



Electricity

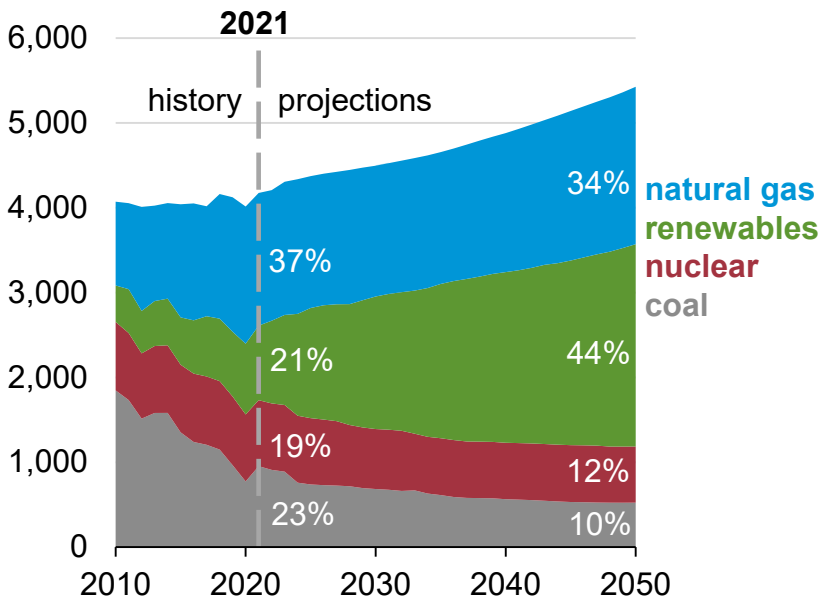


U.S. electricity generation and shares from selected fuels and renewable sources

U.S. electricity generation from selected fuels

AEO2022 Reference case

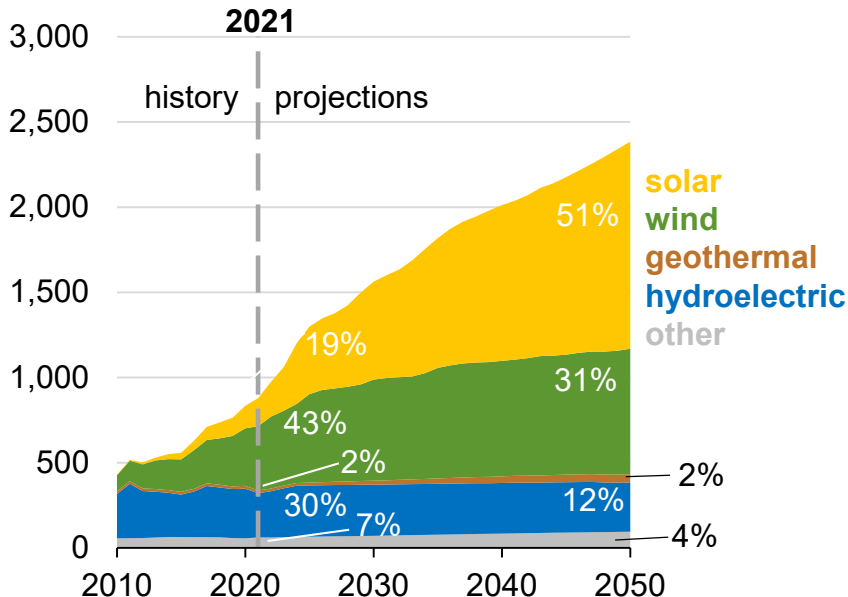
billion kilowatthours



U.S. renewable electricity generation, including end use

AEO2022 Reference case

billion kilowatthours

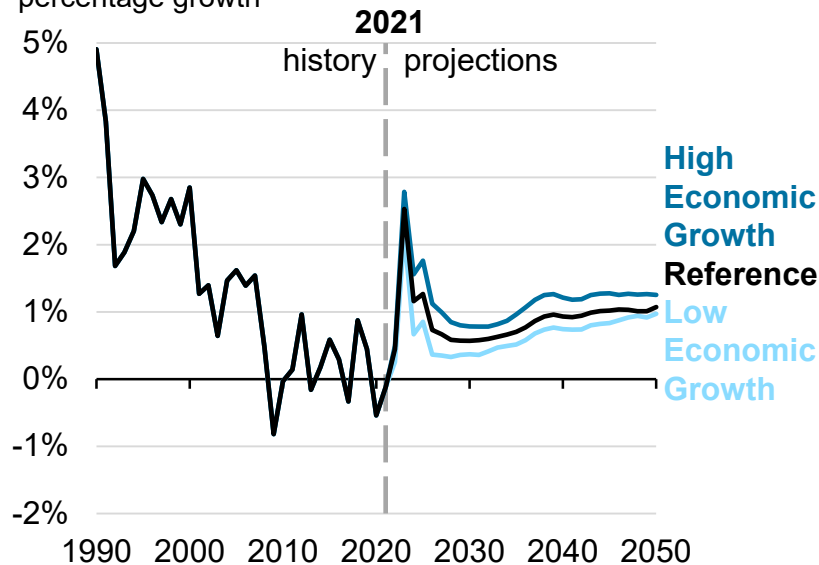




U.S. electricity demand

U.S. electricity use growth rate, three-year rolling average
AEO2022 economic growth cases

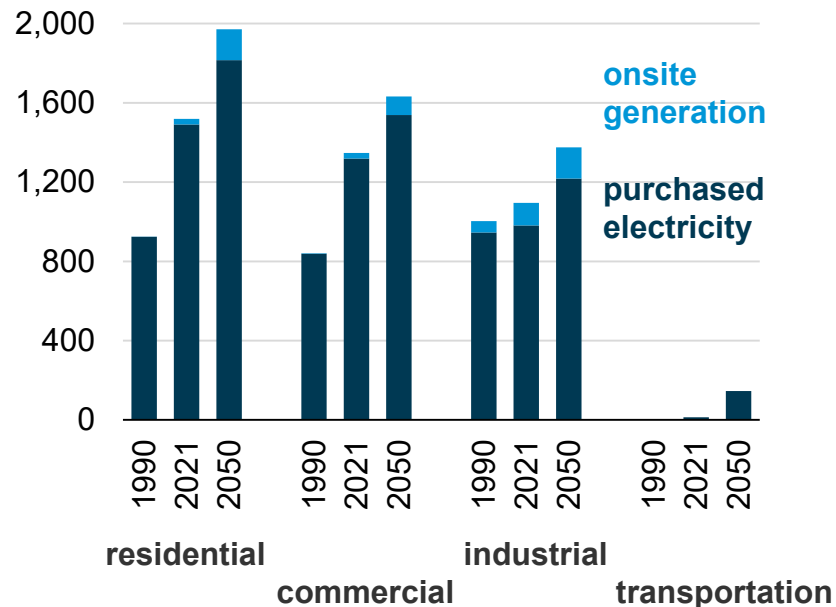
percentage growth



Note: Onsite generation is electricity produced onsite for own use.

U.S. electricity use by end-use sector
AEO2022 Reference case

billion kilowatthours



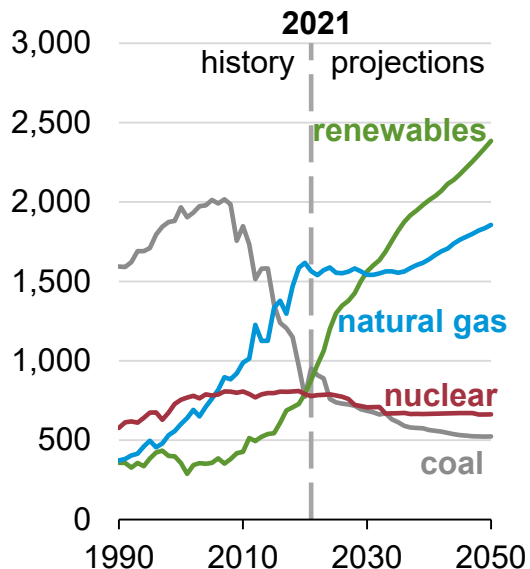


U.S. electricity generation levels from selected fuels and renewable sources

U.S. electricity generation, AEO2022 oil and gas supply cases

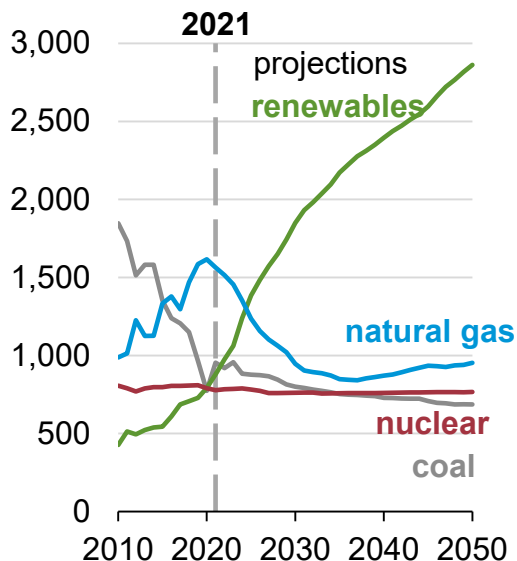
Reference case

billion kilowatthours



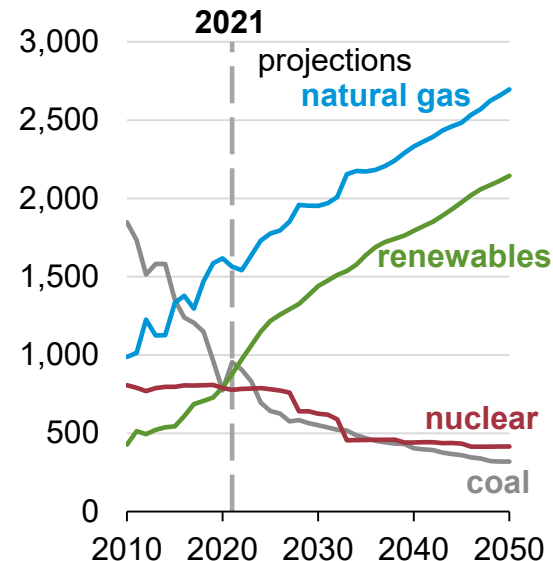
Low Oil and Gas Supply case

billion kilowatthours



High Oil and Gas Supply case

billion kilowatthours



Note: Renewables category includes electricity generation from wind, solar, hydroelectric, geothermal, wood, and other biomass sources.

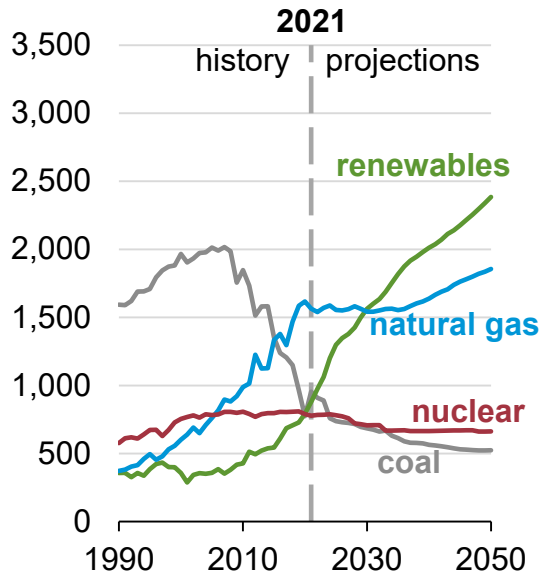


U.S. electricity generation levels from selected fuels and renewable sources

U.S. electricity generation, AEO2022 renewables cost cases

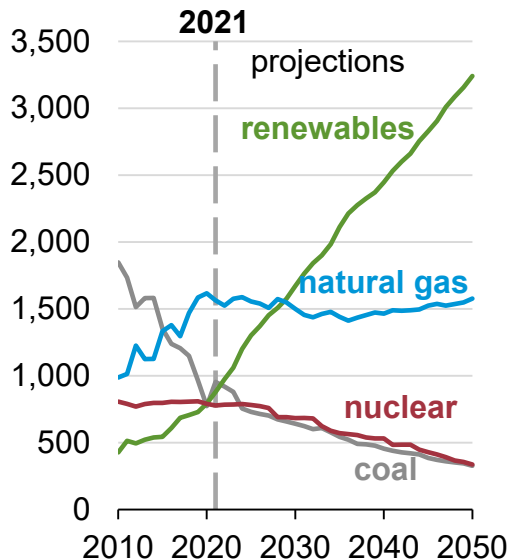
Reference case

billion kilowatthours



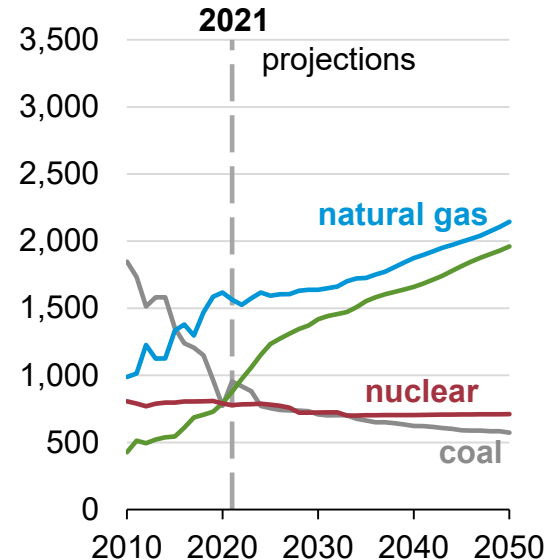
Low Renewables Cost case

billion kilowatthours



High Renewables Cost case

billion kilowatthours



Note: Renewables category includes electricity generation from wind, solar, hydroelectric, geothermal, wood, and other biomass sources.

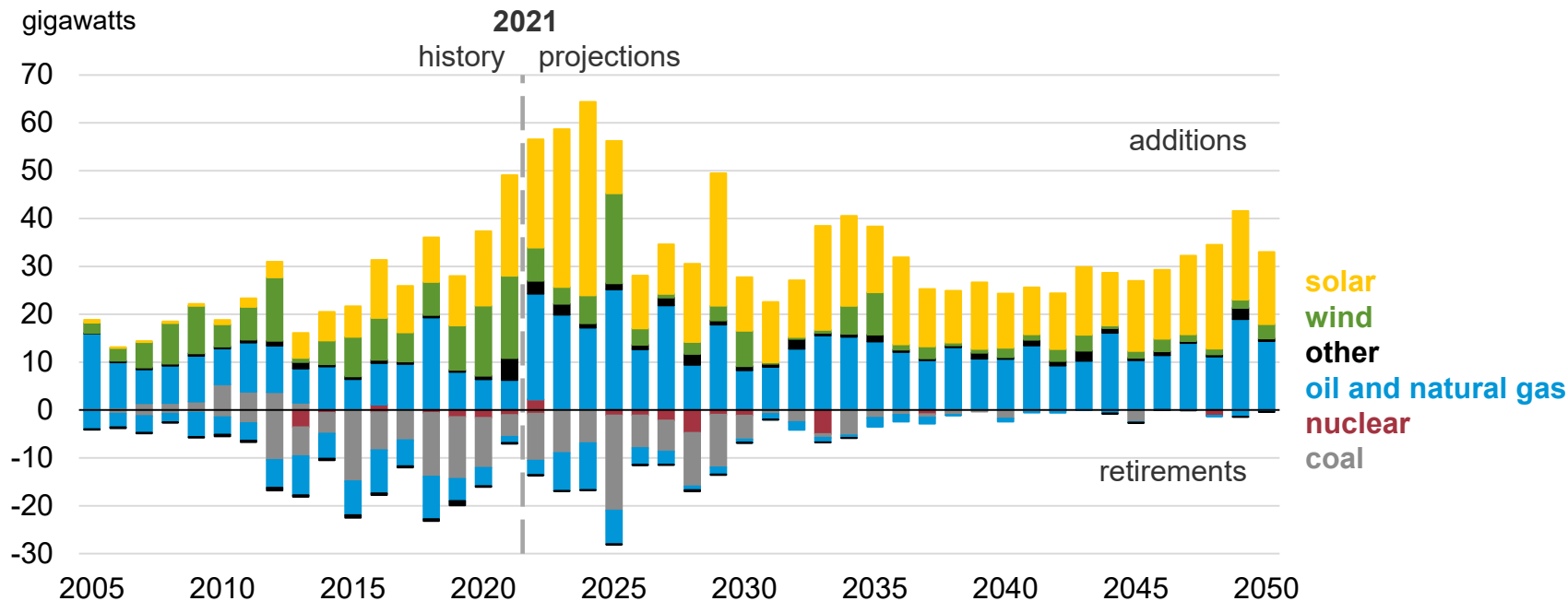


U.S. retiring and new generating capacity

Annual electricity generating capacity additions and retirements

AEO2022 Reference case

gigawatts



Source: Form EIA-860M, *Monthly Update to the Annual Electric Generator Report*, August 2021

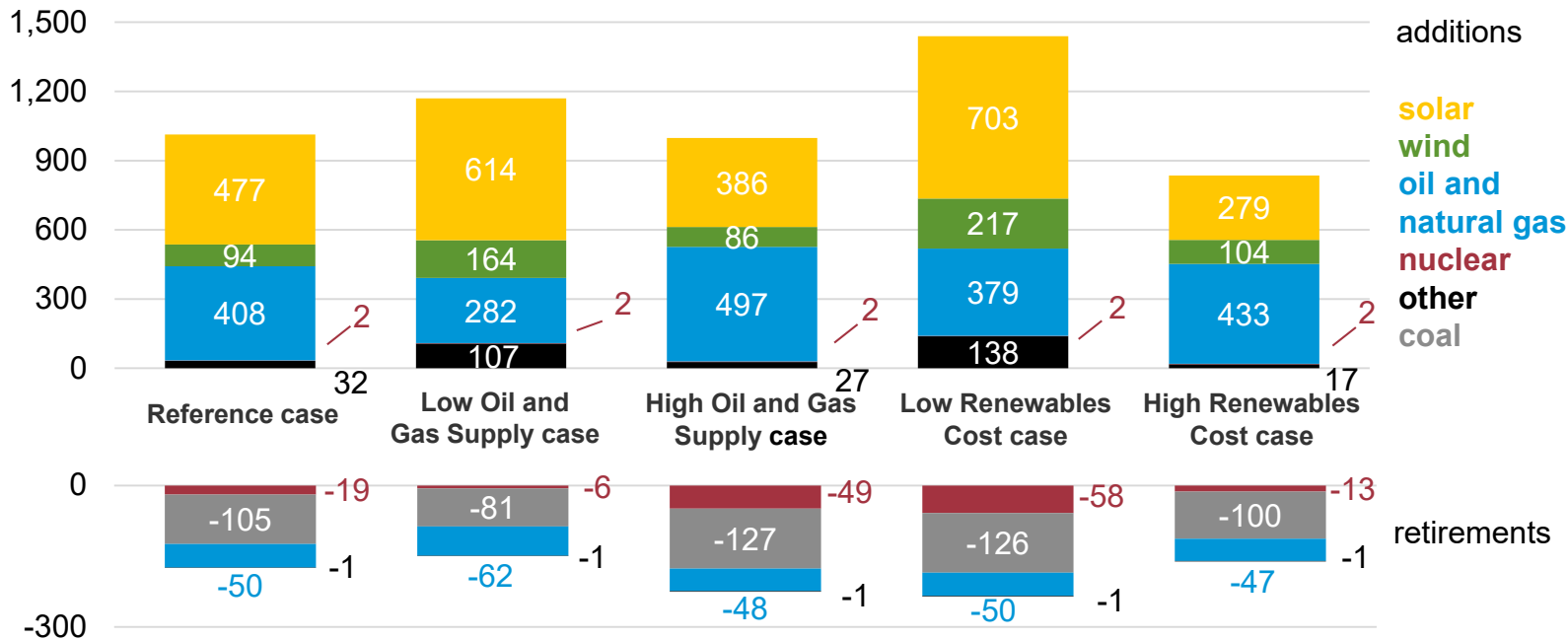


U.S. cumulative retiring and new generating capacity

Cumulative electricity generating capacity additions and retirements (2022–2050)

AEO2022 selected cases

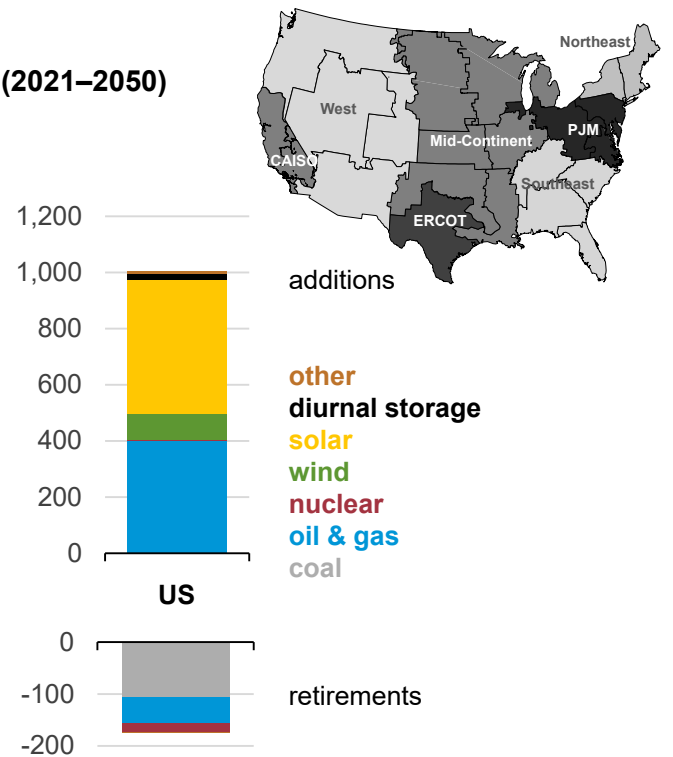
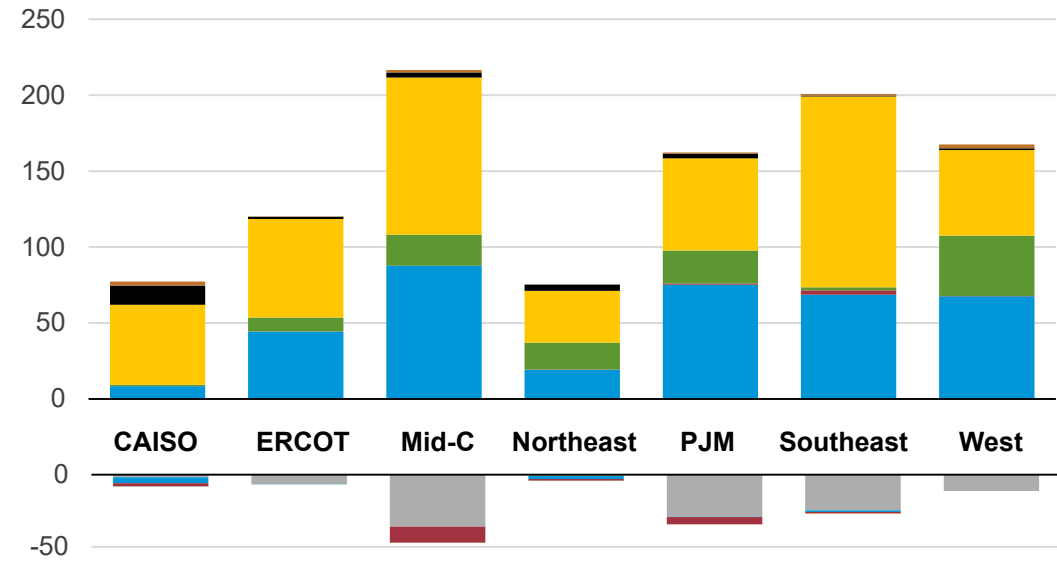
gigawatts





Regional cumulative capacity additions and retirements

Regional cumulative electricity generating capacity additions and retirements (2021–2050)
AEO2022 Reference case
gigawatts



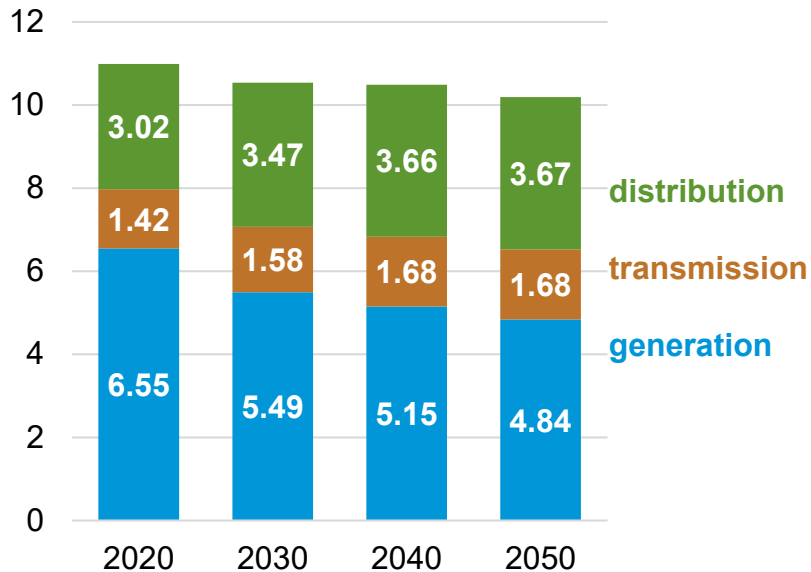


Electricity prices by components and long-term average electricity prices

Components of U.S. Electricity Prices

AEO2022 Reference case

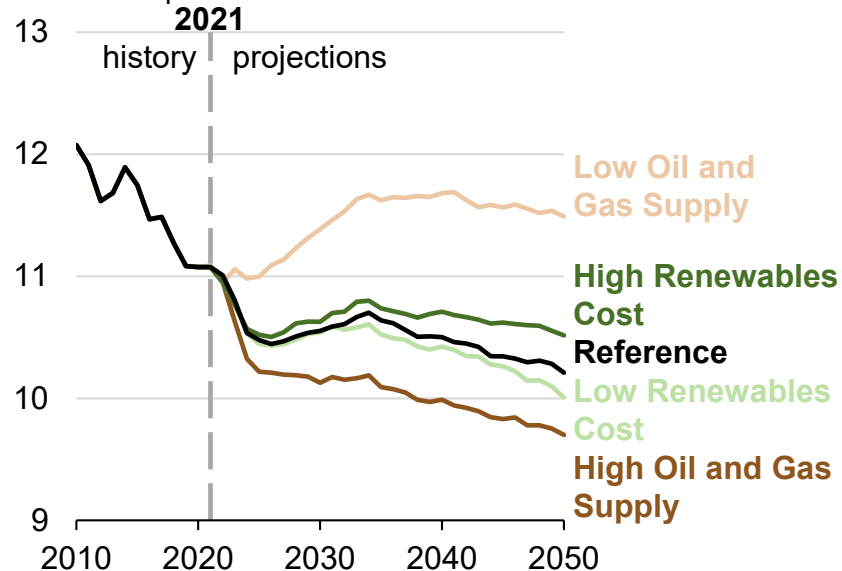
2021 cents per kilowatthour



U.S. average electricity price

AEO2022 selected cases

2021 cents per kilowatthour

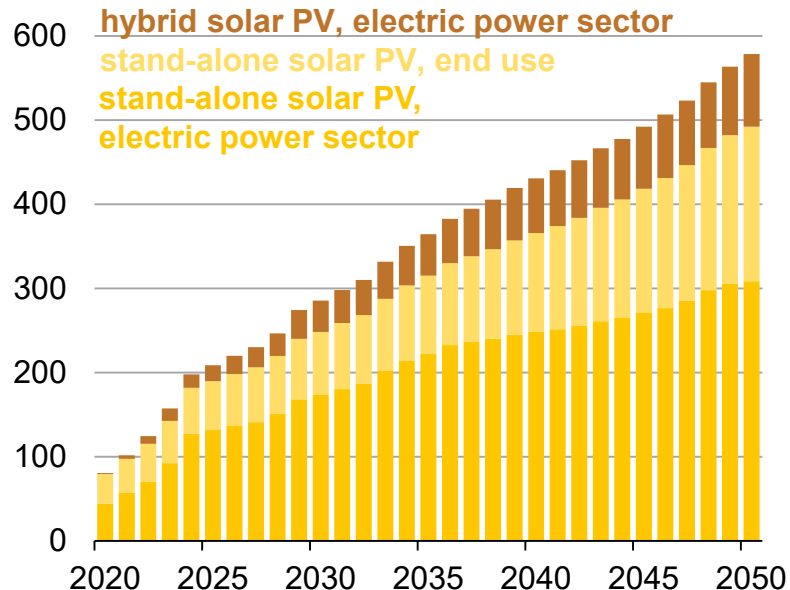




Hybrid versus stand-alone solar PV and energy storage systems

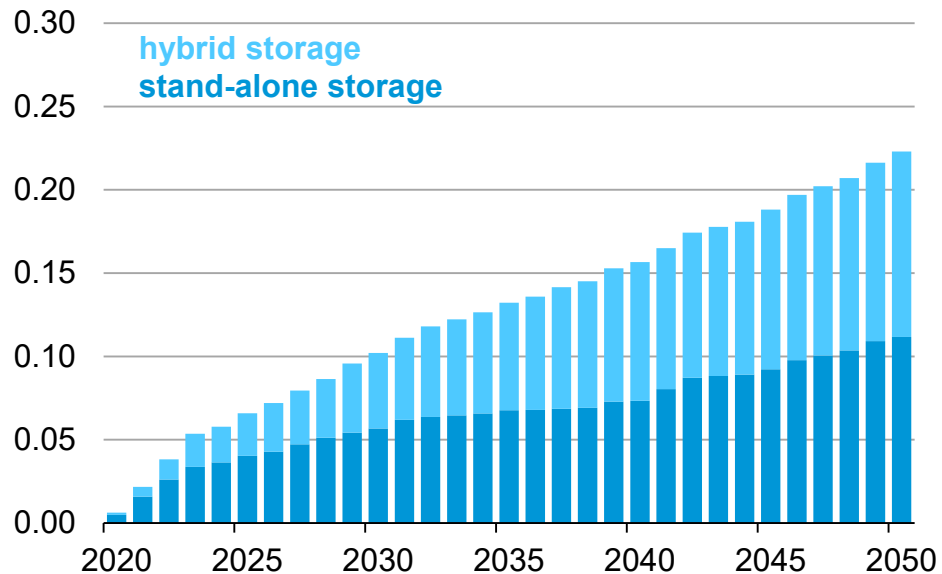
U.S. solar photovoltaic (PV) generating capacity,
all sectors

AEO2022 Reference case
gigawatts



U.S. storage energy capacity, electric power sector

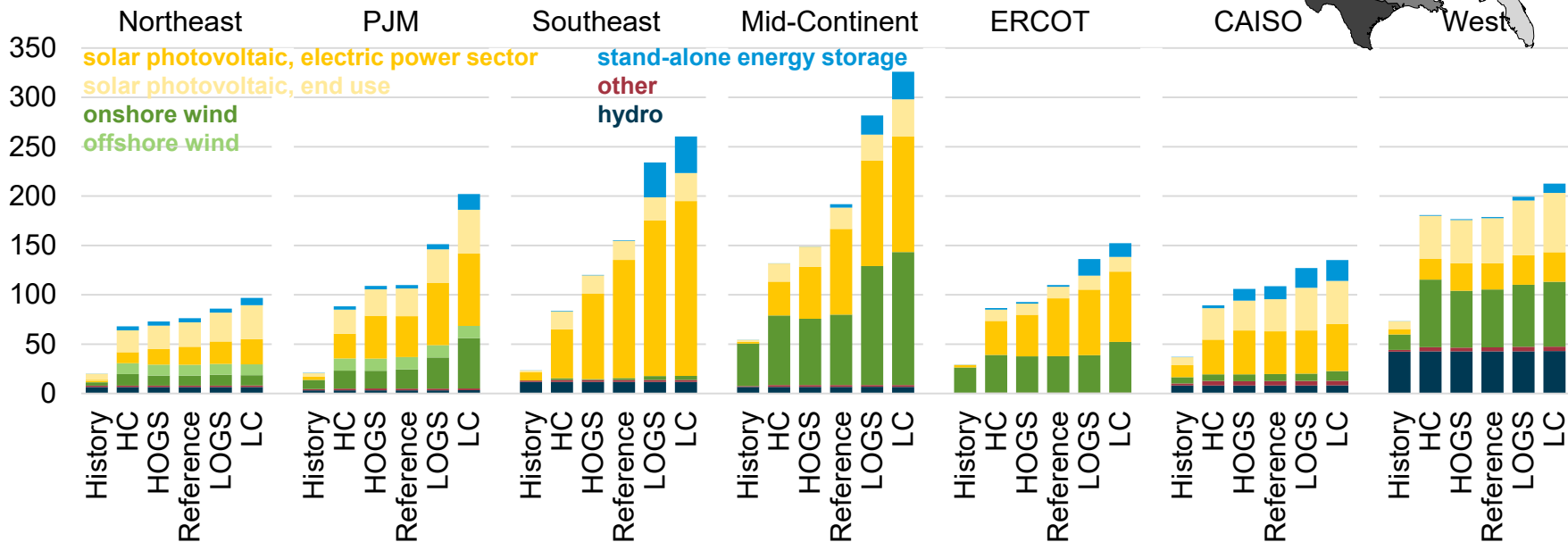
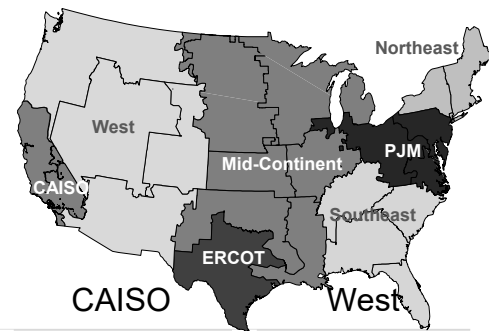
AEO2022 Reference case
billion kilowatthours





Renewable capacity by source and region

Total renewables capacity in all sectors, 2019 (history) and 2050
AEO2022 selected side cases
gigawatts



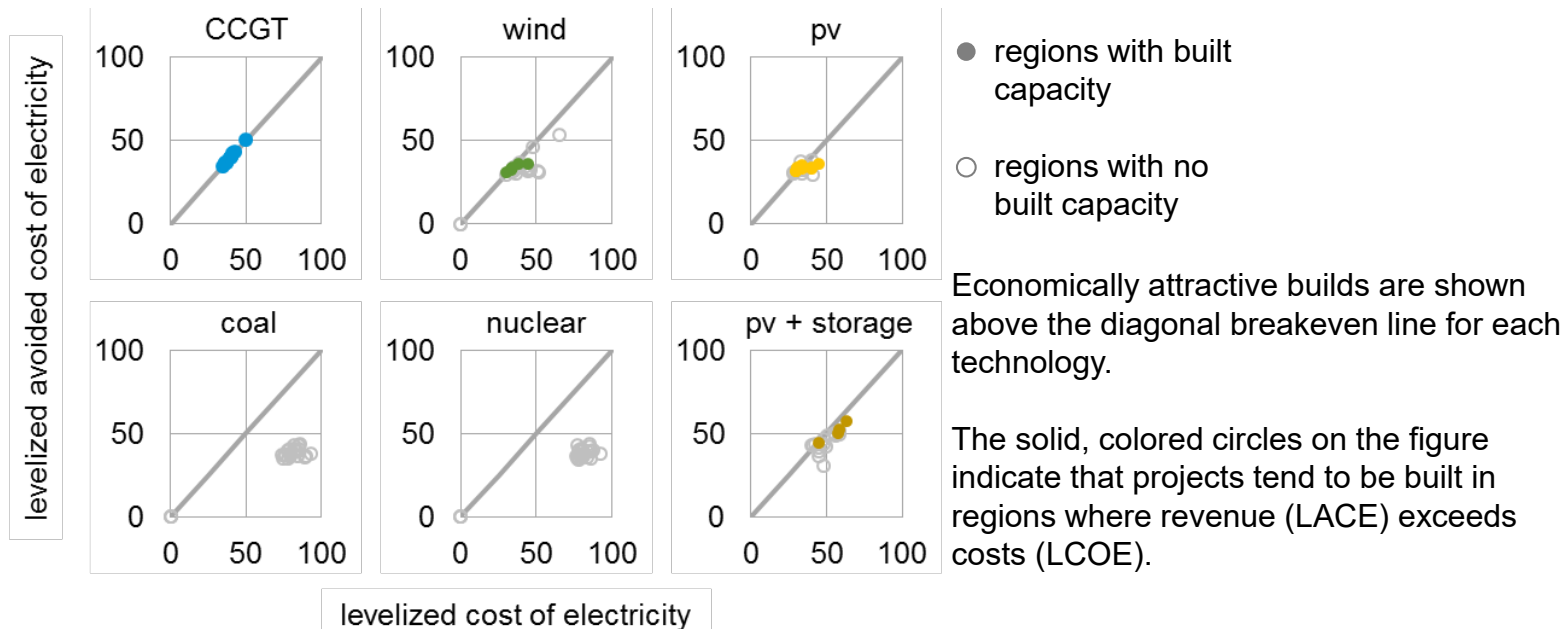
HC = High Renewable Cost; LC = Low Renewable Cost; HOGS = High Oil & Gas Supply; LOGS = Low Oil & Gas Supply; other = geothermal, biomass, municipal waste



Economic cost competitiveness of generating technologies

Levelized avoided cost of electricity (LACE) and levelized cost of electricity (LCOE) by technology, 2027 online year, AEO2022 Reference case

2021 dollars per megawatt-hour



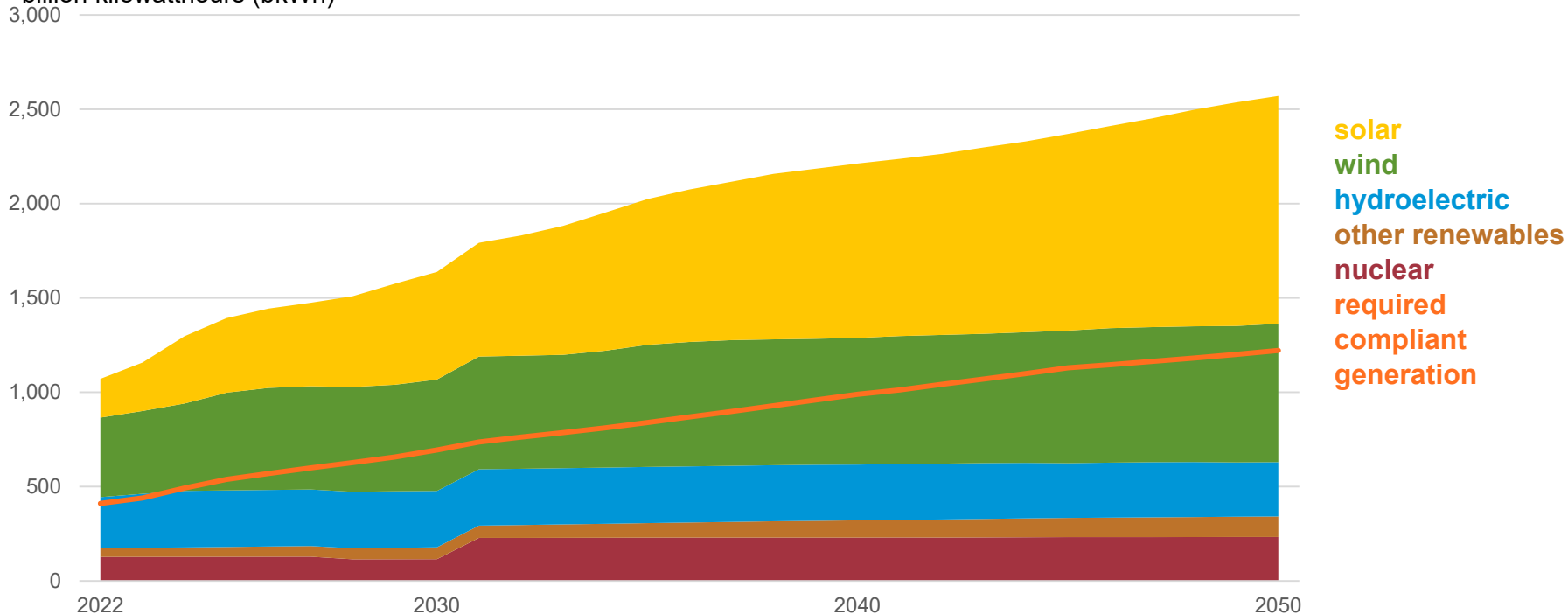
CCGT = natural gas combined cycle, PV = solar photovoltaic



U.S. renewable portfolio standards

Total qualifying carbon-free generation required for combined state renewable portfolio and projected total generation from technologies, 2022–2050

billion kilowatthours (bkWh)

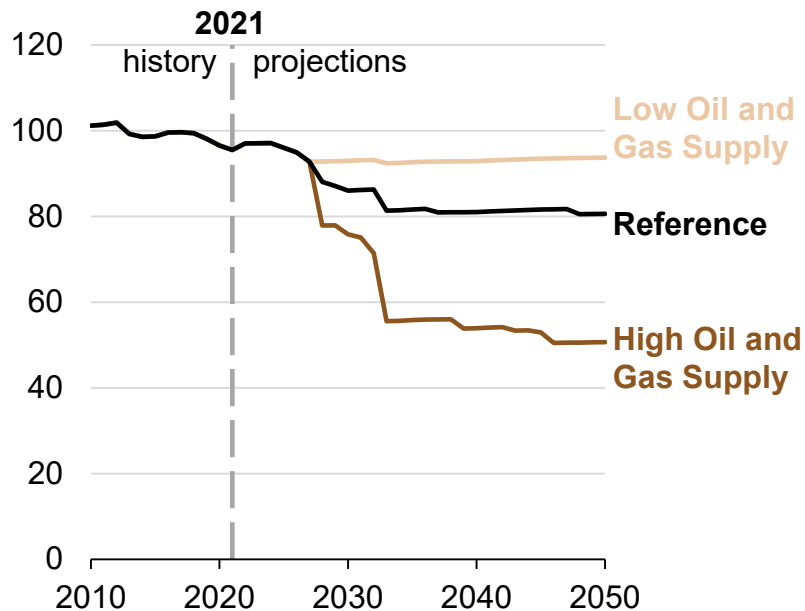


Note: Other renewables includes fuel cells, municipal solid waste, geothermal, wood and other biomass. Solar includes solar thermal and end-use solar. Other end-use sector renewables not included in totals

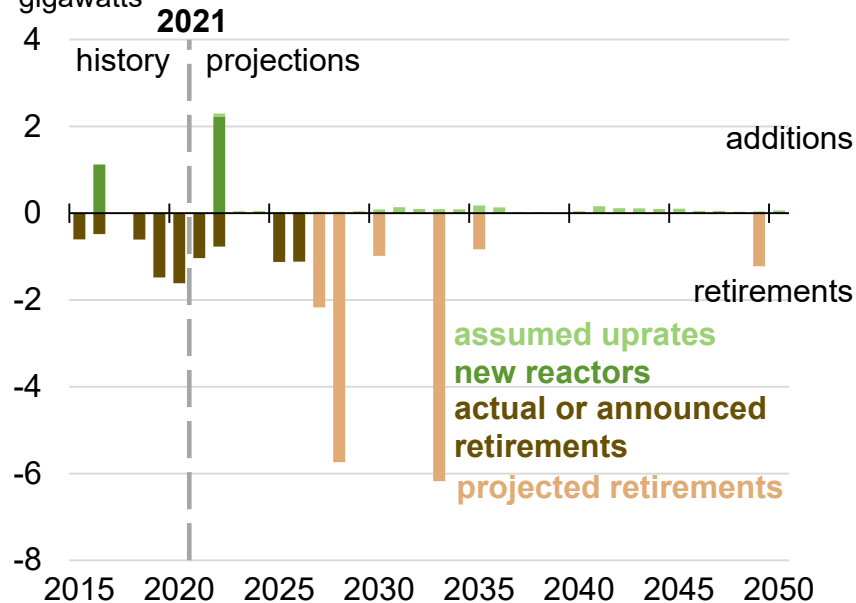


U.S. nuclear capacity and annual capacity changes

U.S. nuclear electricity generating capacity
AEO2022 oil and natural gas supply cases
gigawatts



Year-over-year nuclear capacity changes
AEO2022 Reference case
gigawatts



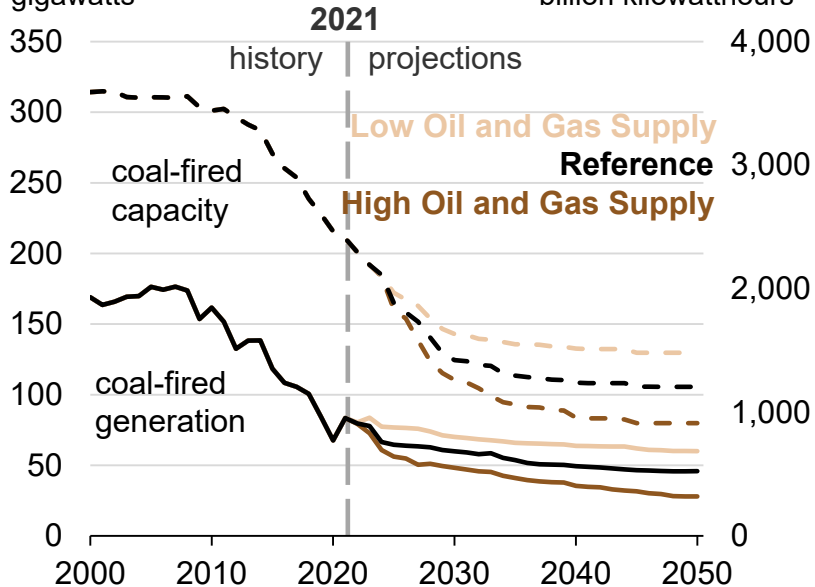


U.S. coal-fired generation, capacity, and capacity factors

U.S. electric generating capacity

AEO2022 oil and natural gas supply cases

gigawatts



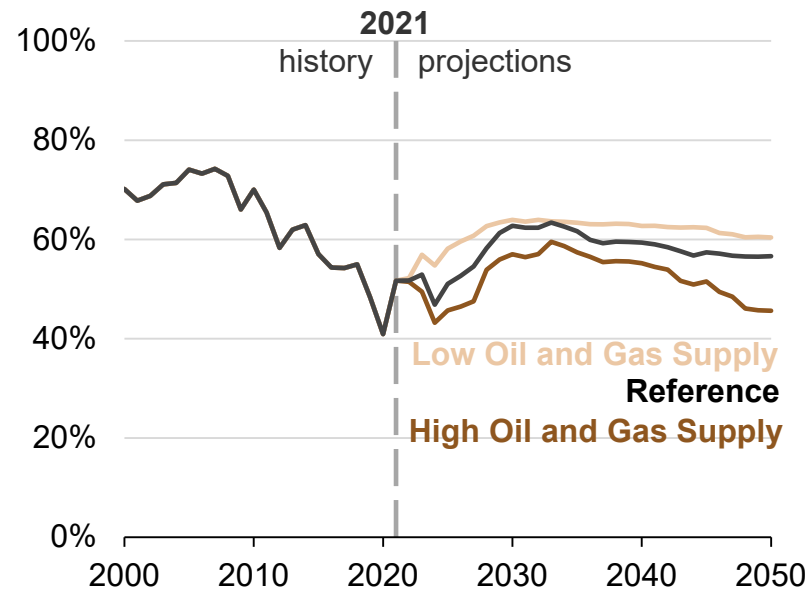
U.S. electricity generation

billion kilowatthours

U.S. capacity factor for coal-fired generation

AEO2022 oil and natural gas supply cases

percentage

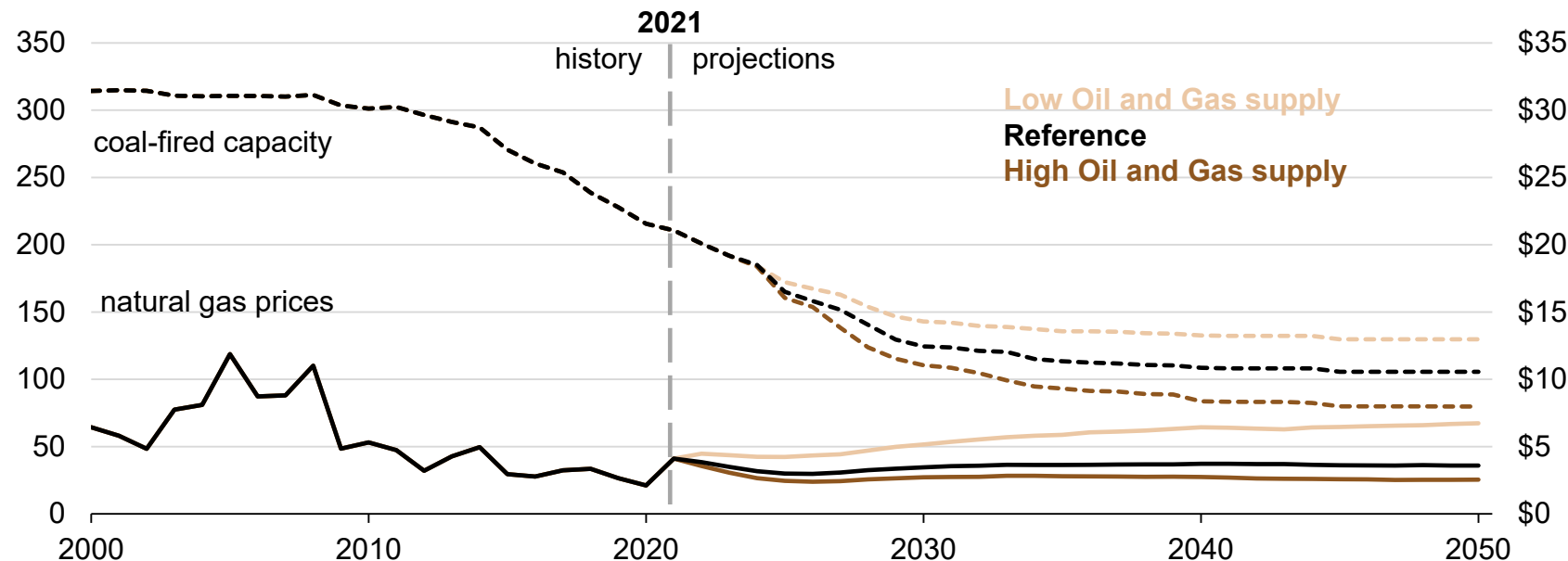




U.S. coal-fired generating capacity relative to natural gas prices

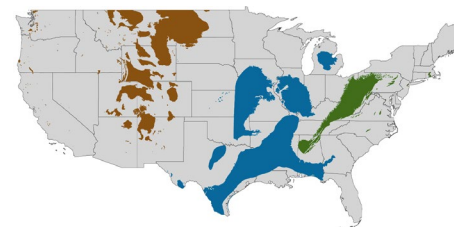
U.S. electric generating capacity
AEO2022 oil and gas supply cases
gigawatts

Average delivered natural gas prices to the electric power sector
2021 dollars per million British thermal units

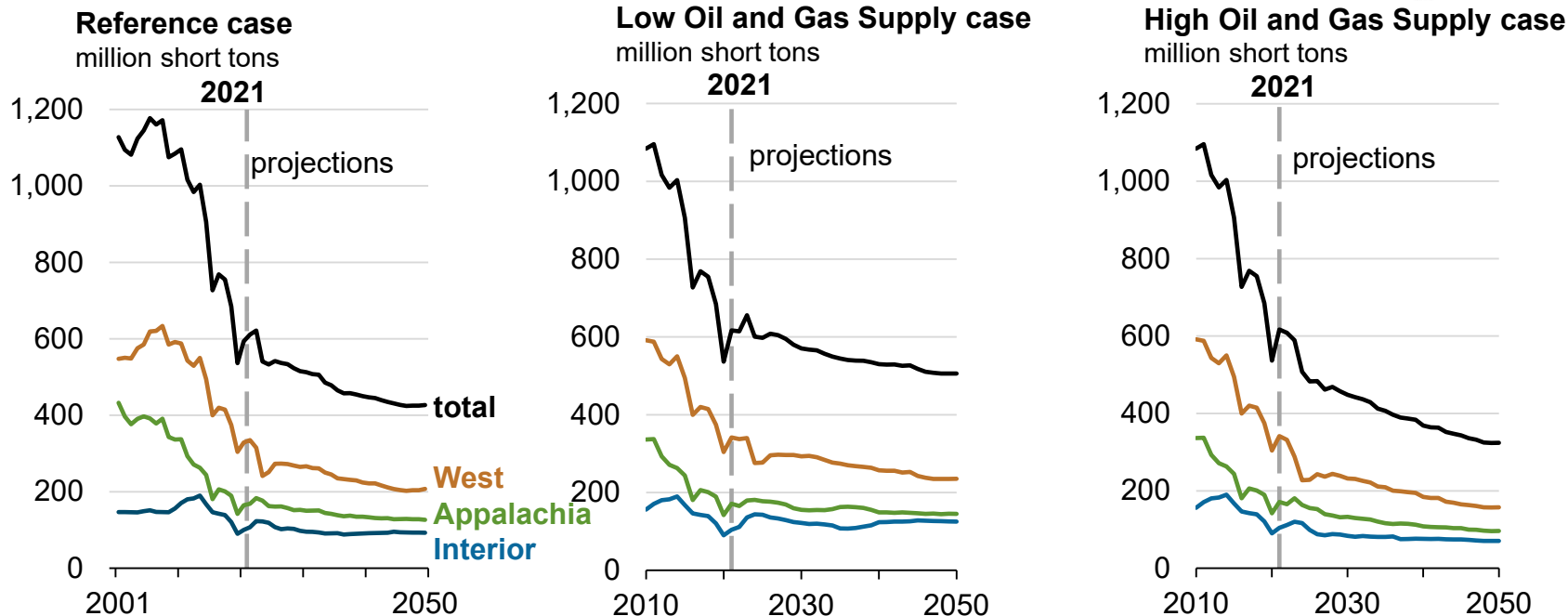




Coal production by U.S. region



U.S. coal production by region, AEO2022 oil and gas supply cases



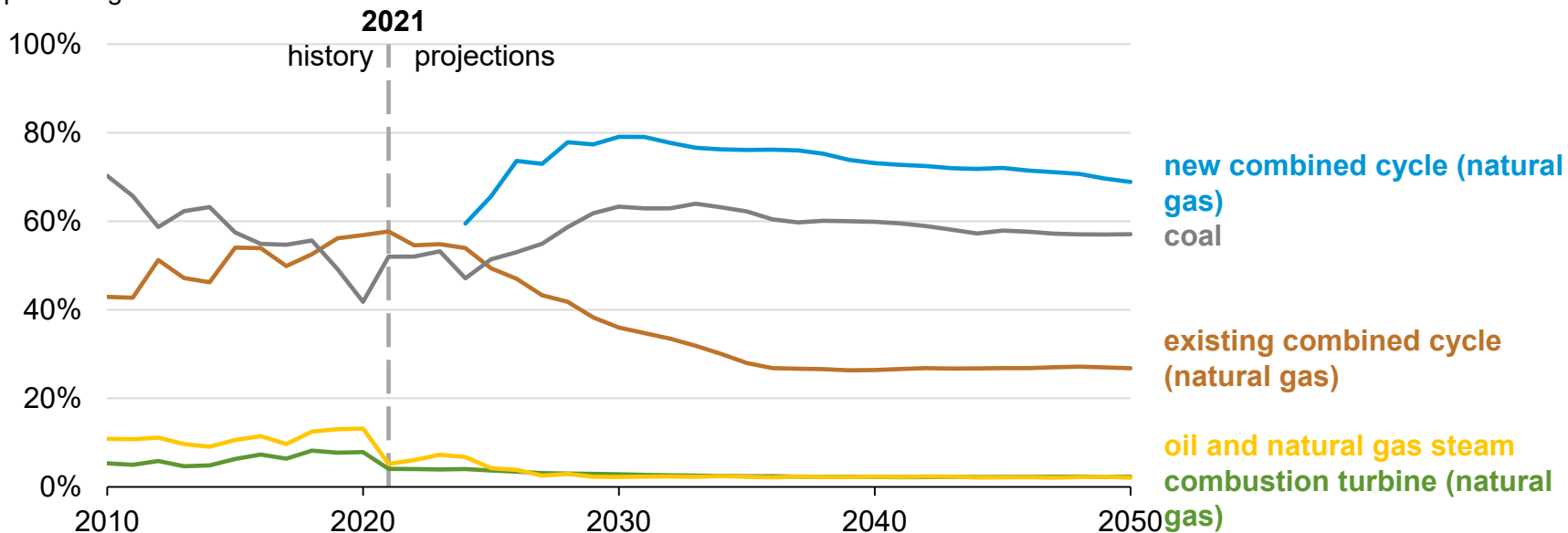


U.S. fossil fuel-fired plant capacity factors

Capacity factor for U.S. fossil fuel-fired plants

AEO2022 Reference case

percentage



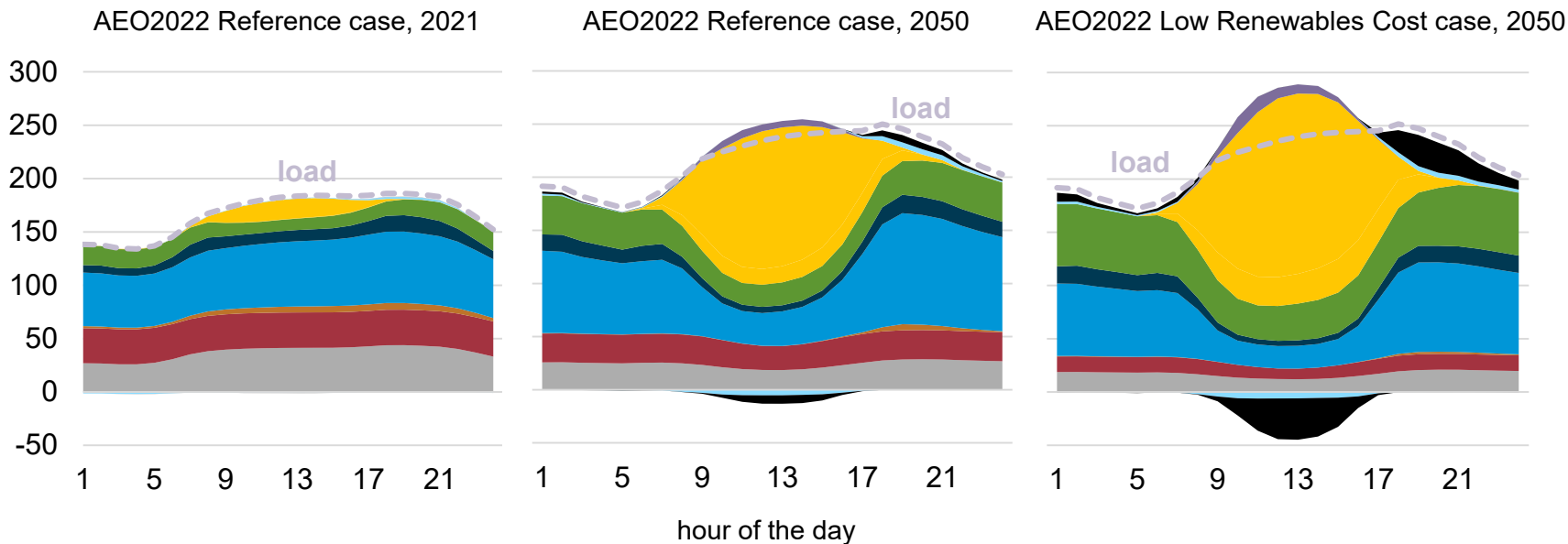
Note: New combined-cycle (natural gas) plants are assumed to come online in 2023. New builds as shown are multi-shaft combined-cycle units. Existing combined cycle units include both multi-shaft and single-shaft; 12 gigawatts of new single-shaft combined-cycle units are included in existing.



U.S. electricity generation by source

Hourly U.S. electricity generation and load by fuel for selected cases and representative years

billion kilowatthours



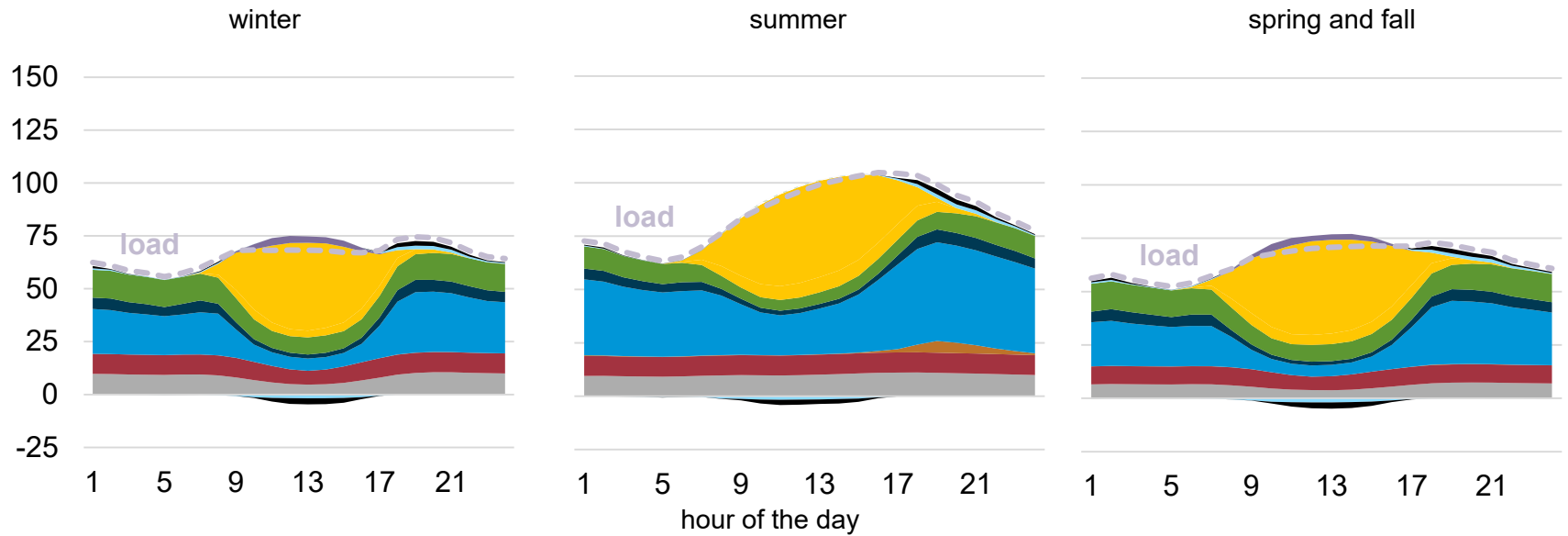
curtailment battery storage pumped storage solar wind hydroelectric natural gas combined-cycle natural gas and oil peakers nuclear coal

Note: Negative generation represents charging of energy storage technologies such as pumped hydro and battery storage. Hourly dispatch estimates are illustrative and are developed to determine curtailment and storage operations; final dispatch estimates are developed separately and may differ from total utilization as this figure shows. Solar includes both utility-scale and end-use photovoltaic electricity generation



Seasonal U.S. electricity generation by source

Hourly U.S. electricity generation and load by fuel type and season in 2050
AEO2022 Reference case
 billion kilowatthours



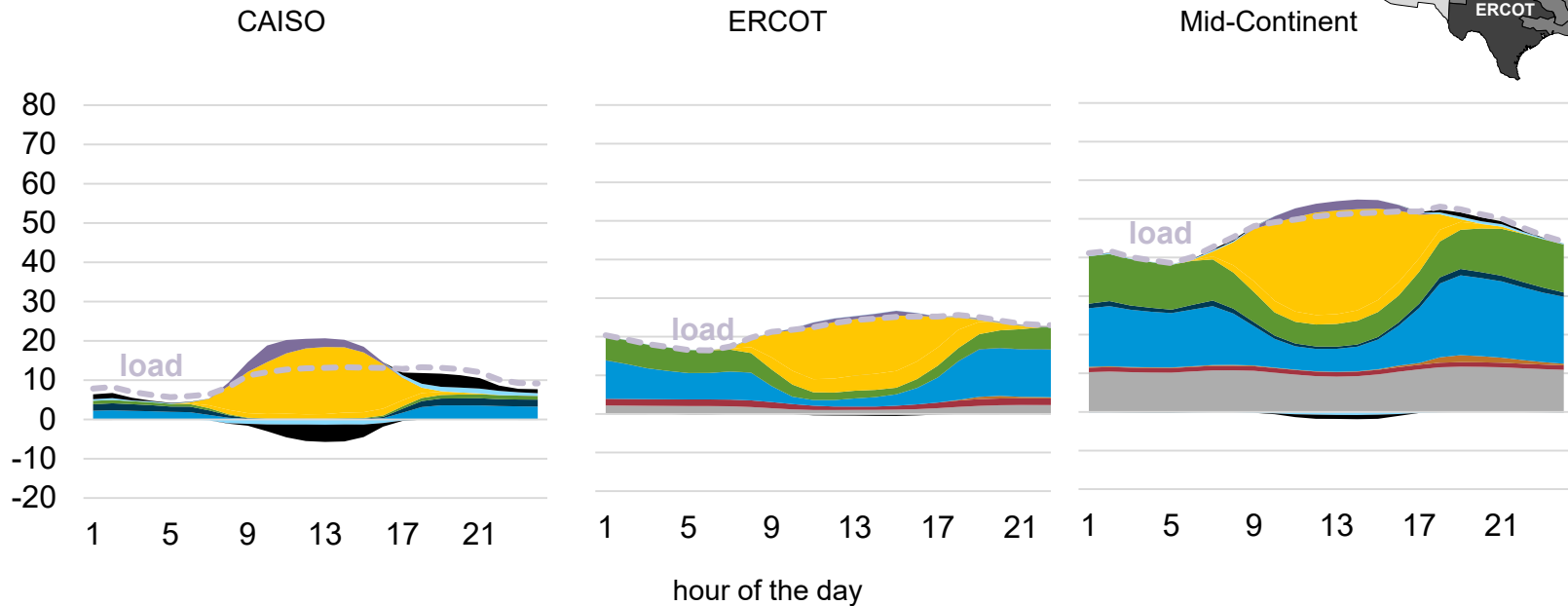
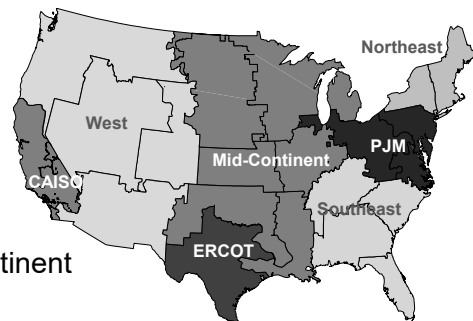
curtailment battery storage pumped storage solar wind hydroelectric natural gas combined-cycle natural gas and oil peakers nuclear coal

Regional U.S. electricity generation by source

Hourly U.S. electricity generation and load by fuel type and region in 2050

AEO2022 Reference case

billion kilowatthours



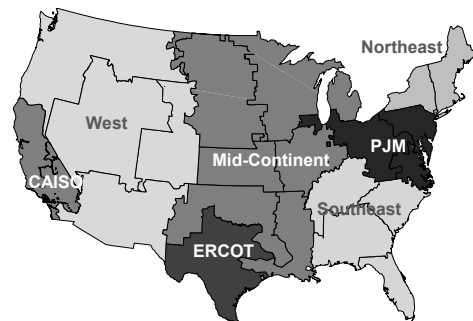
curtailment battery storage pumped storage solar wind hydroelectric natural gas combined-cycle natural gas and oil peakers nuclear coal

Regional U.S. electricity generation by source

Hourly U.S. electricity generation and load by fuel type and region in 2050

AEO2022 Reference case

billion kilowatthours

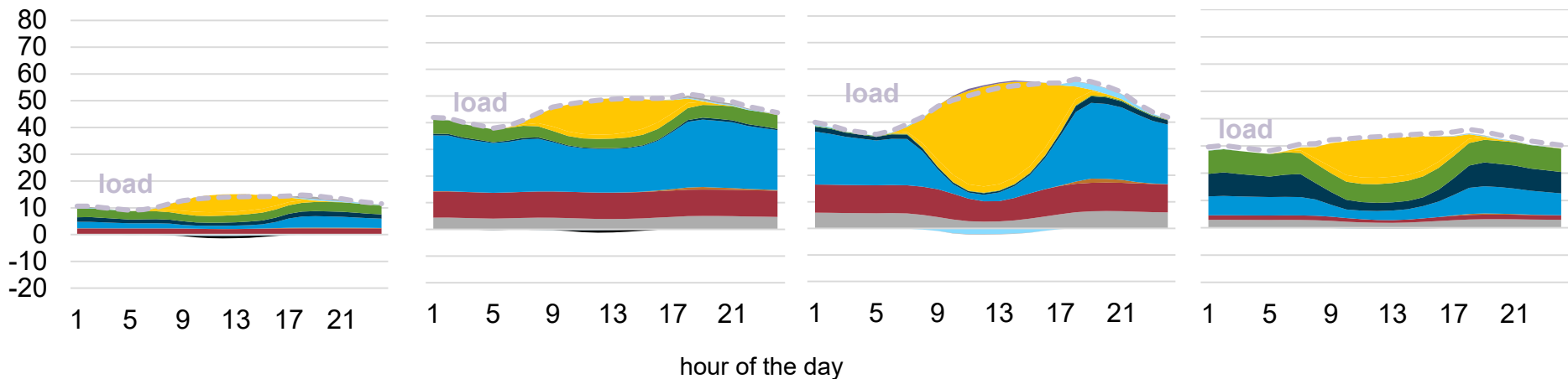


Northeast

PJM

Southeast

West

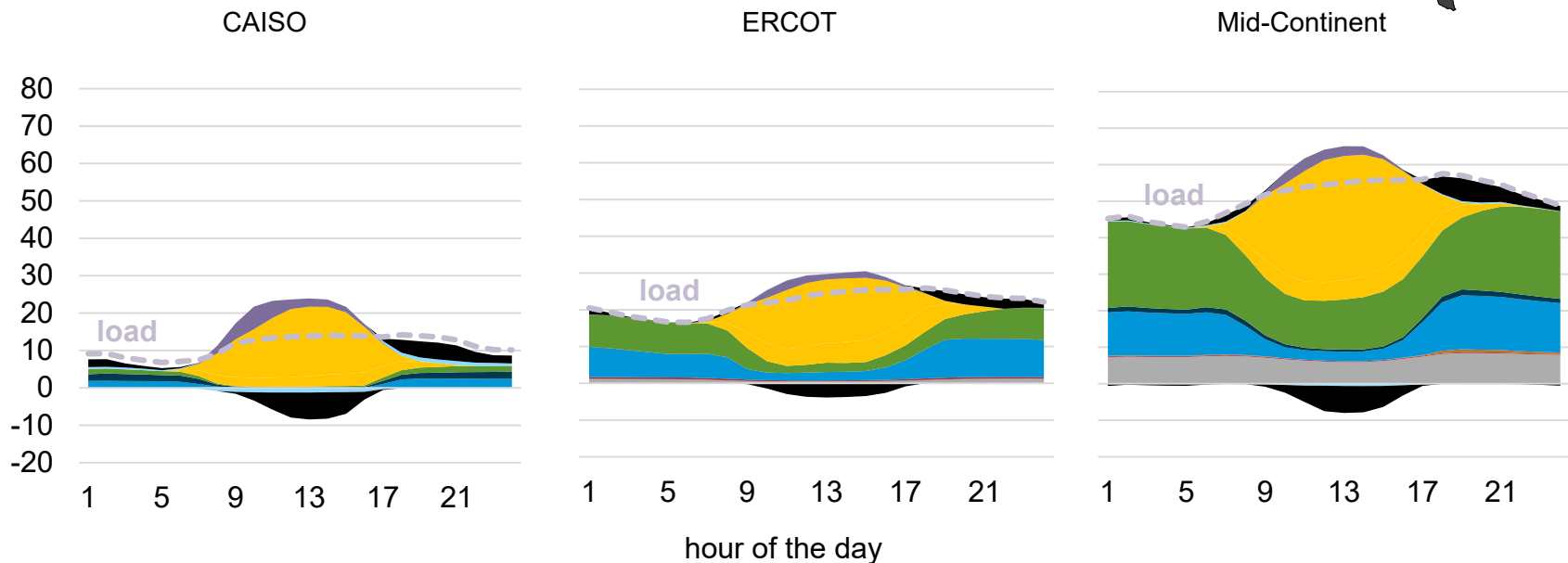
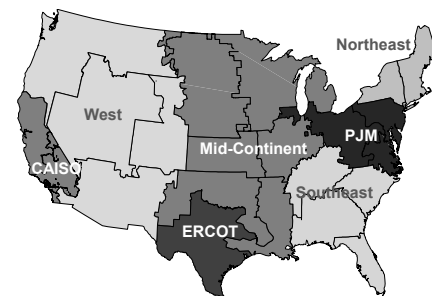


curtailment battery storage pumped storage solar wind hydroelectric natural gas combined-cycle natural gas and oil peakers nuclear coal



Regional U.S. electricity generation by source

Hourly U.S. electricity generation and load by fuel type and region in 2050
AEO2022 Low Renewables Cost case
 billion kilowatthours



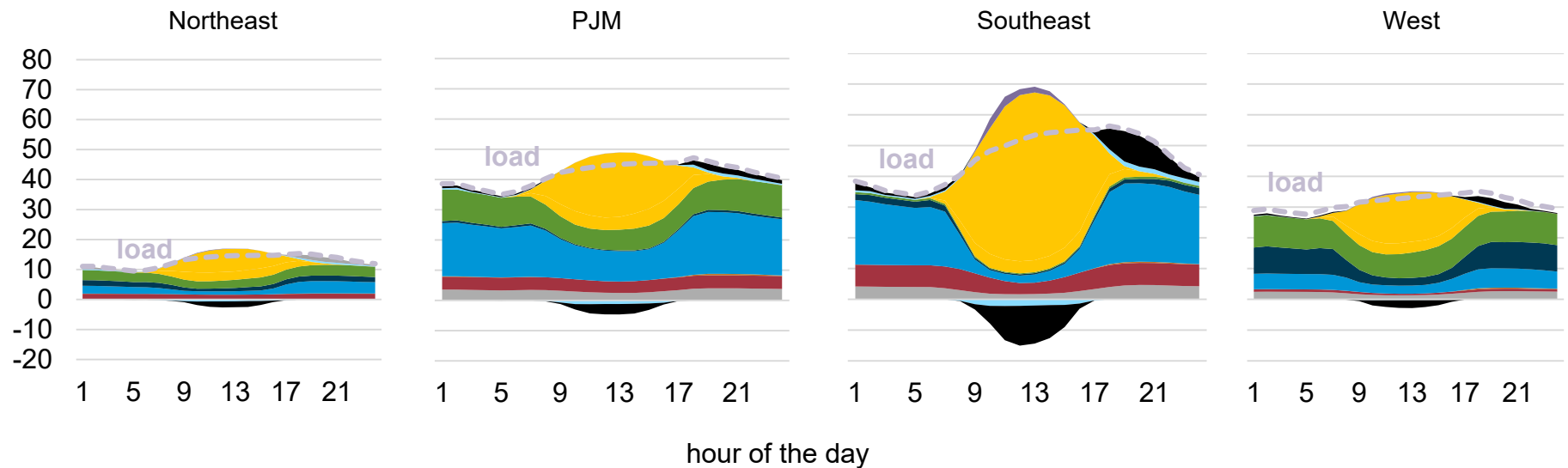
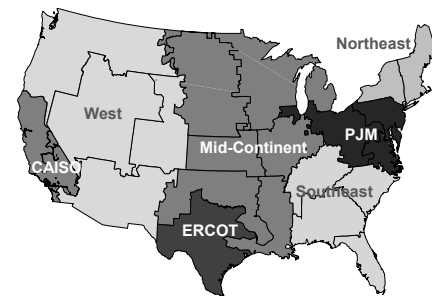
curtailment battery storage pumped storage solar wind hydroelectric gas combined-cycle natural gas and oil peakers nuclear coal

Regional U.S. electricity generation by source

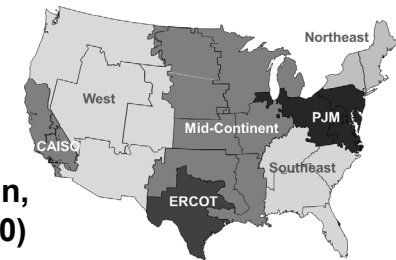
Hourly U.S. electricity generation and load by fuel type and region in 2050

AEO2022 Low Renewables Cost case

billion kilowatthours

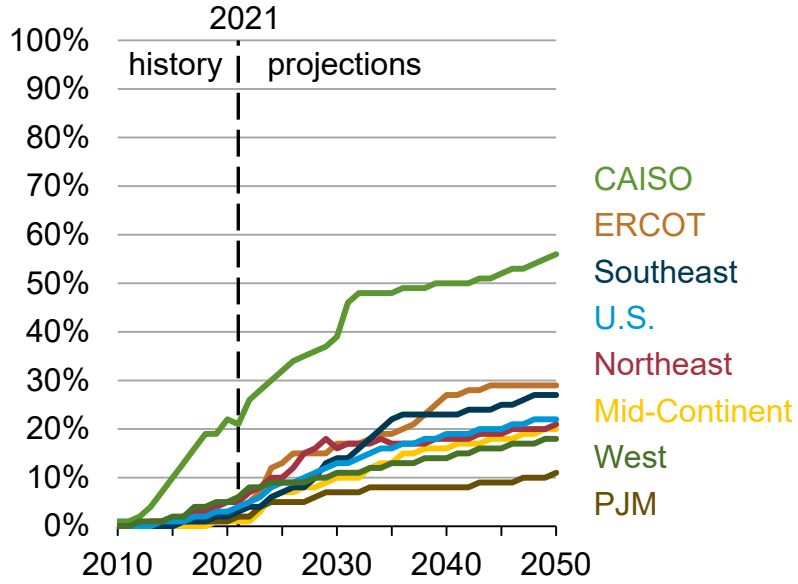


curtailment battery storage pumped storage solar wind hydroelectric natural gas combined-cycle natural gas and oil peakers nuclear coal

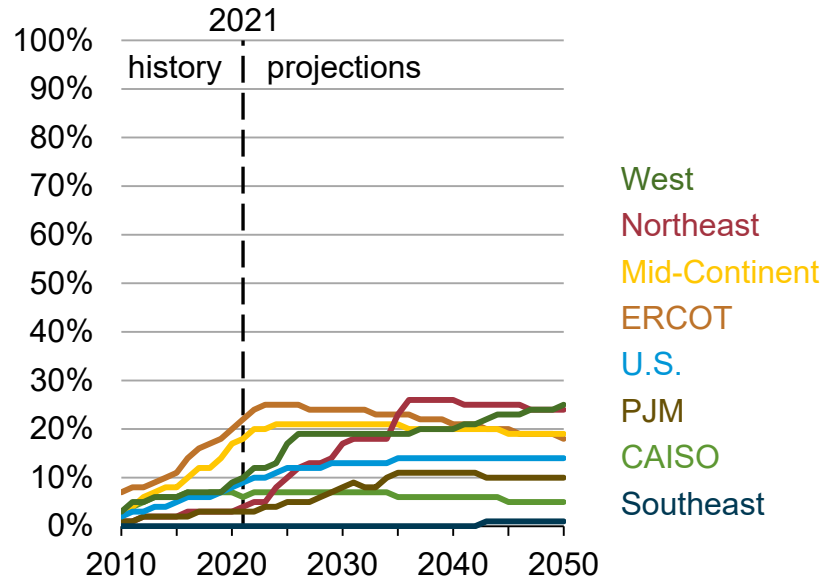


All-sector solar and wind penetration by region

All-sector solar penetration by region, AEO2022 Reference case (2010–2050)
percent of total generation



All-sector wind penetration by region, AEO2022 Reference case (2010–2050)
percent of total generation



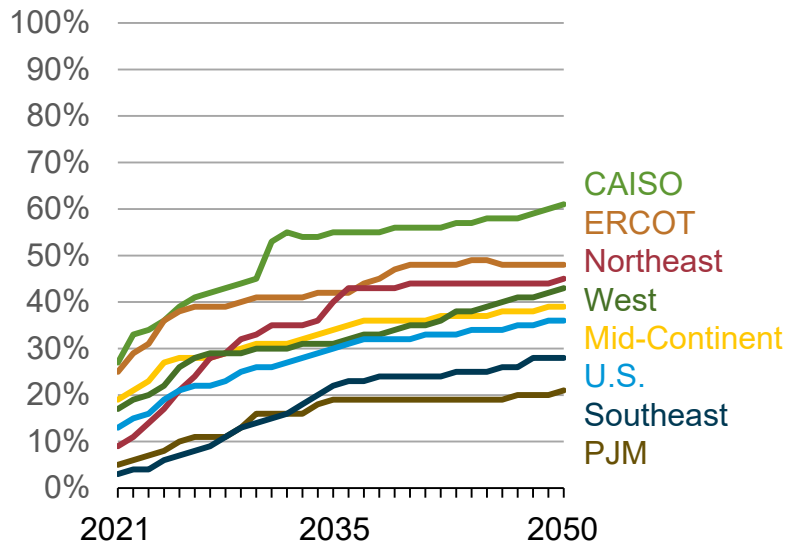


Solar and wind penetration and curtailment by selected regions

Solar and wind penetration by regions in AEO2022

Reference case, 2021-2050

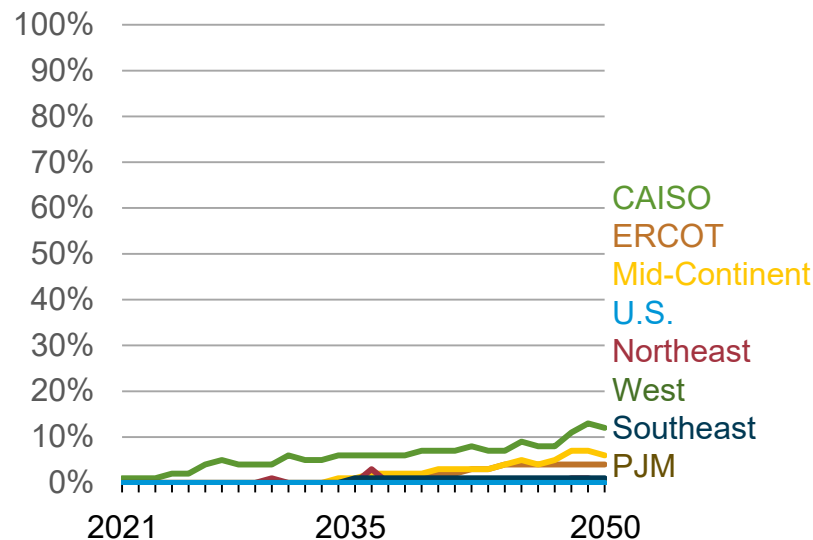
percent of total generation



Solar and wind curtailment by regions in AEO2022

Reference case, 2021-2050

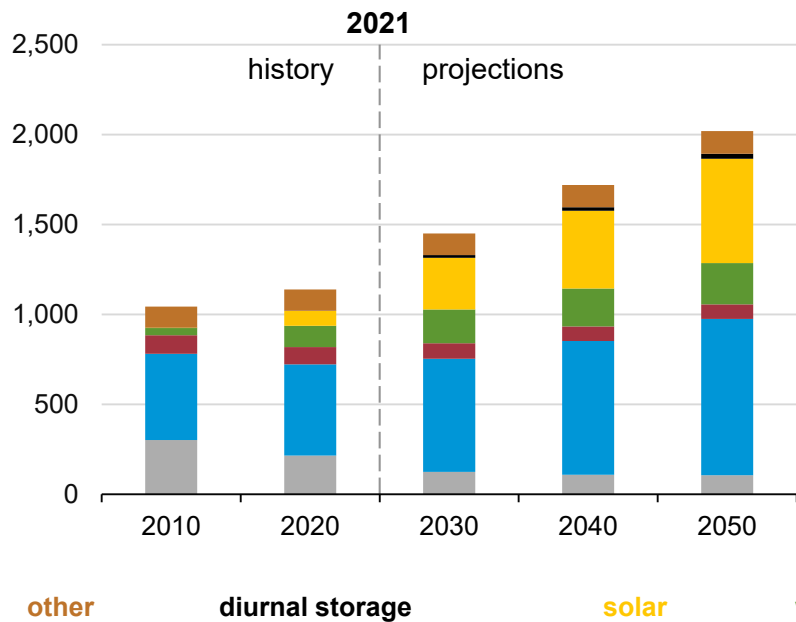
percent of total solar and wind generation





Installed electric generating capacity by source

Installed electric generating capacity by source
AEO2022 Reference case
gigawatts



Share of installed electric generating capacity
AEO2022 Reference case
percentage

