



User Group Initiative

UWIG Fall Meeting
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Seattle, WA

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Expanding UWIG Role

- Previously
 - Self-education
 - Sharing information and experience
- Currently
 - Addressing research topics of interest
 - Source of knowledge and information



Emerging Needs in New Role

- Gather information, develop if required
- Analyze information
- Disseminate information
- Internal and external information
- Domestic and international information



User Group Rationale

- Gather information into one place
- Make it easily available
- Allow the UWIG to take a more proactive role in addressing the ongoing industry challenges related to wind generation
 - Operating impacts and integration studies
 - Distributed wind application
 - Wind plant modeling and interconnection
 - Market operation and transmission policy



Operating Impacts and Integration Study User Group Needs

- Compare and analyze study assumptions, methods, and data
- Explain similarities and differences in study results
- Identify study methodology needs for the future
- Gather, distill, and disseminate results



Operating Impact and Integration Study User Group Scope

- Cost of ancillary services for wind plant
 - System regulation
 - Spinning reserve
 - Operating reserve
 - Unit commitment
- Sensitivity of ancillary service cost to
 - Penetration level
 - Generation mix
 - Fuel cost
- Capacity credit studies
- Domestic and international studies
- Assumptions and methodologies
- Information dissemination



Operating Impact and Integration Study User Group Plan

- Who's doing what in domestic studies
 - UWIG/Xcel Energy Phase 2
 - HECO IGAP
 - Great River Energy
 - We Energies
 - NYSERDA
 - BPA
 - PacifiCorp
 - Avista
 - SPS
 - CEC



Operating Impact and Integration Study User Group Plan

- Who's doing what in international studies
 - NORDEL/ELTRA
 - Ireland
 - England
 - Cyprus



Operating Impact and Integration Study User Group Plan

- UWIG Tech Briefs – Summary of Results
- Summary of applicable tools and techniques
- Discussion of market approaches vs. cost-based methodologies
- Bibliography with links
- Seminar plans
- Other studies
 - Capacity value – literature, methods, results
 - Wind/hydro integration
 - Storage and hydrogen



Operating Impact and Intetegration Study User Group

- Recommendations for future work
 - Modeling tools and methodology
 - Limitations
 - Practical experience from operators
- What would you like to do – priorities and preferences
- Options for participation



Distributed Wind Application User Group Needs

- Provide planning and analysis tools
- Provide application guides
- Provide case study and monitoring results
- Provide current information to members



Distributed Wind Application User Group Scope

- Engineering software tools
 - Voltage regulation and flicker
 - Overcurrent protective device coordination
 - Economic screening
- Application guides for P1547 and flicker
- Case study library
- Measurement database
- Maintain and disseminate information



Distributed Wind Application Initial Plan

- Updates of application guides with new information
- Expand case study database
- Expand measurement database
- Availability of DW software
- Support for DW software
- Tech brief when project is completed
- Bibliography with links



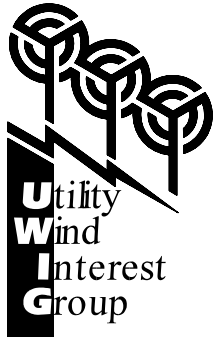
Distributed Wind Application

- Recommendations for Future Work
 - Examine suitability for use in studies under FERC small generator NOPR
 - Summarize new findings
 - Identify need for new tools/info
 - Develop new tools/info
 - Guidance for national and regional programs
- What would you like to do – priorities and preferences
- Options for participation



Wind Plant Modeling and Interconnection UG

- Background
 - Growing awareness of need for wind models
 - Interconnection studies
 - Assumptions and consequences
 - Formal step by ERCOT in 2003
 - Platform Questions
 - Ongoing Needs



Wind Plant Modeling and Interconnection UG Needs

- Wind plant size approaching conventional fossil unit with similar modeling needs
- Understand, compare, and analyze modeling assumptions, methods, and data
- Understand applicability and limitations in a specific situation
- Identify future development needs



Wind Plant Modeling and Interconnection UG Scope

- Advance state of the art in modeling wind turbines and plants for power system studies
- Develop, document, verify, and support model and techniques for planning and operating studies
- Generate confidence in those studying power system performance, stability, security, and reliability



Wind Plant Modeling and Interconnection UG

- ERCOT Project History
 - Discussions of need for better wind plant models in system studies at least as far back as August, 2001
 - Project scope developed in early 2002
 - RFP issued April, 2002
 - Project awarded June, 2002
 - Project kick off August 1, 2002
 - Project completion September, 2003



Wind Plant Modeling and Interconnection

- ERCOT Project Objectives
 - Develop models for four categories of commercial wind turbines appropriate for:
 - Steady state analysis (power flow)
 - Transient stability
 - Small signal stability
 - Stability studies including long and short-term dynamics
 - Validate models with available event data from field measurements
 - Document and deliver as “User Models” for PSS/E



Wind Plant Modeling and Interconnection UG Status

- Initial set of computer models available for
 - Current fleet of commercial turbines
 - Single platform (PSS/E)
- Challenges
 - Limited validation
 - Limited application experience and knowledge



Wind Plant Modeling and Interconnection UG

- Unaddressed or Ongoing Needs
 - Model application expertise
 - Turbine and plant model validation
 - Keeping up with new wind energy technology developments
 - Addressing related issues
 - Short-circuit behavior
 - Advanced wind turbine technologies
 - Advanced wind plant designs
 - Turbine and wind plant requirements/standards



Wind Plant Modeling and Interconnection UG Initial Plan

- Create and maintain wind generation modeling information – new and existing turbines
- Develop new information when required by members – models, validation, assessments, application expertise
- Be platform, vendor independent
- Evaluate new tools and techniques for wind generation studies
- Disseminate data and information to members
- Participate in and stay abreast of industry developments in this area



Wind Plant Modeling and Interconnection UG: Other Activities

- Coordination
 - Distributed Wind UG
 - Operating Impacts UG
 - AWEA “best practices”
 - IEEE PES
 - IEA
- Wind plant design issues
 - Requirements
 - Opportunities
- Interconnection studies evaluation (FERC Order 2003)
- Turbine and plant requirements and standards



Wind Plant Modeling and Interconnection UG

- Recommendations for Future Work
 - New model development and updates
 - Wind turbine and wind plant monitoring and measurement data base
 - Wind speed models for studies
 - Case studies and benchmarks
 - Identifying new research requirements



Wind Plant Modeling and Interconnection UG

- Who would benefit
 - Transmission organizations and utilities
 - Wind turbine manufacturers
 - Wind project developers
 - A/E firms, consultants doing wind generation studies
- What would you like to do – priorities and preferences
- Options for participation



Market Operation and Trans Policy Best Practices User Group Needs

- Wind resources often remote
- Transmission expensive and difficult to permit
- Market operation and transmission planning in transition with RTOs and SMD
- Transmission pricing critical to wind energy
- Need to identify best practices for wind energy as RTO/SMD markets evolve



Market Operation and Transmission Policy Best Practices UG Scope

- Transmission planning process
- Balancing markets
- Markets for transmission rights
- Interconnection standards and policies
- Congestion management
- Rate pancaking
- Flexible-firm tariff



Market Operation and Transmission Policy Initial Plan

- Track new wind related developments in RTO/ISO organizations with input from NWCC, AWEA, NREL
- Identify best practices for wind generation
- Areas of interest
 - Transmission planning process
 - Interconnection practices
 - Congestion management
 - Tariff issues
 - Markets for balancing, transmission rights, ancillary services, energy, capacity



Market Operation and Transmission Policy

- Recommendations for future work
 - Flexible-firm and beyond
 - Financial risk assessment
- What would you like to do – priorities and preferences
- Options for participation



Other User Group Topics of Interest

- Wind turbine operation and performance
 - Individual turbines
 - Wind plants
- Economics
 - Project Cost
 - Contracts/PPAs
 - O&M
- Anything else??



User Group Operation

- Service to members through a variety of mechanisms
 - Communication methods
 - Outreach and education
 - Co-sponsorship
- Common web based infrastructure
- Services will be phased into operation
- User groups will undertake activities as member interest and resources allow



User Group Operations

- Communication Methods
 - Web site with electronic databases and libraries
 - Presentations at UWIG meetings
 - Published technical papers
 - Fact sheets



User Group Operation

- Outreach and Education
 - Seminars and workshops at UWIG meetings
 - Periodic seminars or workshops on topics of high interest
 - Reports to the UWIG membership on topics of general interest
 - Participation in industry activities (IEEE, AWEA, ...)
 - Consultations in response to member requests
 - Provide guidance to national and regional programs



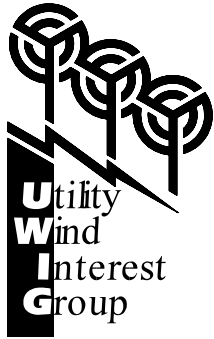
User Group Operation

- Co-sponsorship
 - User groups will be co-sponsored jointly with NREL, serve as a vehicle for making results of government sponsored work available to the industry
 - Co-funding of special activities will be sought



User Group Funding Requirements

- Some startup investment required (~\$100k)
 - Finish model libraries
 - Review and analyze studies
 - Build web site
 - Initial outreach materials
- Ongoing operation of User Groups
 - app. \$100k/yr at min level
 - app. \$250k/yr at expanded level



User Group Funding Sources

- Startup and annual funding
 - Member dues
 - DOE/NREL and EPRI
 - Turbine vendors and RTOs
 - Sustaining members
 - Other interested parties