



## TOTF Meeting Summary

Feb. 22-23, 2012

### **TOTF Members Attending:**

**End Users:** Fred Plett

**Generation Owners:** Michael Goggin

**NGOs:** Ed Pfeiffer, Matt Schuerger

**Public Power/TDUs:** Dustin Betz, Anie Philip

**States:** Diane Barney, Hisham Choueiki, Stuart Hansen, John Stovall, Craig Taborsky

**Transmission Owners:** Randell Johnson, Evan Wilcox

**Other Suppliers:** Bob Stein

**Canada:** Rob Sinclair

**Ex Officio:** David Meyer

**EIPC Members:** David Whiteley (Exec. Dir.), Dan Fredrickson (Co-Chair), Jeremy Bennett, John Buechler, Samrat Datta, David Duebner, Stan Doe, Flora Flygt, Dan Fredrickson, Chuck Liebold, Kerry Marinar, Joe Payne, Zach Smith, David Till

Other attendees and Webinar attendees listed below.

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### **DAY 1: February 22** Recording:

<https://eipconline.webex.com/mw0306ld/mywebex/default.do?siteurl=eipconline&rnd=0.5952572847722672>

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#### **1. Updates since March 9, 2012 TOTF Webinar (David Till, TVA, see [presentation](#))**

- Most of action items noted in previous TOTF meetings have been completed
- PAs are making note of deactivations that are treated as retirements in the SSI; summary should be available when cases are available
- PA Transmission Options work is running behind schedule approximately two weeks, and so load flow data due dates have been adjusted.

#### **2. Updates to Phase 2 Schedule (Dave Whiteley, see [presentation](#))**

- Currently in Week 8 (Actively engaged in Steps 9-12 of [Detailed Schedule document](#))
- PAs have developed the data set for each scenario and set up initial load flow cases; Scenario 1, Block 1 case is complete for each region
- There will be three build-outs, one for each scenario. There will be additional load flow cases developed to represent Block 13 load levels in Scenarios 1 and 2. The build-out for those scenarios will be tested against both Block 1 and Block 13 load level load flow cases.
- Gap analysis on Scenario 1 has started, others to follow
- Steps 9-11 should continue through 3/2/12, about 10 days behind schedule
- Third TOTF meeting will allow opportunity for input on initial results of Step 13 – the initial set of new transmission for each scenario.
- EIPC will try to provide specific dates of release for future data; difficult to predict whether the model will solve quickly or will require additional work to solve

#### **3. Updates to load flow data (Jeremy Bennett, SOCO, Chair of SSLFMWG))**

- New generation additions and deactivations are still in draft form and will continue to evolve; not all PAs have completed all the scenarios.
- Demonstrated how to navigate the input data spreadsheets; changes will be noted as the spreadsheet is updated in the future.
- Discussion:

- Repowering coal to NG assumes the full cost of a new NGCC unit; TOTF members can identify repowering sites by looking at places where coal units are deactivated and new CCs are built at the same site.
- Wind will be dispatched according to NEEM results, may need to be prorated across the installed wind capacity. TOTF member expressed concern that the dispatch assumptions will drive overbuilding the system and suggested the need to look more closely at how NEEM data is translated into dispatch.
- Reviewed how deactivation units were selected. See the [Deactivation](#) memo. Deactivations do not represent decisions of PAs.
- Maps showing additions and deactivations graphically (from presentations that follow) will not be posted but will be shared with TOTF members on request.
- SOCO Region (Jeremy Bennett):
  - Scenario 2 SOCO additions are primarily biomass facilities (80 MW blocks of generation, some clumped together at various sites)
  - Scenario 3 SOCO additions include 8,000 MW of nuclear
  - NG pipeline capacity was not considered in the placement of new CCs; EIPC PAs acknowledge that new CCs would require expansion of the existing NG pipeline capacity
- SPP (Jason Speer):
  - 3 NEEM Regions (NE, SPP\_N, SPP\_S)
  - Scenario 1 - additions are primarily wind in Scenario 1; used previous SPP and other studies of wind to help guide siting (e.g. Economic Studies Working Group, NREL data set and IRP process)
  - Addition of 765 kV conceptual lines is needed to move wind from western to eastern part of the region; during Phase 1, SPP coordinated with Entergy to match the new 765 kV at the borders; not a lot of interregional coordination has taken place yet and termination points are still under study.
  - Scenario 2 – less wind but same 765 kV transmission system to support the wind
  - Scenario 3 – (BAU) much less wind and fewer deactivations
  - SPP had included approximately \$8 billion of additional internal high-level transmission (collector system) and the information shared today is the next level of detail of that collector system.
- Entergy (Joe Payne):
  - Scenario 1 – shut down every coal plant and some oil and gas units; had some partial deactivations; did not add much new capacity to the region; landfill gas and PV added primarily near Texas based on actual interest in these technologies.
  - Scenario 2 – deactivated a few coal units per NEEM results and placed new generation on deactivation sites.
  - Scenario 3 – very similar to Scenario 2.
  - Entergy is likely to be a heavy importer of power, has not looked at the interchange among regions yet.
- NYISO (Zach Smith):
  - All scenarios required significant new wind capacity upstate; most other capacity additions were sited based on interconnection queue information, including those not moving forward at this time.
  - Partial nuclear capacity added as uprates already planned in the region. Some units which were not in SSI but already planned were added at the planned sites.
  - Specific locational requirements for lower NY were not taken into account in NEEM or in locating new generation. It is outside of the scope of this analysis to apply those criteria.
  - Took into account announced retirements, but that was not enough to accommodate all the coal deactivations called for in Scenario 1.
  - Scaled the CC deactivations across all units unless it seemed that the level of scaling would result in unrealistic dispatch.
- TVA (James Normansell):
  - Scenario 1 - Deactivated entire coal and CT fleet; new CC capacity located where coal was deactivated; two CC plants were already included in the SSI

- Scenario 2 – primarily added biomass at coal deactivation sites without consideration of available biomass fuel
- Scenario 3 – less coal, some partial deactivations; some CC and CT additions at deactivation sites
- Nuclear – 2 additions in all Scenarios, one was included in SSI
- Landfill Gas – based on potential sites identified
- VACAR (Mark Byrd, Progress:):
  - Scenario 1 – added 8000 MW of new nuclear
  - Scenario 2 - Drew on prior wind study in NC to site on-shore wind; 28,000 MW of off-shore was beyond what had been studied; located it near on-shore wind
- PJM (Chuck Liebold):
  - Scenario 1 – massive amounts of deactivation and new additions; followed procedure for coal deactivations; in smaller units, deactivated older units first. Wind siting was a special category, consulted recent wind integration study patterned after EWITS.
  - More wind in Scenario 2.
  - Map needs to be updated to include a missing nuclear deactivation.
  - Solar was sited based on NEEM specification.
- MISO\_WUMS (Kerry Marinan):
  - Followed procedure for deactivations and additions
  - Wind: consider generation recently installed or under construction, then sites that are currently under study, then sites that have been withdrawn from MISO Generation interconnection queue, and finally sites that have an annual wind speed of 4.4 m/s or greater.
- MISO (Adam Solomon)
  - MISO\_W, MISO\_MI, MISO\_IN, MISO\_IL
  - Wind Siting – used recently completed Multi-value Project and Regional Generation Outlet Study as resource for siting; installed 500 – 1000 MW wind farms because of the large amount that had to be added.
  - Scenario 1 had the most significant additions and deactivations; deactivated 460 units and sited 110 new units, mostly wind.
  - RGOS transmission overlay was used for the western MISO region
  - Considered brownfield sites in siting new capacity other than wind; may not have been applied exactly the same in each MISO region.
  - Used existing buses in siting the new generation, but will consider the addition of new buses in the future.
- MAPP-US and Canada (Dan Fredrickson):
  - A lot of overlap with MISO\_W but still had to do more wind additions in North and South Dakota.
  - Added 8600 MW of wind in Scenario 1 in 200-MW units with a 345 kV collector system; next step will be collaborating with neighbors to rationalize the interconnections.
  - Relied on interconnection queues, wind resource maps; sited near existing transmission.
  - A lot of ND, SD coal was deactivated which has supporting transmission.
  - MAPP-Canada (Saskatchewan and Manitoba Hydro) also had CC new additions sited on coal deactivations sites.
  - 300 MW of planned wind in Saskatchewan Power; 3400 MW of new hydro in Manitoba; plans for collector systems and additional DC, there is substantial DC currently to move existing hydro from north to south in Scenarios 1 & 2
- NE-ISO (Akarsh Sheilandrananth):
  - Have not yet located additions and deactivations on a map; data still being updated
  - Added transmission to accommodate wind additions (“2 GW overlay”) and voltage regulation to get the case to solve, will be removing these elements incrementally to see if case will hold up; transmission overlays include 2 north-to-south 345 kV lines and 2 collector systems which together should accommodate up to 2 GWs of wind or more.
  - Scenario 1 - 5000 MW of wind sited in the north (primarily ME) and based in large part on the interconnection queue; deactivations primarily in MA.

- Scenario 1 – Added 2,050 MW CCs, most were already in SSI; 334 MW CTs, 119 MW landfill gas, 264 MW of PV.
- Still testing the overlay and aligning additions and deactivations with NEEM results.

#### **4. General Questions (after breakout session):**

- EIPC PAs agreed to provide the incremental (beyond SSI) transmission additions considered to solve regional load flows in a spreadsheet and a map, to be updated as the cases are refined. The PAs invited TOTF input on these proposed solutions
- PAs will begin to collaborate on the interregional flows and transmission solutions.
- A TOTF member suggested that PAs agree on the same approach to deactivations and additions such as PJM's decision to deactivate the oldest units first in the less than 200 MW category. A PA responded that there are a number of different and legitimate approaches, but choosing one over the other would not make an appreciable difference in the outcome. The additional effort may not be worthwhile.
- Maps showing clumps of generation are not necessarily indicating that all the new capacity is located on the same bus, which a TOTF member was concerned about. It would be ideal to spread it out if there was a confluence of buses, wind resources and NEEM restrictions to support it. In reality, new capacity will enter incrementally and new buses will be built to accommodate it. The magnitude of new capacity will likely overload the system whether it is located in clumps or distributed. Need to look more closely at the transmission fix, which may inform the generation location decision. PAs are looking for suggestions. TVA noted that it currently has up to 4,000 MW on a single bus, to the TOTF member's concern.
- Are there cases where generation is being built by two regions in the same state, e.g. PJM and MISO building wind in IN? PAs responded that it is possible and they will need to resolve situations like this when they get to the transmission solution stage.

#### **5. Update on Model Building Efforts**

- Most of the information on deactivation and additions has been available for one week. PAs are seeking input from TOTF on the location of deactivations and new capacity.
- Each PA has combined that data with load data to enter into the regional load flow model; then they will enter the solved regional cases in an EI-wide load flow model.
- PAs have completed Scenario 1, Block 1 but in draft form; may have Scenario 3, Block 1 and Scenario 1, Block 13 in the next day or two; will focus on fully completing Scenario 1, Block 1 before providing results of other scenarios; None of the PAs have tackled the interregional interchange.
- The transmission topology will be driven by either Block 1 or 13 but will meet the needs of both.
- EIPC will release load flow models when they get to a 'significant' stage of the process rather than at each step in the process.
- Block 1 is a 10-hour block.
- NEEM had wind shapes which drive wind dispatch. PAs agreed with the TOTF at the last meeting that it would be appropriate to run some sensitivities in less-than-peak (Block 13) to test a range of wind capacity factors used in PA studies.
- Several TOTF members raised concern about 90% wind capacity factors being used to characterize the dispatch of widely dispersed wind resources. In reality, some wind is curtailed and transmission owners do not build transmission to meet nameplate capacity. Wind's contribution to the reserve margin is only 15%, however the group did not conclude how that is related to the maximum dispatch in peak hours.
- It was noted that sensitivities on Block 13 are not EI-wide; these are to be conducted on a regional basis to determine transmission needed within wind-rich regions.
- Since wind dispatch is also designed to meet state mandates, planners will need to be careful curtailing or it will not meet the mandates.

#### **6. Update on Less than peak case document (Dave Whiteley)**

- Reviewed changes to the document to more accurately describe Block 13 analysis. No objections or comments were raised. The revised document is to be posted on the [Phase 2 Resources page](#).

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DAY 2 – February 23<sup>rd</sup> Recording:

<https://eipconline.webex.com/mw0306ld/mywebex/default.do?siteurl=eipconline&rnd=0.5952572847722672>

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## 1. Update on Load Flow Analysis (Jeremy Bennett)

- Compared the interregional load flow from NEEM (an economic model) to the initial load flow from the recent analysis (a physical transmission flow model) and highlighted some differences in the flows.
- Constraints in the transmission system are the result of the physical load flow analysis. Overloads are only 345 kV and above and include thermal constraints only.
- Next step is to develop transmission options to address these constraints; can also use the percent overload to identify the scale of the problem and the scale of the fix.
- The net import or export of each region in the load flow will equate with NEEM, but it may not go to the same regions.
- For exporting areas, PAs included the deactivated units; A TOTF member raised a concern this could lead to double capacity and more constraints than realistic; deactivated units will be removed by the next step.
- The transmission solutions for interregional flows may not be the same hardened limits envisioned in NEEM, but those will be tested. TOTF member suggested that PAs should look at the general intent of flows from NEEM as a guide.
- EIPC explained the process to address constraints and will be documenting this for stakeholders:
  - Will use an iterative approach to do a high-level screening of various solutions.
  - The PAs took the case built last week and determined the difference between the regional transfers today and the 2030 load flow (e.g. Entergy is currently a net exporter and is projected to be a net importer in 2030, Scenario 1); created a subsystem file that shows the net change in the generation (what was deactivated and what was added) between the two periods.
  - To assess the transfers, PAs will fine-tune the subsystem files to identify only the net change in generators.
  - In a single simultaneous transfer analysis, PAs conducted a contingency on every branch 300 kV and above in the region to identify the major constraints; some of the constraints listed in the spreadsheet are segments of the same line.
  - PAs confirmed that the single contingency analysis planned should capture the impacts of major shifts in generation under Scenario 1, including the loss of a single transmission line.
  - PAs added transmission and pseudo-generators to make the regional cases solve which was necessary, but PAs will review those additions to make sure they do not influence the interregional transfers.
- Reviewed the constraints on maps for PJM, MISO, MISO\_WUMS, NYISO, TVA and Entergy (see recording for details).
- Several TOTF members asked to see the maps with the SSI designated and adjustments made to get to the starting point (E.g. PATH line in PJM was removed and other projects now under construction were added). In addition, TOTF members requested that the additions of transmission and pseudo-generators added to make each regional case solve be noted in map or spreadsheets. PAs will take this under advisement as the best way to present this information.

## 2. Next Steps:

- Next couple of weeks will focus on Scenario 1, Block 1 and Scenario 1, Block 13.

- Each PA will fine-tune deactivations and new additions and start to address the constraints before considering interregional transfers to make sure they can meet their internal load.
- Will continue to work on Scenarios 2 and 3 in the background.
- Next TOTF meeting– first day will be a working group session running the load flow model to jointly explore the options. PAs will have proposals prepared for TOTF to consider.
- Load flow model will be released to those with CEII clearance in advance of the next meeting. Requests should go to TVA.
- PAs will continue to refine subsystem files to prepare for assessing interregional transfers at next meeting.
- Begin in next couple of weeks collecting the data for the more robust contingency analysis.
- Dave Whiteley will work with PAs to get state-by-state data requested.

**3. Future Dates to remember:**

- March 6<sup>th</sup> – SSC webinar, to bring SSC Representatives up to date
- March 8<sup>th</sup> –TOTF Webinar
- March 22 – TOTF Webinar (tentative)
- March 28-29<sup>th</sup> – TOTF meeting in Memphis (CEII clearance required for Day 1)
- April 18-19<sup>th</sup> SSC meeting in Omaha
- May 15-16 - TOTF meeting in Memphis

**NOTE:** EIPC confirmed that 1<sup>st</sup> day of next TOTF meeting, Mar. 28<sup>th</sup>, will be a working session for CEII-cleared officials and stakeholders only to work jointly on possible solutions. No webinar access will be available; PAs will provide load flow cases in advance for those who want to run the cases themselves and develop their own solutions.

TOTF Meeting February 22-23, 2012: Other Meeting Attendees

First Name	Last Name	Organization/Company	Sector
Ed	Tatum	Old Dominion Electric Cooperative	Generation Owners and Developers
Wil	Burns	NGOs	NGOs
Andy	Oliver	Land Trust Alliance	NGOs
Samir	Succar	NRDC	NGOs
Ellen	Vancko	Union of Concerned Scientists	NGOs
Syed	Ahmad	FERC	Other/don't know
Jim	Busbin	Southern Company	EIPC
Caitlin	Callaghan	US DOE	DOE
Emily	Fisher	Lawrence Berkeley National Lab	DOE
Jason	Fordney	Platts	Other/don't know
Doug	Gotham	Purdue	States

Bob	Pauley	EISPC	States
Stan	Hadley	Oak Ridge National Lab	States
Marya	White	EISPC	States
David	Meyer	USDOE	DOE
Jerrod	Moll	Southern Company	EIPC
Jeffrey	Webb	MISO	EIPC
Ken	Wei	New York ISO	EIPC
Jim	Snow	EIPC	EIPC
Ian	Grant	TVA	EIPC
Barry	Huddleston	Clean Line Energy Partners	Transmission Owners and Developers
King	Look	Con Edison	Transmission Owners and Developers

TOTF Meeting February 22-23, 2012: Webinar Attendance

First Name	Last Name	Company
Lee	Adams	
Tami	Anderson	
Denis	Bergeron	
Garrett	Bissell	
Terry	Black	
Mark	Byrd	Progress Energy Carolinas
Caitlin	Callaghan	US DOE
Jim	Calore	PSE&G
Keith	Daniel	
Ben	D'Antonio	
Ed	Ernst	
Emily	Fisher	
Jason	Fordney	
Jonathan	Forward	New York State Department of Public Service
Don	Gates	
Thomas	Gentile	Quanta Technology
Yonas	Habtemichael	PJM
Erin	Hogan	
Robin	Lafayette	ISO New England
Pranaya	Neupane	JEA
James	Normansell	

Sunil	Palla	
Bob	Pierce	Duke Energy
Eric	Runge	Day Pitney LLP for NEPOOL
Maryam	Sharif	
Akarsh	Sheilendranath	
George	Smith	NESCOE
Adam	Solomon	
Jason	Speer	
Samir	Succar	
Xiaohuan	Tan	Quanta Technology
Roy	Thilly	
Brantley	Tillis	
Ellen	Vancko	
Jerome	Vinson	TVA
Frederico	Von Pinho	
Michael	Wegner	Kansas Corporation Commission
John	Zarzycki	NJBPU
Samuel	Zewdie	