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FACT SHEET: TVA'S ENVIRONMENTAL AND ENERGY FUTURE

TVA has developed a final Integrated Resource Plan (IRP), entitled *TVA's Environmental and Energy Future,* to guide TVA in meeting future electricity demand through 2029. The IRP's final recommended planning direction will be presented to TVA's Board of Directors for approval at the April 14th board meeting.

The recommended planning strategy will be presented to the Board in the form of ranges pertaining to various key elements of TVA's operations.

The IRP's recommended planning direction contains, among others, the following guidelines:

Component	Guideline Range	Window of Time
Coal Capacity Idled	2,400 – 4,700 MW	By 2017
Renewable Energy Additions	1,500 – 2,500 MW	By 2020
Energy Efficiency	11,400 – 14,400 GWh[1]	By 2020
Nuclear Additions	1,150 – 5,900 MW	2013 - 2029
Coal additions[2]	0 – 900 MW	2025 - 2029
Natural gas additions	900 – 9,300 MW	2012 - 2029

As a member of TVA's Stakeholder Review Group charged with providing input into the IRP process, Southern Alliance for Clean Energy Executive Director Dr. Stephen A. Smith closely tracked the development of the recommended planning direction over the past 16 months. Based on this experience, SACE has several observations that put the IRP's recommended planning direction in a more revealing light:

- **TVA can idle the full 4,700 MW of coal-fired generation with essentially no additional cost or risk to the agency.**

The results of TVA's analysis of the cost and risk associated with various levels of coal idling are shown below.

[1] GWh stands for Gigawatt-hour, which is a measure of electricity generated, as opposed to MW, which is a measure of capacity for a given resource.
[2] Coal additions are assumed to include carbon capture technology that is not expected to be commercially available until 2025 or later.

	Idled Capacity	Scenarios		
		Scenario 1	Scenario 3	Scenario 8
PVRR (2010B$)	2,400	170.9	108.6	123.1
	3,200	172.4	108.0	123.1
	4,000	175.3	107.6	122.0
	4,700	177.6	108.2	122.5

PVRR = Present Value of Revenue Requirements for a given strategy. Numbers represent the estimated cost of a given plan over the course of the planning period (through 2029).

Short-term Rate Impacts $/MWh (level 2011 – 2018)	2,400	82.24	74.00	76.79
	3,200	82.49	73.21	76.74
	4,000	82.85	72.55	76.56
	4,700	83.56	72.90	76.92

Short-term rate impacts were measured only through 2018 due to high levels of uncertainty beyond TVA's control in the outer years of the planning period.

Risk/Benefit Ratio	2,400	1.41	0.88	1.07
	3,200	1.41	0.90	1.07
	4,000	1.39	0.94	1.08
	4,700	1.39	0.95	1.08

Risk/Benefit Ratio is the potential of exceeding the expected PVRR versus the potential benefits of not exceeding the expected PVRR. Lower values represent a more favorable ratio.

Risk Ratio	2,400	0.229	0.086	0.142
	3,200	0.232	0.091	0.143
	4,000	0.228	0.097	0.148
	4,700	0.227	0.100	0.149

Risk Ratio represents the potential of exceeding the expected PVRR. Lower values imply that there is less risk in exceeding the expected value.

In almost every case, the difference between idling 2,400 MW and 4,700 MW is less than 5% in the respective cost or risk metric. In several instances, this difference actually favors higher levels of coal-fired idling. In cases where there is a more significant difference, the higher levels of idling are favored as frequently as the lower levels.

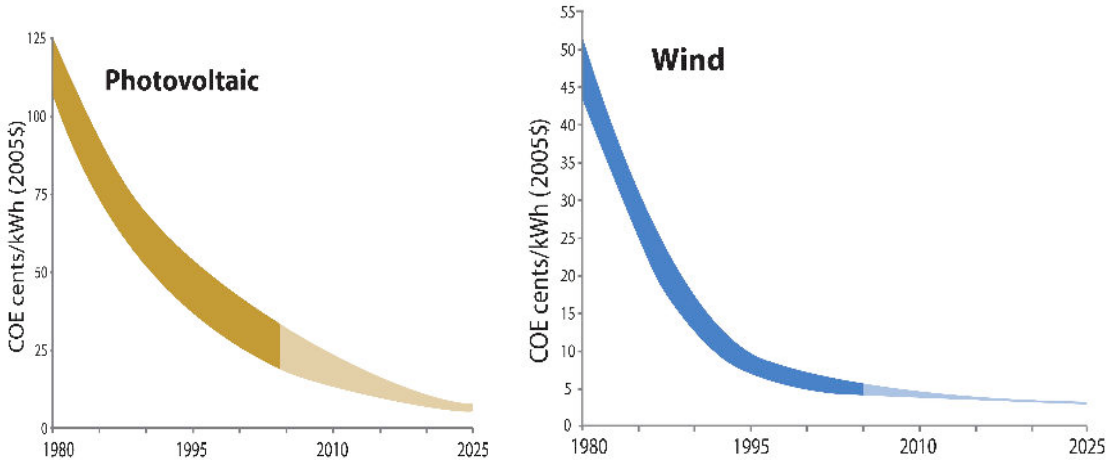
These results indicate that a Board directive to pursue 4,700 MW of coal-fired idling does not appear to add significant levels of either cost or risk to TVA's long-term strategy. Given the environmental and human health benefits of a portfolio that is less dependent on coal, idling the full 4,700 MW of coal-fired generation appears to maximize benefits to Valley residents.

- **TVA's analysis of renewable resources lacks the sophistication given to other resources, which results in a flawed recommendation for future additions.**

  The IRP's recommended planning direction calls for between 1,500 and 2,500 MW of additional renewables by 2020. However, these numbers include the more than 1,600 MW of wind power for which TVA has already contracted and will purchase from sources outside the Valley. This means that the IRP actually recommends renewable energy additions in the range of 0 to 900 MW by 2020.

  The issue is not that renewable energy resources cannot compete with other resource options. What SACE has observed over the past 16 months of engaging in the IRP process is that TVA staff used seriously flawed assumptions about renewable energy to drive the model's selection of these resources.

  As an example, the IRP's analysis does not take into account the well-documented declining cost curves of renewable energy options. Shown below are cost curves for solar PV and wind resources that were developed by the National Renewable Energy Laboratory.[3] The figures show not only the historical declines in price, but also the forecasted continuation of price declines for these resources.



Source: NREL Energy Analysis Office (www.nrel.gov/analysis/docs/cost_curves_2005.ppt)

The IRP does not take these declining cost trends of renewable energy options into consideration when selecting resources to add to TVA's portfolio. In addition, TVA has not conducted appropriate resource potential studies; nor does the

[3] The National Renewable Energy Laboratory (NREL) is a research lab specifically focused on the study of renewable energy and energy efficiency. It is federally funded through the Department of Energy.

model take into consideration increasing efficiencies that renewable energy options are forecasted to experience in the future.

By comparison, TVA's model does take into consideration detailed cost estimate forecasts and anticipated technological improvements in its analysis of coal, nuclear and natural gas when selecting resources to add to TVA's generation portfolio.

TVA's lack of sophistication regarding the potential for renewable energy resources means that these resources compete at a significant disadvantage to other resource options. As a result, the IRP's recommended planning direction does not include the appropriate amount of renewables that would maximize benefits for TVA and its ratepayers.

- **TVA should be pursuing higher levels of energy efficiency.**

  The recommended planning direction recommends between 11,400 and 14,400 GWh of energy efficiency by 2020. 14,400 GWh of efficiency by 2020 would represent approximately 8% of projected demand in 2020, or about 0.8% incremental gains in efficiency each year until 2020.

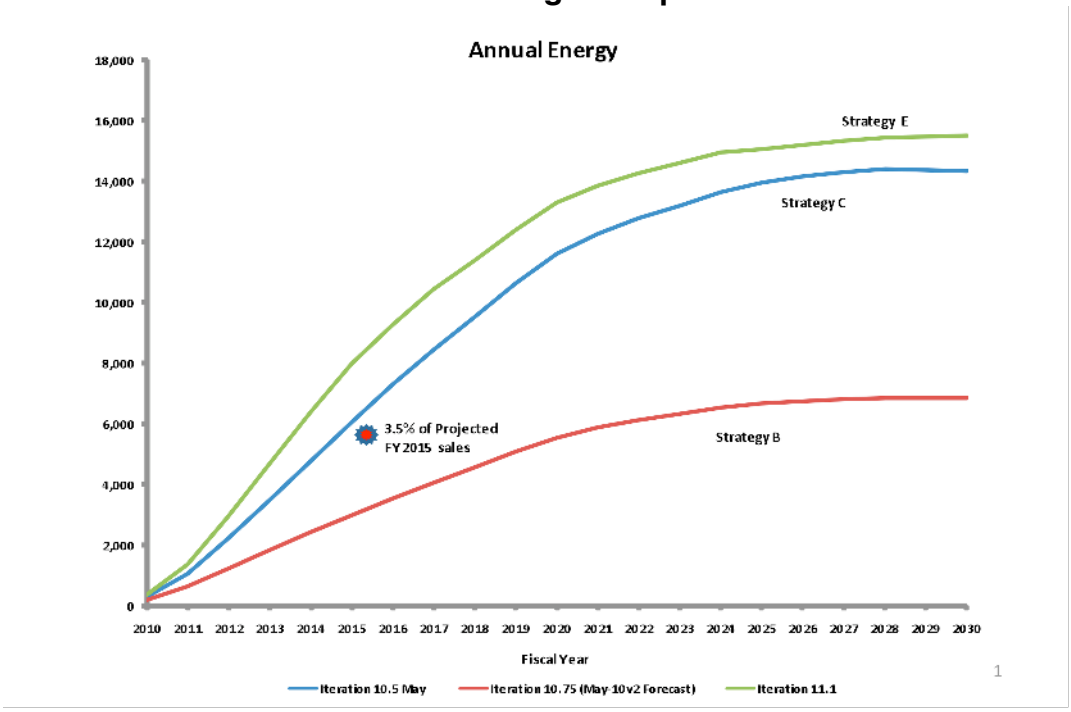
  While this level of efficiency would be a significant improvement over TVA's historical performance, it would still lag behind national best practices where utilities are achieving 1% or more per year.

  As with renewable energy resources, the limits on energy efficiency in the IRP are more a result of flawed TVA staff assumptions than a result of the true limitations of this resource. TVA staff is unwilling to rely on higher levels of efficiency because they erroneously believe that higher levels of efficiency are unattainable because of a variety of factors unique to the Valley. In fact, utilities across the nation under various circumstances, including rates comparable to those in the Valley, are achieving 1% or more in efficiency gains each year at a net benefit to ratepayers.

  What is more concerning, however, is the fact that, beyond 2020, progress in energy efficiency reaches a standstill in the IRP's recommended direction. The forecasted trajectory of TVA's proposed energy efficiency programs over the course of the planning period is shown below.[4] Note that all options level off significantly after 2020.

[4] These graphs are not generated by the model, but are created by TVA staff and inputted into the model as constraints on the model's ability to add efficiency to the resource mix.

EE/DR Program Inputs



As an example, the14,400 GWh by 2020 option discussed above rises to only about 17,000 GWh by 2030.[5] This scenario would represent approximately 8.3% of the estimated 203,000 GWh of demand currently forecasted, a gain of only 0.4% over 10 years, or approximately 0.04% annual incremental gains between 2020 and 2030.[6]

Utilities with experience in aggressively pursuing energy efficiency have learned that, as a resource, efficiency continues to provide reliable energy savings year after year. The incremental growth in efficiency provides benefits by allowing the utility to avoid the higher costs of new generation resources that would have otherwise been necessary to meet demand. If TVA were to model more realistic incremental gains in energy efficiency, it would likely project greater benefits for TVA and its ratepayers.

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[5] The graph shown is illustrative of the trajectory of TVA's various EE/DR inputs. However, the Y-axis represents energy savings levels at the end-use meter taking into account approximately 6.6% line loss. Therefore, to compare these numbers with previous estimates given by TVA staff, it was necessary to adjust these estimates upward by 6.6% for an "apples-to-apples" comparison.

[6] TVA staff have agreed to run sensitivity runs of the IRP model that allow for greater incremental gains in efficiency in the final decade of the planning period. However, it is our understanding that this analysis will not be integrated into the determination of a preferred alternative, but instead will be relegated to a "next steps and discussion" section.

- **Because of the issues discussed above, TVA's nuclear future remains uncertain.**

  Addressing the shortcomings of the IRP regarding efficiency and renewables will likely provide TVA significant financial benefits in the form of greater flexibility surrounding potential investments in new nuclear generation.

  It is no coincidence that the recommended direction calls for significant levels of additional generation, primarily nuclear, as efficiency and renewable resources dwindle in the outer years of the planning period. Addressing the artificial constraints in the current models for energy efficiency and renewable energy would allow these resources to fill part or all of the forecasted capacity needs in 2020 and beyond.

  More appropriate levels of efficiency and renewable energy would offer TVA greater financial flexibility to delay, or possibly avoid altogether, the enormous and risky investments necessary to develop additional nuclear sites or other large baseload generation resources. Even a two- or three-year delay in the need for a multi-billion dollar investment provides significant financial benefits to TVA and ultimately reduces costs for Valley residents.

  In all, the IRP process has been a productive process that will lead to significant improvements in how TVA meets future energy demand and engages with Valley Stakeholders. However, the issues discusses above must be addressed to ensure the Valley's energy future is one that maximizes benefits to the Valley's residents and businesses.

  The Southern Alliance for Clean Energy welcomes the opportunity to discuss these issues further and review other aspects of TVA's IRP with interested media over the coming weeks.