

The Importance of Modeling

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Analysis

NASPI Model Validation Workshop

October 22, 2013

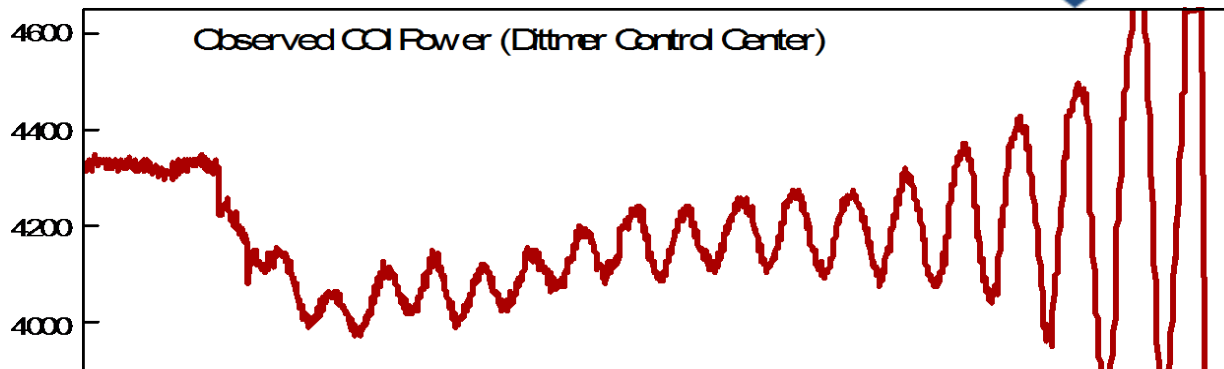
RELIABILITY | ACCOUNTABILITY



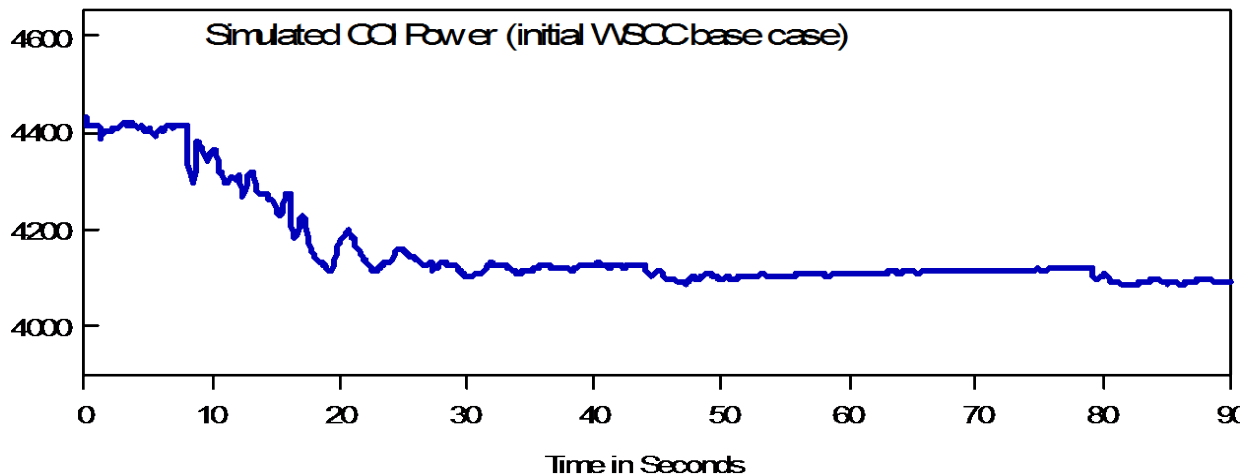
- Predict system behavior and the interaction of components
- Provide heightened view of system security
- Enhance situational awareness
- Potentially increase asset utilization
- Flexibility to reliably integrate resources and loads as technology and characteristics evolve

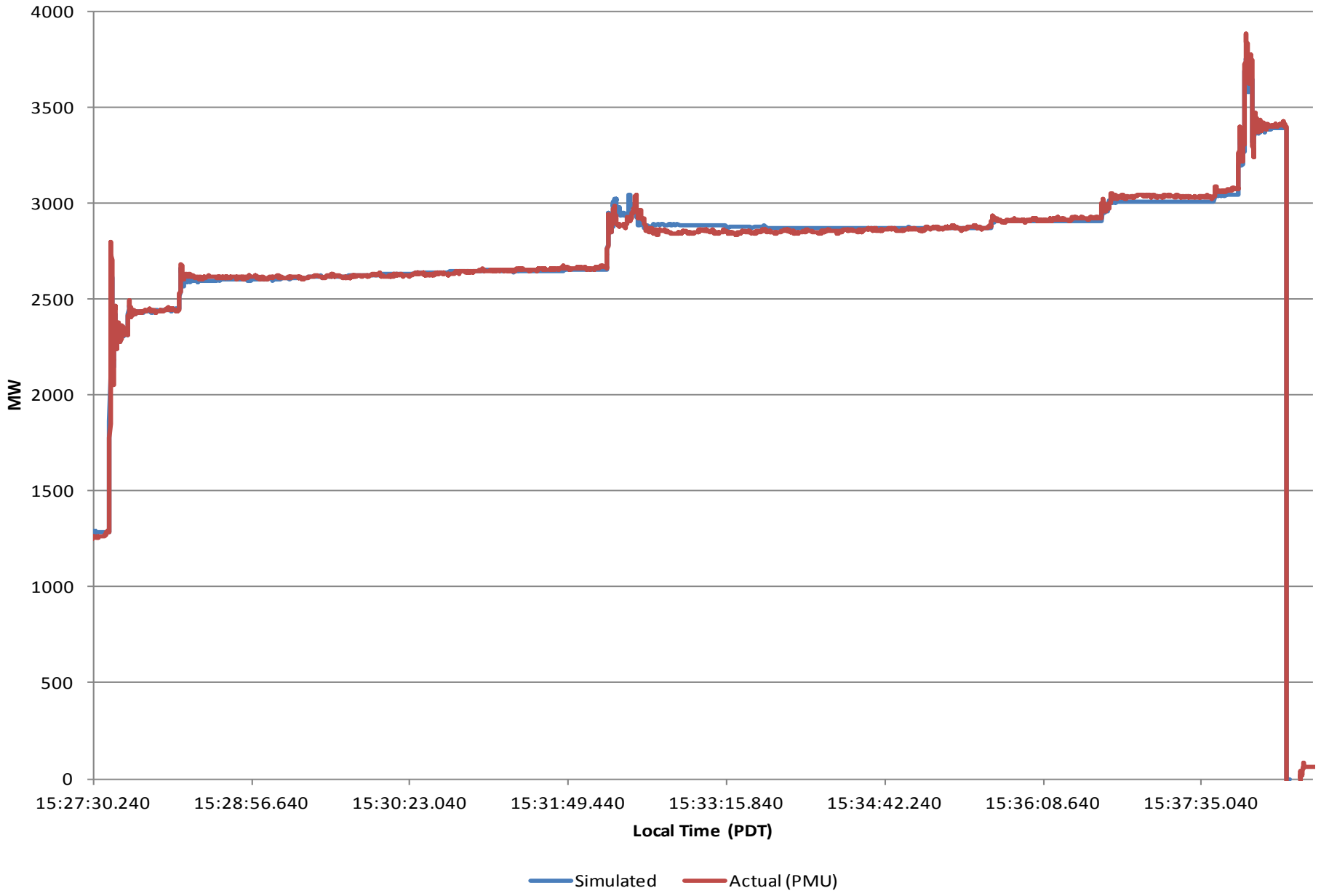
Maximize reliability performance and security

Real event



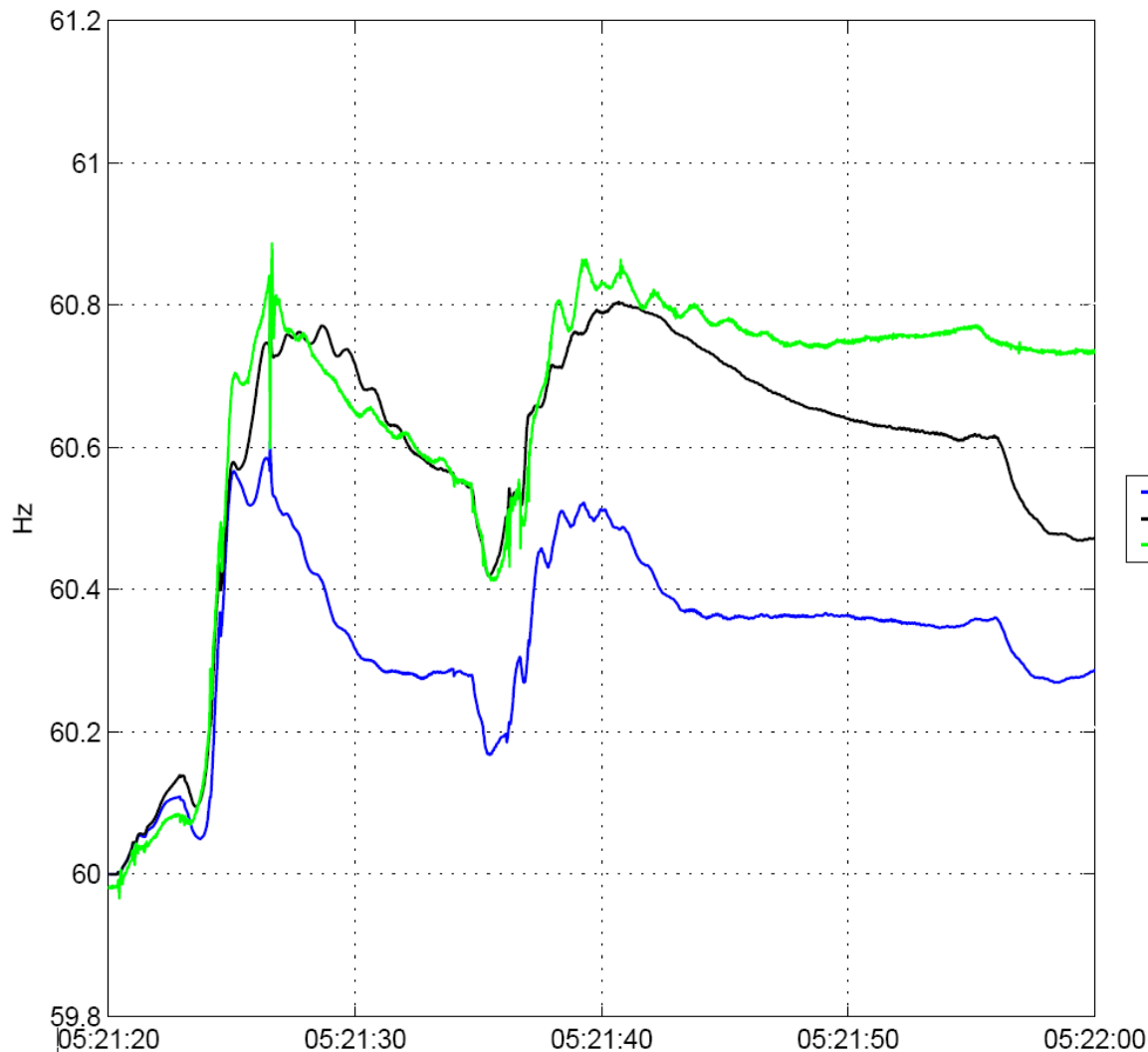
Dynamic simulations





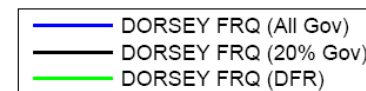
1. Generator Dynamics
2. Load Behavior
3. Frequency Response
4. Inter-Area Oscillations
5. Equipment Modeling
6. Special Protection Systems/Remedial Action Schemes
7. Protection Systems
8. Turbine and Boiler Controls

Components of a Broad Modeling Initiative Design



Actual

Models Adjusted



Database Models

- Validation of system behavior and the interaction of components
- High granularity data/insights to heighten system security
- Potentially increase asset utilization
- Effectively integrate resources and composite loads - technology and characteristics evolve

Maximize reliability performance and security



Questions?

2003 Blackout Recommendations NERC 14 and US-Canada 24:

“The regional reliability councils shall, within one year, establish and begin implementing criteria and procedures for validating data used in power flow models and dynamic simulations by benchmarking model data with actual system performance. Validated modeling data shall be exchanged on an interregional basis as needed for reliable system planning and operation.”

Modeling Improvements Initiative

- Improved and validated powerflow and dynamics models
 - Benchmarking against actual system performance
- Library of standardized component models for generators and other electrical equipment
- Composite load modeling
- Move toward node-breaker modeling
- Tie to protection setting databases
- Interaction of System Protection and Turbine Controls
- Modeling Guideline – industry technical reference