BPA Power System
Stability Controls

Bonneville Power Administration
NASPI Meeting - October 2008
Power System Stability Controls

Power System

Controllability: Effectiveness of Control Actions

Observability: Information content in Measurements

Control Algorithm
What is Different This Time Around

- First, availability of wide-area signals for power system controls.
  - Better observability (information) leads to better decisions
  - Better information makes control algorithm simpler and more robust

- Second, greater acceptance of power electronic devices
  - Can deliver control actions more effectively

- Third, digital control implementation:
  - More effective and flexible control algorithms
Power System Controls

- Voltage / Angle Stability Controls
- Oscillation Damping Controls
- Power Flow Controls
- Wind Power Plant Controls
Controller Design Framework

- **Controllability:**
  - What control actions can we take to improve stability?
  - Do we have appropriate devices, located in right places, and adequately sized?
  - What investments can be made to achieve controllability?

- **Observability:**
  - What types of measurements and locations provide the best visibility of the system conditions?
  - Do we have an adequate wide-area control infrastructure?

- **Control Algorithm Design**
  - Robustness and scalability

- **Controller Implementation**

- **Communication / Acceptance by WECC and Industry**
BPA Team

- BPA Transmission Planning
- BPA Transmission Operations
- BPA Engineering and Design – Remedial Action Schemes, Measurement Systems
- Panel of top industry experts
- Consultants
- Pier review – CISO, SCE, PG&E, BCTC, NERC, CERTS
Voltage / Angle Stability Controls
Oscillation Damping Controls
Power Flow Controls
Wind Power Plant Controls