

## The Clean Power Plan Can Be Implemented While Maintaining Reliable Electric Service in the Southeast

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### *The Distinctive Character of Southeastern Utilities*

Utility customers in the Southeast can be assured that their utilities and regulators have every opportunity to continue to ensure reliable electric service. Dominated by TVA, Duke and Southern Company, it is a region of vertically-integrated, yet multi-state, utilities. North Carolina, Kentucky, and Mississippi bound a region that is not easily subdivided, and which lacks a regional authority to govern or administer aspects of utility operations. Yet the expansive capabilities of these large utilities positions them well for compliance with the Clean Power Plan – these utilities will require relatively modest additional steps to comply with the initial target proposals.

This distinctive character was not directly addressed by the EPA in the proposed Clean Power Plan rule. While EPA did provide extensive, useful explanation of how regional flexibility could facilitate achieving its goals, it did not specifically address the Southeast utility character when discussing the interconnected nature of the electric sector. EPA did discuss the value of state policy strategies (e.g., California and Colorado) and market region strategies (e.g., RGGI, RTOs and ISOs) to achieving both compliance and maintaining reliability. But what is not clearly laid out is how regional flexibility can be achieved under the utility governance structure that exists today in the Southeast.

In human terms, the challenge of Clean Power Plan compliance in the Southeast will not test the engineers who build wind or solar projects, upgrade transmission lines, or dispatch natural gas power plants. In fact, large Southeastern utilities are already moving towards a more flexible generation portfolio. EPA's proposed Clean Power Plan will be flexible and, frankly, not challenging enough to merit alarm. Nonetheless, to address the unique needs of small utilities, the COO will challenge utility executives and regulators to initiate effective and achievable solutions reflecting the regulatory and utility structures in the Southeast.

Our confidence that there are practical, cost-effective paths to compliance with EPA's proposal – even a strengthened EPA proposal – is drawn from several studies that we have conducted or participated in. From these studies, we can recommend several specific steps that utilities can adopt in their planning practices to ensure that proposed actions under CPP are implemented while maintaining the requirement that resource plans put reliability first. In general, these steps **involve improving and effectively applying planning and operational tools the utilities already demonstrate to some degree.**

That's why it is so important that public officials and utility leaders begin, or continue, to engage in the practice of planning a transition to a cleaner, more sustainable energy economy for the Southeast. New technologies and efficiency practices are a promise that can be broken by uninspired, "business as usual" approaches.

*Founded in 1985, the Southern Alliance for Clean Energy is a nonprofit organization that promotes responsible energy choices that create global warming solutions and ensure clean, safe, and healthy communities throughout the Southeast.*

### 1. *Large Southeastern Utilities Will Not Face Reliability Impacts of Clean Power Plan*

- a. Tennessee Valley Authority *Integrated Resource Plan: 2015 Draft Report* – A CO<sub>2</sub> emissions reduction strategy is the least-cost plan, won't drive up rates, and increases system flexibility.
- b. MEPPi TVA *Coal Retirement & Transmission Study* – Cost of upgrades to maintain reliability will be relatively small compared to cost of generation.
- c. SACE *Southeast Renewables and Reliability* study – Studying TVA, Duke and Southern Company, solar and wind power can help meet peak demand without putting reliability at risk.
- d. SACE and La Capra Associates *Cleaner Energy for Southern Company* study – A renewable energy portfolio with an 18% reduction in CO<sub>2</sub> emissions would also result in lower costs.
- e. Compliance options in the Southeast exceed those evaluated by EPA.
  - Studies suggest that state energy efficiency targets of at least 15% are feasible by 2029, rather than the roughly 10% savings utilized by EPA.
  - Wind and solar power market development opportunities in the Southeast are at least 15-20% of total generation, several times greater than the 0-10% considered by EPA.
  - Wind resources are available in-region; proposed HVDC transmission provides access to on-peak wind resources that will complement solar resources to enhance reliability.
- f. Assuming EPA re-asserts its policies regarding enforceable commitments (with limited exceptions to the “practically enforceable” standard), nuclear power (with the compliance complications it induces) would remain outside 111(d) jurisdiction.
- g. Large Southeastern utilities are seeking multi-state compliance solutions. However, the ideas being discussed do not join unrelated utilities into a single accountability framework. Presumably, each multi-state utility seeks to aggregate compliance responsibilities across states.

### 2. *State Regulators Can Address the Unique Needs of Smaller Utilities*

- a. Smaller Southeastern utilities have access to renewable energy and energy efficiency resources.
  - Smaller increments of these resources are cost-effective than for thermal generation.
  - Solar power and energy efficiency are available in every Southeastern utility territory.
  - Recent contracts show that wind-by-wire is cost-effective in today's market.
- b. Small, independent utilities may not have enough generation diversity to meet emission targets.
- c. If Southeast states were to pursue a multi-state compliance solution, it would likely be complex and slow to emerge. Practically, this may be a longer-term goal.
- d. To help smaller utilities comply, state regulators should support the establishment of credit or allowance markets, accessible to any utility under the oversight of state commissions. With clarity from EPA, states could select either in-state or regional solutions.

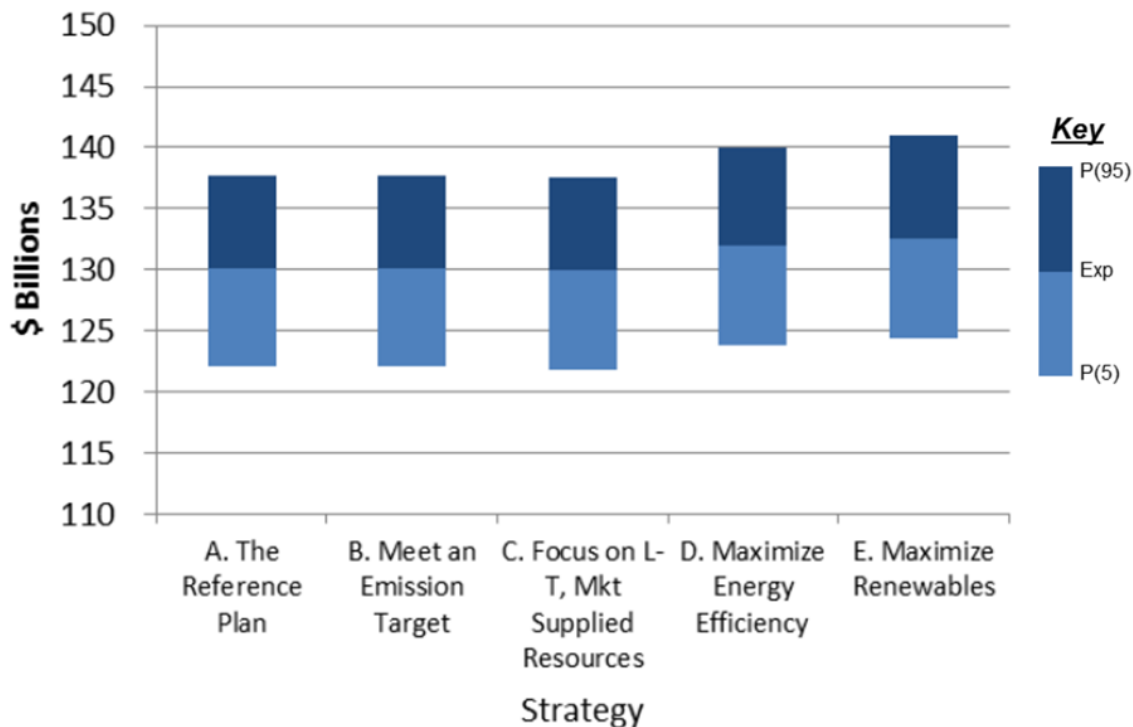
### 3. *Policies to Ensure Reliability and Address Operational/Market Impacts*

- a. When EPA provides clarity on multi-state and mass/rate compliance options, it will be practical to improve or create regional practices to ensure reliability and address other impacts.
- b. One key policy is assigning a fair and prudent capacity value to renewable energy resources. Underrating solar or wind capacity will result in excess reserves, driving up customer costs.
- c. Another key policy is adopting well-informed planning practices for energy efficiency programs.
- d. Southeastern utilities should expand and expedite consideration of renewable energy development projects in regional transmission planning and gas-electric coordination studies.

**Tennessee Valley Authority, Integrated Resource Plan: 2015 Draft Report and 2015 Draft Supplemental Environmental Impact Statement (March 2015).**

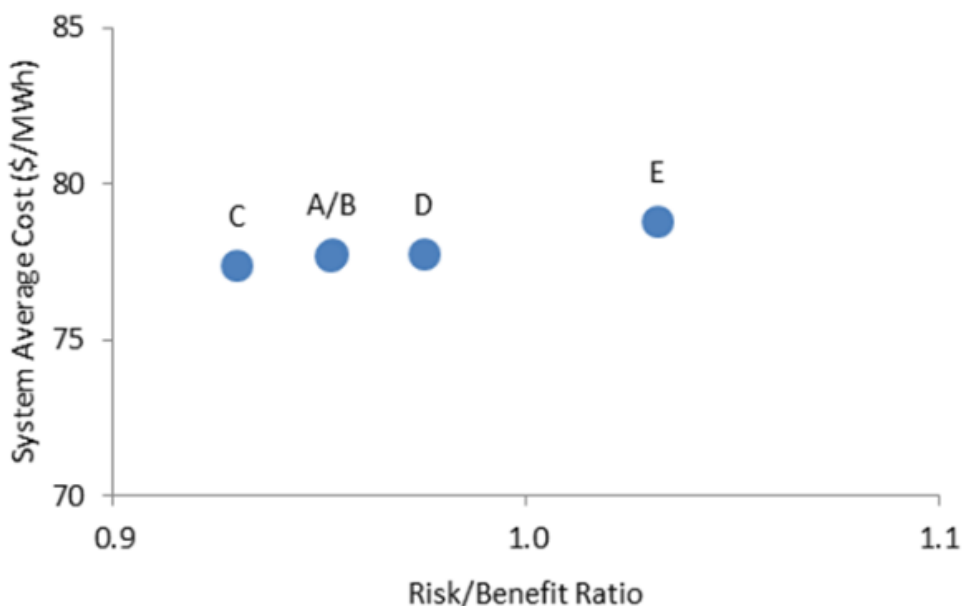
**TVA Draft IRP, Total Plan Cost (PVRR over 20-year planning period)**

The expected cost of the five strategies varies by less than 2%.

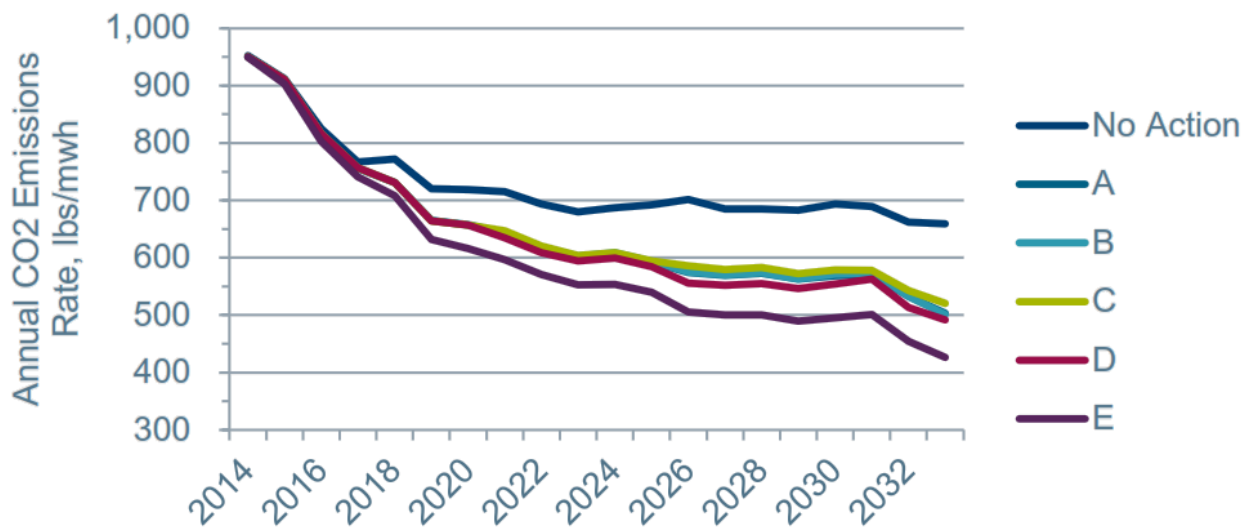


**TVA Draft IRP, 10-Year View, System Average Cost**

The system average cost and risk/benefit ratios vary by insignificant amounts.

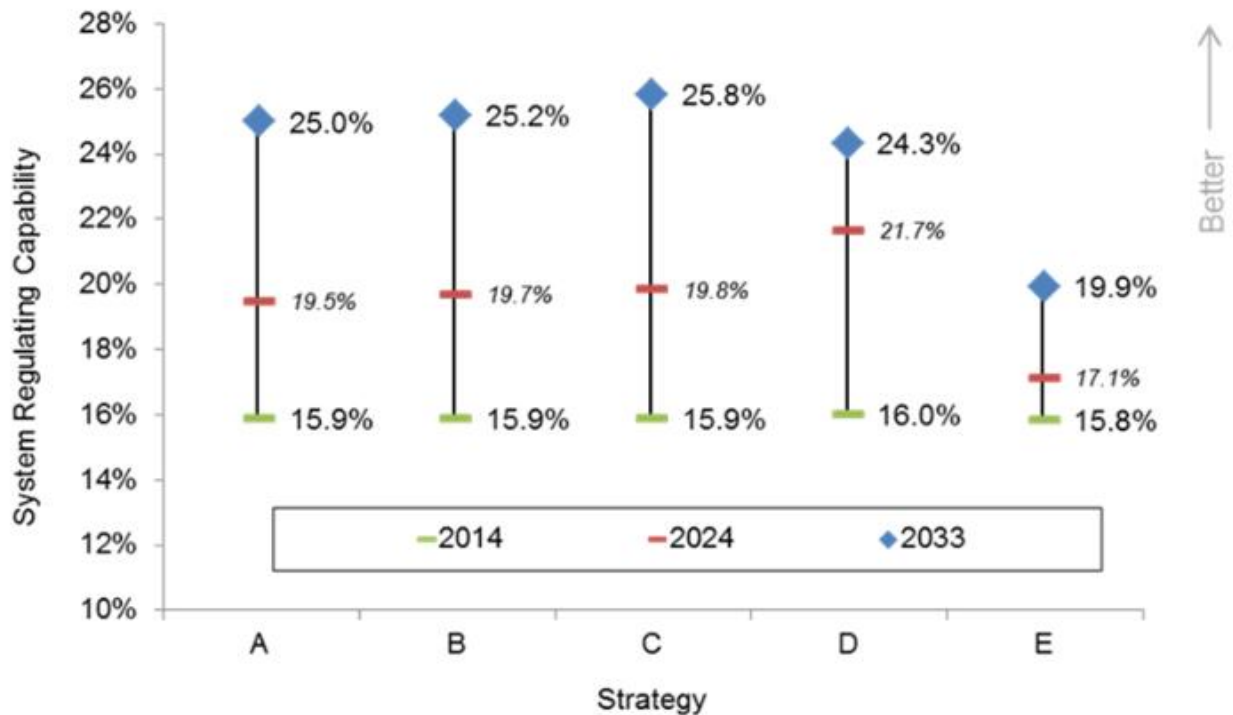


**TVA Draft IRP, Trends in Average Direct CO<sub>2</sub> Emission Rates by Strategy**  
 Strategies A-D have almost identical emission rates.



**TVA Draft IRP, Trends in System Regulating Capability (SRC)**

Annual system regulating capability, expressed as a percentage of peak load, measures the flexibility of the five planning strategies. TVA considers flexibility – the ability of the system to respond to load swings – as a key consideration for long-range resource planning, but has not established a minimum or optimum flexibility score for the TVA system. Even though improvements are lower for Strategy E, all five strategies have better SRC scores in 2024 and 2033.



**Mitsubishi Electric Power Products, Inc. (MEPPI), TVA Coal Retirement & Transmission Study Technical Report (February 2015).**

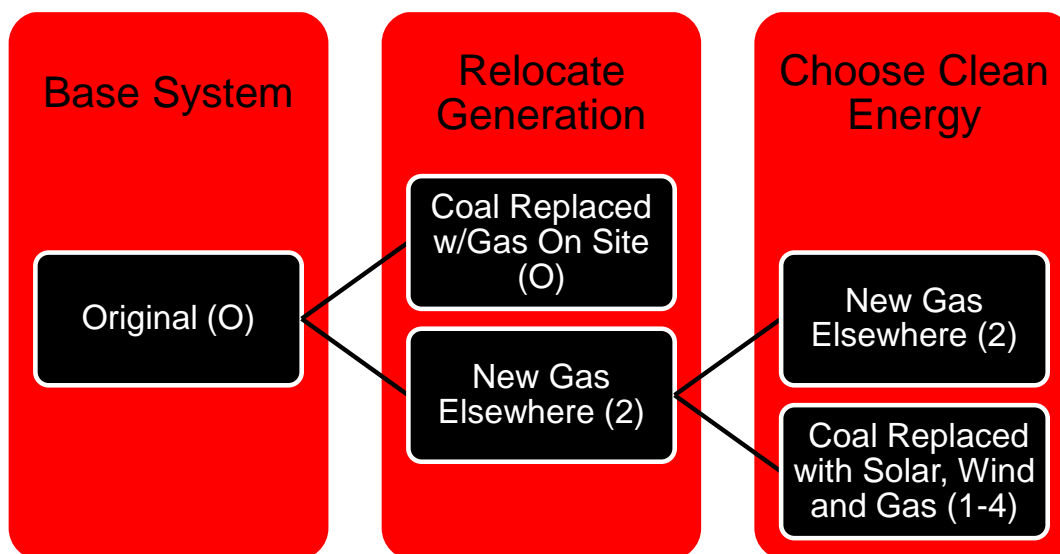
MEPPI studied the replacement of coal fired plants with different combinations of solar, imported wind generation (HVDC), and natural gas. Each scenario represented different generation that the TVA grid might utilize to serve load. The necessary upgrades for reliability were identified, and a high-level cost estimate provided.

The incremental transmission cost to move about 4800 MW of generation from the existing sites to new locations, and to rely on solar, imported wind generation (HVDC) and natural gas to replace coal generation is estimated at \$89 per kW. This transmission upgrade cost includes (a) \$27 per kW related to replacing existing coal plants with new gas fueled power plants elsewhere on the TVA system and (b) \$62 per kW reflecting costs that are more closely associated with utilizing wind and solar in place of coal generation in the configuration studied by MEPPI.

Although the estimated cost is a relatively small fraction of TVA's capital spending estimate over the next decade, the number of lines and transformers that are required to be upgraded will require a significant amount of coordination (scheduling outages), and thus could require a significant timeframe.

**Estimated High-Level Cost Estimate to Alleviate Thermal Overloads  
Due to Coal Retirement Supplemented by Clean Resources**

Total System Wide Upgrades>>	\$470.0 MIL
Base Case Deduction>>	\$40.2 MIL
Total System Wide Upgrades - Base Case Deductions>>	\$429.8 MIL
# of MW of Coal Generation Retired>>	4800 MW
Cost of Clean Generation \$/kW>>	\$89/kW



Cost for each comparison above is derived from the case(s) in parentheses.

Cost = \$0 per kW

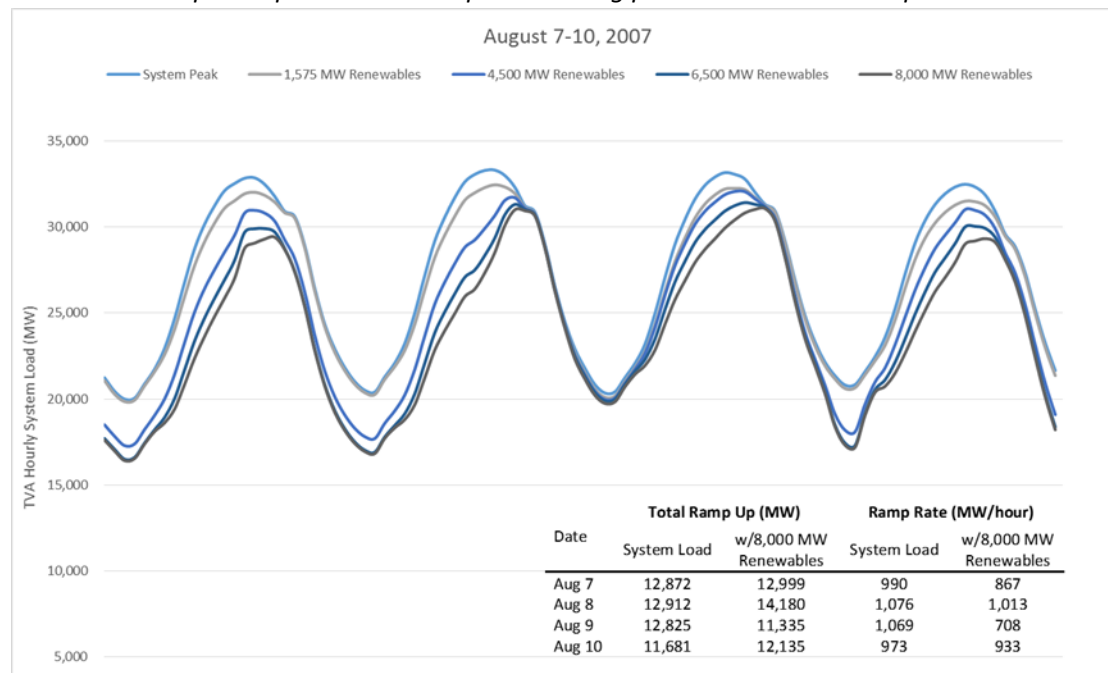
Cost = \$27 per kW

Cost = \$62 per kW

## Southern Alliance for Clean Energy, Southeast Renewables and Reliability (November 2014).

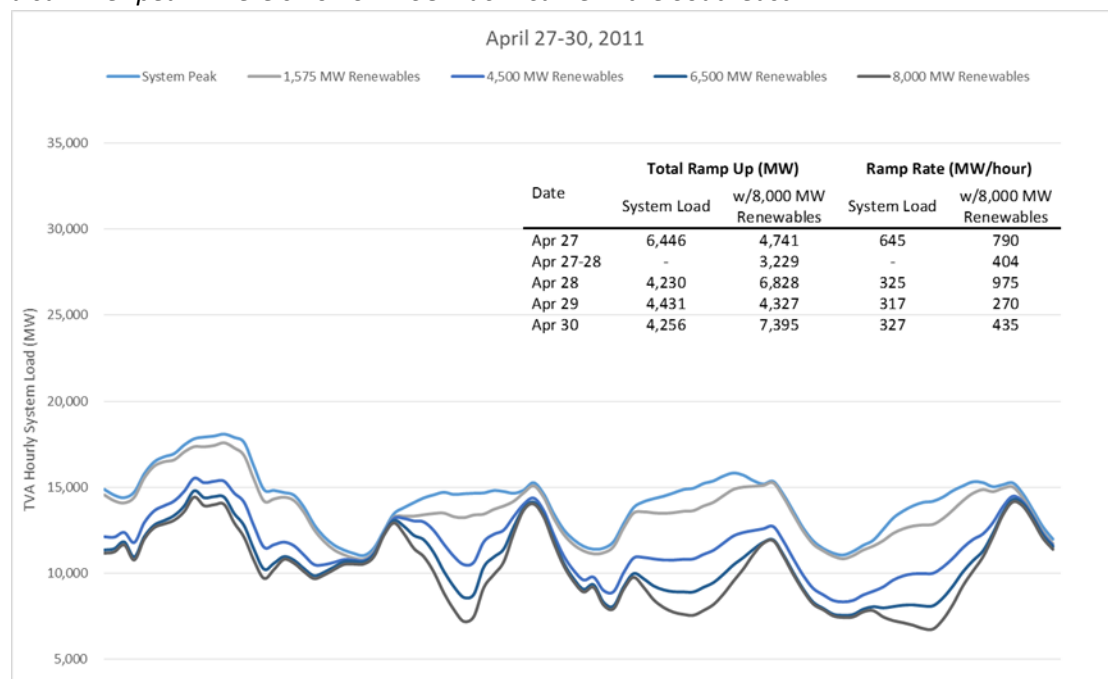
### Up to 8 GW Renewable Energy, Based on TVA Summer Peak Episode

Solar and wind power provide reliable power during peak summer demand periods.

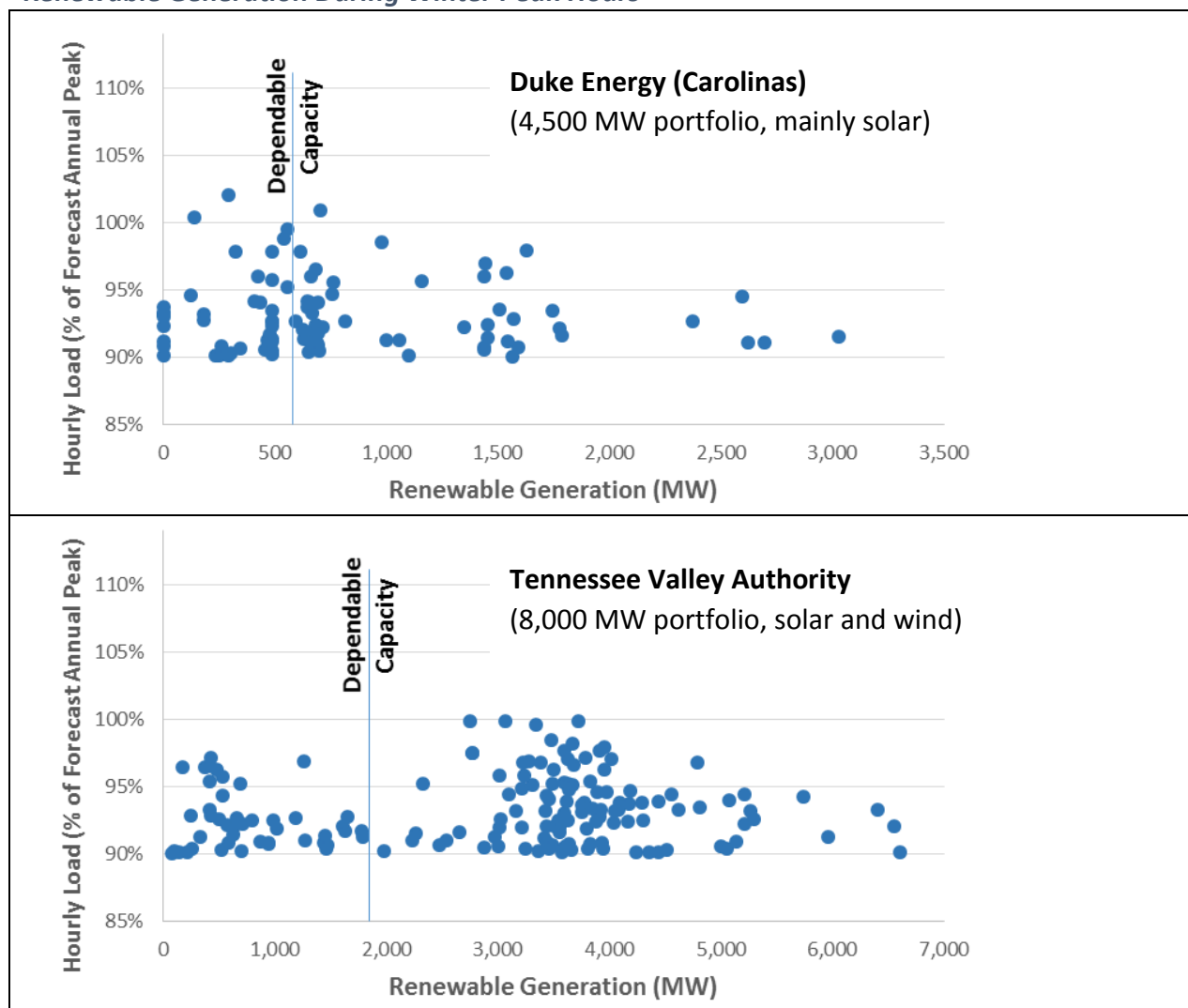


### Up to 8 GW Renewable Energy, Based on TVA Springtime Low Load / High Renewable Generation Episode

Variability can be increased, as this extreme case illustrates, but is no more challenging than a summer peak. There's no "CAL-ISO Duck" curve in the Southeast.



### Renewable Generation During Winter Peak Hours



### Impact of Renewable Energy Development Scenarios on Reliability

Based on 10 (Southern Company) or 15 years of system load data matched to modeled RE generation.

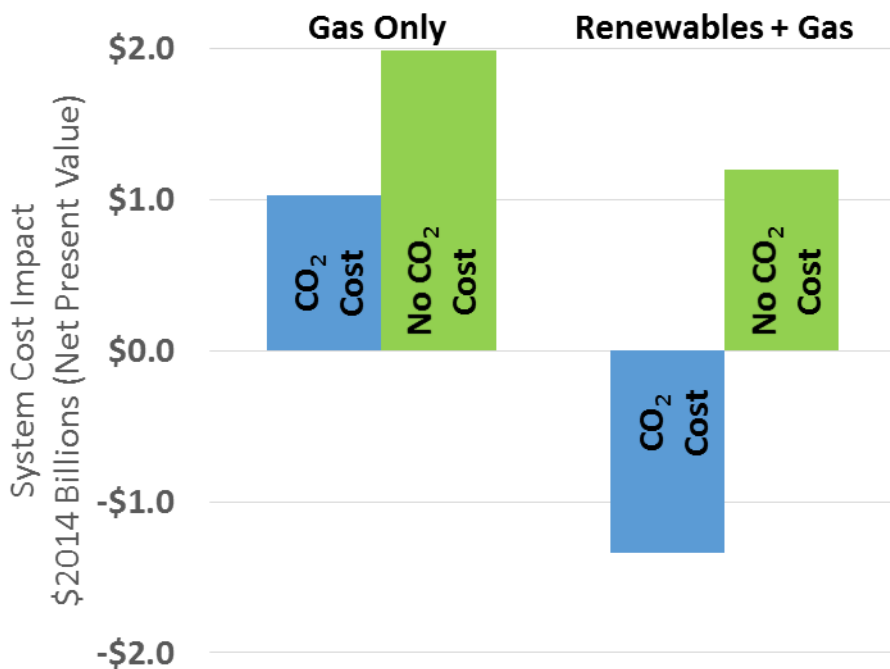
	Higher Risk Hours	Reliability Ensured Hours	Ratio
<b>Duke Energy (Carolinas)</b>	0.0 % (0)	0.734 % (558)	0:100
<b>Southern Company</b>	0.007 % (6)	0.549 % (481)	1:80
<b>Tennessee Valley Authority</b>	0.008 % (11)	0.639 % (840)	1:76

### Impact of Substantial Renewable Energy Development Scenarios on Seasonal Peak

Dependable Capacity (MW)	Thermal Generation			Renewable Generation Scenario		
	Summer	Winter	Summer "Shortfall"	Summer	Winter	Winter "Shortfall"
<b>Duke Energy (Carolinas)</b>	35,467	37,302	<b>1,835</b>	2,246	619	<b>1,627</b>
<b>Southern Company</b>	41,522	43,095	<b>1,573</b>	3,099	2,312	<b>787</b>
<b>Tennessee Valley Authority</b>	40,040	41,157	<b>1,117</b>	3,141	1,890	<b>1,251</b>

Southern Alliance for Clean Energy, *Cleaner Energy for Southern Company* (March 2015).  
 La Capra Associates, Southern Company Dispatch Model (November 2014).

*Cost of Alternative Coal Replacement Portfolios for Southern Company System (2014-2034)*



*CO<sub>2</sub> Emissions by Scenario, Southern Company System (2014-2034)*

