





1933 – George Norris standing over Franklin D. Roosevelt's left shoulder as he signs the TVA Act

Roosevelt envisioned TVA as “a corporation clothed with the power of government but possessed of the flexibility and initiative of a private enterprise.”

## Mission

- ◆ Provide low-cost power
- ◆ Improve navigation and provide for flood control
- ◆ Provide for reforestation and the proper use of marginal lands
- ◆ Provide for agricultural and industrial development
- ◆ Provide for the national defense
- ◆ Technological innovation
- ◆ Environmental stewardship

**Our Vision: To Become One of the Nation's Leading Providers of Low-Cost and Cleaner Energy by 2020**



# TVA Profile and Governance

## Profile

- ◆ Largest public power provider
- ◆ Provides electricity that serves nine million people
- ◆ Seven-state region
- ◆ 80,000 square miles

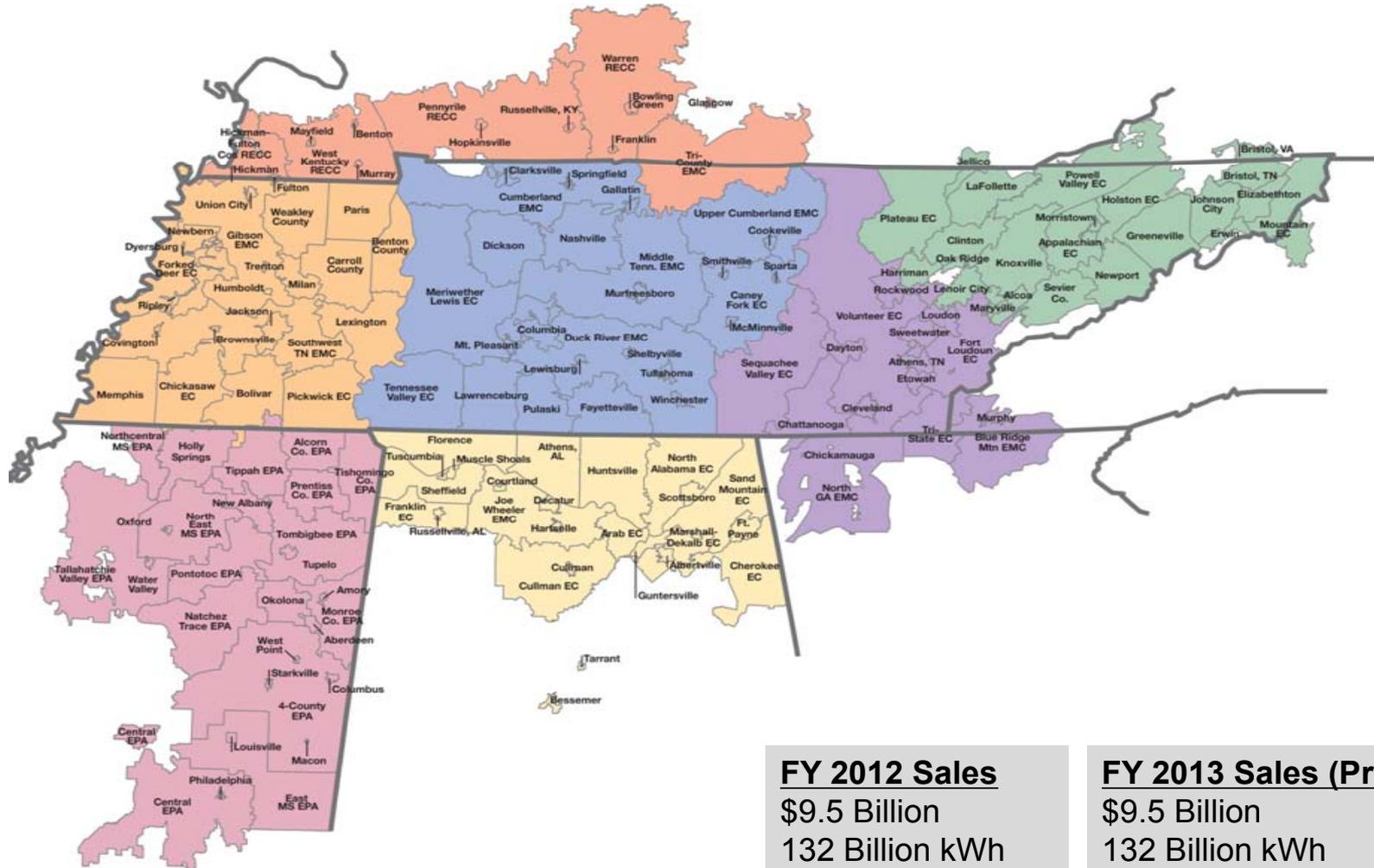
## Governance

- ◆ Federal agency, self-financing
- ◆ Nine-member Board of Directors, nominated by the President, confirmed by the Senate
- ◆ CEO, appointed by the TVA Board
- ◆ RERC provides advice to the TVA Board





# TVA Serves 155 Local Power Companies

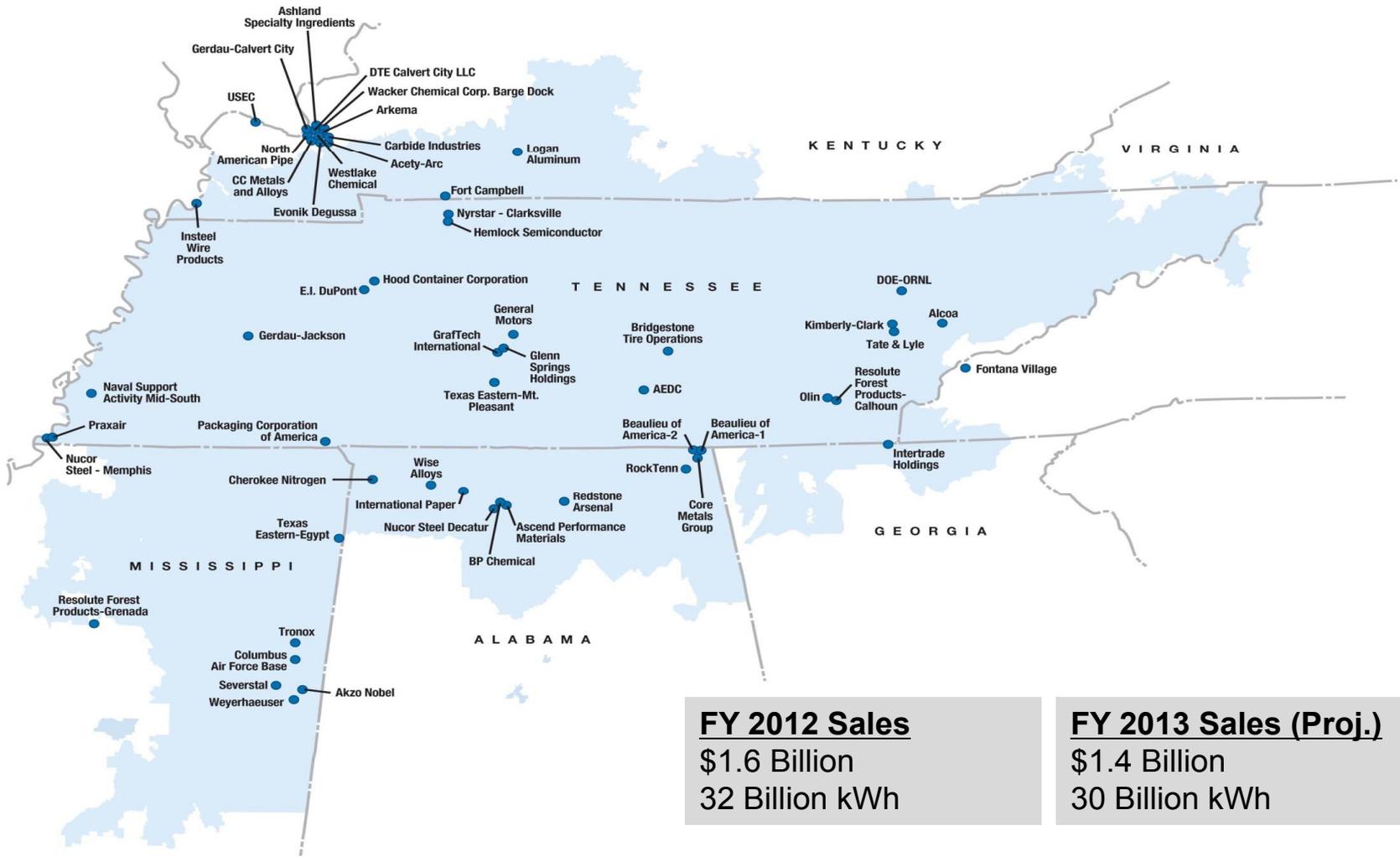


**FY 2012 Sales**  
 \$9.5 Billion  
 132 Billion kWh

**FY 2013 Sales (Proj.)**  
 \$9.5 Billion  
 132 Billion kWh



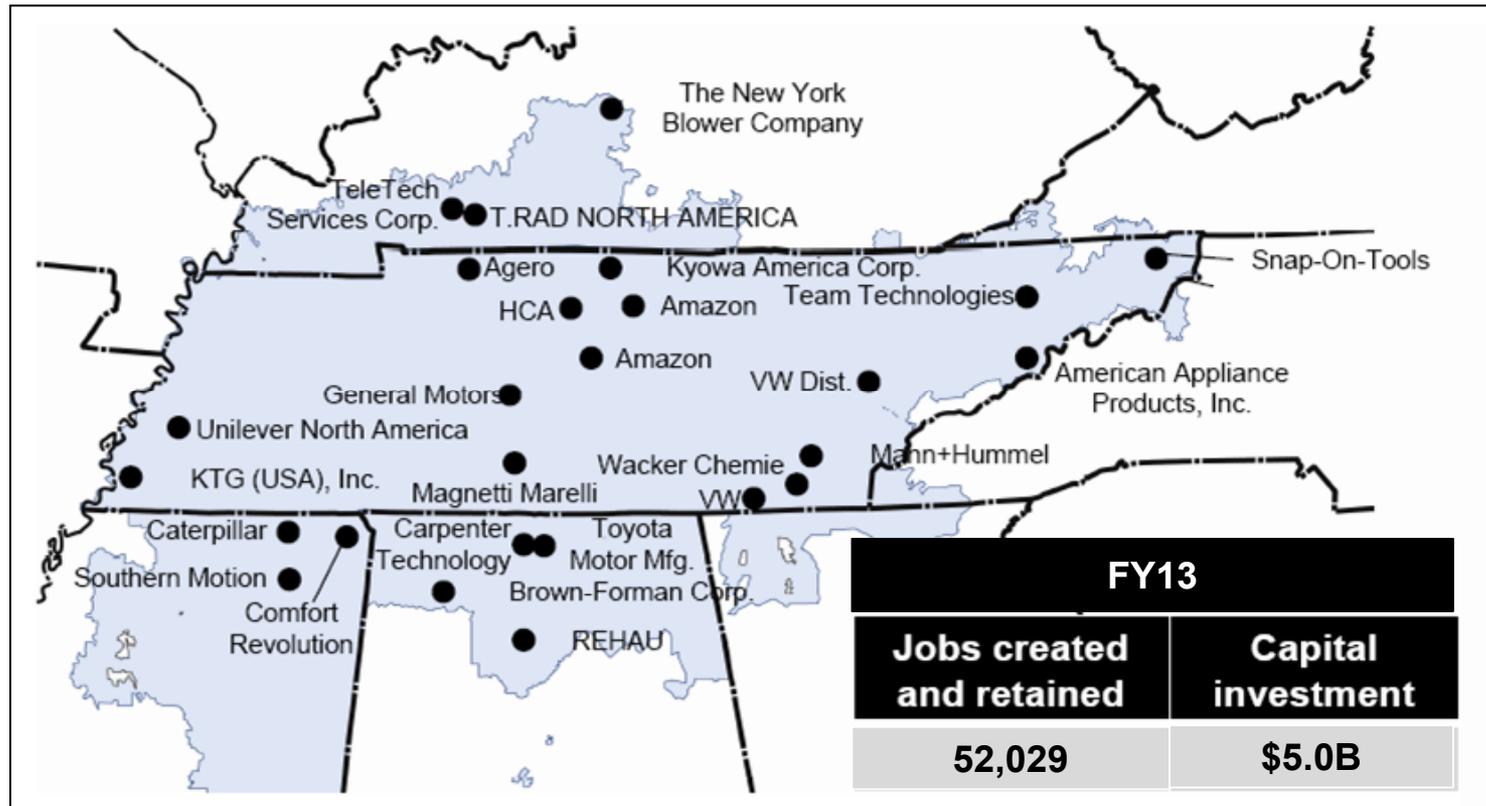
# Serves 57 Customers (Industrials) Directly





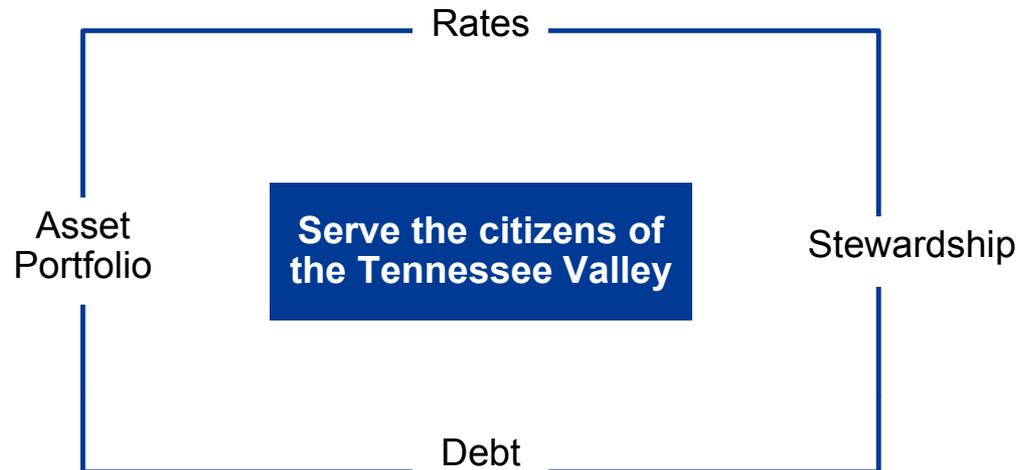
# A Key TVA Imperative: Economic Development

TVA Economic Development partners with local power companies, customers, regions, states and communities to serve as a catalyst for sustainable economic development





# TVA Business Model



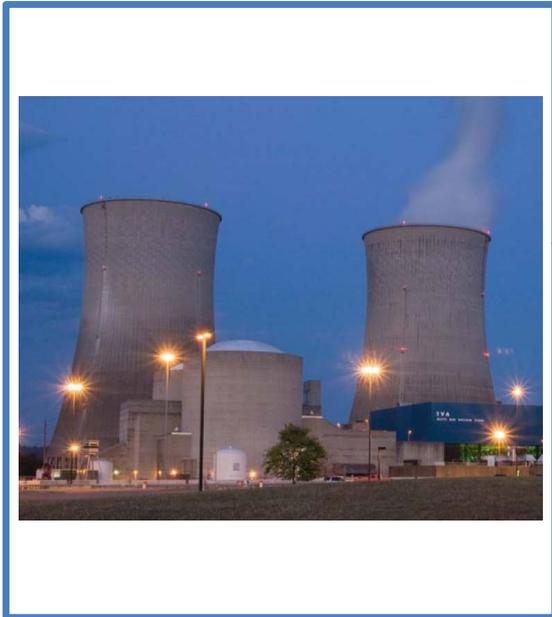
## Key Imperatives

- ◆ **Rates:** we must maintain low rates that encourage regional economic development, encourage energy efficiency and accommodate changing paradigms (e.g., distributed generation, etc.) in our region
- ◆ **Debt:** we must live within our means
- ◆ **Asset Portfolio:** we must optimize the value of the resource portfolio for the Valley
- ◆ **Stewardship:** we must be responsible stewards for the environment/economic resources entrusted to our care

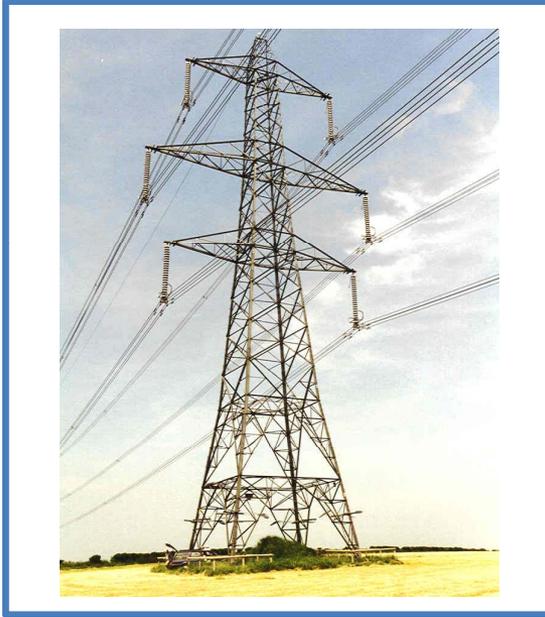


# A Core of TVA's Mission: The Power System

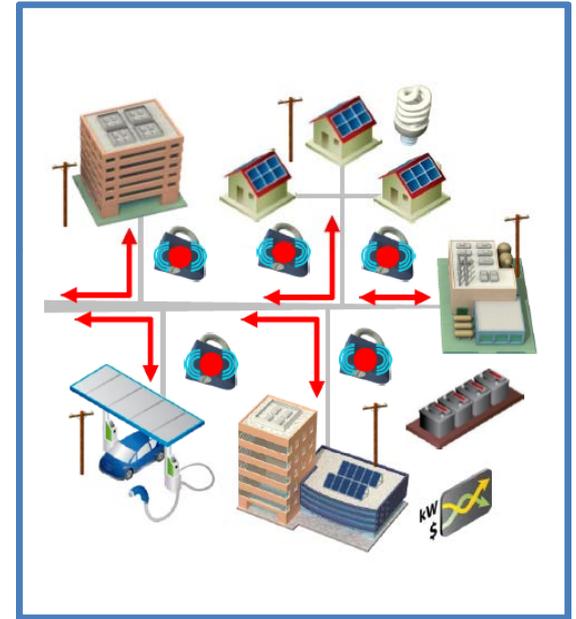
## Supply Power



## Transmit Reliably



## Serve Customers



### TVA Must Balance

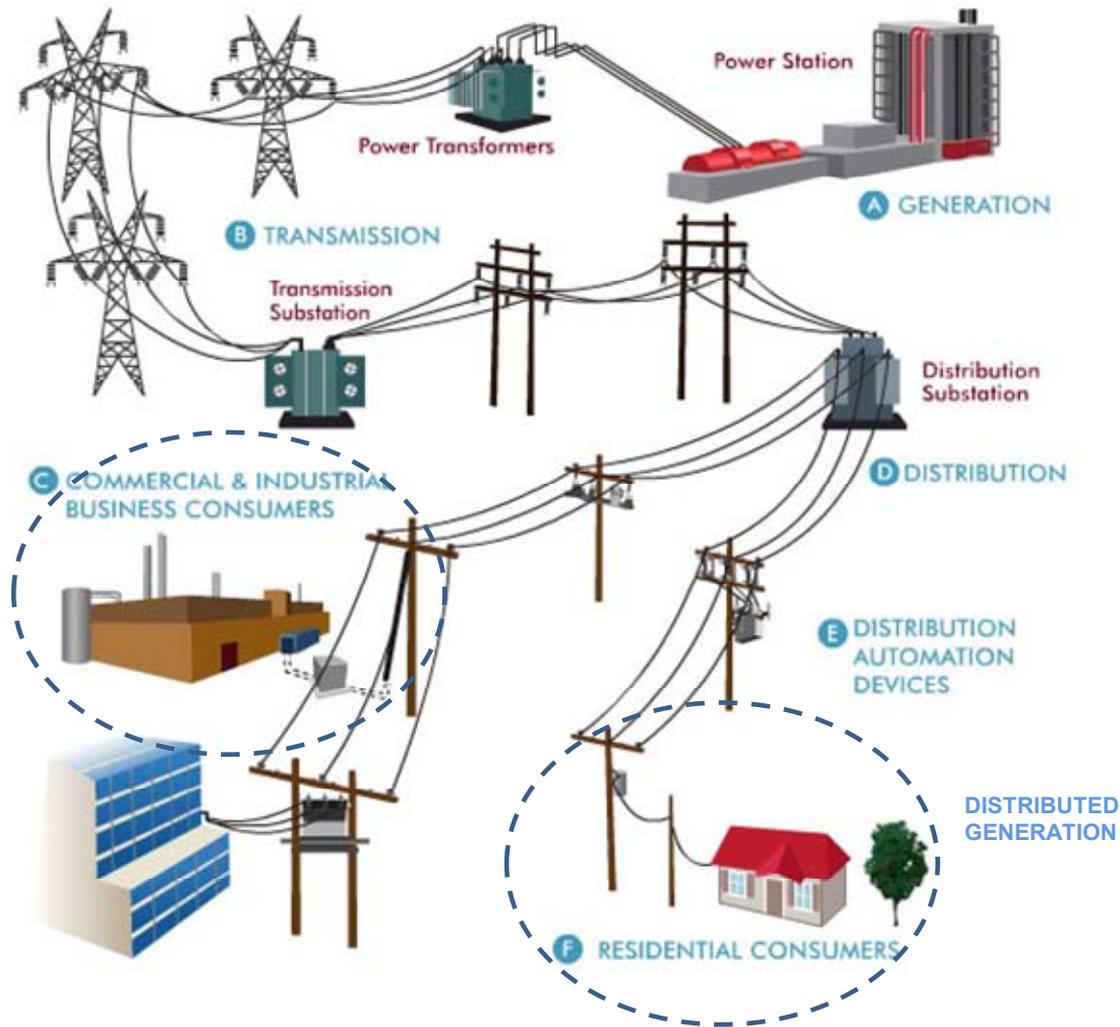


- ◆ Low cost, reliable power
- ◆ Environmental stewardship
- ◆ Economic development

*...and these can sometimes be in conflict...*



# The Electric Grid and TVA's Role within It





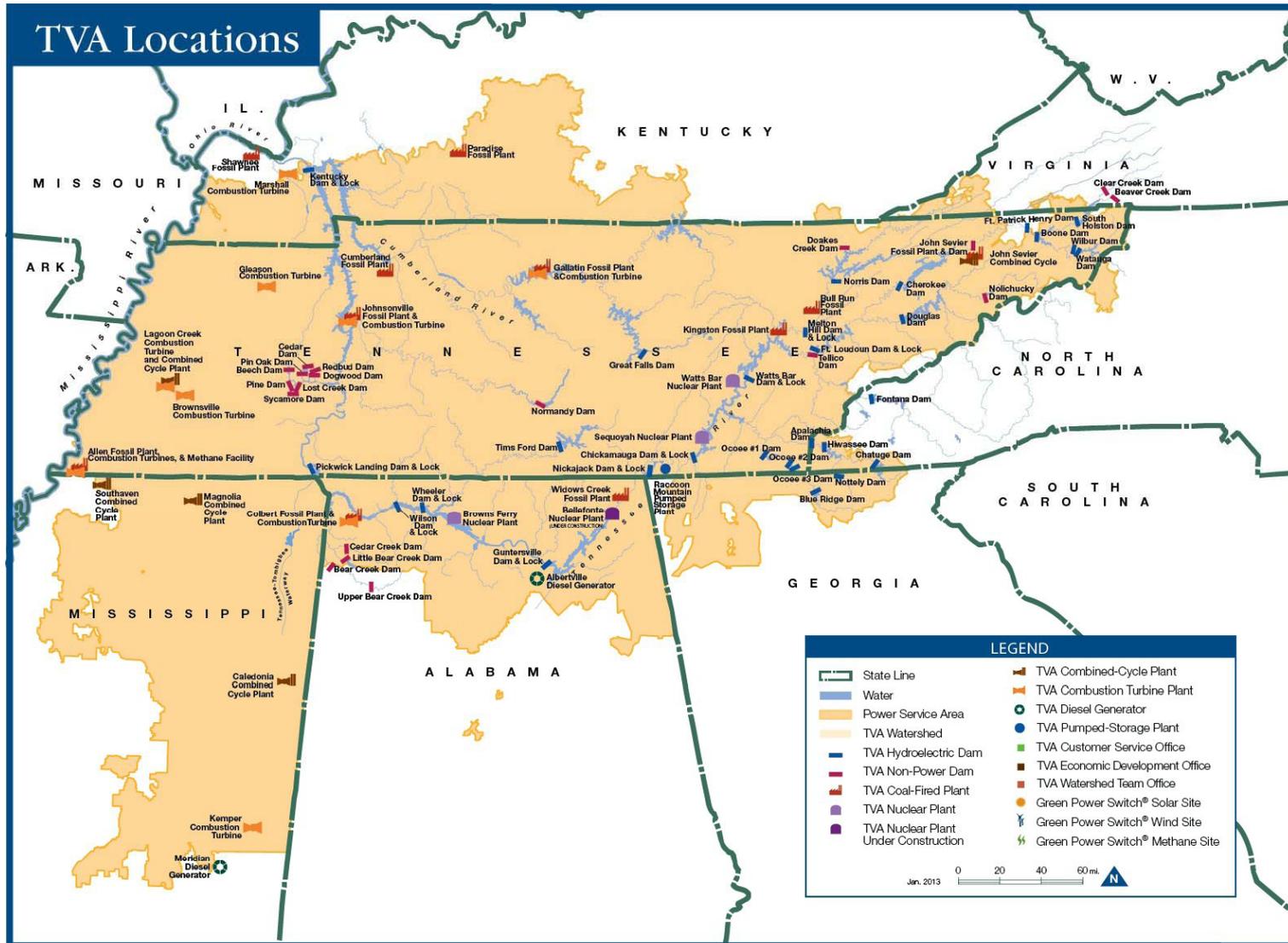
# TVA's Generating Fleet

	<u>Plants/Units</u>	<u>First/Last in Service</u>	<u>Capacity MW*</u>
Hydro	30	1912/1979	5,433
	10	1951/1973	12,901
Coal			
	3 / 6	1974/1996	6,710
Nuclear			
	14	1971/2012	9,242
Gas CT/CC			
	Contractual/Purchases, Diesels, and Renewables		2,295
Other			

\* Summer Net Capability



# TVA Facility Locations

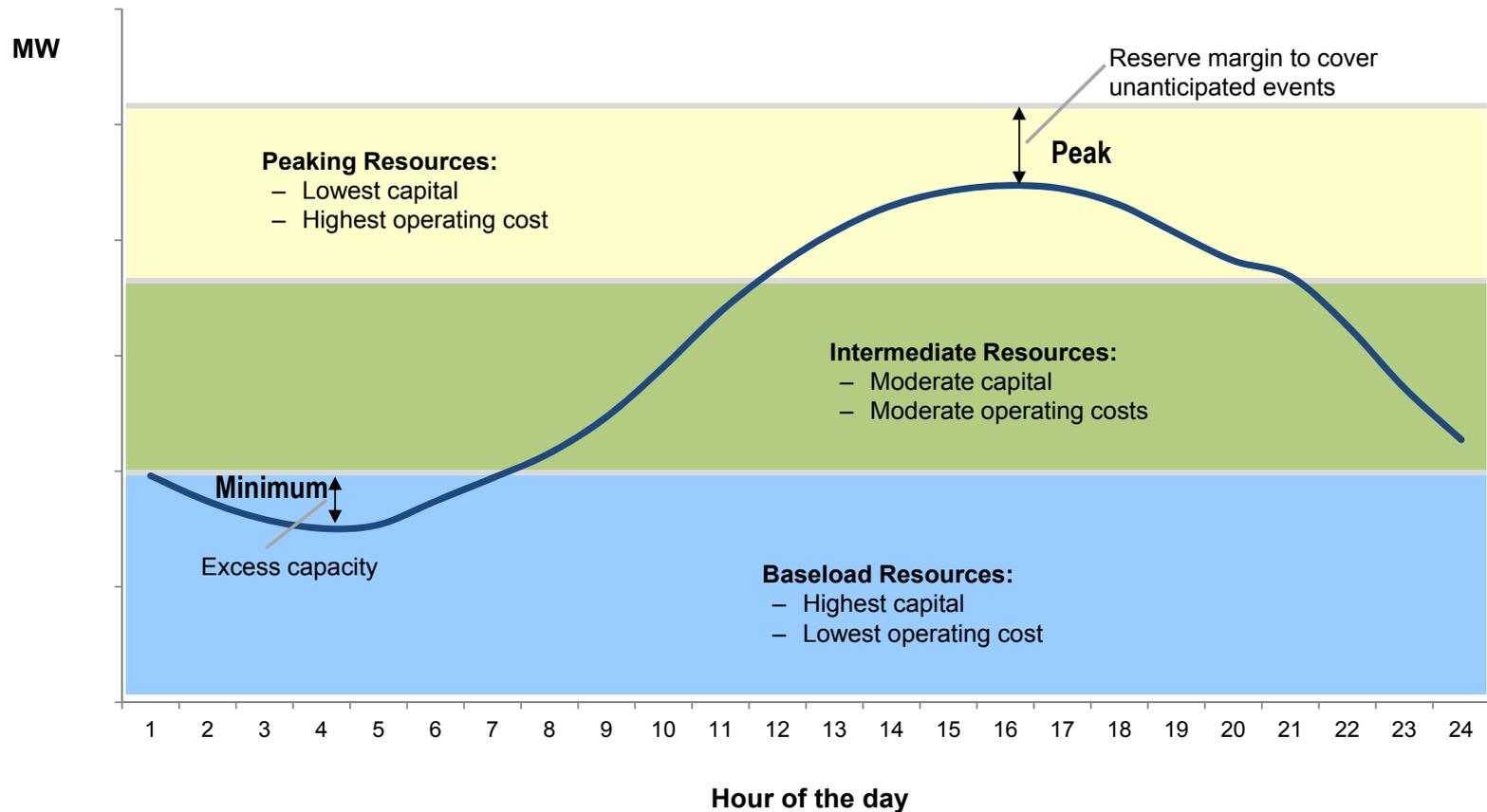




# The Challenge for the Power System: Meeting the Load

Resource options are balanced across generation resources to effectively manage costs

### Typical Summer Load Shape





# TVA's Nuclear Generation Fleet



- ◆ Baseload Resource
- ◆ About 30 percent of TVA's power supply comes from its three nuclear plants
- ◆ These plants make enough electricity to power more than three million homes in the Tennessee Valley
- ◆ Watts Bar Unit 2 is scheduled to begin operation in December 2015 and is expected to generate about 1,150 additional MWs
- ◆ Bellefonte completion is being preserved as a future option
- ◆ TVA is also researching the potential for Small Modular Reactors

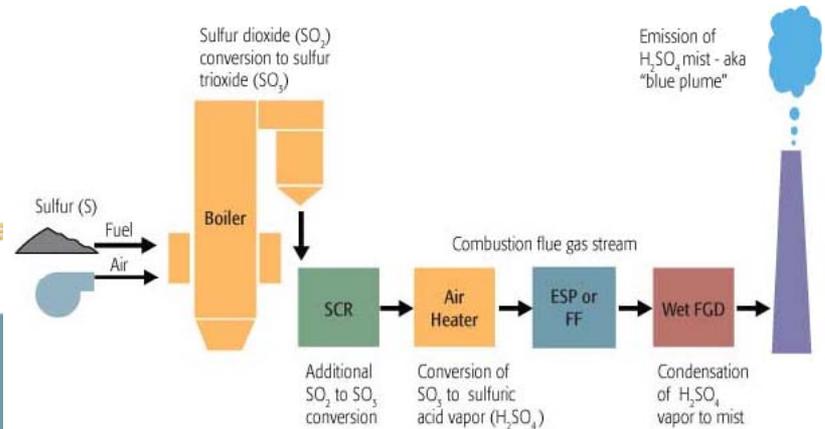
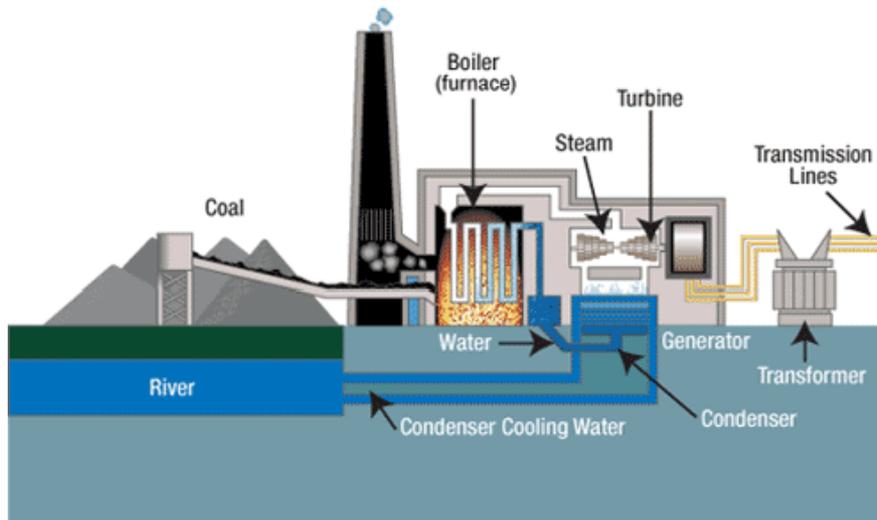
**TVA currently operates 3 units at Browns Ferry, 2 units at Sequoyah, and 1 unit at Watts Bar**



# TVA's Coal Generation Fleet



- ◆ Baseload Resource
- ◆ TVA's 10 coal-fired generating facilities became the backbone of the power system in the 1950s
- ◆ Today: 10 facilities, 46 active units; 13 inactive units
- ◆ Increasingly stringent regulatory requirements



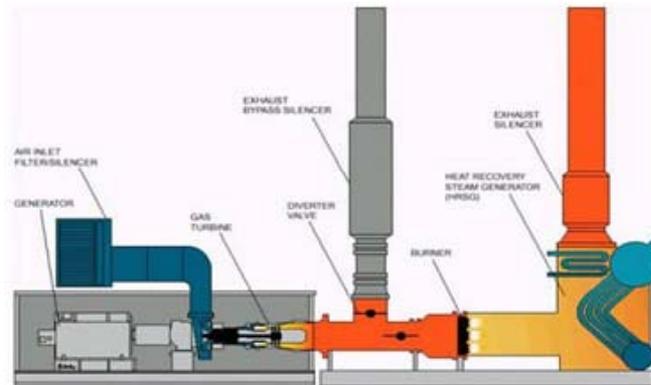
Notes: ESP = electrostatic precipitator, FF = fabric filter, FGD = flue gas desulfurization system, SCR = selective catalytic reduction system.



# TVA's Gas Combined Cycle (CC) Fleet



- ◆ Intermediate Generation Resource
- ◆ 11 of the 98 combustion turbine units are CC
- ◆ CC is a two-step generation process:
  - use combustion turbines similar to jet engines to produce electricity
  - then heat exhaust captured in a secondary system to generate additional electricity

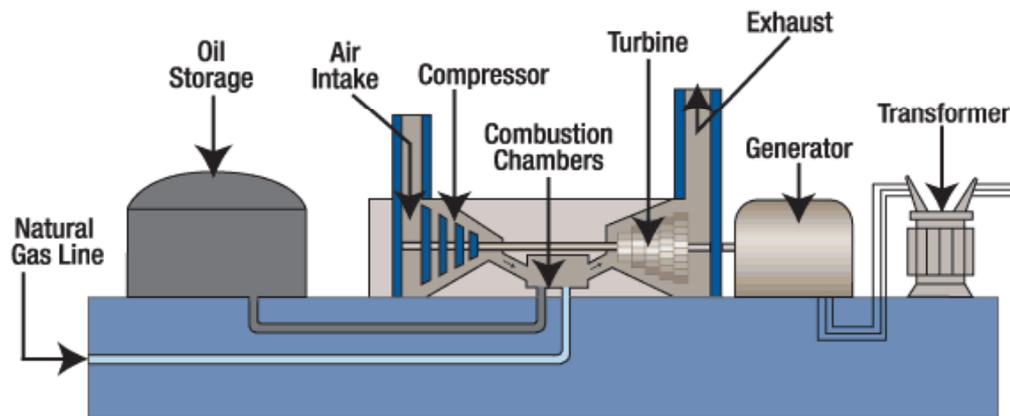




# TVA's Combustion Turbine (CT) Fleet

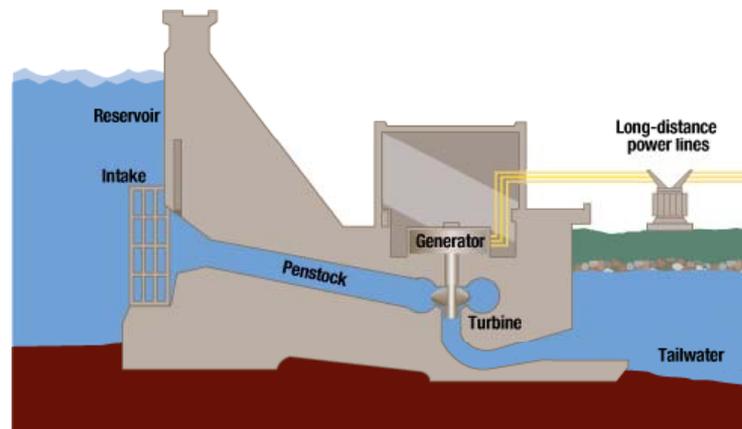


- ◆ Peaking and Back-up Generation Resource
- ◆ Quick dispatch, run on gas or fuel oil
- ◆ TVA's combustion turbine generators are located at 13 sites across the TVA service area. Total of 98 combustion units





- ◆ Intermediate and Peaking Resource
- ◆ Renewable, reliable, efficient and economical
- ◆ Lowest cost of generation
- ◆ 29 conventional TVA hydroelectric dams
- ◆ One pumped-storage facility (Raccoon Mountain)
- ◆ Dependent on precipitation, run-off, water levels and competing water uses





- ◆ Variable Energy Resources (Wind, Solar)
- ◆ 8 contracts for wind energy from the Midwest, ~1500 MW in nameplate capacity
- ◆ Dispatch when energy source available (wind/solar) or when more economical to purchase than generate

Resource	Capacity (MW)
Wind	1,000
Solar	50
Biomass	25
Total Operating	1,075
Total additional committed	650
<b>Total</b>	<b>1,725</b>



- ◆ Mimics an intermediate/peaking generation source
- ◆ Cost effective tool to:
  - Manage peak load
  - Manage load shape
  - Manage minimum loads

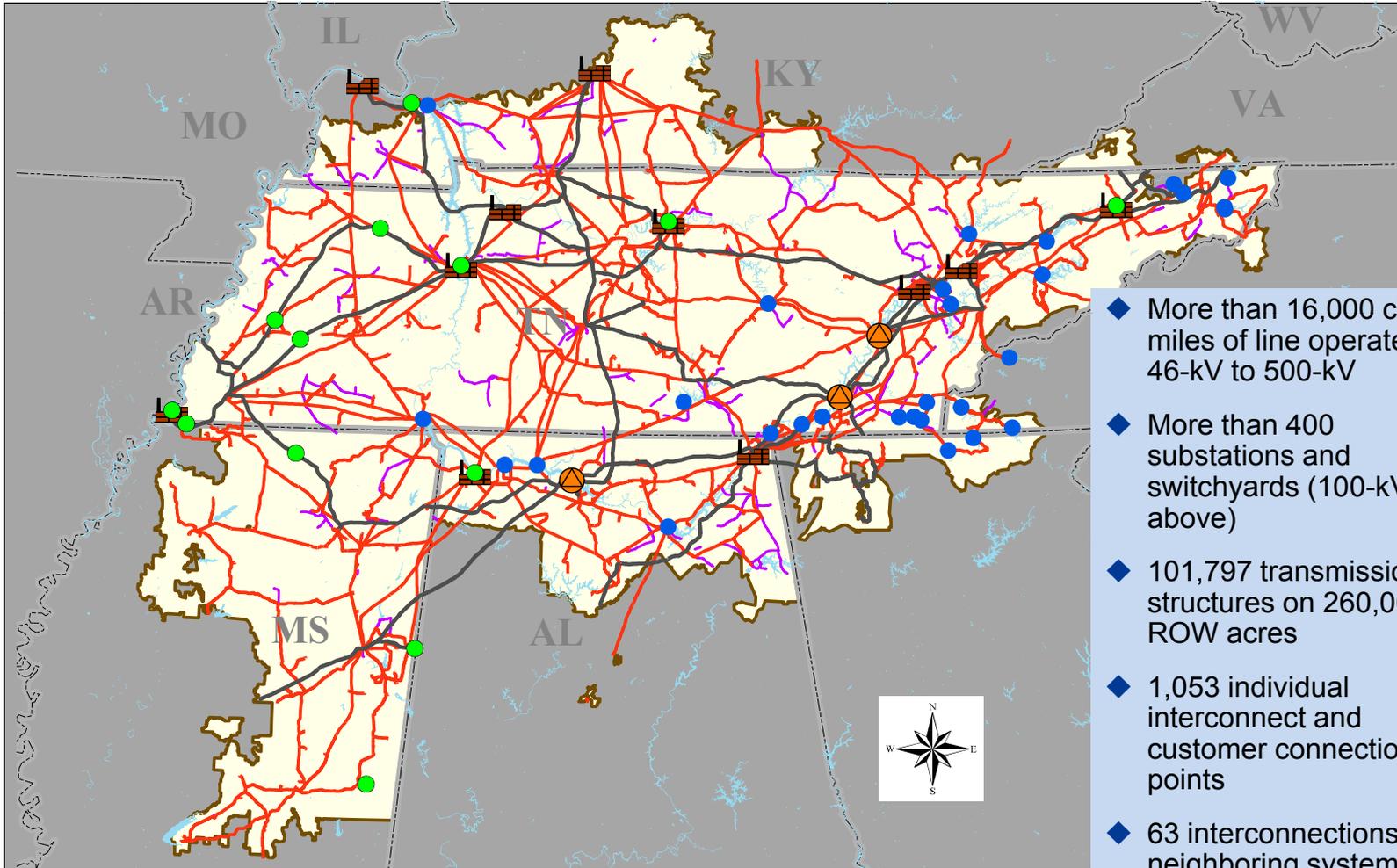
	Top Quartile	TVA
Cost Delivered MWh *	\$46	\$41
Energy Savings MWh*	696,400	1,035,294
Peak Reduction MW*	261	455



\* Source: Energy Information Administration, Form EIA-861, Annual Electric Power Industry Report, TVA Fiscal Year 2013 Benchmarking Notebook, TVA Financial Services. Reflects 3 year average: 2008-2010.



# TVA's Integrated Transmission System

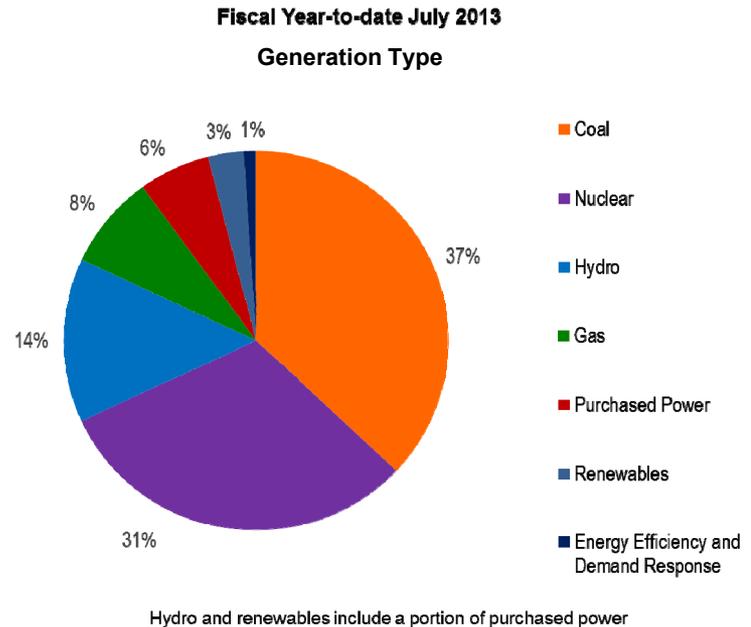
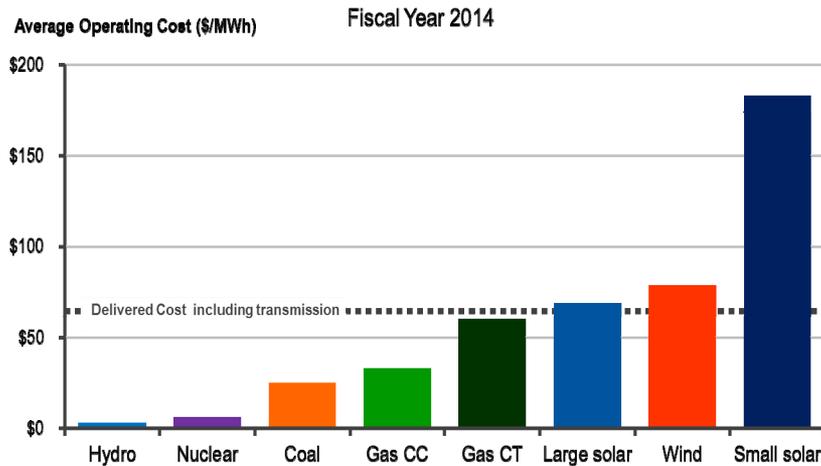


- ◆ More than 16,000 circuit miles of line operated at 46-kV to 500-kV
- ◆ More than 400 substations and switchyards (100-kV and above)
- ◆ 101,797 transmission structures on 260,000 ROW acres
- ◆ 1,053 individual interconnect and customer connection points
- ◆ 63 interconnections with neighboring systems
- ◆ 2,700-mile fiber network

- ◆ Until Duke and Progress merged, TVA was the largest US utility for MWh sold
- ◆ TVA provides the *Reliability Coordinator* function for the TVA Balancing Authority Area plus portions of KY, MO and OK
- ◆ TVA would be substantially affected by loop flows if generation from southern MISO (Entergy) to the north increased



# A Key Challenge: Building a Balanced Portfolio



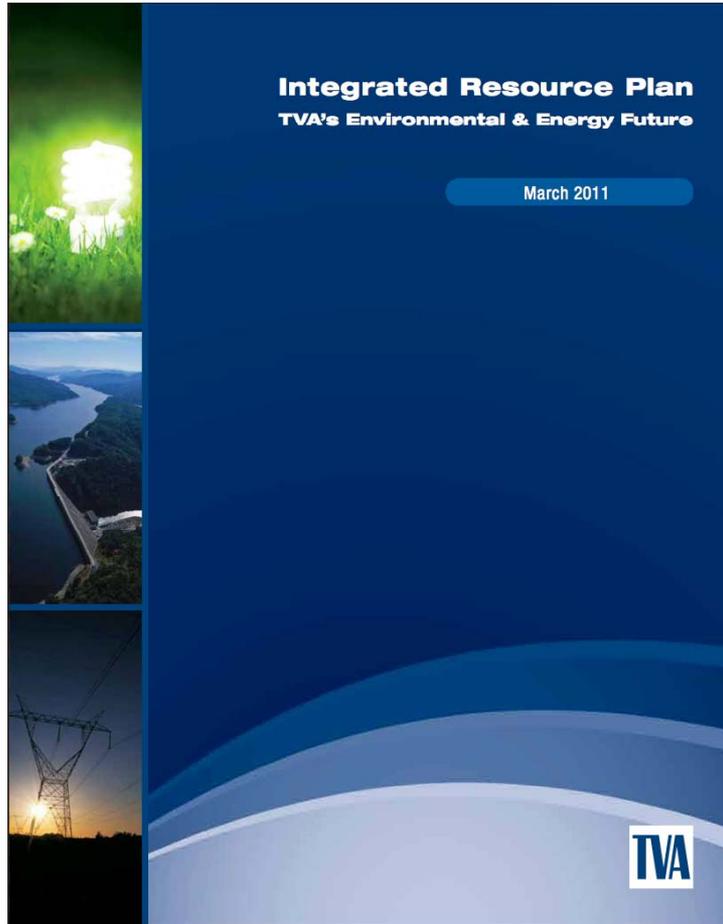
## *The Integrated Resource Plan Defines this balance*

- ◆ Supply-side resources (nuclear, coal, gas hydro, renewables, etc.)
- ◆ Demand-side resources (energy efficiency, demand response, etc.)

***While balancing the many trade-offs between cost (and impacts on rates), environmental impacts, risks, reliability, etc.***



# TVA's 2011 Integrated Resource Plan Paves the Way



## *TVA's Integrated Resource Plan (IRP)*

- ◆ Guides power system planning
- ◆ Balances costs and risks to benefit all stakeholders
- ◆ Allows flexible responses to change
- ◆ Reduces environmental impacts

## Current Resource Plan

 **Nuclear generation**

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 **Coal capacity**

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 **Natural gas as an intermediate supply source**

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 **Energy efficiency and demand response**

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 **Cost-effective renewable energy**

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 **Pumped storage hydro capacity**

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