



REGION 4

ATLANTA, GA 30303

March 25, 2024

Ms. Chevy Williams
NEPA Specialist
Tennessee Valley Authority
1101 Market Street BR2C-C
Chattanooga, Tennessee 37402

Re: EPA Comments on the Final Environmental Impact Statement for the Kingston Fossil Plant Retirement, Roane County, Tennessee; CEQ No: 20240031

Dear Ms. Williams:

The U.S. Environmental Protection Agency reviewed the referenced document in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act. The CAA Section 309 role is unique to the EPA. Among other things, CAA Section 309 requires the EPA to review and comment publicly on any proposed federal action subject to NEPA's environmental impact statement requirement and to make its comments public. In addition to our Section 309 role, the EPA is a cooperating agency on this project. Our review has determined that the Final EIS fails to address numerous EPA concerns identified with the Draft Environmental Impact Statement and the lack of transparency prevents us from understanding TVA's treatment of several important issues. Thus, the Final EIS is inadequate. The EPA requests that Tennessee Valley Authority prepare a supplemental EIS in accordance with 40 CFR 1502.9(d).

The Tennessee Valley Authority issued a Final EIS to evaluate the impacts of the proposed retirement and demolition of nine units of the Kingston Fossil Plant, and the addition of increased generation capacity as compared to the retired units. The KIF is situated on a 2,254-acre reservation at the confluence of the Clinch and Emory Rivers in Roane County, Tennessee. The nine-unit, coal-fired steam-generating plant was designed with a summer net generating capacity of 1,398-megawatts. According to the Final EIS, the Proposed Action would retire and decommission the nine coal-fired units by the end of 2027 and provide replacement generation that can supply at least 1,500 MW of firm, dispatchable power with the capacity for modest load growth, which the Final EIS identifies as consistent with TVA's 2019 Integrated Resource Plan and near-term energy production goals.

TVA developed and analyzed the No-Action Alternative, the preferred alternative, and one additional alternative. TVA identifies Alternative A as the preferred alternative, which involves the retirement and demolition of the KIF, and the construction and operation of a 1,500 MW minimum capacity combined cycle and aeroderivative combustion turbine natural gas plant at the same site. Alternative A also requires construction of a proposed 122-mile natural gas pipeline extending through Roane, Morgan,

Fentress, Overton, Jackson, and Smith counties, TN. That new natural gas plant would need to comply with reasonably foreseeable regulations of the carbon emissions from fossil fuel units. Alternative A also includes a 3 to 4 MW solar site and a 100 MW battery energy storage system. Alternative B consists of the retirement and demolition of the KIF and the construction and operation of 1,500 MW of utility-scale solar generation and 2,200 MW of battery energy storage systems.

As a cooperating agency, the EPA provided recommendations on the Draft Environmental Impact Statement, as well as the administrative Draft and Final EIS documents. Our concerns included the limited range of alternatives evaluated by TVA; the failure to show how the tax and other incentives provided by the Inflation Reduction Act affect the costs of each option; the costs of future regulations on new fossil fuel generation; the methodology for the evaluation of social cost of GHG and calculation of air pollutant emissions; Federal GHG emissions reduction policy and goals; and the incomplete assessment of impacts on communities with environmental justice concerns.

The EPA acknowledges the positive impact that the retirement of the KIF could have on air quality and the reduction of greenhouse gas emissions, though these reductions are much smaller for the preferred alternative than under Alternative B. Further, while some of the recommendations provided in the EPA's June 29, 2023, letter in response to the Draft EIS were incorporated in the Final EIS, TVA did not accept many of the EPA's recommendations, including those related to climate change or GHG emissions reductions. These include:

- Avoid defining the purpose and need of the project too narrowly, such that it is only fully met by the preferred alternative;
- Evaluate a reasonable range of alternatives that considers at least one alternative for formal analysis that provides for a decarbonization transition strategy at KIF;
- Update the air quality analysis and emissions estimates to use the best available data for the facility level analysis;
- Remove the outdated 2020 Social Cost of GHG estimates and only using estimates that represent the best available science;
- Discuss disproportionate impacts specifically from GHGs;
- Incorporate practical mitigation options to reduce GHG emissions; and
- Incorporate the considerable tax incentives for adopting carbon capture and storage, established under the IRA (for example, the Final EIS's failure to reflect the 45Q tax incentives results in a substantial overestimate of the costs of carbon capture).

Our concerns continue to be substantial, and the EPA requests that the relevant portions of the Final EIS be revised and made available for public comment in a supplemental EIS. Specifically, the Final EIS does not disclose essential information underlying the key analysis of the costs of each option, underestimates GHG and criterial pollutant emissions, fails to consider a reasonable range of feasible alternatives including more environmentally protective alternatives that do not lock-in fossil fuel generation, and inadequately considers impacts on communities with environmental justice concerns.

Given these serious deficiencies, the Final EIS does not satisfy the requirements of NEPA and its implementing regulations. Addressing the deficiencies through a supplemental EIS would strengthen the defensibility of the Final EIS and ensure that TVA's final decision is fully informed.

As discussed in the EPA’s detailed comments in the enclosure and comments on the Draft EIS, the EPA recommends that TVA’s supplemental EIS include a reasonable range of alternatives, consider all reasonably available mitigation, account for factors related to considering impacts from GHG emissions that TVA balanced in making its decision on the selected alternative, and address the serious inconsistencies in the emissions estimates between the air permit application before the State of Tennessee and the estimates in the NEPA analysis. The EPA also recommends that TVA incorporate practicable mitigation measures to reduce GHG emissions and associated climate impacts from the preferred alternative, including considering an “adaptive management” strategy to periodically reassess demand reduction opportunities to decrease the amount of natural gas generation required from the Kingston electric generating units.

Further, the EPA recommends, once again, that TVA factor in significant IRA incentives and national GHG reduction goals and policies for this project and all near-term and future TVA actions, such as the Cheatham generation project. Lastly, the EPA recommends that TVA align its 2024 update to its IRP with its 2021 Strategic Intent and Guiding Principles, national science-based GHG emissions reduction policy goals, updated cost factors, IRA incentives, and technological advances that would reduce TVA’s overall reliance on fossil fuel generating capacity to meet future demand projections.

Most importantly, TVA dismisses the lower costs, lower financial risks (compared to future natural gas price volatility), and far superior environmental performance of Alternative B by arguing that solar cells could not be installed by 2027. The imperative of 2027 closure of the KIF is not adequately disclosed. If closure by 2027 is an imperative, then TVA created an alternative that is technically infeasible and therefore not a viable alternative. TVA should either clarify why 2027 is imperative and identify viable alternatives or revise the closure date.

The EPA appreciates the opportunity to review the Final EIS for the Kingston KIF Retirement and replacement project. The enclosure provides our detailed comments and recommendations. Additionally, we request a meeting with your agency to discuss our concerns and recommendations. We remain committed to working with you collaboratively and expeditiously to address our concerns and identify alternatives to achieve a more informed and environmentally protective approach to the retirement of the Kingston Fossil Plant, consistent with the fundamental purposes of NEPA, TVA’s decarbonization goals, and the global imperative to reduce GHG and other harmful pollutants.

To discuss our technical recommendations further, please contact Ntale Kajumba, Acting Strategic Programs Office Director, at Kajumba.Ntale@epa.gov or (404) 562-9620, or Douglas White of my staff at White.Douglas@epa.gov or (404) 562-8586.

Sincerely,

Jeaneanne M. Gettle
Acting Regional Administrator
Office of Regional Administrator

Enclosure: Detailed Comments on Kingston Fossil Plant Retirement FEIS

Enclosure
Detailed Comments on the Final Environmental Impact Statement
for the Kingston Fossil Plant Retirement
CEQ No: 20240031

Range of Alternatives

Preferred Alternative Remains Unchanged from Draft EIS

While TVA provided additional information in response to the EPA's previous comments, the Final EIS does not incorporate any additional measures to avoid or reduce impacts from GHG emissions. TVA continues to state in the Final EIS that the preferred alternative is consistent with its 2019 IRP. However, as the EPA noted in its Draft EIS comments, there have been significant statutory, regulatory, and technology changes since the development of the non-binding 2019 IRP. For example, the IRA and anticipated future policies and rulemakings significantly affect the analysis of each alternative by impacting aspects of the energy market, such as energy prices and demand and supply, as well as the underlying cost of technologies. Failure to fully include the long-term implications of these changes and tax incentives offered by the IRA distort the cost of each alternative.

TVA states that they considered the IRA and its benefits but still argue solar would not meet their purpose and need by 2027 due to short-term limitations in developing new solar facilities. This limited focus is misleading because it discounts longer term IRA benefits to ratepayers and national climate goals. The EPA believes TVA could consider a more balanced alternative that would include both natural gas and a larger solar component to meet TVA's goal of providing short-term dispatchable power while incorporating more renewable energy. TVA also failed to show why the alternative needs to be online by 2027. Given the enormous cost savings, low risk, and dramatic environmental advantages of solar energy, TVA should be open to opportunities to be more flexible about when the new project becomes available.

The IRS published final regulations that describe rules for elective payment of applicable credits on March 11, 2024.¹ The EPA reiterates its comments on the Draft EIS that the Final EIS should have considered the Direct Pay (Elective Pay) tax credits under the IRA as well as updated resources such as the U.S. Treasury Department's Final Rule on Section 45Q Credit Regulations, that provide clarity on how to use the credit for qualified carbon sequestration.² In addition to 45Q, the IRA includes several notable credits that are applicable for TVA: 44(a) renewable electricity production credit, 45Y clean electricity credit, 48C advanced energy project credit, and 48E clean investment credit. There are many publicized examples of electricity generators saving billions in costs from the IRA in their resource planning, including Xcel Energy in Minnesota (\$1.4 billion saved through 2034), and WEC Energy Group in Wisconsin (\$2.4 billion saved in its 5-year capital plan).³ The analysis of how the IRA changes the costs of both alternatives needs to be more transparent and brought into the main body of the EIS; not relegated to an appendix. As we noted, other utilities are incorporating the IRA provisions into their

¹ see <https://www.federalregister.gov/documents/2024/03/11/2024-04604/elective-payment-of-applicable-credits-elective-payment-of-advanced-manufacturing-investment-credit>

² <https://www.federalregister.gov/documents/2021/01/15/2021-00302/credit-for-carbon-oxide-sequestration>

³ <https://www.whitehouse.gov/briefing-room/statements-releases/2023/08/16/fact-sheet-one-year-in-president-bidens-inflation-reduction-act-is-driving-historic-climate-action-and-investing-in-america-to-create-good-paying-jobs-and-reduce-costs/>

planning, and prudent cost management requires the same with the KIF. Although TVA notes that they incorporated National Renewable Energy Laboratory forecasts that include the IRA into the system LCA, Appendix B is deficient on details, and it is unclear how the IRA was actually incorporated into the Final EIS.

The Final EIS pointed to TVA's mandate to provide least cost planning that considers cost, risk, and environmental responsibility. Recent independent cost analyses have shown that Alternative B could save TVA ratepayers roughly \$1.3 billion dollars relative to the natural gas plant, assuming Carbon Capture and Storage (CCS) is installed.⁴ Without CCS, over \$1 billion is saved. To meet TVA's identified mandate, TVA should consider lower cost, lower risk, and more responsible alternatives that are viable. In addition, TVA is already exposed to very high financial risks from higher natural gas prices. Alternative A would only increase exposure to these risks. As the U.S. invests in large increases in liquefied natural gas export capacity, Energy Information Administration and other natural gas market analysts have pointed to the risks of higher prices.⁵ TVA failed to disclose or incorporate these considerations in the Final EIS.

While TVA is proposing outside this NEPA process to substantially reduce GHGs and move its system toward renewable energy, the preferred alternative is potentially inconsistent with the Administration's climate goals and Executive Orders since the preferred alternative will lock in fossil fuel use and production for decades. The Final EIS did not address how the preferred alternative will lock in fossil fuel consumption or discuss how the preferred alternative will yield stranded assets, including the new 122-mile natural gas pipeline required by this project, due to market and policy factors that reduce demand for electricity generated from fossil fuels. Additionally, the Final EIS did not disclose or discuss any inconsistency of the Proposed Action with State, Tribal, or local plans or laws, including local GHG emissions reduction goals, per 40 CFR 1506.2(d), and consistent with the 2023 White House Council on Environmental Quality guidance on consideration of GHG emissions and climate change in NEPA analyses. TVA's recently published Valley Pathways study notes that the addition of new natural gas plants may affect whether the Tennessee Valley economy will be able to achieve net zero GHG emissions by 2050.⁶ The EPA continues to believe that, given the urgency of the climate crisis, it is essential for TVA to consider meaningful, cost-effective action to reduce GHG emissions and conform TVA's action to science-driven policy goals. Also, although CCS is likely necessary to achieve TVA's climate goals and meet reasonably foreseeable regulations given TVA's current generation mix, it is not included in TVA's main analysis, only vaguely referenced in an appendix.

Purpose and Need

The Final EIS does not address the EPA's concern that the purpose and need for the proposed action are narrowly defined by a 2027 timeframe to decommission the KIF units and have replacement

⁴ See Chirag Lala, et al., Applied Econ. Clinic, *TVA's Kingston Fossil Plant: An Economic Assessment of Replacement Alternatives* 7 (Mar. 2024) and Michael Goggin, Grid Strategies, LLC, *Critique of TVA's Alternatives Analysis in the Utility's "Kingston Fossil Plant Retirement, Final Environmental Impact Statement,"* 8 (Mar. 19, 2024). This analysis is done in a transparent fashion with valid, replicable assumptions that include the IRA and other subsidies.

⁵ See https://energyinnovation.org/wp-content/uploads/2024/02/Consumer-Cost-Impact-Of-Completing-Pending-LNG-Export-Projects_2.2.24-1.pdf. Also, the graph on page 21 of Appendix B in the FINAL EIS indicates a wide range of natural gas prices over time within IRP Ranges.

⁶ Valley Pathways Study <https://baker.utk.edu/wp-content/uploads/2024/02/VPS-Preliminary-Findings.pdf>

generation in place. While the Final EIS purports to analyze two action alternatives, it states that Alternative B (the 100% renewable option) does not meet the purpose and need for the proposed action because it could not be completed by 2027 (See Section 3.7.2.4.1.3). Thus, TVA evaluated an alternative that it considered nonviable. Additionally, the Final EIS identified the 2027 timeframe as a rationale for excluding multiple alternatives from further discussion, such as a blended alternative that includes greater renewable energy generation combined with less generation from natural gas (Section 2.1.5). According to the Final EIS, only TVA's preferred alternative meets the purpose and need. As noted in the EPA's Draft EIS comment letter, if only the preferred alternative fully meets the purpose and need, that indicates that TVA may have defined the purpose and need too narrowly, making the NEPA process a "foreordained formality."⁷ TVA should consider options that adjust the 2027 timeframe for the KIF shutdown. If TVA supplements its analysis and adequately justifies that the 2027 date cannot be moved, then TVA should evaluate an alternative that is actually implementable so that the NEPA analysis considers a range of reasonable alternatives that would meet the purpose and need.

The Final EIS fails to provide sufficient disclosure around the basis for the 2027 timeframe identified in the purpose and need, even though this timeframe limited the consideration of alternatives and available mitigation options in the Final EIS. Despite the centrality of the timeframe to limiting consideration of alternatives, the Final EIS provides only two paragraphs to justify the need to have 1,500 MW generation in place by 2027 (Section 1.2.2.2). TVA's disclosed reasons remain the same as in the Draft EIS, with TVA pointing to its 2019 IRP and 2021 Aging Coal Fleet Evaluation which resulted in a *recommended* retirement date for KIF of 2027. The Final EIS also makes vague or conclusory statements that fail to provide adequate disclosure of the assumptions underlying the 2027 timeframe for the start-up of the new units. For example, the Final EIS states "Further, a significant monetary investment would be required to comply with the requirements of the 2020 ELGs and other environmental regulations" without providing sufficient detail assessing the applicability of regulatory exemptions to delay shutting down the coal boilers by 2027, phased retirement as contemplated in TVA's 2020 Regional Haze letter to the Tennessee Department of Environmental Conservation, or a temporary shift to other units until transmission upgrades can occur. Adequate disclosure around the rationale for the 2027 timeframe is critical given it is a key factor limiting consideration of additional alternatives with lower environmental impacts.⁸

Reasonable Range of Alternatives

As in the Draft EIS, the Final EIS only considers two "action" alternatives, the preferred alternative and an alternative consisting of 100% renewable energy generation. The Final EIS fails to disclose or consider a reasonable range of alternatives that fall between these two "endpoints."

In the Draft EIS comment letter, the EPA recommended that TVA consider a reasonable range of alternatives and identified some options that would likely produce lower GHG emissions. However, the Final EIS gave no additional consideration to the EPA's proposal of a blended strategy that combines a

⁷ See, e.g., *Citizens Against Burlington v. Busey*, 938 F.2d 190 (D.C. Cir. 1991) "Yet an agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality."

⁸ Michael G., TVA. Letter to Michelle W. Owenby, TDEC, *Regional Haze Rule – Estimate for Projected 2028 Sulfur Dioxide Emissions for Kingston Fossil Plant and Cumberland Fossil Plant*. 2 Feb. 2020.

more balanced mix of renewables and natural gas. In Section 2.1.5 of the Final EIS, TVA briefly noted with little explanation that a blended alternative would not meet the purpose and need because it would require transmission work over eight or nine years and would not be installed by 2027, would not provide 1,500 MW of firm dispatchable power, and would result in increased capital cost. Again, these brief explanations indicate that the purpose and need is too narrowly defined and prevent consideration of reasonable alternatives.

The EPA continues to recommend that a blended alternative, which TVA's own estimates indicate may require only four additional years to implement beyond the 2027 timeframe, warrants more complete consideration and discussion in the supplemental EIS since it could result in significantly lower GHGs and lock in smaller amounts of fossil fuel consumption, consistent with science-based GHG reduction goals. Additionally, TVA made no revisions to address the EPA's recommended reconsideration of a transition strategy to meet capacity requirements until greater renewable energy generation is available, including peak shaving, increased generation from other production units, energy efficiency, and demand-management.

Air Quality Emissions Estimates (including GHG) and Capacity Factors

Facility Level Analysis

The Final EIS continues to use EIA lifetime national average capacity values (of 55% and 10% respectively) for the new combined and simple cycle combustion turbines in the analysis of the facility level air quality and GHG emissions. TVA provides no additional justification as to how national EIA data represent typical operation of new highly efficient units with the demand TVA has described in the Final EIS, nor any explanation of how it represents the capacity that will be needed for peaking power for renewables. TVA's system-level analysis and discussion in the Final EIS (p. 395) indicate that the new highly efficient combustion turbine units would be dispatched over other less efficient TVA units. TVA has indicated that these national averages were used due to operational uncertainty. However, the estimates used in the facility level analysis are significantly different from the system-wide analysis in the Final EIS and the air permit application recently submitted to the state of TN. The facility-level analysis appears to underestimate the GHG and criteria pollutant emissions for the preferred alternative. This facility level analysis is used for a comparison of the alternatives and may also be used by decision makers to assess local impacts. The EPA recommends that if there is significant operational uncertainty, that TVA use a range of capacity factors, preferably from facility specific forecasts, rather than national averages.

In addition, as discussed in our Draft EIS comments, the NEPA analysis appears to substantially overestimate some of the emissions reductions that may be achieved by the coal boiler retirement. TVA has requested the associated air permit to allow an increase in several pollutants after retirement of the coal-fired units, such as nitrogen oxides, volatile organic compounds, and GHG emissions. The EPA agrees with TVA that emission estimates for air permits can differ from the analyses used for NEPA reasonably foreseeable effects. We also recognize that there will be significant emissions reductions in some pollutants, such as sulfur dioxide and sulfuric acid mist, from the retirement of the coal-fired boilers. However, TVA has estimated emissions of NO_x in the NEPA analysis using a much higher control efficiency (i.e., 2-parts per million by dry volume for the baseload CC; 5-ppmvd for the aero CTs), than assumed in the permit application currently before the state of Tennessee (i.e., 10-ppmvd) for the turbines firing natural gas. The total NO_x emissions estimated in the NEPA analysis are just 178.8 tons

per year, whereas the allowable emissions requested in the permit application are 1456-tons per year of NO_x. Even accounting for the required *potential to emit* emission calculations in air permitting, the NO_x emissions appear to be significantly underestimated in the Final EIS, especially for the base-load CT. Likewise, the allowable CO₂e emissions requested in the air permit are 4,474,309-tpy, whereas emissions estimated in the NEPA analysis are 1,683,886-tpy.

The air quality emissions estimates should be based on the best science/data using the most accurate forecasts. If TVA intends to operate the facility with the control and operating assumptions used in the Final EIS, this should be clarified in the Record of Decision and similar limiting conditions reflected in the air quality permit. If TVA does not intend to operate with the control efficiencies used in the Final EIS, especially for NO_x, TVA should provide revised emissions estimates in the supplemental EIS and clarify why this reasonably available level of control is not being used to mitigate air impacts.

Finally, the Final EIS continues to compare estimated GHG emissions as a percent of state and national emissions. Per CEQ guidance, this type of comparison is not an appropriate method for characterizing the climate impacts of the project. Furthermore, TVA compares the estimated emissions reductions from converting the facility to natural gas from coal to state and national emissions, rather than comparing, or including, the estimated emissions from the natural gas plant itself, underplaying the significant GHG, NO_x, and particulate matter emissions associated with the new units.

System-wide Life Cycle Analysis

TVA still fails to fully present in the Final EIS the assumptions that underlie the modelling of the system-wide Life Cycle Analysis of GHG emissions or report the modelled distribution of future power generation. While the Final EIS explains why the system-wide analysis is necessary to “assess the implementation of each alternative’s impact on the power generation mix throughout TVA’s system” it does not adequately disclose the modelling or assumptions underlying the system-wide analysis (Appendix J.4). Rather than explain in detail how implementing Alternatives A and B would impact the power generation and GHG emissions from the broader TVA system, the Final EIS includes one example of how implementing Alternative A will likely reduce the use of, and thus emissions from, older TVA coal plants. As the EPA noted in our Draft EIS comments, more details are needed about the system-wide LCA modelling, including the distribution of electricity generation in the system-wide model outputs and whether this distribution reflects a “business as usual” approach or TVA’s commitments toward achieving net-zero GHG emissions. Particularly given the substantially higher estimated GHG emissions and social costs that TVA calculated on an individual basis for Alternative A (\$7.7 billion) compared to Alternative B (\$0.67 billion), the Final EIS failed to adequately justify TVA’s conclusion in Section 3.7.1.1.8.3 that the “system-wide effects show that the overall potential for GHG monetized effects under both action alternatives, as compared to the No-Action Alternative, are within the same order of magnitude.”

Similarly, appendix B presents LCA results of cost differences from implementing the EPA’s 2023 proposed New Source Performance Standards requirements on hydrogen and carbon capture and storage. However, there is no detail on how this was implemented and how it affects other model outputs. Appendix B has two slides on the system-wide LCA modeling meeting the EPA’s 2023 Proposed NSPS rule but the details of how this proposed rulemaking is incorporated in this analysis are opaque. The analysis of CCS must be moved from an Appendix into the main analysis. This analysis should expressly consider and evaluate the potential implication of CCS on costs, including the

construction of a pipeline, of reasonably foreseeable future air quality and GHG regulations on natural gas plants. The current analysis in the FEIS yields an additional \$307 million in costs for hydrogen and \$919 million for CCS under Alternative A but the analysis lacks details on how TVA estimated those costs. The system-wide LCA must also clearly incorporate the considerable tax incentives for adopting CCS, established under the IRA. With these tax credits omitted, the costs of CCS appear to be dramatically overstated.

The assumptions and conditions underlying the use of a 30-year life for coal units in the No-Action Alternative are also not clear, especially given TVA claims that many of these units are at the end of their useful life. Appendix J specifies a 50% capacity factor for the No-Action Alternative, based on industry averages over the last 10 years. However, TVA's 2020 Regional Haze Letter to the EPA indicates that because these coal units are expensive to operate, they will eventually be converted to peaking units, leading to fewer GHG emissions under the No-Action Alternative than currently estimated. As noted in the IRP and Valley Pathways Study, TVA plans to phase out all coal by 2038⁹. Consequently, it does not make sense to have a No-Action Alternative with a Coal plant operating for 30 years, which will overstate the modeled emissions benefits of Alternatives A and B.

Additionally, as noted in our comments on the Draft EIS, the EPA remains concerned that the analysis does not fully account for the expected cost decreases of renewable energy and higher future natural gas prices. As the EPA explained: "The costs of renewable energy production and battery storage will continue to fall along the timeline of this project due to subsidies from the IRA and other market factors. Similarly, the price of natural gas is projected by the EIA to be higher than estimated in the 2019 IRP."

Social Cost of Greenhouse Gas Estimates

The Final EIS continues to apply the outdated 2020 SC-GHG estimates, which do not reflect the best available science. Using these estimates, TVA misleadingly states in Section 3.7.2.3.7: "On an individual replacement resource basis, the estimated total Alternative A life cycle social costs of GHG emissions ranges from approximately \$611 million to \$7.77 billion in nominal dollars." This indicates that the climate change damages from the preferred alternative fall within a large range without clearly acknowledging that \$611 million reflects applying outdated estimates developed using methodologies that are widely understood, including by the National Academies of Science, Engineering, and Medicine, to not incorporate the best available science.¹⁰ As noted in the EPA's comments on the Draft EIS, the SC-GHG estimates developed under EO 13783 have been revoked because they fail to reflect the full impact of GHG emissions in multiple ways, including failing to capture many climate impacts that can affect the welfare of U.S. citizens and residents. As noted in the 2023 update to Circular A-4, "OMB determined in 2021, in its role as a co-chair of the Interagency Working Group on the Social Cost of Greenhouse Gases, that the effects of changes in greenhouse gas emissions experienced by U.S. citizens and residents could not be separated from the global effects of changes in greenhouse gas emissions in a practical or reasonably accurate manner. At the time, OMB and the IWG noted available

⁹ Valley Pathways Study <https://baker.utk.edu/wp-content/uploads/2024/02/VPS-Preliminary-Findings.pdf>

¹⁰ See the 2017 report by the National Academies of Science: <https://nap.nationalacademies.org/catalog/24651/valuing-climate-damages-updating-estimation-of-the-social-cost-of>

models could produce only an unreasonably incomplete underestimate of damages accruing to U.S. citizens and residents.”¹¹

Additionally, the use of these estimates in the Final EIS is contrary to the CEQ’s 2023 guidance on consideration of GHG emissions and climate change in NEPA analyses which recommends that agencies “should apply the best available estimates of the SC-GHG” to the GHG emissions from a proposed action and its alternatives. Additionally, in a December 2023 memo, the Office of Management and Budget directed agencies to apply the SC-GHG which “reflect the best available evidence, are most appropriate for particular analytical contexts, and best facilitate sound decision-making.”¹² The best available science is not accepting competing views without regard for their support and then averaging these values. In the Final EIS, TVA stated “Presenting estimated future social costs as a range of values provides decision-makers and the public with better information in an area with uncertainty as evidenced by the shift in values between two successive Administrations.” (Section 3.7.1.1.8.3) As explained in the EPA’s Draft EIS comments, the use of the outdated SC-GHG is misleading to decision-makers and the public as it depicts a skewed and incomplete picture of the scope of environmental impacts.

The Final EIS also incorrectly presents the SC-GHG as uncertain, and states that there are “disparate scientific, economic, and legal positions on the propriety of SC-GHG rates and their application,” and disagreement around the correct discount rate and whether to consider global effects. This statement does not reflect the scientific consensus that the SC-GHG estimates allow the public and decision makers to understand the net harm of GHG emissions released into the atmosphere. The SC-GHG is a comprehensive measure that captures global climate damages based on the best available science and economics. Uncertainty in the discount rate is addressed by presenting the SC-GHG estimates at the different discount rates (5%, 3%, 2%, and 95th percentile at 3% rate). However, TVA in the Final EIS continues to present the SC-GHG as a point estimate at one discount rate, i.e., the SC-CO₂, SC-CH₄ and SC-N₂O are only presented at the 3% discount rate. Furthermore, TVA continues to adjust the SC-GHG values from the Interagency Working Group report, which are reported in 2020\$, by 2% to account for inflation, claiming they need a nominal value for its capacity expansion model. It is incorrect to adjust the SC-GHG values for inflation prior to multiplying them by the emission changes to calculate the monetized climate damages.

Environmental Justice

The EPA appreciates that TVA included a discussion of environmental justice considerations in its climate change analysis for its No-Action Alternative, Alternative A, and Alternative B, at sections 3.7.2.2.1, 3.7.2.3.8, and 3.7.2.4.4, respectively. The EPA recommends that NEPA documents use terminology consistent with EO 14096 and modern practice and use “communities with EJ concerns” instead of “EJ-qualifying communities” or “EJ communities.” Additionally, TVA did not address individuals with disabilities as a component of communities with EJ concerns. The EPA recommends that TVA include individuals with disabilities in its EJ analyses, consistent with EO 14096.

¹¹ <https://www.whitehouse.gov/wp-content/uploads/2023/11/CircularA-4.pdf>

¹² <https://www.whitehouse.gov/wp-content/uploads/2023/12/IWG-Memo-12.22.23.pdf>

The Final EIS discussion of the EJ considerations of climate change for the preferred alternative largely focuses on effects from fugitive dust and particulate emissions, stating that these impacts “may be disproportionate and adverse due to [communities with EJ concerns within the area of analysis] history of health vulnerabilities.” Additionally, TVA defers any detailed analysis of the EJ considerations of climate change for Alternative B until it determines locations for each solar and storage facility. The EPA continues to recommend that TVA discuss the disproportionate impact that GHG emissions have on communities with environmental justice concerns. Additionally, given that NOx emissions appear to be significantly underestimated in the Final EIS, the EPA requests that TVA reevaluate its EJ analysis based on revised emissions estimates in the supplemental EIS, if TVA does not intend to operate with the control efficiencies used in the Final EIS. The Final EIS should employ best available science and information on any disparate health effects arising from exposure to pollution, such as information related to race, national origin, socioeconomic status, age, disability, and sex of the individuals exposed.

Mitigation

TVA’s response to the EPA’s recommendation on the Draft EIS regarding the consideration of sulfur hexafluoride free switchgears as mitigation was that vacuum switchgears do not meet North American Electric Reliability Corporation’s reliability standards. The EPA has confirmed with manufacturers that the new high voltage switchgears using vacuum technology are reported to have higher reliability and lower operation and maintenance costs than current SF6 technology. High voltage units are currently available for order for delivery within the construction timeline anticipated for Kingston.

The lifecycle of SF₆, starting from manufacturing, produces significant SF₆ emissions. SF₆ is the most potent GHG with 26,000 times the global warming potential of carbon dioxide and a lifespan of over 3000 years. Given that the life of a switchgear is over 30 years, the EPA continues to suggest that TVA’s upgrade of its system and installation of new or replacement switchgears represents the ideal time to switch to SF₆ free switchgears. This technology would represent reasonable mitigation and prevent over 30 years of production of additional SF₆ for the TVA system. The EPA has partnered with utilities to reduce and phase out the use of this pollutant and can connect TVA with further resources on SF₆ free switchgears.

Recommendations for Additional Analysis

The EPA recommends that TVA commit to “adaptive management”-like strategies to periodically reassess demand reduction opportunities in the supplemental EIS, even as new renewable energy sources are brought on to the grid to decrease the quantity of natural gas generated power required from the Kingston plant as demand decreases.

- Guidance and increased resources from IRA and other authorities are being released on a frequent basis and may provide opportunities to implement renewable energy and energy efficiency options sooner than estimated in the Final EIS.
- The strategy should also incorporate specific mitigation or abatement measures to reduce impacts from the planned combined cycle gas plant, including green hydrogen options and carbon sequestration.

During TVA's scheduled IRP update, the EPA recommends that TVA align the 2024 IRP with its 2021 Strategic Intent and Guiding Principles, national science-based policy goals, updated cost factors, and technological advances that would reduce its overall reliance on fossil fuel generating capacity to meet future demand projections. The EPA also recommends that TVA's updated IRP reflect the impact of existing legislation, such as the IRA, on demand projections and renewable energy opportunities.

- As mentioned above, because the IRA provides increased opportunities and contains resources relevant to future energy consumption patterns and forecasts, the IRA provisions should be considered in the TVA system-wide approach to managing its resources, as well as immediate future actions, such as the Cheatham generation project.
- TVA should consider updated resources such as the Treasury Department's Final Rule on Section 45Q Credit Regulations, that provide clarity on how to use the Section 45Q credit for qualified carbon oxide sequestration.¹³
- Also of note, the White House's *Guidebook on the Inflation Reduction Act* names TVA as an eligible recipient of direct pay credits under twelve headings, including the Clean Electricity Production Tax Credit, the Production Tax Credit for Electricity from Renewables, and the credit for Carbon Oxide Sequestration, among other sections with potentially significant impacts to TVA's costing analysis.¹⁴
- The EPA recommends TVA also engage NREL for advice and recommendations to advance timelines and opportunities for implementing a more robust portfolio of renewable energy in the updated system-wide approach.

¹³ <https://www.irs.gov/pub/irs-drop/td-9944.pdf>.

¹⁴ <https://www.whitehouse.gov/wp-content/uploads/2022/12/Inflation-Reduction-Act-Guidebook.pdf>.