Smart Grid Technology Selection
Putting Smart Grid to the Test

Rudi Schubert
rschubert@enernex.com
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Discussion Topics

- The Importance of Testing
- Technology Selection Essentials
- Technology Evaluation Options
- Smart Grid Testing & Certification Initiatives

Why is Testing Important?

- Considerable time/effort goes into standards-making

- Purchasers want "standards compliant" products

- How is "standards compliant" determined?

- Testing provides the facts to support claims of "standards compliant"

- Testing is a major factor in technology selection

Technology Selection
Big Money – Big Decisions

- Market reports estimate tens of billions of dollars will be spent in coming years in Smart Grid deployment

- Many competing technologies, and many competing vendors within technology areas

- Regulators and consumers expect cost effectiveness and expect the grid to operate as advertised

Technology Selection Essentials

- Clear and measurable requirements
  - Features, Functions and Performance
  - Quality and Reliability
  - Maintenance, Robustness, Serviceability
- Verified conformance to those requirements
  - RFPs must have well defined requirements
  - Disciplined RFP evaluation processes
- Financial considerations
  - Total cost of ownership; integration costs

Technology Evaluation Options

- Take the vendors word that its good
- Test it yourself
- 3rd party verification of compliance

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- Reasonable approach for low risk products and applications with minimal impact of non-compliance
- Ideally, the vendor should be responsible for replacement/repair when applicable
  - Large end users can mandate this contractually

Vendor declaration is a high risk proposition for mission critical applications

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Test It Yourself

- Advantage is direct control over testing, but:
  - Expensive to maintain needed facilities
  - Difficult to maintain breadth of staff expertise
  - Vendors benefit from users bearing the test cost
    - Vendors also have risk if product exhibits problems
    - End users have charged vendors for test in some industries

- Some degree of integration testing may always be needed
  - Key is to identify problems before integration
  - If not, schedule and cost impact can be severe

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3rd Party Verification

- Independent testing and/or validation of compliance is the preferred approach for high risk situations
  - Service impact, cost of rework, etc.
- Certification takes compliance one step further – ongoing compliance versus a snap shot in time
  - Includes follow on assessments

SGIP and 3rd Party Testing

- The Smart Grid Interoperability Panel has cited testing and certification as a priority issue
- A framework for testing and certification of Smart Grid systems and devices has been released (aka the IPRM)
- The testing and certification framework focuses on 3rd party testing and approvals
  - Strong focus on test construction details and process quality for testers and certifiers
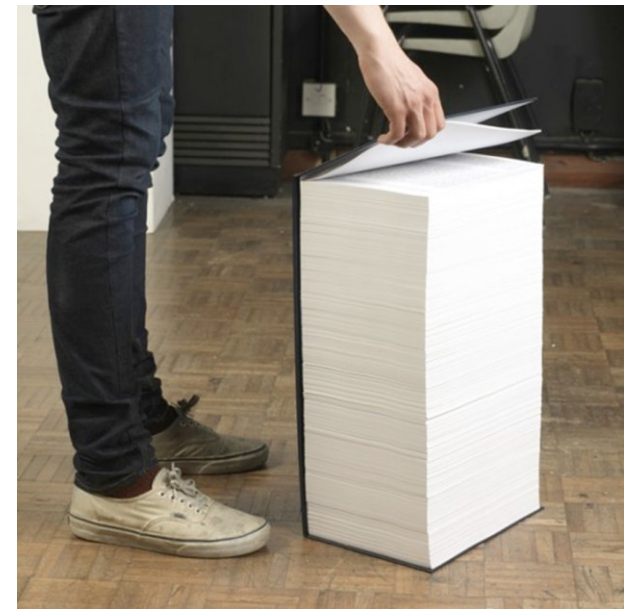
Goals of the IPRM

- Enhancing the ability of testing and certification organizations to accelerate interoperability
- Increase the buyer's confidence in the purchase of certified interoperable products for their organizations
- Standardize the testing and certification processes, through an initial set of best practices, across multiple standards ensuring more consistent and quality interoperable products within the Smart Grid at large
- Implement a formal recognition process for those organizations following the SGTCC Testing and Certification Framework to assure the purchasing organizations of quality reviewed testing programs

Key Testing Considerations

- Was it tested using a documented test plan?
    - Is this an industry accepted test plan (or an internal, custom test plan)?
- Has a detailed test report been written documenting the results?
    - Are the test methods described in the test report?
    - Are the pass/fail metrics specified in the test report?
    - Are results provided relative to each test requirement?
    - It is recommended that the test report be included as backing documentation as part of the decision making process

- High stakes purchasing and deployment decisions require thorough technology evaluation

- Testing, Testing, Testing
  - Measure twice, cut once
  - Identify performance issues early

Questions? – rschubert@enernex.com

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