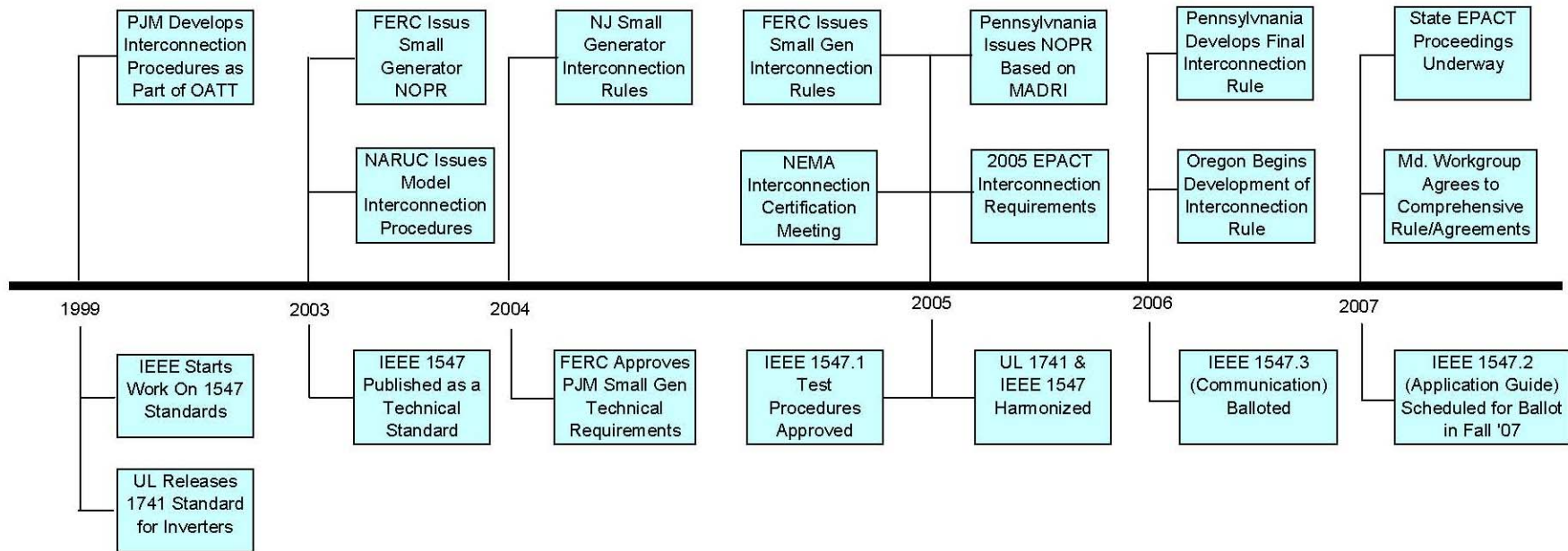
- Requirements vary from utility to utility
- Requirements not transparent
- Requirements not uniformly applied
- Many additional requirements – probably not necessary

Key Interconnection Challenge: *Putting the Pieces Together*



Evolution of Technical Standards and Procedures Development

Interconnection Procedures



Interconnection Technical Standards

Source: Brad Johnson, ACN Energy Ventures

INTERCONNECTION BEST PRACTICES FOR CONSIDERATION

(DOE EERE and OE, March 15, 2007)

http://www.eere.energy.gov/solar/pdfs/doe_interconnection_best_practices.pdf

- First and foremost, EERE and OE note that EPCRA requires that agreements and procedures for interconnection service “shall be just and reasonable, and not unduly discriminatory or preferential.” As such, generators and utilities should be treated similarly in terms of State requirements.
- Create simple, transparent (1- or 2-page) interconnection applications for “small generators” (equal to or less than 2 MW), as noted in the FERC Order 2006.
- Standardize and simplify the interconnection agreement for “small generators” and, if possible, combine the agreement with the interconnection application.
- Set minimum response and review times for interconnection applications. Provide expedited procedures for certified interconnection systems that pass technical impact screens.
- Establish small processing fees for “small generators”, otherwise the interconnection request must be accompanied by a deposit that goes toward the cost of the feasibility study, per FERC Order 2006.
- Set liability insurance requirements commensurate with levels typically carried by the respective customer class.
- Require compliance with IEEE 1547 and UL 1741 for safe interconnection.
- Avoid overly burdensome administrative requirements, such as obtaining signatures from local code officials, unless such requirements are standard practice in a jurisdiction for similar electrical work.
- Develop administrative procedures for implementing interconnection requirements on a statewide basis through a rulemaking or other appropriate regulatory mechanism for state-jurisdictional utilities to apply uniformly to all regulated electric distribution companies in the State. Where practical, State interconnection administrative procedures should reflect regional best practices and be comprehensive in scope. Administrative procedures should also be transparent to both small generators and electric distribution utilities.