

The Battle for Demand A Utility Perspective on Coal / Gas Switching

Ben Jones Asset Manager, Gas Supply July 13, 2015

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, and
- Minimize risks to our customers



TVA Electricity Generation Overview FY 2007 – FY 2020



FY 2007

In 2007, TVA's generation mix was heavily dependent upon coal-fired plants

<u>FY 2020</u>

The forecasted generation mix reflects a shift towards a **more balanced** portfolio

- ~58% coal
- ~10% gas
- ~26% nuclear

- ~20% coal
- ~21% gas
- ~38% nuclear

TVA's Current Portfolio

Approximately 37 percent of TVA's capacity is emission-free

Hydro	Nuclear	Renewables	EEDR	Gas	Coal
4,200 MW conventional 1,600 MW pumped storage	6,700 MW	1,500 MW wind 120 MW solar/biomass	1,300 MW avoided capacity	5,500 MW CT and diesels 4,500 MW CC	12,200 MW





Gas on Coal Competition Affects Dispatch Volatility



TVA Current Coal Capacity

TVA plans to operate ~7,900 MW of coal capacity in its balanced portfolio

Retirement of ~4,300 MW of coal capacity will be completed by 2019



TVA Current Gas Capacity

TVA currently has total capacity of 12,000 MW

- 5,600 MW of CC capacity
- 6,400 MW of CT capacity

TVA plans to add 2,000 MW of CC capacity by 2018



IVA

Generation Flexibility Enables Adaptation 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 who combine operations to reduce costs and close marginal operations

Regulatory Conditions

- Significant coal plant retirements occur over the next three years
- Additional retirements in 2015 as utilities comply with new EPA regulations

Pricing Competiveness

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

2007 - Typical July Day



2008 - Gas Enters the Mix



2011 - Gas Eats Into Base Load



2012 - Gas is Here to Stay



2014 - Gas Takes a Back Seat to Coal



Nuclear Influence – Watts Bar 2

Added Power

- WBN2 will add 1,150 MW
- Scheduled for commercial operation in December 2015

Project Overview

- WBN2 will help TVA avoid yearly emissions of 6 to 8 million tons of carbon
- First new nuclear unit to come online in the 21st century
- The plant will generate 2,250 MW of carbonfree electricity when both units are operational — enough to power about 1.3 million homes in the Tennessee Valley



So What?

Turndown is a major contributor to reduced coal burn

As gas prices rise the result (as shown in 2014) is less coal turn down

Based on similar trends, up to 5M tons of coal could be lost due to turn down

One day of coal turndown at TVA results in 1 less train of coal per day

Hour	Coal	Capacity factor	Tens
1	8,892	88%	4,240.2
2	8,007	79%	3,818.2
3	7,250	72%	3,457.2
4	7,041	70%	3,357.5
5	7,066	70%	3,369.4
6	7,170	71%	3,419.0
7	7,478	74%	3,565.9
8	8,143	81%	3,883.0
9	8,852	88%	4,221.1
10	9,469	94%	4,515.2
11	9,945	98%	4,742.1
12	10,031	99%	4,783.3
13	10,031	99%	4,783.3
14	10,031	99%	4,783.3
15	10,031	99%	4,783.3
16	10,031	99%	4,783.3
17	10,106	100%	4,819.1
18	10,079	100%	4,806.1
19	10,079	100%	4,806.1
20	9,965	99%	4,751.6
21	9,832	97%	4,688.4
22	9,167	91%	4,371.4
23	8,727	86%	4,161.4
24	8,407	83%	4,008.9
		89%	102,918.2

At Max Burn

115,657



Summary

Gas and coal complement each other

Coal as a generation fuel source is being used less, but gas won't fully replace it

Nuclear power will cut into coal's base load demand

Coal/Gas competition creates a dynamic market



Questions

