



Questions and Answers: Cumberland and Kingston Coal Plant Retirements

General

Is there a plan for replacement generation at the retiring site?

- The current and retired coal plant locations are prime locations for new generation assets because of existing transmission grid connections, availability of cooling water and environmental footprint considerations. These features generally make the sites attractive for locating future power generation such as solar, gas, storage, emerging technologies, or a mix of these uses. Certain sites or parts of sites may also be attractive for economic development.
- **Cumberland:** The proposed plans for Cumberland Fossil Plant include the replacement of generation of one of the retired coal units with gas (either combined cycle or combustion turbine) or solar paired with storage.
- **Kingston:** The proposed plans for Kingston Fossil Plant includes replacement of all units with generation from gas (either combined cycle or combustion turbine) or solar paired with storage.

What are the plans for supporting the replacement capacity at the site?

- Tennessee Valley Authority (TVA) will not make a final decision on retirement or replacement capacity until the environmental reviews are complete and have TVA Board approval.
- **Cumberland:** TVA executed a precedent agreement with Kinder Morgan/Tennessee Gas Pipeline to explore the option of using a newly built 32-mile, 30-inch gas pipeline to be generally located along an existing power transmission corridor to support a proposed 1,450 megawatt (MW) combined-cycle gas plant at the Cumberland site.
- **Kingston:** TVA plans to enter into a precedent agreement with Enbridge/East Tennessee Natural Gas to explore the option of using a newly built 117-mile, 30-inch gas pipeline, a majority of which to be generally located along an existing pipeline corridor with a 24-inch eight mile lateral along a new route to the Kingston site, to support a proposed 1,450 MW combined-cycle gas plant at the Kingston site. The pipeline would include construction of a compressor station near Hartsville, Tennessee to support the project.



Why are we going ahead with plans to build a pipeline if we haven't decided yet?

- To preserve the option for combined cycle replacement generation (Alternative A), Kinder Morgan (Cumberland) and Enbridge (Kingston) will begin the Federal Energy Regulatory Commission (FERC) Pre-filing process in 2022 while environmental reviews are ongoing. Initiation of field studies and the Pre-filing allows TVA to meet the proposed project's timeline once and/or if the reviews are found favorable.
- Kinder Morgan and Enbridge will also be working with local landowners, government officials and affected counties and towns to safely site, permit and construct the pipeline.

Why is TVA replacing coal assets with gas or fuel assets? How will this decision impact its carbon goals?

- The 2019 Integrated Resource Plan (IRP) indicated a need for solar, gas, storage expansion and early coal retirements will likely be replaced by a mix of these technologies that are viable today. Specific capacity replacement combinations will consider cost, system reliability and flexibility needs, and environmental impacts. Evolving signposts such as the load forecast, environmental regulations and technology advancements will influence the need for and type of capacity replacements over the longer term. Recommending a least cost asset strategy with all of these priorities in mind will ensure TVA continues to fulfill its mission to serve the people of the Tennessee Valley.
- In the coming months, TVA will be performing Environmental Impact Statements (EIS) to assess the impact of coal plant retirements at Cumberland and Kingston. The EIS process for each plant retirement will assess various options for replacement generation and will allow the public the opportunity to weigh in, provide input and voice concerns.

What will it cost to shut down a plant (including environmental cleanup and brownfielding costs)?

- When making asset strategy decisions, TVA considers the key areas in its mission: energy, environment, and economic development. Coal assets are aging, and a number of operational and environmental challenges make retirement worthy of consideration. Environmental cleanup costs will be incurred whether a plant retires now or in the future. Since total asset retirement obligations at these sites are adjusted for inflation as time moves forward, the total cost figure is the same if TVA retires these plants in 5 years, or 50 years from now given the current scope of work required to responsibly close these sites. The longer a plant operates, the scope of environmental costs will continue to increase and may expand further if additional regulation requires more extensive work.
- Additionally, the final condition of each site may potentially be impacted by future uses of the site. While at this time TVA does not know what the demand for these sites may be, recent experience with the Widows Creek site indicates a benefit from repurposing these sites for alternative uses. It is unclear whether that will be an option in the future.



Economic Development: Community Impacts

Is there a plan for economic development at the site(s) of the retiring coal plant(s)?

- Economic development is fundamental to TVA's mission, and we have a strong record of attracting and retaining some of the biggest corporate names in manufacturing, aerospace and defense, technology, and transportation.
- As we have done with other TVA sites impacted by fleet changes, we will evaluate options for the sites of retiring units. These options may include both replacement generation and opportunities for economic development or other redevelopment.

How will coal plant retirements impact surrounding communities regarding funding from payment in lieu of taxes (PILOT)?

- TVA returns 5% of power sales revenues from the previous year in the form of tax equivalent payments to the eight states where it sells electricity or owns generating plants, transmission lines, substations and other assets, and directly to 147 local governments where TVA owns power property.
- State and local governments distribute the funds according to their own formulas and discretion to support a variety of initiatives, including schools, fire departments and other emergency response agencies, tourism and recreation, and human service organizations.
- Requests for PILOT information will be considered individually and should be directed to TVA Corporate Accounting.

How will this impact TVA's economic development incentives in surrounding communities?

- TVA remains committed to supporting economic development in areas where we retire generating assets. As we have done with other TVA sites impacted by fleet changes, we continue to work to limit the impacts of plant closures on local communities. If TVA continues to serve an area, there are no anticipated impacts to economic development incentives and those incentives will still apply.

Economic Development: Business Partner Impacts



How will TVA address impacts to external companies that it supplies with Coal Combustion Residuals (CCR) (e.g., Georgia Pacific and drywall, TDOT and asphalt)?

- All of TVA's contracts with buyers have provisions for early termination. Closure of a coal plant is a condition that would lead to contract termination. However, TVA will work with our buyers to provide as much notice as possible to allow them adequate time to arrange alternative supply.
- **Cumberland:** There is currently enough gypsum at Cumberland to continue supplying gypsum to our buyers beyond the retirement of Cumberland. Additionally, we are currently conducting a study of the ash stack and if the results are favorable, there could be a several years of remaining supply available to buyers.

What about the indirect impacts related to the mining, limestone and transportation industry that would result from the coal site closure?

- The retirement of Cumberland and Kingston could result in adverse economic impacts to the surrounding plant areas, including mines and other industries supplying goods and services to the plant. Any such impacts would be assessed in the NEPA review for any closure.
- Any decisions made by TVA regarding its power generation assets must be done in the best interests of all its customers, employees, and residents across the Tennessee Valley.

How has the flexibility capacity associated with the Long-Term Agreement (Valley Partners) been considered for either the solar planning assumption and/or in considerations related to power demand projections?

- TVA assumes in the asset strategy that Valley Partners execute their flexibility potential over time, with the vast majority expected to be solar additions. Small commercial and industrial customers are less likely to add solar “behind the LPC meter” and instead collaborate with their Valley Partner LPC on solar additions.
- This tradeoff is incorporated in TVAs plans, along with some acceleration of mid-scale solar additions driven by Valley Partners’ ability to make it easier for their customers to add solar.

Will TVA’s commitment of a decade of flat rates be impacted by any of the asset strategy decisions? Will there be additional avenues to provide thoughts and have more robust dialogue related to the asset strategy above and beyond the EIS process?

- TVA’s strategic planning incorporates coal end-of-life assumptions and potential replacement generation options. TVA remains committed to holding rates flat through the decade. Incorporating these planning assumptions reinforces TVA’s ability to deliver no



base rate increases through 2030 by mitigating the operational and financial risk associated with these aging assets.

- Retirement and replacement generation options will be comprehensively evaluated in Environmental Impact Statements (EIS), which will inform a final recommendation to the TVA Board. Valley Partners will have the opportunity to comment through regular partner dialogue, as well as through the EIS process.

Environmental Strategy

How will TVA's asset strategy (specifically using gas for replacement capacity) be impacted by the new energy and climate related Executive Orders from the Biden Administration?

- TVA's continuing mission to provide affordable, reliable, and clean energy to the Valley is a priority shared with each administration. TVA reviews Executive Orders and memoranda to guide agency policies and practices. Some executive actions may not apply, but TVA reviews each for keeping current with changes in policies and directives.

How might the Effluent Limitation Guidelines (ELG) Rule impact TVA's asset strategy?

- TVA is still evaluating all applicable options of the ELG rule. According to the rule, TVA has three compliance pathways for each site:
 1. Invest in our units to be in compliance with the new limitations
 2. Operate each unit at a significantly reduced output which allows the unit to run at 10% of the unit's capacity.
 3. Cease burning coal no later than December 31, 2028.
- At this time, no final decision has been made. TVA is leaving options open for maximum flexibility as we continue to evaluate the best avenue for each plant within our coal operating fleet.
- On January 11, 2021, TVA submitted letters to the Tennessee Department of Environment and Conservation (TDEC) and the Kentucky Department of Environmental Protection to request a modification to our water permits, which includes adding language for all applicable options outlined in the ELG Rule to comply with the revised regulations.
- TVA will make a decision on selecting one or more of the compliance pathways by October 2021 as required by the rule. The rule does provide some options to transfer from one compliance pathway to another after October 2021.



Will the new ELG rule cause TVA to invest in plants that are going to be retired in the next 10-20 years (after 2028)? If so, does that change the retirement timeline?

- In all cases TVA will comply with the new ELG rule. Our current planning assumptions are that Cumberland and Kingston will retire before the end of 2028. Until timelines are certain, TVA will proceed with actions to ensure compliance with and flexibility under the ELG rule.

What will TVA do with the CCR at each plant?

- Decisions regarding the closure and long-term storage and management of coal combustion residuals (CCR) are based on the unique characteristics of each site. TVA, with oversight from TDEC, will continue to use science, data, and analysis to inform those decisions. Each site will be closed in an environmentally safe manner (i.e. Closed-in-Place or Closed-by-Removal). We will work closely with economic development and other stakeholders on any plans to potentially repurpose the sites for the benefit of the community after closure.

How will NEPA considerations impact retirement decisions?

- The National Environmental Policy Act (NEPA) requires federal entities to assess the social, economic, and physical environmental impacts of a proposed action to inform decision-makers as they evaluate the alternatives. The scope of the review is generally dependent upon the scope of the proposed action along with reasonable alternatives and their anticipated impacts.
- NEPA gives the public and other local, state and federal stakeholders an opportunity to provide input to a plan or project before it is executed. The results of a NEPA review, including external feedback and the anticipated environmental and socioeconomic impacts associated with the action, are then considered before a decision is made.

What is the typical two-year process of an Environmental Impact Statement (EIS)?

- Once a project scope is identified, a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) is published in the federal register and a minimum 30-day public scoping period begins, which may include a public meeting. TVA then considers the public input received in preparation of a Draft EIS.
- After the close of the scoping period, after considering all public input, the TVA NEPA staff identifies the essential components for use in preparing the Draft EIS. The Draft EIS is developed and reviewed by the TVA core team and management. A Notice of Availability (NOA) of the Draft EIS is published in the Federal Register for a 45-day public comment period, which may include one or more public meetings. TVA then reviews and addresses public comments, including them in the appendix of the EIS. If needed, TVA performs additional analysis based on public comments; otherwise, TVA completes and issues the Final EIS.



- There is a 30-day waiting period after the final EIS is published before the Record of Decision (ROD) can be published in the Federal Register. The ROD summarizes the plan, environmental impacts and mitigation measures.

What's the next step for environmental reviews for coal retirements?

- TVA is continuing to conduct an environmental impact statement in order to analyze the impacts associated with the proposed retirement of TVA's Cumberland and Kingston Fossil Plants, along with the potential construction and operation of generation to replace the output from the retired units.
- These reviews will take into account alternatives, including no action and retirement of the coal plant with the construction and operation of either a combined-cycle gas plant, combustion turbine gas plant(s), and/or a solar or other storage facilities. Once the EIS process is complete, TVA will use this information to make decisions.

Risk and Reliability

What are the risks if TVA keeps coal assets in operation?

- Currently, we are asking our coal assets to operate outside of their design basis to balance load and meet current turndown issues. This need to cycle off, swing and balance load is placing stress on units designed for reliable and economic base load capacity. As our sites age, the risk of the unknown continues to grow. Many of these risks relate to core infrastructure (such as stacks, foundations, intake tunnels, etc.) that are very difficult to assess and address.
- As load profiles are changing with the influx of lower cost renewable and gas generation, it's no longer cost effective to operate and maintain one of the oldest coal fleets in the country. Our customers are demanding more renewables in their energy which only increases the challenge of operating our coal fleet.
- Stricter environmental regulations play a role as well, such as the environmental compliance limitations from the 2020 Effluent Limitations Guidelines (ELG) rule.

Following the recent grid issues in TX, a state which has shifted from primarily fossil fuels to including more renewables, how is TVA going to avoid similar issues as we retire coal plants?

- In Texas, served by ERCOT (their competitive market), and in MISO and SPP, which are neighboring competitive markets, the grid operator is responsible for maintaining the market and maintaining the stability of the overall grid. The markets are supplied by competitive power providers who are not incentivized to invest in reliability measures to keep their units reliable in extreme conditions. As a result, the gas providers and power producers' infrastructure was not reliable in the extreme cold conditions experienced in TX.



- TVA and its partners operate in an integrated Public Power model and focuses on reliability for end use customers. TVA builds enough margin in generation reserves and designs and operates its plants to provide a high level of assurance that generation will operate in extreme temperatures. While we had some instrumentation issues due to freezing conditions, the 2018 investment in freeze protection alleviated most of the reliability issues we previously experienced. We will continue to invest in our units and transmission line system to address issues experienced in February so that we reduce the risk that our customers would experience the situation that emerged in Texas.

TVA's coal fleet operated very well during the recent polar vortex. Gas prices skyrocketed and there was concern about gas availability. Is TVA being short-sighted with planning assumptions to retire the coal fleet?

- The coal fleet operated exceptionally well during the polar vortex. This is attributed to the skilled and dedicated workers who operate and maintain these units as well as the significant investments made over the past few years to address the highest risk material condition issues. We need our coal fleet to continue to operate well. However, TVA's fleet is among the oldest in the country and we cannot count on this same level of performance a decade or more from now. The purpose of a long-range asset plan is to anticipate the future. We know that coal assets will continue to face more and more challenges, so it is important to develop a plan to address these future risks.

Asset Strategy

TVA has shared retirement planning assumptions with employees and other stakeholders. How does a planning assumption become a decision?

- Initial evaluations of TVA's aging coal fleet that assessed cost, risk, reliability, and environmental impacts indicated that retirement and replacement of coal with gas capacity, complementing solar expansion, is the most likely path forward in the near term. Based on these evaluations, TVA has established planning assumptions for retirement dates for all remaining coal plants, with the Cumberland and Kingston Fossil Plants having the earlier expected end-of-life dates.
- TVA issued Notices of Intent to complete Environmental Impact Statements (EIS) that will provide more comprehensive evaluations of the potential retirement of the Cumberland and Kingston Fossil Plants, along with replacement alternatives and associated social, economic, and physical environmental impacts, to inform specific asset recommendations to the TVA Board.



Is establishing coal retirement planning assumptions consistent with the 2019 IRP?

- Yes. The Integrated Resource Plan (IRP) is meant to be a roadmap for TVA's future, not a specific asset plan. Certain IRP cases included some coal retirements, and all IRP cases showed challenged coal operations, with more frequent cycling of aging plants not built for this type of operation. One of the next steps identified in the 2019 IRP was to further evaluate the long-term viability of the coal fleet. The plan for a long-term asset strategy is a result of that continued work. In this constantly evolving industry, TVA must remain agile in our decision-making to maintain healthy finances, a diverse generation portfolio, and flexibility as a public power company for the people of the Tennessee Valley.

What kind of analysis was performed to determine the order and years of retirements?

- As recommended in the 2019 IRP, TVA staff performed an end-of-life evaluation for the aging fossil fleet. We evaluated all plants with respect to age, material condition, use patterns, performance, contribution to system flexibility needs, carbon and other environmental impacts, and grid support role. Analysis indicated end-of-life for the Cumberland and Kingston Fossil Plants in the 2025-2030 window and for the Gallatin and Shawnee Fossil Plants in the 2030-2035 window. Also, analysis indicated retirement of some of TVA's oldest Combustion Turbine units at the Allen and Johnsonville sites and replacement with newer, more efficient peaking technologies.

How does TVA make decisions about their long-term asset strategy?

- As the future unfolds, TVA monitors key signposts that guide decisions in the longer term. The signposts relate to key variables that could have a significant influence on the future generation portfolio. These signposts include:
 - Demand for electricity
 - Natural gas prices
 - Customer expectations
 - Regulatory requirements
 - Operating costs for existing units
 - Solar and wind costs
 - Emerging and developmental technologies

What are the key elements of the asset strategy?

- Developing planning assumptions to reflect the retirement of remaining coal plants based on end-of-life evaluations
- Adding solar capacity to meet customer and system needs
- Adding gas assets to replace retiring coal and aging gas capacity, to support solar integration and to maintain reliability during peak demand



- Utilizing existing sites to take advantage of existing infrastructure and transmission assets, thus also managing associated costs and environmental impacts
- Pursuing renewal of operating licenses for all seven nuclear units and investigating options for advanced nuclear technologies
- Investigating options for storage and demonstrating early use cases
- Investigating new pumped and pump-back hydro technology and continuing to refurbish and maintain existing hydro units
- Investigating emerging technologies such as carbon sequestration and hydrogen fuel

Outside of coal and gas, what other technologies is TVA exploring as part of Asset Strategy?

- **SOLAR** – More than 10,000 MW of solar capacity is expected to be installed by 2035, with 2,755 MW of these additions already under contract. Solar generation will be a combination of TVA-owned assets and assets owned by others.
- **NUCLEAR** – Pursuing renewal of operating licenses for all seven nuclear units and investigating options for advanced nuclear technologies, such as potentially building small modular reactors (SMRs) at the Clinch River site
- **HYDRO** – Refurbishing and maintaining existing hydro stations while analyzing assets for pumped-storage capability
- **BATTERY** – Looking into battery storage options as this technology becomes more affordable and feasible
- **OTHER DEVELOPING TECHNOLOGIES** – TVA is working with DOE, EPRI, and others in the industry to explore other no/low carbon resources (e.g., hydrogen fuel, carbon capture and sequestration, storage, etc.)

Asset Strategy: Renewables

What role do direct serve customers' requirements to be powered by renewable energy have on TVA's decision to retire coal units and contract renewable energy?

- The 2019 IRP indicated a substantial level of solar expansion driven by a combination of customer demand and system needs, along with the possibility of additional coal retirements.
- Primarily, customers partnering with TVA to meet their renewable requirements is accelerating the pace of solar expansion. Coal retirements drive a somewhat higher level of solar expansion, but long-term economic benefits to the portfolio are the primary driver of solar additions.



What is the unsubsidized cost per MW for renewable power and is it competitive with the rest of the portfolio?

- Subsidies have increased the cost-competitiveness of renewable power, particularly for solar as costs have continued to decline and installations have become more attractive in the Valley. Most sources are forecasting further efficiency gains and cost declines, more than offsetting the reduction in investment tax credits. This increasing competitiveness drives the expectation for significant solar expansion in TVA's portfolio to meet both customer and system needs.
- For now, the avoided cost of solar is very similar, if just slightly higher, than our other portfolio options. The reason for this is our large, diverse portfolio of assets that are available to backstop solar when the sun is not shining. Therefore, we have the ability now to add a substantial amount of solar to our system and not increase customers' cost. Once we cross a certain threshold, our system will not be able to backstop solar easily and we will have to add assets to do so. At that point, solar will become much more expensive. We are exploring new and innovative solutions to proactively address this challenge.

Cumberland Scoping Meeting Questions

What will happen to the Cumberland Fossil Plant and employees currently there?

- TVA is working closely with the Cumberland Fossil Plant and their employees. As with other coal plant retirements, TVA is working to support employees and minimize impact to the surrounding communities.
- TVA would work with employees to identify opportunities within other business units throughout the company. TVA has been successful with redeployments and other ways of supporting our employees.

Could the plant be closed permanently and is that under serious consideration?

- Yes, retirement of the Cumberland plant (two units) and the replacement of the generation of one unit is being considered by TVA under the NEPA process.

What technologies exist to burn coal cleaner and use the ashes productively?

- TVA's operational plants already use several clean coal technologies, including SCRs and ash dewatering and other things to protect the environment.



- There are other clean coal technologies that are being studied today at a smaller scale. As those technologies become available, TVA will evaluate them for future operating plants that are still in service.
- Cumberland currently provides for the beneficial reuse of coal ash. In 2020, Cumberland produced 300,000 tons of fly ash; of that 250,000 tons was beneficially reused as replacement for Portland cement and concrete. Cumberland serves about 200 ready-made concrete producers in Tennessee and surrounding states. The ash has been used in a variety of projects such as roadways, dams, bridges and construction projects such as Nissan Stadium in Nashville. In 2020, the plant produced 600,000 tons of synthetic gypsum, of which 100 percent was beneficially reused for the wallboard plant next door, which uses enough gypsum to construct 71,000 homes.

What is the difference between gas cost, solar cost, and battery storage cost? How much money would TVA spend to build a new combined-cycle gas plant to replace the Cumberland coal plant? How much money would TVA spend to build new combustion turbine gas units? How much would TVA spend to build new gas pipelines to provide fuel to the new gas plants?

- TVA projects the cost of all our power resources and benchmarks its projections against U.S. Energy Information Administration (EIA) and other sources. Both gas and solar are part of the total cost involved for determining the system's capacity to serve electricity demand. Solar and gas complement each other and merit TVA's use of both technologies.
- Different resources serve different needs within the TVA portfolio. There is a need for dispatchable assets in addition to solar, that can be turned on and off for energy efficiency and demand response. Battery storage remains a developing technology with uncertain costs. All the options will be evaluated as part of the EIS.

What source has the best job creation?

- The Draft EIS will include a socioeconomic analysis that includes anticipated job creation associated with each alternative. Beyond the replacement generation, the needs of the system, according to forecasts, speak to the growth in the Cumberland area and the Tennessee Valley region. Future load growth is modest, but economic development and new businesses entering the region as well as population in-migration all contribute to job creation. Replacing the current plant's generation speaks to job creation based on anticipated demand.

Will there be any consideration for nuclear power as a replacement option?

- Due to current cost and timeline risks, nuclear power is not being considered as an alternative for this project. TVA will continue to work with the Department of Energy and



other industry partners to consider emerging nuclear technologies such as SMR for other projects.

What is TVA's response to the climate crisis as it relates to replacing the electricity from the plant?

- TVA's commitment to environmental stewardship is in concert with the mission of providing low-cost, reliable energy and spurring economic development. TVA is leader in reducing carbon emissions nationally. TVA is on a path of 70 percent reduction in carbon by 2030 and approaching 80 percent reduction by 2035, and aspirations of net zero carbon emissions by 2050. TVA's baseline Asset Strategy plan includes 10,000 MW of solar. In addition, end of life evaluations of our coal fleet and additional gas and solar sources are part of this commitment.
- Natural gas is a bridging technology with the expectation that society will have more renewable energy in the future.
- The EIS alternatives include considering solar and storage options as well as natural gas or fuel options.

How many employees does Cumberland currently have?

- As of June 2021, there are 252 employees at the Cumberland coal plant. In addition, there are 160 contract partners who support ongoing operations at the facility.

On the retirement timing, if the project is replaced with solar and storage does that mean that the retirement can occur before 2026 or to retire both units in 2026, and is this something you will evaluate as part of this EIS process?

- The two-year process of the EIS will evaluate the timing of the retirement of both units along with the proposed power generation alternatives for replacing the generation of one unit only.

On the project alternatives, can there be more than three? Why are energy efficiency and demand response not considered as resources not considered as part of one or more alternatives, and can the final recommendation include a combination of alternatives (such as a combination of energy efficiency, solar, storage, and a few gas CTs)?

- This EIS is evaluating replacement generation needed as a result of the retirement of the one unit at the Cumberland coal plant, with subsequent analysis to follow for the second unit. Many alternatives are being considered, including a variety of resource types such as gas, energy storage, nuclear, solar, wind, and demand side Energy Efficiency (EE)/Demand Reduction (DR).



- All alternatives include the retirement of both Cumberland units. Additionally, TVA's current base asset plan includes 10,000 MW of solar additions and the alternatives are meant to complement these solar additions and the balance of the TVA fleet.
- Different resources serve different needs within the TVA portfolio. There is a need for dispatchable assets in addition to solar, that can be turned on and off to provide reliability year-round.
- Demand side resources, such as EE and DR, reduce demand by either installing efficiency measures to reduce energy use across all hours or provide on-demand load reduction during times of heavy demand by issuing a "call" to contractually non-firm load. TVA currently offers EE programs under its EnergyRight® brand, in partnership with Local Power Companies, and will continue to offer programs for the foreseeable future. In recent years, TVA has placed increased emphasis on its missional offerings, including low-income assistance through its Home Uplift program and community redevelopment through its Community Centered Growth program. TVA also has extensive experience with DR, with over 1,500 MW of DR capacity today. A large percentage of this capacity is currently contracted with industrial customers, although TVA also has DR contracts for aggregated commercial customers as well. Additionally, TVA has been piloting a program in the residential DR space, which has the potential to offer additional diversification in its DR portfolio. Demand side EE and DR resources are well positioned to help TVA absorb load growth resulting from increased electrification of the economy, from sources such as electric vehicles (EVs) or appliance fuel switching (gas to electric). However, demand side resources do face challenges around timing and limits on dispatchability. EE programs take time to scale and market, while also facing increasing costs for higher depth and penetration levels. DR programs allow TVA to offset physical capacity needs; however, they are limited in the number of calls available. While demand side options have the potential to contribute to the overall system solution, the capacity and energy needs resulting from the retirement of CUF make it unlikely that these options would be viable replacement options.

What is TVA's plan to address a decrease in expected payments in lieu of taxes to Stewart County?

- Every state handles payment in lieu of taxes differently and TVA will work closely with local and state officials as determinations are made. See the section, *Economic Development: Community Impacts*, for more information about economic development incentives.

Has TVA studied the impacts to groundwater supply due to the large amount of water needed to operate gas plants?

- If a combined cycle plant is evaluated as an alternative to replace generation from retirement of one of the coal units at Cumberland, a groundwater impact study will be performed as part of the EIS process.



Will TVA continue plans to build a wastewater treatment facility in response to federal guidelines requiring limits of pollution discharges to the Cumberland River?

- TVA put a wastewater treatment plant in service in April 2021. TVA will make the investments needed to be in federal compliance.

Will the EIS evaluate what will be done with the coal ash, or will that be handled in a separate NEPA process on decommissioning the plant?

- No, there has already been an extensive study done in concert with the Tennessee Department of Environment and Conservation on what to do with the coal ash as part of the decommissioning process that complies with federal regulations.

Why do separate NEPA processes for each plant and not just do a new IRP, and NEPA, to evaluate holistically when to retire coal plants and what new resources are needed? Duke Energy in the Carolinas just did this last year as ordered by their state regulatory commission.

- The TVA IRP occurs in about four to five-year intervals. The 2019 IRP is still good and is being implemented. TVA is working towards the next IRP and will look at how projects can be incorporated into the next IRP.
- An IRP looks at a number of scenarios and strategies. It does not contain specific projects, but rather requires a NEPA process to consider information and feedback from the public before seeking board approval for certain projects or implement certain asset strategy.
- The EIS from the IRP and the whole IRP itself is a system-level look and is not site specific. NEPA requires a deep dive into specific impacts and actions with every project in alignment with the IRP.

How will TVA ensure impacted communities are able to participate in the decision-making process given the limited access to broadband Internet in this part of the state?

- Using GIS-screening tools, TVA can identify communities with low Internet access and broadband availability.
- With this knowledge, TVA can provide notices directly by mail or through other forms of direct outreach to identified communities. Once pandemic restrictions are lifted, TVA can also put in a plan in place to engage these communities by phone and in-person.



Is there an option for local participation in this study and will TVA accept verbal and written comments?

- Under pandemic restrictions, in-person meetings were not possible. TVA remains hopeful when the draft EIS comes out early next year that in-person meetings will be available.

Do you plan cultural resources surveys in the new areas for construction? Will Tribes be contacted?

- Yes, TVA considers evaluation of impacts to cultural resources as part of the NEPA process and TVA must also comply with the National Historic Preservation Act. TVA will conduct archaeological and architectural resource surveys for any areas of disturbance. TVA will also consult with all federally recognized Indian tribes who have an interest in the affected areas before the draft EIS is issued.

Is there a draft version available for view?

- The draft EIS will be available for public review in early 2022. Public comment will be accepted by email to NEPA@TVA.gov or to TVAinfo@TVA.gov for general questions.

Will TVA conduct site-specific environmental justice analysis on the decision to retire the Cumberland coal plant and replace the output with new generation from fossil fuel infrastructure? What exactly will be considered with regards for such an analysis?

- Yes. Environmental justice is another resource area that is considered as part of the EIS study. TVA considers environmental justice impacts to communities with respect to resources such as air, water, and waste, and whether such communities will be disproportionately impacted, as part of the EIS.

Are you evaluating how to replace the Cumberland capacity or energy one-to-one, or evaluating what is needed and if less capacity is needed plan for just what is needed?

- The retirement of the Cumberland coal plant will require one-for-one capacity replacement. TVA is forecasting modest load growth over the next 10 to 20 years. With strong economic development and residential in-migration to the region, TVA is seeing modest growth in the area that rationalizes the need for replacement generation in full. In the event that loads decrease, due to loss of customer load or other macro-economic factors, TVA will have additional opportunities to re-evaluate long-term capacity needs as additional assets retire or PPAs expire in the early 2030s.



Other than environmental impact and cost, to what extent are location, workforce availability, existing public-private partnerships used to determine replacement sources of generation?

- There are several considerations that go into the evaluation of alternatives in the environmental impact statement. Coal technology is one of the most mechanically complex technologies, requiring a great deal of maintenance to keep those plants running well. As the plants mature, this becomes more challenging.
- TVA also considers both the reliable operation of the transmission grid and the ability to leverage existing transmission infrastructure when making siting decisions.
- The operating characteristics of generation units are also a consideration. When TVA first put its coal units online, they were baseload units designed to stay online day in and day out. As TVA has evolved and added additional baseload nuclear in its portfolio, coal units are being forced to be more flexible as the load moves during the day. The amount needed to support the territory changes over time. TVA will have to adjust the amount of output for those units in real time. Coal units are not designed to do that, i.e. follow the changes in load, while gas and hydro units are designed for flexibility. As TVA integrates more solar power into the system, this will be more challenging. Flexible power generation as the sun sets will be even more important.
- Making sure we can retain reliability as we integrate more solar will be important. Many of the companies that are evaluating putting new installations in our service territory are interested in creating sustainability in what power they consume.
- TVA is deliberate about developing alternatives that will create jobs for displaced communities at TVA and through local industries.

Are there others coal plants that TVA is considering closure on?

- TVA is also considering closure of the Kingston fossil coal plant.

Will TVA consider plans to build solar generation in Stewart County or at the site of the coal plant if it is retired later this decade?

- TVA's existing Cumberland plant location is well-suited for additional generation. The EIS will evaluate existing sites because of their transmission connections and water supplies. However since multiple solar and storage sites would be needed to meet the replacement generation needs of CUF Unit 1, additional offsite land would be required to be considered as part of this alternative.
- Any new sources of energy will need to be constructed and brought online prior to the retirement of the existing units.
- None of the alternatives being considered would use the exact same footprint as the current plant. For example, through the EIS study, the combined cycle gas plant alternative would consider utilizing a location somewhere in the Cumberland reservation. The proposed combustion turbine gas plant and other proposed alternatives would also be constructed at other areas throughout the Valley.



What current/expected storage technologies are in the plan? Are there recommended information resources? Does the plan include any type of carbon capture?

- There are nearly 200 MW that are committed for through PPAs related to solar that have some battery storage. As the solar projects under these PPAs are built and come online, TVA will be able to better understand the value of integrating battery storage and solar and how much location matters in using batteries. TVA is also planning a self-build battery storage facility to support system needs near an industrial park in Vonore, TN. These initial use cases will also inform the planning of additional battery storage going forward.
- TVA continues to monitor carbon capture in concert with the innovation and research team, leveraging information across the industry. Carbon capture technology is currently not viable for scaled deployment, but TVA will continue to monitor and seek further demonstration for commercial deployment through 2030. For the gas alternatives in the EIS, TVA would gauge the use of carbon capture, hydrogen as a fuel source and other flexible options as possible technologies viable in the future.

You haven't mentioned wind. Aren't there some locations for wind in TN?

- TVA will continue to monitor prices and technology developments for wind resources both in- and out-of-Valley, especially as technology evolves to improve efficiency at lower wind speeds. Due to high transmission costs to source out-of-Valley wind and lower in-Valley wind speeds reducing economic viability at this time, wind resources were deemed not viable to replace generation lost from retiring the first unit at CUF.

On the reverse of using plant byproducts, what is the plan to replace those companies' raw material requirements?

- There is currently enough gypsum at Cumberland to continue supplying gypsum to our buyers beyond the retirement of Cumberland. Additionally, we are currently conducting a study of the ash stack and if the results are favorable, there could be a several years of remaining supply available to buyers.

Will TVA incorporate the newest International Energy Agency projections? It states that to keep the world within 1.5 C of warming, fossil fuels will have to decline very rapidly, and get near zero before the service life end of any gas plants built today.

- The greenhouse gas/climate analysis in the Draft EIS will be completed consistent with 2016 CEQ Final Guidance for Federal Departments and Agencies on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews, the 2021 Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim



Estimates under Executive Order 13990 and other applicable directives, and would involve the consideration of assessment methodologies such as proxy analysis. The greenhouse gas analysis will also include discussion of the potential impacts of predicted changes in the climate of the project area on the proposed replacement generation infrastructure and possible measures to mitigate those impacts.

Is any new ground disturbance planned for the new construction? If so, will it all be in the footprint of the facility to be closed?

- The soil and land use are key considerations in the EIS process. TVA evaluates issues in the EIS to consider the unique challenges and advantages of the resource sites. TVA plans to target land utilized in previous disturbed areas as much as possible before any new ground disturbance.

Kingston Public Scoping Meeting Questions

What steps is TVA taking to catch up with other southeast utilities in solar capacity?

- TVA is working with their customers to help meet their renewable goals. More than 5,000 MW in solar is expected to be installed by 2030, with 2,755 MW of these additions already under contract. TVA's baseline Asset Strategy plan includes 10,000 MW of solar by 2035. Solar generation will be a combination of TVA-owned assets and assets owned by others.

Please discuss how the energy needs are currently being met by the Kingston facility and how they can be met by investing in renewable sources.

- TVA is looking at three alternatives in the EIS; Alternative C is the combination of renewables and storage to replace the power generated by Kingston coal plant. For the replacement for Kingston's coal generation, it would take ten acres of solar for every MW replacement generation. As a result, solar development on multiple sites will be considered as part of the EIS.

Has there been any nuclear power generation consideration?

- Due to current cost and timeline risks, nuclear power is not being considered as an alternative for this project. TVA will continue to work with the Department of Energy and other industry partners to consider emerging nuclear technology going forward for other projects. Small modular reactors (SMRs) are an emerging technology, but the development



timeline would not meet the project schedule. SMRs are generally about 300 MW and smaller than the Kingston Fossil Plant.

How is the local community being involved in these plans? Who has been consulted during the development of these plans?

- TVA values community input and there are many opportunities for public and community engagement during the NEPA process. TVA distributed fliers with information about the virtual public meeting to public facilities within proximity to the Kingston plant during the scoping period. Public input and outreach occur during the 30-day scoping period and public meeting, after which TVA compiles comments and incorporates them into development of the Draft EIS. After release of the Draft EIS, TVA holds a 45-day public review and public meeting. TVA then reviews and addresses public comments, including them in the appendix of the EIS. If needed, TVA performs additional analysis based on public comments; otherwise, TVA completes and issues the Final EIS. There is a 30-day waiting period before the Record of Decision (ROD) can be published in the Federal Register, which summarizes the plan, environmental impacts and mitigation measures. The assessment in the Draft EIS is coordinated with other Federal agencies as well as with state agencies during this process.

How can fossil gas be a "bridge fuel" when methane emissions from hydraulic fracturing and transport are far more potent than carbon emissions from other fossil power sources such as coal? Has TVA considered the timing and expense of building new gas pipelines when we've seen that to be increasingly difficult across the country?

- During the development of reasonable alternatives, TVA will consider costs, the overall TVA power system, and anticipated environmental impacts, including air quality. TVA expects to analyze three alternatives, which have varying emissions reductions compared to the current Kingston coal plant. Alternative B, the proposed combustion turbine plants, would likely have the highest emissions compared to the other alternatives, but would still be considerably more efficient compared to the coal plant. TVA is analyzing the potential environmental impacts associated with the approximate 125-mile long pipeline as part of the EIS.

How will TVA update its replacement plan if/as changes in technology prices, federal and local policies, and load change? How can TVA use energy efficiency and smart home technologies to offset some of the needed replacement capacity?

- TVA continually monitors changes in the marketplace (e.g. technology, electricity demand, federal and state policies, natural gas prices, and more) and based on those changes our plans evolve and will adjust to the timing of those changes.



- Demand side resources, such as energy efficiency (EE) and demand response (DR), reduce demand by either installing efficiency measures to reduce energy use across all hours or provide on-demand load reduction during times of heavy demand by issuing a “call” to contractually non-firm load. TVA currently offers EE programs under its EnergyRight® brand, in partnership with Local Power Companies, and will continue to offer programs for the foreseeable future. In recent years, TVA has placed increased emphasis on its missional offerings, including low-income assistance through its Home Uplift program and community redevelopment through its Community Centered Growth program. TVA also has extensive experience with DR, with over 1,500 MW of DR capacity today. A large percentage of this capacity is currently contracted with industrial customers, although TVA also has DR contracts for aggregated commercial customers as well. Additionally, TVA has been piloting a program in the residential DR space, which has the potential to offer additional diversification in its DR portfolio. TVA anticipates initiating an updated Energy Programs Potential Study in 2021 and completing it in 2022, which will further inform costs and depth of EE and DR potential in the Tennessee Valley. Demand side EE and DR resources are well positioned to help TVA absorb load growth resulting from increased electrification of the economy, from sources such as electric vehicles (EVs) or appliance fuel switching (gas to electric). However, demand side resources do face challenges around timing and limits on dispatchability. EE programs take time to scale and market, while also facing increasing costs for higher depth and penetration levels. DR programs allow TVA to offset physical capacity needs; however, they are limited in the number of calls available. While demand side options have the potential to contribute to the overall system solution, it is unlikely that these options would be viable for replacement of the capacity and energy needs resulting from the retirement of Cumberland and Kingston.

How can TVA combine aggressive energy efficiency measures, renewable energy, energy storage and demand response in a comprehensive program to get off fossil fuels?

- TVA’s continued investments in EE and maintaining our DR portfolio are foundational elements included in the base plan. By 2030, TVA is estimating the impact of EE programs to contribute about 600 megawatts. Our main focus is on buildings and homes with the greatest energy burden, such as schools and low-income households.

Has there been any consideration to turning this into a modular nuclear reactor like the kind of things they're working on at Oak Ridge National Laboratory?

- Due to current cost and timeline risks, nuclear power is not being considered as an alternative for this project. TVA will continue to work with the Department of Energy and other industry partners to consider emerging technology such as SMRs for other projects.



How much money would TVA spend to build a new combined-cycle gas plant to replace the Kingston coal plant? How much money would TVA spend to build new combustion turbine gas units? How much money would TVA spend to build new gas pipelines to provide fuel to the new gas plants? What impact will the rising cost of gas have on ratepayers/customers in the future if TVA’s plant is not economically feasible within 5 years from today? Will TVA commit to using local and union labor in any demolition or construction projects related to the Kingston site?

- During the development of reasonable alternatives, TVA will consider all future costs, the overall TVA power system, and anticipated environmental impacts.
- TVA does not expend capital for gas pipelines. The construction cost of potential pipelines is born by the pipeline operator and would be recovered through a long-term service agreement with TVA.
- TVA is constantly updating forecasts for all fuel types, resource costs, loads, and other important factors. Additionally, TVA runs sensitivity and scenario cases to determine the impact of higher or lower natural gas prices and other key variables. All of this information is used when performing risk-informed analysis.
- TVA uses local contractors and union labor for the construction projects.

If the combined cycle natural gas plant must be constructed before KIF is retired, where on the KIF site would it be located?

- Areas are currently being evaluated over the next 18 months to see where the natural gas plant would be located on the KIF reservation. This site or sites would be evaluated for impacts in the KIF EIS.

Are the upstream emissions of methane been taken into consideration in NEPA? What estimate of indirect methane emissions is made by TVA for the life-cycle climate impact of gas-fire generation?

- TVA will analyze the proposed project’s effects on air quality and greenhouse gases, including methane, in the Draft EIS.
- Natural gas is expected to be sourced from multiple existing supply areas and pooling points that are accessible through interconnections along the supplying pipeline systems. The ultimate production sources cannot be reasonably traced nor are any such sources within TVA’s control. TVA expects any such sources to comply with regulations applicable to natural gas production.



What are the long-term economics of gas versus solar to the consumers of TVA power?

- While solar prices continue to become more competitive with other resources, and are anticipated to continue falling, they do not contribute to TVA's capacity needs in winter when the TVA system typically experiences its highest loads just before dawn. Therefore, TVA must also add resources which contribute dependable capacity in the winter. At this time, gas assets remain the least-cost option to ensure year-round reliability. Gas assets are also very flexible and can be used to overcome the intermittent nature of renewable resources.

When will TVA relax its COVID protocol to allow in-person public meetings?

- Under pandemic restrictions, in-person meetings have not been possible. TVA remains hopeful when the draft EIS comes out next year that in-person meetings will be available.

How long will it take to dismantle what is currently on the Kingston site?

- Demolition of the Kingston plant would not occur until after all units are retired, which may occur as early as 2027 but as late as 2033. There are four steps in the demolition process, which takes about three to five years to complete:
 1. Decommission
 2. Deactivate
 3. Decontaminate
 4. Demolish

How are you planning to use these employees as you retire the Kingston Coal Plant?

- TVA is working closely with the Kingston Fossil Plant and their employees. As with other coal plant retirements, TVA is working to support employees and minimize impact to the surrounding communities.
- TVA would work with employees to identify opportunities within other business units throughout the company. TVA has been successful with redeployments and other ways of supporting our employees.

Has TVA studied the impacts to groundwater supply due to the large amount of water needed to operate gas plants?

- TVA will study existing groundwater supply and other water supply options and the alternatives' anticipated effect on these water resources (including groundwater) will be part of the EIS.



Once retired, what will the property be suitable for? Can it be turned into a park?

- TVA restores all sites to brownfield conditions; therefore, the following is done to those sites to get ready for economic development:
 - Structures are removed
 - Foundations as deep as three feet from the surface are removed
 - Basements are fractured and backfilled to grade
 - The site undergoes restoration and is regraded to promote positive drainage and vegetative growth.
- During the economic development study, it will be determined what type of development the site may be suitable for, which can include industrial sites, agriculture, and other types of uses.
- The structures would be removed except for the switch yard, transmission lines, intake and discharge structures, and rail spur for potential industrial sites.
- The property's future use will be determined based on the seller and what their plans are for the property.

What will TVA do to evaluate risks for customers, since TVA passes all fuel costs on directly to customers doesn't relying more on gas increase the risks of spiking customer bills?

- TVA evaluates the sensitivity of gas prices, uncertainty of reliability risks and factors that into the analysis.
- TVA utilizes a fuel hedging program to reduce volatility of coal and gas prices. Additionally, TVA is planning to add around 10,000 MW of solar by 2035, which will add to fuel diversity and further reduce natural gas price volatility.

Was continued operation of KIF with carbon sequestration addition evaluated? Was it ruled out based on cost, technical constraints, or other reasons?

- Following the publication of the 2019 IRP, TVA began conducting end-of-life evaluations of the remaining coal fleet to inform long-term planning. TVA's recent evaluation confirms that the aging coal fleet, including KIF, is among the oldest in the nation and is experiencing deterioration of material condition and performance challenges. The performance challenges are projected to increase because of the coal fleet's advancing age and the difficulty of adapting the fleet's generation within the changing generation profile; and, in general, because the coal fleet is contributing to environmental, economic, and reliability risks. For these reasons it would not be prudent to make additional investments in carbon capture and sequestration at the existing KIF plant.



Why doesn't the EIS include impacts of pipeline construction?

- TVA will analyze effects of the proposed pipeline associated with Alternative A as part of the EIS.

Will TVA conduct site-specific environmental justice analysis on the decision to retire the Kingston coal plant and replace the output with new generation from fossil fuel infrastructure?

- Yes. Environmental justice is another resource area that is considered as part of the EIS study. TVA considers environmental justice impacts on disadvantaged communities with respect to resources such as air, water, and waste, and whether such communities will be disproportionately impacted, as part of the EIS.

Aren't simple cycle gas turbine plants incredibly inefficient? Why would they be considered?

- While combustion turbines operated in a simple-cycle configuration are less efficient than when in combined cycle, they do offer system flexibility and year-round reliability which is increasingly important as TVA plans to add 10,000 MW of solar by 2035. As part of the EIS, TVA will analyze which alternative is best suited to replace power generated by the existing coal plant while meeting system needs.

What will be done with the existing coal ash stored in Kingston? Can it be removed safely?

- TVA is currently conducting an extensive environmental study on long-term coal ash storage and would have two options: 1) closure in place or 2) closure by removal. TVA will have more information based off this study.

Would storage mean batteries or something else?

- In the context of EIS, Alternative C will utilize lithium-ion battery storage. TVA continues to research and evaluate new types of storage options.

Is there currently any knowledge of how many jobs Option C could generate, and would there be an effort to ensure the people working at the Kingston plant would be have the ability/opportunity to work for the solar and battery operation?

- Jobs associated with each alternative will be analyzed in the EIS. TVA is working closely with the Kingston Fossil Plant and their employees. As with other coal plant retirements, TVA is working to support employees and minimize impact to the surrounding communities.



- TVA would work with employees to identify opportunities within other business units throughout the company. TVA has been successful with redeployments and other ways of supporting our employees.

What company will TVA be working with to construct the pipeline?

- TVA plans to enter into a precedent agreement with Enbridge to explore the option of building approximately 125 miles of gas pipeline.

Do you have a technology dashboard that summarizes the basic attributes of all of the technologies that is being evaluated?

- TVA does not have a dashboard, but the EIS will provide summaries and tables comparing alternatives and anticipated impacts.

Will TVA follow President Biden's executive orders on climate and federal policy?

- TVA's continuing mission to provide affordable, reliable, and clean energy to the Valley is a priority shared with each administration. TVA reviews Executive Orders and memoranda to guide agency policies and practices. Some executive actions may not apply, but TVA reviews each for keeping current with changes in policies and directives.

Will TVA study on-site solar and distributed solar as a lesser-impact option?

- Alternative C includes solar and battery storage options to replace the power generated at Kingston. While a portion of the solar and battery capacity might ultimately be located on-site, due to the large land requirements for solar, multiple locations would be needed to replace the generation from Kingston.
- Distributed generation, such as distributed solar, storage, wind, etc., was also considered as part of the scoping process. Distributed Energy Resources (DER) are generally smaller in size and can be aggregated together in a program or agreement for planning purposes. TVA's flexibility option, available to Local Power Company (LPC) Long-term Partners, provides an avenue for additional levels of DER as well by allowing LPCs to self-generate up to 5% of their annual load. TVA's long term plan includes assumptions for DER adoption, including DER added by our Partners on the distribution system. In general, the cost for distributed generation is higher than it is at utility-scale for the same type of resource. It was determined that a combination solution of utility-scale solar paired with utility-scale storage offered the lower-cost solution for a renewable offering to be studied as an alternative (See Alternative C) to replace the generation and capacity lost from the retirement of KIF.