

# Energy and Climate Impacts of Data Centers

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Scholarship:

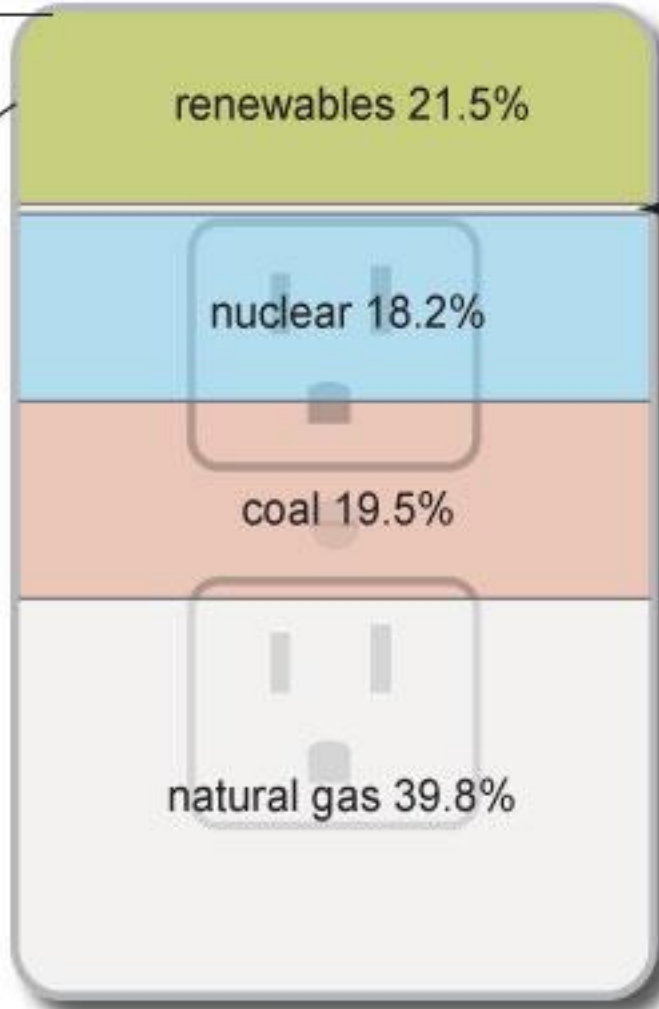
[https://papers.ssrn.com/sol3/cf\\_dev/AbsByAuth.cfm?per\\_id=121697](https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=121697)

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# Sources of U.S. electricity generation, 2022

Total = 4.24 trillion kilowatthours

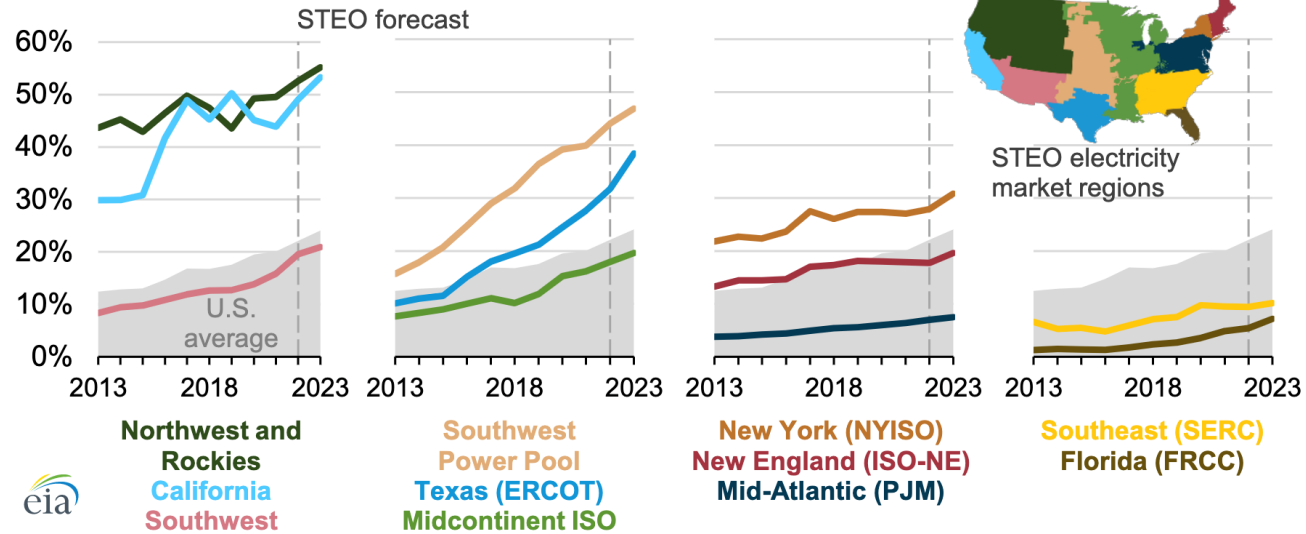
wind	10.2%
hydro	6.3%
solar	3.4%
biomass	1.3%
geothermal	0.4%



petroleum 0.9%

## Annual renewable electricity generation in selected regions (2013–2023)

percentage of regional total electricity generation



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook* (STEIO)



Data source: U.S. Energy Information Administration, *Electric Power Monthly*, February 2023, preliminary data  
 Note: Includes generation from power plants with at least 1,000 kilowatts of electric generation capacity (utility-scale).  
 Hydro is conventional hydroelectric. Petroleum includes petroleum liquids, petroleum coke, other gases, hydroelectric pumped storage, and other sources.





IN-BRIEF ANALYSIS

JUNE 28, 2024

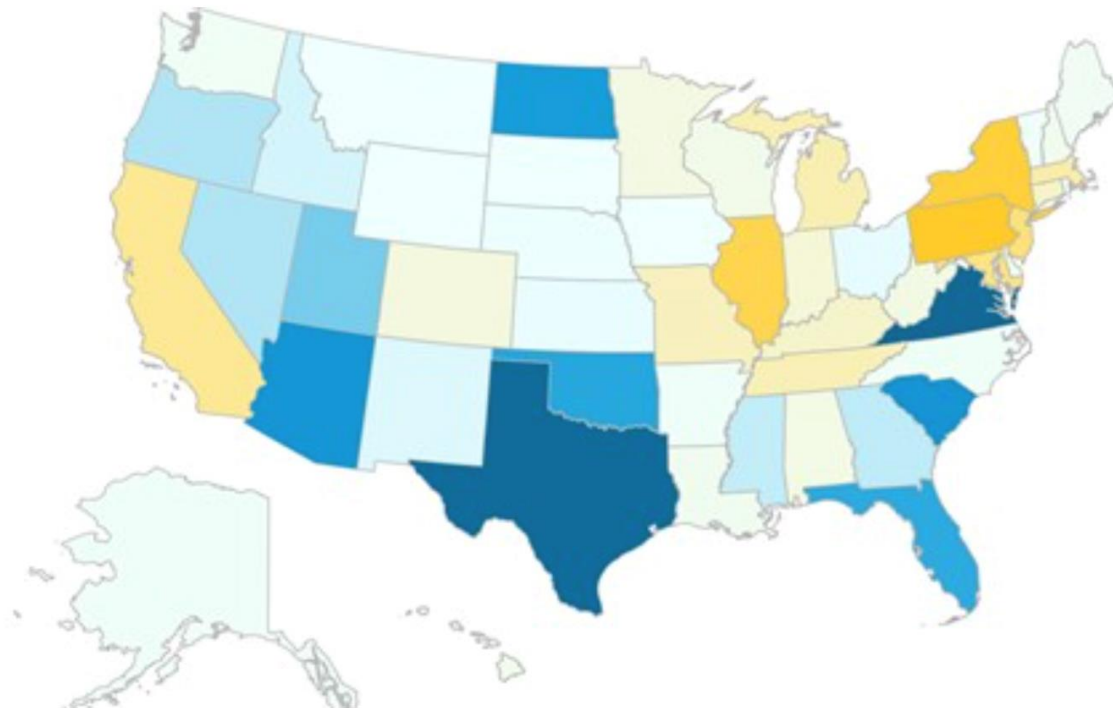
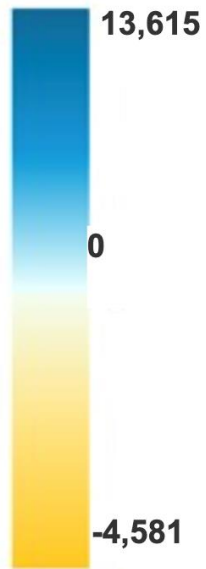
# Commercial electricity demand grew fastest in states with rapid computing facility growth

## U.S. states change in commercial sector electricity consumption (2019–2023)

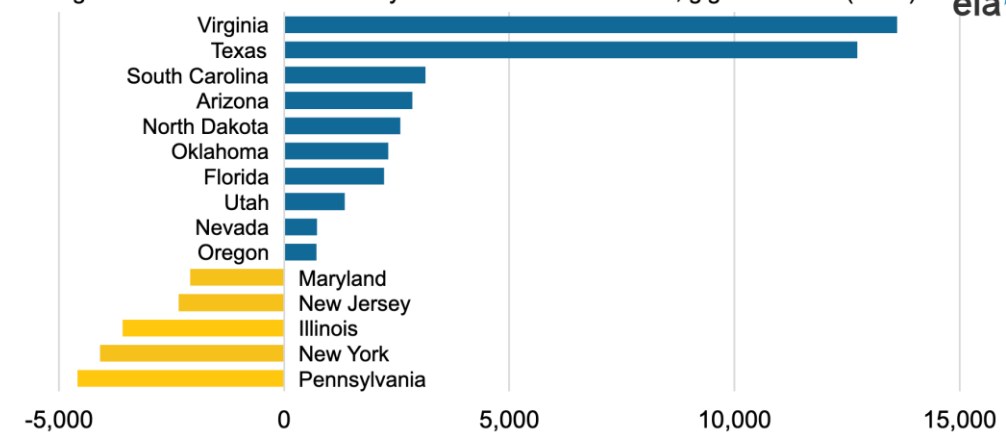
change in annual sales of electricity to commercial customers, gigawatthours (GWh)



GWh change



### Select states by growth in commercial sector electricity consumption (2019–2023)



Data source: U.S. Energy Information Administration, [Electricity Data Browser](#)

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# Microsoft will be carbon negative by 2030

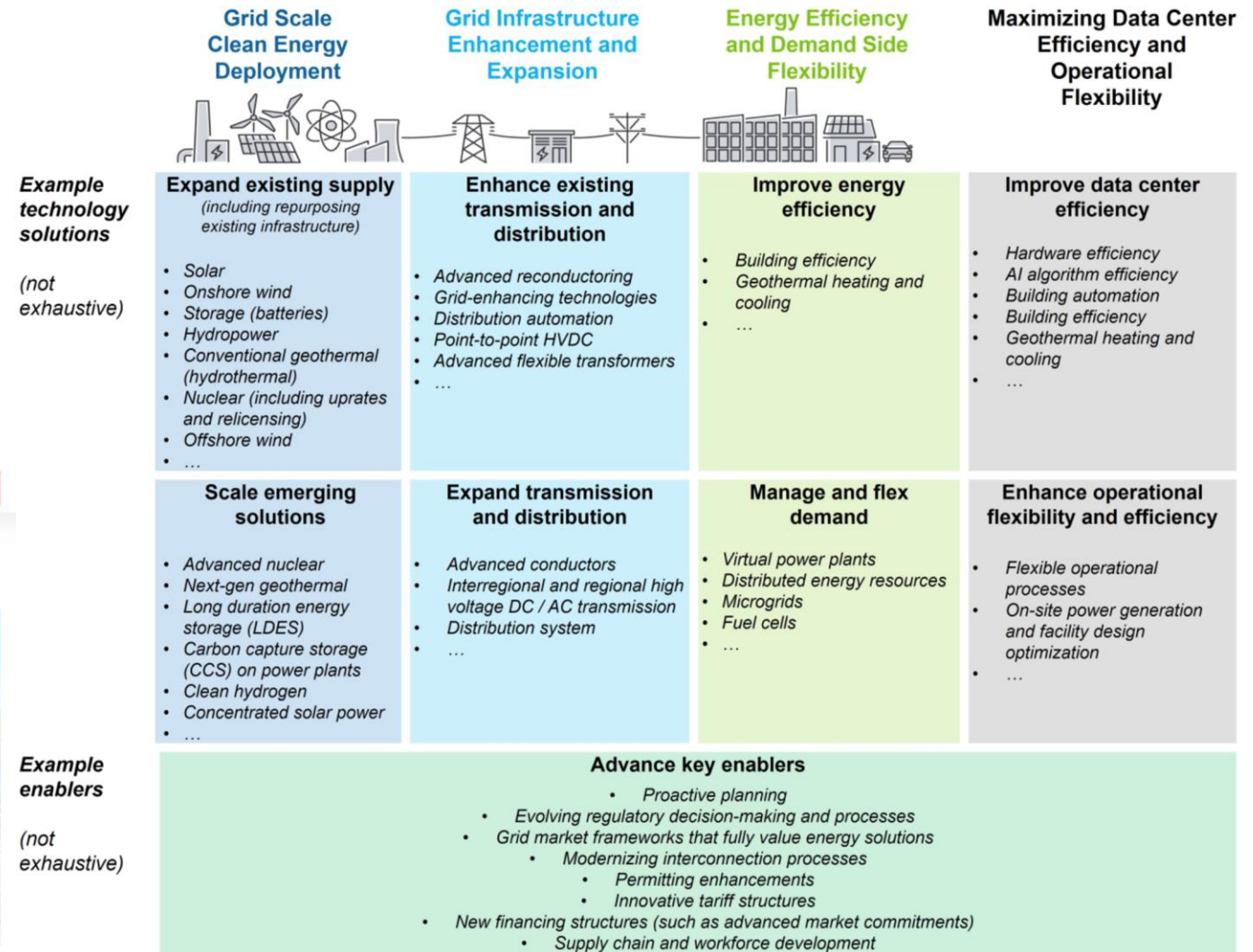
Jan 16, 2020 | [Brad Smith - President & Vice Chair](#)

Source: DOE, <https://www.energy.gov/policy/articles/clean-energy-resources-meet-data-center-electricity-demand>

## 500+

companies have joined Amazon in signing The Climate Pledge, committing to reach net-zero carbon emissions by 2040

Figure 2: Examples of Tools to Address Growing Electricity Demand from Data Centers



**Big Tech is the nuclear industry's new best friend: Amazon, Microsoft and Google rush to sign deals**



Microsoft hopes to tap the former Three Mile Island nuclear plant in Pennsylvania to power a nearby data center. CHIP SOMODEVILLA—GETTY IMAGES

BY DAVID MEYER November 21, 2024 at 2:00 AM MST