

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

MEETING MINUTES

**August 26, 2010
Chattanooga, TN**

Members Present:

Randy McAdams, Facilitator
Ryan Gooch, State of Tennessee
Louise Gorenflo, Sierra Club
Richard Holland, Packaging Corporation of America
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
Deb Woolley, Tennessee Chamber of Commerce and Industry

Members Absent:

Lance Brown, Partnership for Affordable Clean Energy
Dana Christensen, Oak Ridge National Laboratories
George Kitchens, Joe Wheeler Electric Membership Corporation
Jan Simek, University of Tennessee
Patrick Sullivan, Office of Governor Haley Barbour

Alternates Present:

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

TVA: Bob Balzar, Gary Brinkworth, Ed Colston, BJ Gatten, Mike Ingram, Randy Johnson, Alisha Mulkey, Greg Signer, Van Wardlaw, Beth Yetter, Steve Gilbert (ScottMadden)

I. Introduction

Randy McAdams welcomed the SRG and thanked them for their ongoing participation in the IRP process. McAdams reviewed the SRG ground rules, key purposes of the SRG and today's agenda. Randy McAdams introduced David Tapley, who was sitting in for Lance Brown (PACE).

Next, McAdams went over the structure of the working session. The purpose of today's working session is to give the SRG members a preview of the draft IRP document and the overall themes that are emerging from the IRP analysis. The IRP has come to the step of the study that entails reviewing the draft document and evaluating portfolio options. Initial analysis and evaluation has been completed.

McAdams reminded the SRG of their purpose – to provide in-depth ongoing discussion and provide input from different viewpoints and provide real-time public input. We are now in the process of completing step 4, present initial results, and preparing for step 5, incorporate input.

The next step, incorporate input, involves addressing comments received during the public comment period surrounding the release of the draft IRP. The public comment period is scheduled to begin September 24 and to last for 45 days (ending on November 8). The schedule right now is to have the Board approve the final IRP by April 2011. First, Van Wardlaw is going to give an overview of the Board meeting, which was held on August 20. Then, the draft will be reviewed chapter by chapter.

II. **Review of August 20th Board Meeting**

Executive Vice President of Enterprise Relations, Van Wardlaw, gave a brief overview of what transpired during the Board briefing on August 20, 2010. The SRG's input has helped TVA make decisions, as was evident from the Board meeting. In terms of energy efficiency, there are still a lot of programmatic questions of a realistic amount that can be achieved but the overall thought is that TVA should become more aggressive.

In terms of nuclear, TVA is considering what might be needed in the future in terms of baseload generation. At this point, TVA is not sure exactly how much nuclear generation will need to be added in the future but, especially in terms of Bellefonte, TVA has to make sure that the option is available if TVA happens to need this generation at some point in the future. Current IRP study results are indicating that Bellefonte will probably be needed around the 2018-2020 time period. This will continue to be a tough issue to evaluate since there is still ongoing analysis on when/whether TVA would need generation at Bellefonte. With that being said, TVA is confident that resuming construction on the B&W reactors is the best path compared to building AP1000 nuclear technology.

The Board is in the process of defining the aspirational steps the agency wants and needs to carry out. Also, the Board is working to define its aspirational position meaning that some action needs to be taken in incremental steps to stay on path towards achieving TVA's newly laid out vision. Actions of focus right now include: increase energy efficiency commitment, reduce reliance on oldest and least-economical coal-fired generation units, and to preserve the option for additional non-emitting baseload capacity. It is obvious that the IRP process has been feeding into the Board's decisions and the IRP will continue to feed into even harder discussions that are in the near future. With that being said, TVA is confident that there will not be another large time gap between this IRP and the next IRP TVA will complete. The IRP will be refreshed on a regular schedule so it won't be as major of an undertaking every time. Tom Kilgore announced that another IRP evaluation will be undertaken by 2015.

SRG Comments and Questions:

- It was mentioned that several stakeholders are surprised with the amount of information TVA shared at the last Board meeting. Seems that there is more and more transparency within the agency. Stakeholders are very appreciative of the amount of information TVA is sharing.

- The Board has been very forthcoming in the information that was shared in terms of presenting an outline to the public to let them know what TVA plans to accomplish.
- Question on how the development of the final IRP will be managed over the next six months relative to soliciting public input, how it is incorporated, how the Board makes a board decision, etc.
- Some surprise around the lack of renewable energy mentioned, especially given the path the region is taking on investments and job creation. Would like to see the Board to identify renewables as an aspirational goal because there are organizations looking to this process and waiting to see if they will invest in renewables in the Tennessee Valley region or go to another area. Van committed to provide that feed back to our executives.

III. **Review of Draft IRP Contents (Chapters 1-6)**

Gary Brinkworth presented an overview of the draft IRP and draft EIS. The IRP is the document that plans for generation into the future and the EIS evaluates the environmental impacts of the proposed actions contained in the IRP document. As a federal agency, TVA is required by NEPA to complete an environmental impact statement as is with any TVA plan that is produced.

Next, key themes were presented, some being:

- Nuclear expansion is present in the majority of portfolios
- Compared to maintaining the existing fleet, some level of fossil layups is favorable
- EEDR and renewable generation play an increasing role in future resource portfolios
- Natural gas additions are a viable resource option
- The intensity of CO₂ emissions decreases in all portfolios

Chapter 1: This chapter gives a brief overview of the goals and objectives of this IRP and also describes some high level planning methodology. Chapter 1 also gives a brief description of TVA's history, TVA's mission, and TVA's current operations and system.

Goals of the IRP include:

- Ensure TVA can meet demand for electricity in a cost-effective, reliable manner with due regard for protection of public health and the environment
- Develop a robust solution that best balances competing objectives while minimizing risks and retaining the flexibility to respond to future risks and opportunities as they unfold
- Adopt a preferred strategy that accounts for the expectations of the majority of stakeholders, while supporting TVA's multi-faceted mission
- Engage the public in a transparent process that solicits and ensures public input, while also educating participants on the constraints and tradeoffs that are required to produce a plan of this magnitude.

Chapter 2: This chapter describes the three phases for engaging the public: (1) scoping period, (2) analysis and evaluation period, and (3) draft IRP public comment period.

This chapter also outlines techniques for capturing public input such as quarterly public briefings, phone surveys, Webinars, and written comments. Also, this chapter contains the dates for the public meetings to be held after the release of the draft IRP.

SRG Comments and Questions:

- There were some questions around the Shawnee fossil plant in terms of if it will be open past 2013 due to it not having any emission controls in place. It was mentioned that some had heard Shawnee unit 10 may be biomass fired after the plant is idled.

Chapter 3: This chapter, the need for power, describes the analysis and key components used to establish the need for power. Forecast ranges of peak demand and annual energy requirements and components of these forecasts are also described in this chapter. Graphics included in this chapter were firm requirements by scenario (takes load forecast, deducts contractual interruptible customers).

In chapter 3, high and low load forecasts will be included also as well as the range of the capacity gap (range of shortfall) based on the load forecasts and the defined model inputs. Also planning to make a new scenario (Scenario 8) which will represent the current budget plan and the long range financial plan and the load forecast will also be updated in this scenario.

Chapter 4: This chapter describes the various supply- and demand-side resource options as well as power imports that TVA could utilize as new generation is needed. Three groups of resource options were described: options identified but not considered, options not requiring new generation, and options requiring new generation.

A few questions concerning NEPA coverage came up and it was explained that the EIS covers NEPA. For example, the IRP contains portfolios of renewables and the EIS discusses specific components of these portfolios. Both documents will be issued at the same time, but they will be two separate documents.

Chapter 5: This chapter describes all the process type things involved in formulating the IRP. This chapter also goes into detail on what scenarios and strategies are, how ranges are set on analyses, the scorecard method and metrics, and the methods utilized to analyze the data in terms of software tools used. This chapter is purely about process and mechanics – no scorecards or tables are populated with data, only the process is described. The capacity optimization model (CapEx) and the stochastic model (MIDAS) were also described, which are the two models utilized in the IRP.

Chapter 6: This chapter is one of the most important chapters that make up the IRP. This chapter is where all the “stuff” comes together. Graphics in this chapter include: capacity gaps, bar charts of resource additions, energy mix charts and expansion plan charts. Also, the performance of the different portfolios is discussed in this chapter in terms of present value of revenue requirements (PVRR), short term rate impacts, and two risk metrics. All the building blocks of how TVA will identify the preferred strategy are encompassed in this chapter and provide the context for chapter 7.

SRG Comments and Questions:

- Notice the narrow range of cost variation among the different strategies; encourage TVA to call this out in the document.
- Are the new proposed manufacture plans developed for MS included? (Yes, it is in the load forecast)
- Some concern on how to truly quantify the value of a pumped hydro unit considering it can swing 3200 MW (1600MW pump and 1600 MW load)
- Question and discussion on why pumped hydro was chosen instead of compressed air energy storage (CAES)?

LUNCH

Chapter 7: This chapter includes the updated scorecard, recommended planning strategies, and implementing portfolios (final). This chapter basically takes the information from chapter 6 and draws preliminary conclusions. This chapter also showed the populated IRP scorecards with ranking metrics on the left and strategic metrics on the right. The scoring and coloring are intended to communicate the relative relationships between the scores.

The technology innovation portion was pulled off of the scorecard and is now described with text in chapter 7. The text talked about the likely technology innovations to realize the benefits of a particular strategy. The message we got from the SRG in the last working session was that examining technology innovation in the context of the IRP is a good thing but more rigor needs to be applied to this option.

SRG Comments and Questions:

- Suggested to apply the color-coding to the strategic metrics side of the scorecard
- Still have concerns on the economic development strategic metric in terms of the rigor and inputs – hard to sort through how conclusions were reached. Can lead to skewed interpretation of results
 - o (It was stated that the IRP is not supposed to predict an economic development strategy for TVA but is meant to set a pathway for TVA. From the analysis, it is evident that the impact is pretty small).
- Don't use the title "strategic metrics" – suggests level of rigor equal to the left hand side (because both use 'metrics') – suggest using strategic impact or strategic implications
- May be more appropriate to change economic development to economic impact because economic development implies that the economy is "developing" as a result of what TVA is doing; but, if it is a result of what happens in a strategy, might be considered economic development.
- The Harvey Balls are confusing – there is no reference for quantifying a value for a filled versus empty Harvey Ball. ("good" = fully black-filled circle; "bad" [relatively speaking] is an open circle with no black fill).

Van explained that TVA is trying to do something good by examining these different areas and also support TVA's mission and the TVA Act. TVA is trying to figure out the correct way to represent these things – either don't include any or take subset of some that are applicable, which is what TVA is trying to do.

Gary explained that the economic metrics were calculated on a ranking based on the baseline – the baseline is strategy B in scenario 7. It looks at the change in employment and the change in personal income compared to these estimates in that strategy in that world. Then, a differential is assigned and a ranking is assigned based on that differential. It is all a perspective thing – all of this is forecasted economic impact; not benchmarking against TVA's history or benchmarking against someone else's economy.

It was explained that the purpose of the strategic metrics is to help TVA's decision makers who may be focusing mostly on the left hand side (reliability, cost, and risk) and, as they hone in on this, to keep in mind that relatively speaking these strategies have different environmental implications and economic implications. We want decision makers to keep these in mind, but the intention is not to get caught up in exact numbers. The strategic metrics are meant to be relative and not incredibly precise.

Gary reminded the SRG how the scorecards are calculated and showed the formulas for calculating the ranking metrics on the left hand side of the scorecard. The strategic metrics on the right are calculated differently:

- For the environmental metrics, there is a white paper that will be in the IRP appendix that will show the calculations used for the environmental metric. Also, the CO₂ footprint calculations used the average annual CO₂ tons emitted
- For the economic metrics, two of the scenarios for each strategy are calculated (meaning, a total of 10 cases since there are five strategies). This was decided because the cases take a long time to run and the two scenarios that were used encompass the total range of all the scenarios, meaning the scenario with the most aggressive growth and the scenario with the least aggressive growth (in order to see the range of possible economic impact). There will be some blank spaces in the draft because the full analysis will not be completed until the final, due to time constraints.

It is reminded that the comparisons on the scorecard are not absolute; they are to be compared horizontally, and not vertically. Preliminary results indicate that Strategy C performs best in five of the seven scenarios even though Strategy E scores close behind C, but is only best in 2 of the scenarios. This of course depends on which side of the scorecard an individual sees as having more weight, based on their perspective, as was brought up by one of TVA's stakeholders.

It is reminded that the purpose of completing an Integrated Resource Plan for most utilities is to solely identify the least-cost plan that presents the least risk. TVA decided to include the strategic metrics as an addition to the left side of the scorecard to help decision makers make more informed decisions. Also, TVA is and will be conducting sensitivity runs, mostly around the two top ranked strategies, C and E. Sensitivity runs are meant to assess how "sensitive" a strategy is; for instance, putting more weight on short term rates compared to risk may cause a strategy's score to shift. Sensitivity runs can help identify where breaking points are by assigning different weightings.

Stakeholder Comments and Questions:

- Suggest using time of use (TOU) pricing and see how that progresses the scoring in the short term rate impacts. (It was explained that TOU pricing is

assumed in some of the scenarios and that short term rates are driven by the difference in the debt cap and cost of the plan. There will be some sensitivities done to address this).

- Don't understand how a 2 hour public meeting will familiarize the public with the IRP. (It was explained that these public meetings are meant to spread awareness of the draft and the public comment period so that the public is aware that it is accessible via the TVA website. Also meant to inform the public of how comments can be submitted during the public comment period).

When selecting the portfolios to be included in the draft IRP, it was ensured that the breadth of analysis was represented appropriately without including an unnecessary amount of portfolios. The best performing strategies that are included in the draft are Strategies C, E and B, scoring best to least best in that order. Each strategy contains seven portfolios (each representing a cross section of the specific strategy and the seven scenarios). As it turns out, some portfolios are identical or nearly identical and there is no need to retain all portfolios within the three strategies for inclusion in the draft IRP. TVA will not lose flexibility by only using four portfolios within each strategy to represent the breadth of analysis; rather, TVA is trying to represent the unique expansion plans within the strategies and not be repetitive.

It was decided that the four scenarios that accurately represent the breadth of possible impacts within the IRP study would be retained, meaning four portfolios within each of the three strategies. It was decided that within the three strategies, portfolios driven by Scenario 1 (aggressive load growth), Scenario 2 (medium growth), Scenario 3 (low load growth), and Scenario 7 (baseline resource portfolio) would be retained for the draft, meaning 12 portfolios will be included in the draft IRP. With these portfolios retained, both no build (Strategy E, Scenario 3) and aggressive build (Scenario 1 in Strategies C, E, and B) are both represented.

Within the unit addition schedules, purchased power agreement acquisitions (purchasing of PPA in the Valley), JSF combined cycle (Board approved) and Gleason combustion turbine (opportunity to refurbish existing CT at Gleason) are included. The rest of building is done by new units which would have to be constructed, with the exception of Watts Bar and Bellefonte, which is partially constructed (but, it has not been decided what action will be taken at Bellefonte). The renewable portfolios represent both in Valley and outside the Valley resources. There is a noticeable break at 2015 primarily because TVA is planning on doing another IRP evaluation by 2015 in order to make sure TVA is still on the right track or to adjust TVA's path accordingly based on economic, legislative, and environmental conditions at this time, among others.

Gary showed another way to look at the range of capacity additions by type at the summer peak (MW) by showing three snap shots of this in 2014, 2021, and 2028. This is another way to view the boundaries of the portfolios (split by supply and demand side).

IV. **Next Steps**

A "next step" that is already underway includes the sensitivity analyses that were mentioned earlier. Some sensitivity analyses have already been completed including:

- Take out the pumped hydro storage from Strategy C and see how that impacts short term rates (sensitivity C1)

- This sensitivity (C1) actually had a better score than Strategy C and became the top ranked strategy
- Take out pumped hydro storage and limit build out in Strategy C (sensitivity C2)
- Greater fossil layups than Strategy E (sensitivity E1)
- Lower renewable portfolio than Strategy E (sensitivity E2)
 - Both sensitivities E1 and E2 scored lower than Strategy E itself. This is due to: implementing a larger amount of fossil layups means more capacity must be built which means higher cost (E1); When the renewable portfolio is reduced, have to make up for this lost capacity (E2)

Other sensitivities considered by TVA and suggested by stakeholders:

- Other fossil layups in Strategy C
- Increment/decrement around level of EEDR in Strategy C (try to see where “knee” of curve is)
- Increment/decrement around level of renewable
- Create a Scenario 8 which will reflect the current planning strategy
- Assess constraints in Strategy E such as releasing the constraint on when nuclear can be built
- Test deferral of nuclear expansion until 2020
- Look at gas only (no nuclear or coal)
- Aggressive EEDR portfolio that targets 50% of the energy gap beginning 2015

TVA is sending the draft IRP to the EPA on September 15 with the expected Notice of Availability to be published in the Federal Register on September 24, which will begin the 45 day public comment period. April 2011 is still the target for the Board to take action in choosing a strategic direction to support TVA’s vision.

There was discussion about when the next SRG meeting should be held. It is preferred to be held when the bulk of the sensitivity analyses are run so that the results can be shared with the SRG.

Van Wardlaw thanked the SRG for their time and input. Van reminded the SRG that while TVA is not perfect, there is a new day dawning at TVA and TVA is starting to set the plan for where it will be going in the future, which has been possible with guidance provided from the SRG.

The meeting was adjourned.