



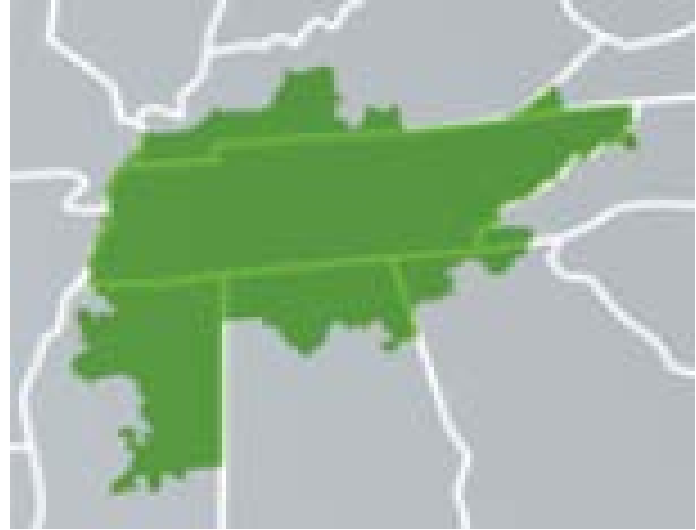
TVA Coal Portfolio: Yesterday, Today and Tomorrow

David Owens

July 15, 2019

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

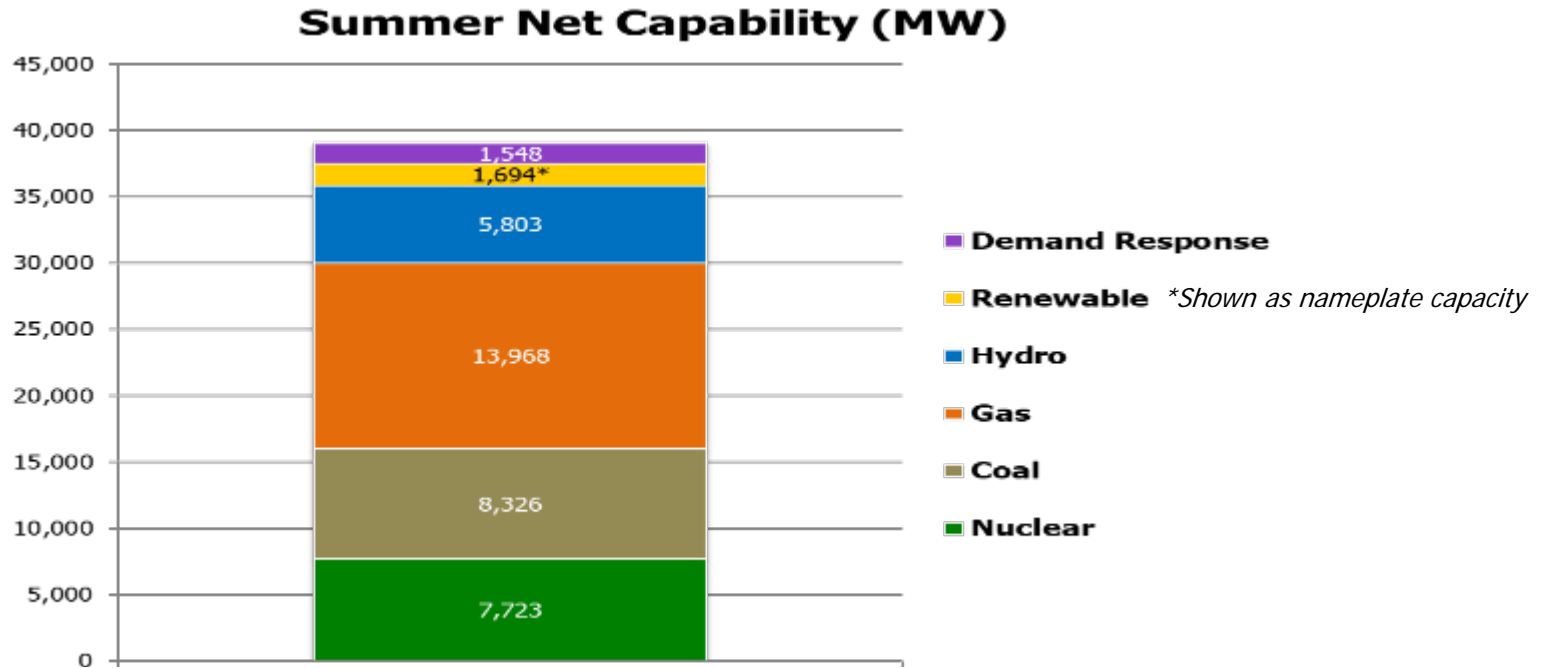


TVA's Fuel Resiliency

- 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

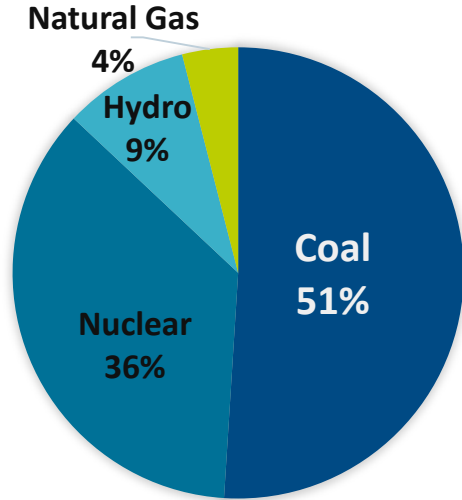


TVA's FY2018 Generation Portfolio

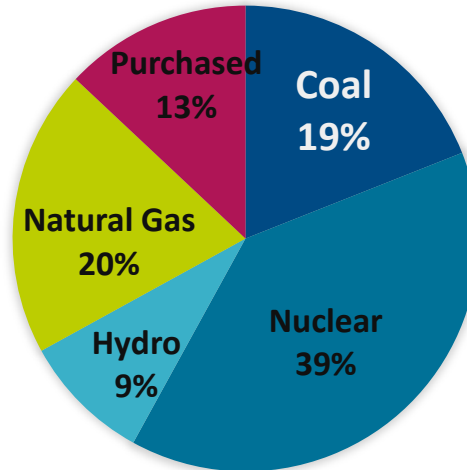


Total Summer Net Generating Capability of 37,514 MW
and 1,548 MW of Contracted Demand Response

Generation from Coal – Yesterday & Today



**147 TWh
FY2010**



**149 TWh
FY2018**

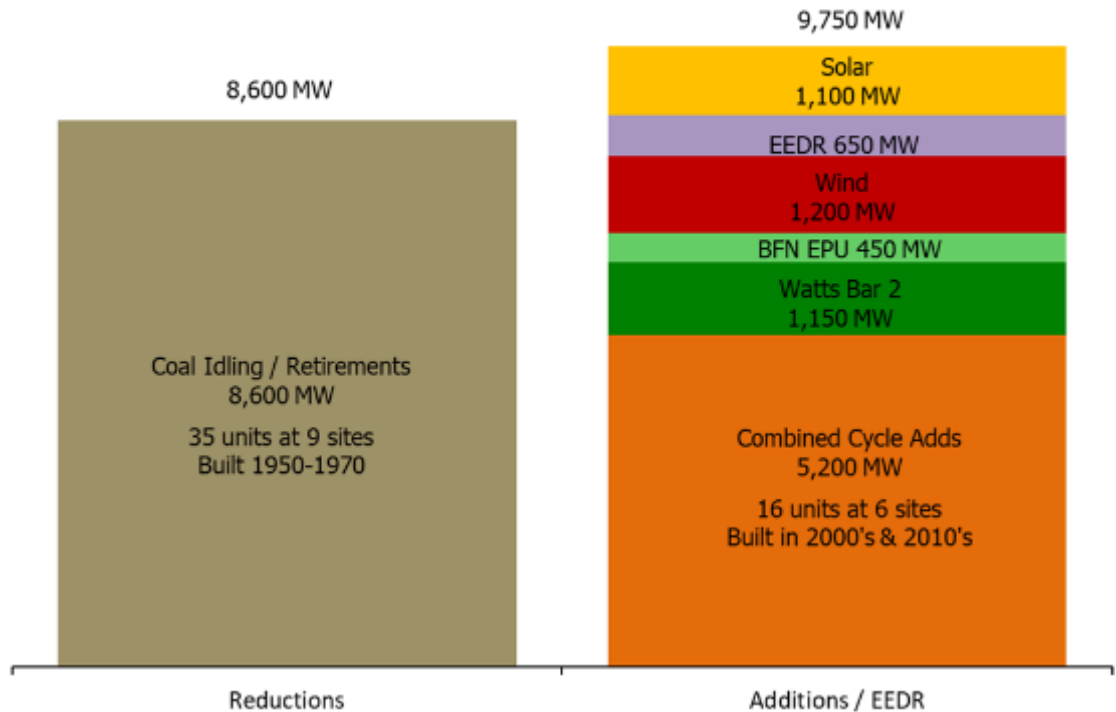
Primary Drivers:

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

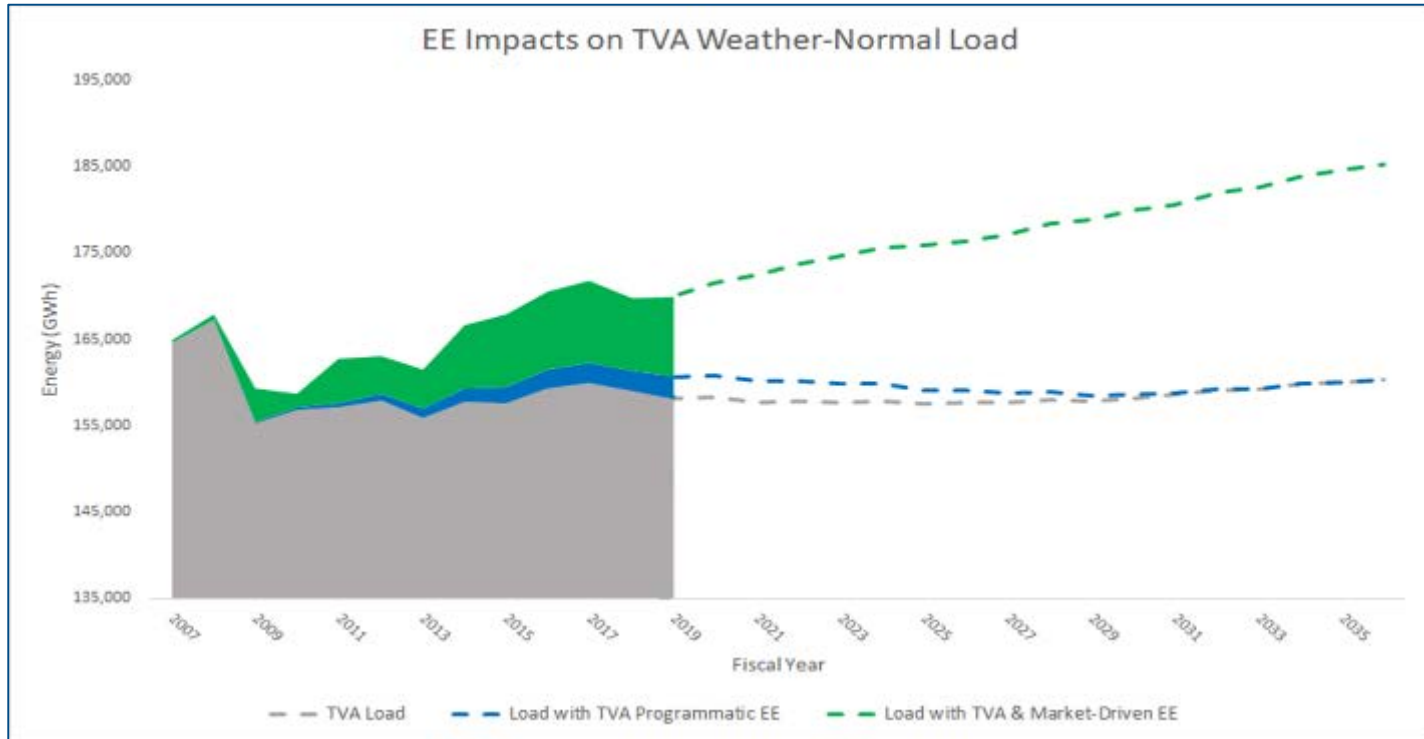
Shift to a More Efficient Generation Portfolio

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

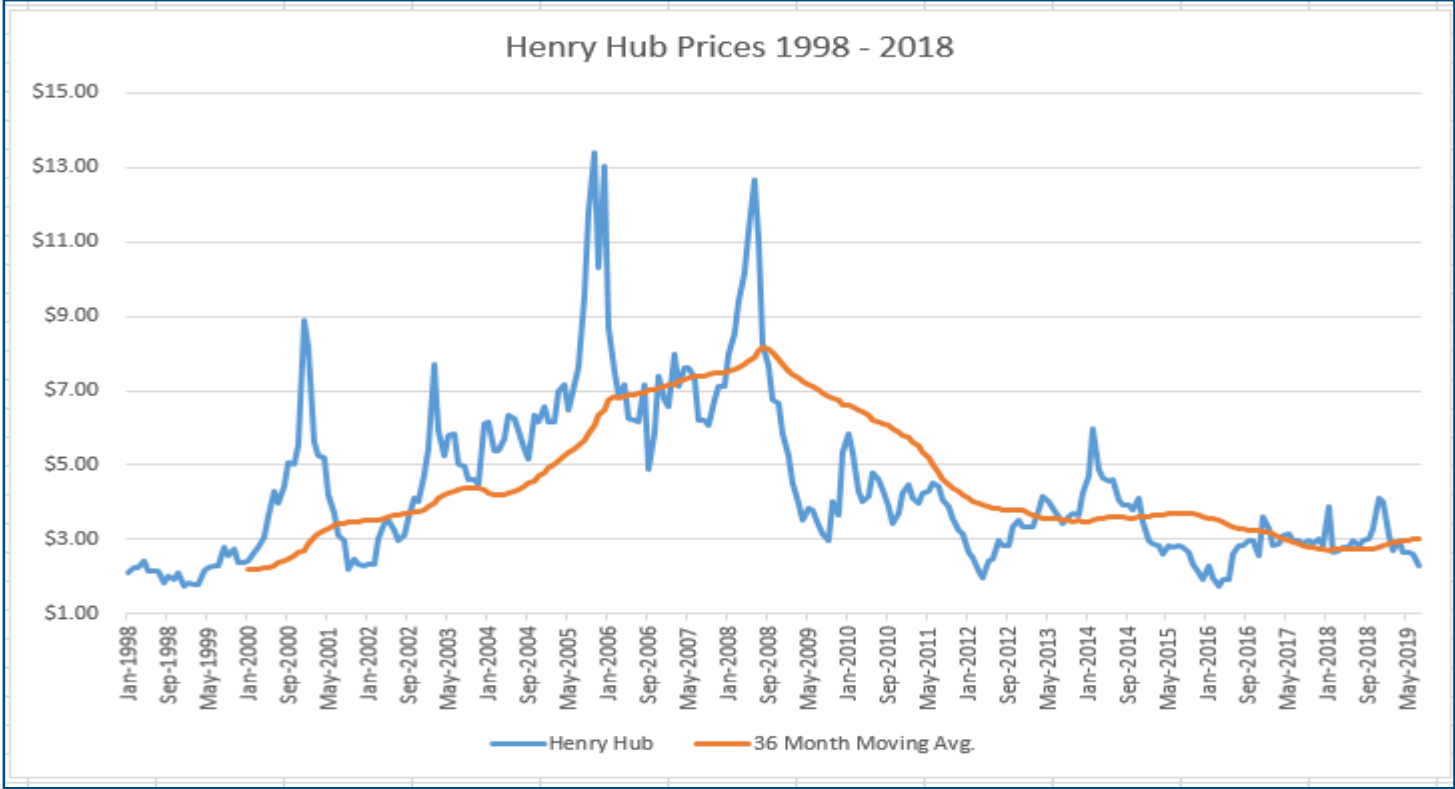
- Replacing 20% of capacity (~60% of coal fleet) with new gas plants and new nuclear capacity
- Adding 1,200 MW of contracted wind capacity
- Adding 1,100 MW of contracted solar capacity
- Funding EEDR program with 650 MW of impact



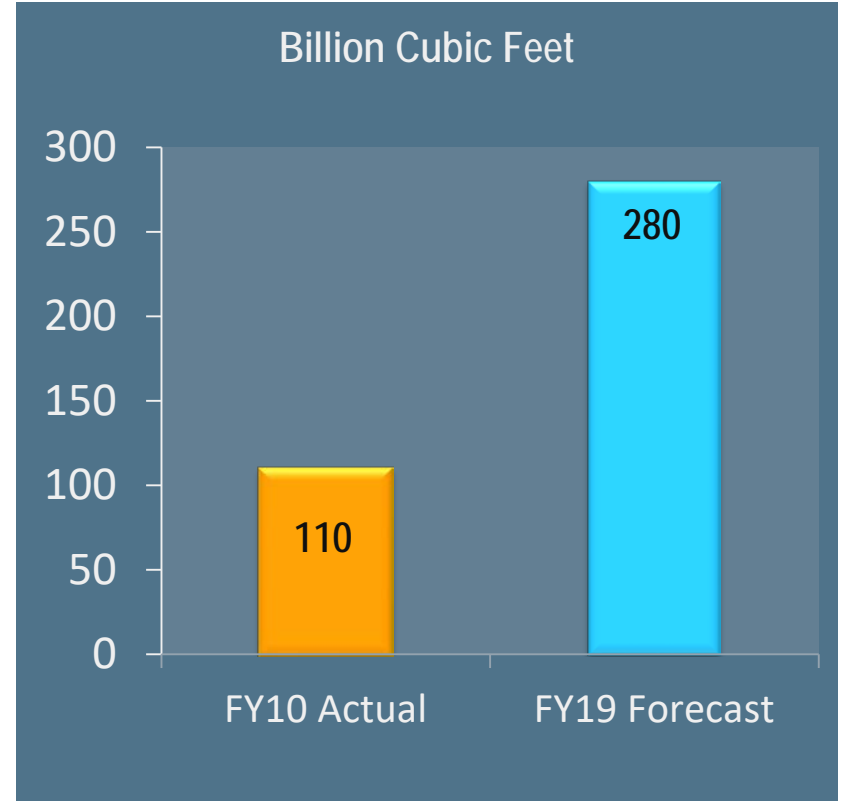
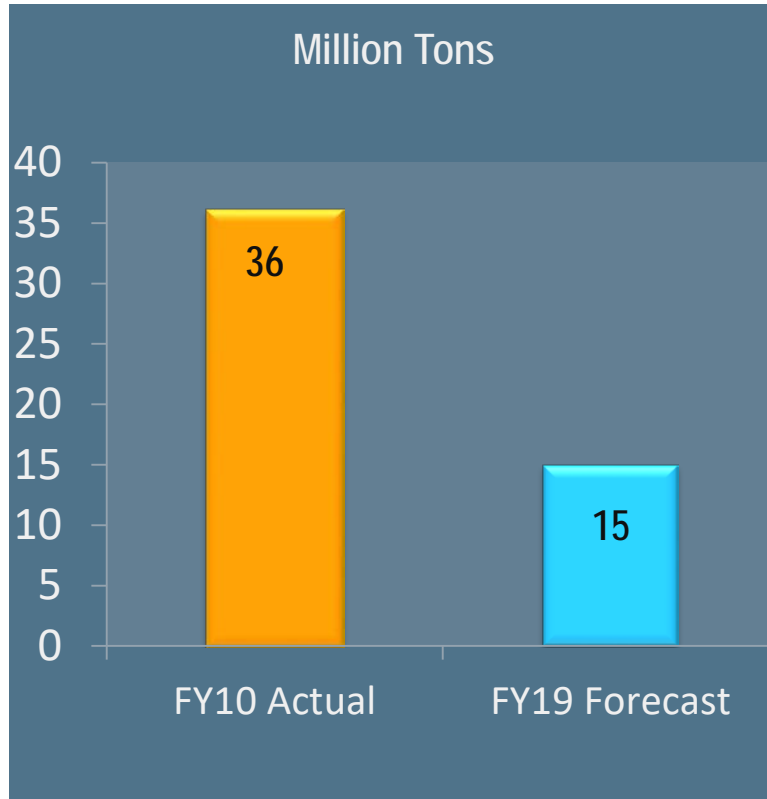
TVA Load Changes – FY2010 to FY2019



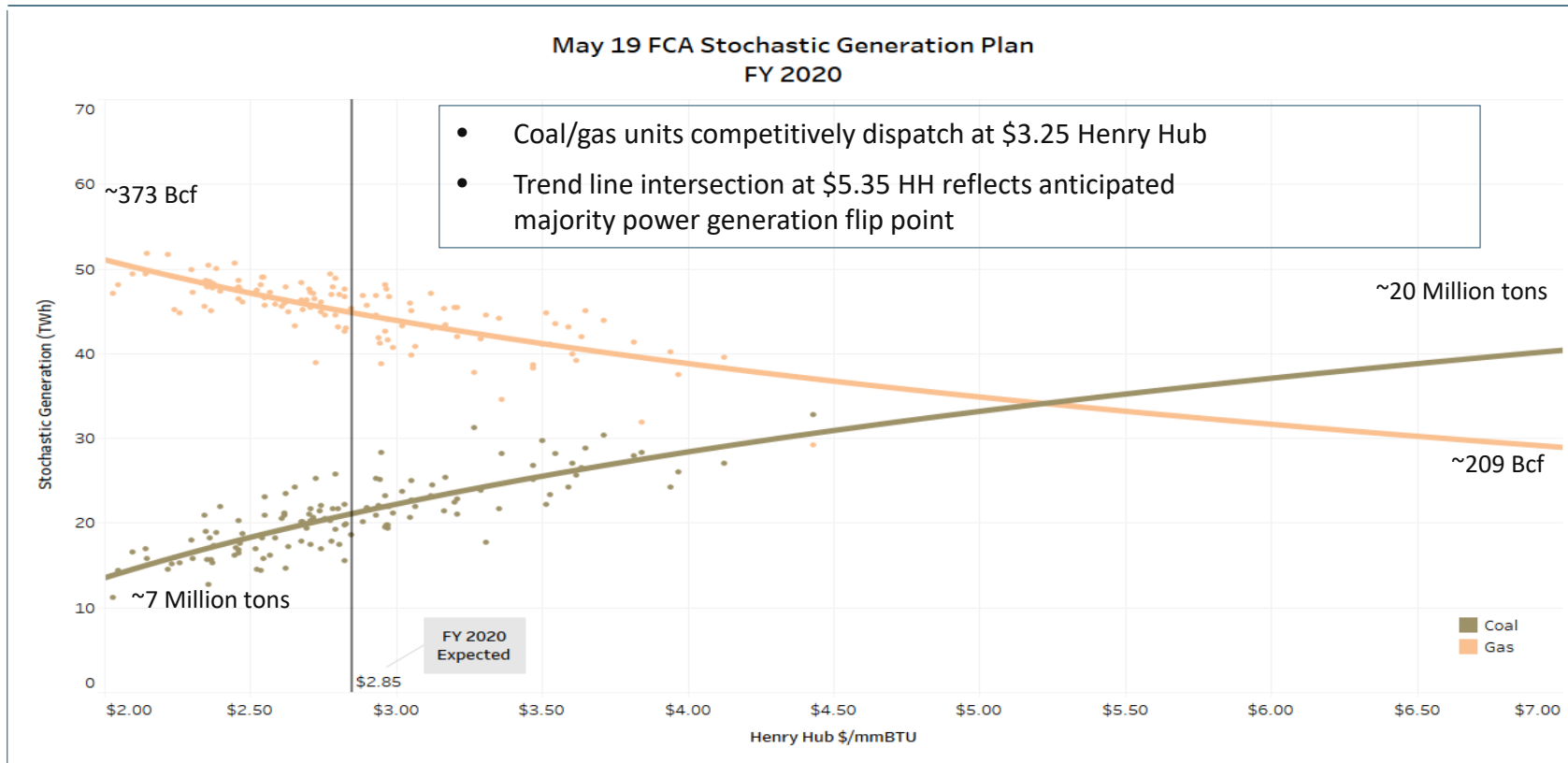
HH Natural Gas Prices 1998 - 2018



Historical & Forecasted Coal & Gas Burn



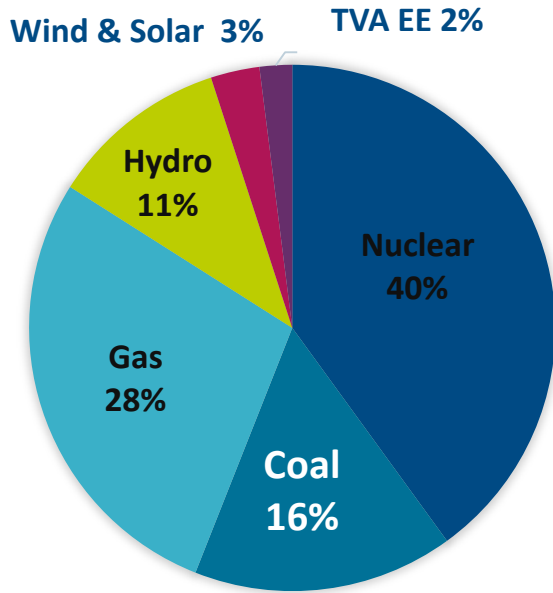
Coal/Gas Competition Influences Dispatch



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

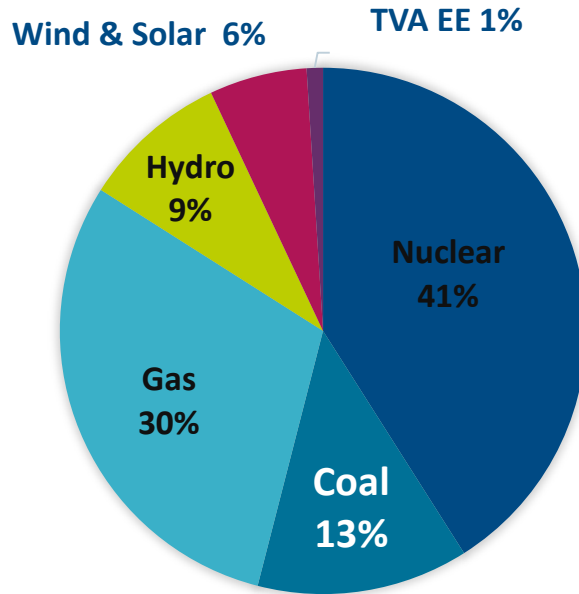


Generation from Coal – Today & Tomorrow



FY 2019

Forecast 161 TWh*



FY 2023

Forecast 166 TWh*

Primary Drivers:

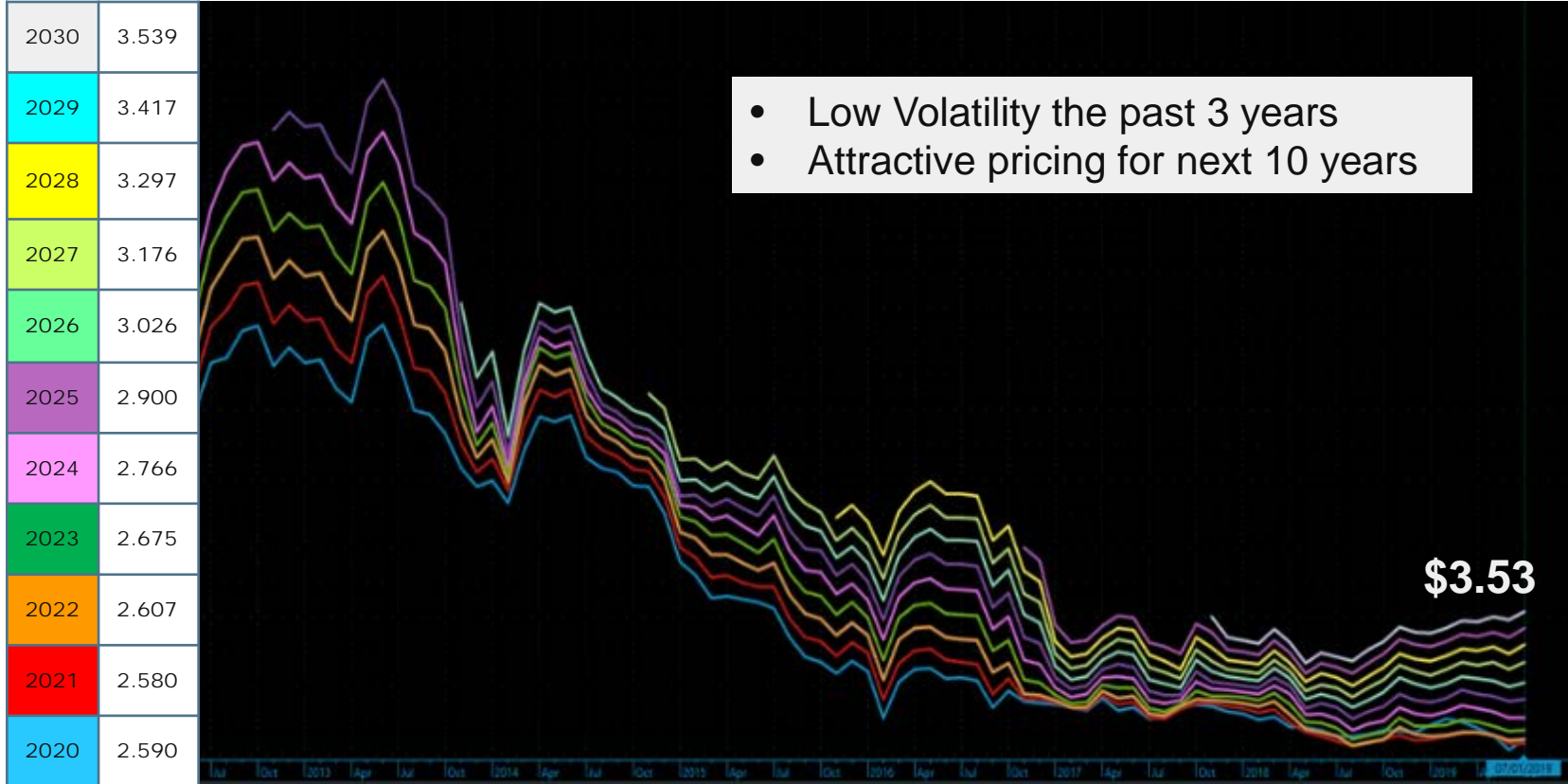
- Forecasted - Low gas prices
- Forecasted - Low to no load growth
- Aging coal-fired fleet
- Retirements
 - Paradise Unit 3 – 973 MW
 - Bull Run Fossil – 865 MW

* Source: TVA's Resource Planning Forecast.



NYMEX Natural Gas Forward Curve

as of July 1, 2019



Coal & Gas Services Strategic Focus

TRUST

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

ENERGY

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

RELIABILITY

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

COMMITMENT

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**



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

