TVA Coal Portfolio: Yesterday, Today and Tomorrow

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Tennessee Valley Authority

TVA’s original 1933 purpose – set forth in the TVA Act – was to address the Valley’s most important issues in energy, environmental stewardship and economic development.
What We Are

• Provider of affordable, reliable power
• Steward of the Valley’s natural resources
• Partner for economic growth

“Power is really a secondary matter…. TVA is primarily intended to change and to improve the standards of living of the people of that valley. Power is, as I said, a secondary consideration. Of course, it is an important one because, if you can get cheap power to those people, you hasten the process of raising the standard of living.”

President Franklin D. Roosevelt
What We Do

Serve over 10 million people across portions of seven states
- 154 Power distributors
- 56 Directly-served customers
- 80,000 square miles

Operate with a mission to serve
- Electricity
- Environmental stewardship
- Economic development

Manage the Valley’s river systems and environmental resources
TVA’s Fuel Resiliency

- TVA’s commitment to reliability and fuel security are extremely important
- TVA performed a study to answer the question - *How resilient is our system to a fuel supply interruption?*
- The study provided a framework to evaluate the fuel supply chain of our current fleet and how it might change with fleet decisions
- Findings indicated TVA’s overall fuel supply position is among the most resilient in the U.S. due to:
  - A well-diversified generation portfolio
  - Access to multiple coal supply and transport options
  - A strong and resilient program to secure nuclear fuel
  - Advantageous location with respect to major gas transportation pipelines
TVA’s FY2018 Generation Portfolio

Total Summer Net Generating Capability of 37,514 MW and 1,548 MW of Contracted Demand Response
Generation from Coal – Yesterday & Today

Primary Drivers:
- Falling gas prices
- Low to no load growth
- Aging coal-fired fleet
- Environmental Regulations
  - MATS
  - CPP

Source: TVA 10K, for the years ended September 30, 2010 and September 30, 2018.
Shift to a More Efficient Generation Portfolio

From FY 2010 to FY 2020, TVA modernized the fleet by:

- Replacing 20% of capacity (~60% of coal fleet) with new gas plants and new nuclear capacity
- Adding 1,200 MW of contracted wind capacity
- Adding 1,100 MW of contracted solar capacity
- Funding EEDR program with 650 MW of impact
TVA Load Changes – FY2010 to FY2019

EE Impacts on TVA Weather-Normal Load

- TVA Load
- Load with TVA Programmatic EE
- Load with TVA & Market-Driven EE
HH Natural Gas Prices 1998 - 2018
Historical & Forecasted Coal & Gas Burn

Million Tons

- FY10 Actual: 36
- FY19 Forecast: 15

Billion Cubic Feet

- FY10 Actual: 110
- FY19 Forecast: 280
Coal/Gas Competition Influences Dispatch

- Coal/gas units competitively dispatch at $3.25 Henry Hub
- Trend line intersection at $5.35 HH reflects anticipated majority power generation flip point

Stochastic inputs: Include gas price, coal price, oil price, peak demand, energy demand, electricity price, hydro generation, fossil unit availability, nuclear unit availability and gas unit availability.
Generation from Coal – Today & Tomorrow

**Primary Drivers:**
- Forecasted - Low gas prices
- Forecasted - Low to no load growth
- Aging coal-fired fleet
- Retirements
  - Paradise Unit 3 – 973 MW
  - Bull Run Fossil – 865 MW

**FY 2019**
Forecast 161 TWh*

**FY 2023**
Forecast 166 TWh*

*Source: TVA’s Resource Planning Forecast.*
NYMEX Natural Gas Forward Curve
as of July 1, 2019

• Low Volatility the past 3 years
• Attractive pricing for next 10 years

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$3.53
TVA strives to be a trusted public power partner by carrying out its mission of service to make life better in the Tennessee Valley by focusing on the three E's: Energy, Environment and Economic Development.

TVA maintains its commitment to supply the Valley’s consumer and businesses with clean, reliable energy at the lowest feasible cost.

In Fiscal Year 2020, CGS will manage $1.35 billion (50%) of TVA’s $2.7 billion Fuel and Purchased Power Portfolio forecasted spend by optimizing fuel costs, responding to changes in demand, and mitigating emergent risks from changing market conditions.

CGS supports TVA’s mission to serve the people of the Tennessee Valley by effectively managing TVA’s fossil fuel supply to meet the needs of the Power Operations’ generation fleet.
FY20-22 Coal Strategic Challenges

**CGS Mission Statement:** To deliver the fuel supply that meets the coal-fired generation fleet requirements at the lowest possible cost
- Maximize value for the ratepayers by effective contract management
- Maximize flexibility in supporting TVA’s system needs through collaboration with stakeholders
- Continually improve the coal supply chain by monitoring coal and utility industry trends

### Fuel
- Consolidation and shrinking of U.S. coal markets
- Volatility of burn: managing near and mid-term swings in demand

### Transportation
- Downturn in coal transportation markets
- Uncontrollable force majeure events

### Storage
- Plant stockpile footprint and coal yard staffing is constrained
2019 Integrated Resource Plan Results

All portfolios point to a TVA power system that will be LOW-COST, RELIABLE, and CLEAN

- Over the next 20 years
- Up to 14 GW solar additions
- Up to 5 GW storage additions

- Evaluation of additional coal and gas retirements
- Projected 70% reduction in CO2 intensity from 2005 baseline

www.tva.com/irp
IRP Indicates Near-Term Actions

Renewables & Flexibility
- Add solar based on economics and to meet customer demand
- Enhance system flexibility to integrate renewables and distributed resources
- Evaluate demonstration battery storage to gain operational experience

Existing Fleet
- Pursue option for license renewal for TVA’s nuclear fleet
- Evaluate engineering end-of-life dates for aging fossil units to inform long-term planning

Energy Usage
- Conduct market potential study for energy efficiency and demand response
- Collaborate with states and local stakeholders to address low income energy efficiency
- Collaboratively deploy initiatives to stimulate the local electric vehicle market

Distribution Planning
- Support development of Distribution Resource Planning for integration into TVA’s planning process
In Summary

• CGS believes that **RISK MANAGEMENT** and **FLEXIBILITY** are critical to managing TVA’s fuel supply risks and position

• Our goal is to make every decision result in the best solution for the Valley’s ratepayers