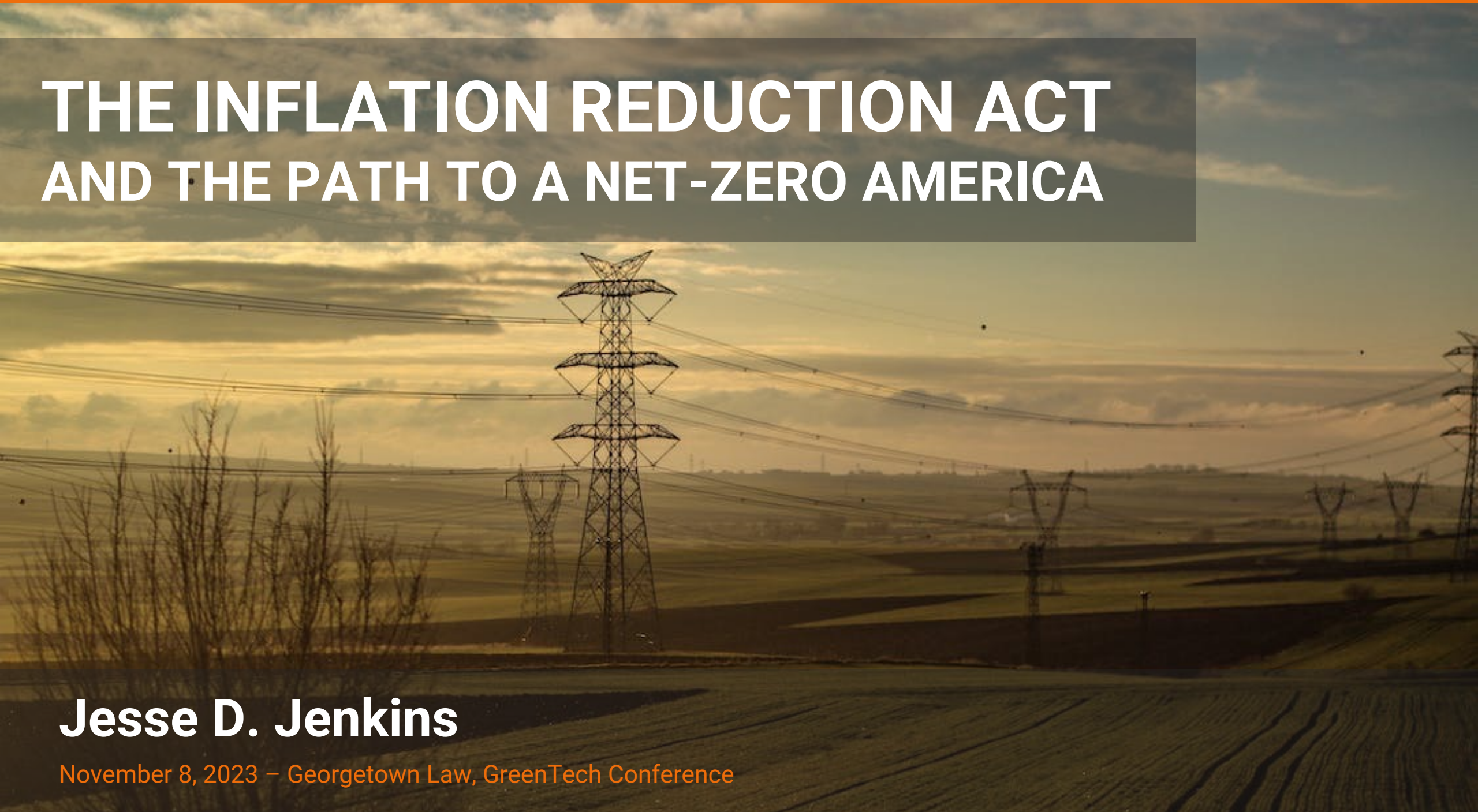


THE INFLATION REDUCTION ACT
AND THE PATH TO A NET-ZERO AMERICA

Jesse D. Jenkins

November 8, 2023 – Georgetown Law, GreenTech Conference

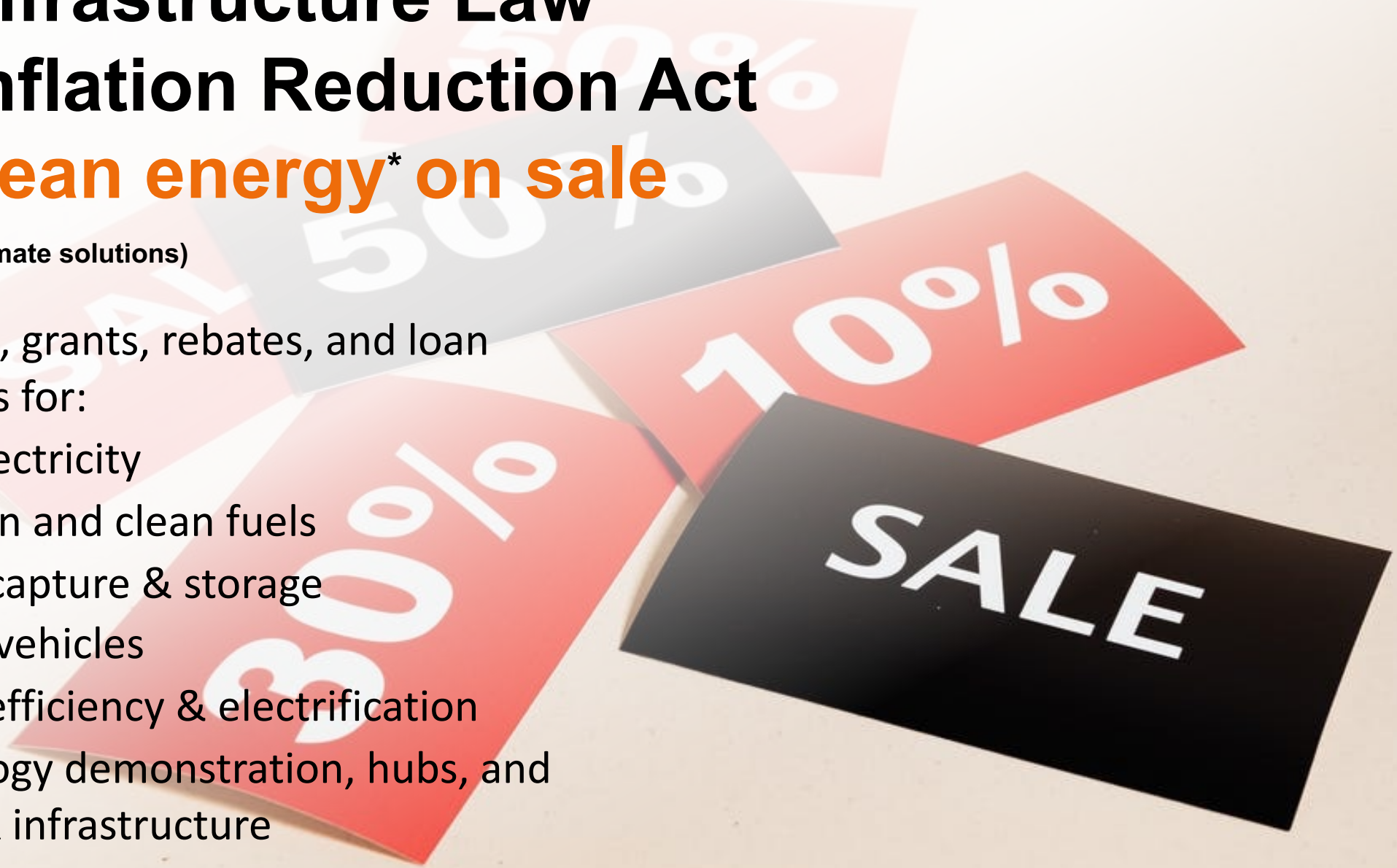
The full financial might of the federal government is now aligned behind the clean energy transition

The Infrastructure Law and Inflation Reduction Act put clean energy* on sale

*** (and other climate solutions)**

Tax credits, grants, rebates, and loan guarantees for:

- clean electricity
- hydrogen and clean fuels
- carbon capture & storage
- electric vehicles
- energy efficiency & electrification
- technology demonstration, hubs, and network infrastructure

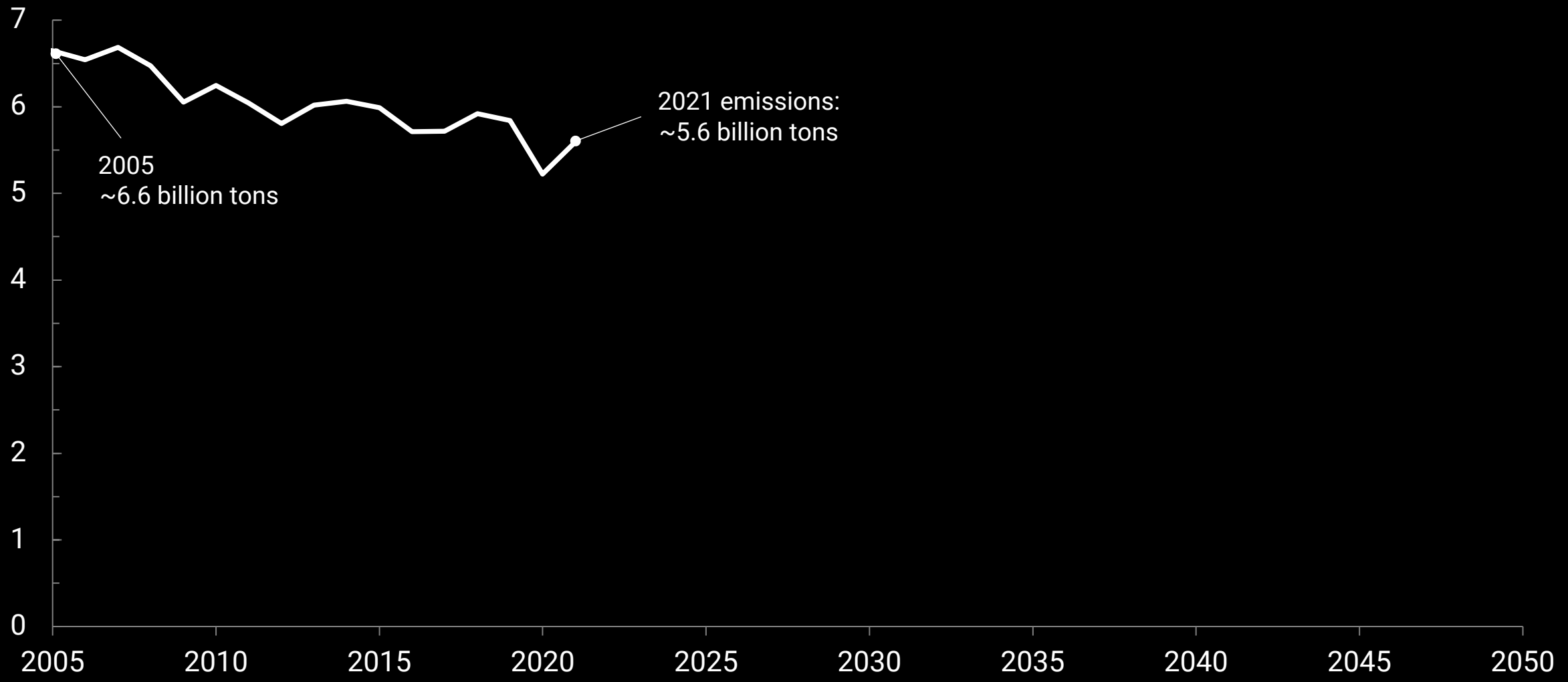


Progress on the Path to Net-Zero

repeatproject.org

Historical and Modeled Net U.S. Greenhouse Gas Emissions (Including Land Carbon Sinks)

billion metric tons CO_2-equivalent (Gt CO_2-e)[1]



1 - CO_2.equivalent emissions calculations use IPCC AR4 100 year global warming potential as per EPA Inventory of Greenhouse Gas Emissions and Sinks.

Data source: "Climate Progress and the 117th Congress: The Impacts of the Inflation Reduction Act and Infrastructure Investment and Jobs Act," REPEAT Project, July, 2023

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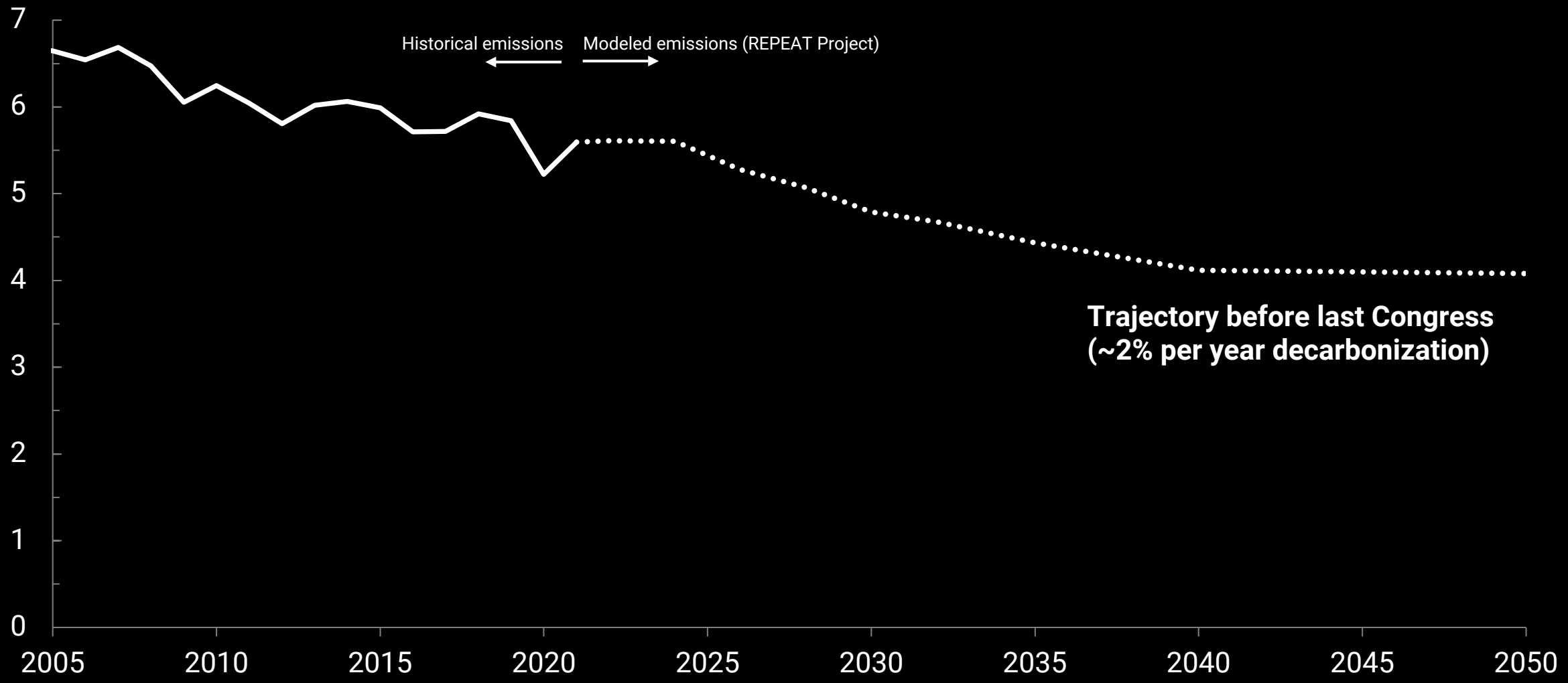

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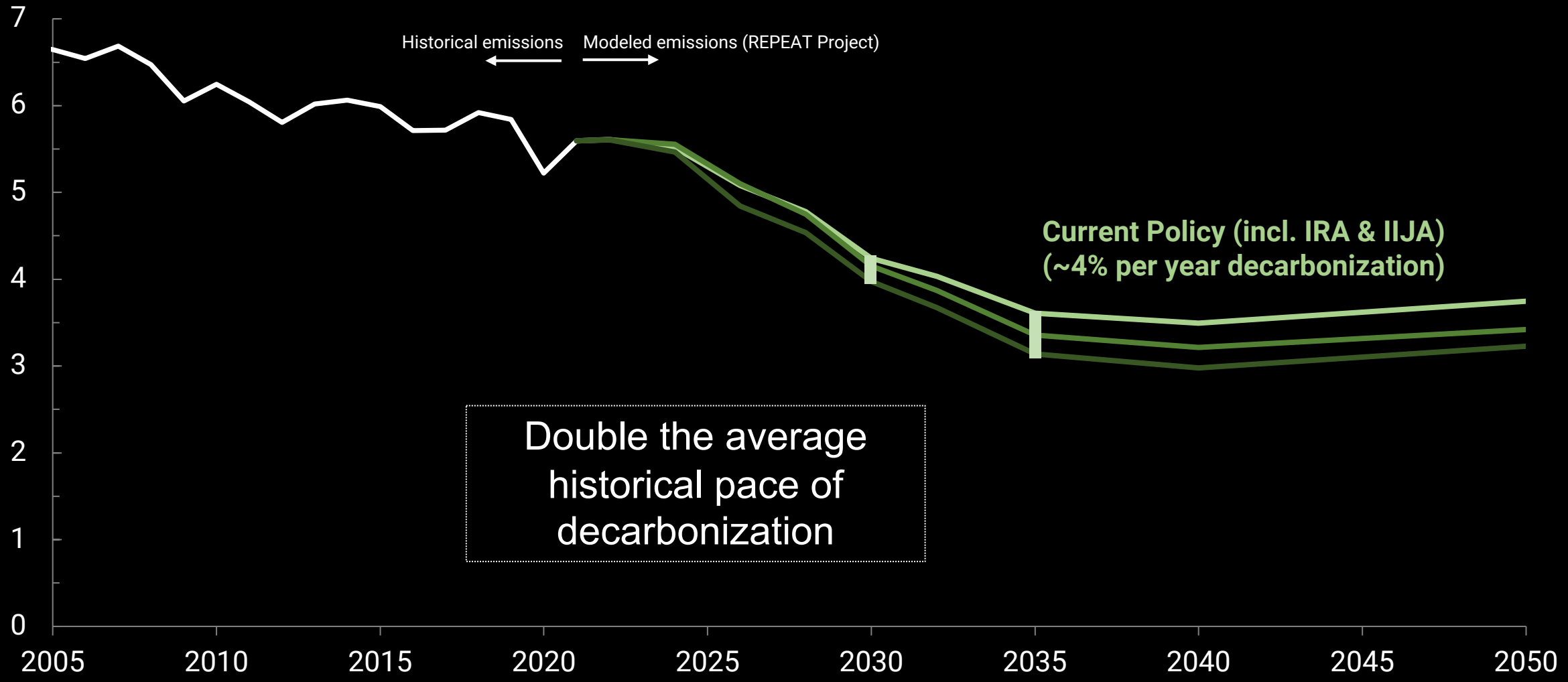

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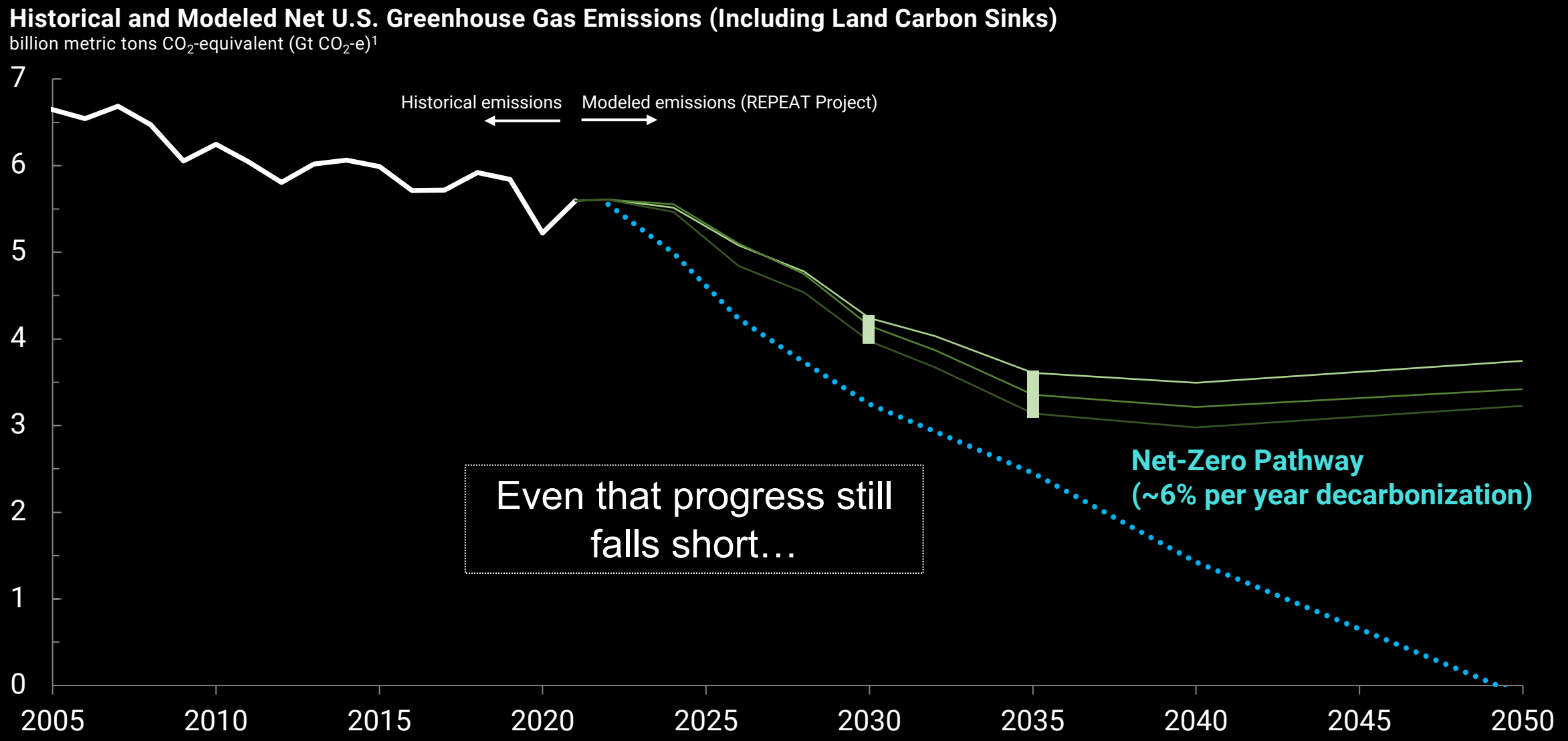

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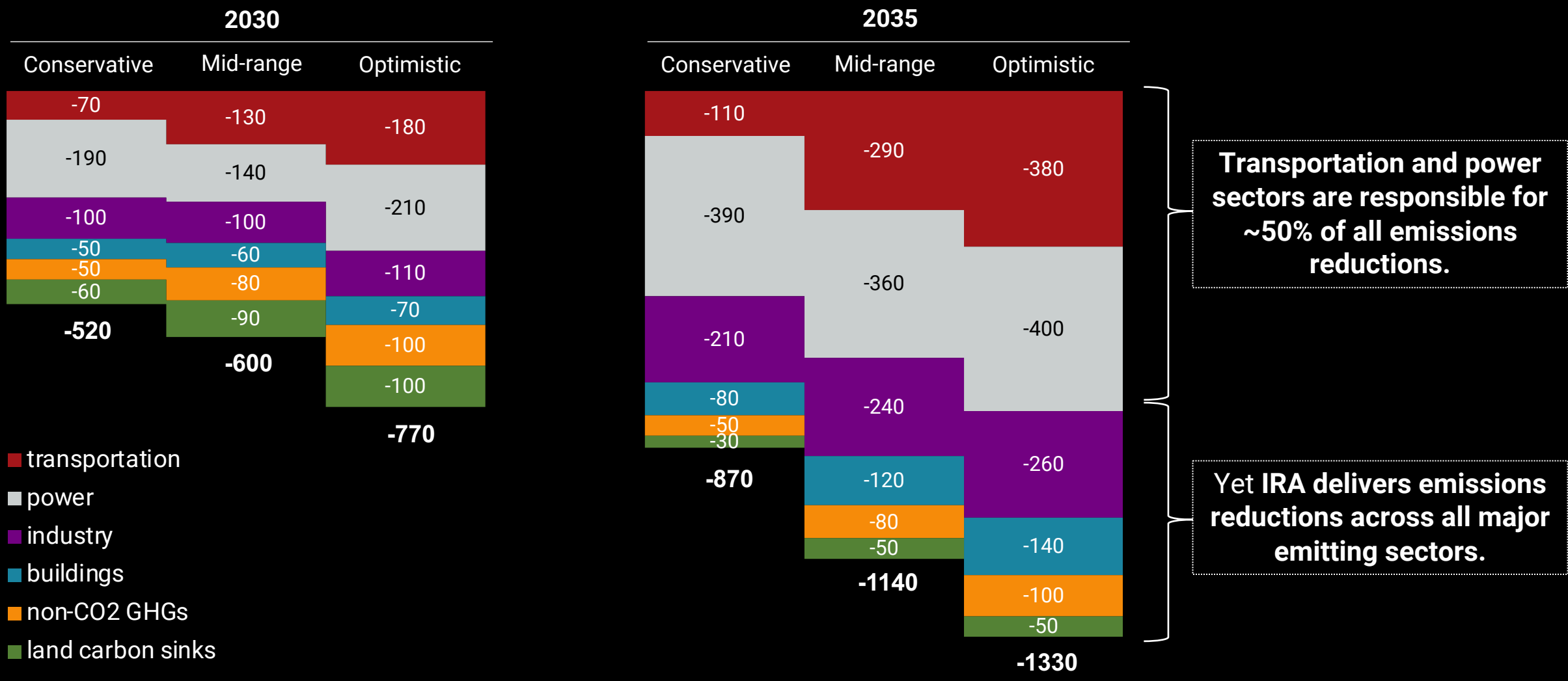
A Comprehensive Strategy

repeatproject.org

Difference in Sectoral Emissions Under Current Policies vs Frozen Policies as of January 2021

million metric tons CO_2-equivalent (Mt CO_2-e)[1]



Transportation and power sectors are responsible for ~50% of all emissions reductions.

Yet **IRA delivers emissions reductions across all major emitting sectors.**

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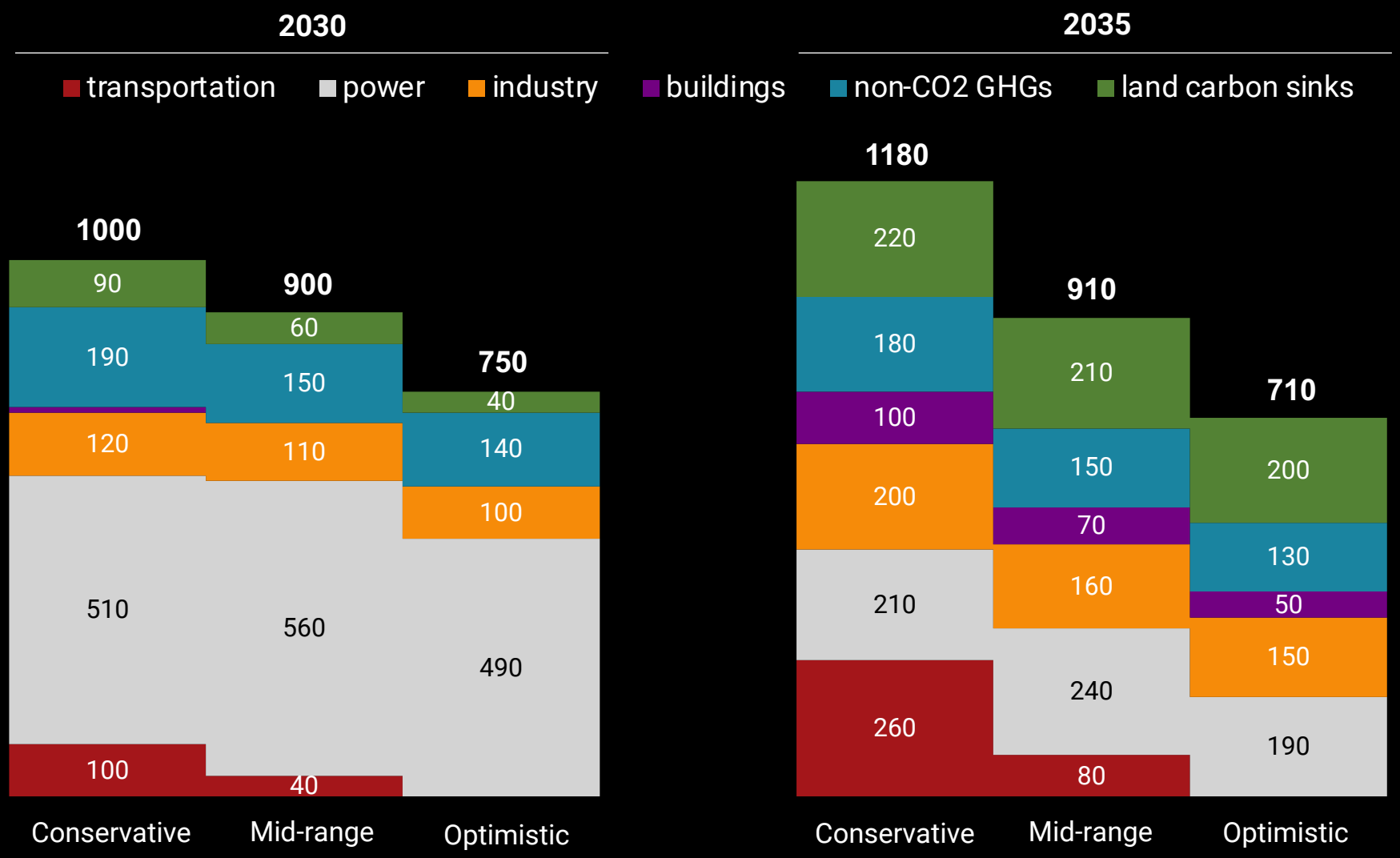
Closing the Gaps

repeatproject.org

Difference in Sectoral Emissions Under Current Policies vs Net-Zero Pathway

million metric tons CO_2-equivalent (Mt CO_2-e)[1]



Further emissions reductions are needed to **close the gap and reach 2030 GHG target.**

Major opportunities:

1. **EPA power sector regs**: accelerated coal retirements
2. **EPA methane rules**
3. **EPA vehicle regs**
4. **Farm Bill**: agricultural methane & N_2O, soils & forests.
5. **Industrial efficiency & decarbonization**

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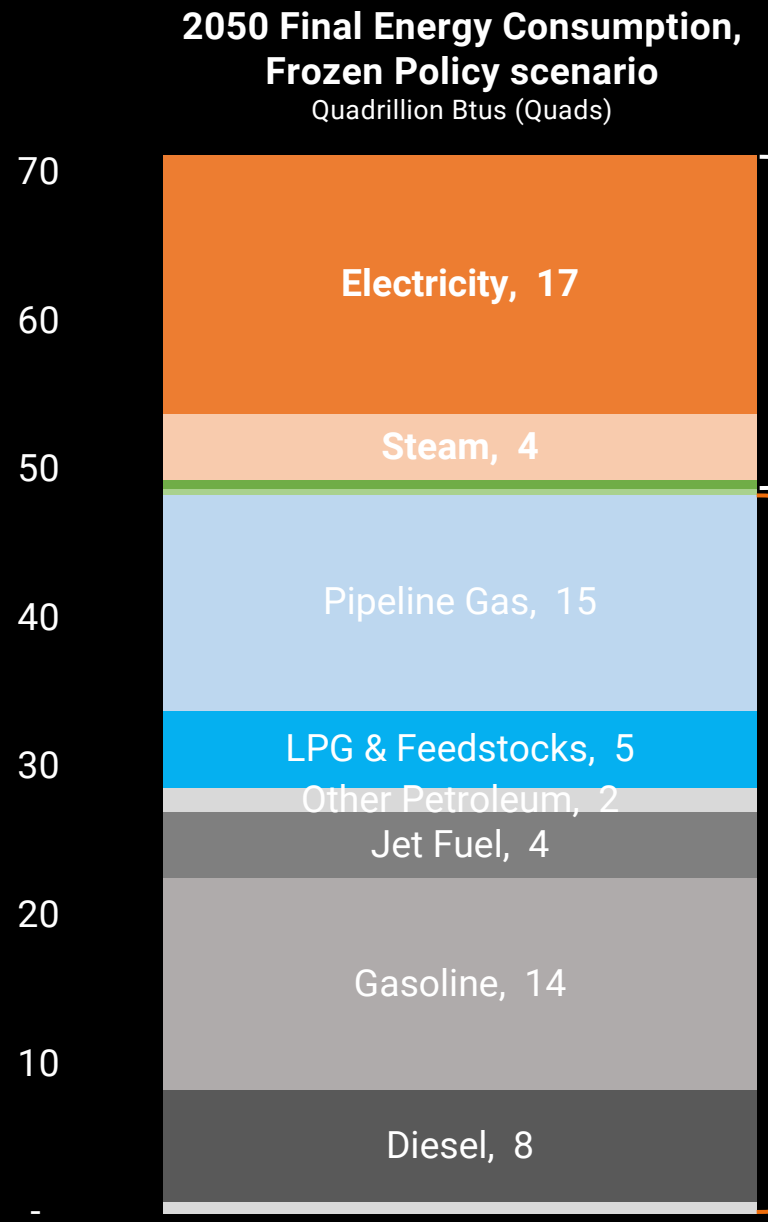
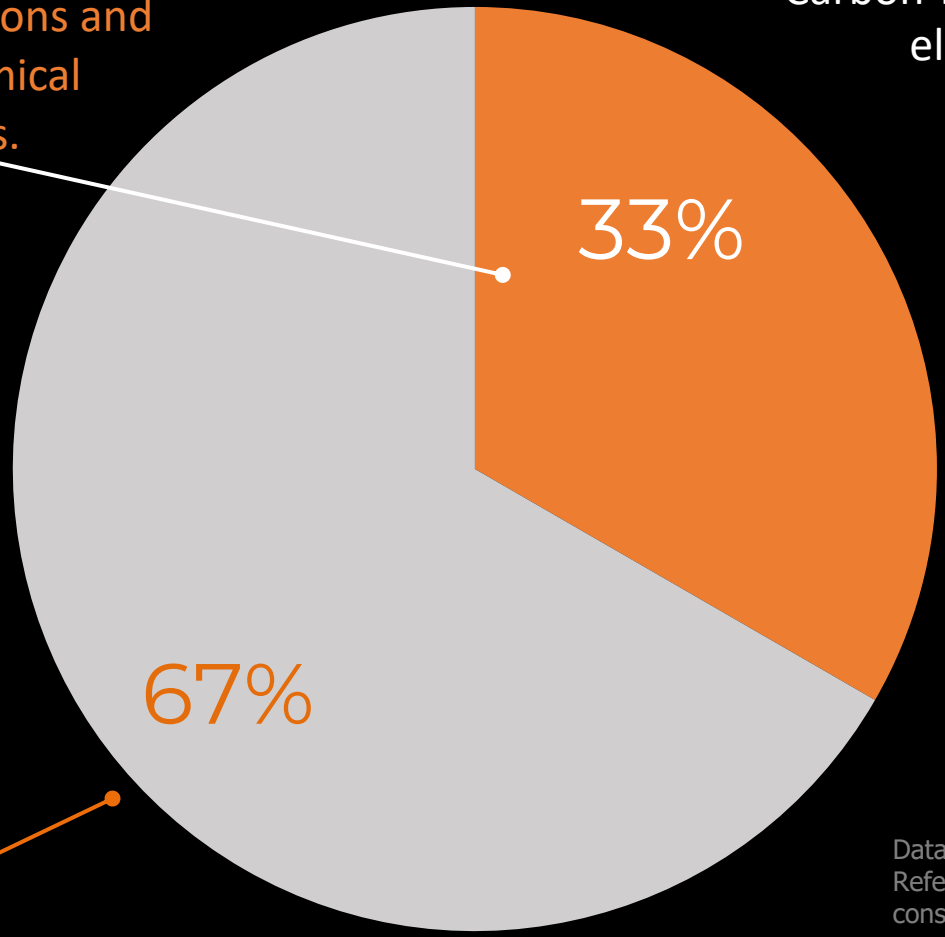
HOW DO WE GET ON THE
PATH TO NET-ZERO?

Sizing up the challenge



Liquid and gaseous hydrocarbons and petrochemical feedstocks.



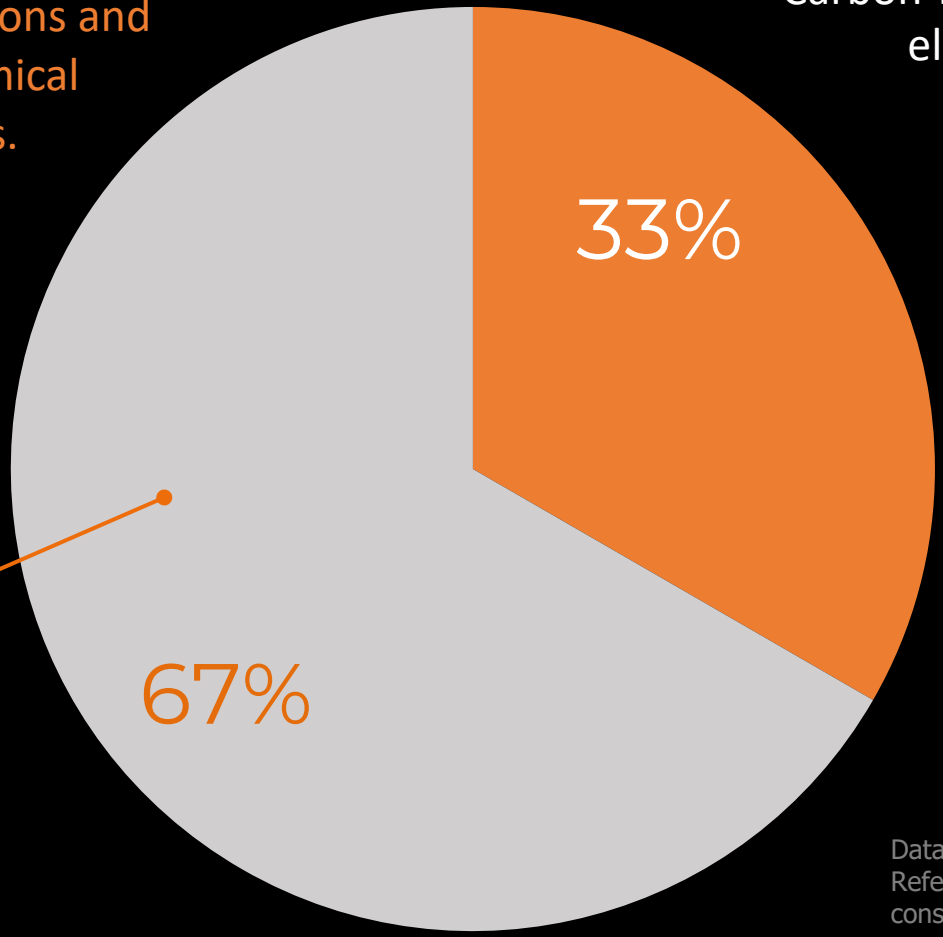
Carbon-free carriers like electricity, steam, hydrogen, plus biomass-derived fuels.

Data source: Net-Zero America study, Reference scenario 2050 final energy consumption

Sizing up the challenge

Liquid and gaseous hydrocarbons and petrochemical feedstocks.

Carbon-free carriers like electricity, steam, hydrogen, plus biomass-derived fuels.

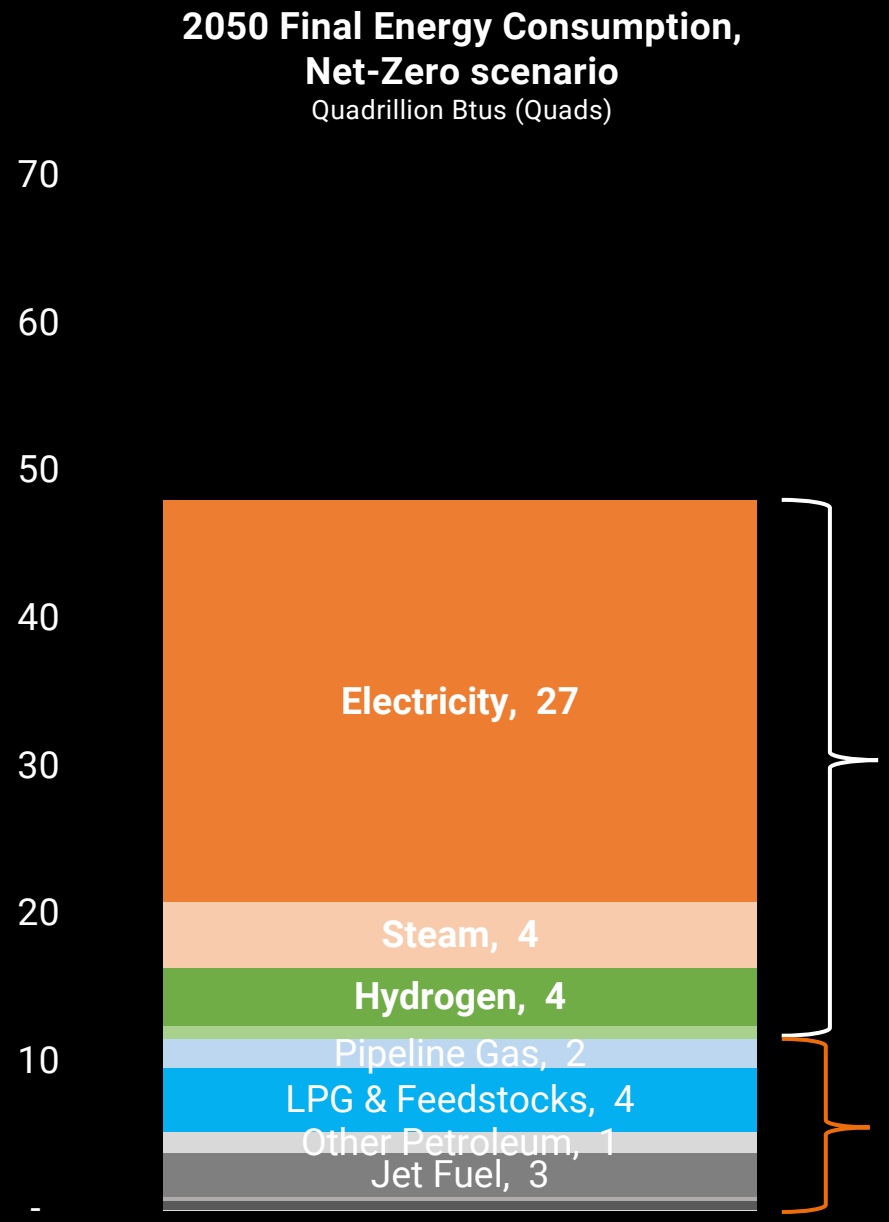


Options:

- Carbon capture and storage
- Carbon-neutral substitutes like some biofuels, hydrogen, or electro-fuels
- Negative emissions technologies like carbon dioxide removal

Data source: Net-Zero America study, Reference scenario 2050 final energy consumption

The net-zero solution



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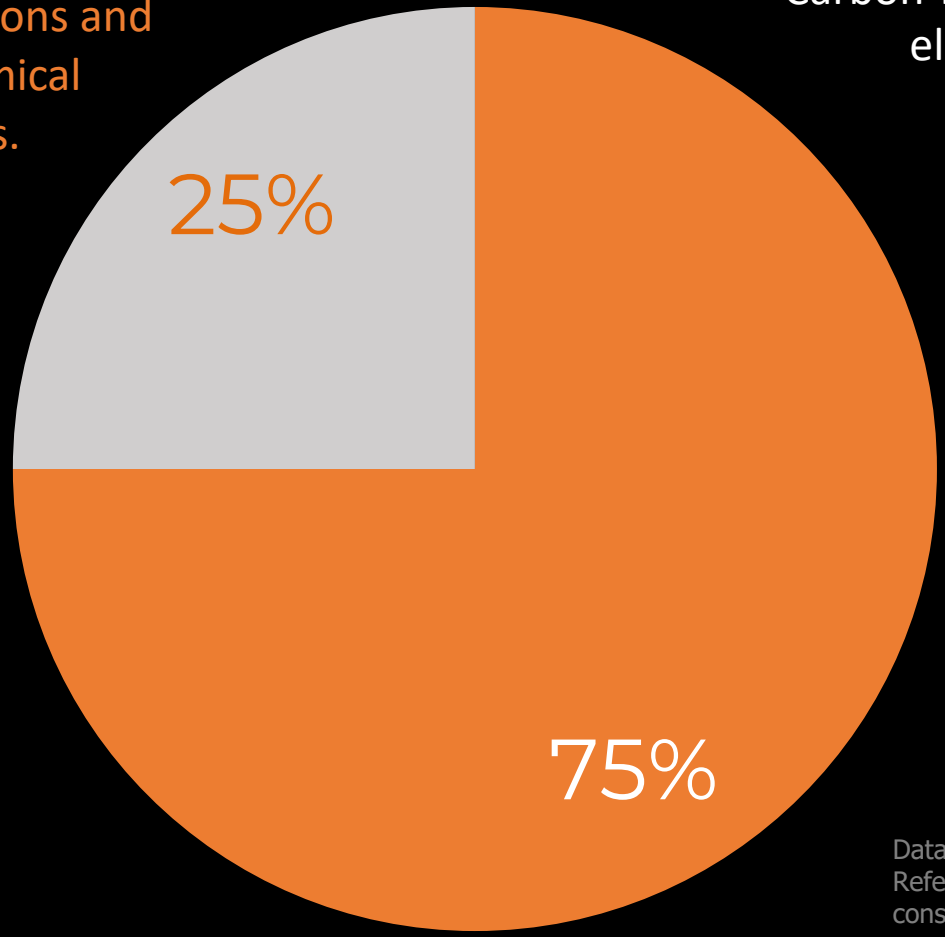

Carbon-free carriers like electricity, steam, hydrogen, plus biomass-derived fuels.

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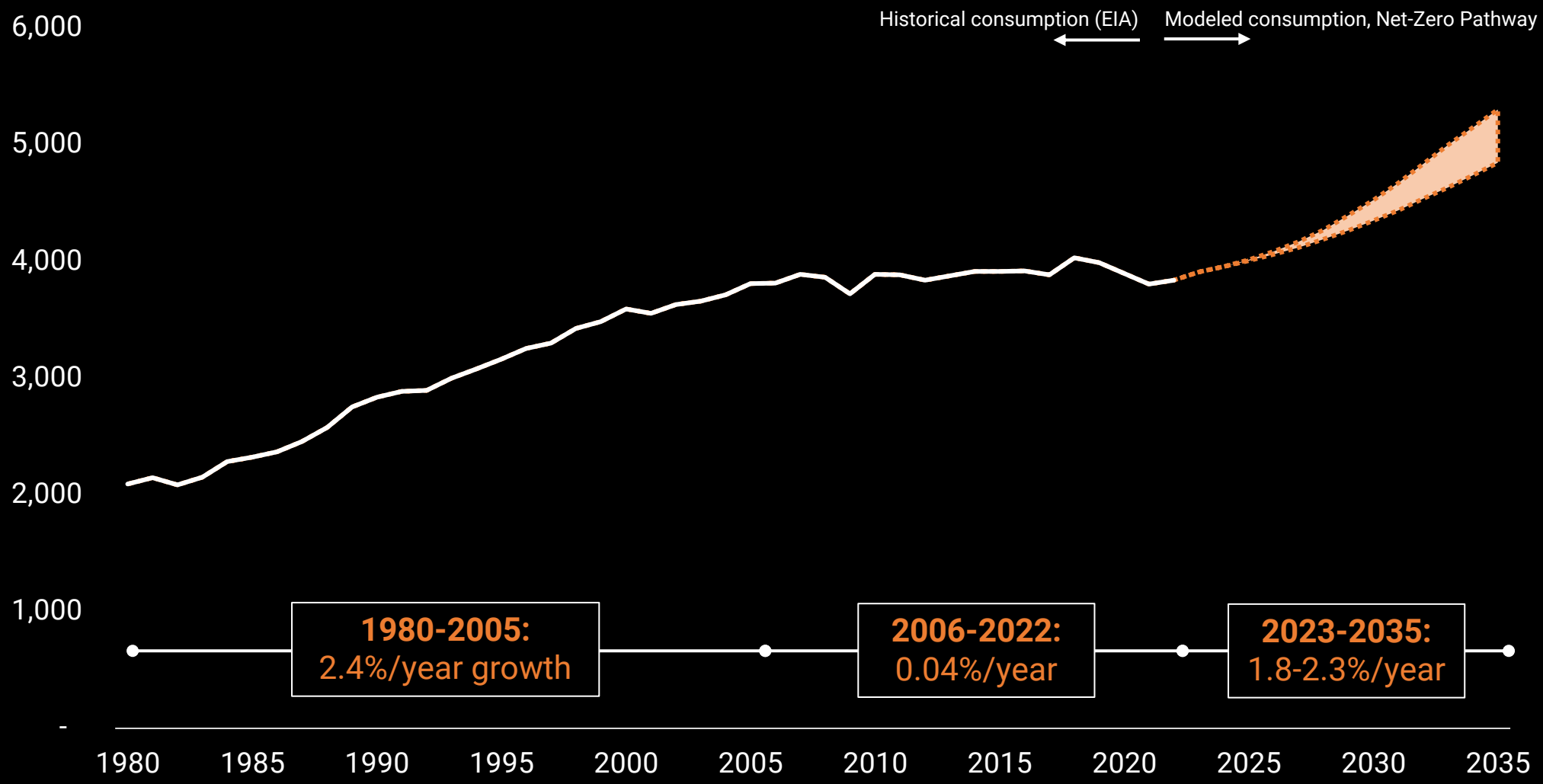
Electricity sector must get ready for growth mode

Total annual U.S. electricity consumption
Billion kilowatt-hours (or terawatt-hours)



Data source: EIA (historical), REPEAT Project (modeled)

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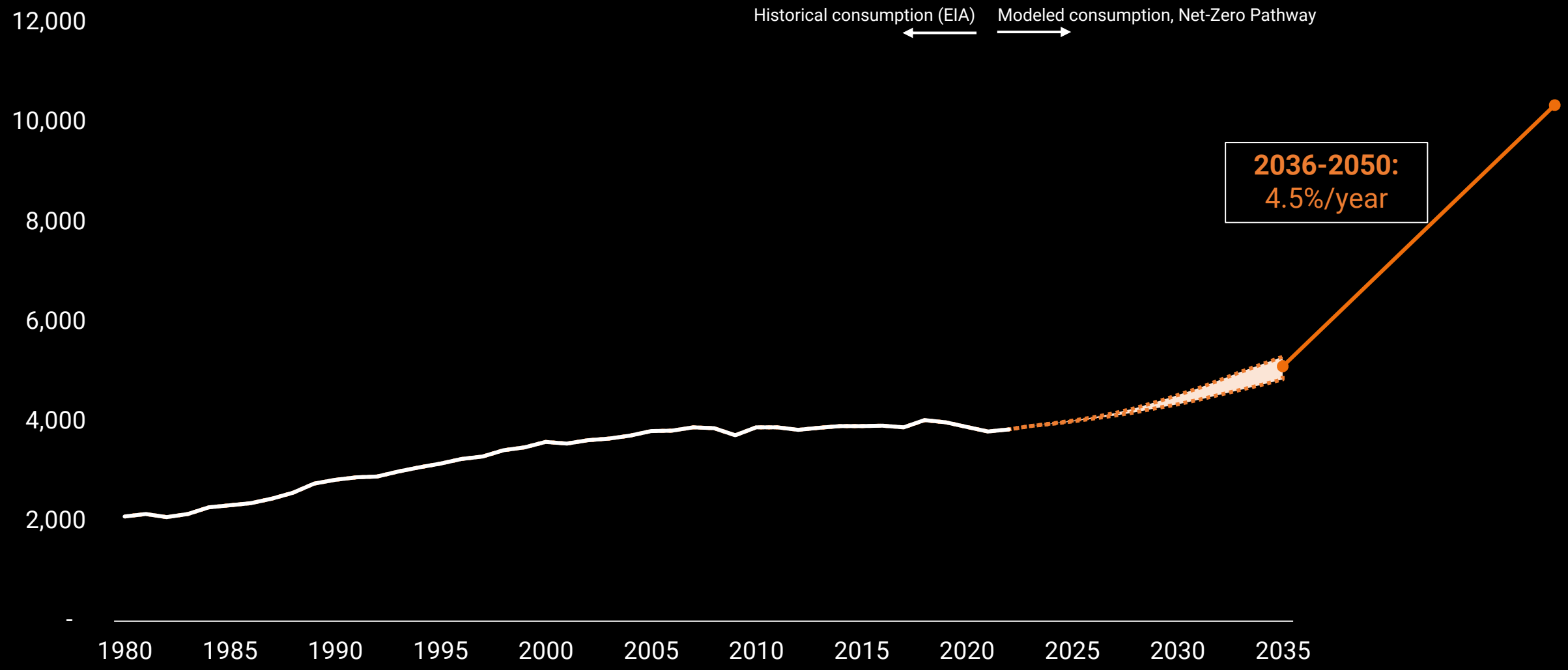
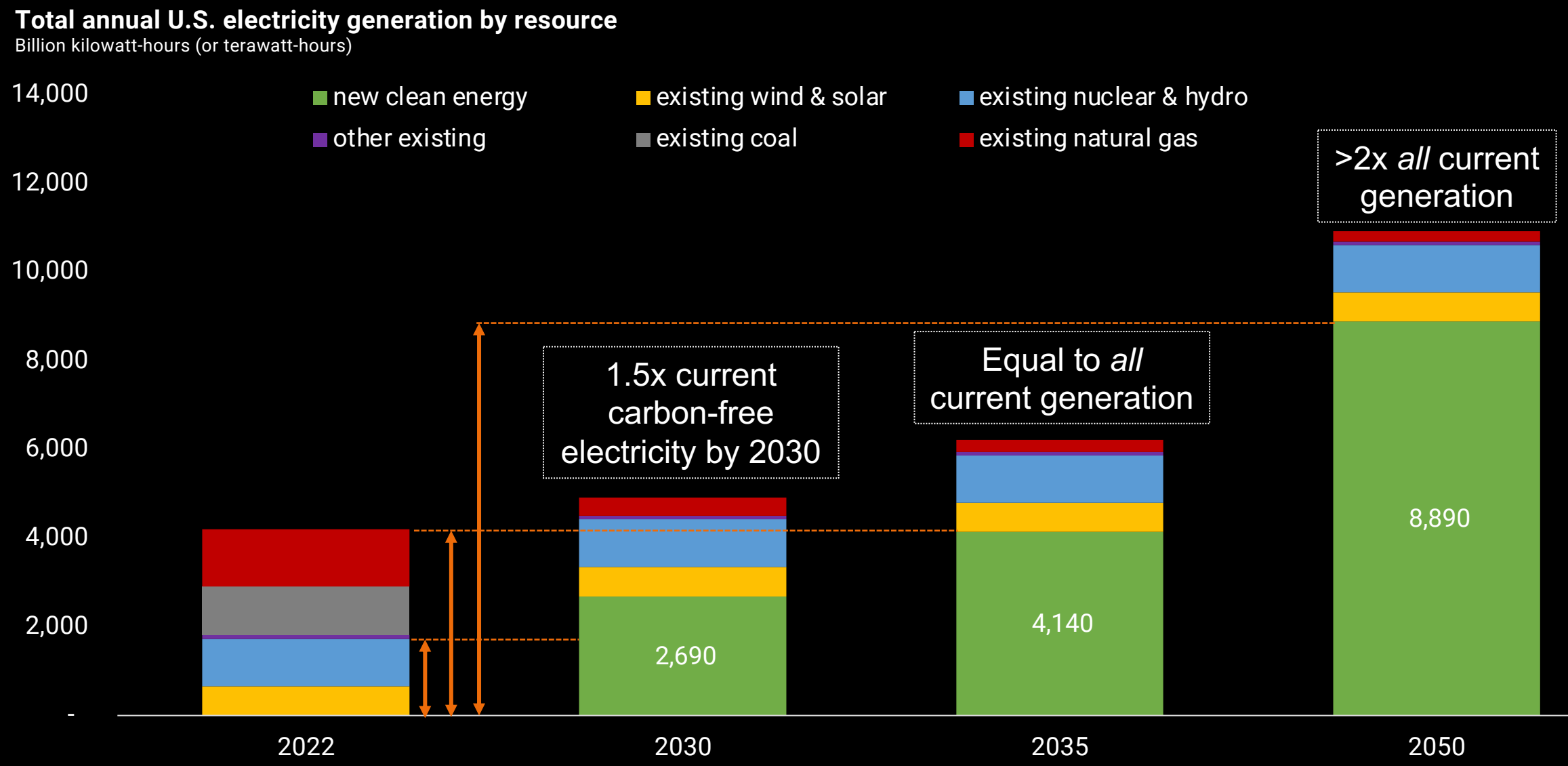


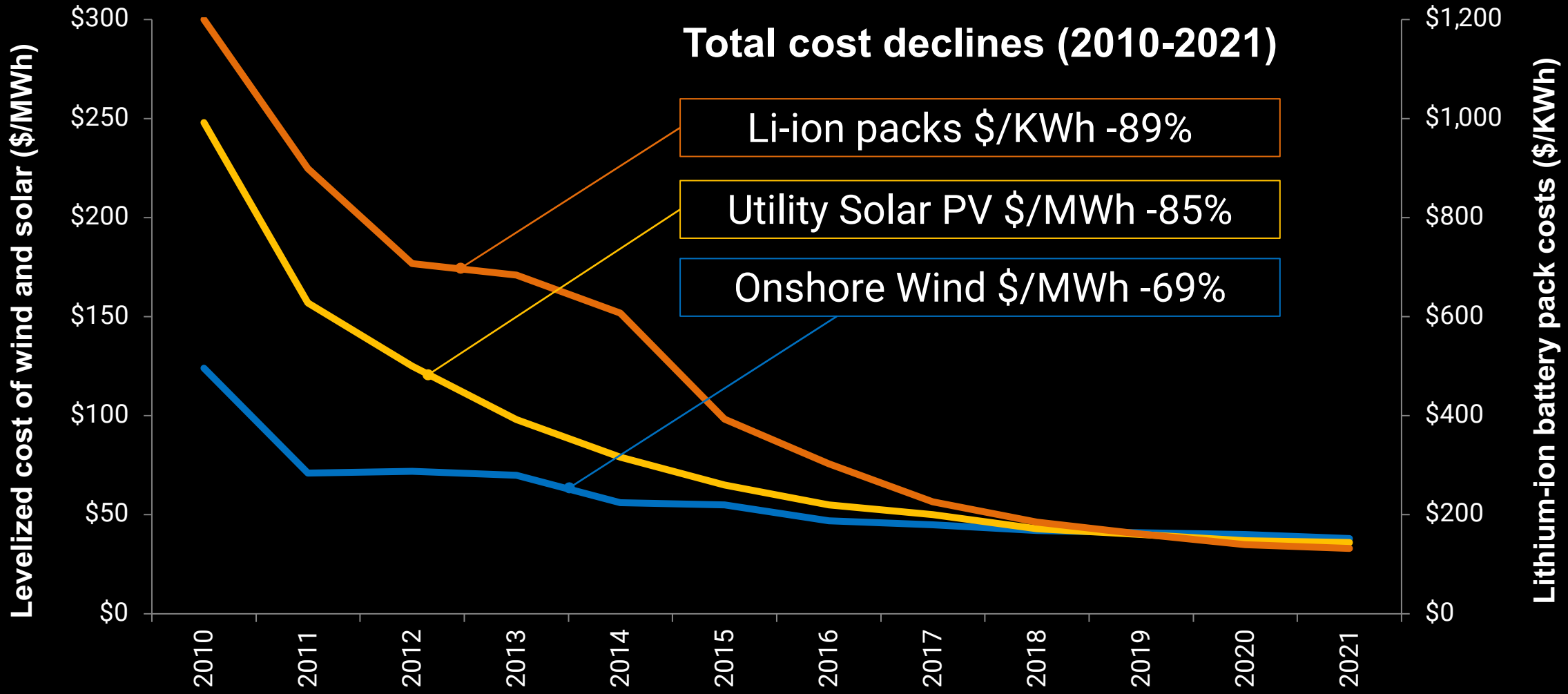
Data source: EIA (historical), REPEAT Project (modeled)

Clean electricity: the linchpin



Data source: REPEAT Project, Net-Zero Pathway

Wind, solar, and battery costs have plummeted

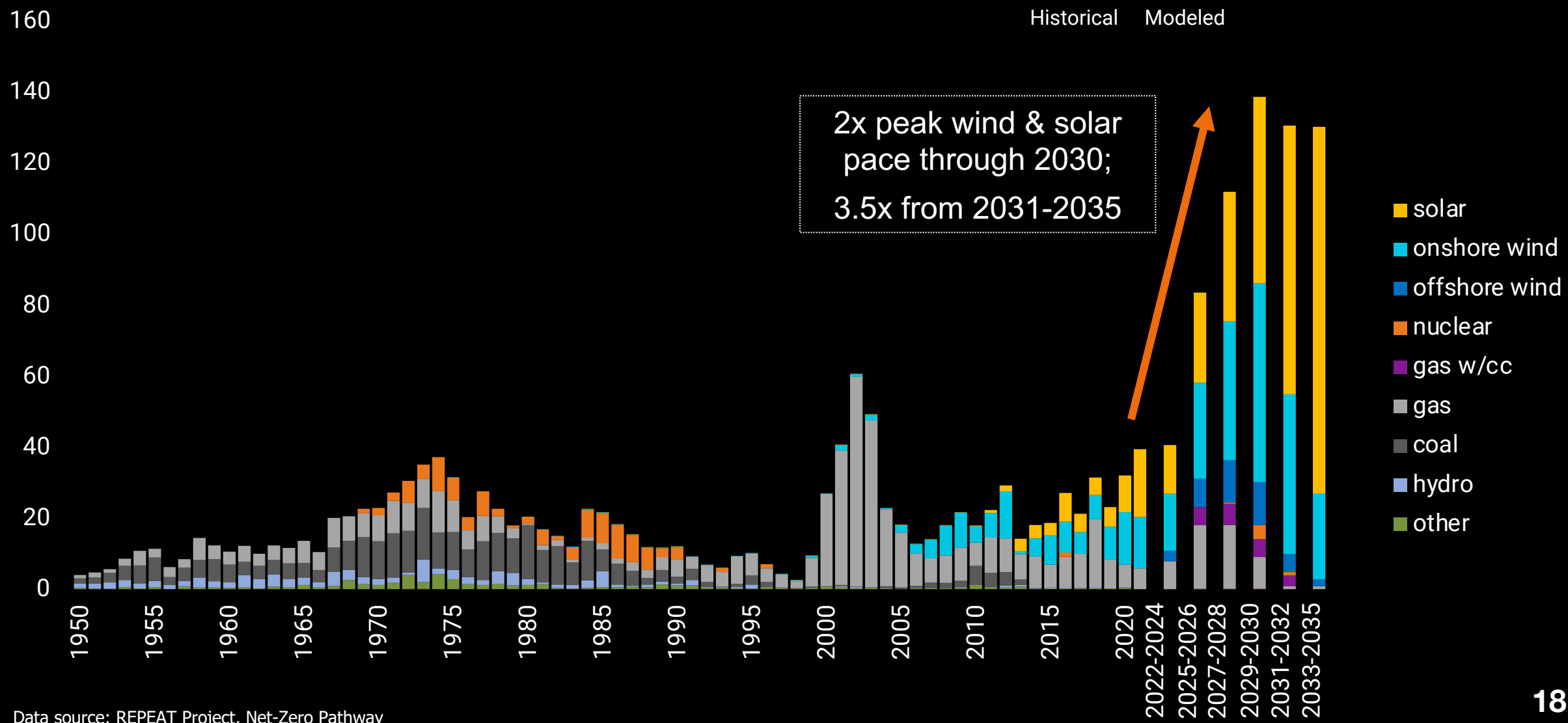


Data Sources: Wind & solar costs from Lazard (2021), Lazard's Levelized Cost of Energy Analysis – Version 15.0.
Battery pack costs from Bloomberg New Energy Finance (2021), Battery Price Survey.

Time to smash new records

Historical power generation capacity additions vs modeled Net-Zero Pathway

gigwatts per year



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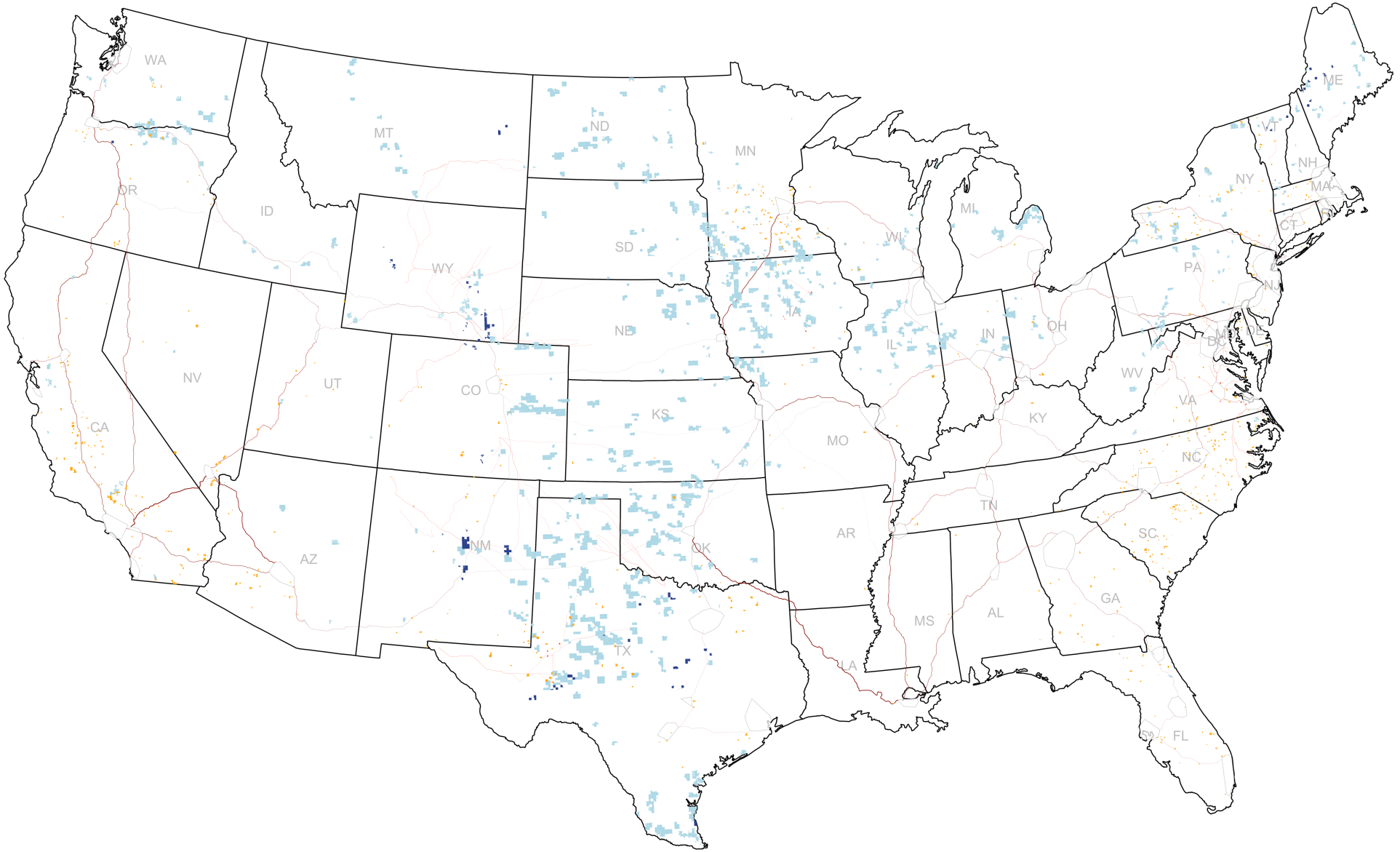
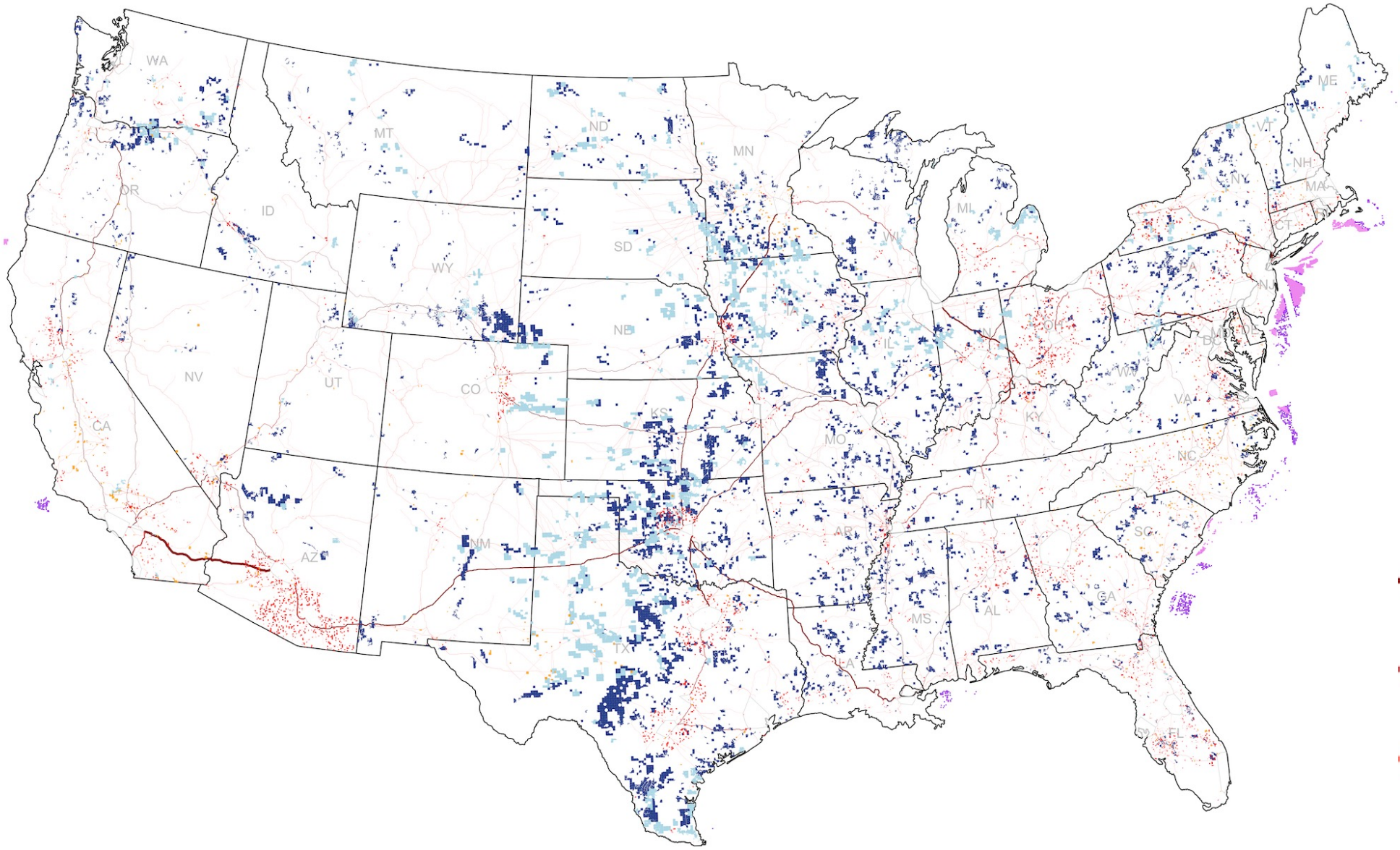
2022



- Existing Utility-scale Solar
- Existing Onshore Wind
- New Utility-Scale Solar
- New Onshore Wind
- New Offshore Wind - Preferred
- New Offshore Wind - Non-preferred
- Inter-regional transmission (>500 kV HVDC)
- Intra-region transmission (<500 kV,>240 kV)
- CPA-substation to metro-substation (240 kV)

2050



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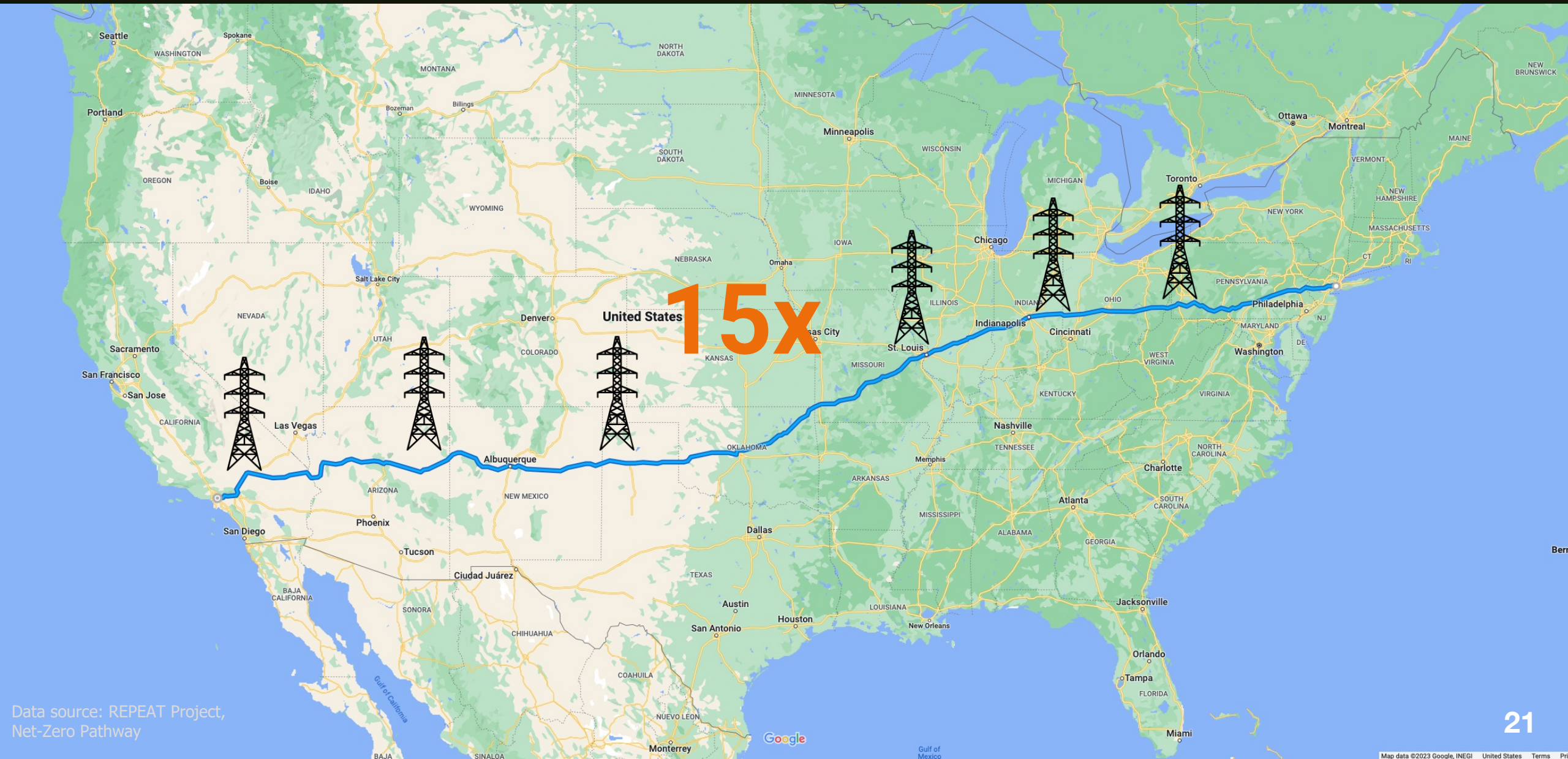
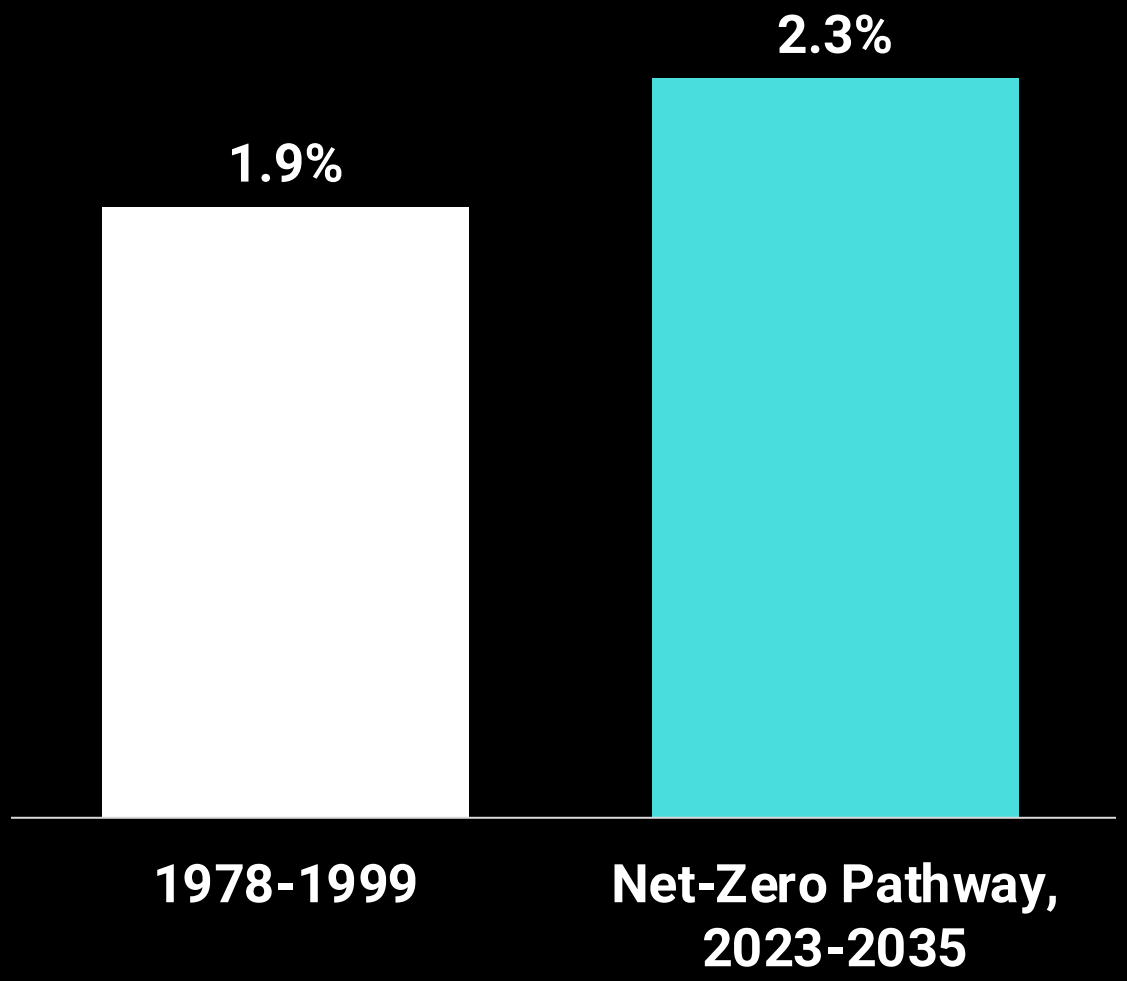
We’re going to need a bigger grid



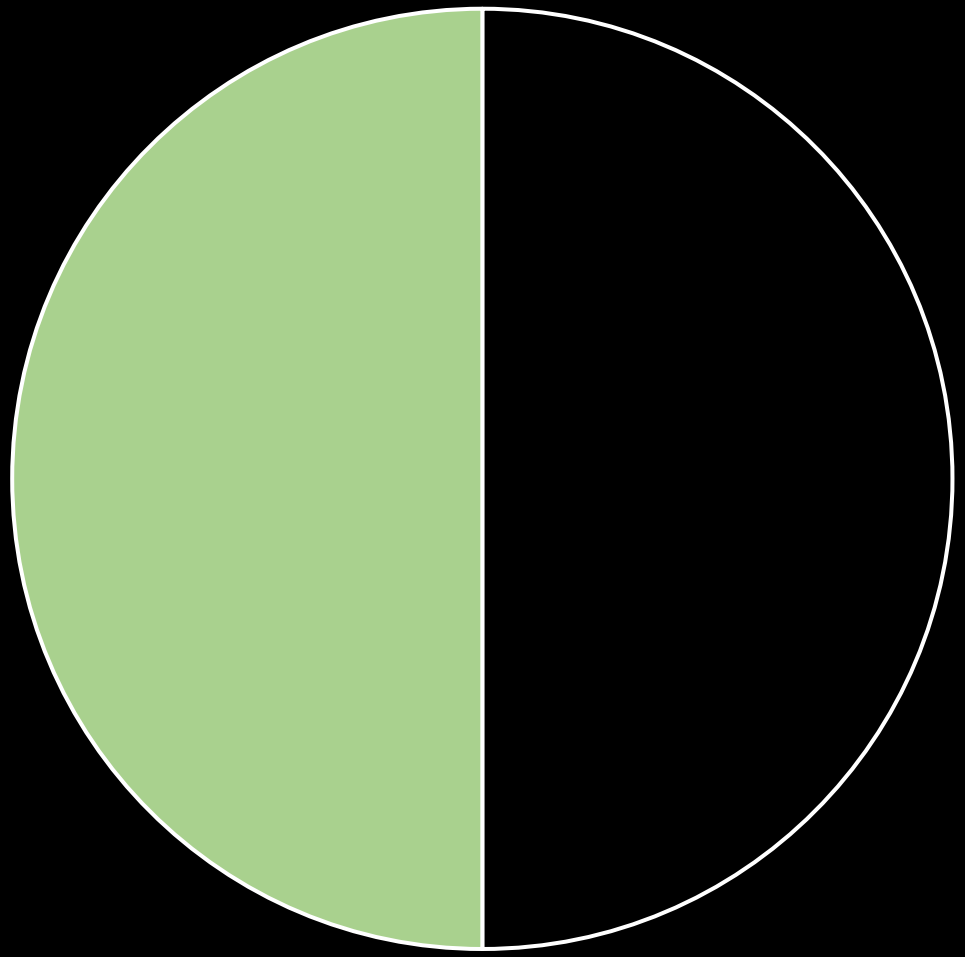
Data source: REPEAT Project, Net-Zero Pathway

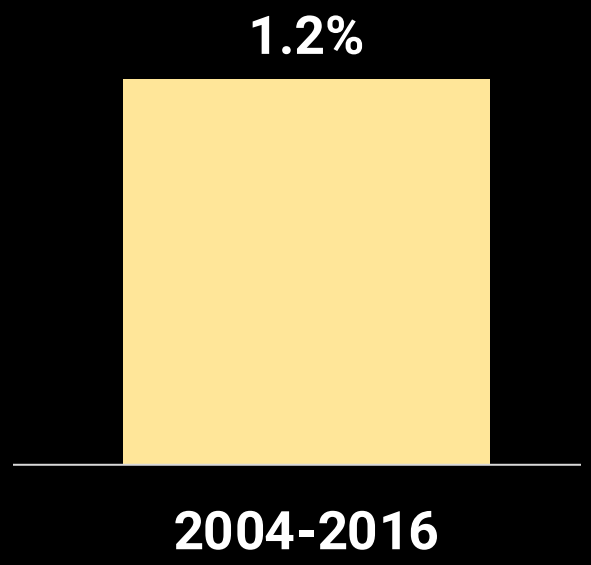
This isn’t impossible...



Data source: REPEAT Project, Net-Zero Pathway and Cembalest (2022), “Eye on the Market 12th Edition: 2022 Annual Energy Paper” p.12.

...but the price of failure is high





Data source: REPEAT Project, Net-Zero Pathway and Cembalest (2022), "Eye on the Market 12th Edition: 2022 Annual Energy Paper" p.12.

The playbook is now clear

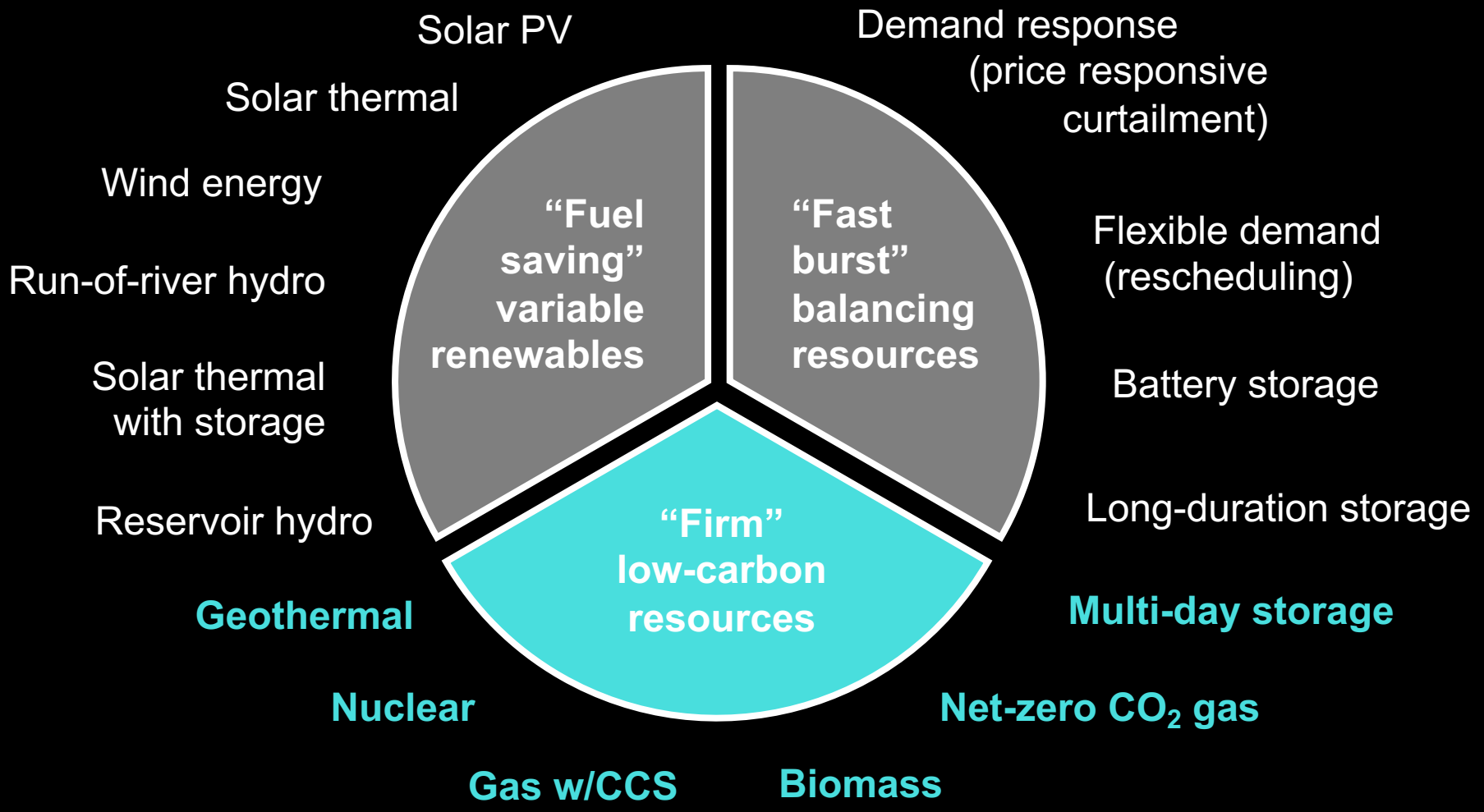
1. **Build wind & solar at record pace**
2. **Expand the grid to ready for electrification & renewables**
3. **Retire coal**
4. **Maintain existing nuclear and natural gas capacity (on net)**

These steps can deliver 80-90% cut in electricity sector CO_2 emissions by 2035 with bulk electricity supply costs comparable to or lower than today's

Just two more steps to get to 100% clean

1. Build wind & solar at record pace
2. Expand the grid to ready for electrification & renewables
3. Retire coal
4. Maintain existing nuclear and natural gas capacity (on net)
5. **Demonstrate clean firm resources at commercial scale in mid-to-late 2020s**
6. **Transition to clean firm resources by 2045**

The winning team



Adapted from figure originally published in: Sepulveda, Jenkins et al. 2018, "The role of firm low-carbon electricity resources in deep decarbonization of power generation, *Joule* 2(11). https://doi.org/10.1016/j.joule.2018.08.006

The 100% clean electricity playbook

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