June 13, 2022 via email to nepa@tva.gov

Ashley Pilakowski
NEPA Specialist
400 West Summit Hill Drive, WT 11B
Knoxville, TN 37902

Re: SACE Comments on CUMBERLAND FOSSIL PLANT RETIREMENT DRAFT ENVIRONMENTAL IMPACT STATEMENT

Dear Ms. Pilakowski,

The Southern Alliance for Clean Energy (SACE) respectfully submits these comments in response to the Tennessee Valley Authority's (TVA) draft Environmental Impact Statement for replacement of the retiring Cumberland Fossil Plant (hereinafter referred to as the "Cumberland DEIS" or "DEIS").

In the DEIS, TVA failed to accurately evaluate all options to replace Cumberland and skewed its analysis toward its desired outcome. If TVA moves forward with a new gas plant and pipeline, TVA's customers will suffer higher electric bills and TVA will not be on track to decarbonize its grid by 2035 without significant stranded costs that must be borne by TVA customers. Replacing Cumberland with diverse, clean energy would lead to a more resilient grid and point TVA on a path that will ensure it fulfills its obligations to provide electricity to its customers at a low cost while safeguarding the environment and bolstering the regional economy.

SACE is a regional organization that promotes responsible and equitable energy choices to ensure clean, safe, and healthy communities throughout the Southeast. SACE's members are concerned by TVA's proposal to continue reliance on fossil fuels for decades, refusal to extend the comment period, and refusal to share documents used in compiling the DEIS. The comments submitted here do not cover the full array of shortcomings in the DEIS, but supplement the comments submitted by others by focusing on the following:

- TVA does not need additional gas to integrate renewable energy, and
- TVA failed to account for higher bills and energy burdens that would result from increased gas reliance and increased risk of stranded assets.

SACE calls on TVA to replace the Cumberland fossil plant with a combination of distributed and utility-scale solar, wind, and demand-side measures.

Sincerely,
Maggie Shober, Research Director

SACE calls on TVA to Replace Cumberland with Clean Energy, Not Another Fossil Fuel

Table of Contents

I. TVA Does Not Need New Gas

TVA states its preferred alternative in the DEIS is Alternative A, a 1,450 MW combined cycle (CC) gas plant that requires a new gas pipeline to the Cumberland site be built. It appears that TVA's analysis skews its results to favor Alternative A in several ways, including:

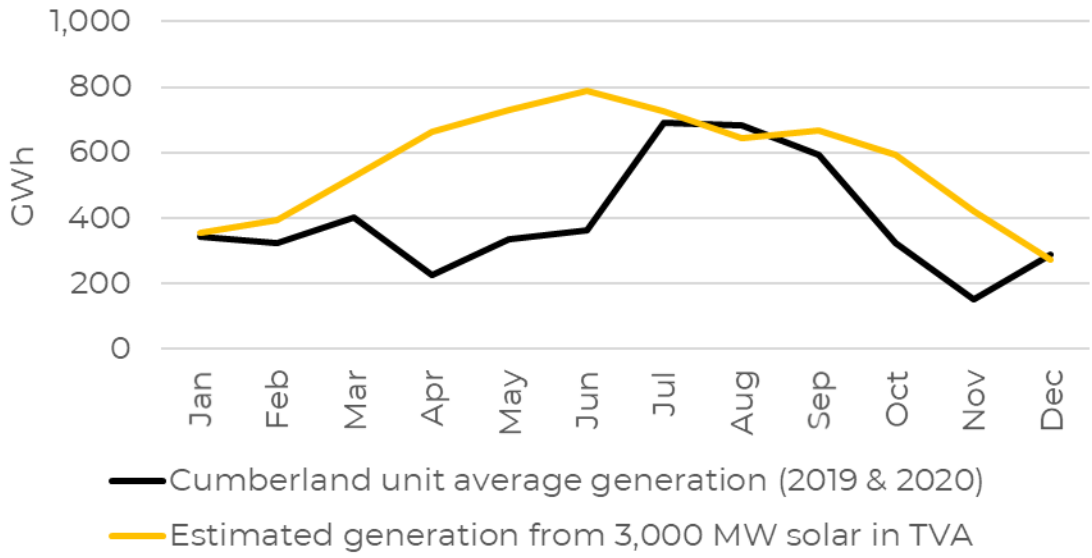
- Inflating the amount of solar and storage resources required to replace one Cumberland unit, and starting to work toward only Alternative A, resulted in costs and timeline estimates that appear unfavorable for that alternative,
- Failing to evaluate the alternatives under a realistic gas price forecast where gas prices remain high and volatile through at least the next decade, driven by more frequent climate change-fueled extreme weather events and political instability abroad, and
- Inflating the carbon emissions from the clean energy scenario, i.e. Alternative C, by failing to use its existing gas and hydro system effectively to integrate planned variable solar.

However, since TVA has refused to share its assumptions and studies that led TVA to the conclusion that Alternative A is preferred, the public, including SACE and our members, is unable to fully participate in the public review process as required under the National Environmental Policy Act (NEPA).

The DEIS does not present evidence that 3,000 MW of solar and 1,700 MW of 4-hour battery storage are required to replace one unit of the Cumberland fossil plant. Both units at the Cumberland plant are just under 1,300 MW of capacity, 400 MW less than the 1,700 MW of storage. Recent capacity factors of the Cumberland units have been 40-53% for Unit 1 and 31-50% for Unit 2, generating a range of 3.2 GWh to 5.5 GWh in a year. For comparison, 3,000 MW of utility-scale solar in TVA's territory would generate 6.8 GWh in a year. As seen in Figure 1, 3,000 MW of solar provides approximately the same amount of energy as a single Cumberland

unit during the winter and summer peak months, and significantly more in the shoulder months.

Figure 1. Comparison of Monthly Generation



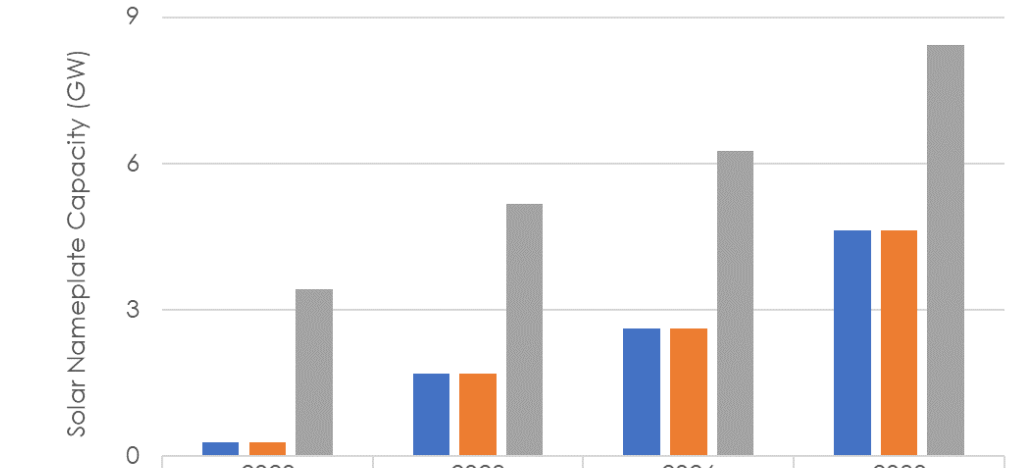
Even if we assume that TVA needs a full 3,000 MW of solar and 1,700 MW of storage to replace a Cumberland unit, the cost assumptions for the alternatives that are presented in the DEIS and supplemental materials are likely incredibly inaccurate. The level of inaccuracy was not able to be verified because the assumptions and methods made in the cost analysis were not available to the public. SACE attempted to recreate these calculations, and replace likely TVA assumptions with more reasonable assumptions for resource capital costs, operating and maintenance costs, and fuel costs.[1] With these more reasonable assumptions, the direct costs (which includes capital costs, operating and maintenance costs, and fuel costs) are nearly the same for both Alternative A and Alternative C. Since all the costs for Alternative C are dependent on how much solar and storage are built (capital costs are in $/kW and fixed operating and maintenance costs are in $/kW-year), if the amount of solar and storage were lower, the cost of Alternative C would be lower than that of Alternative A.

TVA does not need additional gas to integrate solar. For a point of comparison, Duke's two utilities that operate in the Carolinas, Duke Energy Progress (DEC) and Duke Energy Carolinas (DEP), have a combined system capacity approximate to TVA's. DEC and DEP already have over

[1] SACE pulled assumptions for solar, battery, and combined-cycle construction and operations and maintenance costs from the National Renewable Energy Laboratory's 2021 Advanced Technology Baseline and the Energy Information Administration's Annual Energy Outlook assumptions published in March of 2022. SACE adjusted the gas price forecast to reflect higher and more volatile gas prices and used a flat 2%/year assumption for inflation and 3% for TVA's cost of capital. SACE kept TVA's assumption that the gas CC in Alternative A would have a capacity factor of 87%, a booklife of 20 years, and a heat rate of 6,520 Btu/kWh. SACE also kept TVA's discount rate of 8%.

3 GW of solar operating on the two systems with significantly less gas and hydro than TVA, and a similar capacity from nuclear. And TVA's three gas combustion turbine projects that will be online in the next two years will only increase TVA's ability to integrate solar without adding new gas. TVA makes false claims that a new CC will be needed to integrate solar into TVA's system but does not provide any evidence to back up that claim. Based on what other utilities are doing across the world, and even TVA's neighbors, that claim just does not make sense.

Figure 2. TVA's Solar Nameplate Capacity under Alternatives A and C, with Duke Energy Carolinas (DEC) and Duke Energy Progress (DEP) for comparison



	2020	2023	2026	2030
TVA, Alt A	0.3	1.7	2.6	4.6
TVA, Alt C	0.3	1.7	2.6	4.6
DEC + DEP	3.4	5.2	6.3	8.4

TVA's DEIS states that the 3 GW of solar added in Alternative C is in addition to the 10 GW TVA claims it will have on its system by 2035. From statements made by TVA leadership, the main driver of those 10 GW of solar is for large corporate/industrial/commercial customers with clean energy goals, or cities with clean energy or carbon goals. That 10 GW of solar by 2035 goal has in interim target of 5 GW of solar by 2030, of which 2.4 GW is operating or contracted for and scheduled to come online in the coming years. Assuming that 2.4 GW comes online by the end of 2023, that leaves 2.6 GW remaining of the 2030 goal, and spread evenly that's the addition of just 372 MW of solar each year. As such, if TVA does not replace any of Cumberland with solar, it would be at approximately 3,516 MW of solar by the end of 2026. If TVA were to add an additional 3 GW of solar, as laid out in Alternative C, the system would have a total of approximately 6,516 MW of solar by the end of 2026. Based on the capacity projections from TVA's 2019 Integrated Resource Plan (IRP), which are the latest that have been made public, these levels of solar would mean solar would be approximately 8% of TVA's total nameplate capacity by the end of 2026 under Alternative A and solar would be approximately 14% of TVA's total nameplate capacity by the end of 2026 under Alternative C. By comparison, Duke's combined utilities in the Carolinas had 9% of total nameplate capacity as solar in 2020 and are

expected to increase solar to 15% of nameplate capacity by the end of 2026 and 19% of nameplate capacity by the end of 2030 under the utilities' current resource plans.

Using the values from TVA's 2019 IRP for capacity credit and peak load forecasts from the 2020 FERC 714 report (published June 21, 2021), because the winter capacity credit that TVA assumes is zero, the winter reserve margin for Alternative C is only one percentage point lower than the winter reserve margin for Alternative A. In addition, the summer reserve margin is 8 percentage points higher under Alternative A than under Alternative C.

While TVA has not added more than 1,000 MW of solar in a single year, the integration of that level of solar in a single year is physically possible and the levers that make it possible, such as the contracting and interconnection process, are within TVA's control.

In addition to reducing the amount of solar and storage needed to replace one unit of the Cumberland coal plant, TVA should include more diversity in the sources it included in its analysis. For instance, the financial incentives TVA would need to provide in energy efficiency, demand response, and rooftop solar would provide similar energy and capacity benefits at a fraction of the cost because the participating customers would bear most of the resource costs. In fact, since TVA has a higher winter planning reserve margin in its 2019 IRP, if TVA focused financial incentives on energy efficiency and demand response programs with load shapes that are known to shave the winter peak, it would both improve reliability and resilience over the construction of a gas CC, and fill the reserve margin and energy needs of its customers at a lower cost. TVA must not finalize the Cumberland replacement EIS without analyzing the potential to use winter peak-focused demand-side measures to replace some of the energy and reserve margin that Cumberland currently provides.

II. TVA Should Include Analysis of the Impact of Gas Reliance on Bills in EIS

If TVA moves forward with Alternative A it will increase its reliance on natural gas from 29% of total energy in 2020 to at least 34% of total energy in 2026. An increased reliance on gas means TVA customers have an increased risk of high bills driven by higher gas prices and likely stranded asset costs.

TVA's low-income residential customers already experience high, and in some cases extremely high, energy burdens, as TVA described in its presentation to its Board of Directors on May 11, 2022. In addition, TVA passes its fuel costs directly to local power companies (LPC) customers, who all pass those costs on directly to customers in some way. That means high or volatile fuel costs are reflected in what customers pay for electricity every month. However, TVA's analysis of the impact of the Alternatives failed to consider any bill impacts from high fuel costs.

TVA refused to share the gas price forecast, instead stating in an email that, *"Fuel forecasts are closest to the Rapid DER Adoption scenario."* However, "*closest to*" could be above, below, or

approximately the same. TVA's Rapid DER Adoption scenario had the lowest gas prices of all the gas price forecasts evaluated in the 2019 IRP and appears to top out at a $4.50/MMBtu in nominal dollars in 2038. This is wildly out of step with the reality of gas markets today and into the future. Gas futures were already increasing prior to Russia's invasion of Ukraine, but since that prices have topped $9.00/MMBtu this year. The U.S. has increased is ability to export liquid natural gas (LNG) significantly since TVA developed the gas price forecasts it used in its 2019 IRP, so even absent global instability in key regions that supply global fossil fuel markets gas prices are expected to remain both higher and more volatile than the forecast TVA has used in this analysis.

At a gas price of $9.00/MMBtu TVA would pay an additional $325 Million in annual fuel costs for the fuel needs of a new CC at Cumberland compared to TVA's assumed maximum gas price of $4.50/MMBtu. The fuel costs of TVA's proposed new CC at Cumberland would add $40-75 to residential customer bills each year, with the potential for volatile gas markets to increase this figure. Industrial and commercial customers would see significantly higher bill increases due to the cost of fuel at a new gas CC.

TVA hedges a portion of its gas needs, approximately 20% in recent history according to presentations to the TVA Board. However, even if TVA were to hedge 20% at $4.50/MMBtu and pay $9.00/MMBtu for the remainder, it would still pay an additional $260 Million in annual fuel costs for the fuel needs of a new CC at Cumberland under today's gas price forwards.

Figure 3. TVA Gas Price Forecasts per Scenario in the 2019 IRP

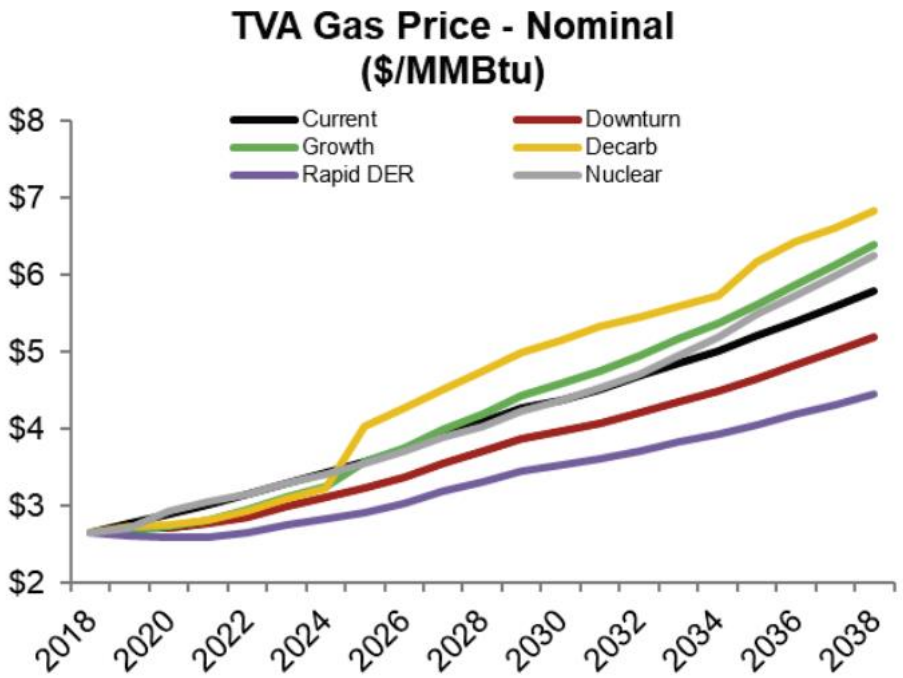
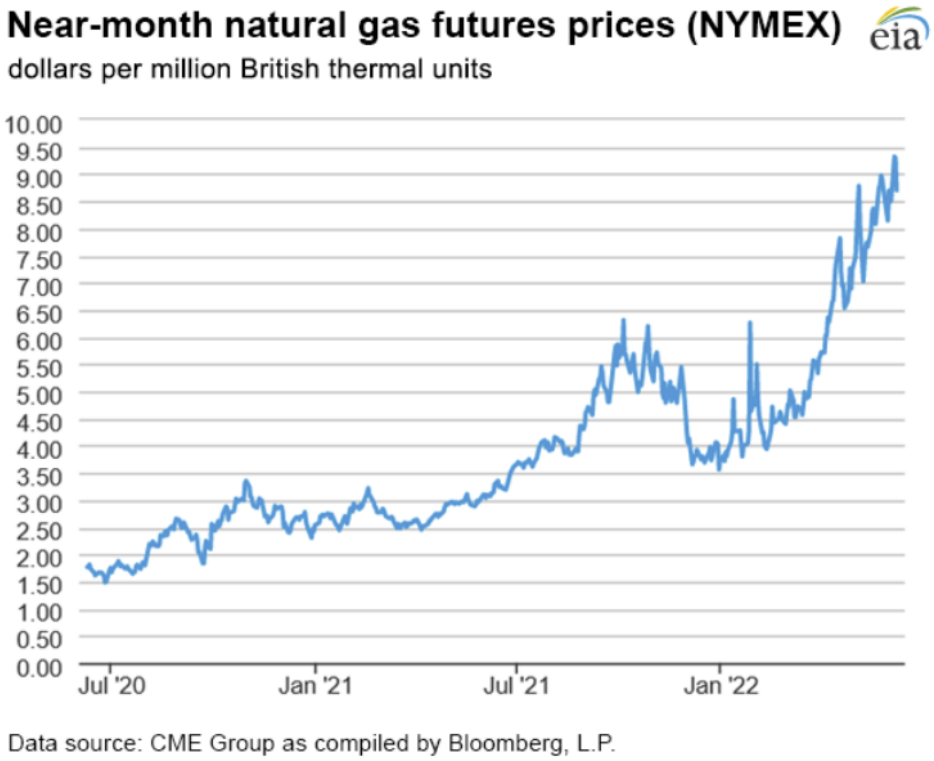


Figure 4. Gas Price Futures as of Monday, June 13, 2022



Greenhouse gas emission policies and/or regulations mean TVA will very likely have to shut the new CC proposed in Alternative A before 2044, the year a 20-year asset like a CC would be fully depreciated. Policies and regulations are likely to limit both carbon dioxide (CO_2) and methane within that timeframe, and gas plants have significant emissions of both of those pollutants. TVA should evaluate the cost and environmental impacts of replacing the new CC much earlier than 2044, or the costs and environmental impacts associated with switching the new CC at Cumberland to a zero-carbon and zero-methane fuel. TVA's failure to account for, or even mention, these risks in its DEIS indicates an egregious disregard for the potential for this decision to seriously increase customer bills. If TVA were to be required to close the new CC at Cumberland by the end of 2035, which matches with President Biden's Executive Order and climate scientist calls for the electric sector to be carbon-free by 2035, TVA's customers would be saddled with $5 Billion in stranded costs because of this decision to build a new CC at Cumberland. That means TVA customers would pay an additional $5 billion over 2036-2044 without receiving a single MWh. This cost risk needs to be evaluated in the DEIS, particularly its potential impact on low-income customers that are already facing high energy burdens.

TVA's DEIS does not mention energy burden, and the impacts of increased fuel costs and stranded asset costs are not considered in any of the NEPA analysis. TVA should analyze these impacts in a transparent manner. If this analysis is done correctly, it will make it conclusive that a replacement of Cumberland with clean energy is the least-cost and least-risky option for all of TVA's customers.

III. TVA Should Replace Cumberland with Clean Energy

As the IPCC's Sixth Assessment Report, Working Group III, makes clear in its headline statements from the summary for policymakers: greenhouse gas emissions need to peak by 2025, experience rapid and deep declines following, and achieve next zero by the early 2050s at the latest to limit warming to 1.5°C. As part of those headline statements, the IPCC WGIII states with high confidence:

> *"Reducing GHG emissions across the full energy sector requires major transitions, including a substantial reduction in overall fossil fuel use, the deployment of low-emission energy sources, switching to alternative energy carriers, and energy efficiency and conservation. The continued installation of unabated fossil fuel infrastructure will 'lock-in' GHG emissions."*

TVA's decision to replace one fossil fuel resource with another, and then present the decision as "beneficial" on climate, is an absolute farce. Furthermore, as we look to decarbonize other sectors through electrification, further reducing the emission intensity of electricity through energy efficiency, renewables, and storage compounds the emission reductions gained through electrification. Continuing to use a fossil fuel like gas, which is a major source of methane emissions, limits the greenhouse gas emission reductions available through electrification.

The statement from scientists, and approved by policymakers around the world, is clear that installation of new fossil fuel infrastructure does the exact opposite of what is needed to mitigate climate change: rapid and deep reductions in greenhouse gas emissions, including both CO_2 and methane. TVA's DEIS does not justify how locking in further CO_2 and methane emissions is a good option for its customers.