Southwest Power Pool

WIND INTEGRATION TASK FORCE (WITF) MEETING

December 4, 2008

Dallas Love Field Conference Center – Dallas, TX

• Summary of Action Items •

1. Send out meeting documents to group.
2. ERCOT resource to share Lessons Learned from GE ERCOT Study for January WITF Meeting.
3. Nebraska resource to share information regarding NE Wind Integration study.
4. Evaluate BAAL-00x standard changes for potential impact.

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• M I N U T E S •

Agenda Item 1 – Administrative Items

SPP Secretary Bruce Rew called the meeting to order at 9:30 a.m. After introductions of in person attendees and those participating via conference call, Bruce introduced Bill Grant, who was appointed Chairman of the WITF by the MOPC.

The meeting was attended by 18 people with Bruce Merrill (LES), Jon Iverson (OPPD), Jason Tanner (ACES), Doug Kallesen (NPPD), Jay Caspary (SPP), and Frank Bristal (Attachment 1 – Attendance List).

Agenda Item 2 – Review of WITF Charter

Chairman, Bill Grant, led the group in a brief overview of the WITF Charter (Attachment 2- WITF Charter). The group agreed that the current charter adequately summarizes the goals and objectives for the group. The timeline for this study would be to have a draft RFP available to the MOPC for the January meeting. After further discussion and learning the SPP SPS study would not be available for review until after that meeting, the WITF decided it would need to extend the draft of the WITF RFP deadline until later that date. The RFP can be submitted to the MOPC for review outside of a scheduled meeting; it was felt that the WITF study was significant to the MOPC and other items on their radar for 2009. The WITF will still focus on completing the study in 2009.

Bruce explained that we are charged to complete a 'tipping point' look at wind penetration in the SPP footprint. This means we need to determine how much wind generation we can add without causing issues. Sam Loudenslager suggested the study be a base case from which future studies and evaluations can use for SPP.

Two minor updates should be made to the Scope of Activities section on item #1:

Current state: Provide input into the execution and results of the SPS Wind Penetration Study commissioned by SPP to be completed by the end of 2008.

Proposed state: Provide input into the ~~execution and~~ results of the SPS Wind Penetration Study commissioned by SPP to be completed by the end of ~~2008~~ the Q1 2009.

Agenda Item 3 – Discussion of Existing Wind Studies

A document of known studies that could provide relevant insight into our study was distributed to the group for review (Attachment 3 – Wind Study summary). The majority of the discussion was regarding the GE ERCOT study. It is generally thought, by the group, that this was a comprehensive study and WITF needs to focus on this study and get lessons learned from ERCOT regarding this study.

The State of Nebraska is also working on a study to determine the wind needs for their area. Since Nebraska has been approved to join the SPP, we will seek to get an update on their study at the next WITF meeting.

The XCEL Minnesota study from 2003 was also briefly discussed. Bill explained this study was limited due to modeling issues related to using 4 second data.

Members of the task force were asked to review other studies for issues relative to this study and bring to the next meeting.

Agenda Item 4 – Update on SPP SPS Wind Penetration Study

A written status report from the SPS Wind Study team was distributed to the group for review (Attachment 4- SPS Wind Penetration Study). A mid January 2009 completion date for this study is anticipated; prior to the January 14, 2009 SPP MOPC meeting. Scope and models have been completed for this study.

It was discussed that ramp rates in the SPS system will be critical to this study and could significantly affect the results. It is hopeful we could get some draft results of this study to review during the January 8, 2009 WITF meeting. If not, we will schedule a meeting once the SPS results are available.

Agenda Item 5 – Develop Project Action Plan for WITF Study

The following assumptions were decided upon during this meeting:

Models: for the Base Case we will start with the 2010 models from the 2008 series and need to include CAWG and CBTF assumptions. It is assumed these beginning models will not include the future market projects for the base case. All approved STEP projects and other in-service projects for 2010 will be included.

The Change Case studies would include the Day Ahead market.

Other model assumptions:

- It was also agreed that 1 minute data would be sufficient for this study.
- Curtailments would be used in the change case but not the base case.
- Base Case models will include known reservation and traditional flows; will also bilateral schedules for impact to ATC's.
- ACE diversity could be in change case
- CBA in change case only
- Models need to be able to consider times when units are on-line but not available for ramp
- Change case needs to consider demand response
- Demand Response – use known DR for base case and add more for the change case

Ramp Rates: Three options were introduced for ramp rate options for this study; max ramp rate as bid into the market, nameplate, or average ramp rates as bid into the market over a certain period of time. It was decided that the best course of action would be to assume the ramp rates as an average ramp rate as bid into the system for the months of March – May.

Scenario Analysis: Three options for scenario Analysis were discussed; 8760 hour analysis, representative day analysis and seasonal week analysis. After a lengthy discussion it was decided to use seasonal week analysis.

Reserve Sharing Group Issues: It is assumed that RSS events will be available for loss of wind farms for over a minute or 50MW. Losses will include breaker open transmission lines and cut outs.

Policy Issues: Need to consider the National Portfolio of 20% wind penetration.

Minimum Uptime Runtimes: Need to understand unit characteristics of minimum uptime runtime data. Need to also understand the impact of self schedule deployments signals versus manual status schedule signals. Consider hibernation mode for unit availability.

Environmental Issues: There are many environmental issues and we will need to be aware of known issues and solicit others for additional items that could be factors in our study.

Agenda Item 6 – Summary of Action Items

See above.

Agenda Item 7 – Next Meeting

The next WITF meeting will be scheduled for January 8, 2009 at the AEP Offices. The meeting is scheduled to run from 8:00 a.m. – 4:00 p.m. The meeting was adjourned at 1:45 p.m.

Respectfully Submitted,

Bruce Rew
Secretary

Attachments

Southwest Power Pool, Inc.

WIND INTEGRATION TASK FORCE MEETING

December 4, 2008

Dallas Love Field Conference Center – Dallas, Texas

• ATTENDANCE LIST •

Name	System
Bill Grant	SPS
Sam Loudenslager	Arkansas PSC
Gary D. Clear	OG&E
Harold Wyble	KCPL
Tim Soles	Oxy
Walt Shumate	Shumate & Assoc.
Pete Wybierala	FPL Energy
Cesar Roda	FPL Energy
Frances Collins	AEP
Jay Lobit	Novus Windpower
Mike Wise	Golden Spread Electric Coop
Alan Myers	ITC Great Plains
Rick Walker	For The Wind Coalition
Jerry Ohmes	BPU
Ben Bright	SPP
Bruce Rew	SPP
John Harvey	John Deere
G. S-Copeland	Babcock & Brown

Southwest Power Pool
Wind Integration Task Force
Charter
October 24, 2008

PURPOSE

The Wind Integration Task Force is responsible for conducting and reviewing the studies needed to determine the impact of integrating wind generation into the SPP transmission system and energy markets. These impacts should include both planning and operational issues. Additionally, these studies should lead to recommendations for the development of any new tools required for SPP to properly evaluate requests for interconnection of wind generating resources to the SPP transmission system.

SCOPE OF ACTIVITIES

In carrying out its purposes, the Wind Integration Task Force will:

1. Provide input into the execution and results of the SPS Wind Penetration Study commissioned by SPP to be completed by end of 2008.

2. Conduct a study in 2009 of the impacts of integrating wind generation into the SPP transmission system and energy markets. The Task Force shall develop requirements for the study, develop an RFP for MOPC review and approval, assist SPP Staff in the solicitation of proposals, recommend a vendor for MOPC approval, monitor and assist the vendor in the study, report to the MOPC on the progress of the study, provide final results to the MOPC, provide recommendations on changes to the generator interconnection study process and otherwise within SPP based on the study, and work with other Working Groups and Task Forces in the performance of their tasks. The following are among the issues to be addressed:

    a. Define the limitations on the amount of wind that can be integrated into the SPP transmission system based on the current planning and operational standards of NERC and SPP and the current SPP structure.

    b. Determine the technical, standards, and/or process changes, as well as the expected costs and benefits, required to increase the amount of wind generation that can be integrated into the SPP transmission system through mitigation of the limiting factors identified in part (a) related to the following items:
        i. Transmission expansion requirements to facilitate deliveries of wind energy both within and external to the SPP transmission system and market footprint, including:
            a. Transient Stability, Voltage Stability, VAR requirements
            b. Recommendations on generation interconnect analysis, procedures and requirements for wind generation
        ii. Operating requirements

a. Consolidation of Balancing Authorities
b. Operating horizon concerns for operating reserves and regulation requirements

iii. Market design and requirements
a. Ancillary services markets
b. Day-ahead markets
c. Impact on ATC of wind generators operating in the Imbalance Market.
d. Potential changes required in the Energy Imbalance Market protocols related to wind generation.

c. Determine the expected regional diversity of wind performance for the SPP region.
i. Does the regional diversity provide any advantages in capacity accreditation, capacity margin, transmission expansion and/or operational and reserves requirements?

REPRESENTATION
The Task Force is comprised of at least 7 and no more than 12 members, including a Chairman, who are appointed by the Chair of the MOPC. Members should be experienced in transmission planning, operations, and markets. The representation should exhibit diversity in geography within SPP, as well as different types of membership. Each member has one vote and approval of business requires a simple majority of members present and voting.

DURATION
Duration of Wind Integration Studies and presentation of final recommendations to the Markets and Operations Policy Committee.

REPORTING
The Task Force reports to the Markets and Operations Policy Committee.

Study Name	Summary/Objectives/Goals	Current Status	Available for WITF	SPP Participation
GE ERCOT Study	ERCOT engaged GE to produce a study to determine the level, type, and cost of additional ancillary services that might be required to maintain reliability of the ERCOT system for increasing levels of wind generation. The GE study covered 4 scenarios: 5000MW, two 10000MW sceanrios, and 15000MW. This study did not cover issues with frequency response of the system and with large drops in wind generation in the system.	Complete	Yes	None.
SPS Wind Penetration Study	This study commissioned by SPP to lresearch the limts of wind generation that can be safely connected and operated on the SPS area of the SPP footprint.	In Progress (Jan 2009)	Yes	Requestor
NREL/DOE Eastern Wind Integration and Transmission Study (EWITS)	NREL sponsored study to evaluate the power system impacts and costs and transmission associated with increasing wind capacity to 20% and 30% of retail electric energy sales in 2024. The study areas include MISO/PJM/SPP/TVA/MAPP/NYISO/ISO-NE.	In Progress		
NE Wind Integration Study	Study commissoned by the NPP, OPPD, LES, and MEAN to look at specifically the needs of the state of Nebraska .	In Progress	Yes	Charles Hendrix
WFEC	2005 Study sponsored by NREL - In 2003 WFEC added 74MW of wind power into their area with an agreement with Blue Canyon Wind Power Project north of Lawton, OK. This report analyzes system and wind energy data recorded by the WFEC control area energy management system and evaluates the effects of wind energy on system operations.	Complete		
XCEL	Wind Integration Study Report of Existing and Potential 2003 Least Cost Resource Plan Wind Generation - This study was completed at the direction of of the Colorado PSC to assess the wind genrations impact on the Public Service system. This study includes solutions to system stability issues and reliability impacts of wind generation to long-term planning studies.	Complete	Yes	
All-Island Grid Study	UWIG Study - initated to address and report on the technical and economic issues associated with the development of renewable energy with a vision for 2020 and beyond for Ireland and Northern Ireland. Scenarios include renewable penetration ranging from 16% to 54%; installed wind ranging from 2000MW to 8000MW, and wind energy ranging from 11% to 36%.	Complete	Yes	
Danish Wind Study	Energinet.dk study to research the technical, economic market-related, and environmental cosequences of increased wind generation. The share of wind power studied varied between 0% and 100% of annual energy consumption.	Complete	Yes	
AMEC	Proposal to SPP to look at the GI process and related SPP Tariff provisions relating to proposed wind generation facilities in the SPP footprint.		Yes	Requestor

UWIG	Utility Wind Intergration Group (www.UWIG.com) -- The mission of the Utility Wind Integration Group (UWIG) is to accelerate the development and application of good engineering and operational practices supporting the appropriate integration of wind power into the electric system. This will be accomplished through the coordinated efforts and actions of its members in collaboration with wind industry stakeholders, including federal agencies, trade associations, and industry research organizations.	n/a	UWIG is a leading Wind Integration advisory group.	Jay Caspary - Board Member

Status of SPS Wind Penetration Study - 12/1/08

Progress

1. Wind power curves
    a. Wind farm sites identified and grouped by location.
    b. Wind data identified for wind farm site.
    c. Turbine type identified.
    d. Algorithms identified to convert forecast data to wind speed.
    e. Algorithms generated for site power for given wind speed.
2. Reviewing
    a. Data separated by project and groups and reviewed by hour and by day.
    b. Maximums and minimums
    c. Bias between groups and projects
    d. Averages/ standard deviations
    e. Significant changes in power output over selected intervals

Assumptions

1) Generation to be studied includes existing wind generation and queued generation with an expected in service date prior to Summer 2010.
2) Using 100 M hub height wind speed for new projects and 80 M for existing sites.
3) Some turbine types have multiple models of equal size. The power curves are dependant on the rotor diameter. One of the types was assumed and used.
4) Some turbine curves weren't complete, and some of the values were extrapolated from the existing data.
5) Wind farm locations were assumed from Potential Wind Sites map.
6) Wind data assumed to be provided as Hour Ending.
7) Where a wind farm did not fall within a site with wind speed data, the distance from multiple sites was estimated, and the data used was an average of the multiple sites, weighted by the estimated distance from the wind farm.
8) Regulation will be evaluated with and without assistance outside of SPS.
9) Study data window of February 1st through April 31st, 2004 – 2007**.**

Outstanding Issues/Data

1) Project G03-020 is listed as having GE/Mitsubishi turbines. Is there still uncertainty on the turbine, or is there a mix of turbine technologies at the site?
2) Assumptions for the wind farm geographic locations.
3) SPS load data needed for evaluation of regulation.
4) Time difference between forecasted and observed power.
5) Confirm forecasted/observed power is in W – M^2
6) Mak Nagle Requested items
    a. Net MW wind to be modeled in SPP/SPS.
    b. Wind forecast error in %.

c. Decision to commit generators based on day-ahead wind forecast and dispatch using actual wind generation or use forecast error model to add errors on top of actual wind generation.