

# Landscape of Energy and Climate in S.C.

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*Chris Carnevale  
Southern Alliance for Clean Energy  
April 14, 2021*





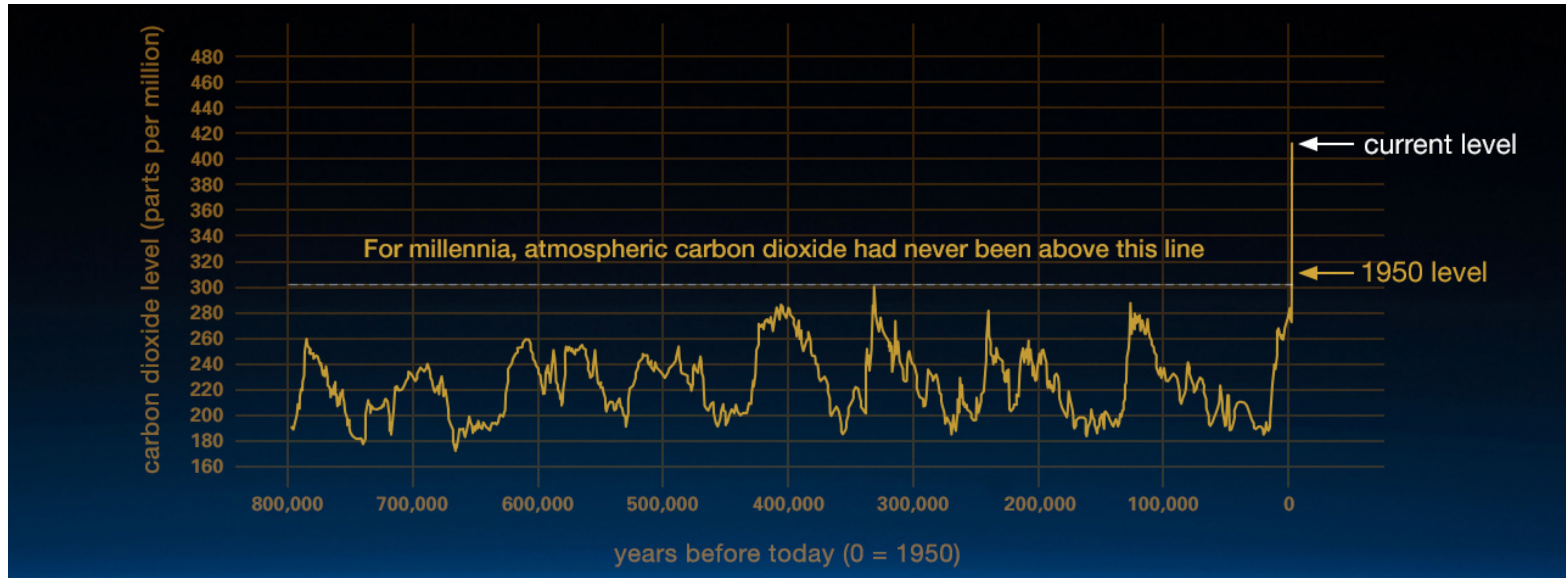
# ABOUT US

The Southern Alliance for Clean Energy promotes responsible and equitable energy choices to ensure clean, safe, and healthy communities throughout the Southeast.

# OUTLINE

- I. Confronting the climate crisis
  - II. Are we on track?
- III. Clean energy opportunities in U.S.A. and S.C.
- IV. Questions

# UNPRECEDENTED CO<sub>2</sub>

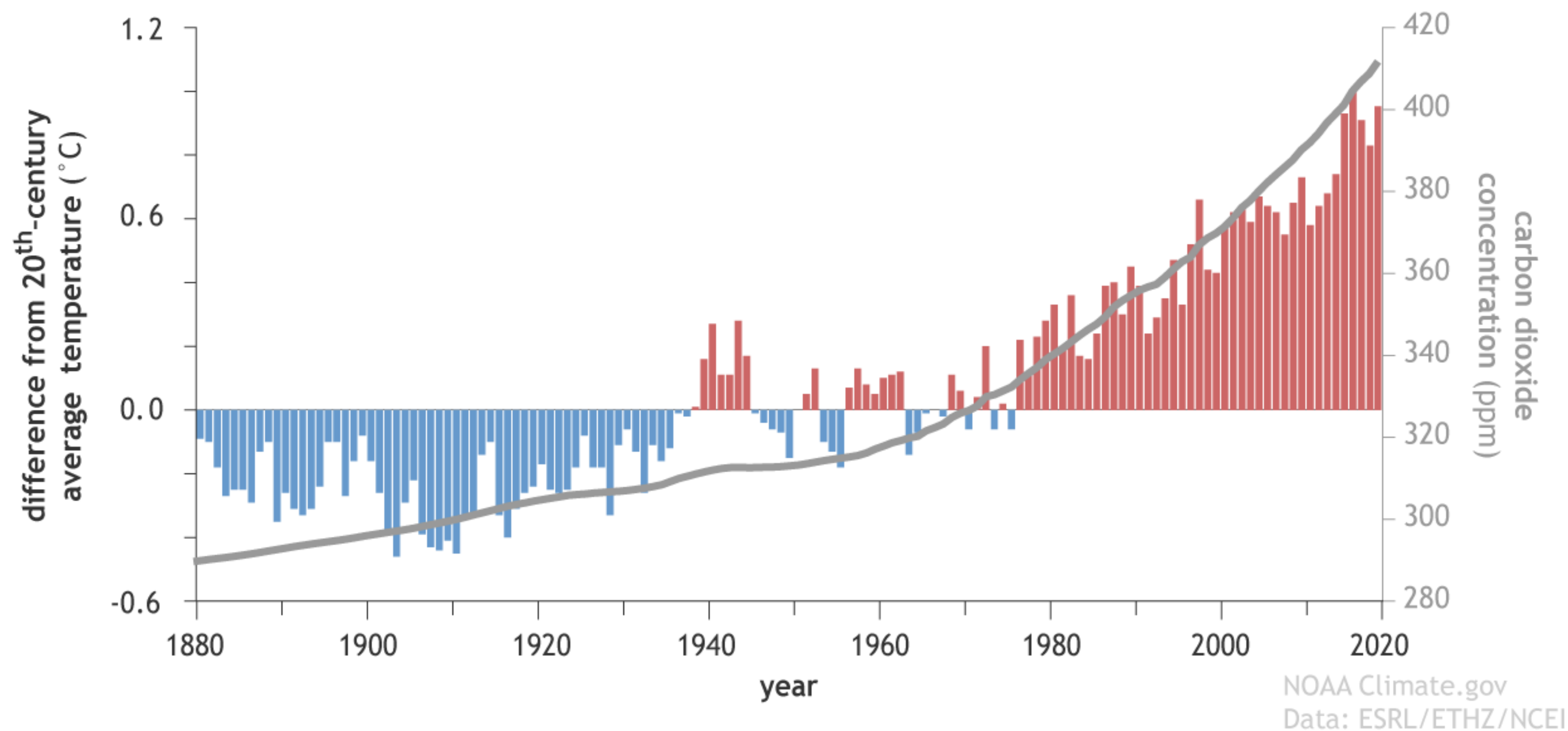


Source: NASA. "Vital Signs of the Planet." <https://climate.nasa.gov/evidence/>



# CO<sub>2</sub> & WARMING

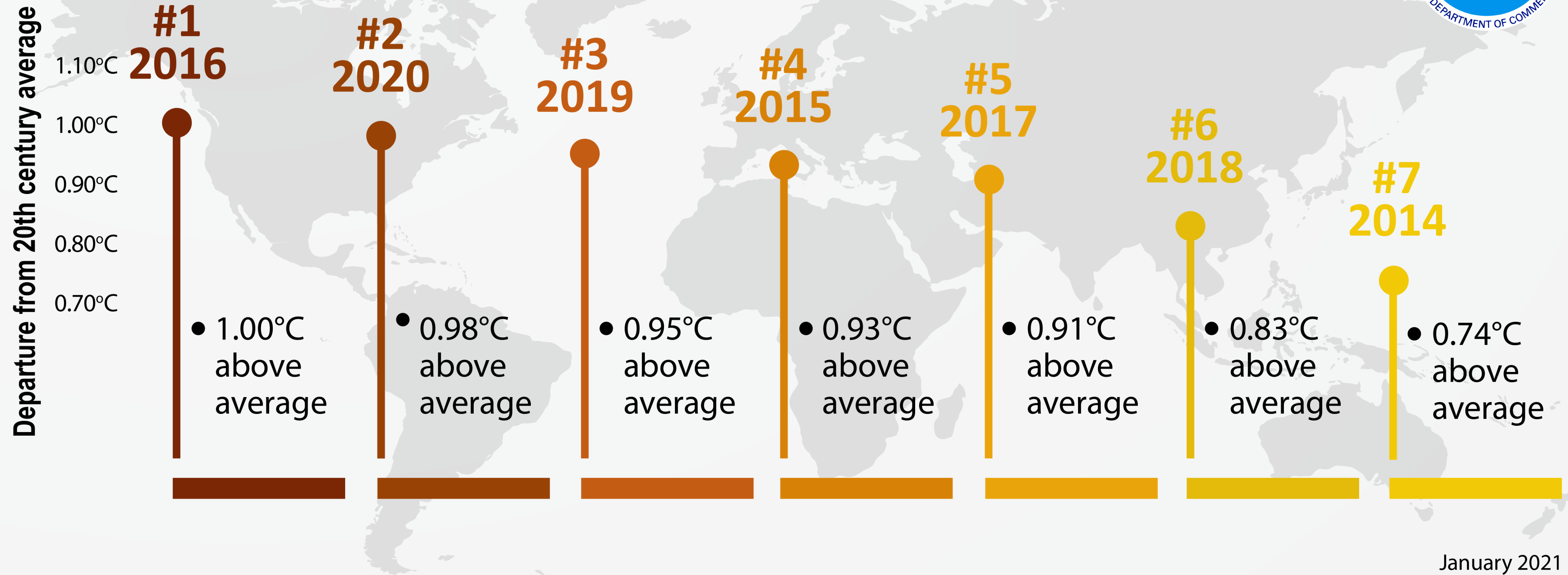
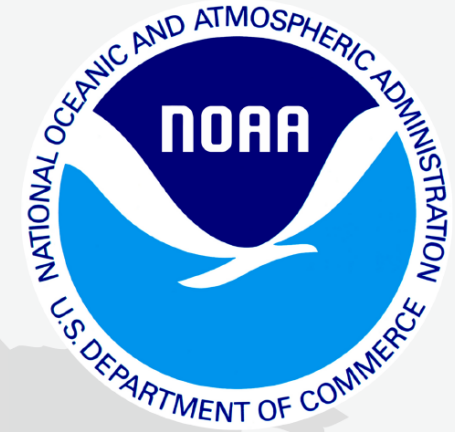
Atmospheric carbon dioxide and Earth's surface temperature (1880-2019)



**Source:** NOAA Climate.gov. <https://www.climate.gov/news-features/climate-qa/if-carbon-dioxide-hits-new-high-every-year-why-isn't-every-year-hotter-last>



# LAST 7 YEARS RANK AS TOP 7 HOTTEST



**Source:** Barbara Ambrose, NOAA National Centers for Environmental Information.  
<https://www.ncei.noaa.gov/news/projected-ranks>



# GLOBAL WARMING & POLLUTION IMPACTS ON SOUTHEAST

Heat effects on health and quality of life

Sea level rise

Heavy precipitation

Stronger hurricanes

Spread of disease vectors

Ocean acidification

And more



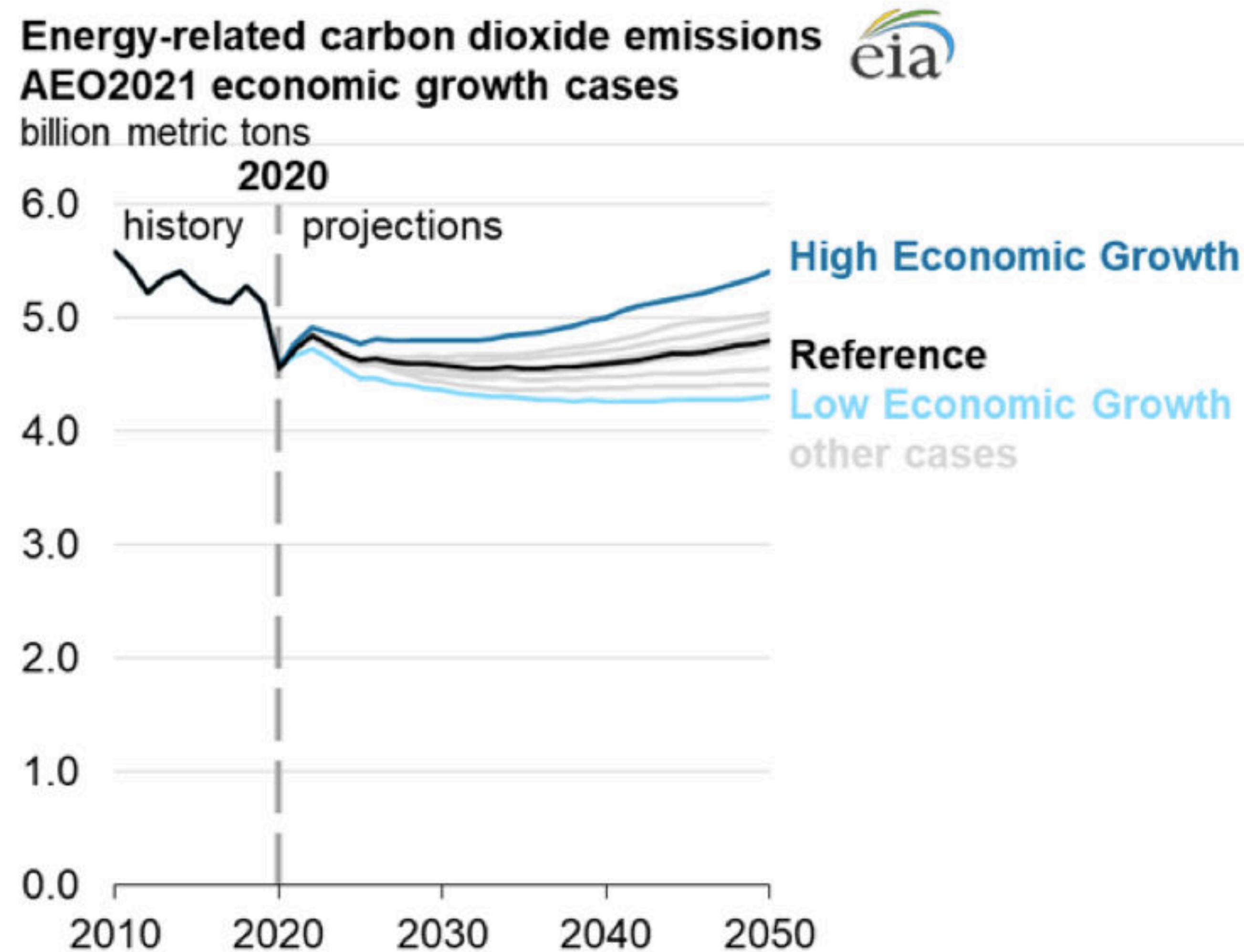
# THE IMPORTANCE OF 1.5° C

|  | 1.5°                      | 2°                       |
|--|---------------------------|--------------------------|
| Extreme Heat (Global population exposed to severe heat at least once every five years)   | 14%                       | 37%                      |
| Coral Reef Decline   | 70-90%                    | 99%                      |
| Ecosystem Shift (Amount of Earth's land area where ecosystems will shift to a new biome) | 7%                        | 13%                      |
| Insect Species Habitat Loss (species that lose at least half of their range)             | 6%                        | 18%                      |
| Sea Ice-Free Arctic (Number of ice-free summers)   | At least once per century | At least once per decade |

**Source:** Kelly Levin, World Resources Institute. "8 Things You Need to Know About the IPCC 1.5°C Report." October 7, 2018. <https://www.wri.org/blog/2018/10/8-things-you-need-know-about-ipcc-15-c-report>



# ARE WE ON TRACK AS A NATION?

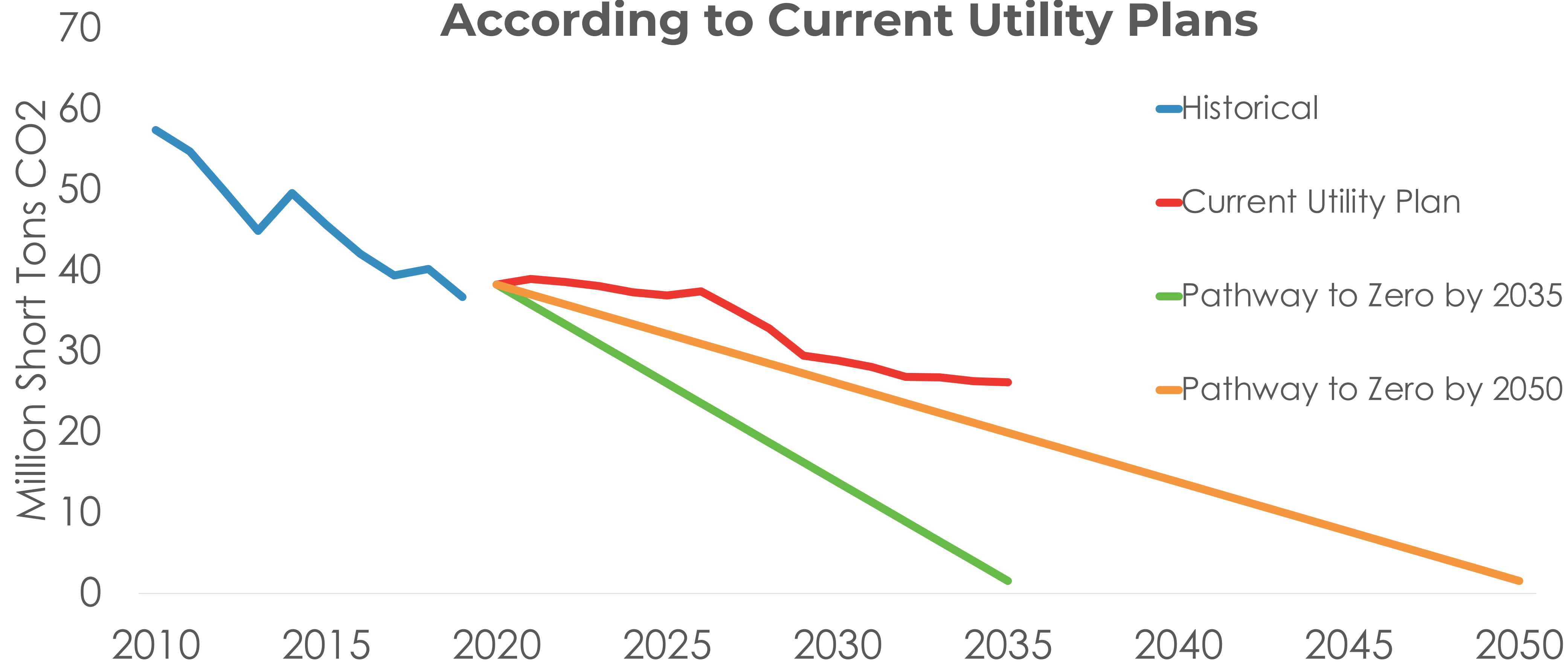


**Source:** U.S. Energy Information Administration. *Annual Energy Outlook 2021 Narrative*. Figure 4.



# ARE WE ON TRACK AS A STATE?

## South Carolina Annual CO<sub>2</sub> Emissions According to Current Utility Plans

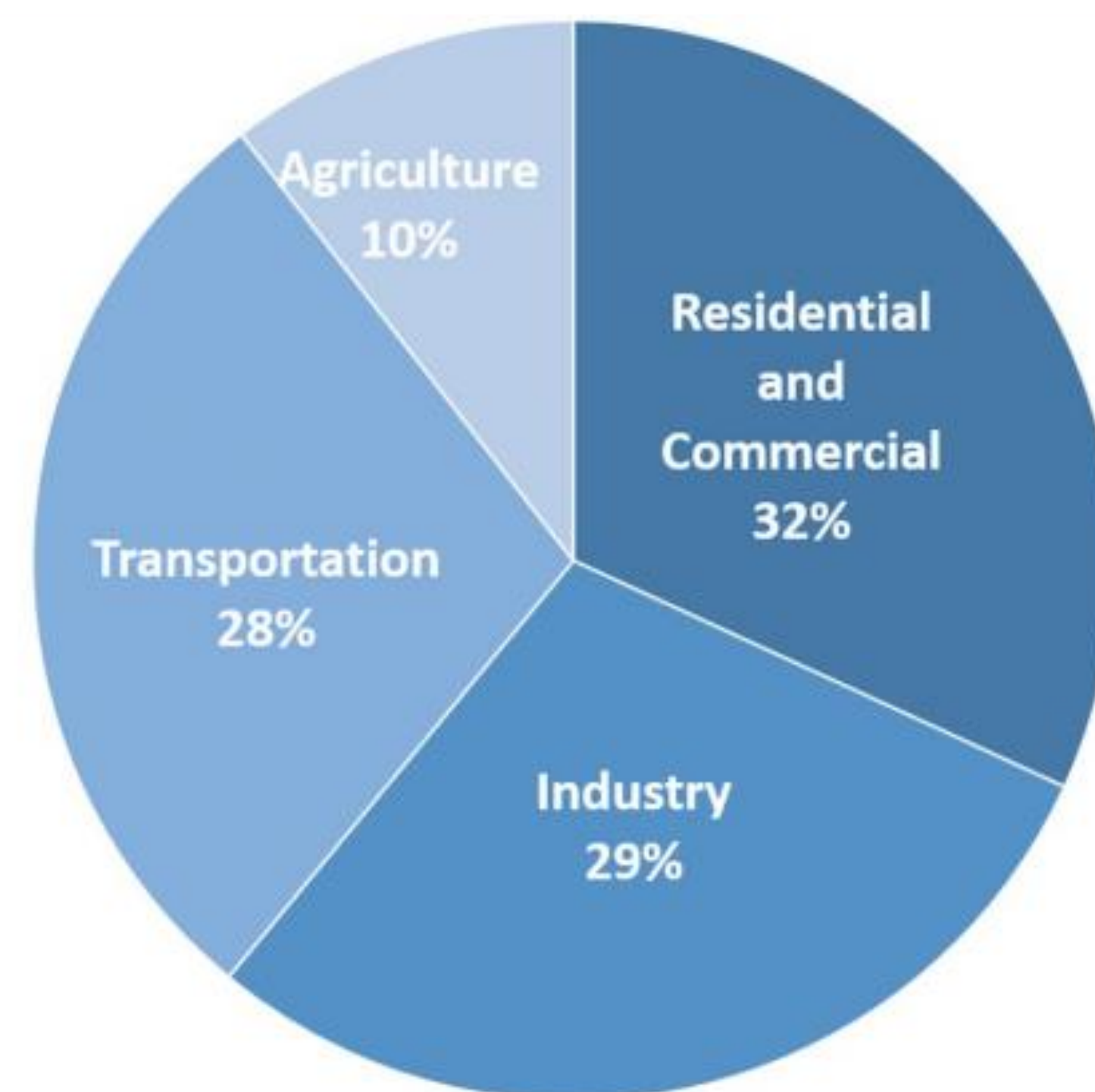
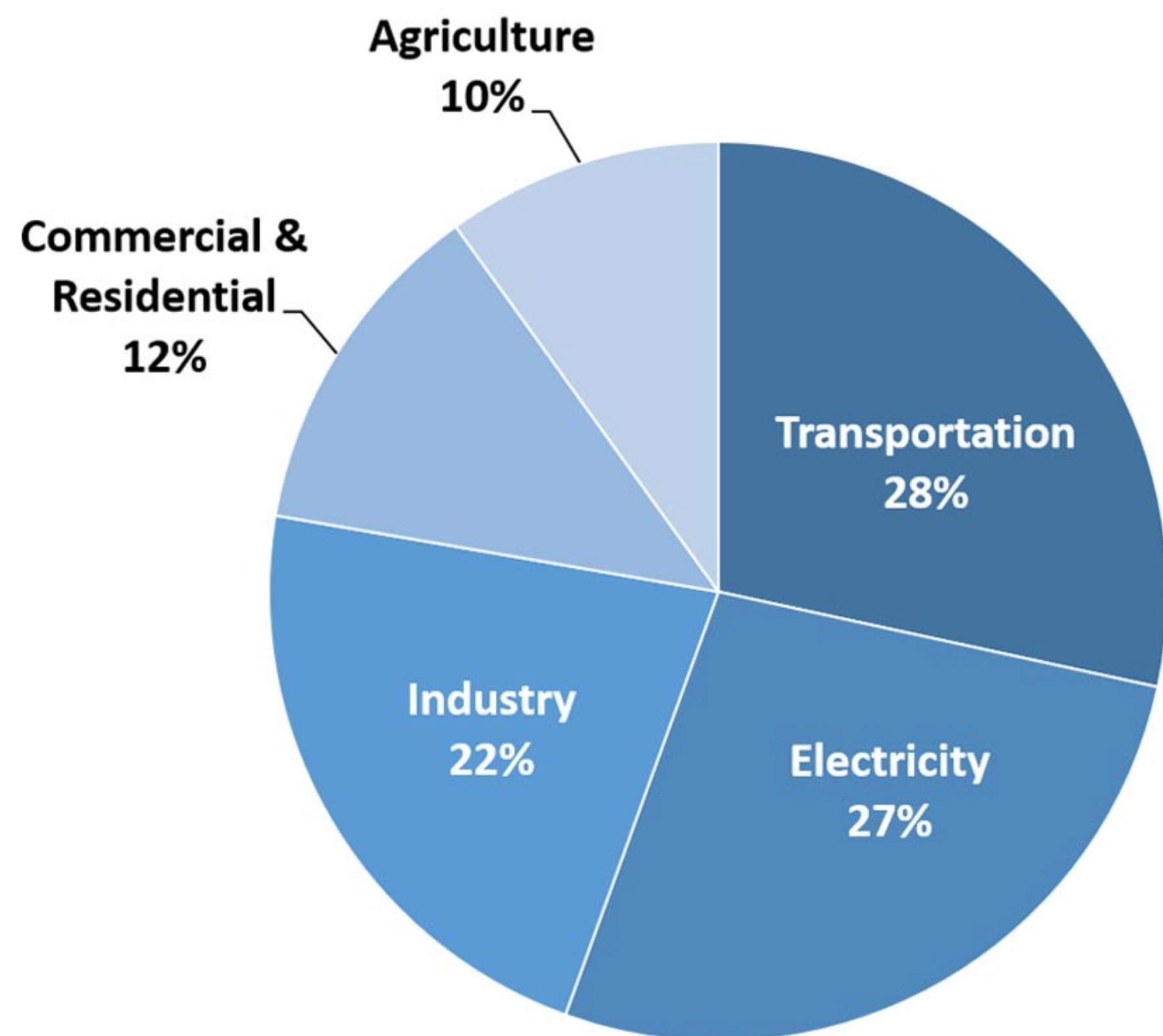


**Source:** Data from Southern Alliance for Clean Energy (2021). *Tracking Decarbonization in the Southeast: Generation + CO<sub>2</sub> Emissions Report*.



# WHERE DOES CLIMATE CHANGE POLLUTION COME FROM IN U.S.?

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2018



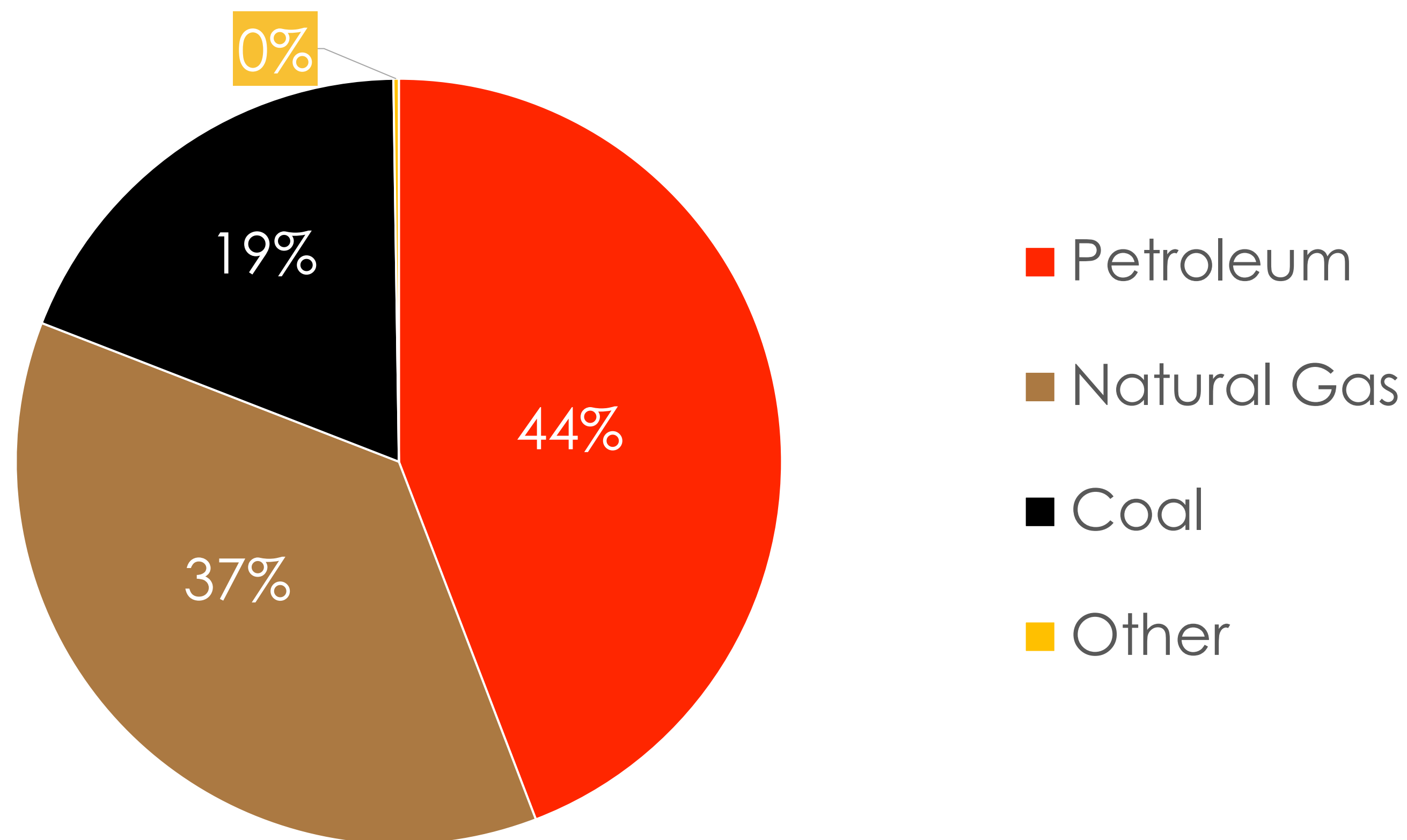
With electricity distributed

**Source:** U.S. Environmental Protection Agency (2020). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018.



# WHERE DOES CLIMATE CHANGE POLLUTION COME FROM IN U.S.?

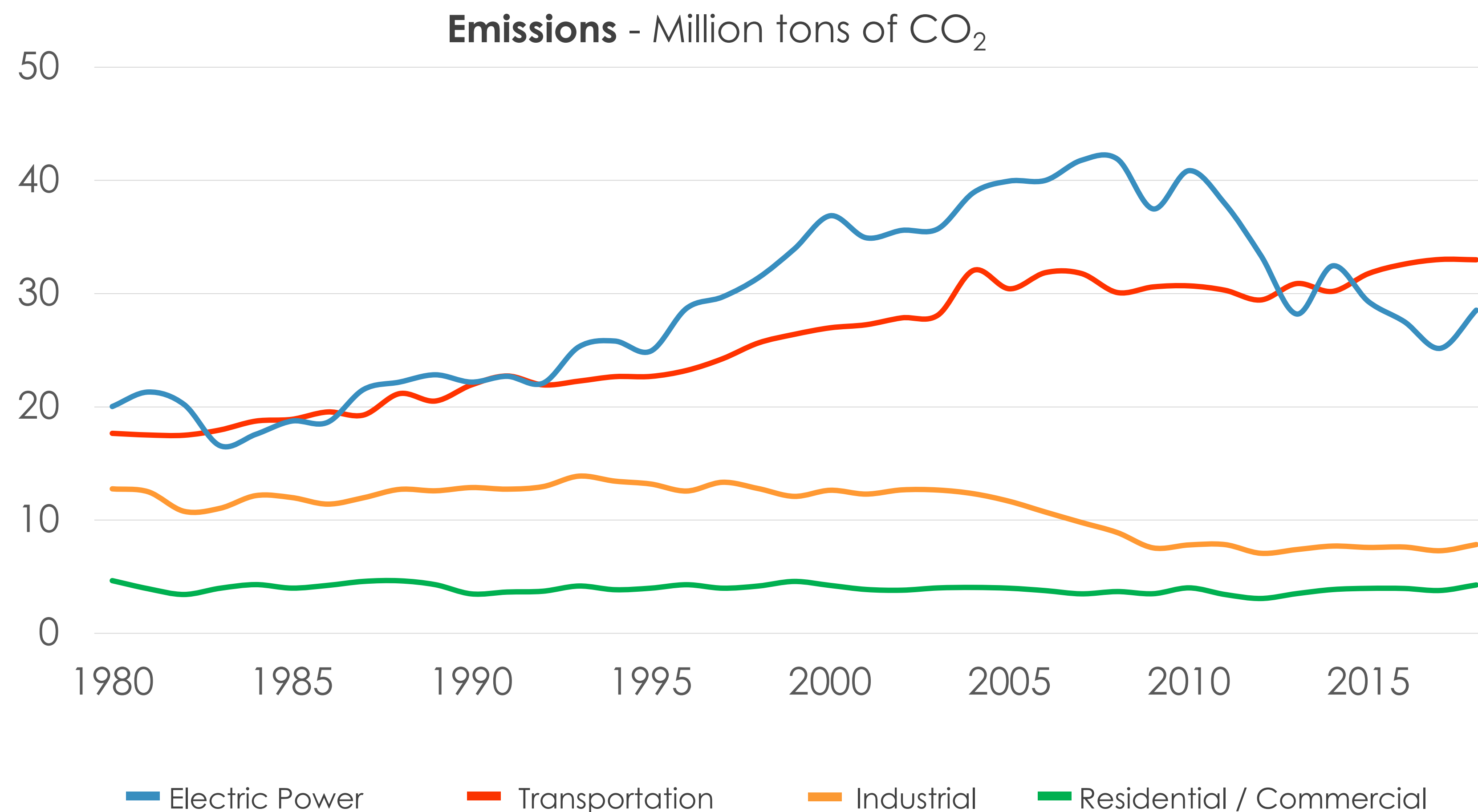
## U.S. 2020 Carbon Dioxide Emissions by Fuel, Estimated



**Source:** U.S. Energy Information Administration. *Annual Energy Outlook 2021*. Table 18. Energy-Related Carbon Dioxide Emissions by Sector and Source. Case: Reference case.



# WHERE DOES CLIMATE CHANGE POLLUTION COME FROM IN S.C.?



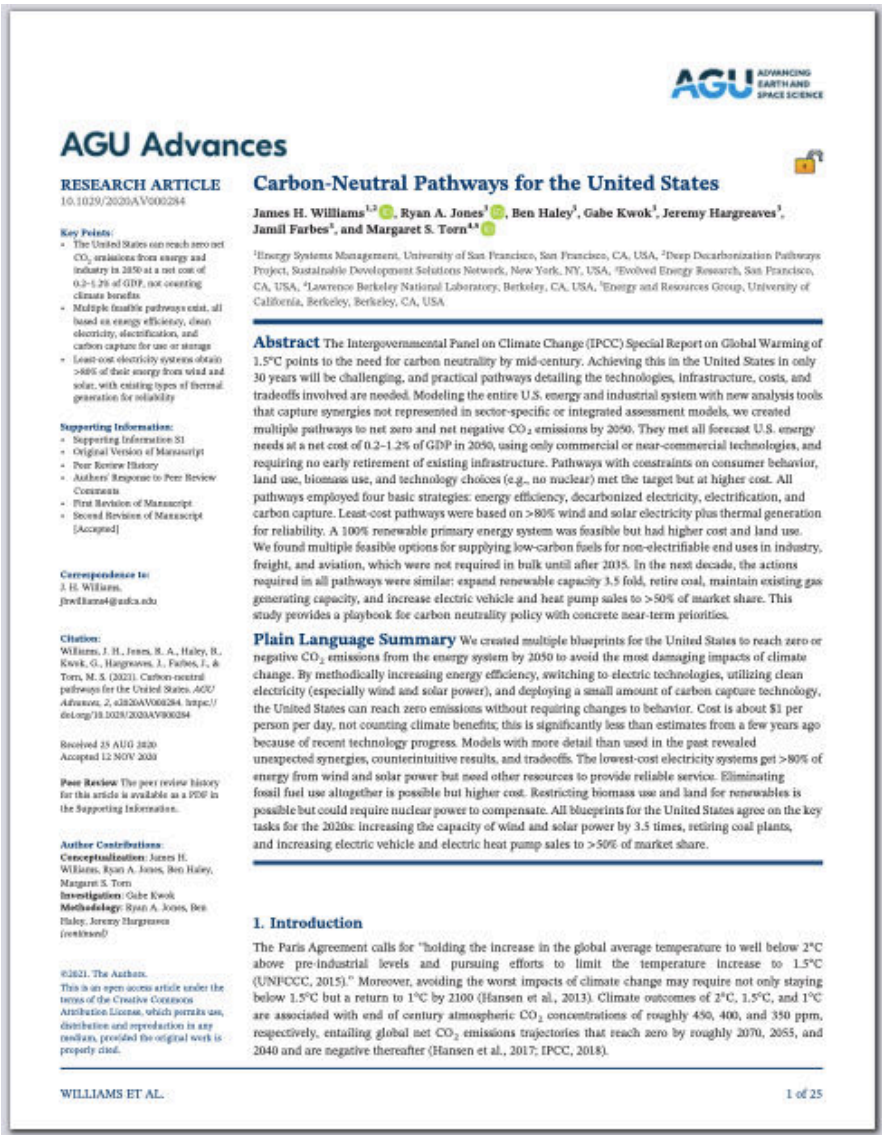
## In 2018:

|                          |     |
|--------------------------|-----|
| Transportation           | 45% |
| Electric Power           | 39% |
| Industrial               | 11% |
| Commercial & Residential | 6%  |

**Sources:** • Southern Alliance for Clean Energy (2021). *Tracking Decarbonization in the Southeast: Generation + CO<sub>2</sub> Emissions Report*.  
 • U.S. Energy Information Administration (March 2021). "2018 State energy-related carbon dioxide emissions by sector."



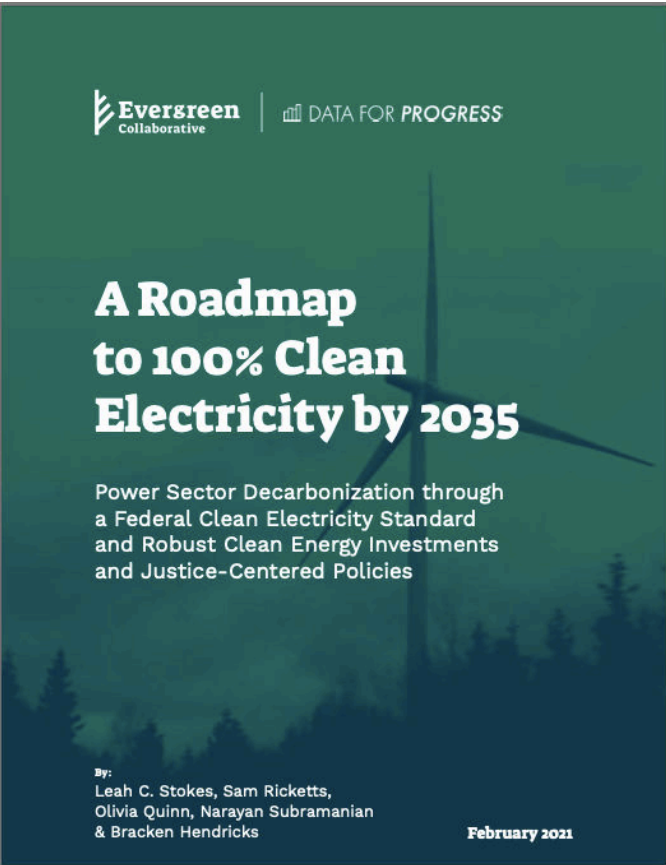
# CAN WE DO IT? CAN WE AFFORD IT?



Lawrence Berkeley National Laboratory/University of San Francisco/Evolved Energy Research



Princeton University



Evergreen Collaborative/Data For Progress



U.C. Berkeley

**Sources:** • Williams et al. (2021). "Carbon-neutral pathways for the United States." *AGU Advances*, 2, e2020AV000284. • Princeton University (2020). *Net-Zero America: Potential Pathways, Infrastructure, and Impacts*. • Goldman School of Public Policy, U.C. Berkeley (2020). *Plummeting Solar, Wind, and Battery Costs Can Accelerate our Clean Electricity Future*. • Evergreen Collaborative and Data For Progress. *A Roadmap to 100% Clean Electricity by 2035*.





# SOLAR AND WIND ARE CHEAP

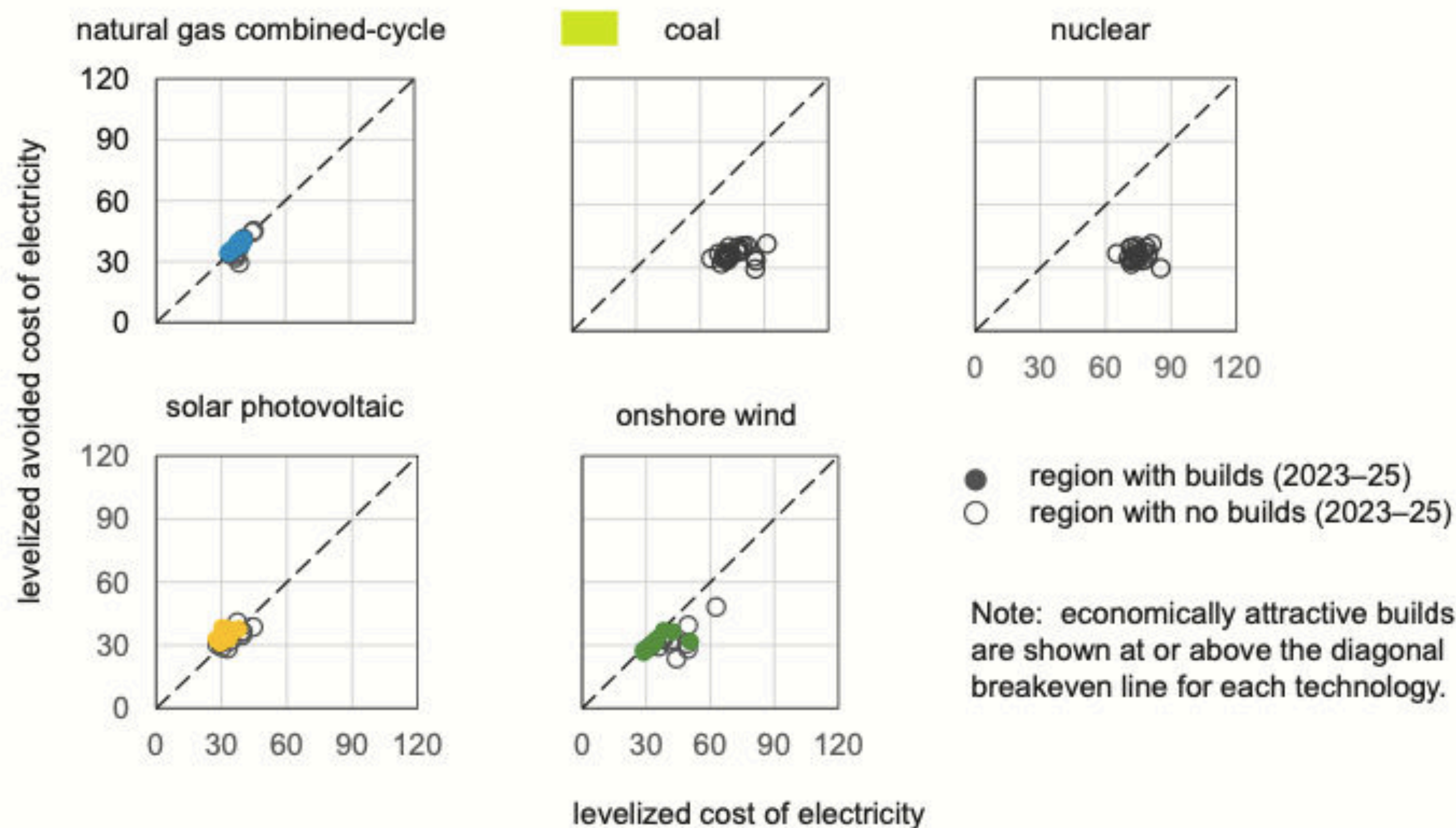
## Cost of Electricity from New Generation Sources

| Technology                      | Cost per megawatt-hour<br>(unsubsidized) |
|---------------------------------|--|
| Solar                           | \$31.30                                  |
| Wind, Onshore                   | \$31.45                                  |
| Natural Gas, Combined Cycle     | \$34.51                                  |
| Solar-Battery Hybrid            | \$45.13                                  |
| Natural Gas, Combustion Turbine | \$107.83                                 |
| Offshore Wind                   | \$115.04                                 |
| Nuclear                         | Not Built                                |
| Coal                            | Not Built                                |

**Source:** U.S. Energy Information Administration (2021). *Levelized Costs of New Generation Resources in the Annual Energy Outlook 2021*, Table 1a: Estimated capacity-weighted levelized cost of electricity (LCOE) and levelized cost of storage (LCOS) for new resources entering service in 2026 (2020 dollars per MWh).

# SOLAR AND WIND ARE VALUABLE

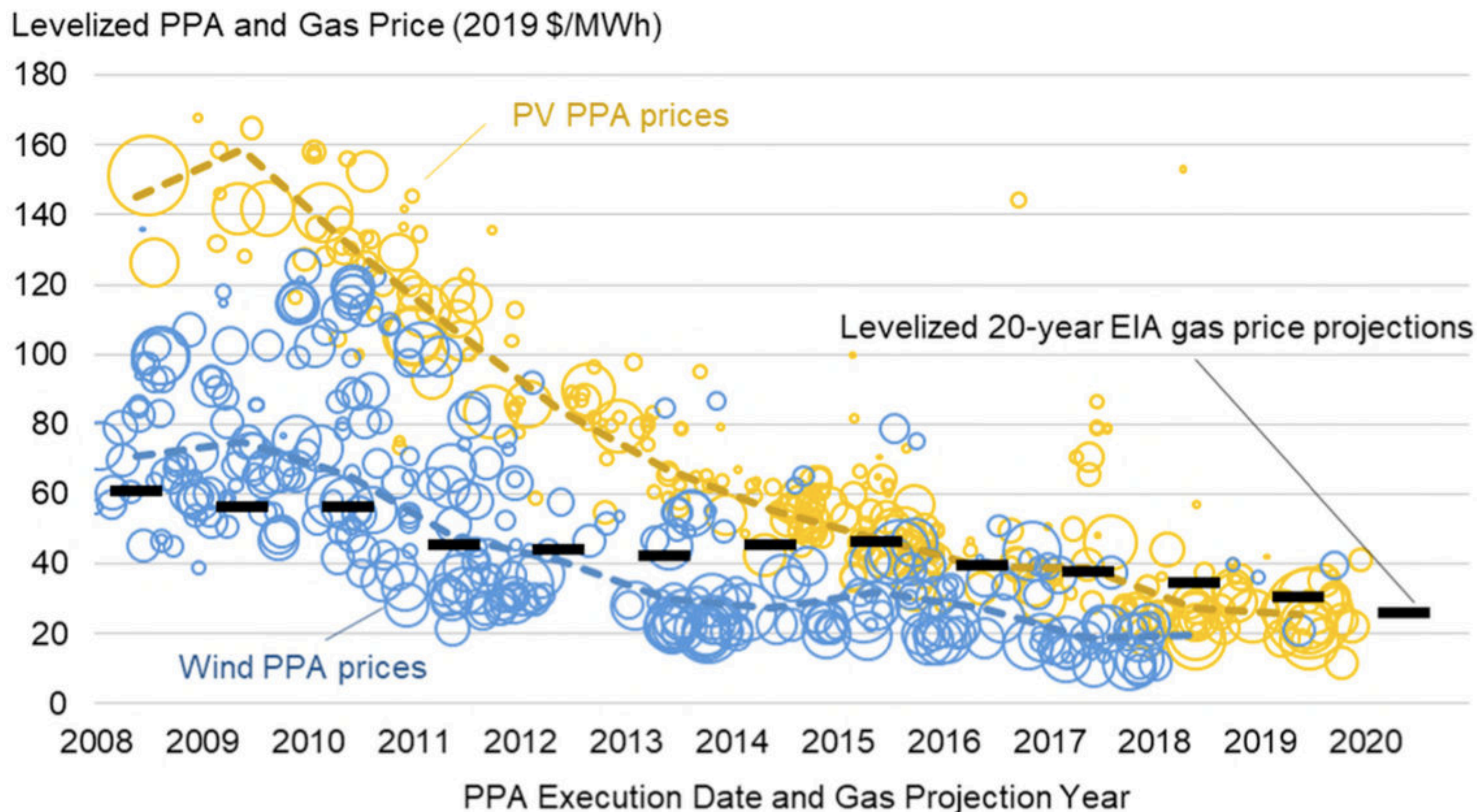
AEO2020 levelized cost of electricity and levelized avoided cost of electricity by technology and region, 2025  
2019 dollars per megawatthour



Source: U.S. Energy Information Administration (2020). *Annual Energy Outlook 2020*, p. 75.



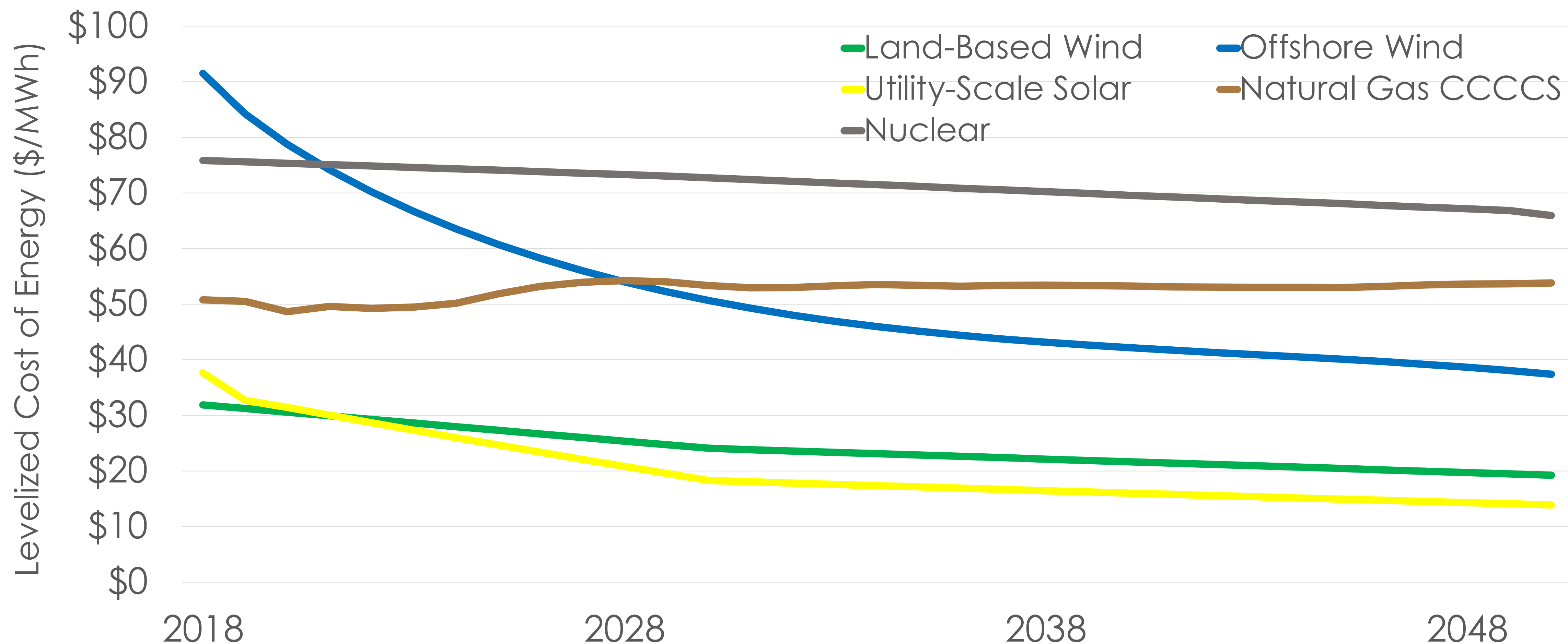
# SOLAR AND WIND HAVE GOTTEN CHEAPER



**Source:** Wiser et al., Lawrence Berkeley National Laboratory (2020). *Wind Energy Technology Data Update: 2020 Edition*. p. 70.



# SOLAR AND WIND WILL GET EVEN CHEAPER



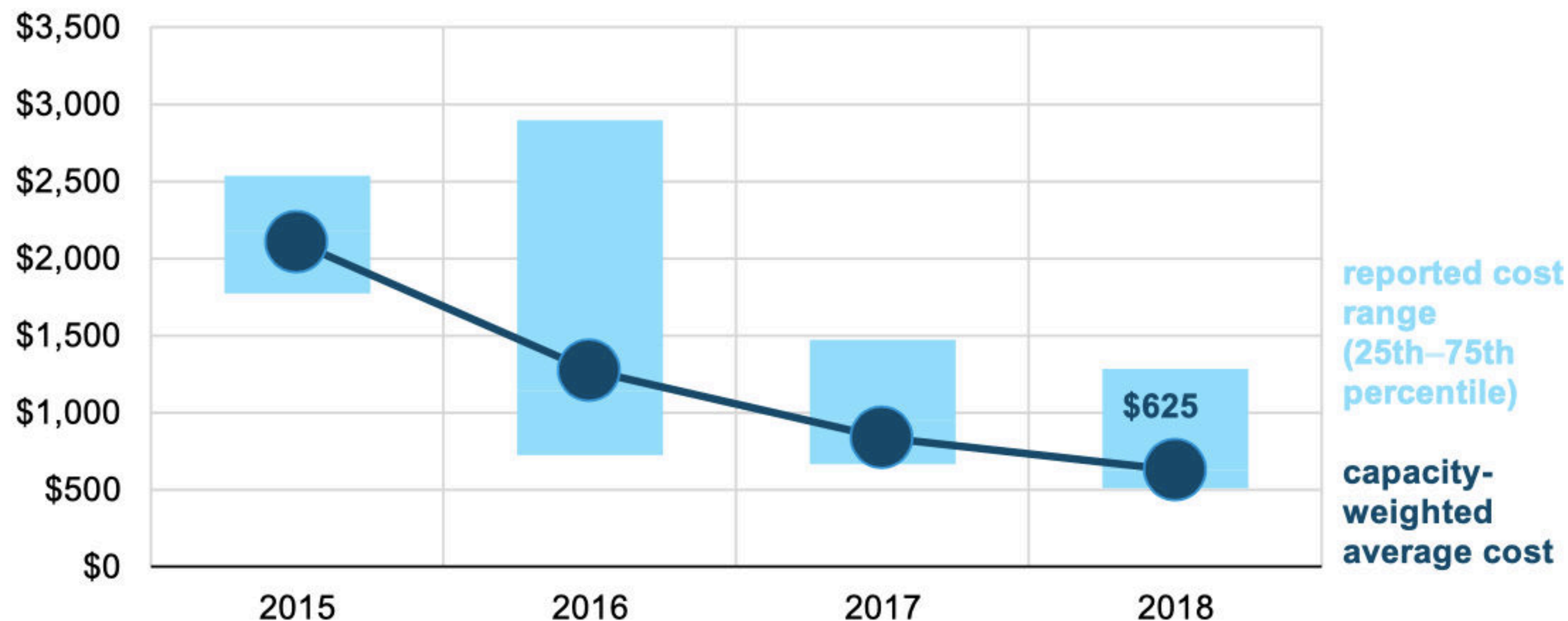
**Source:** NREL (National Renewable Energy Laboratory) (2020). "2020 Annual Technology Baseline." Golden, CO: National Renewable Energy Laboratory. <https://atb.nrel.gov/>. These data are the ATB "moderate" technology innovation scenario and "R&D Only" financial assumptions case.



# BATTERIES HAVE GOTTEN CHEAPER

## U.S. average installed utility-scale battery storage cost (2015–2018)

dollars per kilowatthour



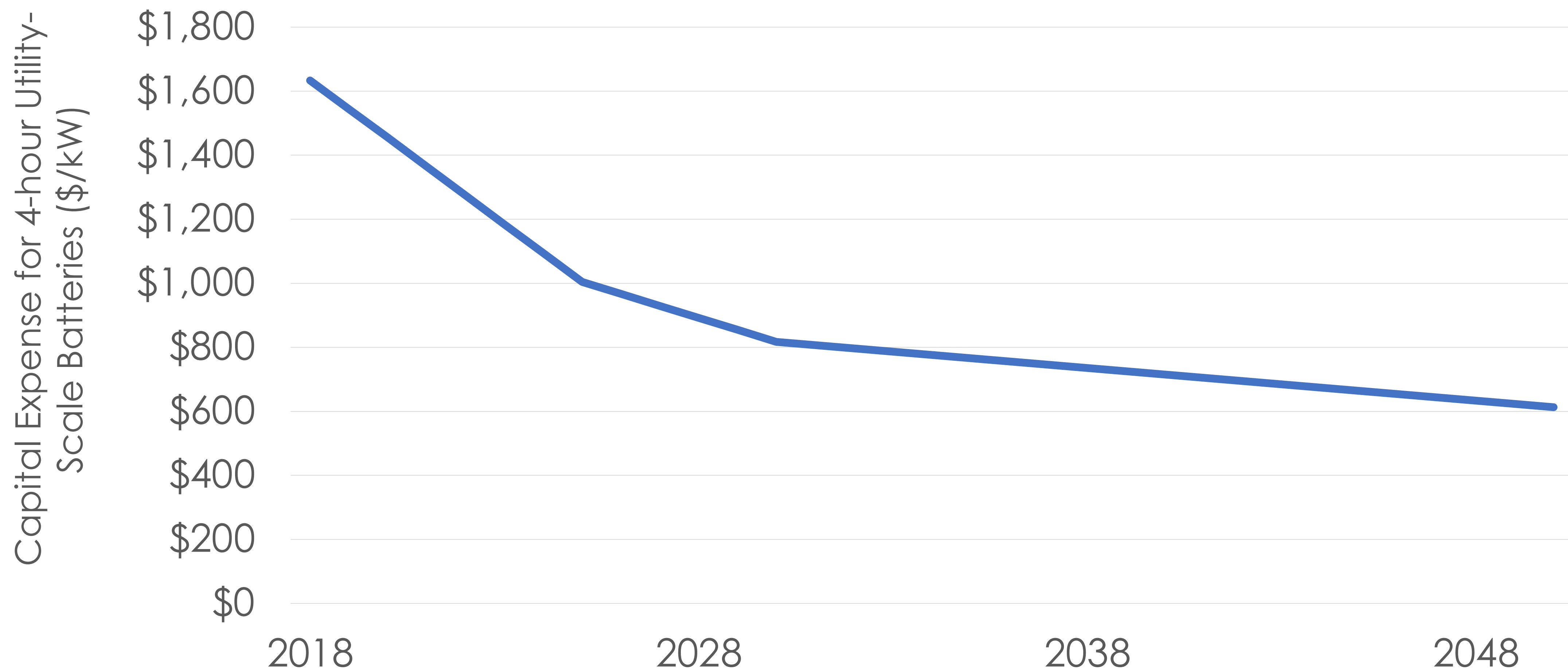
Source: U.S. Energy Information Administration, *Annual Electric Generator Report*

Note: Only includes capacity with available cost data. Puerto Rico is excluded.

**Source:** U.S. Energy Information Administration (October 23, 2020). "Utility-scale battery storage costs decreased nearly 70% between 2015 and 2018."

<https://www.eia.gov/todayinenergy/detail.php?id=45596>

# BATTERIES WILL GET EVEN CHEAPER

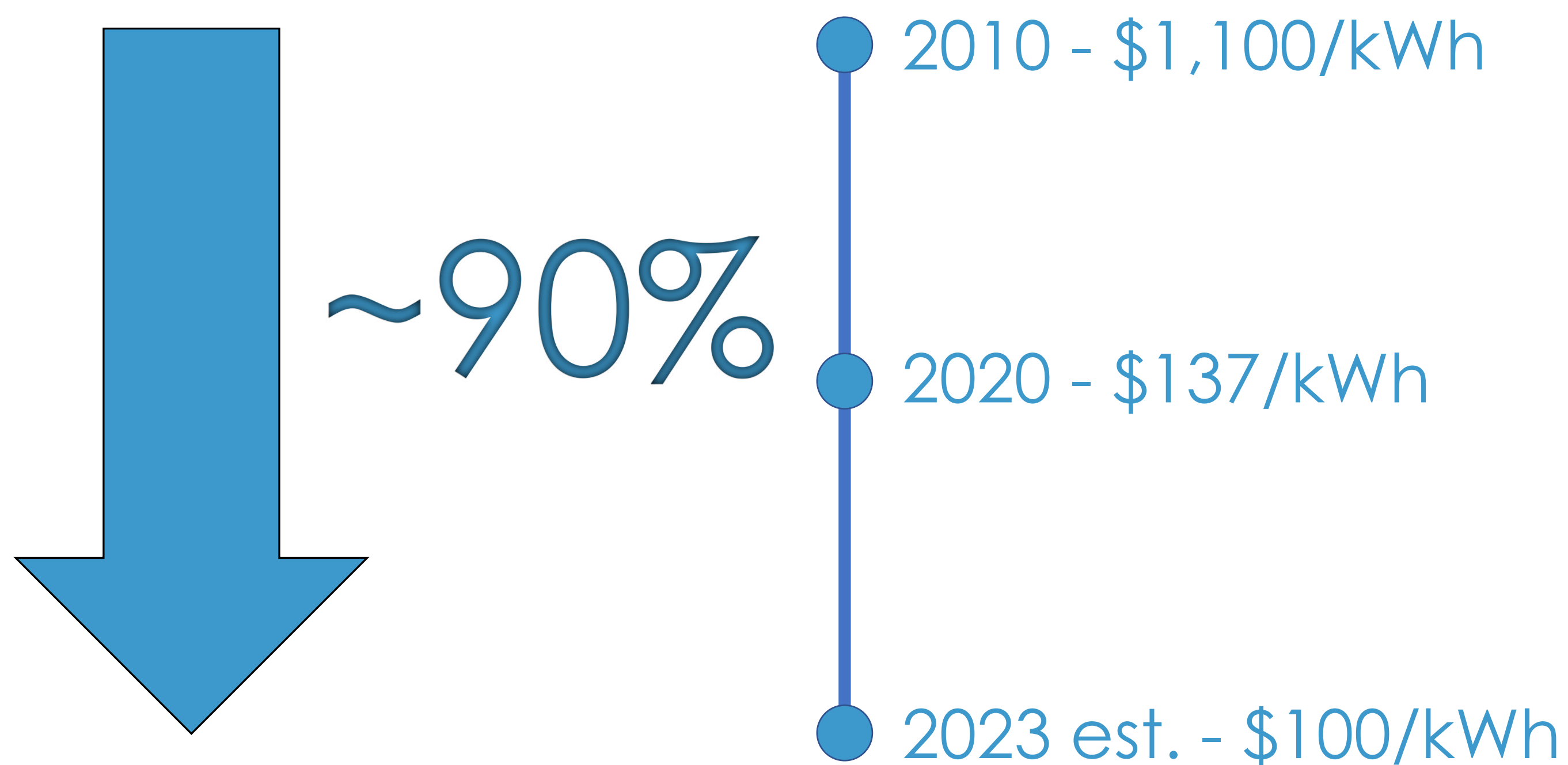


**Source:** NREL (National Renewable Energy Laboratory) (2020). "2020 Annual Technology Baseline." Golden, CO: National Renewable Energy Laboratory. <https://atb.nrel.gov/>. These data are the ATB "moderate" technology innovation scenario.



# ELECTRIC VEHICLES ARE GETTING CHEAPER

## EV Battery Pack Price

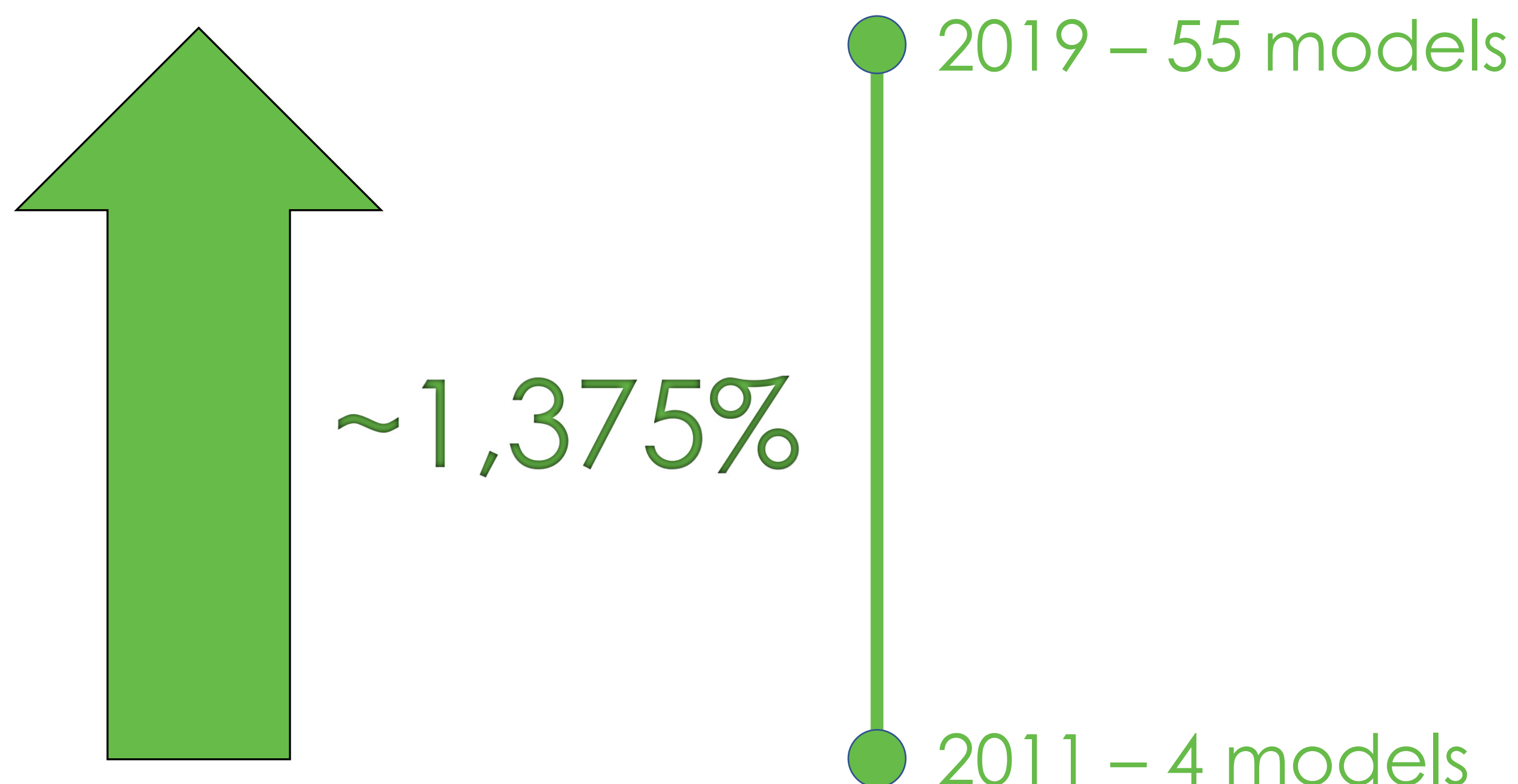


**Source:** BloombergNEF (December 16, 2020). "Battery Pack Prices Cited Below \$100/kWh for the First Time in 2020, While Market Average Sits at \$137/kWh." <https://about.bnef.com/blog/battery-pack-prices-cited-below-100-kwh-for-the-first-time-in-2020-while-market-average-sits-at-137-kwh/>



# ELECTRIC VEHICLES ARE BECOMING MORE AVAILABLE

## Passenger EV Models Available in U.S.



**Source:** U.S. Department of Energy Alternative Fuels Data Center (2020). "U.S. Plug-in Electric Vehicle Sales by Model." <https://afdc.energy.gov/data/10567>



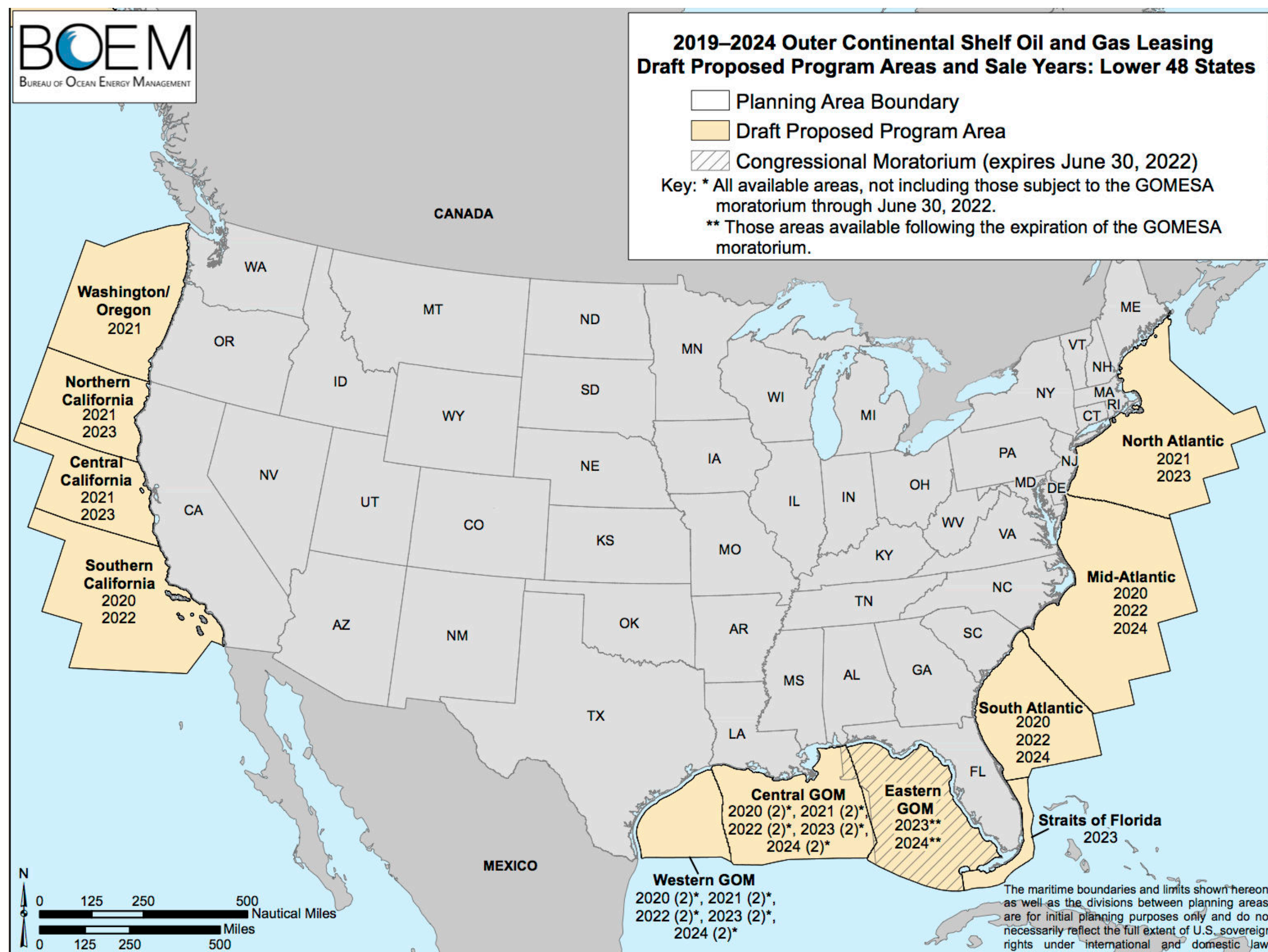
# ELECTRIC VEHICLES ARE GETTING CLEANER

## EV Emissions MPG Equivalence in S.C.

| 2019    | 2030     |
|---------|----------|
| 89 MPGe | 144 MPGe |

**Source:** Southern Alliance for Clean Energy (2021). *Tracking Decarbonization in the Southeast: Generation + CO2 Emissions Report*.

# ELECTRIC VEHICLES CAN REPLACE OFFSHORE DRILLING

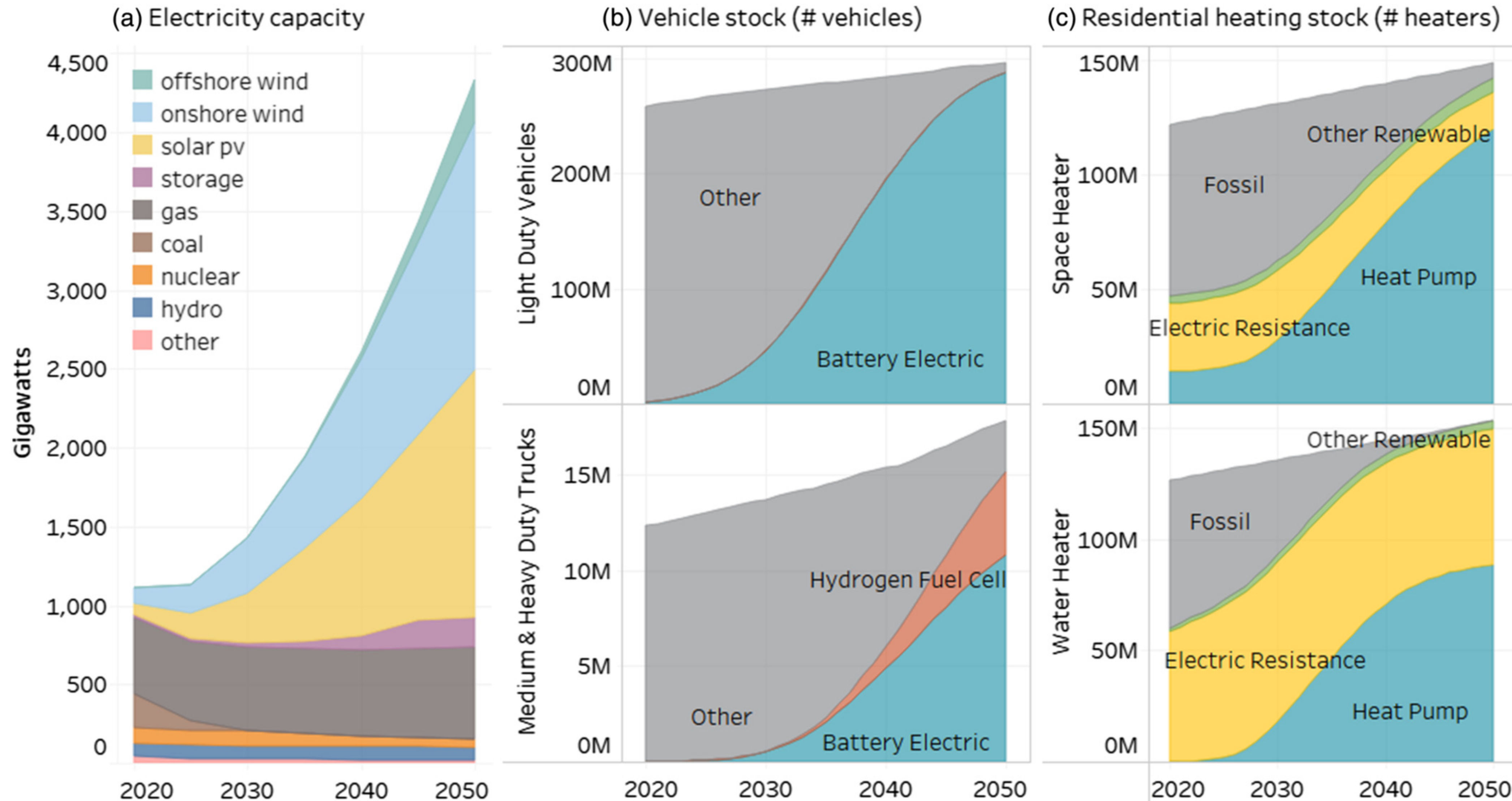


**18-48 million EVs  
nationwide can  
reduce gasoline  
demand equal to  
the potential  
production from  
the Atlantic,  
Pacific, and Eastern  
Gulf of Mexico**

**Sources:** • U.S. Bureau of Ocean Energy Management (January 2018). "2019-2024 Outer Continental Shelf Oil and Gas Leasing Draft Proposed Program Areas and Sale Years: Lower 48 States." • Southern Alliance for Clean Energy (May 2020). "Can Electric Vehicles Replace New Offshore Drilling?"



# WHAT COULD NET-ZERO LOOK LIKE?



**Source:** Williams et al. (2021). "Carbon-neutral pathways for the United States." *AGU Advances*, 2, e2020AV000284. <https://doi.org/10.1029/2020AV000284>

# WHAT COULD NET-ZERO LOOK LIKE?

Better health and saved lives

Jobs for hundreds of thousands of people

Improved economy

Preservation of treasures places and species

Global leadership



# ENERGY EFFICIENCY IN S.C.

## SOUTH CAROLINA ENERGY SAVED IN 2019 AS A % OF ANNUAL SALES

| UTILITY                       | % OF SALES   |
|-------------------------------|--------------|
| DUKE ENERGY CAROLINAS         | 0.98%        |
| DUKE ENERGY PROGRESS          | 0.87%        |
| <b>SOUTH CAROLINA AVERAGE</b> | <b>0.41%</b> |
| DOMINION ENERGY               | 0.32%        |
| <b>SOUTHEAST AVERAGE</b>      | <b>0.26%</b> |
| SANTEE COOPER                 | 0.07%        |

## PERFORMANCE OF REGIONS

| REGION            | % OF SALES   |
|-------------------|--------------|
| NORTHEAST         | 2.15%        |
| WEST-PACIFIC      | 0.87%        |
| MIDWEST           | 0.97%        |
| WEST-MOUNTAIN     | 0.87%        |
| <b>SOUTHEAST</b>  | <b>0.26%</b> |
| <b>U.S. TOTAL</b> | <b>0.67%</b> |

**Source:** Southern Alliance for Clean Energy (January 2021). *Energy Efficiency in the Southeast, Annual Report*.



# SOLAR IN S.C.

## UTILITY-SCALE SOLAR, MW

| UTILITY               | 2019 | 2023         |
|-----------------------|------|--------------|
| DOMINION ENERGY SC    | 439  | <b>1,058</b> |
| SANTEE COOPER         | 6    | <b>597</b>   |
| DUKE ENERGY PROGRESS  | 372  | <b>576</b>   |
| DUKE ENERGY CAROLINAS | 359  | <b>544</b>   |

## DISTRIBUTED SOLAR, MW

| UTILITY               | 2019 | 2023       |
|-----------------------|------|------------|
| DOMINION ENERGY SC    | 126  | <b>247</b> |
| SANTEE COOPER         | 25   | <b>41</b>  |
| DUKE ENERGY PROGRESS  | 11   | <b>20</b>  |
| DUKE ENERGY CAROLINAS | 36   | <b>68</b>  |

- South Carolina's "Energy Freedom Act" (Act 62) passed unanimously in both chambers of the South Carolina General Assembly in 2019. This comprehensive solar bill will sustain all segments of the vibrant solar market in the state.
- Act 62 eliminates caps and extends retail net metering through mid-2021, thereby preserving value for customers with distributed/rooftop solar generation.

## SOLAR WATTS PER CUSTOMER

| UTILITY               | 2019  | 2023         |
|-----------------------|-------|--------------|
| DUKE ENERGY PROGRESS  | 2,343 | <b>3,622</b> |
| DOMINION ENERGY SC    | 807   | <b>1,809</b> |
| STATE AVERAGE         | 551   | <b>1,262</b> |
| DUKE ENERGY CAROLINAS | 681   | <b>1,029</b> |
| SOUTHEAST AVERAGE     | 325   | <b>819</b>   |
| SANTEE COOPER         | 31    | <b>664</b>   |

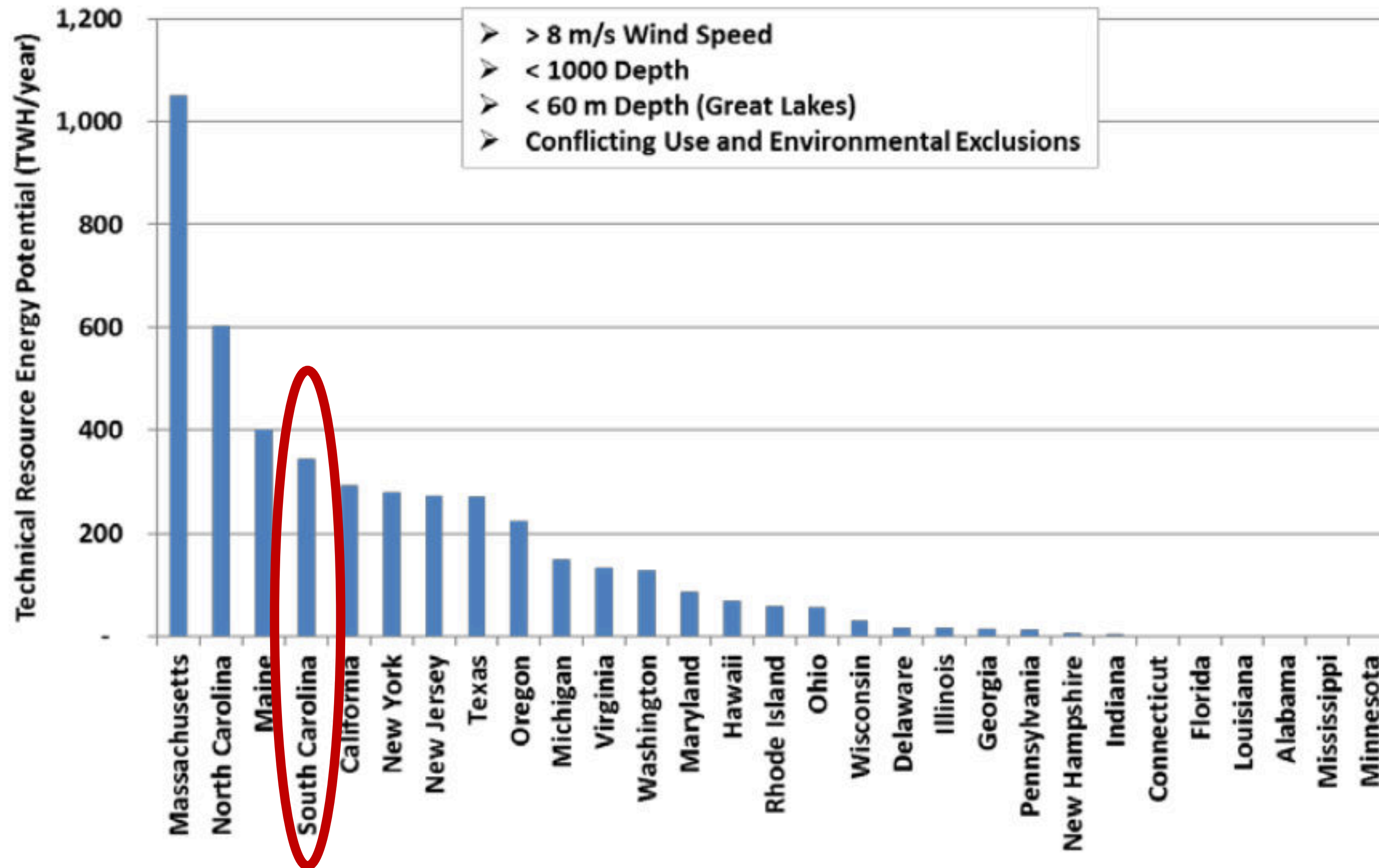


- Act 62 also ensures fair market access for developers of utility-scale solar projects. Across the spectrum, the Energy Freedom Act protects jobs for hard-working South Carolinians in this field, adding certainty to a healthy economic driver in the state.
- Equally important, the bill asserts that it is "the intent of the General Assembly to expand the opportunity to support solar energy and support access to solar energy options for all South Carolinians."
- DEP and DESC both earned the SunRiser designation for the third consecutive year.
- Each of the potential options for the future of Santee Cooper includes substantial solar expansion therefore, the SunBlocker designation no longer applies for that South Carolina utility.

**Source:** Southern Alliance for Clean Energy (2020). *Solar in the Southeast: 2020 Annual Report*, p. 19.

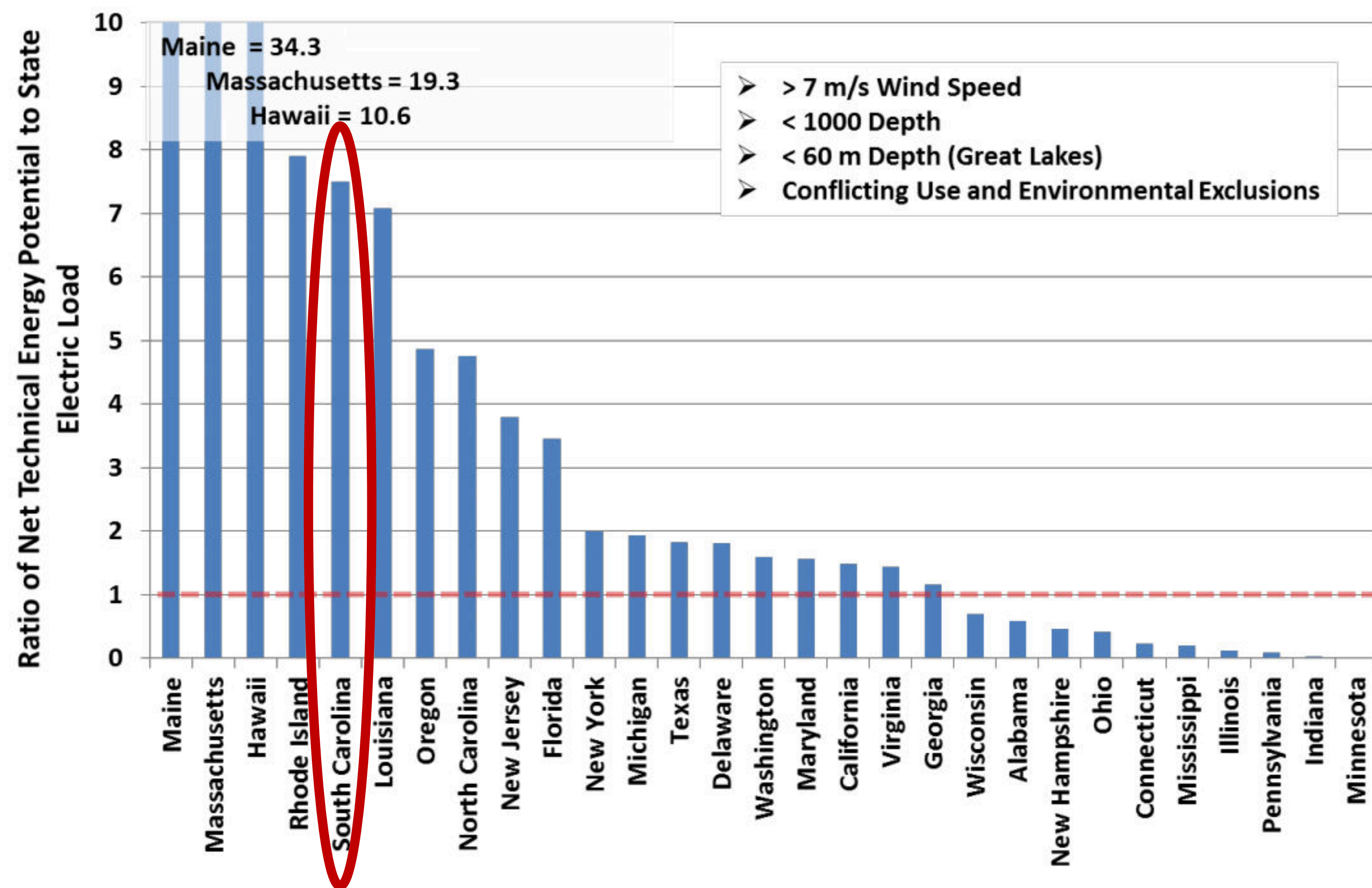


# OFFSHORE WIND POTENTIAL



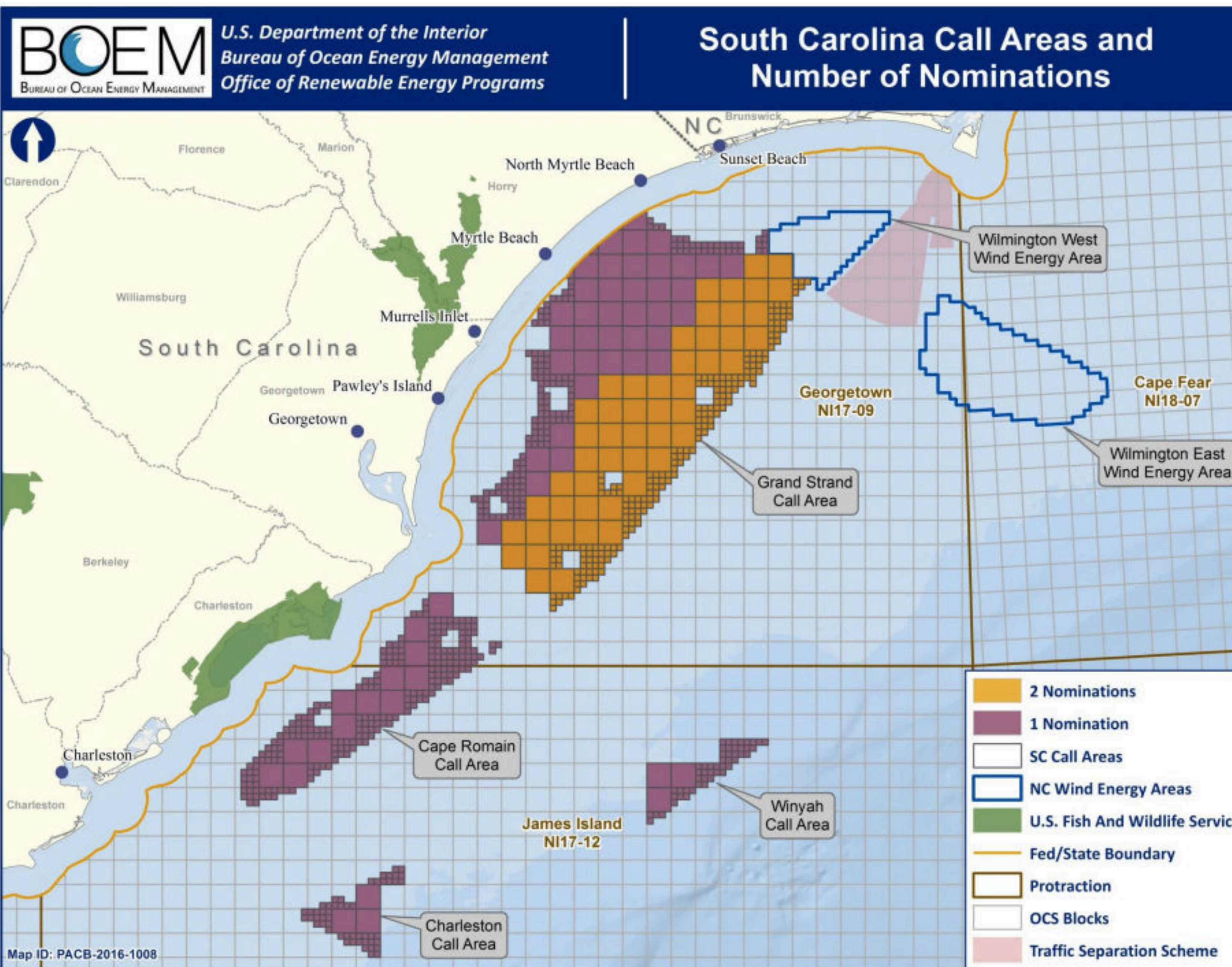
**Source:** Musial et al., National Renewable Energy Laboratory (2016). 2016 Offshore Wind Energy Resource Assessment for the United States.

# OFFSHORE WIND POTENTIAL



**Source:** Musial et al., National Renewable Energy Laboratory (2016). 2016 Offshore Wind Energy Resource Assessment for the United States.





**Source:** Bureau of Ocean Energy Management." Nominations Received in Response to the South Carolina Call for Information and Nominations." <https://www.boem.gov/SC-Nomination-Tables/>



# ELECTRIC VEHICLES IN S.C.



## Passenger EV Manufacturing Employment

- State Total (Facility-Level): 12,500
- State Total (EV-specific): 345
- % of National Total (EV-Specific): 1%



## Passenger EV Manufacturing Investment

- State Total (Facility-level): \$11.7 billion
- State Total (EV-specific): \$620 million
- % of National Total (EV-specific): 3%



## EV Sales

- State Total: 5,222 (29th in nation)
- EVs per 1k people: 1.08 (41st in nation)
- Models available: 27 out of 52



## EV Charging Deployment

- State Level 2 Total: 531 ports
- State DCFC Total: 117 ports (32nd in nation)
- DCFC per 1k people: 0.02 (45th in nation)



## Utility Investment

- State Total: \$0
- % of SE Total: 0%



## Government Funding

- State Total: \$17.2 million
- % of National Total: <1%

**Source:** Atlas Public Policy and Southern Alliance for Clean Energy (2020). *Transportation Electrification in the Southeast: State of Technology Deployment & Investment in Manufacturing.*



# JOIN US!



Chris Carnevale

Southern Alliance for Clean Energy

[chris@cleanenergy.org](mailto:chris@cleanenergy.org)

843-973-2637

