

South Texas Plant Units 3 & 4

Date: December 8, 2010

Time: 10:00 am PST

Attendees:

| Name | Title | Agency/Organization |
|--------------------|--------------------------------------|---|
| Michael J. Scott | Staff Scientist (scribe for notes) | Pacific Northwest National Laboratory |
| George V. Last | Scientist | Pacific Northwest National Laboratory |
| Warren Lasher | Manager, System Assessment | Electricity Reliability Council of Texas |
| David J. Bjornstad | Scientist | Oak Ridge National Laboratory |
| Andrew Kugler | Senior Environmental Project Manager | Office of New Reactor Programs, Nuclear Regulatory Commission |

Call Subject: 2010 Electric Reliability Council of Texas] (ERCOT) Electricity Demand and Supply Forecasts and Related Topics

Purpose of Call: Develop additional background understanding of ERCOT electricity demand and supply forecasting methods as they may relate to comments NRC received concerning the need for baseload power in Texas.

Call notes: [bracketed items are clarifications and edits by the author]

1. There have been several recent changes in the level of funding for improved energy efficiency in Texas. About \$326 million in Federal stimulus funds in [American Recovery and Reinvestment Act of 2009] ARRA allegedly were spent in Texas on low-income weatherization (possibly 40-50,000 homes?). The State Energy Conservation Office (SECO) expanded its Loan Star program to \$150 million; there were several millions in additional federal block grants, and now we have pilot Property-Assessed Clean Energy Programs (PACE). Do you take any of this into account? If so, how?
 - ERCOT has been making an effort in the last 4 months to better understand the impacts of such programs, including working with SECO to try to understand how the funds are being spent. Initially, it appears that that the impact is relatively "small," although they think that the impact might be as large as 200MW (illustrative number) over 4-5 years. The impact would be less than the difference between a hot summer and a mild one.
 - So far they have not included in their forecasts because of the low quantitative significance.
 - Concerning ARRA they have been working with the Texas Department of Housing and Community Affairs (TDHCA) to try to understand the impacts there. The impact has been good for the residents (they get a better house) but limited as far as energy savings are concerned-maybe 50-100 MW. The reason is that much of the money has to be spent on what amounts to repairs—in order to have \$200 in insulation to work, you sometimes need to fix (or even replace) the leaky roof (I suggested maybe \$7000 for the roof). Another example is that the resident was not running an old-broken-inefficient A/C unit, but they run the new

replacement. So although the new one is more efficient, the amount of energy used actually goes up.

- PACE is potentially important but it's still a relatively unformed pilot program, and it's unclear what it will save.
 - Austin Energy and San Antonio CPS are taking energy conservation seriously and in the case of Austin for a long time, but their overall impact has been small so far.
 - ERCOT is looking to the Texas A&M Energy Systems Laboratory to help quantify the impacts of these programs, since they are looking at it anyway for the State Implementation Plan (SIP) [for state air quality] and Clean Air Interstate Rule (CAIR) programs [and successor programs] for air quality reasons.
2. New building codes have been adopted in Texas, apparently to take effect in 2011. We understand that Texas is a home rule state and that these statewide rules would have to be adopted at the local level. Have you factored them into the 2010 forecast? If so, how? If not, have you thought about their effect?
- There is little detailed information available so far on what the new building codes may do. It is clear that they will affect only new buildings and will take some time to have an impact. They have not included in their forecasts. Eventually they will have to find a way to adjust the econometric forecasts so that the portion of savings not captured in the econometrics is accounted for.
3. Are the energy efficiency goals of municipal utilities such as San Antonio, Austin, and El Paso or of public utility districts like Pedernales Electric and Bluebonnet Electric factored into the ERCOT forecasts? If so, how? Do you have a feel for their effect on demand?
- They haven't seen any impact in the historical loads. The impact is pretty limited and hard to find. They see the goals, know the current impact is pretty small, and note that it is difficult to see how the goals will be achieved. The programs are ramping up, and they have questions about the extent to which these programs are already captured in the forecasts.
4. HB 3693 programs are shown in the 2010 forecast at 242 MW per year constant through 2015. Is this the [Public Utility Commission of Texas] PUCT utility rule that requires 20% of load growth be reduced by energy efficiency? If so, it seems like this would be a bigger and increasing number. Also recent PUCT actions effective Dec 1 have increased the value of the utility programs to 25% of load growth in 2012 and 30% in 2013. How will that be handled?
- The existing flat estimate 242 MW per year for the impacts of the existing 20% program is intended to be the incremental amount of conservation not captured by the econometric model. ERCOT was not able on the call to provide information on how exactly the number was calculated. They believe that as time goes on, this value should decline as the econometric aspect takes over.
 - They regarded the new PUCT goals of 25% savings on load growth in 2012 and 30% after 2013 is ambitious. [The implication of 30% savings over and above the econometric estimate was about 3000 MW by 2020.] They believe that no more than about 1000-2000 MW is possible and do not see the level of commitment necessary to produce the savings implied by the goals. The costs go back to the

utility customers through rates. But the “savings” are deemed savings (e.g. a CFL is assumed to save a certain amount of electricity), the utilities are credited for making certain dollar investments, and there is no rigorous process to track whether the deemed savings actually occur.

5. ERCOT recently released a new study showing that [Electric Load Carrying Capability] ELCC of wind energy should now be 12.2%. Is that going to be the new figure? To your knowledge, is all of the wind energy a “must-run” resource if it is available?

- The latest study is one of a series that look at ELCC and reserve margin together. The Board of Directors of ERCOT is free to accept, reject, or modify the ELCC and reserve margin as they choose. Their first study produced a range of reserve margins from 10%-15%, and they compromised in the middle with 12.5%. Originally they based ELCC on wind availability during peak demand hours and specified ELCC at 2.9%. In a 2006 study that evaluated ELCC for wind and Loss of Load Probability (LOLP), much new capacity was assumed to be gas. The reserve target was calculated at 13.6% if coal was assumed and 12.5% if gas was assumed. They stuck with 12.5% for reserve margin. ELCC was calculated at 8.7%, and that was what they adopted.
- The latest study of LOLP with wind in the system at current demand calculated impacts the same way as in 2006 but did more simulations. Target reserve margin was calculated at 13.75% and ELCC at 12.2%. At its November 16, 2010 meeting the Board adopted 13.75% reserve margin but stayed with the 8.7% ELCC.
- They noted a flaw in the calculation of 12.2% ELCC. Load data in the study was not correlated with wind data. Had it been time-stamped so that the correct hours were lined up, the loss of load probability would have calculated differently and the ELCC would have fallen.

6. How are the forecasted values of the planned installed wind resource figured into the forecast? At the existing ELCC of 8.7%, it looks like the wind resource 115 MW in the 2010 ERCOT forecast would be about 9100 MW in 2014. We are using a planning figure from the [Competitive Renewable Energy Zones] CREZ study of 18,456 MW for 2020. We recognize that it could be bigger, since it doesn't look like coastal wind or offshore wind was included. What credibility do these estimates have in the ERCOT forecasting procedures?

- They thought that using the CREZ study value of 18,546 MW was a good planning figure for our work. They noted that with 2010 to 2012 loads, the system could accommodate about 15,000 MW. Beyond that, some sort of compensating technology (quick-start units, system inertia units, or storage) would be necessary.
- As the load increases, it is possible to accept more wind.
- Interest in wind remains strong, but appears to be less strong than it was 3 years ago (incentives and transmission constraints are issues). Fewer people are requesting interconnection information right now. Some are waiting to see how the Panhandle development plays out before committing. New resources are more consistent with peak demand. There are 38,000 MW of wind in the interconnection process. A lot of parties are new parties (different stages in development- a lot are now the land owners).

- Last monthly update for wind installed was 10,475 MW (9,467 operational). 1,008 signed contracts for [Interconnection Agreement] IA.
 - The next wave of development will probably be in the Panhandle. The resource is very strong and it will represent a better mix of geographic diversity than Southwest Texas. In South Texas, there is room for about 1,500 MW. Above that very costly new transmission would be needed
 - In the CREZ hearings, wind would not impact nuclear. From a price standpoint, wind would imply a de-commitment of coal in the “off” months, and natural gas would be used on peak. This would actually raise the price of electricity.
7. Supposedly, there is a PUCT rule being published tomorrow (Dec. 9) requiring a non-wind Resource Portfolio Standard (RPS) of 500 MW. The 2010 forecast planned non-wind units with signed IA and air permits 0 to 4,059 MW by 2015. Is any non-wind RPS factored into the non-wind portfolio? How should it be handled?
- 500 MW is a guess, partly depending on the prospects for energy credits for non-wind developed after 2005, 2007. For example a there was a new solar farm about 2-3 months ago, which probably would get incentives. Older projects might not. A lot of solar would be downtown. There would be congestion problems with biomass in East Texas.
 - Must-run is misleading. They curtail wind all of the time. There is more wind capability than transmission can take. They are limited to about 6,700 MW at present. The trading prices are negative some of the time at some nodes.
8. How are the effects of combined heat and power (CHP) programs of the Texas CHP initiative handled in the ERCOT forecasts?
- They believe CHP could be important but have not quantified it
9. We have rules of thumb from elsewhere in the country that suggest baseload is about 35%-40% of peak power. In Texas, it has been estimated that the percentage of generation that is “baseload units” is more like 25%-30%. Are these two estimates in conflict? What is the likely best way to estimate baseload power for Texas?
- They don't try to calculate baseload as a percentage of peak, or percent of hours from a load duration curve, because the hours are not time-connected and this gives misleading picture of the viability of different generating plants. When available (strongest in March-April-May, October, middle of the night), wind could some push coal off the system even though it's not baseload.
10. Has ERCOT been tracking efforts to upgrade the firm delivery capability of wind and solar? What have you found that informs forecasts?
- Compressed air storage is a hard sell. It's designed mainly for a situation where there is an overabundance of off-peak power. But the existing system can ramp up as necessary.
 - Another question is where to put the storage. Do you put in west Texas, where the price goes negative, but the geology is not easy? Or do you put in East Texas, where you have the storage capability, but maybe not the price problem?

Maybe with more CREZ lines and more wind, it will make more sense. Currently, batteries make better sense.

- Compressed air storage also currently needs natural gas during the energy recovery process. The situation may improve with adiabatic systems.

11. How does ERCOT account for potential plant retirements in the planning process, either inside or outside of the demand forecast?

- They look at the potential but do not include it in their forecasts. They get a 90-day notification of retirements, and direct that some plants become “must-run” for system operational requirements.
- They expect a lot of steam turbine gas would retire.
- There is a new NERC study of potential retirements based on EPA environmental regulations (316B entrainment, Clean Water Act, ash, mercury, CAIR). About 5,000 MW was included in ERCOT region.