

ERCOT

Renewable Technology Working Group (RTWG)

List of Workshop/Training Opportunities

May 2009

Issue Category	Issue No.	Title	Description	Assigned to:	Priority	Status	Other Ref. No.
WT	1	Resource Plan and Schedule Update Process	Determine potential improvements to the Resource Plan and Resource Schedule update process to improve performance and reliability.	RTWG/ERCOT Operations	Undetermined	Included with Workshop III	
WT	2	Wind Workshop III - Summer 2009	Develop list of topics and speakers for the ERCOT Wind Workshop III to be held in the summer of 2009.	RTWG/ERCOT Operations	Near Term	ERCOT Operations to develop draft outline	
WT	3	Wind Turbine Operator Training	Develop list of topics for use in development of a training session for wind turbine generator operators.	RTWG/ERCOT Operations	Long Term	Ask ERCOT training to discuss with RTWG	
WT	4	Wind in the Nodal Market	Develop presentation for use in the Wind Workshop explaining how wind generation will be treated in the Nodal Market design.	RTWG/ERCOT Operations	Near Term	Include in Wind Workshop III	

**ERCOT**  
**Renewable Technology Working Group (RTWG)**  
**List of All Completed Issues**

Issue Category	Issue No.	Title	Description	Assigned to:	Priority	Revision Mechanism	Status	Other Ref No.
MD	2	Ancillary Services Procurement Optimization for 2009	Develop any ancillary services cost allocations applicable to wind generation resources (see also MD-6).	QMWG	Complete		ERCOT Board approved the 2009 Ancillary Services Procurement methodology at the February Board Meeting - <b>COMPLETE</b>	
MD	6	Ancillary Service Procurement Methodology	Determine impact and possible changes in amounts of ancillary services to be procured to ensure reliability with increasing amounts of wind generation being installed in the ERCOT market.	WOTF	Complete	ERCOT Procedure	<b>COMPLETE:</b> WOTF reviewed draft procedure method and made comments that were incorporated in the AS methodology approved for 2009	WOTF 3c
MD	12	Wind Generation Resource LSL as a Percentage of HSL	Establish a minimum percentage for the Low Sustained Limit (LSL) of the High Sustained Limit (HSL) for a wind generation resource.	QMWG	Complete	PRR 773	<b>COMPLETE</b>	WOTF 2a
MD	13	Use of State of the Art Wind Forecast	Requires Wind Generation Resources to use of a state-of-the-art wind production forecast (AWS Truewind) in their daily resource plan submittals.	N/A	Complete	PRR 763	<b>COMPLETE</b>	WOTF 3b
SO	12	Low-Voltage-Ride-Through for Wind Generators	Develop low-voltage-ride-through requirements for wind generators.	N/A	Complete	OGRR 208	<b>COMPLETE</b>	
SO	13	Performance Metrics for Wind Generation	Develop appropriate operational performance metrics for wind generation.	QMWG	Complete	PRR 793 (Urgent)	PRR793 approved by the ERCOT Board - <b>COMPLETE</b>	
SO	16	Wind Generation Ramp Limits	Develop appropriate ramp rate limits for wind farms	ROS	Complete	PRR 771, PRR 788	<b>COMPLETE</b>	WOTF 3a
SO	17	Mid-Term and Short-Term Load Forecast Weather Sensitivity	WOTF determined that this was not a determining factor in the February 26, 2008 event.	WOTF	Complete	ERCOT Procedures	<b>COMPLETE:</b> Issue resolved as result of ERCOT Operations response to SDWG comments. WOTF recommended no further action.	WOTF 3b
SO	19	Improve Competitively Sensitive Constraints (CSC) Process	Evaluate increasing the frequency of ERCOT CSC studies to more accurately determine congestion problems that affect wind generation.	WOTF	Complete	N/A	<b>COMPLETE:</b> ERCOT implemented hourly limits effective June 10, 2008	WOTF 3f
SO	20	Dynamic Transmission Line Ratings	Evaluate cost and benefits of using dynamic transmission line ratings in ERCOT's planning processes to allow more efficient use of transmission lines serving wind farms.	WOTF	Complete	N/A	<b>COMPLETE:</b> RPG has agreed to consider dynamic line rating solutions to congestion problems	WOTF 3g
SO	21	Evaluate Emergency Electric Curtailment Plan (EECP) Steps	Determine if the existing EECP steps need to be modified to take into account the increasing amount of variable wind generation in the ERCOT system.	OWG	Complete	PRR 769 NPRR 142	<b>COMPLETE:</b> PRR 769 approved by BOD and NPRR 142 at January 20 BOD meeting	WOTF 3h
SO	24	Settlement of Advanced Meters in the Nodal Market	Determine appropriate settlement timeline to accommodate use of advanced meters in the Nodal Market design.	AMIT	Complete		Go-live date is November 2009; all provisioned advanced meters will be settled on a 15-minute basis - <b>COMPLETE</b>	
SO	27	Manual Curtailment of Wind Generation to Resolve Local Congestion	Determine if changes can be made in the existing zonal systems to allow for automating curtailment of wind to resolve local congestion problems.	CMWG	Complete		<b>COMPLETE:</b> ERCOT Operations discussed this issue extensively at February CMWG; no reasonable, timely or cost-effective solution is available in the existing zonal market, issue is resolved by the Nodal market design.	
SP	1	Verify Wind Turbine Technical Data	Create and maintain an inventory of installed wind turbine characteristics.	ERCOT Operations	Complete	ERCOT Survey	<b>COMPLETE:</b> ERCOT to report on status at January 30 WOTF meeting	

**ERCOT  
Renewable Technology Working Group (RTWG)  
List of Market Design Issues**

May 2009

Issue Category	Issue No.	Title	Description	Assigned to:	Priority	Revision Mechanism	Status	Other REF No.	Action Date
MD	1	Ancillary Services Cost Allocations Applicable to Wind	Develop any ancillary services cost allocations applicable to wind generation resources.	TAC	Near Term		The ERCOT Board requested TAC provide more detail related to their recommendation to not do any special Ancillary Services cost allocations applicable to Wind. TAC is no longer working on this issue. COMPLETE?		
MD	3	Non-Spin Requirements	Determine if additional Non-Spin Service procurements are required to accommodate increased amounts of wind generation in ERCOT.	PERTF	Near Term		To be included in MD 4		
MD	4	New Ancillary Service Products Needed for Reliability	Determine if new ancillary services are needed to reliably integrate the large amounts of wind generation coming into the ERCOT market.	ROS	Long Term		Eric Goff had developed a list of questions to be discussed at the Feb. 20 RTWG meeting; Eric will bring a whitepaper in May		Circulated prior to Feb meeting
MD	5	Benefits of Storage Technologies	Determine benefit and potential applications of storage technologies in the ERCOT market.	RTWG	Long Term		Steve Isser will bring white paper to RTWG;		Presented at Jan 29 meeting
MD	7	Wind Generating Resources Providing Ancillary Services	Determine possible changes in the ERCOT Nodal Protocols to allow Wind Generation Resources to provide ancillary services.	ROS	Undetermined	PRR	Walter Reid will develop list of questions to be presented to RTWG in May.		Circulated prior to Jan 29 meeting
MD	8	Reactive and Voltage Requirements Applicable to Wind Generators	Review of current ERCOT Protocols to ensure reactive and voltage control requirements are applicable to all generating technologies, including wind generation.	WOTF	Near Term	PRR	Docket 36482 has been abated. ERCOT staff is preparing a draft PRR that should be out in March.	WOTF 1a	
MD	9	Wind Generation Dispatch in the Nodal Protocols	Review of Nodal Protocols to ensure proper treatment of wind generation in regard to dispatch response.	WMS	Near Term	NPRR	Draft PRR will be prepared and distributed for review in April	Under active discussion by Nodal Wind Generation discussion group.	White paper to be presented in March
MD	10	Wind Generation Performance Metrics in the Nodal Protocols	Review of Nodal Protocols to ensure proper treatment of wind generation in regard to performance metrics when negative pricing exists.	WMS	Near Term	NPRR	Draft PRR will be prepared and distributed for review in April	Under active discussion by Nodal Wind Generation discussion group.	White paper to be presented in March
MD	11	Wind Generation and Base Point Deviation in the Nodal Protocols	Review of Nodal Protocols to ensure proper treatment of wind generation in regard to Base Point deviation.	WMS	Near Term	NPRR	Draft PRR will be prepared and distributed for review in April	Under active discussion by Nodal Wind Generation discussion group.	White paper to be presented in March

**ERCOT  
Renewable Technology Working Group (RTWG)  
List of System Operations Issues**

May 2009

Issue Category	System Ops Issue No.	Title	Description	Assigned to:	Priority	Revision Mechanism	Status	Other Ref No.
SO	1	Inventory of Wind Generation Facilities	Develop forms and collect wind turbine data from Wind Generation Resources to improve ERCOT's modeling and operations databases.	WOTF	Near Term	ERCOT Forms	Assigned to WOTF Modeling Subgroup. Currently being reviewed	WOTF 1d
SO	2	Nodal Tools to Integrate Wind Generation	Determine tools applicable to the Nodal Protocols to successfully integrate wind generation into the ERCOT markets.	RTWG	Undetermined		Reviewed at January 29 RTWG meeting through Floyd Trefny's presentation; next steps pending.	
SO	3	Wind Generation Response and SCE	Determine proper wind generation response to down balancing instructions from ERCOT and also address SCE issues.	QMWG	Near Term		Being worked on currently by QMWG; draft PRR/OGRR to be available in March	
SO	4	Smart Grid Implications for Renewable Resources	Determine how development of a "smart grid" could benefit and improve integration of renewable resources into the ERCOT grid.	RTWG	Long Term		Eric Goff and Steve Isser will develop a white paper	
SO	5	Operational Studies Related to Wind Generation	Operational studies re: Wind (ramp rate, low load situations, forecasting)	RTWG	Long Term		Walter Reid to develop a white paper to be presented to RTWG	
SO	6	Testing Reactive Capability of Wind Generation	Determine the appropriate testing methodology to measure the reactive capability of wind generation.	ERCOT Operations	Near Term	OGRR	ERCOT Operations is drafting OGRR because the current procedure is inadequate	
SO	7	Wind Generation and High System Frequency	Determine impact of wind generation on high system frequency events and develop possible solutions.	WOTF	Near Term		WOTF currently reviewing a whitepaper on governor response; a draft PRR will be developed.	WOTF 5
SO	8	Wind Generation and System Inertia	Determine impact of wind generation on system inertia and develop possible solutions.	PDCWG	Long Term		Mark Garrett to ask ROS for status update	WOTF 1e
SO	9	SCADA Control of Generator Circuit Breakers	Develop guidelines for better control of generator circuit breakers via SCADA.	OGRR TF	Near Term	OGRR	Draft OGRR is being discussed at OGRTF	WOTF 1b
SO	10	Voltage Management Practices Applicable to Wind Generation	Develop appropriate voltage management practices for ERCOT and Transmission Service Providers that would apply to wind generation resources.	RPG	Near Term		Walter Reid to develop a white paper to be presented to RTWG	
SO	11	Technology-Specific Procedures and Protocols Changes	Develop renewable technology-specific changes in existing ERCOT Protocols, Operating Guides, Interconnection Agreements and interconnection procedures to recognize unique characteristics of various renewable generation technologies.	ROS	Near Term	PRR, OGRR, ERCOT Procedures and Agreements	ERCOT developing a technology-specific procedure for wind; RTWG is considering technology-specific procedures for other renewable technologies	
SO	14	Impact of Transmission Outage Planning on Wind Generation	Examine possible ways to improve transmission outage planning to better coordinate with wind generation operations.	RPG	Long Term	PRR 795	PRR 795 was approved by the Board - Policy issues still open	
SO	15	Communications between Wind Farms and TSPs	Examine possible improvements in real-time communications between wind farms and transmission service providers (TSPs).	WOTF	Near Term	OGRR	Draft OGRR will be discussed at OGRTF (response time OGRR)	WOTF 2a
SO	23	Impact of Advanced Meters on Integration of Renewable Resources	Examine impact of advanced metering capabilities on integration and deployment of renewable resources and demand-side management technologies.	DSWG	Long Term		2009 Goal for WMS; on-going in DSWG	
SO	25	Generator Governor Response for Wind Generators	: Determine proper generator governor response requirements for wind generators in the Nodal Market design.	WOTF	Short Term		Under active discussion at WOTF; a draft PRR will be prepared	WOTF 1e
SO	26	Impact of Solar Generation on System Operations	Determine potential impact of new solar generation on ERCOT system operations through appropriate studies of solar ramp rate capabilities, forecasting of solar energy production, voltage and reactive control capabilities.	RTWG	Long Term		Steve Isser to develop a white paper to be presented to RTWG in April	

SO	28	SPS Actuation for N-0 Conditions	Determine possible changes to eliminate actuation of special protection systems (SPS) caused by variable output of wind farms.	CMWG	Near Term		John Dumas is planning to prepare an OGRR to address this issue	
SO	29	Transmission Outage Planning for CREZ	Determine ways to accommodate large amounts of transmission outages associated with the CREZ buildout while still providing adequate transmission service to existing wind farms and maintaining adequate system reliability.	RPG	Near Term		Issue has been raised at RPG but little support has been forthcoming; the Red Creek line is being evaluated	
SO	30	Application of Wind Generation Forecast to PASA	Determine how the ERCOT wind generation output forecast could be used to improve the Projected Assessment of System Adequacy (PASA).	ERCOT Operations	Near Term		To be discussed at April RTWG meeting	
SO	31	Tension Monitors on Transmission Lines	Determine the need (if any) to install tension monitors on certain existing transmission lines that will be affected by construction of CREZ transmission facilities.	RPG	Near Term		To be brought up at RPG	
SO	32	Real-Time Wind Generation Capacity	Determine the value of having a real-time value of available wind generating capacity for use by ERCOT operations.	QMWG	Near Term		Draft PRR/OGRR to be developed by QMWG	
SO	33	Real-Time Wind Turbine Availability	Determine the value of having a real-time indication of the availability of each wind turbine for use by ERCOT operations.	QMWG	Near Term		Draft PRR/OGRR to be developed by QMWG	

ERCOT

Renewable Technology Working Group (RTWG)

List of System Planning Issues

May 2009

Issue Category	Issue No.	Title	Description	Assigned to:	Priority	Revision Mechanism	Status	Other Ref. No.
SP	2	Wind Turbine Computer Models	Collect and verify accuracy of computer models for each type of wind turbine installed on the ERCOT grid.	ERCOT Planning	Near Term		Included in ERCOT's LVRT Study	
SP	3	Wind Turbine Fault Tolerance	Prepare a study of the fault tolerance of wind turbines installed on the ERCOT grid.	ERCOT Planning	Near Term	OGRR	Included in ERCOT's LVRT Study	
SP	4	Voltage Transient and Small Signal Stability Study	Update ERCOT voltage transient and small signal stability study and prepare a West Zone to North Zone transfer study.	ERCOT Operations	Near Term		Limit study is underway; the design study is still under discussion at RPG	
SP	5	Impact of Wind Turbines on System Inertia	Determine the potential impact on system reliability of large amounts of wind turbine generating capacity on ERCOT's system inertia requirements.	ERCOT Planning	Long Term		Will be undertaken following completion of LVRT study	
SP	6	Variable Frequency Transformers	Determine potential for variable frequency transformers (VFTs) to solve stability problems caused by the addition of large amounts of remotely-located generation capacity (e.g., wind generation).	RTWG	Long Term		Walter Reid/Paul Hassink to develop white paper	
SP	7	Voltage Control Process	Develop a process to better control voltage in areas with large amounts of wind generation (comment: have I described this issue correctly?)	ERCOT Planning	Long Term		Walter Reid to develop a whitepaper	
SP	8	Low Voltage Ride-Through (LVRT) Study	Prepare a study of the system reliability and associated requirements applicable to all generators for voltage ride-through capability.	ERCOT Planning	Near Term		All study results due to ROS no later than June 2010	