

Landscape of Energy and Climate in S.C.

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



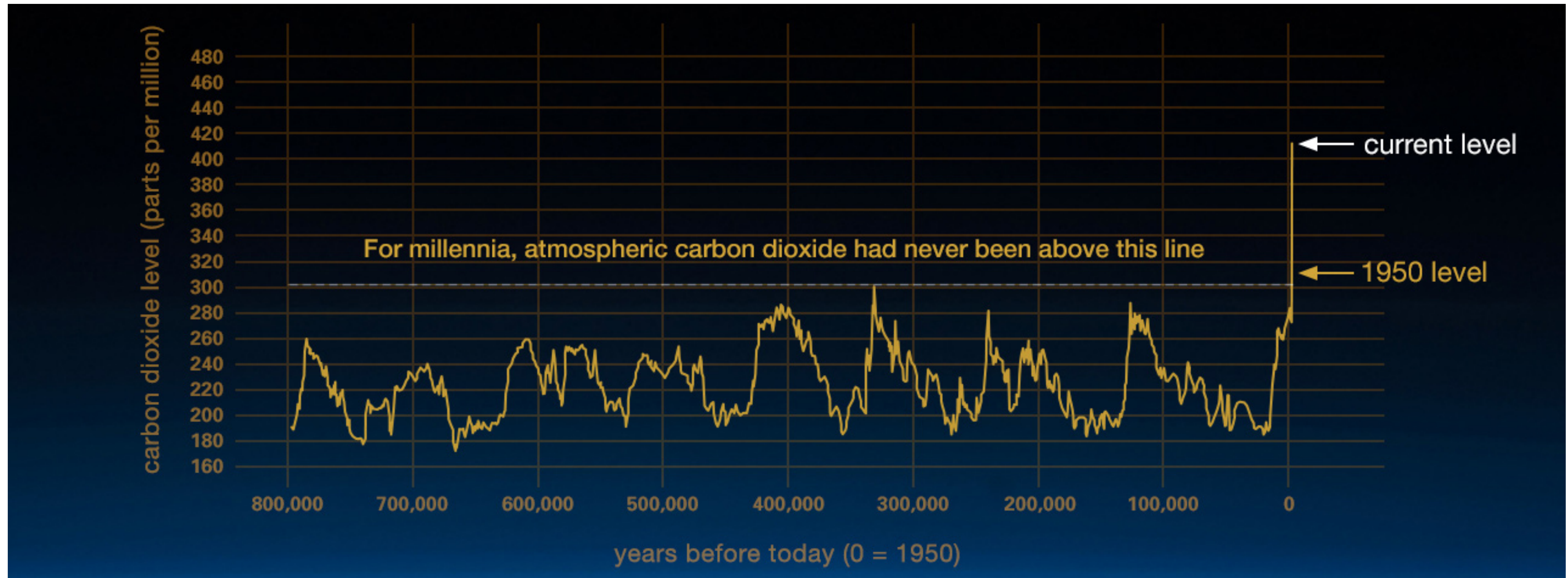
ABOUT US

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

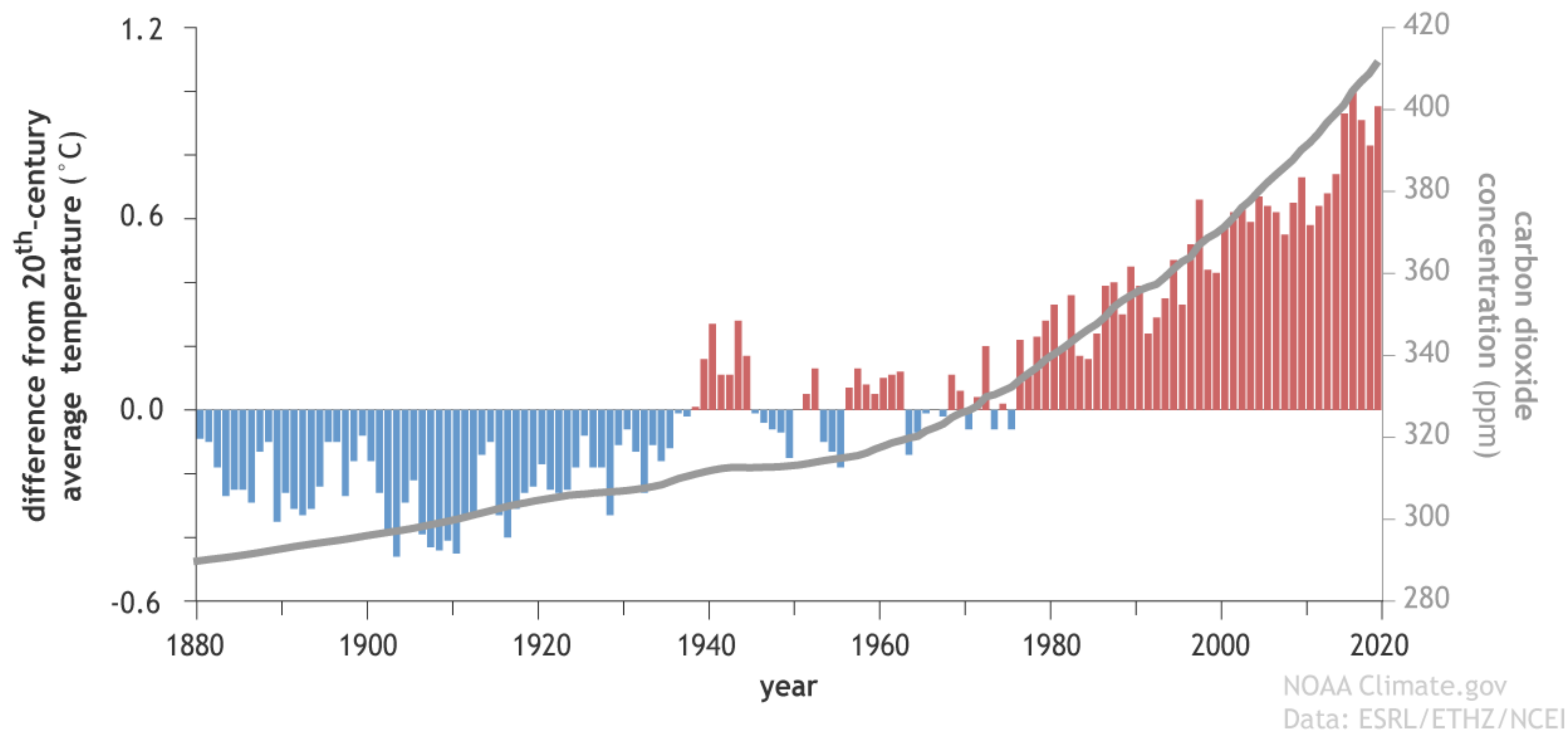
UNPRECEDENTED CO₂



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

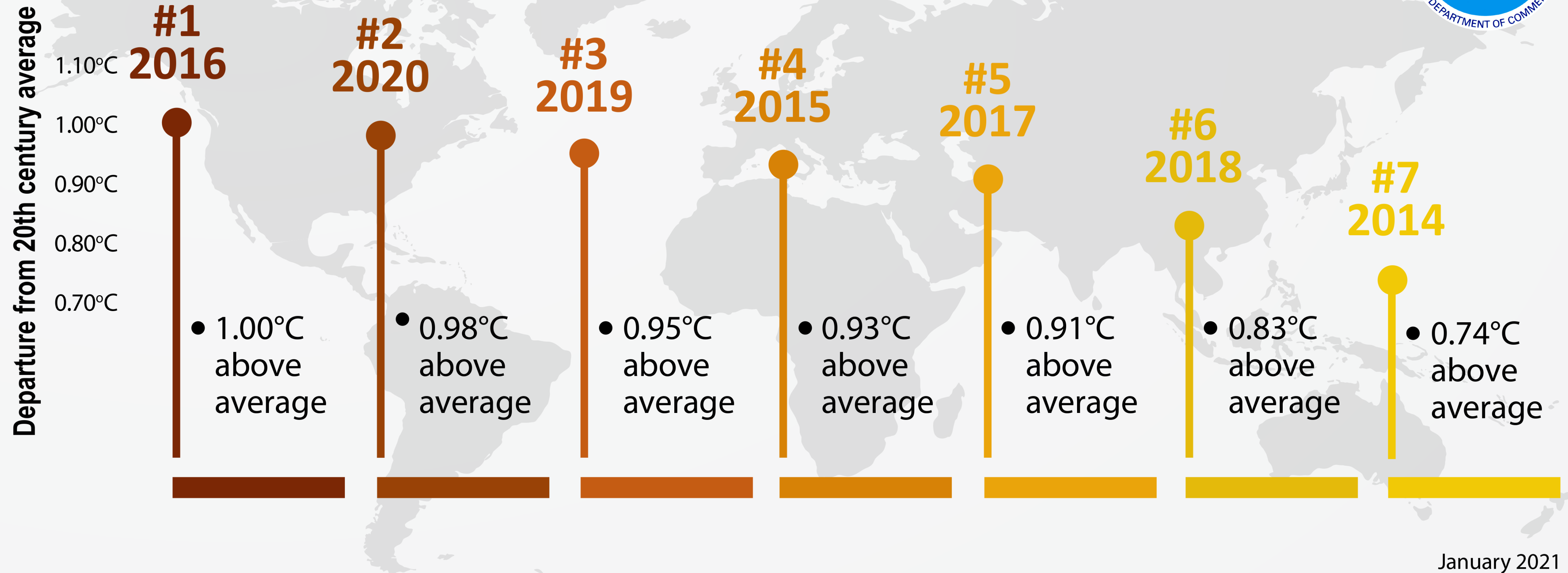
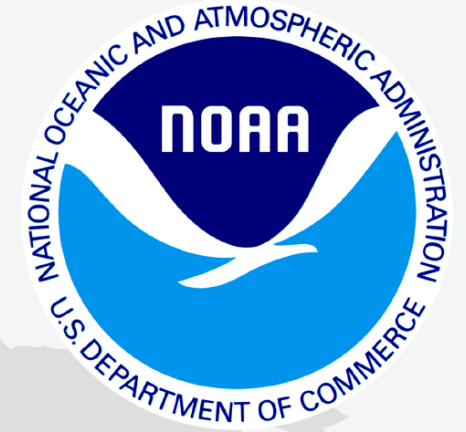
CO₂ & WARMING

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

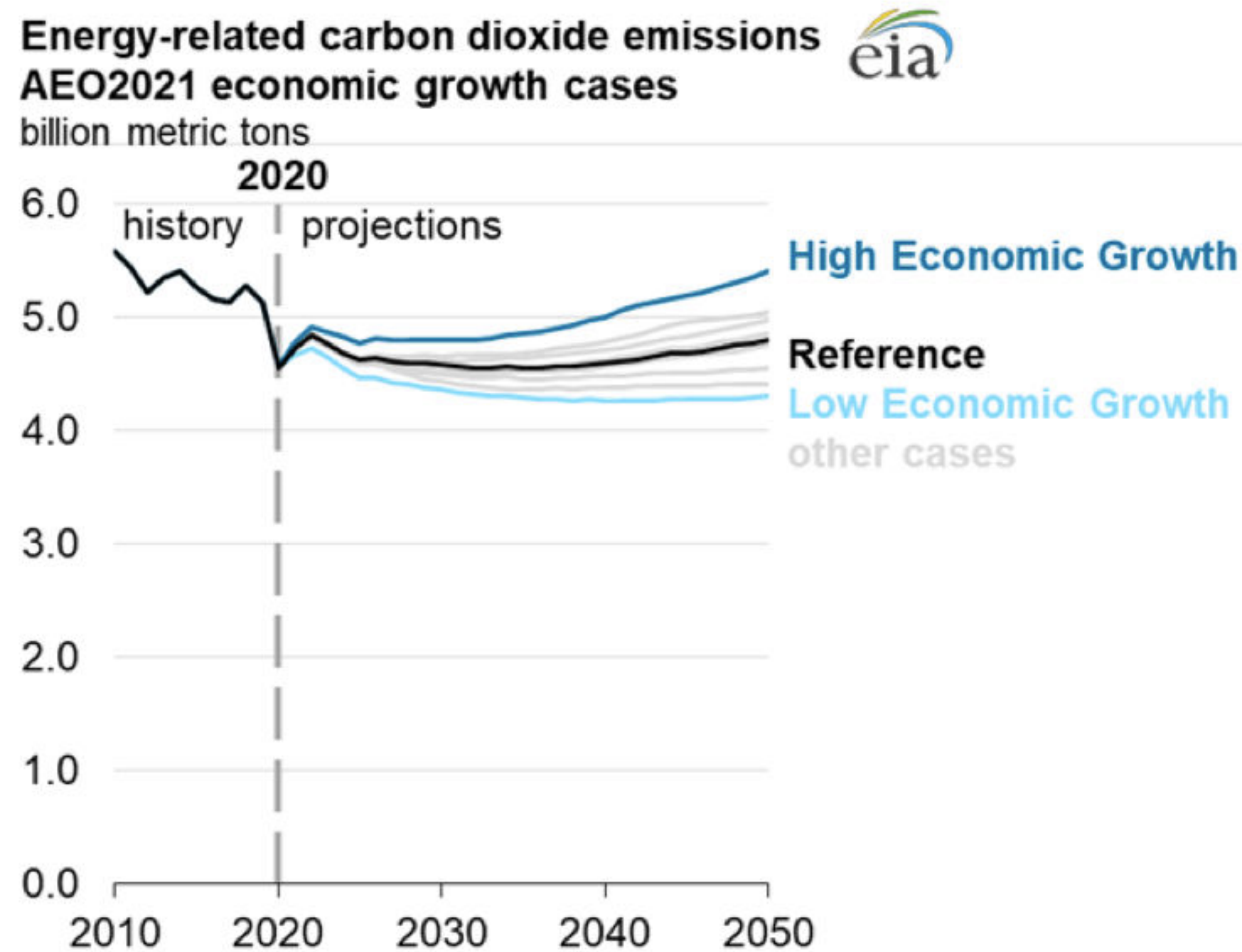
And more

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>

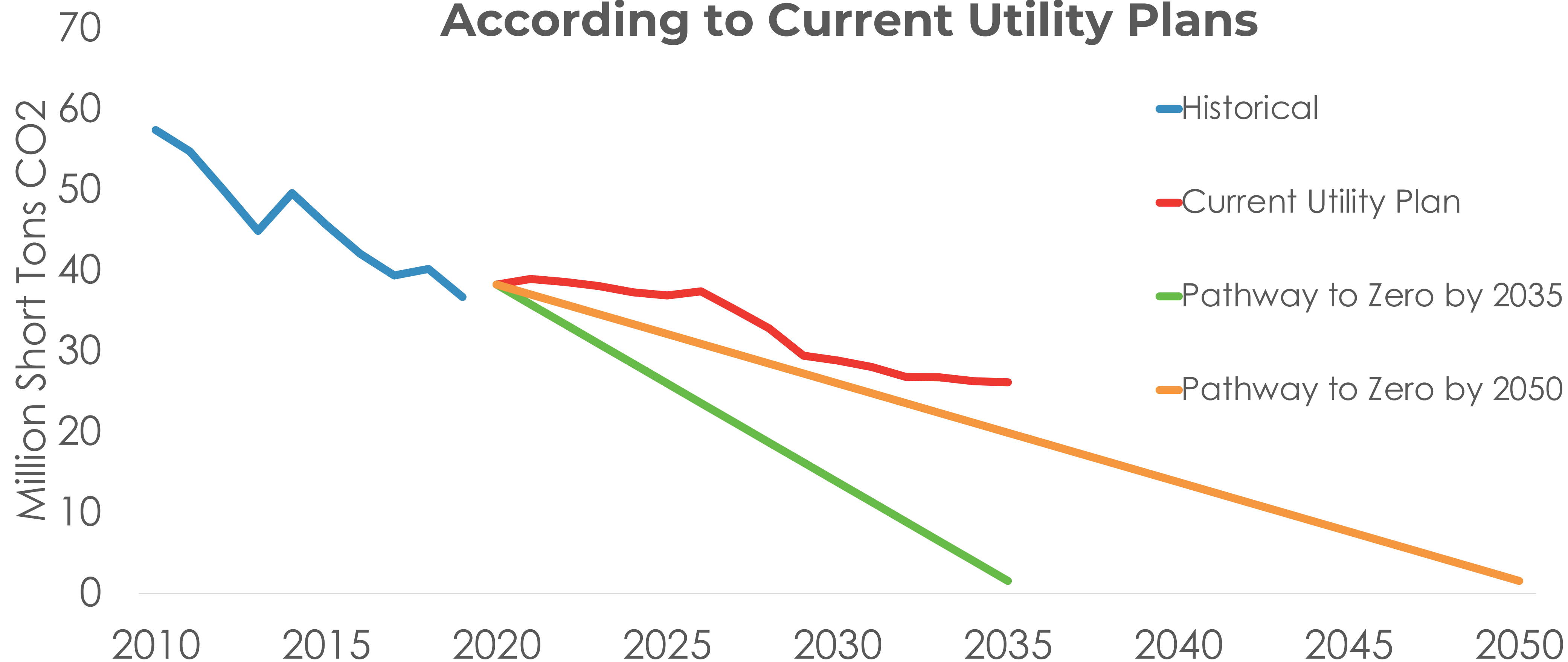
ARE WE ON TRACK AS A NATION?



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

ARE WE ON TRACK AS A STATE?

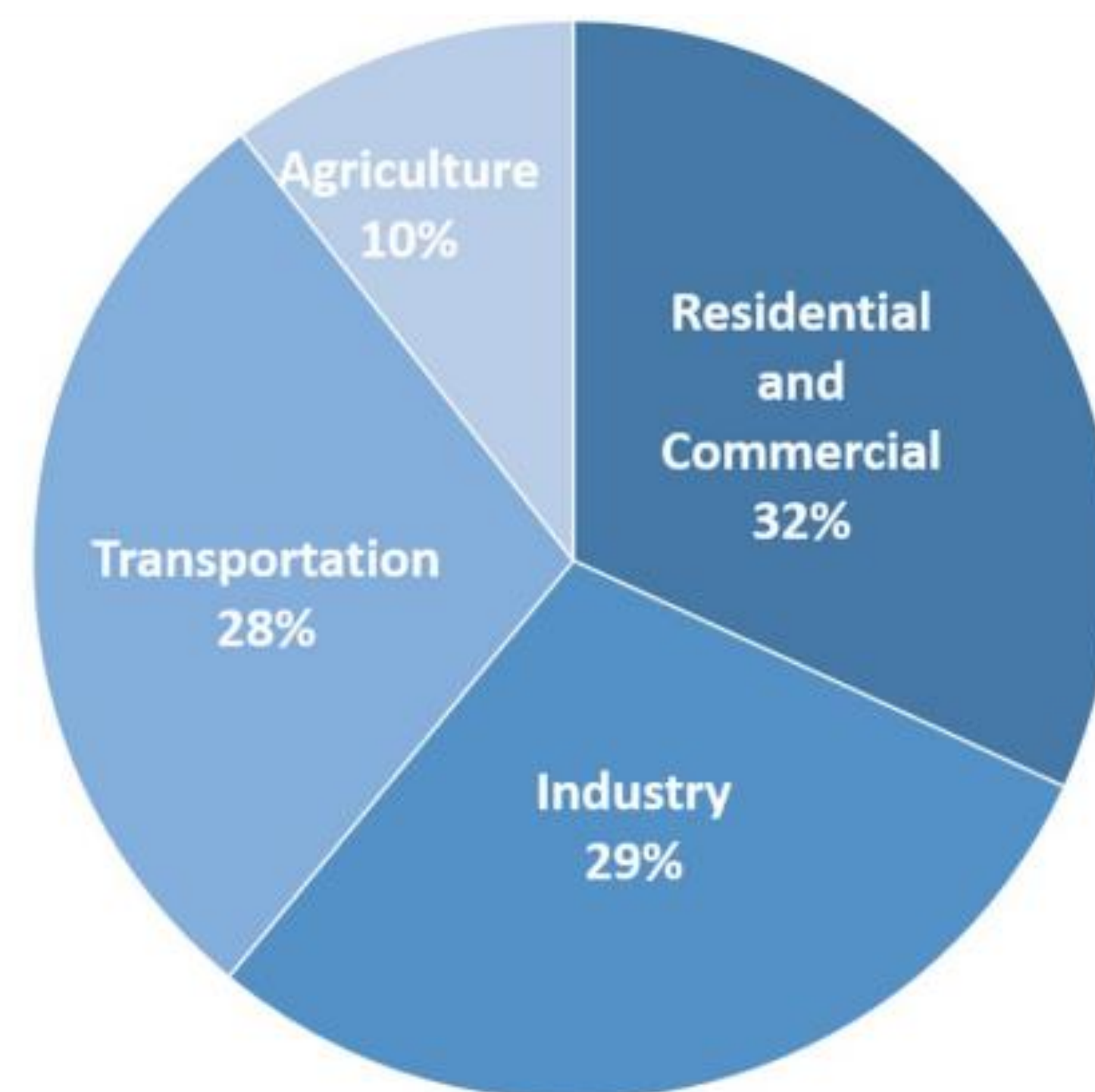
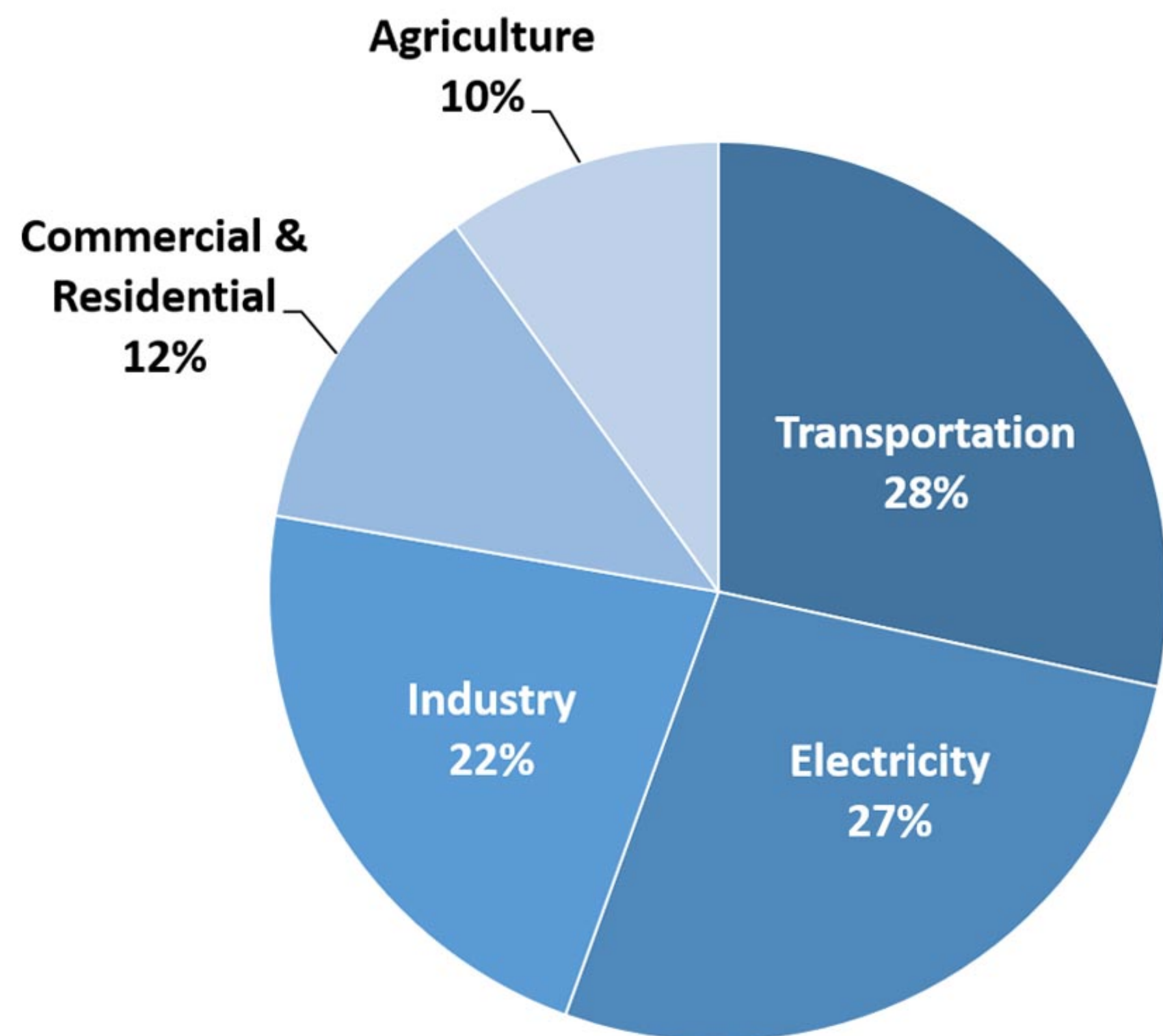
South Carolina Annual CO₂ Emissions According to Current Utility Plans



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

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

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

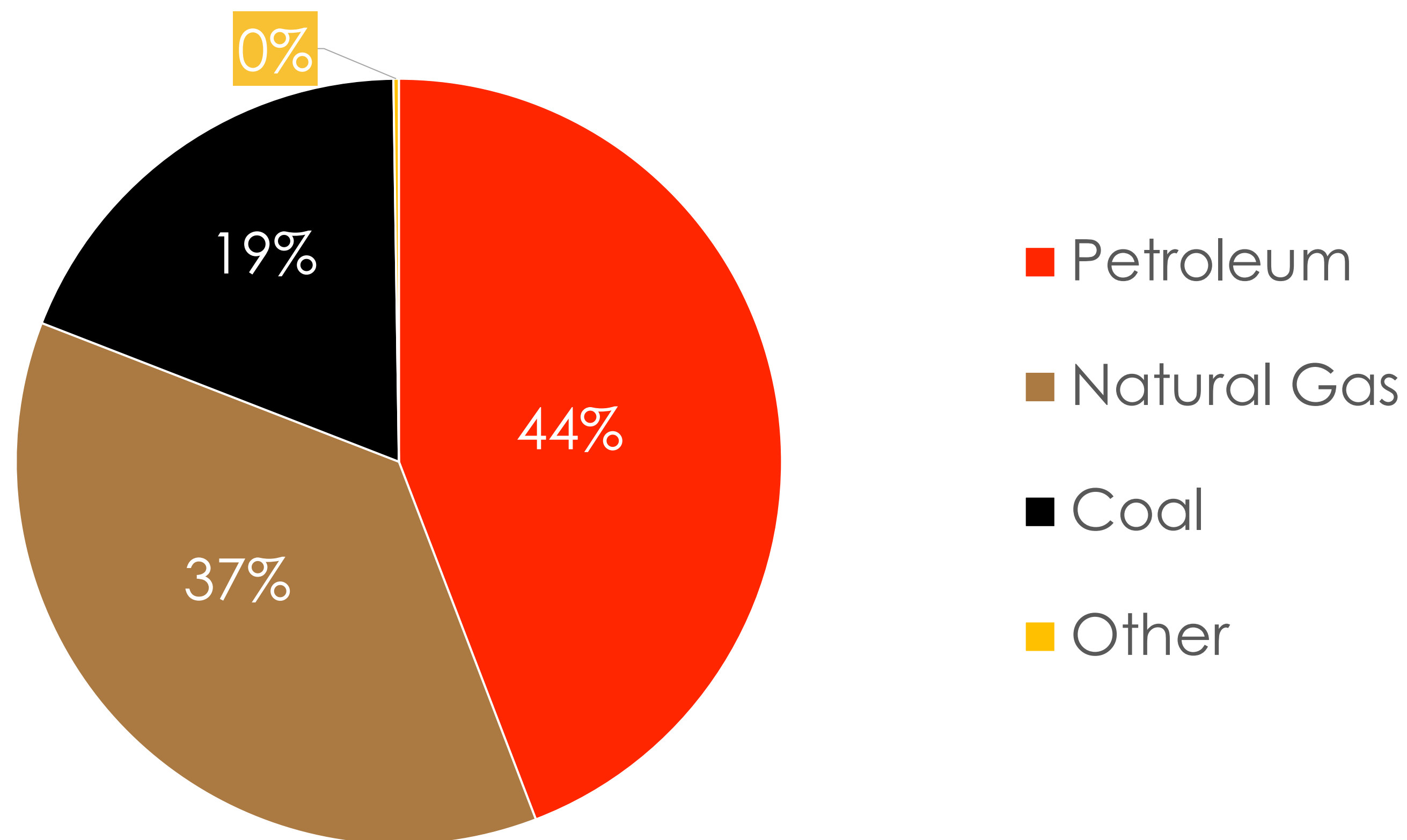


With electricity distributed

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

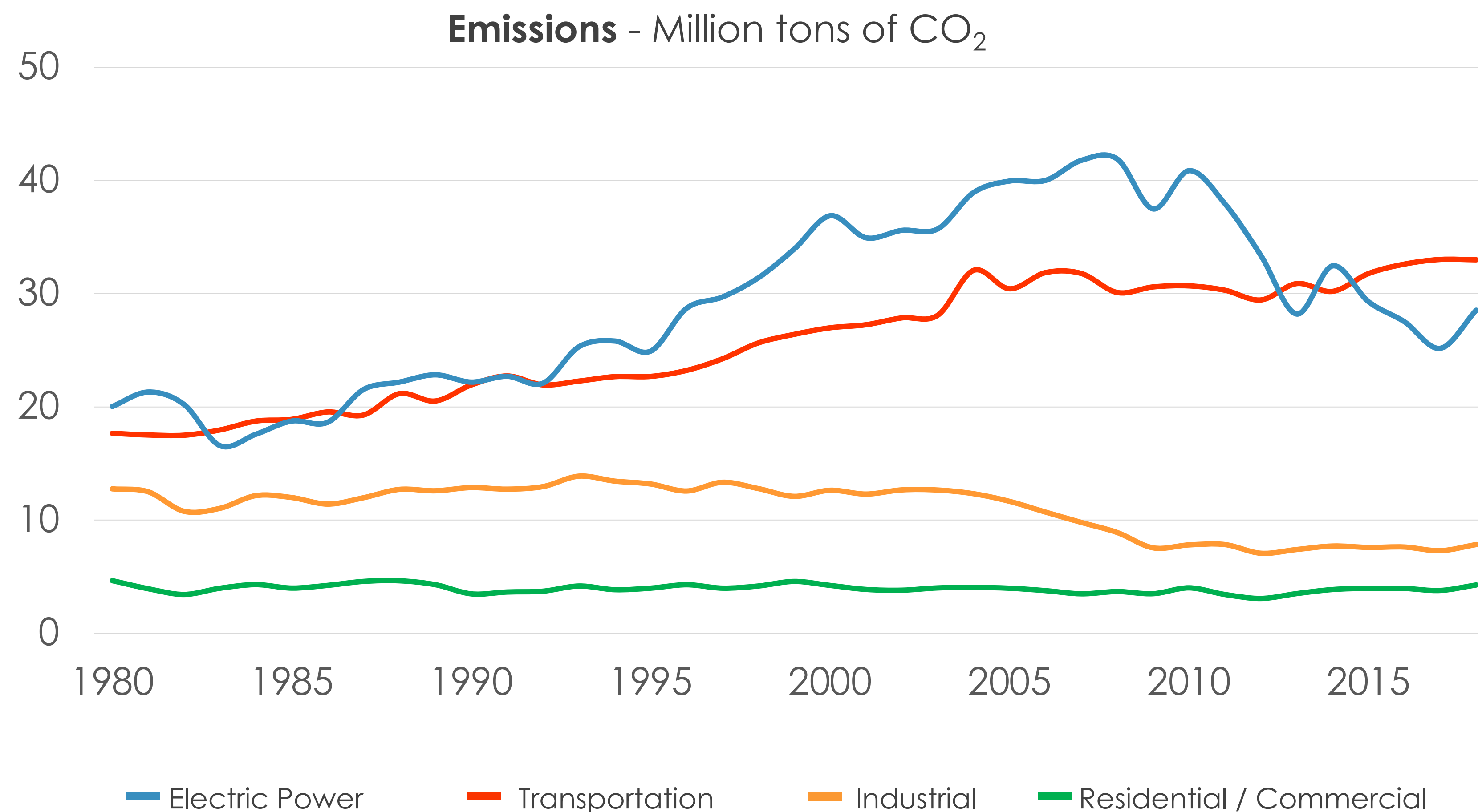
WHERE DOES CLIMATE CHANGE POLLUTION COME FROM IN U.S.?

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.?

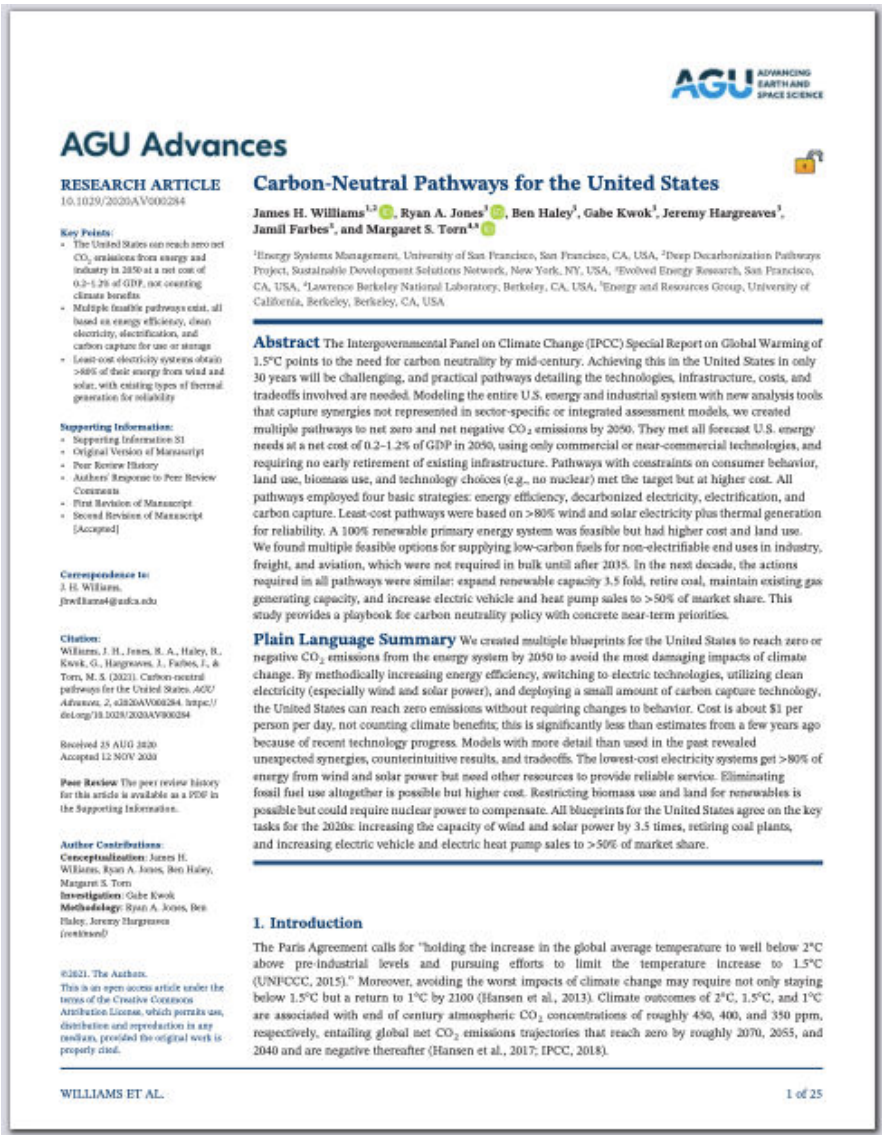


In 2018:

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

Sources: • Southern Alliance for Clean Energy (2021). *Tracking Decarbonization in the Southeast: Generation + CO₂ Emissions Report*.
 • U.S. Energy Information Administration (March 2021). "2018 State energy-related carbon dioxide emissions by sector."

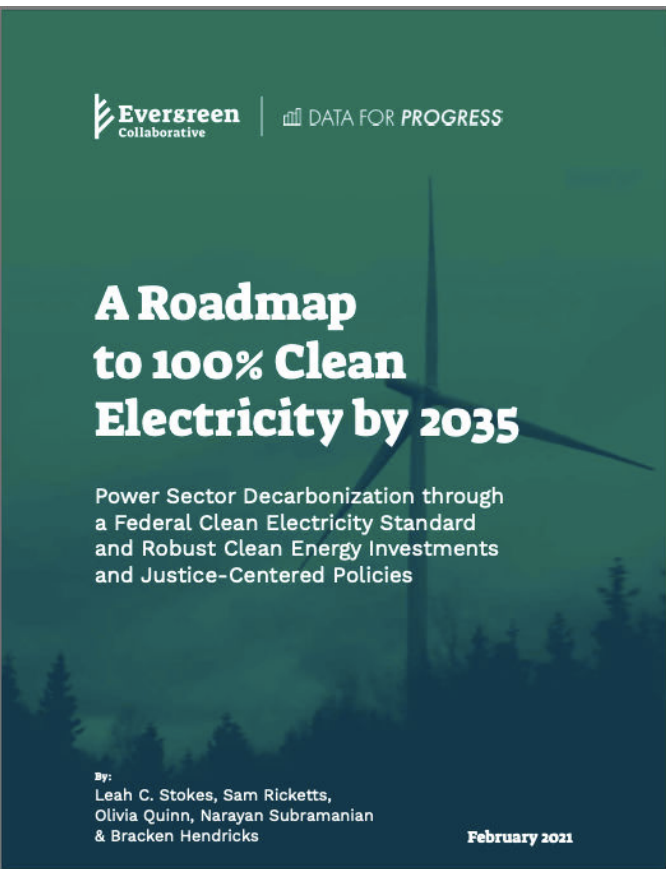
CAN WE DO IT? CAN WE AFFORD IT?



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

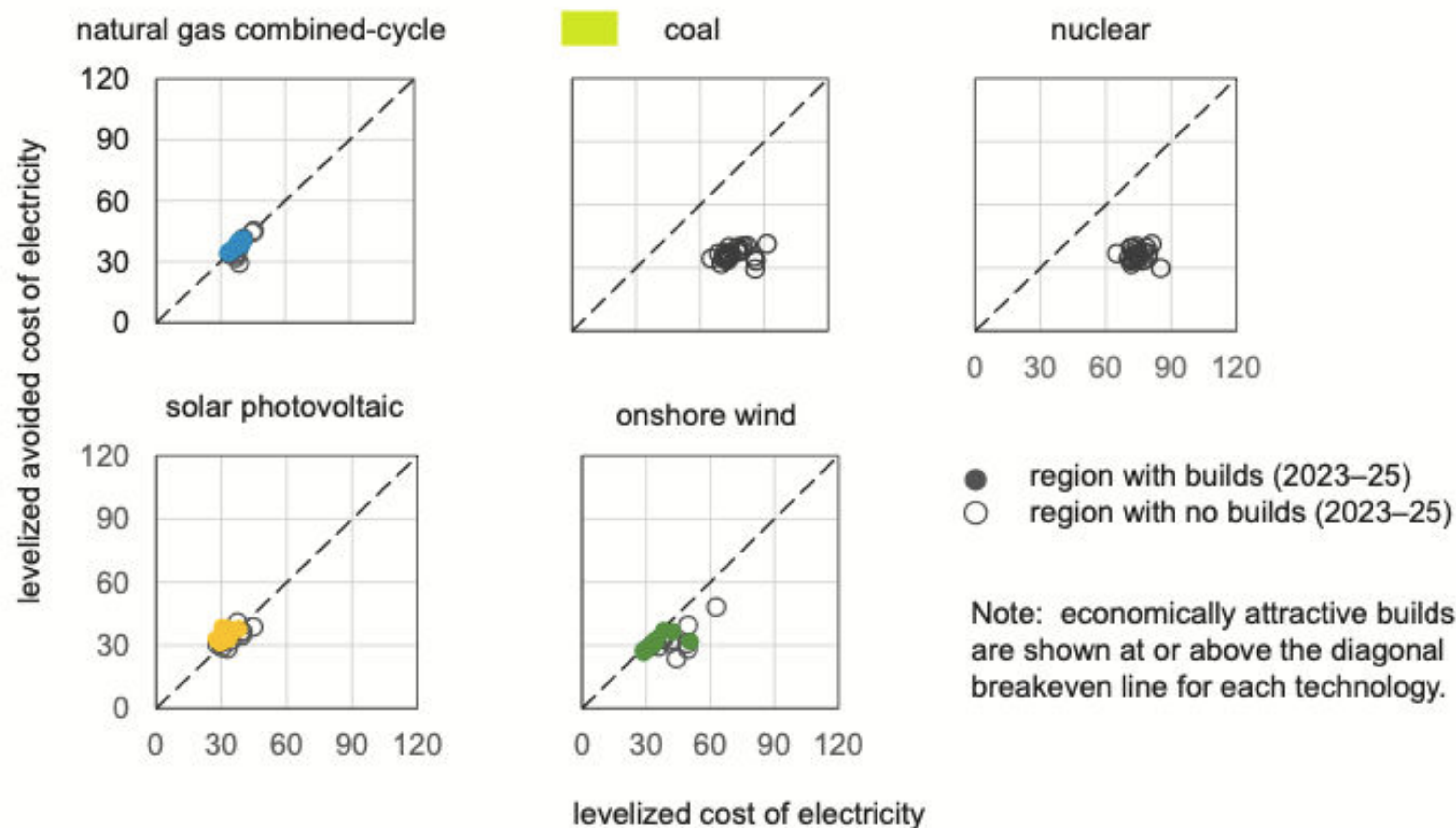
Cost of Electricity from New Generation Sources

Technology	Cost per megawatt-hour (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).

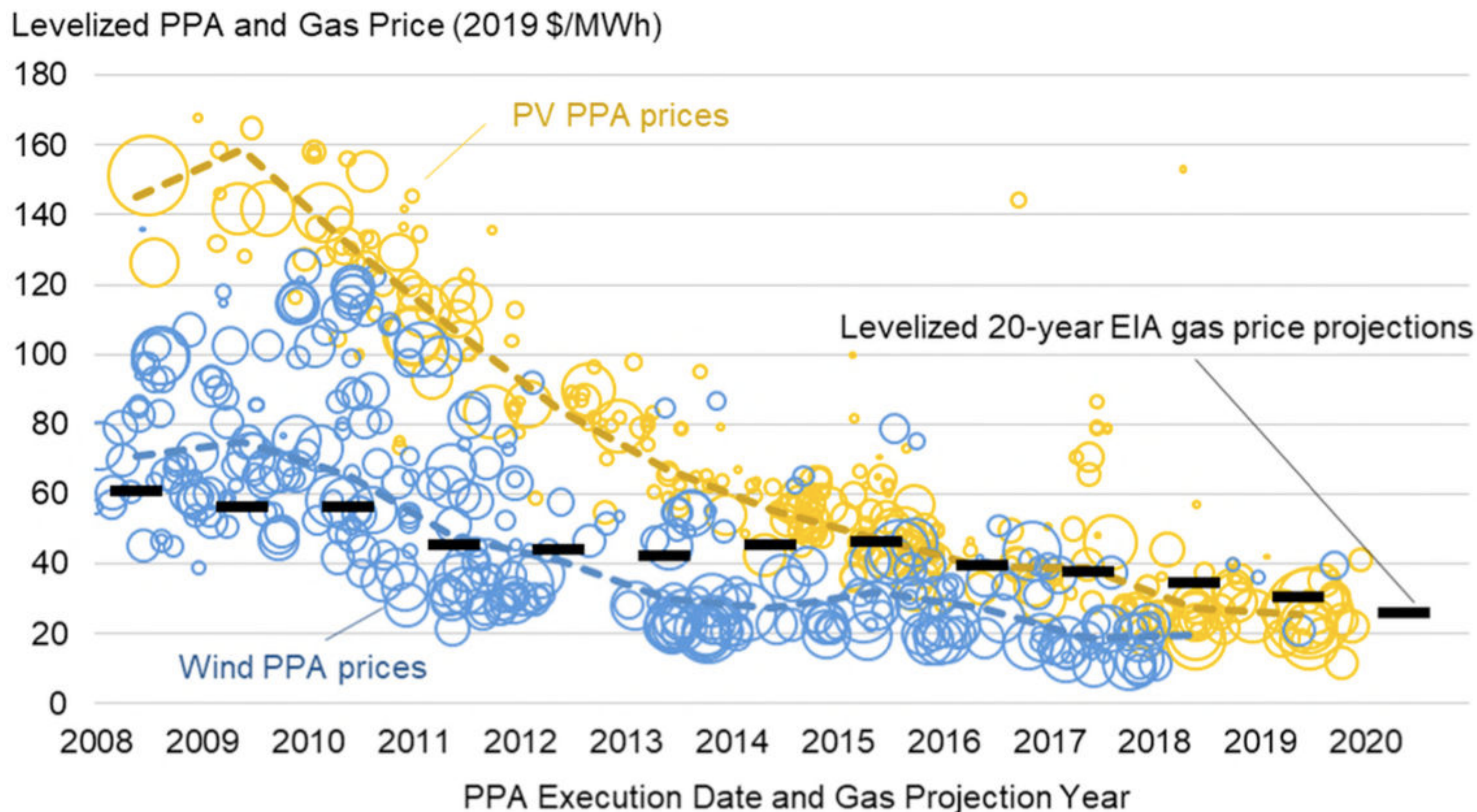
SOLAR AND WIND ARE VALUABLE

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



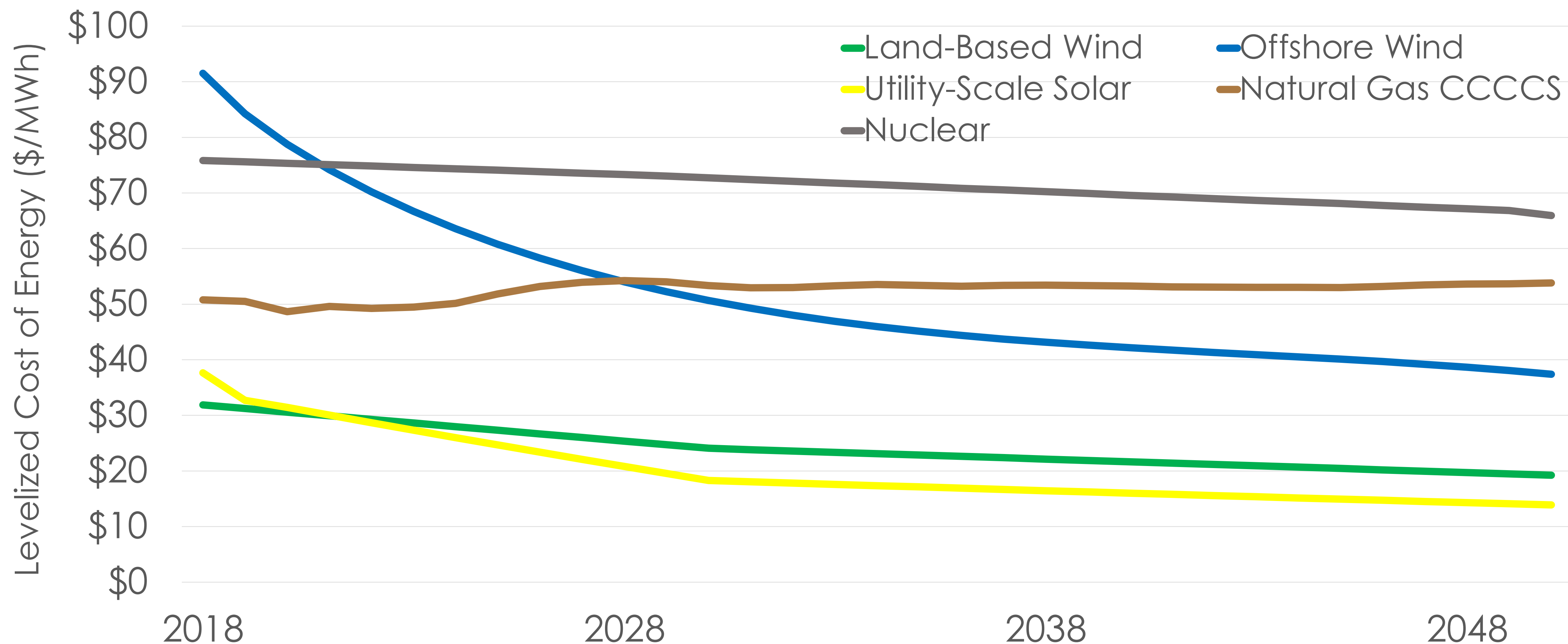
Source: U.S. Energy Information Administration (2020). *Annual Energy Outlook 2020*, p. 75.

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

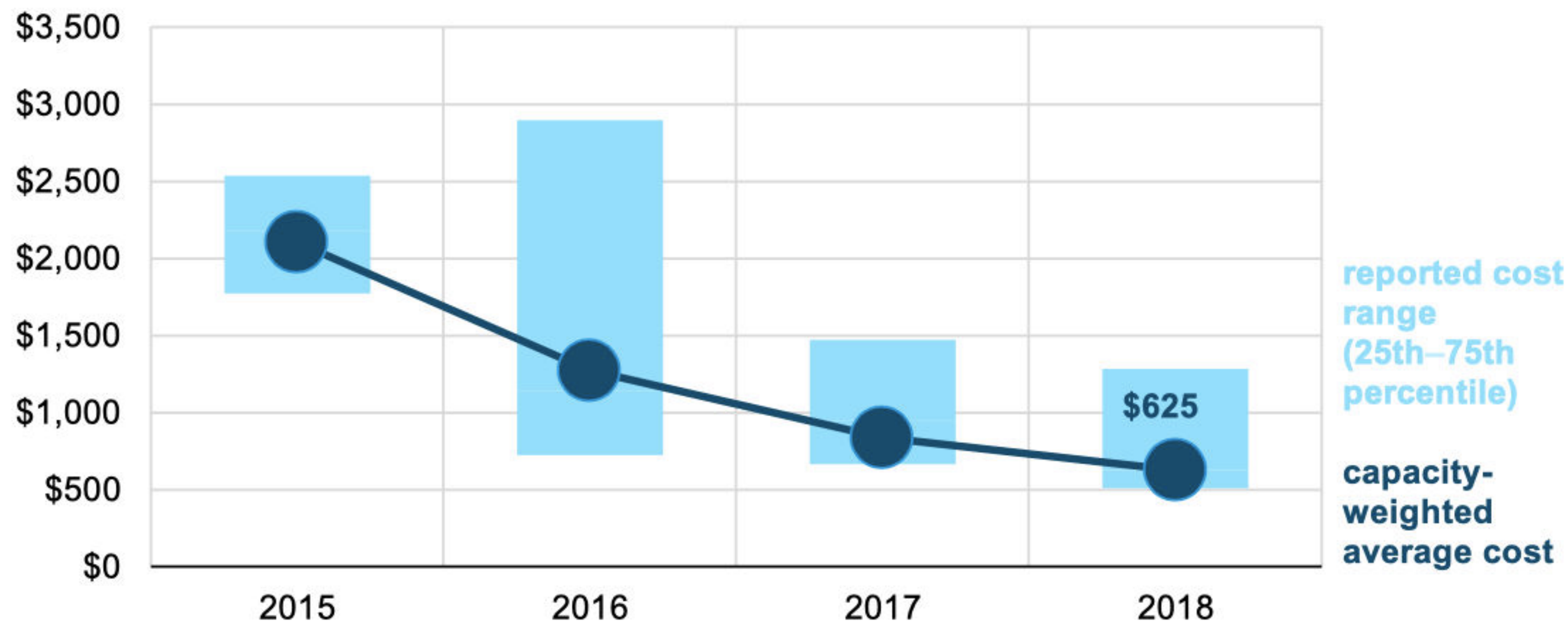


Source: NREL (National Renewable Energy Laboratory) (2020). "2020 Annual Technology Baseline." Golden, CO: National Renewable Energy Laboratory. <https://atb.nrel.gov/>. These data are the ATB "moderate" technology innovation scenario and "R&D Only" financial assumptions case.

BATTERIES HAVE GOTTEN CHEAPER

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

dollars per kilowatthour



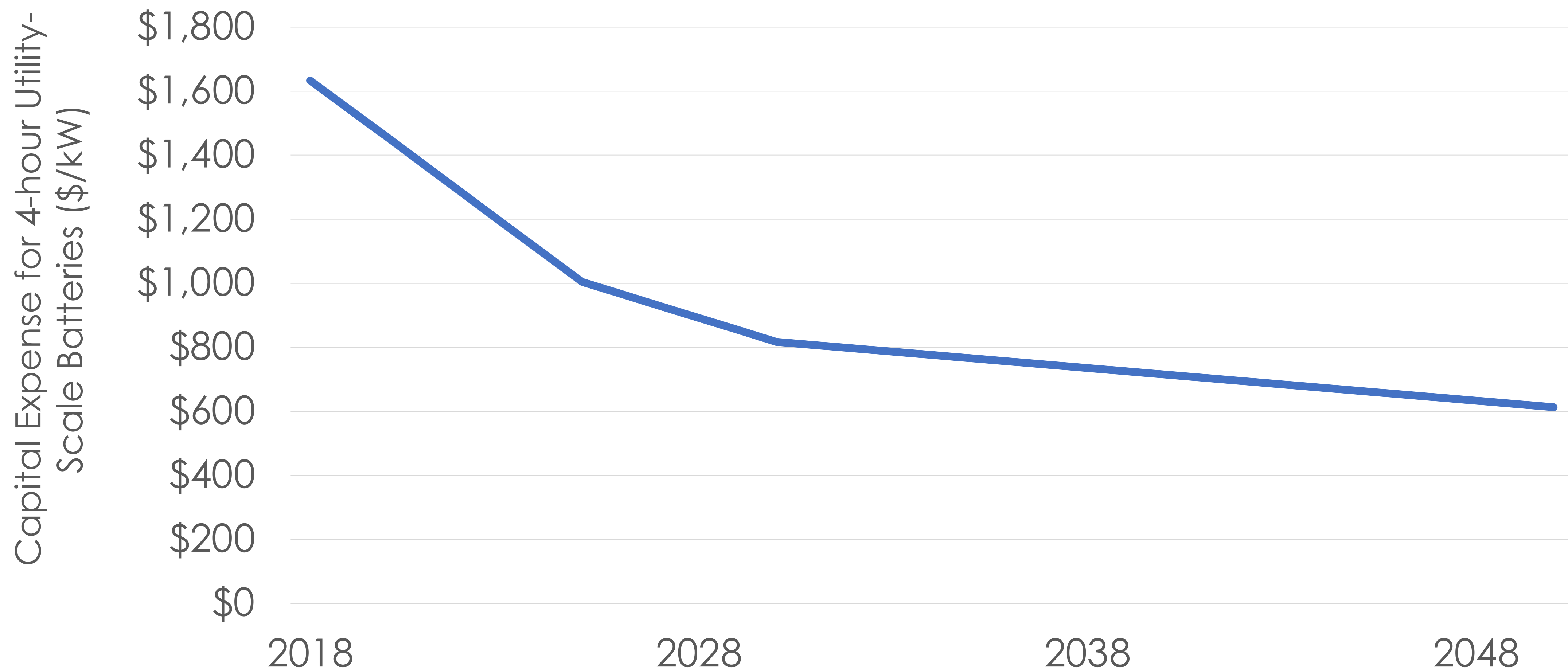
Source: U.S. Energy Information Administration, *Annual Electric Generator Report*

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>

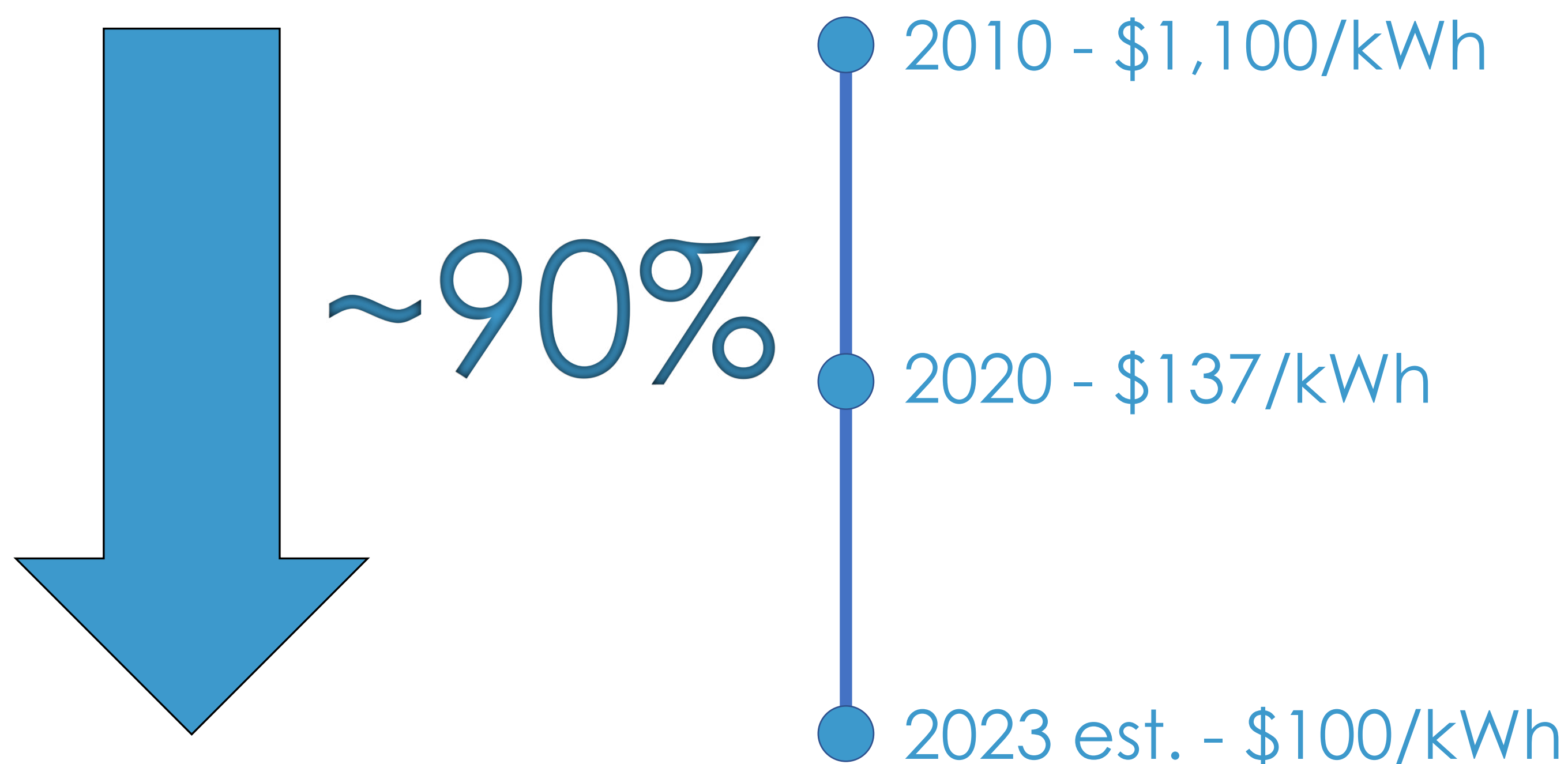
BATTERIES WILL GET EVEN CHEAPER



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

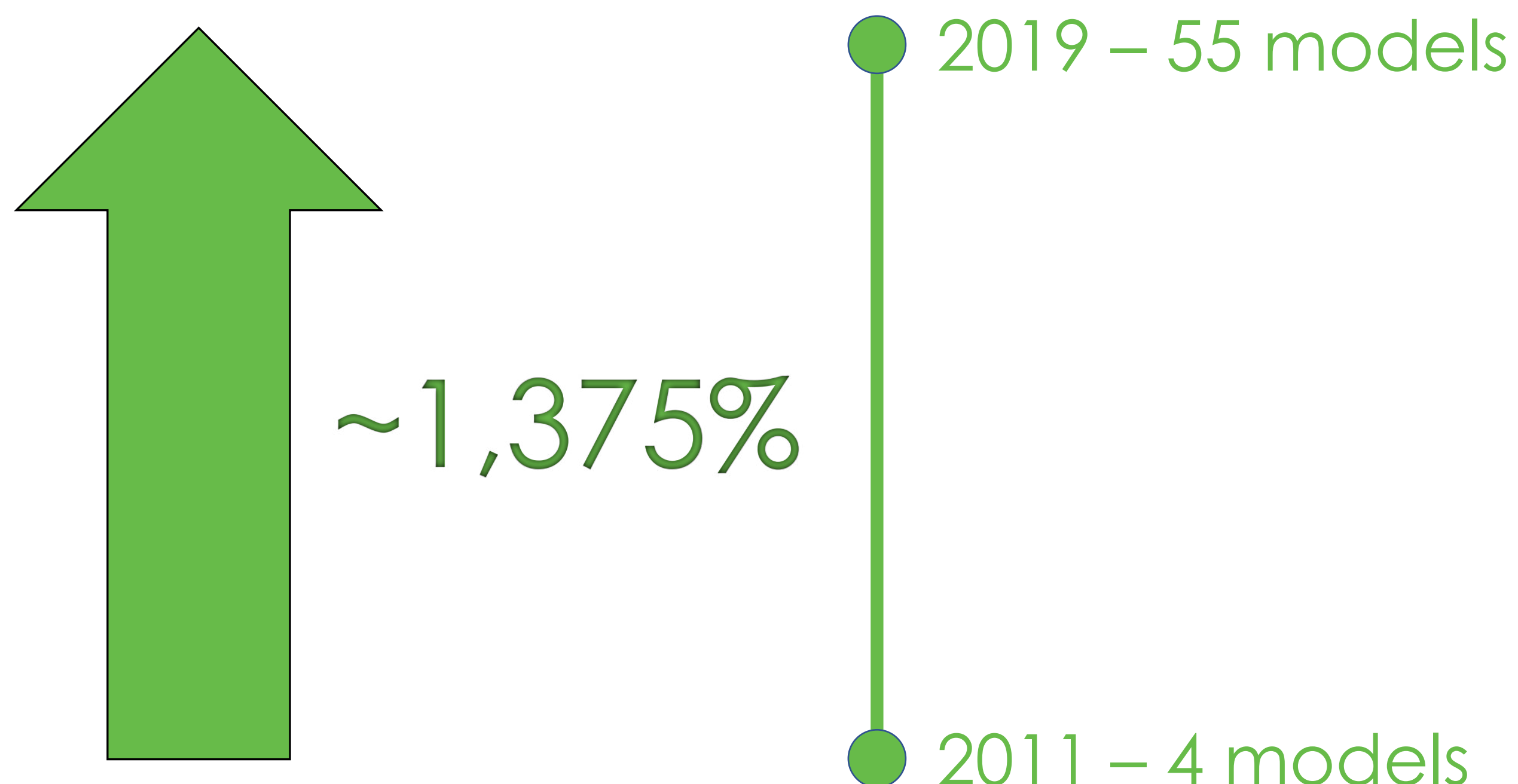


Source: BloombergNEF (December 16, 2020). "Battery Pack Prices Cited Below \$100/kWh for the First Time in 2020, While Market Average Sits at \$137/kWh." <https://about.bnef.com/blog/battery-pack-prices-cited-below-100-kwh-for-the-first-time-in-2020-while-market-average-sits-at-137-kwh/>



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>

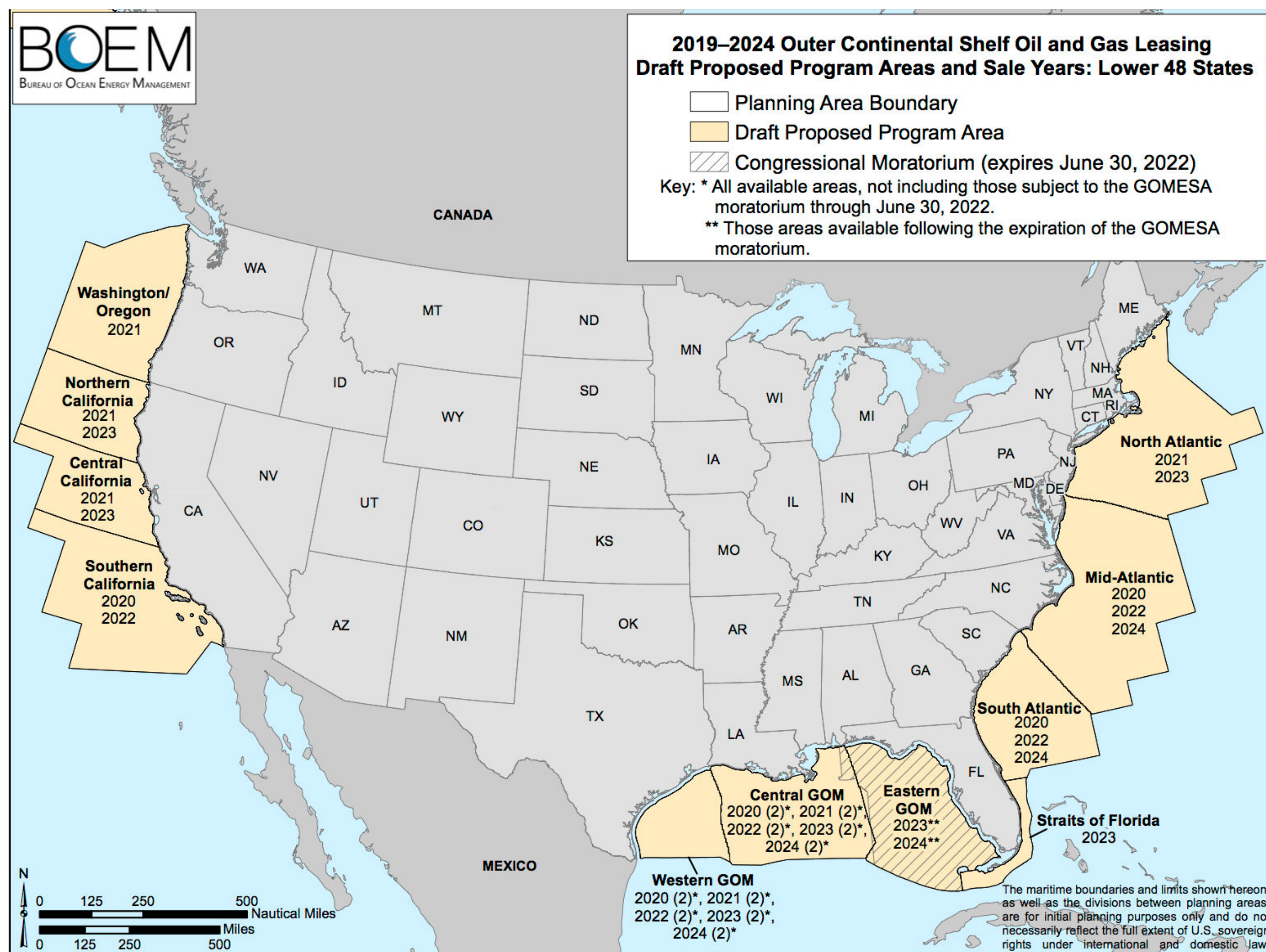
ELECTRIC VEHICLES ARE GETTING CLEANER

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*.

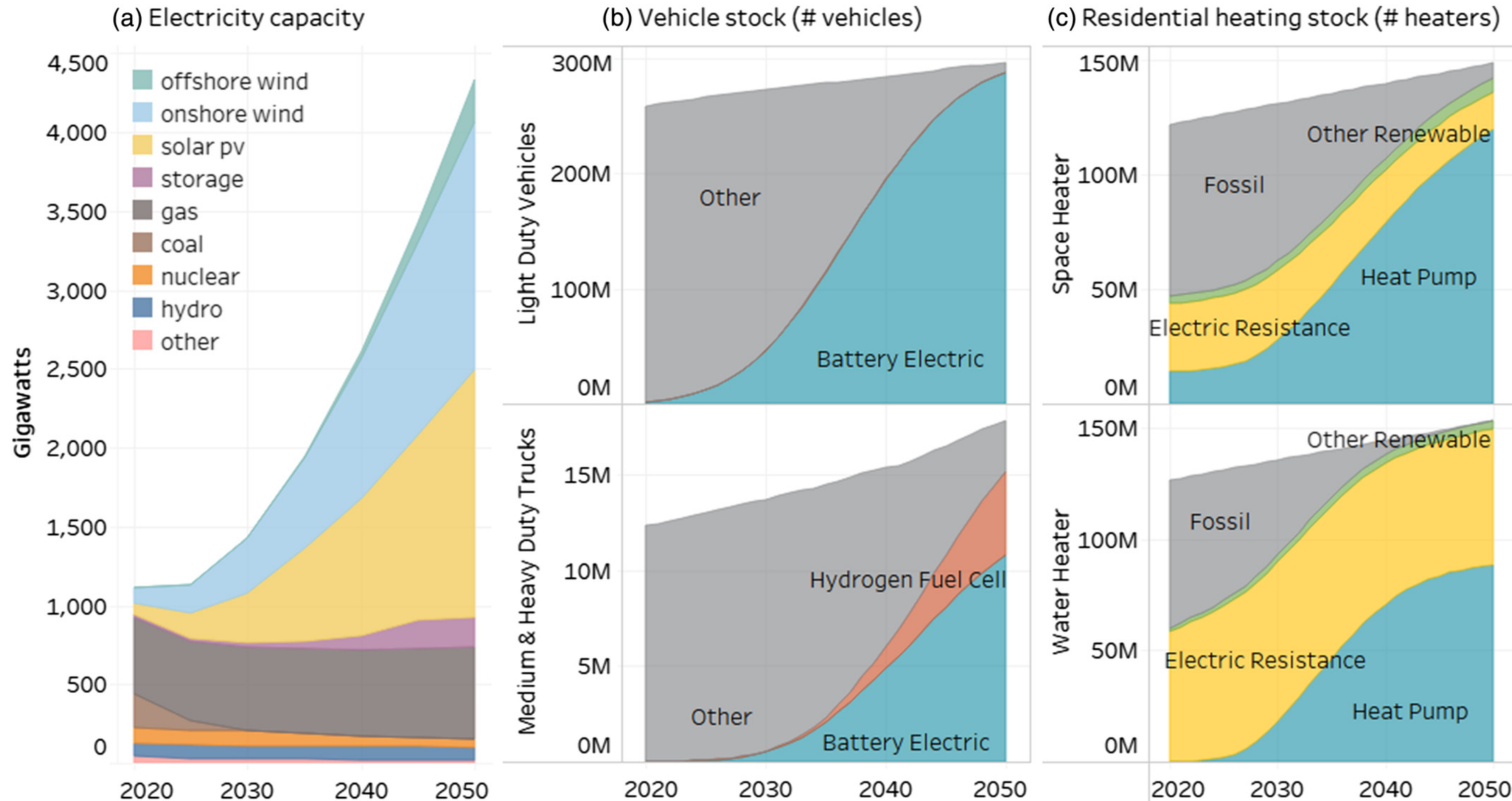
ELECTRIC VEHICLES CAN REPLACE OFFSHORE DRILLING



**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%
SOUTH CAROLINA AVERAGE	0.41%
DOMINION ENERGY	0.32%
SOUTHEAST AVERAGE	0.26%
SANTEE COOPER	0.07%

PERFORMANCE OF REGIONS

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

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	1,058
SANTEE COOPER	6	597
DUKE ENERGY PROGRESS	372	576
DUKE ENERGY CAROLINAS	359	544

DISTRIBUTED SOLAR, MW

UTILITY	2019	2023
DOMINION ENERGY SC	126	247
SANTEE COOPER	25	41
DUKE ENERGY PROGRESS	11	20
DUKE ENERGY CAROLINAS	36	68

- 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

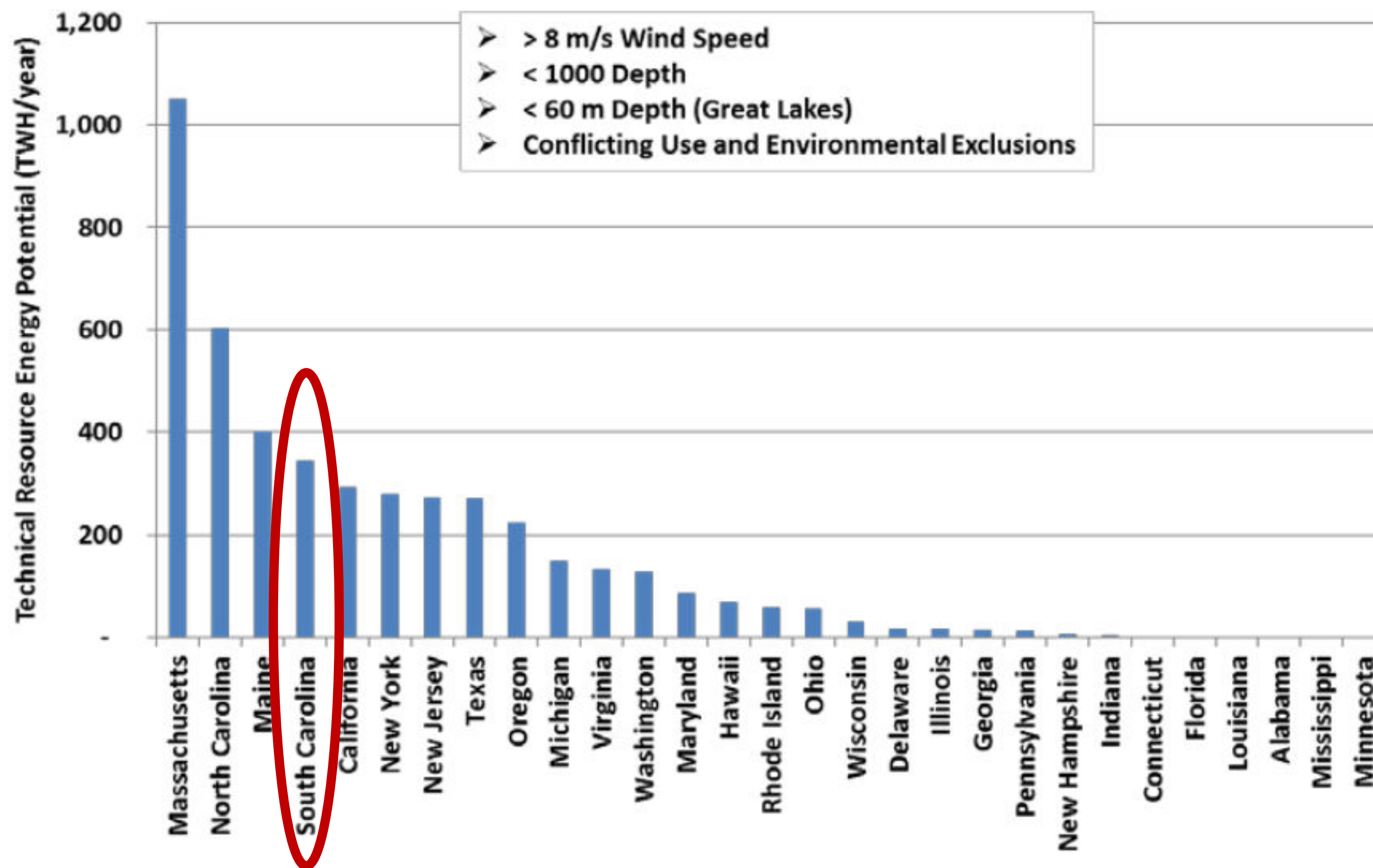
UTILITY	2019	2023
DUKE ENERGY PROGRESS	2,343	3,622
DOMINION ENERGY SC	807	1,809
STATE AVERAGE	551	1,262
DUKE ENERGY CAROLINAS	681	1,029
SOUTHEAST AVERAGE	325	819
SANTEE COOPER	31	664



- 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.

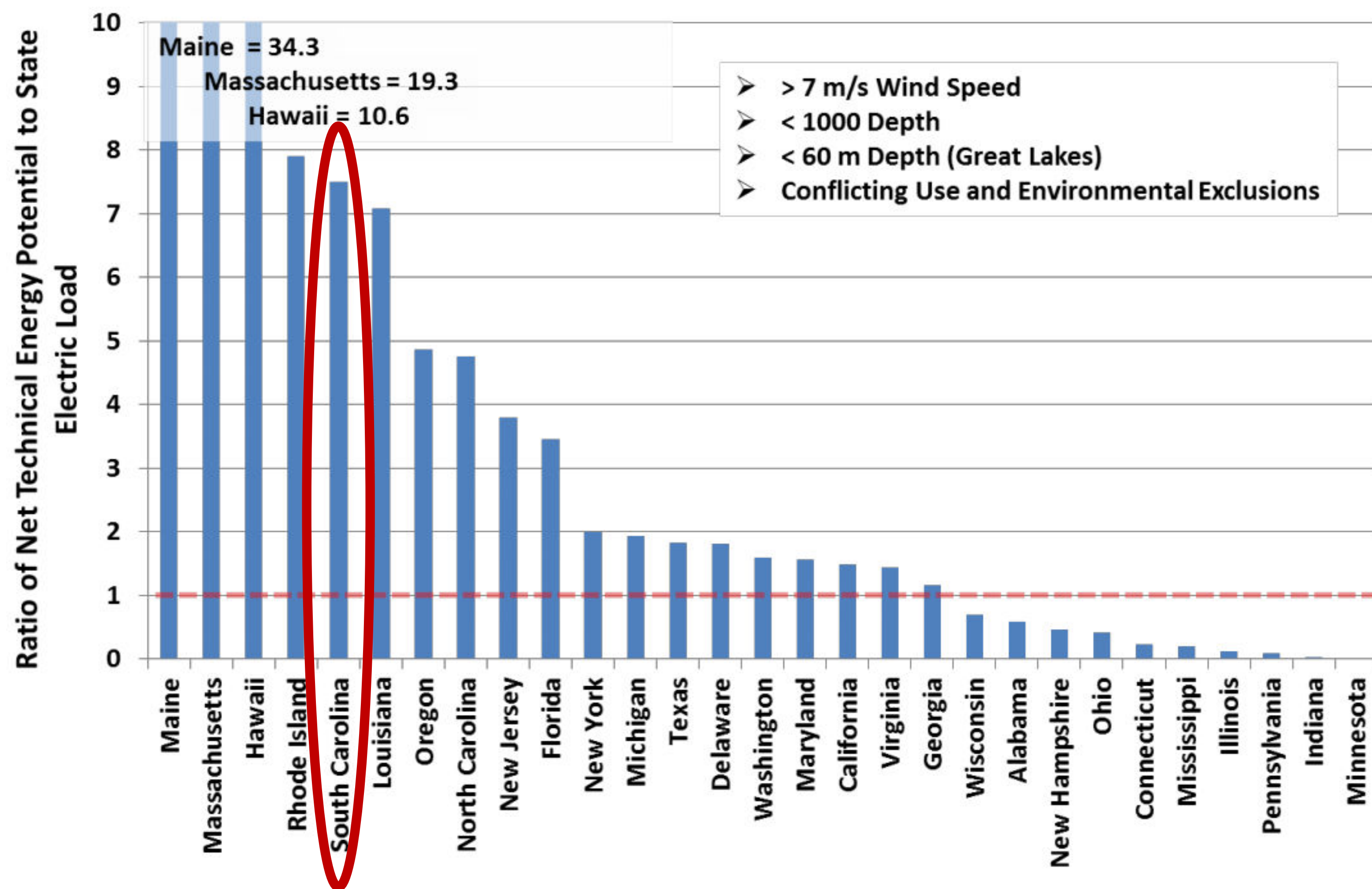
Source: Southern Alliance for Clean Energy (2020). *Solar in the Southeast: 2020 Annual Report*, p. 19.

OFFSHORE WIND POTENTIAL

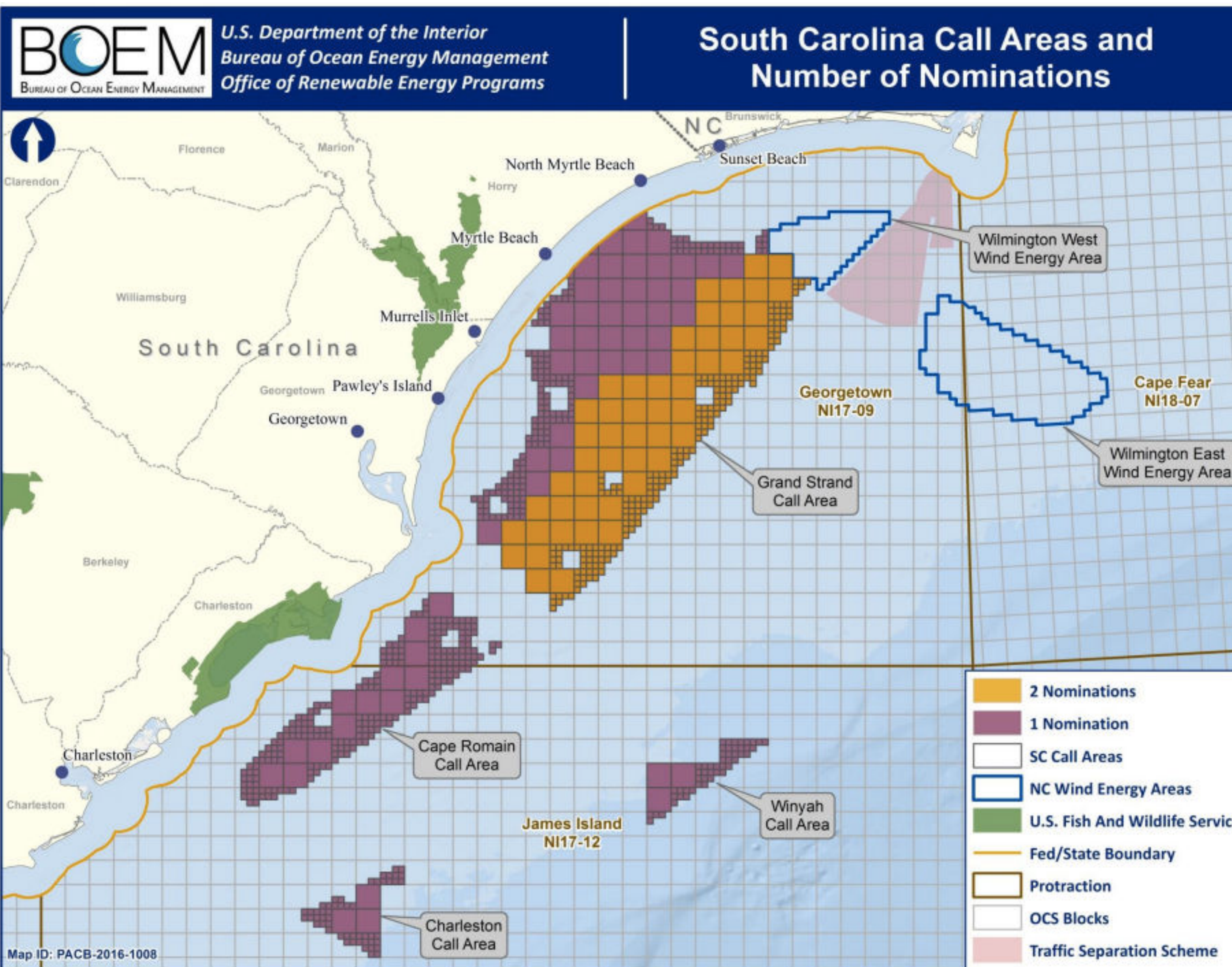


Source: Musial et al., National Renewable Energy Laboratory (2016). 2016 Offshore Wind Energy Resource Assessment for the United States.

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

843-973-2637

