

Systems Integration: Overview of Activities

Wind Energy Program
Strategic Planning Meeting
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Resource Characterization and Performance Modeling

- Mesomodeling
- Tall Tower Measurements
- Forecasting
- Solar modeling and Data base cooperation

Mesomodeling

- Western (3-Tier) and Eastern (AWS Truewind) grids
Meso modeling
 - 2 km, 10 minute resolution
 - 2004-2006
- Data storage and public access interface

***Strategic issues: validation/
methods improvement, annual
updates***



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Tall Tower Measurements

- Critical need for
 - Meso model validation/improvement
 - Grid integration temporal power profiles
 - Updated wind mapping
 - Turbine design
- Program '08 priorities
 - Great Lakes 100m map
 - Anemometer => power transfer function
 - Meso model spot checks
- New towers, existing structures, buy developer data

Strategic issues: critical mass, priority optimization

Forecasting

- Laboratory role: commercial firms, national weather modelers
- Key grid issues:
 - Improved accuracy on planning, scheduling and system balancing time scales
 - Anticipation of extreme events
 - Integration into grid control rooms
 - How to characterize in dispatch modeling for integration cost studies

Strategic issue: best use of lab incremental investment

Solar modeling and database integration

- Similar variability issues, recognition that wind program has a track record
- Increasing demand for integrated planning and analysis (PV and CSP)
- Future renewable-wide integration cooperation at DOE and NREL (RSI and ESIF)
- Mesomodels and satellite photo analysis

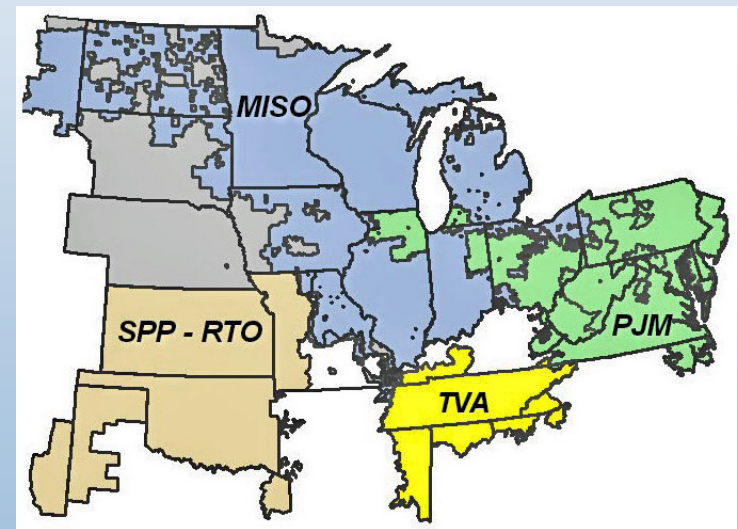
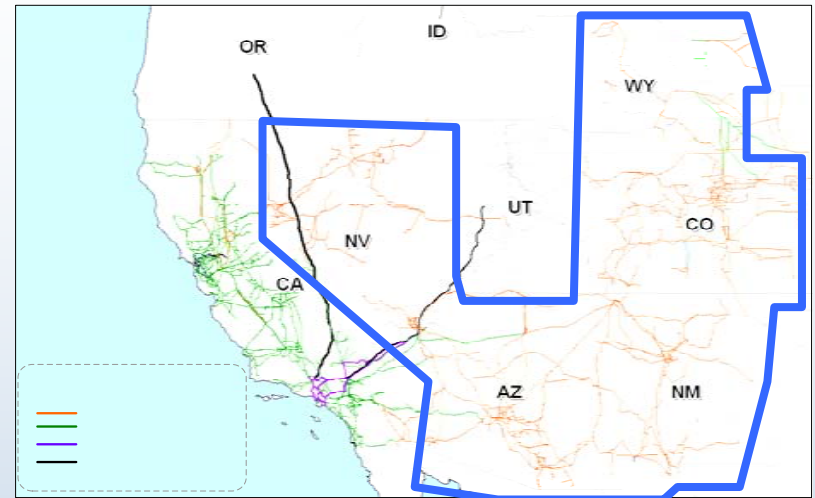
Strategic issue: different stages of technology and market deployment

Integration and Resource Planning

- Modeling and Methods
 - Generator Dynamics – WECC/CEC co-fund
Validation and grid monitoring expansion?
 - Production Cost and Grid Simulators
 - Wind Farm Data
Need inflow data and more developer cooperation
 - WinDS (econometric expansion planning)
Load flow modeling, meso profile integration, and 20% sensitivity studies

Integration and Resource Planning

- Operational and Transmission Studies
 - Westconnect Wind and Solar - GE
 - Joint Coordinated System Plan – RFP soon
 - WAPA customer cost-share opportunity



Integration and Resource Planning

- Operational and Transmission Studies (2)
 - Review, methods and data support of other operational and transmission studies
e.g. PNM and TOT3/Highplains
 - WGA Western Renewable Energy Zone Initiative
Co-funded with OE and Solar
 - Hawaii Clean Energy Initiative support
 - Storage (discussed later)
 - Wind/Hydro analysis (including water program collaboration, 2606 Tribal)
 - Best use of existing grid projects

Strategic issue: growing the number of competent consultants and analysts



Communication, Policy, Education and Outreach

- Utility Wind Integration Group and IEEE
- IEA high wind penetration and wind/hydro annexes
- Golden Office: Industry issues and WIEB
- NWCC transmission
 - WECC/Upper Midwest/SPP regional engagement*
- Regional SWAT team issue support
- FERC/NERC
- PUC/Legislative
- University
 - PSERC R&D projects
 - Curriculum Development
- Website and publications

Strategic issue: simple, understandable messages for a variety of audiences, coordination with other organizations

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