



2010 ELECTRIC RESOURCE PLANNING PUBLIC PARTICIPATION PROCESS

Prepared: 5/4/2010

SUMMARY OF APRIL 23, 2010 PUBLIC PARTICIPATION MEETING

Tri-State Generation and Transmission Association's (Tri-State) second Public Participation meeting was held on Friday April 23rd, from 8:00 am to approximately 12:30 p.m. at Tri-State's headquarters building in Westminster, Colorado. The meeting was previously noticed through Tri-State's Website, regional newspapers and various Cooperative member publications.

The meeting was attended by approximately 40 members of the public. The prepared content of the meeting included presentations by Tri-State's Fred Stoffel, Mike Stortz, Robert Wolaver, and Kevin Cox. The PowerPoint presentations made by Tri-State are posted on Tri-State's Website. Paper copies of the prepared presentations were provided to the meeting attendees.

Fred Stoffel, Energy Resources Strategy Coordinator, provided an overview of the day's agenda and went over the purpose of the Monday, April 26th meeting for developing a meeting agenda for the third public participation meeting to be held on Wednesday, May 19th. He also discussed the formal communications list for the participants and addressed the process Tri-State will use to respond to questions.

Mike Stortz, Long Range Load Forecasting Manager, provided an overview of the Tri-State's load forecasting schedule, information about the composition of the 44-Members' annual and seasonal load patterns and trends, in aggregate and broken out by region. He discussed the load forecasting process and the modeling approaches used for the various customer classes, including the statistically adjusted end-use model. He also discussed how Tri-State incorporates Demand Side Management and government efficiency standards within its modeling.

Rob Wolaver, Senior Manager, Energy Resources, discussed Tri-State's obligations to its Members and others, its planning objectives and the various usages of Tri-State's completed resource plans. He discussed items included in the last resource plan submitted to the Western Area Power Authority (Western), as well as the actions Tri-State has taken since the last filing in February 2007. He provided an overview of the resource planning calendar and internal process flows as well as the resource acquisition processes used by Tri-State. He stated that Tri-State is using a 20-year resource planning period and 6-year resource acquisition period. He presented information related to Tri-State's existing resource stack, 20-year load and resource balance and the load duration curve, under basic planning assumption. The information showed that Tri-State does not need capacity resources during the

resource acquisition period for firm load service, but will need additional renewable generation for compliance with Renewable Portfolio Standards.

Kevin Cox, Resource Planning and Analytics Manager, discussed the tools and inputs Tri-State uses as it moves through the expansion planning, production cost modeling and economic modeling processes. He provided information regarding Tri-State's existing aggregate capacity and energy profiles, as well as specific profiles of Tri-State's generation fleet including base load, intermediate peaking and renewable resources. He described renewable resources attached to Member systems. He provided summary information regarding generic resource types and costs that will be used in Tri-State's expansion plan modeling. He provided an overview of Tri-State's long-term purchases and sales contracts together with a summary of the effects of changes in such contracts over the resource planning period. He discussed the sources for future electric energy, natural gas and coal prices that Tri-State will use to model certain planning scenarios.

Mr. Wolaver made a second presentation directed at the assumptions, scenarios and modeling that Tri-State will undertake. He discussed the importance of assumptions for modeling, as well as their limitations. He discussed the assumptions with regard to Tri-State's needs assessment and provided information regarding certain financial factors such as inflation rates, borrowing costs and escalation factors that will be incorporated into the modeling. He provided an example of how Tri-State will construct a set of assumptions that comprise a scenario to model. He provided a draft matrix that will be used to compose alternative scenarios and provided a list of scenarios that Tri-State anticipates modeling in preparation for the June 10th public participation meeting.

Following are some specific comments made by the presenters and related questions and comments:

Load Forecasting

Tri-State has a defined 2-year planning process. The process differs in even and odd years.

A large part of commercial load is related to motor loads. When Nexant performed its energy efficiency study, it reallocated loads from the commercial to industrial class.

Tri-State grows about 361 GWh per year. Tri-State's growth is more linear than compound. It grows the same number of GWhs per year; not the same percent growth from year-to-year. That is declining over time.

Eastern Colorado is growing at 134 GWh per year. About 2% per year.

Western Colorado is growing at 111 GWh per year. There have been very large gas processing loads in recent years.

New Mexico shows a large dip because of a mine closing. It's growing at 63 GWh per year, about 2%.

Wyoming is showing large growth, due to oil production.

Nebraska is very sensitive to weather because of its irrigation load.

Monthly patterns:

Large irrigation loads in Eastern Colorado.

Western Colorado is fairly constant.

New Mexico shows less weather variation, but has a lot of heating load.

Wyoming has a fair amount of irrigation in the east and large industrial loads in the west.

Nebraska has very low industrial and commercial load. Load factor during the summer is more than 90%.

Load forecasts are done for each of the nine classes listed in the RUS classification. Forecasting then pools the models for each Member and finally pools to the total for Tri-State.

Questions

Q. What is projection of annual growth rate?

A. We generally have a linear growth rate. We grow about 360 GWh per year, which is now about 2.1 to 2.2%. It was higher in the 1990s. In our years it is 1.8%.

Q. What happens to irrigation pumping load in view of limited water?

A. We have had drilling restraints for new water wells since the 1990s. There has been conversion to electric pumps from alternative fuels.

Some wells have dried up, but some have come back. We have not accounted for long term shut-ins of wells.

As gas prices have changed some customers have gone back and forth between electric irrigation pumps and using fossil fuels.

Q. Is the list of types of large customer accounts shown on Slide 29 for Tri-State or for its Member Co-ops?

A. The list shows customers that are served by the Members. Tri-State is a wholesaler and does not directly serve end-use customers.

The utilities category includes water utilities, sanitation districts and some wind farms.

Q. How much information does Tri-State's central services organization provide to individual Members? Is there sharing of information by Tri-State to the Members?

A. Tri-State does not itself share specific information between Members. Trend information is provided to the Board of Directors. Tri-State does develop specific products to benefit all Members that are based on the trends.

Q. How is irrigation load forecast?

A. We look at historical trends. We look at precipitation and growing degree-days by month. There's a lot of variability. In the 1980s and 1990s there were trends showing improvements in technology that reduced usage per account, but this seems to have reached saturation. Now there are no new wells in some areas of the service territory and growth results from conversions to electric from other engines, gas or diesel.

Q. Does Tri-State have information on specific trends regarding the impact of DSM programs over the years?

A. No. We don't have direct access to end user meter data so that we don't know the reductions of specific programs. We see aggregate impact of measures, but do not have clear information on local programs.

Q. How is the load forecasting process split between Members and Tri-State?

A. Tri-State does the main modeling. We get the basic data from Members. Tri-State takes that data and models for load growth. It then sends the forecast to the Members to review. There is a back-and-forth process. The managers and Boards of Directors of each of the Members ultimately approve the forecasts.

Q. Is forecast modeling done on a member-by-member basis?

A. Yes. It's done by Member, by each of the 9 RUS classifications, so there are actually 9 times 44 forecasts.

Q. How will the results of the Nexant energy efficiency study be incorporated?

A. The results will be included when we construct the different scenarios to be modeled.

Q. In the last Western IRP, Tri-State used the high load growth scenario for the development of its Action Plan. Is Tri-State planning to use the high case in this process?

A. We intend to model Low, Medium and High growth scenarios.

Q. How do actual sales in 2009 compare to the forecast from several years ago for 2009?

A. There were a lot of gas field pumping conversions in previous forecasts. Some of that growth has not materialized. The recession has had an impact. The current forecast shows dampening of sales compared to previous forecasts. The number of new accounts added each year has diminished.

Q. There was a suggestion that Tri-State provide a graph showing actual sales compared to previous forecasts.

A. This will be taken under advisement.

- Q. How does the energy forecast translate into demand growth?
- A. Rob Wolaver's presentation should answer this question. We can provide demand forecasts by region but not by class.
- Q. Is the Member shown of Slide 72 driven by electric heat? Is that a DSM opportunity?
- A. Yes, electric heat is contributing to spikes. There is a DSM opportunity for that Member and it is already being pursued.
- Q. Is Eastern Colorado summer peak driven by air conditioning or by irrigation?
- A. The Eastern part of the Eastern Colorado area is driven by irrigation. The Front Range part is driven by air conditioning.

Resource Planning

Rob Wolaver provided an answer to the question of how energy sales convert to demand growth. Energy equates to demand growth of approximately 60 to 70 MW per year plus losses and reserves.

Tri-State tries to minimize its exposure to market risk. The Company was hurt by the California market crisis several years ago. The Board of Directors directed that we should plan so that this does not happen again.

In the last WAPA Action Plan, Tri-State made no specific commitments regarding resource expansion, but rather provided overall direction.

High oil and natural gas prices leads to high growth in electricity demand on Tri-State's system.

The recession has had a significant impact.

Since the WAPA IRP, Tri-State has entered into contacts with two IPPs that previously served Xcel Energy. We have also entered into a contract with Platte River Power Authority and have added the PPAs for wind and for solar.

Tri-State is choosing to use a 20-year planning period. It fits with what we are doing today. Outside of 20 years, forecasting accuracy declines.

Tri-State will use a 6-year resource acquisition period. It will provide maximum flexibility.

The Tri-State Board of Directors wants the organization to be somewhat self-sufficient and not dependent on outside markets.

Tri-State serves an area larger than the state of California – our load density is about 10 kw per square mile.

Western provides good hydro resources, but they need to be scheduled 2 days in advance, which reduces our operational flexibility.

The contracts with Xcel Energy are for contingent capacity, which also provides constraints since Tri-State needs to take the swing from hour to hour.

Because the system is sprawled out, Tri-State has the opportunity to interact with the market every hour; both buying and selling.

Tri-State does not have firm pipeline capacity or storage; we rely on interruptible capacity to move natural gas.

Our peaking units, while available, are not often “in the money.” Therefore we often buy energy from the market.

Tri-State takes balancing service from 5 balancing authorities.

Tri-State spends \$4.5 million per year on regulation and frequency response services.

We expect these rates will go up as more intermittent resources are added.

Tri-State has not done Loss of Load Probability studies. We have small impact on multiple regions.

Questions

- Q. Is there no wind capacity value for future RPS additions?
- A. No. We just don't know what the capacity value is because it will depend on technology.
- Q. How does Tri-State define transmission constraints? Are they just limits?
- A. They are operational, but also TOTs as broadly understood. We look at our contractual rights as limits.
- Q. Are contractual rights necessarily constraints?
- A. That's how we treat them for planning purposes.
- Q. What does Tri-State do with respect to price elasticity?
- A. It's hard to gauge since the impacts are on our Members' systems. The price impacts are to Members' prices. We have no elasticity data to provide.
- Q. What is first year of resource acquisition period?
- A. 2010.
- Q. What is the basis for the Renewable Portfolio Standard that Tri-State is using?

A. Tri-State is using the Colorado and New Mexico requirements, with existing multipliers and pricing assumptions.

Q. What is oil generation capacity on Tri-State's system?

A. The Burlington Station is oil. 100 MW.

Q. Can Tri-State sell power to the eastern grid?

A. Operationally, we rarely interact with eastern grid. There are minimal merchant activities involving the eastern grid, except for some prescheduled transactions.

Q. How many RECs has Tri-State purchased for its optional sales?

A. 115 GWH per year for the green choice program.

Q. Will Tri-State provide access to its purchase/sales contracts?

A. Contracts will be treated as confidential.

Q. Does Tri-State know the timing of any future RFP for additional renewables?

A. We don't know yet. We want to get some operating experience with the new wind and solar facilities to see how they work on our system.

Q. Can participants get more information on marginal costs?

A. The incremental cost of coal is around 2 cents. Most single cycle units do not run.

Q. Is Tri-State limited in the amount of leverage from RUS in its financing?

A. The RUS is not lending for new generation, so it's a moot point.

Q. Is there any market data on the costs of ancillary services in this region?

A. No there isn't. The \$4.5 million that Tri-State is paying is for regulation costs.

Q. How does the imbalance market work?

A. Each of the balancing authorities charges for balancing services. Tri-State is showing the aggregate of all of the regions.

Q. Why do coal units trip off?

A. For a number of reasons like boiler leaks, control system problems.

Q. As coal units age, there will be more unplanned outages. How does this relate to increasing imbalances?

- A. Certainly aging units experience performance degradation, but it really doesn't impact imbalance expenses in any meaningful way.
- Q. Does the 5% self-generation show up in the system supply graph?
- A. The supply is included in the graphs but it is not broken out separately.
- Q. Why is there a 5% limit for Members to self-generate?
- A. This was discussed and approved by the Board of Directors and also agreed to by RUS.
- Q. Was there a minimum size for bids for additional gas generation capacity?
- A. We were looking at large options. There is some concern about the transaction costs for a bunch of smaller units.
- Q. Does Tri-State have a view of likely changes in gas prices over time?
- A. Tri-State relies on outside services from which we buy forecasts.
- Q. How does Tri-State dispatch relate to WACM?
- A. WACM refers to the Western Area Colorado Missouri balancing authority, and Tri-State dispatches generation independently from these federal hydro facilities.
- Q. With respect to recent wind and solar PPAs, were these resources viewed as economic when they were signed?
- A. Only time will tell whether they are economic resources. They were entered into for compliance reasons. Wind contract is in the 6 to 7 cent range, versus 10 cents for wholesale electricity at the time of the RFP.
- Q. Does Tri-State have any long-term gas contracts?
- A. No. Tri-State has no long term gas contracts. Tri-State typically buys gas on a monthly basis.
- Q. What is the fuel source for the contract with Basin; mainly coal?
- A. The majority of the Basin's generation is coal, but they have a large fleet of wind generation and the contract is non-specific.
- Q. What about Tri-State's other purchases, are they primarily coal-based generation?
- A. We don't know specifically.
- Q. Isn't Tri-State actually 70 to 80% coal?
- A. Depending on how this is calculated, this is probably not a bad estimate.

- Q. Where is the carbon risk added to Tri-State's modeling?
- A. It goes into both the Expansion Plan and the Dispatch Model. The system will redispatch to develop an alternative expansion plan and the result flows into the Planning and Risk model.
- Q. Will the existing tools model a Carbon Cap?
- A. Yes.
- Q. How does the Ventyx price forecast incorporate carbon costs/risks?
- A. Ventyx was assuming the Waxman/Markey bill which has a 17% drop in carbon by 2020.
- Q. Is the Western allocation used to integrate renewables?
- A. No. The integration benefits are near zero because the schedules for Western power are required at least 2 days in advance of delivery. Western is an intermediate resource. This is also true for pumped storage. We do buy ancillary services through our transmission contract, and Western hydro resources are used for regulation under this contract.
- Q. What is basis for cost of IGCC forecast? Is it going to be updated in view of the recent experience of Duke with their actual IGCC?
- A. This number was included before recent news of the costs of Duke's project. We are aware of developments at Duke, but we need to lock the number down for modeling.
- Q. What is the source of cost of solar trough?
- A. We used the Black and Veatch technical study. These numbers are all in constant dollars.
- Q. Will Tri-State use NREL cost estimates?
- A. We will try to use the best information available.
- Q. Does Tri-State's planning model provide the ability to accept a range of cost estimates, for instance, for cost inputs for different types of geothermal resources?
- A. These costs could be modeled in different scenarios. Our goal is to get the basic types and some representative costs.
- Q. How does Tri-State model for local renewables installed at distribution levels?
- A. We remove what we get from Member systems. We don't model to buy market RECs, we build or buy to meet RPS.
- Q. Does model incorporate the risk of drought?

- A. No, not in the Production Cost or Expansion Model, but they can be modeled outside the system. Tri-State's fuel and water division believes we have sufficient water.
- Q. How much does the Western price fluctuate?
- A. There has been some movement as Western has needed to buy power in recent years because of the drought, but going forward we do not see significant Western price fluctuations.
- Q. Does solar trough include storage?
- A. There is storage included but it is not known how much at this time. (Supplement to meeting: the storage is 3 hours.) .
- Q. What is the price of the solar from the Cimarron project?
- A. It is confidential.
- Q. What capacity factor would be used for geothermal?
- A. The information was not available at the time of the meeting. (Supplement to meeting: It is approximately 80%.)
- Q. What are the costs used for energy efficiency?
- A. We are working with Nexant to incorporate costs at different incentive levels. The effects will either be a reduction in load or alternative "supply" resources.
- Q. There was an assertion that Energy Efficiency should be viewed as a resource.
- A. This will be taken under advisement.
- Q. What is best way to model carbon constraints?
- A. We are looking at various alternative scenarios with alternative carbon prices. We can model various legislative proposals.
- Q. Do you model production for 20 years?
- A. Yes.
- Q. Is there sufficient gas pipeline capacity available at your coal plants to repower Tri-State's generation?
- A. No. Repowering would require additional pipeline costs.
- Q. What does yellow line mean on Slide 165?
- A. There is not significant transmission capacity between New Mexico and Colorado.

- Q. Does Tri-State model its system as autonomous regions? If not, Tri-State should consider doing so.
- A. Yes, in that there is only one Tri-State in terms of financial impacts and rate-making, but transmission constraints must be taken into account.
- Q. What is modeling sequence?
- A. Resource Expansion to Production Cost to Long Range Economic Forecast.
- Q. Is Tri-State going to develop a base case?
- A. Not necessarily.
- Q. What do you mean by environmental attributes?
- A. Primarily carbon offsets.
- Q. How much time does it take to develop and run scenarios?
- A. About a week per scenario. Models do break down occasionally.
- Q. What level of detail is required in the public meeting to define a scenario?
- A. The more the better.
- Q. How many scenarios is Tri-State going to run?
- A. Don't know for sure. 18 plus...

Comments and open issues.

Tri-State should consider providing more detail about its historic coal costs.

Tri-State should consider decreasing capacity factor of coal units over time.

Tri-State should look carefully at coal supplies and availability.

Look at Rocky Mountain Institute "Small is Profitable."

Consider the high capital costs of future pollution control equipment.