

DRAFT
Tennessee Valley Authority
Integrated Resource Plan Stakeholder Review Group
Working Session

MEETING MINUTES

October 28, 2010
Knoxville, Tennessee

Members Present:

Randy McAdams, Facilitator, Scott Madden
Lance Brown, Partnership for Affordable Clean Energy
Louise Gorenflo, Sierra Club
Richard Holland, Packaging Corporation of America
Tom King, Oak Ridge National Laboratory
Hank List, Commonwealth of Kentucky
David McKinney, Tennessee Wildlife Resource Agency
David Reister, Environmental Stakeholder
Jack Simmons, Tennessee Valley Public Power Association
Stephen Smith, Southern Alliance for Clean Energy
Lloyd Webb, Tennessee Valley Industrial Committee

Members Absent:

Ryan Gooch, State of Tennessee
George Kitchens, Joe Wheeler Electric Membership Corporation
Jan Simek, University of Tennessee
Patrick Sullivan, Office of Governor Haley Barbour
Deb Woolley, Tennessee Chamber of Commerce and Industry

Guests:

Steve Adams, Tennessee Valley Public Power Association
Sam Gomberg, Southern Alliance for Clean Energy
Brian Paddock, Sierra Club

TVA:

Bob Balzar, Gary Brinkworth, Larry Cole, Ed Colston, B.J. Gatten, Bob Irvin, Randy Johnson, Chuck Nicholson, Dan Pratt, Greg Signer, Tim Smith, Van Wardlaw, Beth Yetter, Steve Gilbert (Scott Madden)

I. Opening Remarks

Randy McAdams welcomed members of the SRG. McAdams reminded the SRG that the IRP has been published and was transmitted to EPA on Sept. 15. He also reiterated that the public comment period will extend to Nov. 8. During the public comment period, TVA conducted five public meetings around the Valley. Today's focus is the input TVA has received as a part of these public meetings and other comments submitted during the comment period.

McAdams went over the agenda. Chuck Nicholson (NEPA Project Manager) - the author of the Environmental Impact Statement (EIS) that accompanies the Integrated Resource Plan (IRP) – will give an update of the public comments. Randy Johnson will give a review of the phone survey of Valley residents that was conducted this past summer. Tim Smith, a

manager within the transmission planning group, will talk about potential impacts the IRP planning process may have on the transmission system.

I. Introduction

McAdams reminded the SRG that today is a working session and that the SRG is meant to provide TVA with in depth and ongoing discussion which helps build efficiency into the study process. At this point in the IRP, step 4 of the process has been completed. Next is step 5 – incorporating the input TVA is receiving during the comment period into the final IRP.

II. Update on Public Comments

Chuck Nicholson, Manager, NEPA Compliance.

TVA began distributing the draft IRP and EIS on Sept. 15. The IRP was mailed and uploaded to the IRP website. TVA issued press releases and also sent email notifications regarding its availability on the TVA website. On September 24, the EPA published the official notice of availability of the IRP in the Federal Register.

Attendance at the public meetings varied from 20-40 attendees in the live audience and about 8-12 attended each on the webinar. For the webinar, there were consistently more attendees registered than actually participated.

At each of the public meetings the format was the same. Gary gave a presentation of the draft IRP and its findings/implications to date; then a panel of TVA representatives was available to answer questions and receive comments; these comments become part of the public record. Comments were also received from webinar participants. All meetings were scheduled for a couple hours and most ran the full two hours. There were a total of about 130 attendees in person from all the public meetings and a total of about 50 who participated on the webinars.

Total comments received to date are about 250. About 20 of these comments were submitted through the online form; about 10 letters have been submitted; and about 150 comments were received in the form of pre-printed postcards. Themes of these postcards include: maximize energy efficiency, maximize renewables, TVA committing to regular IRP updates and keeping the public review process active. To date, there have been no substantive comments from state or federal agencies, but do expect them soon.

Themes of comments include supporting TVA's decisions on laying up coal plants; some suggest we should increase the amount of units considered for layup. Other themes include support for more renewable energy (especially within the TVA region). TVA has received mixed comments on nuclear – some support nuclear in terms of increasing baseload capacity, but other commenters suggest not increasing nuclear due to extraction and storage issues with radioactive waste as well as concerns pertaining to thermal effects on waterways surrounding nuclear plants. In terms of energy efficiency (EE), some commenters expressed concern pertaining to achieving TVA's goal of becoming a the Southeast leader in energy efficiency (EE). In terms of energy storage and natural gas, most commenters encouraged TVA to add more of both resources.

Van Wardlaw, Executive Vice President of Enterprise Relations, mentioned a couple of thoughts he gathered from the audiences at the public meetings which included the criticality of EE design in terms of how TVA deals with the reality of reaching its goal as well as incentives TVA could provide to push this resource. He also noticed a lot of push for pumped storage – especially to couple possible additions of wind power to TVA's resources.

Comments and questions from Stakeholders:

- The standard offer TVA recently released does not hit what solar installers/developers have said is the number that will continue to grow in the industry. Does TVA anticipate how the market will grow/bring the cost of solar down in a proactive way? Does not appear that TVA understands the trend of solar prices into the future years. Request to look at solar numbers again before the final IRP is published.
- Interested in an update on TVA's thinking pertaining to the penetration of electric vehicles and how this may affect the load shape.
 - o (TVA staff): It is true this could be an asset to TVA but the infrastructure is not currently in place to support this load. This requires updating distribution lines/transformers in order to bring this into the system. Mostly boils down to how much ratepayers are willing to pay for this. Though, there is a lot of focus on increasing the use of electric vehicles and placing charging stations at recreational destinations, among other places. There is also a concern on reselling electricity.
- There is very short lead time between the issuance of the IRP; there is a real concern around the short turnaround period between the issuance of the draft and the start of the public meetings. Also, the 45 day public comment period seems too short. Concern that TVA may not capture the true public opinion of certain issues.
 - o If an extension was requested, how much would it impact the schedule?
 - (TVA staff): TVA strives to be very descriptive in its planning processes. With that being said, the IRP project team is on a tight schedule in terms of completing sensitivities/other model runs and communicating these results upwards in the agency. These results will probably impact decisions that would then evolve into business plans/fiscal plans, so need modeling runs tied up at a certain time.
- Not sure if the EIS document captures the full breadth of analytics that were done.
- Is there a history of commenters/agencies waiting until the last minute to comment?
 - o (TVA staff): Most substantive comments come in at the last minute.

III. Phone Survey:

Randy Johnson, Manager, Enterprise Relations – Integrated Resource Planning
During the scoping period an online survey was conducted but when the data was reviewed it was found to be not statistically significant. As a result, the SRG requested that a more accurate survey be conducted. TVA hired *Harris Interactive* to conduct a survey which included adults aged 25 and older. 1001 surveys were conducted evenly across the service region.

- Survey Results:
 - o The number one concern of those surveyed was to provide reliable electricity and keep prices affordable
 - o Concerning future energy needs, a common response from those surveyed was for TVA to find alternate energy sources such as solar and wind (highest response rate); The second highest concern regarding future energy needs was to find a reliable and cheap power supply
 - o The region responses vary a little bit: 42% surveyed would like to see more utilization of renewable sources but the number of people who are willing to pay more for renewable energy is very low – those who will “definitely pay more” is only 4%
- Is evident that the biggest concern among Valley residents is cost and billing.

Comments and Questions from Stakeholders:

- Request for specific wording and order of questions from phone survey
- This data suggests that TVA needs to educate people on different energy sources
- Why were questions asked about paying extra for renewables and not paying for other types of generation?

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IV. Transmission System and Potential Future Impacts:

Tim Smith, a manager in the transmission planning group.

This portion of the presentation focuses on TVA owned substations. Tim started off with an overview of TVA's transmission system. He emphasized that without consideration of transmission impacts from proposed IRP resources, an unrealistic plan could be created.

TVA's transmission system is designed to deliver internal TVA generation to native TVA load; currently 16,000mi of transmission line covers 80,000 square miles. TVA itself operates up to 46-kV substations; our distributors mostly own 26kV or 13kV substations but there are TVA distributors that own up to 69-161kV substations. A minimum of 161kV substations are at TVA plants (up to 500kV).

EEDR and Transmission: One of the most noticeable impacts from EEDR is a total savings of 10% from transmission (2%) and distribution (8%) losses. EEDR also has the potential to delay transmission expansion projects. A major drawback is that it is difficult to identify the specific delivery point for EEDR. Though a specific amount of EEDR can be forecasted (within a load forecast), it is difficult to target EEDR to specific areas of transmission congestion. It is also difficult to "capture" this service/value and feed it back into equations. With that being said, EEDR – much like renewables projections - are viewed as a "target" since the actual values are transmission dependent.

Fossil Layups and Transmission: Taking generation off of the transmission system has similar effects as when new generation is put on the transmission system. For instance, when a new generator is built (up to 1000 MW) new lines are needed. This also applies when plants are shutdown because the transmission system is designed around key baseload plants. Many fossil/nuclear plants are "pillars" supporting the transmission systems meaning they provide the necessary voltage support and reactor power. Most congestion on the grid is due to interconnected flow.

Example: If you were to take the load of a Johnsonville sized plant off of the transmission system, where power was going out you now have power coming in and that power has to be imported back out. A lot of times this will cause the transmission system to be overloaded.

- Basically when something is shut down, there are impacts on everything interconnected in the network
- Biggest concern is the voltage – when you remove a source of reactive power you'll see a compression on the transmission system that somehow needs to be corrected.
- Voltage support has to do with load on the system – for example, if a plant the size of John Sevier was shut down, there would be an immediate impact of 4600 MW on the system which could cause the system to collapse if not handled properly.
- Areas that are impacted most by transmission are the areas in which there is a lot of load but not a lot of baseload resources.
- New transmission infrastructure can take 8-10 years to build.

- The 7000 MW retirement assessment does not fit into the analysis window in terms of getting timely transmission improvement completed in order to support this amount of layups which is one of the reasons that it was dropped from the shorter list of options to test in the IRP.
- Schedule has a lot to do with limitations – you can turn off a fossil plant but you cannot immediately take care of all of the effects or immediately turn it back on.

Renewables and Transmission: TVA has been a leader in pursuing long-term renewable energy contracts and firm transmission lines to import this energy. Currently have 1300-1400 MW of imported wind with no upgrades required (there is sufficient paths in the transmission system). By buying these purchase power agreements, we buy transmission rights – if you are going to buy a firm contract you need a firm transmission line

- Looked into the JCSP study in terms of implementing 20% renewable energy into the TVA system
 - o The transmission impacts identified were 15,000mi of extra high-voltage transmission lines and there would still be a need to build up the underlying transmission system (~\$80 million). A lot of transmission gurus believe the underlying system would cost just as much
 - o Transmission lines aren't rated based on how much power can be pushed through but on safety (overloaded, underloaded, etc.)
 - o There are tradeoffs associated with each type of line/transmission – some lines are cheaper but the transmission terminal could be more expensive
 - o Transmission looks at the full nameplate value – they are expected to deliver that full capacity (not an energy value).

Comments and Questions from Stakeholders:

- How does TVA compare in investment and maintenance to other utilities?

V. Update on Ongoing Analysis:

Gary Brinkworth, Senior Manager, Generation and Portfolio Optimization.

This portion of the presentation will cover what the study approach will be going forward as well as how the analysis will be bound to ensure a robust analysis is done; with all this being said, modeling must be tied up by mid-December in order to meet the defined timeframe (go to Board with recommended strategy in April 2011). This bounded optimization also allows us to test the robustness of the portfolios and indicate which assumptions may need to be refreshed. The goal of doing the analysis in this way is to try and define the “edges” of the envelope in order to come up with a preferred planning strategy.

- Instead of what was done before, have now formulated a set of options that match up to those incremental choices that were otherwise being scheduled into the case runs – now we are allowing the model to choose what the model prefers instead of scheduling in certain resources. Are binding options to stay in defined envelope (defined in draft).
- A “floor” is defined, meaning the model cannot pick below a certain amount and/or choose certain resources before a specified year; then the model optimizes above this “floor.” This is still a scenario driven analysis. The analysis will also assess ways to achieve the Board’s vision, but these aspects are not being forced into the model. The actual “translation” of how we meet the Board’s vision is the role of the IRP.
- The only thing that cannot be optimized effectively is the level of fossil layups; fossil layups remain a model input. There are four different levels of fossil layups that the model will be allowed to optimize around. The model is provided with layers of renewables and EEDR and it is allowed to optimize based on a least cost plan. Then, the model optimizes its schedule for all other resources (nuclear, gas, PPA). Are

allowing the model to optimize in this way in an attempt to assess the model's behavior when it is allowed to select resources based on cost optimization rather than defining certain inputs like with the strategies in the draft.

- Key takeaways:
 - o The model seems to have a preference for efficiency and conservation.
 - o When resources are deferred, cost goes up.
 - o Resources are chosen based on cost, performance, need for resource.
 - o Part of this process helps to assess if costs/assumed values for certain resources need to be reevaluated.
 - o Nuclear deferral will happen automatically when we allow the unit to "float" and be chosen based on the most optimal plan.
- Then, Gary went over the method for addressing requested sensitivities. Some of these will be assessed automatically with this new bounded optimization approach. For example, the fossil layup evaluation incorporates multiple layup amounts in the same run to see which gets chosen/which is the optimal amount.
- Have added a new scenario based on the annual refresh of the load forecast - Scenario 8. Biggest difference between Scenarios 7 and 8 is a lower load projection (about 2000 MW less in Scenario 8 than in Scenario 7 – meaning a smaller capacity gap). With that being said, scenario 8 is no more accurate than any past forecasts in terms of load projections changing over time. Scenario 8 firm requirements still fall in the middle (much like Scenario 7); Scenario 1 is still the top bound and Scenario 3 is still the bottom bound. For Scenario 8:
 - o Growth rate is less and energy forecast has decreased.
 - o Along with load forecast, assumptions/inputs are being refreshed as well. Are receiving a new FY2012 planning cycle forecast at the beginning of December. Currently trying to anticipate trends for EEDR, capital cost estimates, renewables, and regulatory outlook. Commodity forecasters are producing an updated natural gas price to use in the updated case runs. Though natural gas prices are falling, the question still remains pertaining to how much it will cost to put natural gas infrastructure in place.
- Risk: The draft IRP document does have things that are not fully quantified in terms of risk. There are risks and uncertainties that we need to take into account throughout this evaluation but we cannot apply numbers to it. When the Board is taking an action, needs to keep risks in mind as well as the metrics on the scorecard.
- Path going forward: right now, in the public comment period. Will complete the analysis and respond the public comments by late December/early January. Then, a recommended strategy will be developed and vetted. The final IRP will be published 30 days before the April Board meeting.

Comments and Questions from Stakeholders:

- Consider doing a more robust study on the real cost of renewables, especially if they are going to be "unhinged" in the model.
- Consider how to assess the ability of EEDR programs to stimulate distributor/customer participation and deliver forecasted energy savings and demand reductions. Need to consider the development of programs in conjunction with TVPPA and TVA customers.

VI. Next Steps: Future SRG meetings: May host a webinar to summarize input from comment period and preliminary responses to input received (also an update on the analysis); all dates below are tentative:

- Propose to hold a meeting with SRG in mid-December to give update on preliminary analysis results

- Early January – discuss potential recommendation in Final IRP
- February 24 – preview final IRP.

Comments and Questions from Stakeholders:

- Request to hold a workshop in November or December, before modeling is tied up, to review detailed assumptions (cost, load forecast, renewable portfolios, EEDR, etc.)
 - o Propose a workshop to hold this discussion (9 out of 9 SRG members voted for holding the workshop)

VII. Closing Remarks

Randy McAdams thanked the SRG members for attending the working session. Based on a unanimous vote to hold a workshop on assumptions/inputs used in the IRP, TVA staff will work to get it scheduled as soon as possible and notify the SRG.

The meeting was adjourned.