

Regional Energy Resource Council Minutes December 18, 2018

Tennessee Valley Authority Regional Energy Resource Council December 18, 2018 Meeting Minutes

The Tennessee Valley Authority (TVA) Regional Energy Resource Council (RERC or Council) convened for the fifth meeting of its third term at 9:00 a.m. Eastern on Tuesday, December 18, 2018, at the Knoxville Hilton Downtown, 501 West Church Avenue, Knoxville, Tennessee 37902.

Council members attending:

Wayne Davis, Chair	Rodney Goodman (by phone)	Michael Butler
Doug Lawyer	Peter J. Matheis	Jennifer Mundt
Stephen Smith	Susan R. Williams	Dan Ionel
Jeremy Nails	Doug Peters	Lloyd Webb

Designated Federal Officer (DFO): Joe Hoagland

Alternate Designated Federal Officer: Amy Henry

Facilitator: Jo Anne Lavender

Appendix A identifies the TVA staff, members of the public, and others who attended the meeting.

Appendix B is the agenda for the meeting.

Appendix C contains the advice statement voted on by the Council.

Copies of the presentations given at the meeting can be found at <http://tva.gov/lerc>.

1. **Welcome**

Joe Hoagland, DFO (Enterprise Relations) and Dr. Wayne Davis (Chair of the Council) opened the meeting by welcoming everyone. Rodney Goodman participated by telephone.

2. **Safety Moment, Overview of Agenda, Meeting Protocols**

Ms. Lavender, Facilitator, covered the meeting protocols in her presentation (see Slide 9). She also informed the Council members that there are two questions (Slide 8)

Regional Energy Resource Council Minutes December 18, 2018

on which TVA is seeking advice from the Council, assuming the presence of a quorum to take a vote.

3. DFO Update

Joe Hoagland provided a recap of the four meetings held for Term 3 of the RERC, a TVA update, and the purpose for today's meeting (See Slides 10 to 13).

- At the first two meetings of the Council's third term (held in November and December 2017), the RERC provided advice on the principles that TVA should consider when designing wholesale rate changes and the mechanisms to use to engage Valley stakeholders when making those changes. At the third meeting (held in June 2018), the Council provided advice on focus areas for the 2019 IRP and how to engage the public in the development of this IRP. At the fourth meeting (held on September 5, 2018), the Council provided its sentiments surrounding the scenarios and strategies covered in the 2019 IRP.
- At today's meeting, staff would provide information on the progress with development of the IRP, the associated Environmental Impact Statement (EIS), and the metrics and scorecards to evaluate various scenarios. Subsequently, TVA would seek advice from the Council on (1) the ability of the metrics and scorecards to distinguish and communicate results; and (2) the considerations for TVA as it applies the metrics in the planning process.
- The DFO stated that this past year was a good year for TVA's finances as a result of measures taken to improve efficiency and reduce operating costs.
- Approximately 50 percent of the energy produced by TVA this past year was from carbon-free sources, and this figure is expected to reach a target of 60-percent, carbon-free generation by 2020.
- TVA met the highest 24-hour demand during this past year.
- TVA completed Allen combined cycle plant in Memphis and finished the air pollution control upgrades at Shawnee.
- TVA completed the power uprates at the Browns Ferry Nuclear plant (460 MW).
- TVA managed the river system to minimize flooding despite the fact that rainfall was 12 inches above normal.
- TVA's economic development efforts resulted in adding or retaining 65,000 jobs. Its economic development activities were ranked in the top 10 among utilities in the U.S. for the 13th consecutive year.
- TVA helped with efforts to provide relief during Hurricane Florence.
- With the announcement of the retirement of CEO Bill Johnson, the Board has established a search committee for a new CEO.

Regional Energy Resource Council Minutes December 18, 2018

- TVA terminated the contract for sale of Bellefonte nuclear units based on failure on the part of the purchaser to meet contract terms.
- Lloyd Webb asked for a copy of the new organization chart after the recent organization change in which Mike Skaggs was appointed the Chief Operating Officer.

4. **2019 IRP Update (Brian Child)**

Brian Child provided an update of the IRP process (Slides 19-25).

- The 2019 IRP has focused on three areas: System Flexibility, Distributed Energy Resources, and Portfolio Diversity.
- Brian outlined the scenarios and strategies addressed in the 2019 IRP (Slide 23).
- Brian provided the schedule for development of the IRP, indicating that TVA is roughly at the mid-point of the IRP process. (Slide 24).
- The stakeholders involved in the IRP Working Group (IRPWG) have helped TVA develop the IRP. The ninth meeting of the IRPWG would be held on December 19-20, 2018.

5. **2019 IRP Update (Amy Henry)**

Amy Henry covered the IRP process from the standpoint of stakeholder engagement and public outreach (Slides 27-36).

- Amy indicated that as a federal agency, TVA complies with the National Environmental Policy Act (NEPA) while undertaking federal actions, including this action to develop an IRP.
- Amy described the public outreach tools used by TVA (social media, public webinars, video series, etc.) in developing the 2019 IRP.
- Under NEPA, TVA will provide a 45-day comment period to enable the public to provide comments on the Draft EIS.
- TVA's 2019 IRP website has had around 8,000 views so far with an average time of 2.5 minutes per visit.
- Keeping stakeholders engaged helps create a better IRP/EIS document, keeps people informed, aids in the public understanding the IRP process, and leads to better outcomes.
- Amy covered TVA's environmental justice review in the IRP process, providing some of the basics for this review under Executive Order 12898.
- The minority population in the TVA region is at 21-22 percent at the block level, while the low-income population is at 19-20 percent at the block level.

Regional Energy Resource Council Minutes December 18, 2018

- TVA's public outreach efforts are aimed at reaching minority and low-income populations by using alternative language format, target-specific messaging, and the use of easy (understandable) language.
- Wayne Davis asked about the 8,000 views on TVA's IRP website, and how this compares with the Valley population. Joe Hoagland indicated that a total of 8,000 views constitutes an eight-fold increase from the past IRP. However, the numbers are not at the recommended levels considering that there are 4.5 million households in the Valley. Amy Henry indicated that the fact that many households may not have access to the internet affects (at least partly) TVA's outreach efforts.

6. Public Comment Session

Members of the public did not provide any comments at this Council meeting.

7. 2019 IRP Update (Jane Elliott)

Jane Elliott provided an IRP update, focusing on scenario design, resource planning framework, final resource options, final strategy design and metrics (Slides 41-60).

- Scenarios test the bounds as they cover different future worlds; the assumptions play on the load shape.
- The load outlook (peak and energy) for the different scenarios is shown in Slide 43.
- The behind-the-meter impacts on certain resources (EV, EE, renewables and CH&P) are shown in Slide 44.
- In planning for an evolving system, reserve margin targets are of great importance, especially during the winter.
- Integration cost recognizes the sub-hourly costs that are driven up by integrating more intermittent, renewable resources onto the system.
- Incorporating highly flexible resources (such as aero-derivatives) onto the system provides flexibility benefits.
- The planning models and the Reserve Margin Study are hourly in granularity; however, the Flexibility Study identifies the sub-hourly impacts of intermittent resources (such as renewables) and highly flexible resources (such as aero-derivatives) so that these impacts can be captured in the hourly planning models.
- The seasonal (summer and winter) risks are balanced to achieve 0.1 LOLE (i.e. one Loss of Event in 10 years).
- TVA conducted the seasonal risk study in two ways: (1) CT only, and (2) CT and Solar.

Regional Energy Resource Council Minutes December 18, 2018

- The seasonal risk study indicates that if TVA system has more solar on it during the next years, the optimum reserve margin would be 17% in summer and 25% in winter. The current (2018) position is 20% in summer and 30% in winter.
- Incorporating intermittent resources (wind and solar) on the system requires the balance of the system to respond to their variability, which drives up the integration cost.
- Solar generation in summer matches up well with the summer peak, and integration cost for solar that is lower than previously thought.
- Solar costs are similar from 2500 MW up to 5500 MW, with 5500 MW being an inflection point beyond which integrations costs begin escalating.
- Wayne Davis asked about the extent to which the onus for backup of solar (in the form of battery storage) can be placed on behind-the-meter (btm) providers of storage. Jane answered that the model assumes some btm storage, but there is uncertainty as to how the btm provider would use that storage.
- Lloyd Webb asked whether TVA developed the cost for the resources in Slide 52. Jane responded that the costs for some of the resources were based on TVA's own experience. For other resources such as fuel cells, where TVA lacked first-hand experience, TVA relied on the data from EPRI or in the Navigant Study.
- Lloyd Webb also asked whether the study accounts for the life of fuel cells. Jane responded that the data considers the life of resources, but these life periods are variable.
- Stephen Smith asked about the basis for the SMR cost (in Slide 52) since there is no experience with SMRs and it is an unproven technology. Jane responded that the SMR cost was based on data from TVA's work with DOE, and Navigant also reviewed this information. Stephen Smith also asked about the narrow bandwidth for SMRs (Slide 52), especially in comparison to the broader width for the Advanced Pressurized Water Reactors. Joe Hoagland responded that the vendor's belief was reflected in the narrow width for SMRs.
- Doug Peters asked about the "DR" category in Slide 53. TVA responded that this represents the aggregation of space conditioning and water heating for peak shaving purposes.
- Jane discussed the retirement options for coal and gas. The window for retirement of certain gas units (CTs), Shawnee uncontrolled coal units and Paradise Unit 3 opens up as early as 2020. The same slide also reflects the window for Browns Ferry retirements when the units come up for relicensing in 2033-36.
- Stephen Smith asked whether the cost for replacing the rotor on Paradise Unit 3 would be considered in the retirement decision. Joe Hoagland responded that it would be considered.

Regional Energy Resource Council Minutes December 18, 2018

- On strategies, Jane explained that the strategies promote certain resource types or characteristics by promoting DER, resiliency, efficient load shape or renewables.
- For some resources such as DER, there is an overlap between scenarios and strategies.
- Strategies promote adoption of certain resources by providing incentives at 50% or 100% marginal cost. For most resources, this is the marginal energy cost except for DR where the marginal capacity cost is applied.
- Jane discussed the Strategy Design Matrix in Slide 58.
- The distributed resource modeling methodology (Slide 59) affects market depth and pace of adoption.
- Mike Butler asked whether TVA bakes in the natural resource impacts in the modeling methodology. Jane indicated that natural resource impacts are considered in the metrics. Joe stated that the models are economic and that TVA considers other things such as natural resource impacts through the metrics.
- Jane discussed the running list of planned sensitivities to be assessed in the IRP process (Slide 60).
- Mike Butler expressed concern that the accelerated pace of development of utility solar could affect greenfield areas in the future. He would like to engage with TVA on this issue outside of the IRP process.
- Lloyd Webb would like sensitivities to be built around regulatory changes. Jane indicated that this was primarily reflected in the Decarbonization scenario. Lloyd stated that the regulatory changes should be picked up in all scenarios. Jane indicated that TVA could consider another sensitivity around gas prices.

8. IRP Update – Metrics and Scorecards

Hunter Hydas discussed the metrics that would be used to compare portfolios; and how these metrics would be combined to create a scorecard for each strategy. (Slides 62-76).

- At the outset, Hunter stated that the metrics are intended to align with TVA's mission and strategic imperatives: delivering affordable, reliable power; environmental stewardship; and economic development.
- There are two types of metrics: primary metrics (that are well-understood and reflect industry standard measures); and secondary metrics (that are advanced and developmental).
- All metrics are weighted equally.

Regional Energy Resource Council Minutes December 18, 2018

- Hunter discussed the primary metrics (Slide 65) and how they are aligned with TVA's mission.
- Hunter indicated that Total Resource Cost (TRC) is a new metric. In assessing the TRC, utility and distributed resources receive the same incentive; for a distributed resource, the TRC accounts for both the TVA modeled cost (incentive) and the participant cost.
- Net load is a NERC-accepted metric for evaluating flexibility needs to accommodate VERs. Under California ISO's (CAISO) flexible capacity needs assessment, consideration is given to understanding the negative contributions of load to the three-hour net load ramp.
- Hunter discussed the secondary metrics on Slide 71. Among the secondary metrics, net CO2 emissions, water consumption by basin, and land use are the new metrics for the 2019 IRP.
- Land use metric represents just the footprint of the resource (plant).
- Net CO2 emissions are depicted in Slide 72. While beneficial electrification results in more CO2 from TVA's generation, there is a net reduction as a result of avoided CO2 from other sectors.
- Hunter showed an example (Slide 76) of the 2019 IRP Scorecard. A scorecard will be prepared for each strategy across the scenarios.
- Mike Butler asked about the difference between primary and secondary metrics. Hunter indicated that the primary metrics are more mature while the secondary metrics are newer. Mike indicated that it would be good to bring primary and secondary metrics together in some way.
- Stephen Smith asked why life-cycle acreage for mining of coal was not considered. Hunter indicated that this was not done because of the difficulty of determining how much coal from a mine can be ascribed to a particular plant. TVA realizes that this metric is not perfect, but it bears noting that the metrics are not an output of the model, but something applied to the output to evaluate the portfolios.
- Wayne Davis indicated that "secondary" should not imply that the metric is less important, just that we do not have enough experience with them. "Land" may not be secondary in the long term.
- Jennifer Mundt asked how existing storage areas are accounted for in the stewardship paradigm. Hunter indicated that existing use is not considered in the "land" metric. Jennifer stated that there should be a way to show how land use changes as we make a transition from current resources to future resources.

9. **2019 IRP Environmental Impact Statement (Ashley Pilakowski)**

Regional Energy Resource Council Minutes December 18, 2018

Ashley Pilakowski discussed the organization of and the analysis in the 2019 IRP EIS (Slides 79-90).

- Ashley discussed the organization of the five main chapters of the EIS (Slides 79-84)
- Ashley also discussed the impacts quantified in the EIS: CO2 emissions, water consumption, land use and coal combustion residual production (Slides 85-87).
- Life cycle GHG emissions and land requirements were then presented (Slides 88-91).
- Lloyd Webb asked whether other utilities prepared an EIS. Brenda Brickhouse answered that the EIS is prepared under the National Environmental Policy Act, which applies only to federal agencies.
- Lloyd Webb also asked whether the EIS analysis would affect the IRP. Joe Hoagland answered that TVA may do additional sensitivity runs based on comments on the Draft EIS. Ultimately, the environmental impacts would inform TVA's IRP analysis.
- Susan Williams asked whether the new CEO could decide not to support the IRP analysis. Joe Hoagland indicated that the IRP evaluation and analysis is unlikely to change as a result of a new CEO. It could be that a new CEO may be supportive of an alternative different from the one TVA originally supported.

10. RERC Discussion on Advisory Questions

The Council discussed the two questions: (1) TVA's primary objectives in developing metrics and scorecards are to distinguish individual portfolio outcomes to evaluate differences and to clearly communicate results. How well do you think that the metrics identified and scorecard designed accomplished these objectives? (2) What should TVA consider as it applies these metrics and scorecards in the IRP and EIS?

The salient features of the discussion on these questions are recounted below.

- Referring to the metrics on Slide 71, Lloyd Webb indicated that the top line refers to cost and asked whether the IRP would also determine what this looks like on a cash basis to determine whether this influences the debt target at all. Joe Hoagland answered that the IRP would not make this determination. Rather, this would be the next step taken as part of TVA's long range financial planning.
- Jennifer Mundt stated that life cycle costs should look at the impact of the existing fleet and not just the projected fleet expansion when it comes to applying the environmental metrics.

Regional Energy Resource Council Minutes December 18, 2018

- Dan Ionel stated that TVA should consider the transmission system impacts, *i.e.*, the impact of resources on the transmission system.
- Wayne Davis stated that the metrics and scorecard do a reasonable job in helping distinguish individual portfolio outcomes, except that the use of the terms primary and secondary metrics should be replaced with other terms such as traditional and emerging metrics.
- Lloyd Webb stated that the costs should be spelled out so that people can see the full consequences of each portfolio. He was concerned that TVA is constrained by debt and that rates could be impacted. Laura Campbell indicated that the debt constrain would be there until 2023.
- Rodney Goodman stated that the land metric should be more clearly defined.

Based on the discussions, advice statements in response were drafted by the Council members in response to the two questions. The advice statements are included in Appendix C.

11. Formulation of Advice Statement

Based on discussions among the Council members, the Council jointly prepared advice statements to reflect a summary of the discussions among the participating members.

Under the RERC Bylaws and Operating Procedures, 11 voting members constitute a quorum for the conduct of business. The Bylaws also provide that any recommendation by the Council to TVA requires an affirmative vote of at least a simple majority of the total membership present on that date. A quorum was established as 11 members voted on the advice statement. All 11 votes were in favor of adopting the advice statement. The Advice Statement is included in Appendix C.

Dr. Wayne Davis thanked members for their input and for a great discussion on the IRP. The meeting adjourned at 4:00 p.m. Eastern.

Minutes approved:



Dr. Wayne Davis, Council Chair

Date: 03/20/19

Regional Energy Resource Council Minutes December 18, 2018

Appendix A Non-Council Meeting Attendees

TVA Staff			
Jane Elliott	Hunter Hydas	Michael Clavell	Jessica Coleman
Amy Henry	Jo Ann Lavender	Ashley Pilakowski	Khurshid Mehta
Barbie Perdue	Michael Scalf	Liz Upchurch	Brian Child
Brenda Brickhouse			

Members of the Public In Attendance
n/a

Other
TVA Office of the Inspector General
TVA Police

Regional Energy Resource Council

December 18, 2018

Hilton Downtown Knoxville

501 West Church Avenue, Knoxville, TN 37902

Tuesday, December 18, 2018	
All times are EST	
9:00	Welcome - Joe Hoagland, Designated Federal Officer; Chancellor Wayne Davis, Chair; Jo Anne Lavender, Facilitator Safety Moment – Building Emergency Plan – Lavender Introductions – Lavender
9:10	TVA Update - Hoagland Meeting Purpose & Recap of September 5, 2018, Meeting- Hoagland
9:25	IRP Update: <ul style="list-style-type: none">• Overview of IRP Status – Brian Child• Public Engagement Status – Amy Henry
9:45	Break and prepare for public comment period
10:00	Public Comment Period
11:00	Break
11:15	IRP Update: Modeling, Metrics and Scorecards Final Scenarios and Strategies Jane Elliott and Hunter Hydas
12:15	Lunch Break
1:15	IRP/EIS Update: EIS Overview and Update and Environmental Impacts Assessed in the EIS 15 min Pilakowski
1:45	Council Discussion- Lavender
2:45	Break
3:00	Form Advice Statement – Lavender and RERC
4:00	Wrap up & Adjourn- Hoagland/Davis

Appendix C

Regional Energy Resource Council

December 18, 2018

**Advice Statement Adopted by the TVA Regional Energy Resource Council by a
Formal Vote**

The RERC has reviewed the metrics and scorecards planned for use in evaluating the 2019 Integrated Resource Plan portfolios. The RERC believes that the metrics and scorecards developed represent a reasonable basis to evaluate the differences and trade-offs among the various portfolios. However, to increase clarity for the public, TVA should consider renaming the metric categories to more meaningful titles such as Traditional instead of Primary, and Emerging or Developing instead of Secondary.

We understand the land-use category is a developing metric that may need further refinement by staff. Further, the RERC suggests that metric definitions be included to increase general understanding. TVA should also consider meshing the financials with the metrics to increase broader understanding of the impacts of the strategies. The RERC looks forward to reviewing the draft IRP and EIS where the draft portfolios will be fully described and the metrics and scorecards applied.