



Managing Coal Burn

Challenges of Yesterday, Today and Tomorrow

Greg Nunley

Director – Coal Services

April 2015

Adapting to Changing Market Dynamics

Threats to Supplier Financial Stature

- U.S. power sector coal demand decline is eroding the financial strength of the industry
- Struggling coal producers are being absorbed by better financed companies that combine operations to reduce costs and close marginal operations

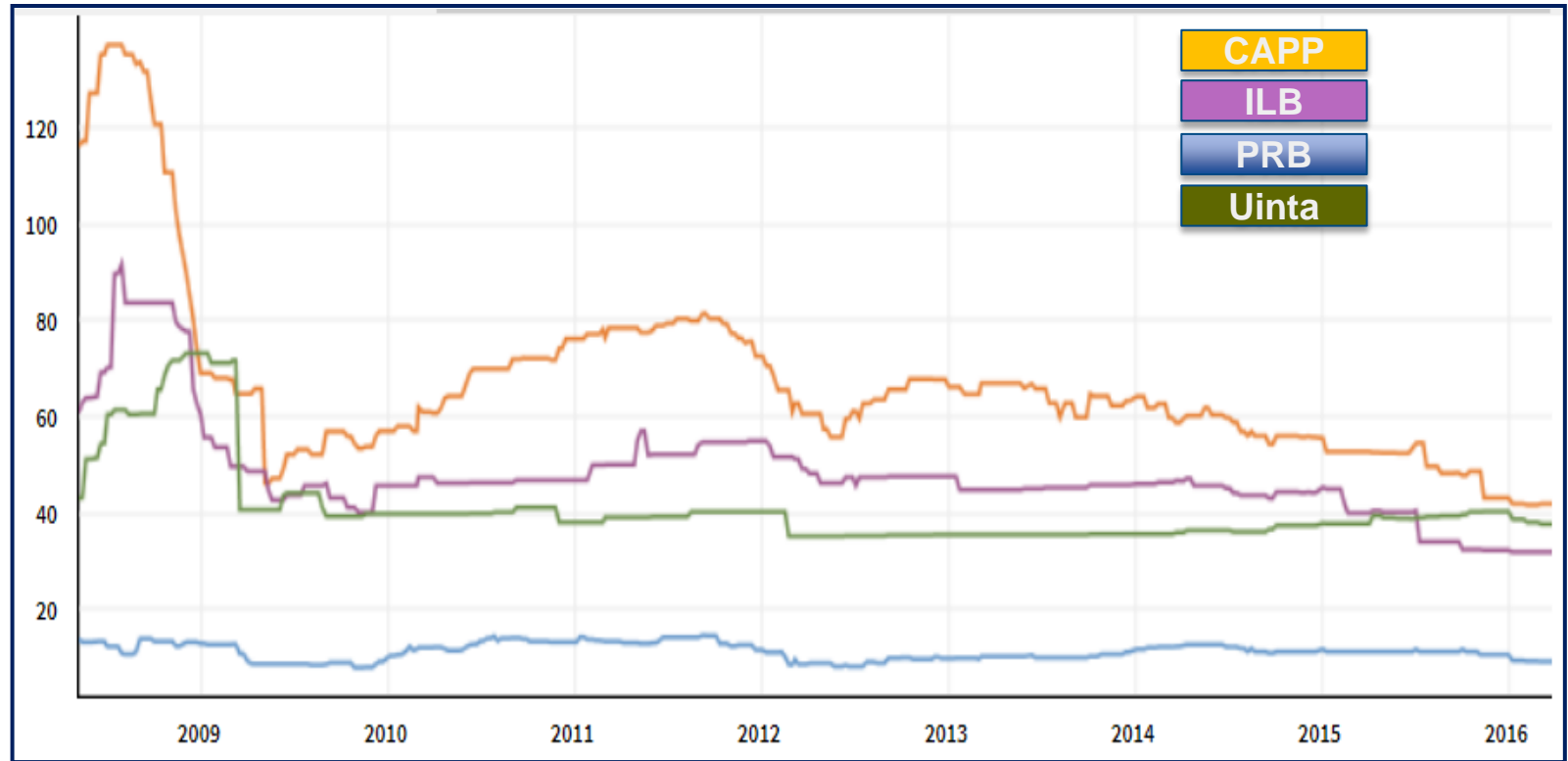
Pricing Competitiveness

- CAPP and Uinta market share continues to erode due to cost
- ILB and PRB are competing for declining domestic market share

| YEAR | CAPP \$/ton | ILB \$/ton | PRB \$/ton | Uinta \$/ton |
|------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| 8-Year Peak | 137.50 Jul '08 | 92.00 Jul '08 | 14.90 Sep '11 | 73.50 Dec '08 |
| March 2016 | 42.25 | 32.20 | 9.45 | 38.05 |

Source: EIA Database

Coal Commodity Prices July 2008 – March 2016

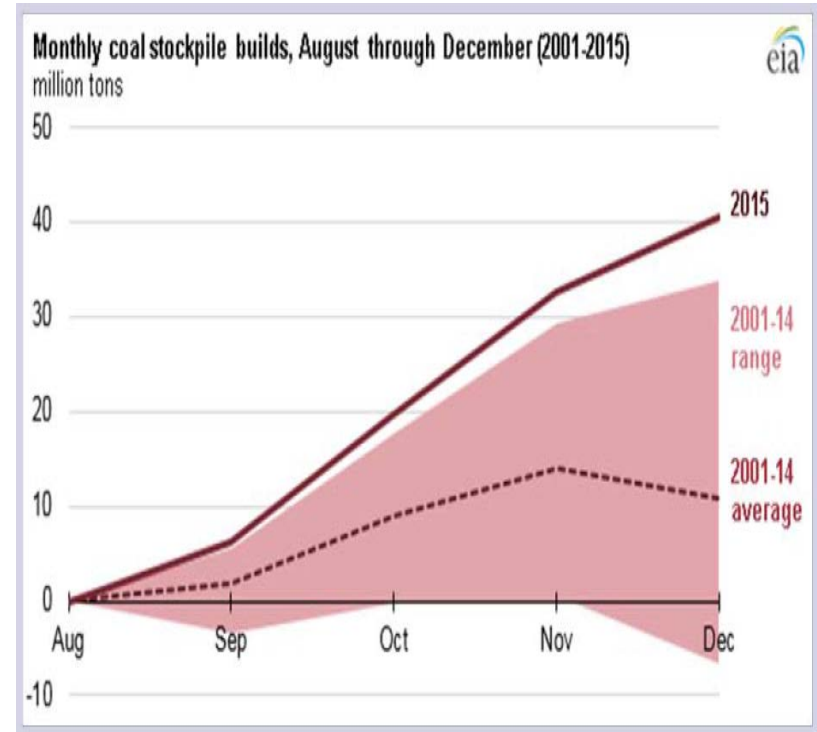


Source: EIA Database

Adapting to Changing Market Dynamics

Stockpiles

- Coal stockpiles at plants are at the **highest year-end inventory levels** in at least 25 years
- Stockpiles built in August - December 2015 are ~40 million tons, **~29 million tons higher than 2001-14 average**
- Weekly railcar loadings from September to December 2015 are **22% below the previous five-year average**



Adapting to Changing Market Dynamics

Environmental & Regulatory Conditions

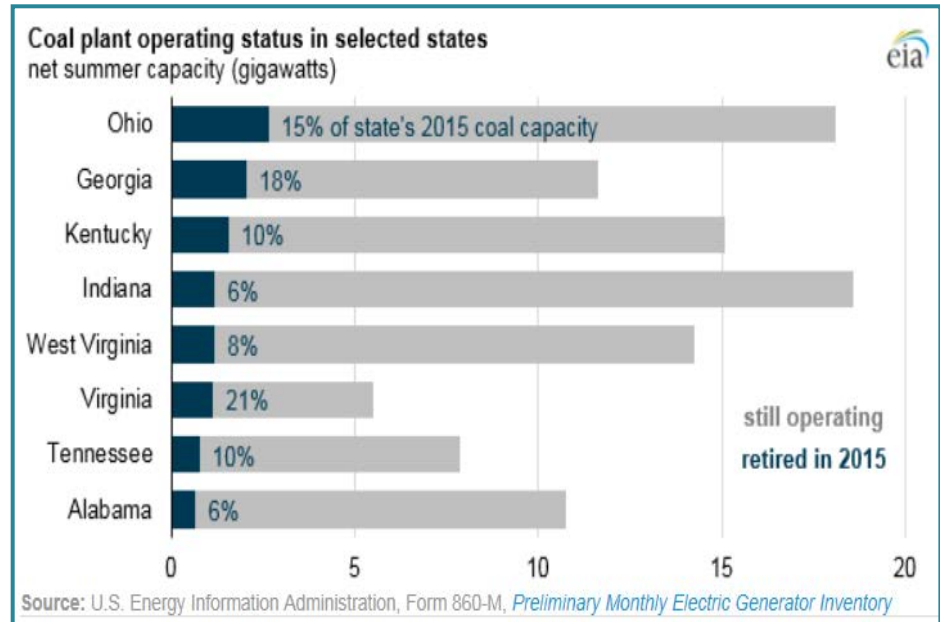
- Additional retirements in 2015 as utilities comply with new EPA regulations
- Significant coal plant retirements occur over the next three years
- Global Climate Agreement and the Clean Power Plan (CPP)

Natural Gas Impacts

- Natural gas prices remain low on continued supply growth, lower costs and increased drilling efficiencies
- Natural gas storage is ~2,493 Bcf (as of March 29, 2016)
 - 69% above last year's level
 - 51% above 2011-15 five-year average
- Potential implementation of the CPP is expected to increase demand for gas-generated electricity

Coal Plant Retirements

- Coal capacity retired in 2015 was ~4.6% of the nation's coal capacity. Additional retirements planned for 2016
- Nearly half of the retired coal was primarily located in three states – OH, GA and KY
- Coal shares of electricity generation continue to fall
- Lost generating capacity could have an impact on the power generator's reserve margin

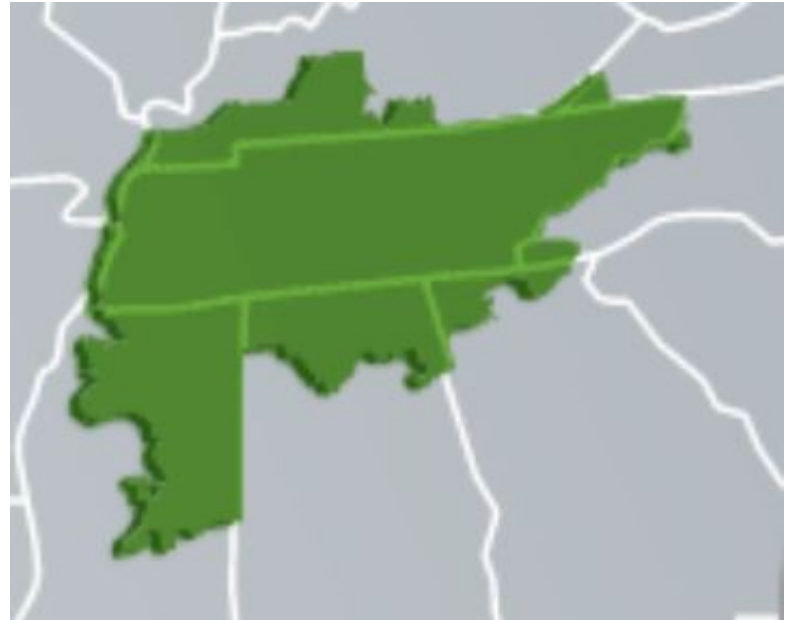


TVA's Strategic Focus

TVA relies on a mix of owned and contracted assets using a variety of fuel and energy resources to meet the power demands of the Tennessee Valley

Balancing the mix of generation assets and including other resources will give TVA the flexibility to:

- Adapt to changing business environments
- Keep costs less volatile and more predictable
- Minimize costs and risks to our customers



Changes in TVA Electricity Generation Mix

FY 1995

In 1995, TVA's generation mix was heavily dependent upon coal-fired plants

- **~71% coal**

- ~17% nuclear
- ~12% hydro

FY 2005

Coal-fired generation was still predominant. Nuclear increased and nominal gas was added

- **~62% coal**

- ~28% nuclear
- < 1% gas

FY 2020

TVA's forecasted generation mix reflects a shift towards a **more balanced** portfolio

- **~20% coal**

- ~38% nuclear
- ~21% gas

Industry Drivers

Environmental Regulation

- TVA's commitment to significantly reduce emissions by 2020
- Additional U.S. regulations on CO₂ emissions
- Clean Power Plan – Global Climate Agreement

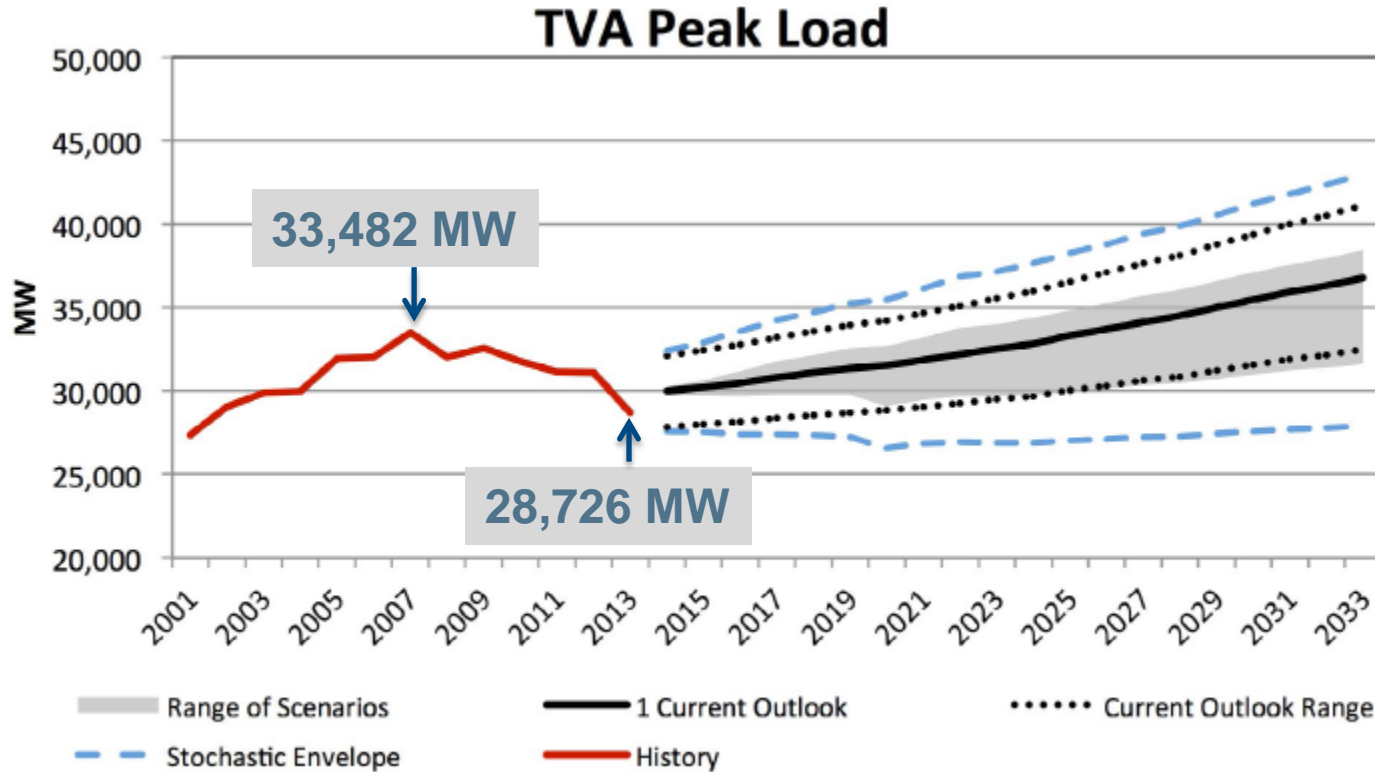
Gas Prices

- NYMEX forward curve remains under \$4.00/mmBtu through 2025
- Gas storage is 51% (846 Bcf) above the previous five-year average

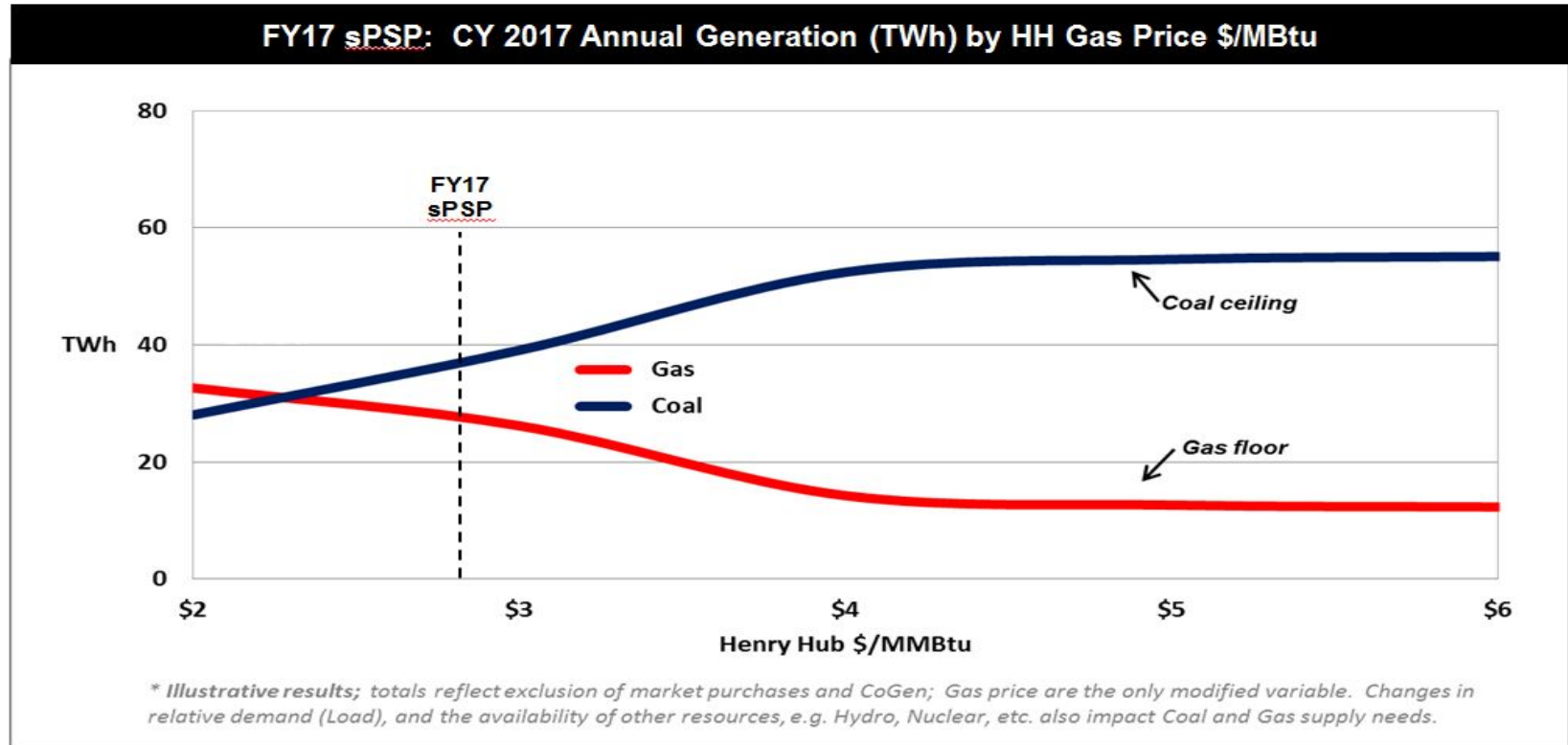
Customer Demand is Declining

- Slower economic growth driven by baby boomer retirements
- Increased focus on energy efficiency behaviors and use of renewable resources

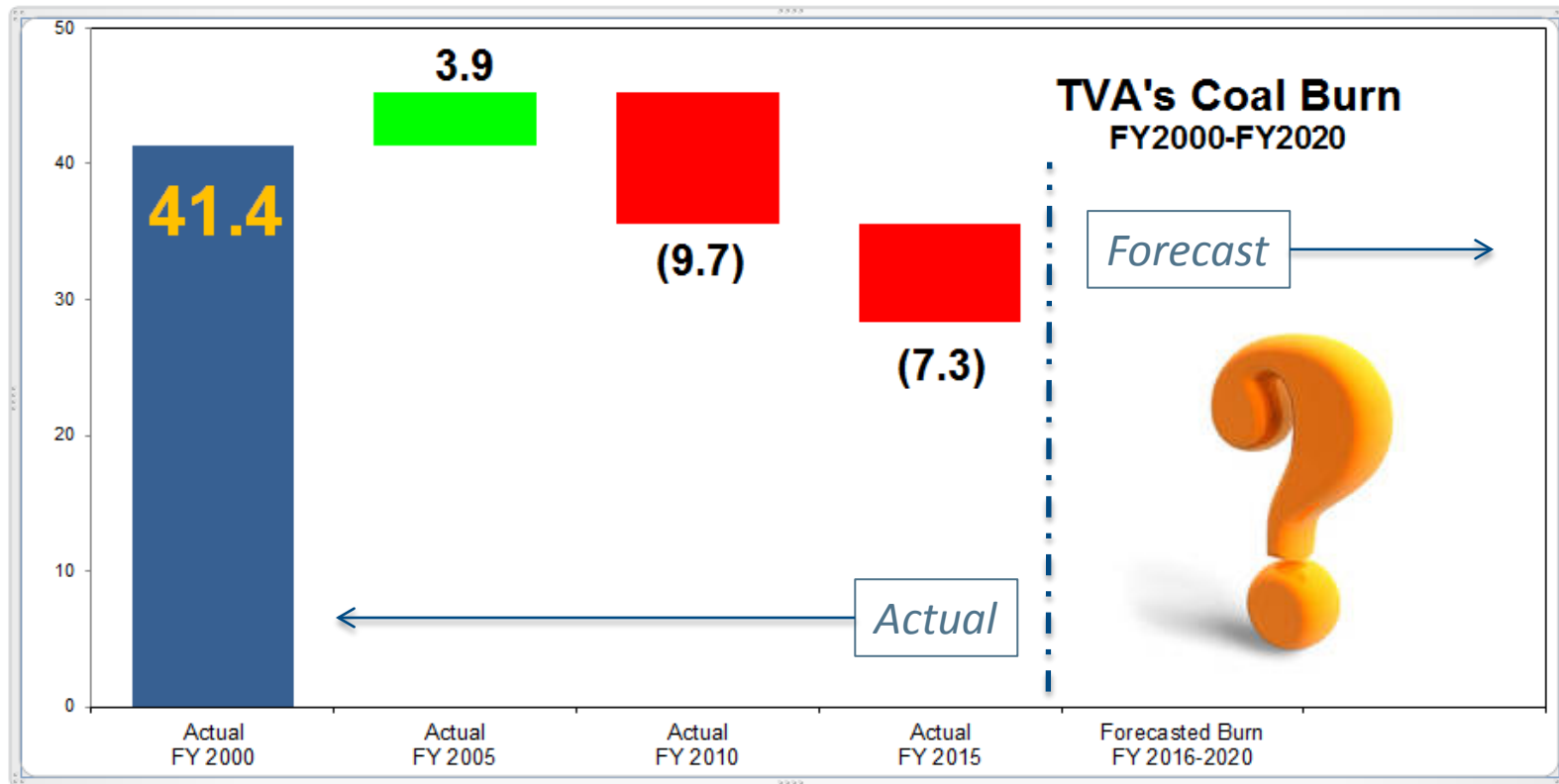
Forecasting Future Load Based on Scenarios



Gas on Coal Competition Affects Dispatch Volatility



Impacts to TVA's Coal Burn



John Sevier Coal was Replaced with a Natural Gas Combined-Cycle Plant in 2012 for Environmental Reasons

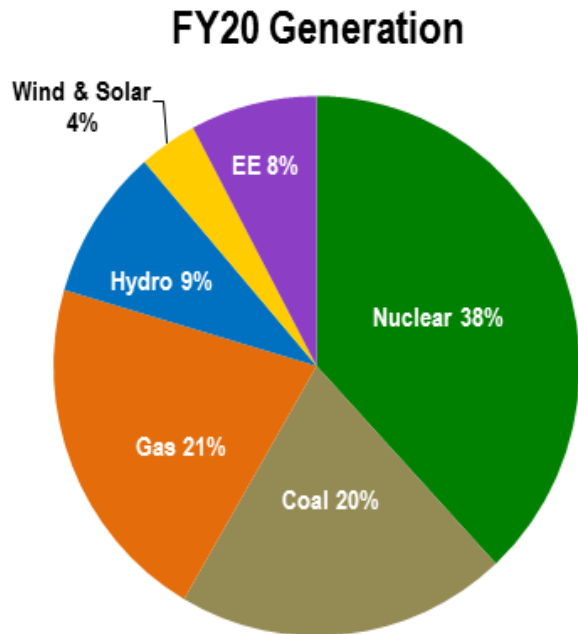


TVA is Shuttering Additional Coal-Fired Plants



TVA is on a Trajectory to Comply with Environmental Regulations

- Minimize environmental impacts from TVA's operations across the region
- Long-range integrated resource planning scenarios include significant reductions in carbon emissions
- Balance generation requirements with the following resources:
 - Gas – Allen CC and Paradise CC
 - New Nuclear – Watts Bar 2
 - Hydro – Evaluation of new projects and addition of turbines to existing dams
 - Renewables and Energy Efficiency



Summary . . .

Overall, loads are down and forecast for load growth is down

- Nuclear and hydro will be base fuel sources
- Coal and gas will compete for the remainder generation
- Generation from coal-fired plants will become seasonal
- Regulation will continue to drive up the cost of mining coal and generating power with coal

