

TRACKING DECARBONIZATION IN THE SOUTHEAST

GENERATION + CO₂ EMISSIONS REPORT

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INTRODUCTION

Power generation in the Southeast is changing: carbon dioxide (CO₂) emissions are falling, and solar is being deployed at increasing scale. Electricity demand is declining and the economics of clean energy continue to improve. Some utilities are setting long-term goals such as transitioning away from fossil fuels and lowering greenhouse gas emissions. While emission reduction opportunities exist in many sectors, this report will discuss decarbonizing emissions from utility generation in the electric power sector.

SACE has compiled historical data for 2010-2018 and forecasts of power generation for Southeast utilities. By examining the mix of fuels used to meet the region's power needs, we can describe how generation and demand relate to regional carbon emissions. Generation and emission figures given in this report are tied to the utility or state in which the power is ultimately consumed, not generated or emitted.

The purpose of this report is to review regional emissions and generation trends in the electric power sector in the Southeast. We will identify what current supply and demand forecasts tell us about the region's resource mix and future carbon emissions.

ABOUT SACE

The Southern Alliance for Clean Energy (SACE) is a nonprofit organization that promotes responsible energy choices to ensure clean, safe, and healthy communities throughout the Southeast. As a leading voice for energy policy in our region, SACE is focused on transforming the way we produce and consume energy in the Southeast.

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EXECUTIVE SUMMARY

Changes in power generation have driven carbon (CO₂) emissions from electric utilities in the Southeast down for over a decade. Despite the deployment of new solar generation, these emissions flatten out under current utility plans. This flat trend falls far short of the trajectories recommended by scientists as needed to avoid the worst of the climate crisis, prompting questions and observations:

DECARBONIZATION GOALS ARE BECOMING THE NEW NORM

Decarbonization is the transition of our power supply to sources that emit lower CO₂ emissions. A growing number of electric utilities and cities in the Southeast have set goals to decarbonize by 2040-2050, including Duke Energy and Southern Company, two of the largest utility systems in the country. However, other notable utility systems like NextEra have only announced short-term goals and the Tennessee Valley Authority (TVA) has declined to formalize any carbon reduction goal. In order to avoid the worst impacts of the climate crisis, cities and utilities must work towards a long-term carbon reduction goal.

UTILITY PLANS MISS THE MARK

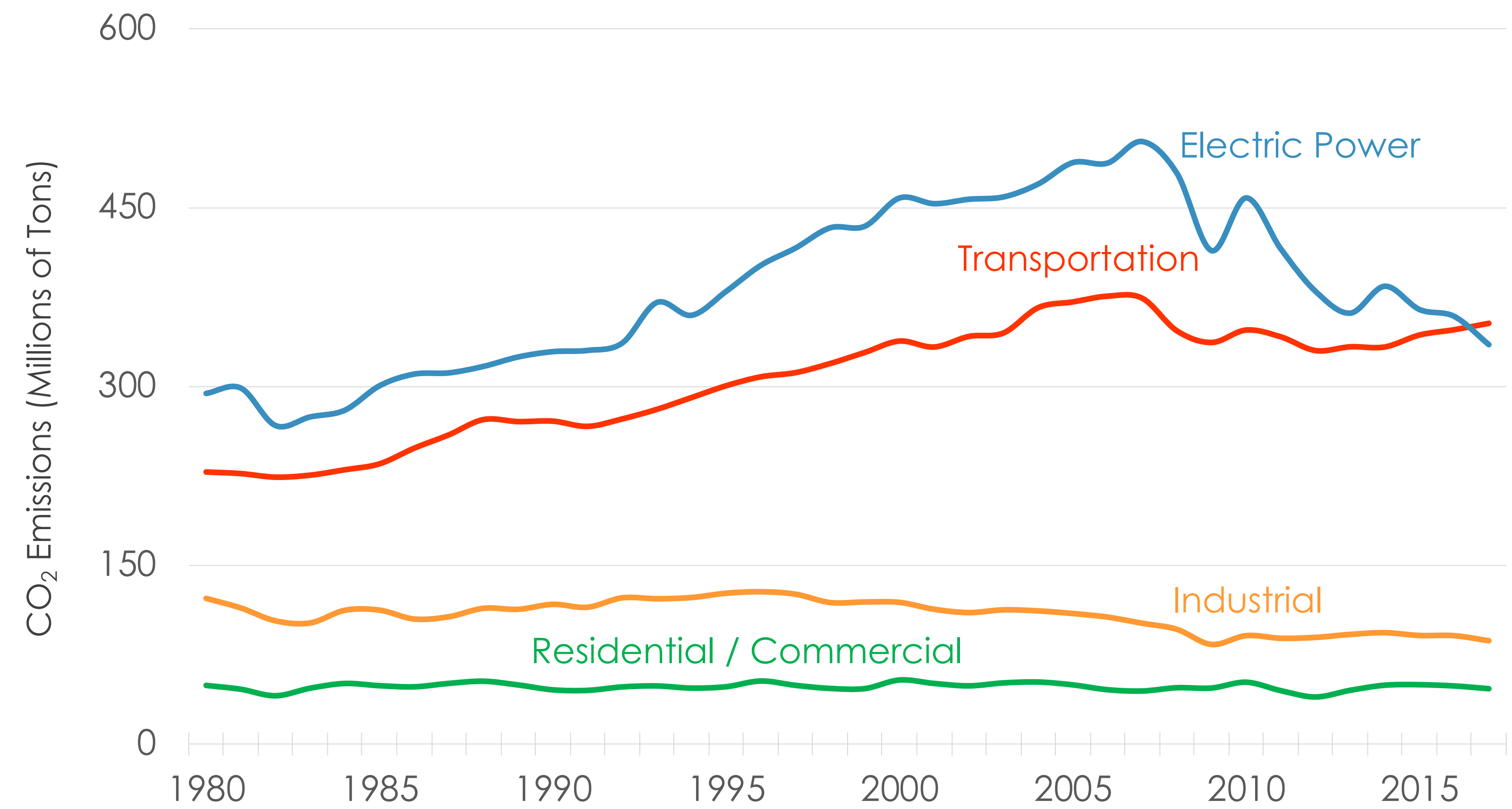
Continued cost reductions and technology improvements have put zero-emission solar on par with new fossil gas-fueled plants, but under current utility plans, utilities are missing key opportunities to add more solar, wind, and efficiency to the resource mix. Instead, integrated resource plans (IRP) frequently result in new fossil gas capacity. Because fossil gas has approximately half the emission rate of coal generation, historical CO₂ reductions have been dramatic. But continued investment in fossil gas infrastructure hinders the ability to reach net-zero carbon emissions, and creates additional “fugitive emissions” of methane from leakage, which are more difficult to track and prevent.

SHOULD THE TRANSPORTATION SECTOR LOOK TO UTILITIES FOR LEADERSHIP?

Historical drops in utility emissions and increased vehicle travel mean the transportation sector is now the largest source of CO₂ in the country and Southeast region. This does not diminish the need for action in the power sector. In fact, decarbonizing remains as crucial as ever. Simultaneously, the transportation sector is electrifying, as many consumers are taking advantage of the public health, economic, and environmental benefits of by switching to electric vehicles (EVs). The cleaner the electricity, the cleaner the EV, therefore emission reductions in electricity help the transportation sector decarbonize as well.

HISTORICAL EMISSIONS TRENDS BY SECTOR

SOUTHEAST ANNUAL CO₂ EMISSIONS BY SECTOR



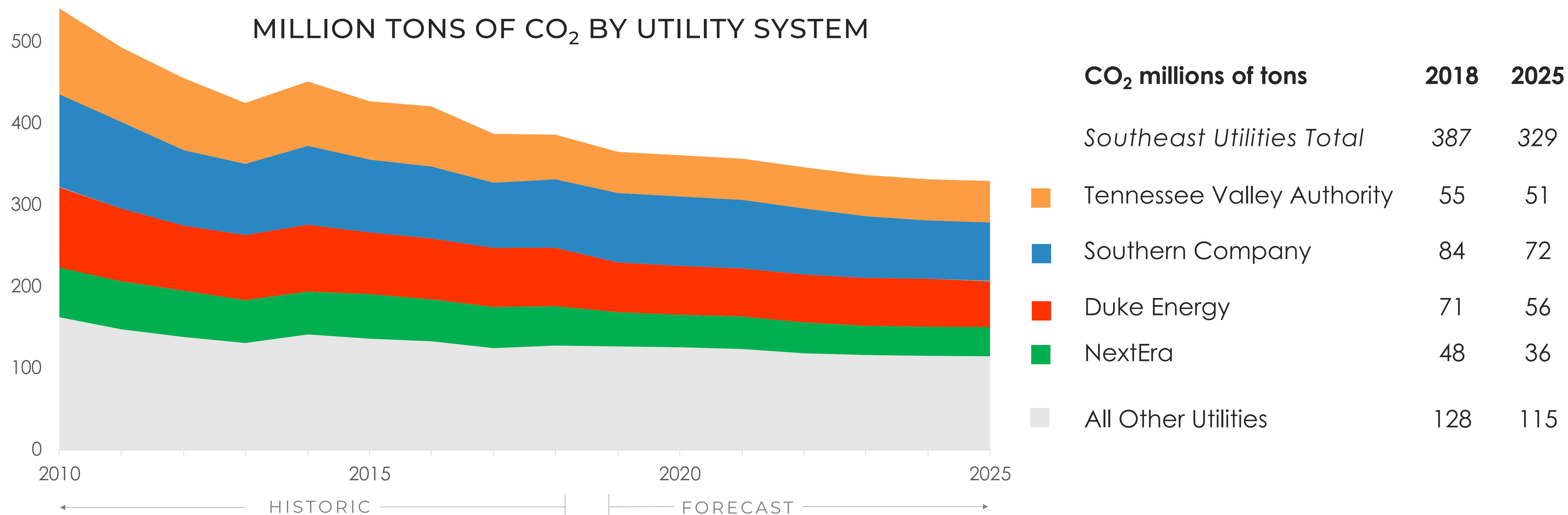
Source: U.S. Energy Information Administration (EIA) – [State Carbon Dioxide Emissions](#) for AL, FL, GA, MS, NC, SC, TN (1980-2017).

WHY THE POWER SECTOR?

CO₂ emissions are reported by sector to measure how consumption of fossil fuels, such as coal and fossil gas, contributes to greenhouse gas emissions.

Globally, emissions are on the rise. But on a national and regional level, reported annual CO₂ emissions are beginning to drop. The primary driver for this sharp decrease is observed in the **electric power sector**, which is the focus of this report. A notable result of falling emissions in the power sector from their peak in 2007 is that the transportation sector recently surpassed the electric power sector as the largest regional source of CO₂ because utilities are decarbonizing faster than transportation is growing.

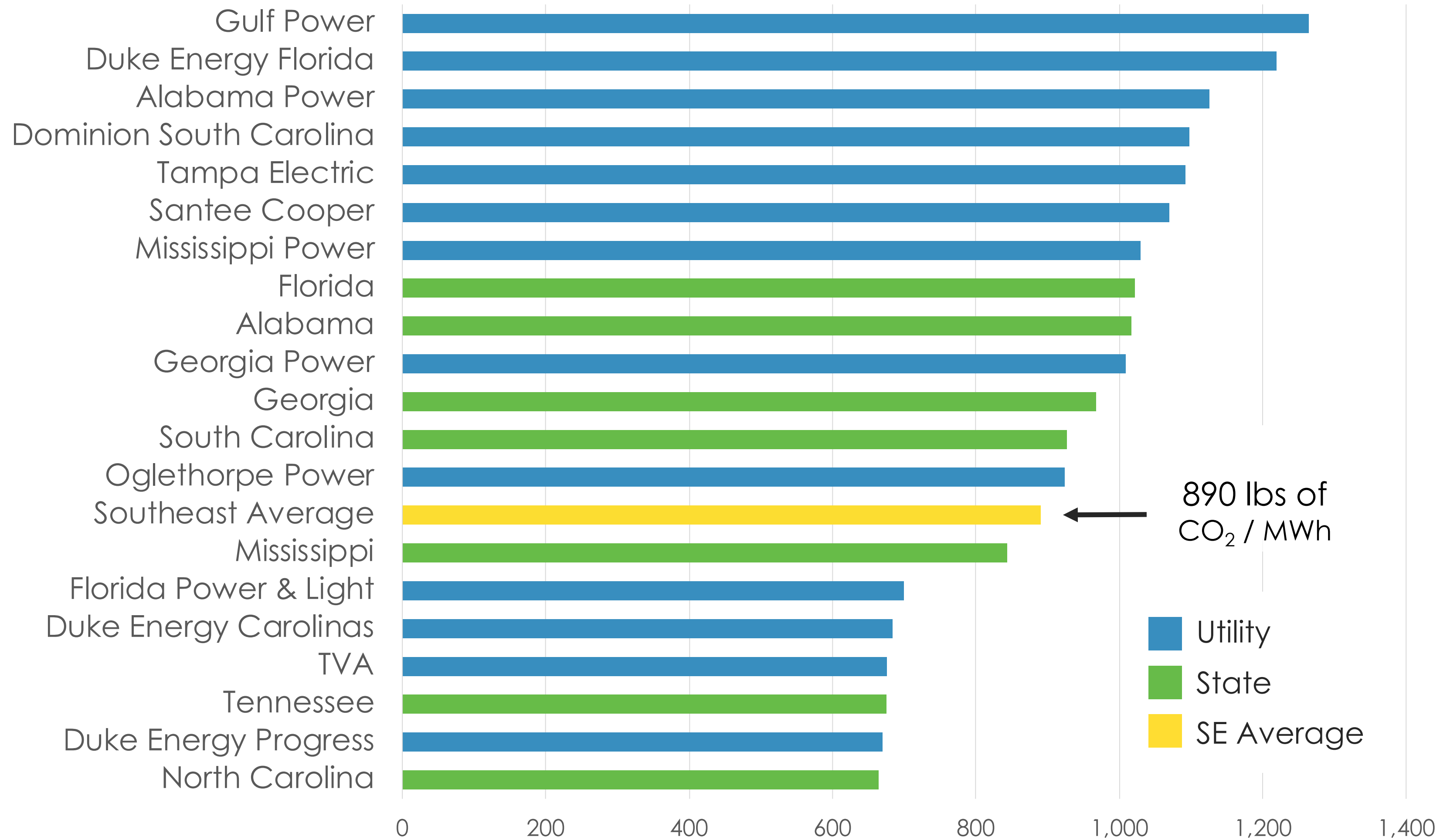
EMISSIONS FORECAST FOR UTILITIES



Four major utility systems make up approximately nearly 70% of regional CO₂ emissions. The top two CO₂ emitters, Duke Energy and Southern Company, have both set goals to reach net-zero emissions by 2050. NextEra and TVA have both announced 70-80% reductions in the emissions rate, although TVA has not characterized it as a goal or commitment. Total regional emissions are expected to fall 15% from current levels by 2025, with most of those reduction occurring over the next two-three years.

EMISSIONS CO₂ INTENSITY OF POWER SUPPLY⁷

EMISSIONS INTENSITY (lbs of CO₂/MWh) IN 2018



CARBON INTENSITY VARIES THROUGHOUT THE REGION

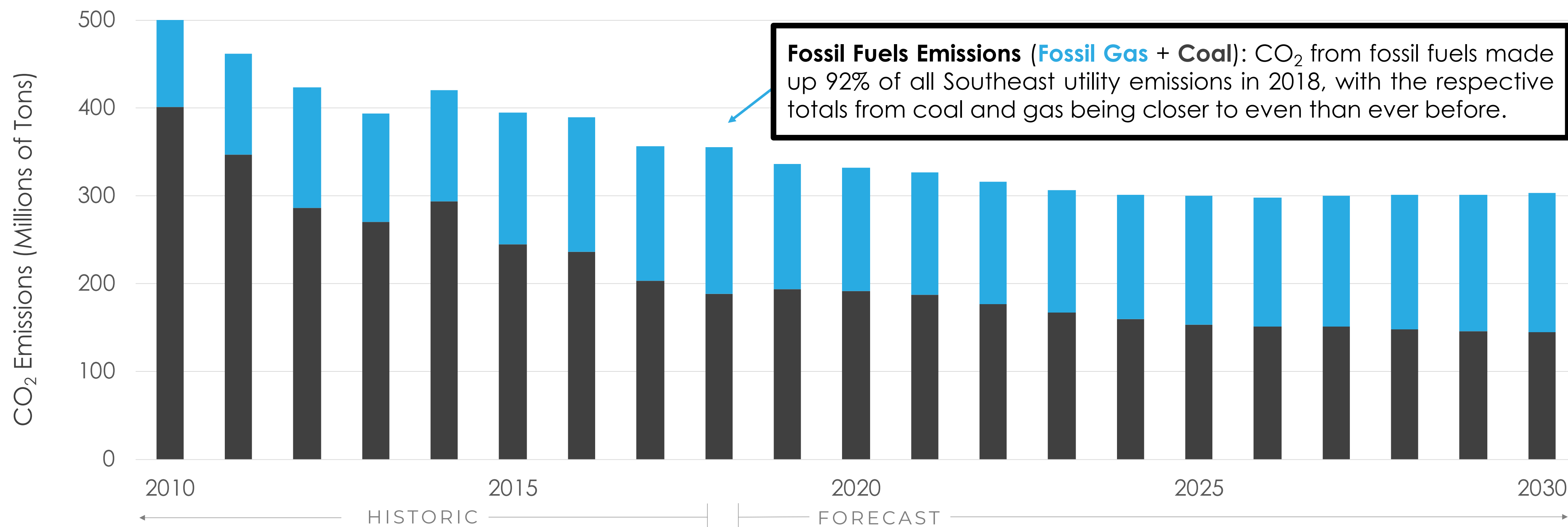
The climate impact of the power supply can be measured by its **carbon intensity**. When consumed, different fuels emit different amounts of carbon for each megawatt hour (MWh) of electricity produced. Lower emissions intensity = cleaner electricity.

Currently, the regional average is 890 lbs/MWh close to what of an average fossil gas plant emits using the same measure. North Carolina remains the “cleanest” state, but in 2018 Tennessee came much closer to tying for that spot than last year.

Also notable, Florida utilities still remain among the most emissions-intense in the region. This is due to high reliance on fossil gas, with some coal usage still lingering.



FOSSIL FUEL EMISSIONS TRENDS



While further coal retirements are expected to drive regional CO₂ emissions downwards, rising fossil gas consumption remains a roadblock to reaching long-term carbon goals. The process of drilling for and delivering fossil gas to the Southeast region also causes high methane emissions due to leaks in the gas transmission system. Emissions from this leakage are referred to as “fugitive emissions”, and many utility systems are beginning to track them due to aging fossil gas pipelines and infrastructure.

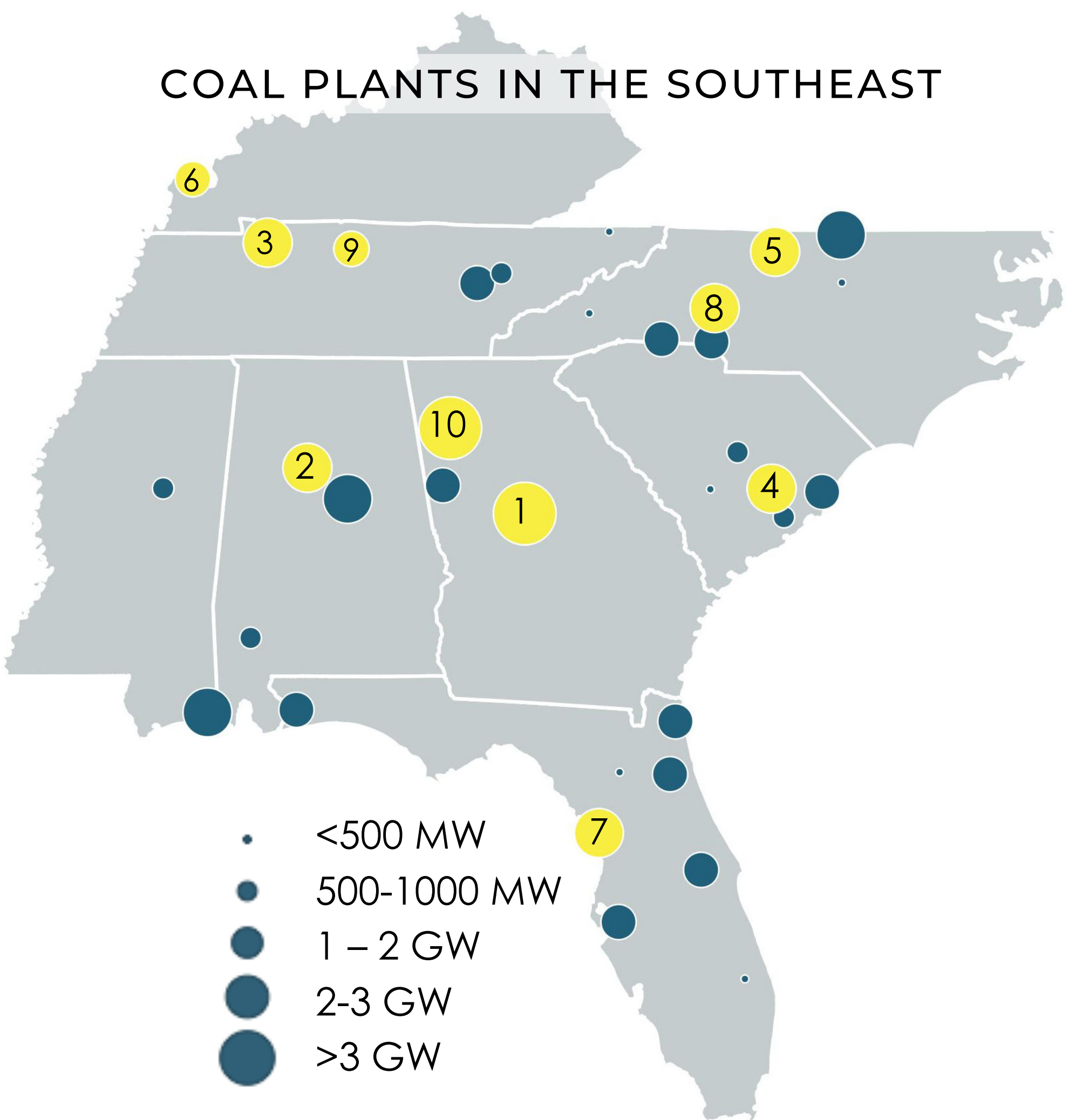
EMISSIONS FROM COAL GENERATION

COAL PLANTS ARE DWINDLING

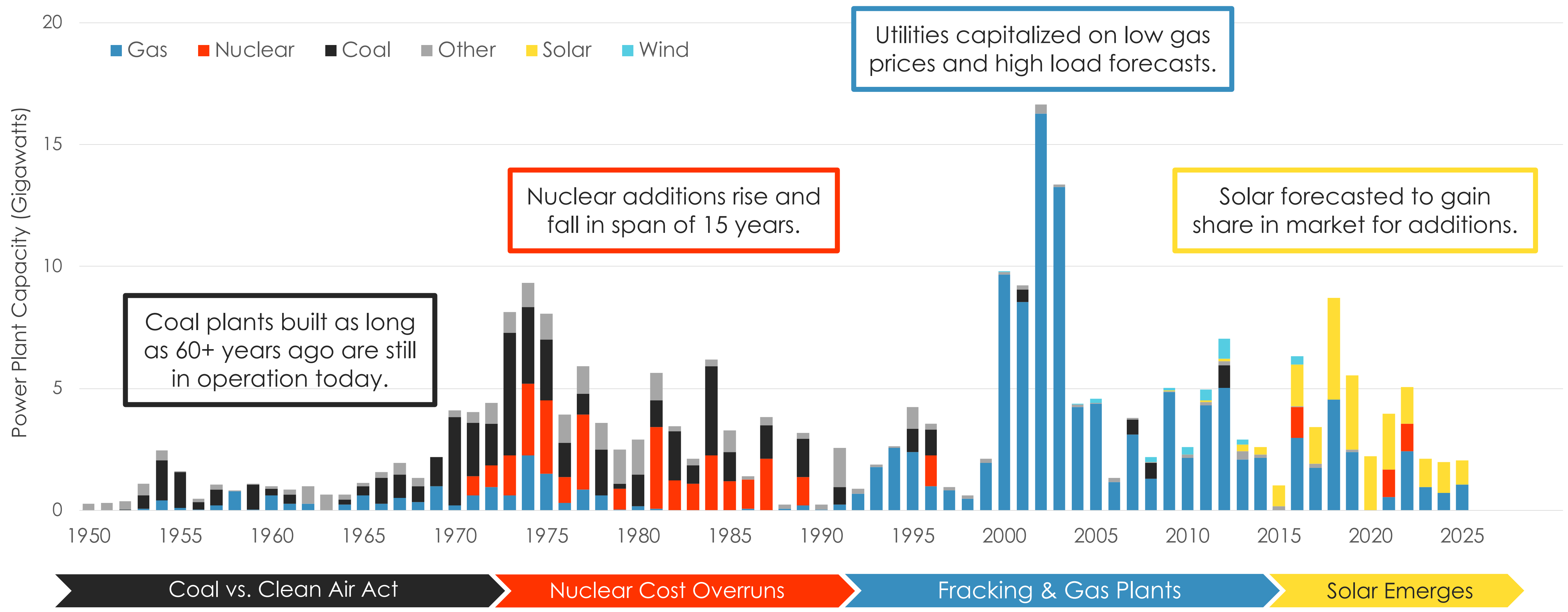
Following a wave of expected retirements, just a few coal plants will remain in the region by 2030. The top ten coal plans represent over 94 million tons of CO₂ per year, just under one third of the region's total CO₂ emissions. Coal plants are usually owned and operated primarily by one utility, but some, like Scherer, sell power to two or even three other utilities across state lines, meaning retirement decisions can be impacted by multiple utility plans.

TOP COAL PLANT BY CO₂ IN 2030

Rank	Plant Name	Utility	CO ₂ (m)	CO ₂ / MWh
1	Scherer	Georgia Power	19.0	2,254
2	James Miller Jr	Alabama Power	12.7	2,184
3	Cumberland	TVA	12.3	2,165
4	Cross	Santee Cooper	9.1	1,893
5	Belews Creek	DEC	8.9	1,890
6	Shawnee	TVA	7.0	2,418
7	Crystal River	DEF	6.8	2,099
8	Marshall (NC)	DEC	6.2	1,935
9	Gallatin (TN)	TVA	6.1	2,237
10	Bowen	Georgia Power	6.0	2,014

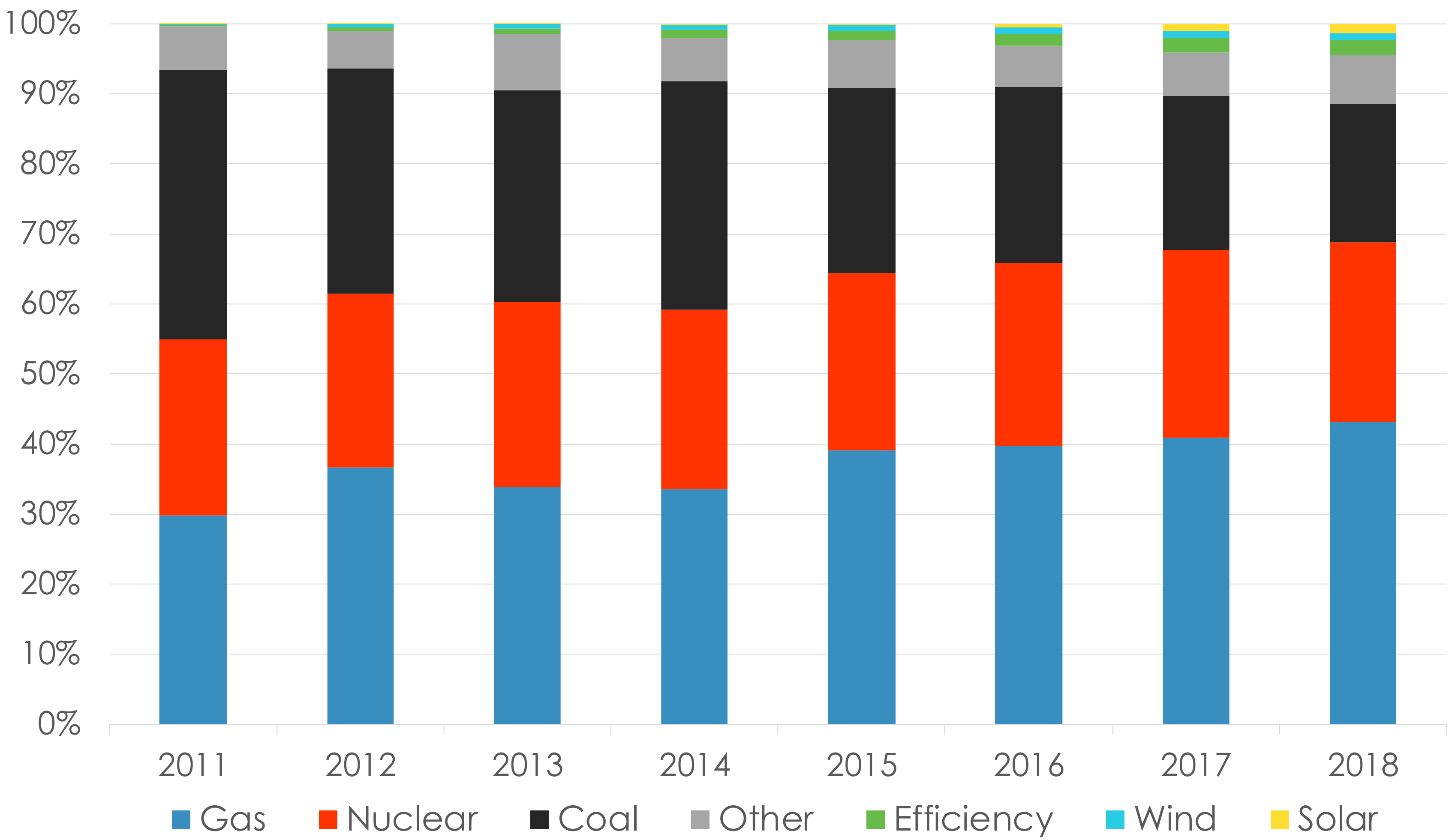


OPERATING & PLANNED CAPACITY BY YEAR BUILT



HISTORICAL RESOURCE MIX

PERCENTAGE OF SOUTHEAST GENERATION BY RESOURCE



UTILITY PLANS SHAPE THE RESOURCE MIX

Resource mix, or the combination of resources that provide power, varies from state to state and utility to utility. At a regional level, 90-95% of generation has historically come from fossil gas, coal, and nuclear.

CAN SOLAR REPLACE GAS?

In 2012, the top fuel for power generation in the Southeast shifted from coal to fossil gas. While the *current Southeast* resource mix is primarily from fossil fuels, solar has doubled its contribution to the resource mix every year for the past four years. Still, only 2-3% of Southeast power generation comes from renewables, and efficiency, in comparison to 10% across the U.S, showing there is room for improvement.