AEO2022 Buildings Working Group Meeting II

Office of Energy Consumption and Efficiency Analysis
September 28, 2021 | Washington, DC

By
Buildings Energy Analysis group

Overview

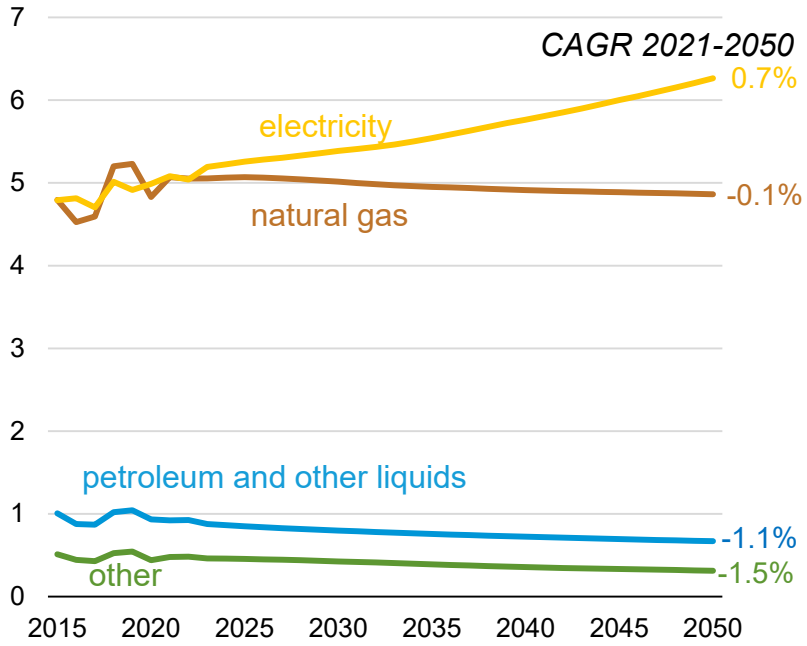
- AEO2022 results overview—delivered energy by fuel
- Comparison with AEO2021
  - Model drivers
  - Residential and commercial electricity and natural gas consumption
  - Miscellaneous Electric Loads (MELs)
  - Distributed generation
- EIA consumption survey updates

AEO2022 Results Overview

Electricity continues to be the fastest-growing energy source for building use in AEO2022

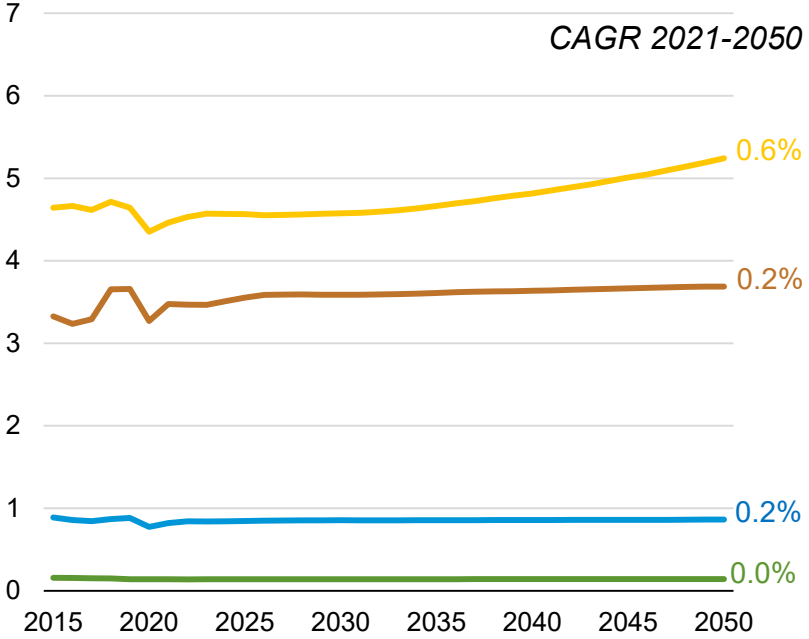
Residential sector delivered energy consumption

quadrillion British thermal units



Commercial sector delivered energy consumption

quadrillion British thermal units



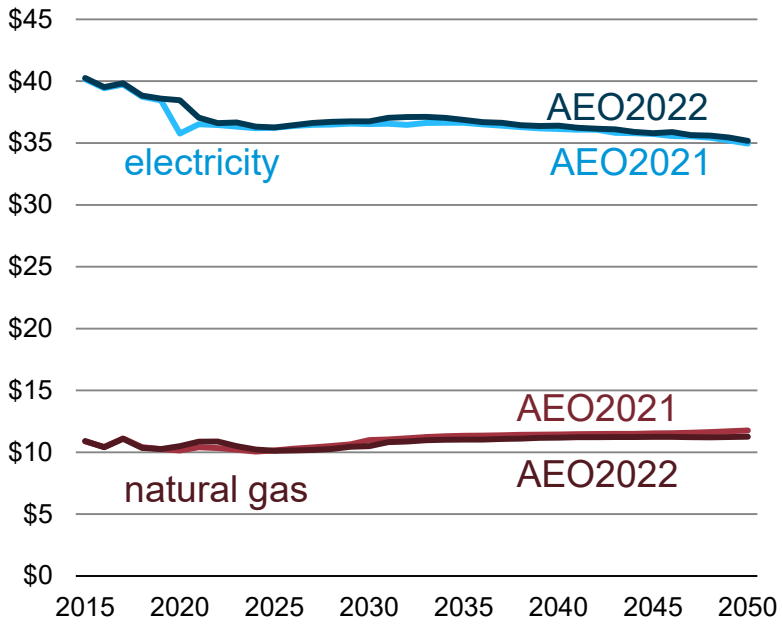
Source: AEO2022 preliminary

Comparison with AEO2021

End-use fuel prices trends vary by sector

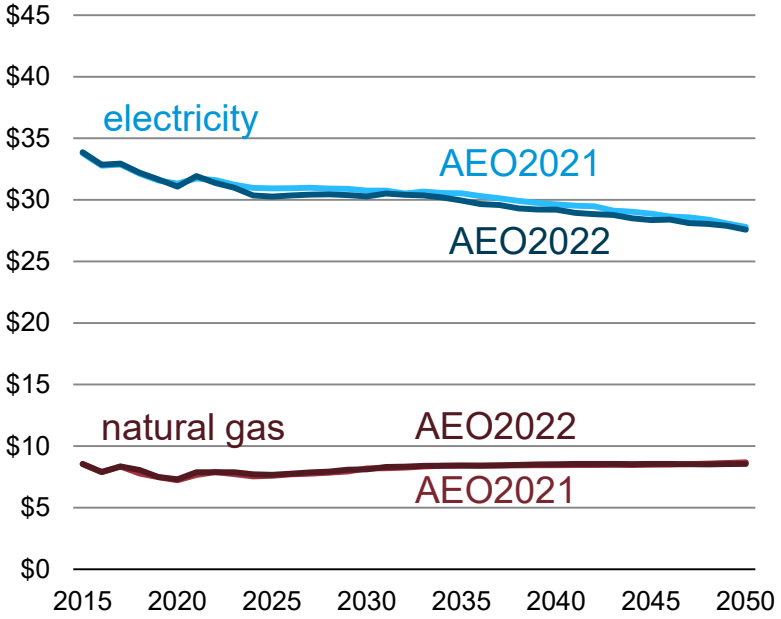
Residential fuel prices

2020 $/MMBtu



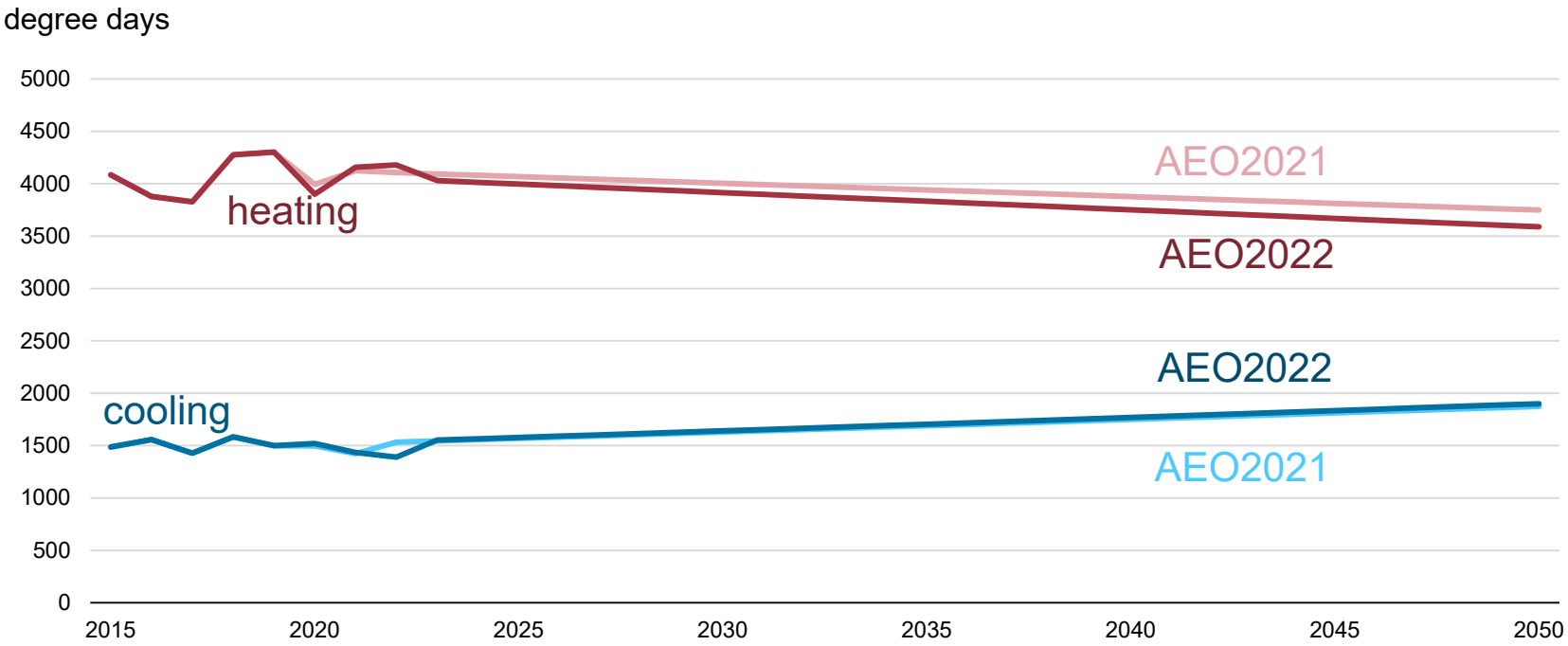
Commercial fuel prices

2020 $/MMBtu



Sources: AEO2022 preliminary, AEO2021

Heating and cooling degree days include NOAA historical data and short-term forecast, along with 30-year trend through projection period



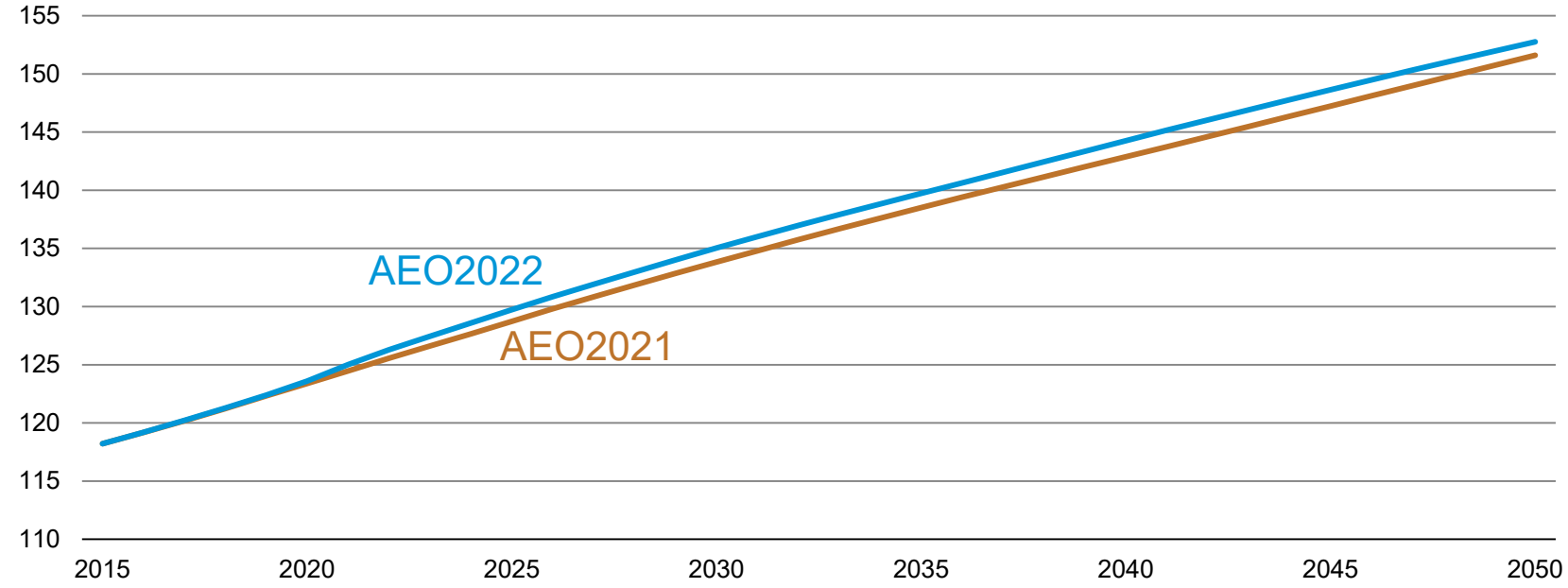
Sources: AEO2022 preliminary, AEO2021

Note: NOAA refers to the National Oceanic and Atmospheric Administration.

Residential housing starts projected to increase after 2021

total households

millions

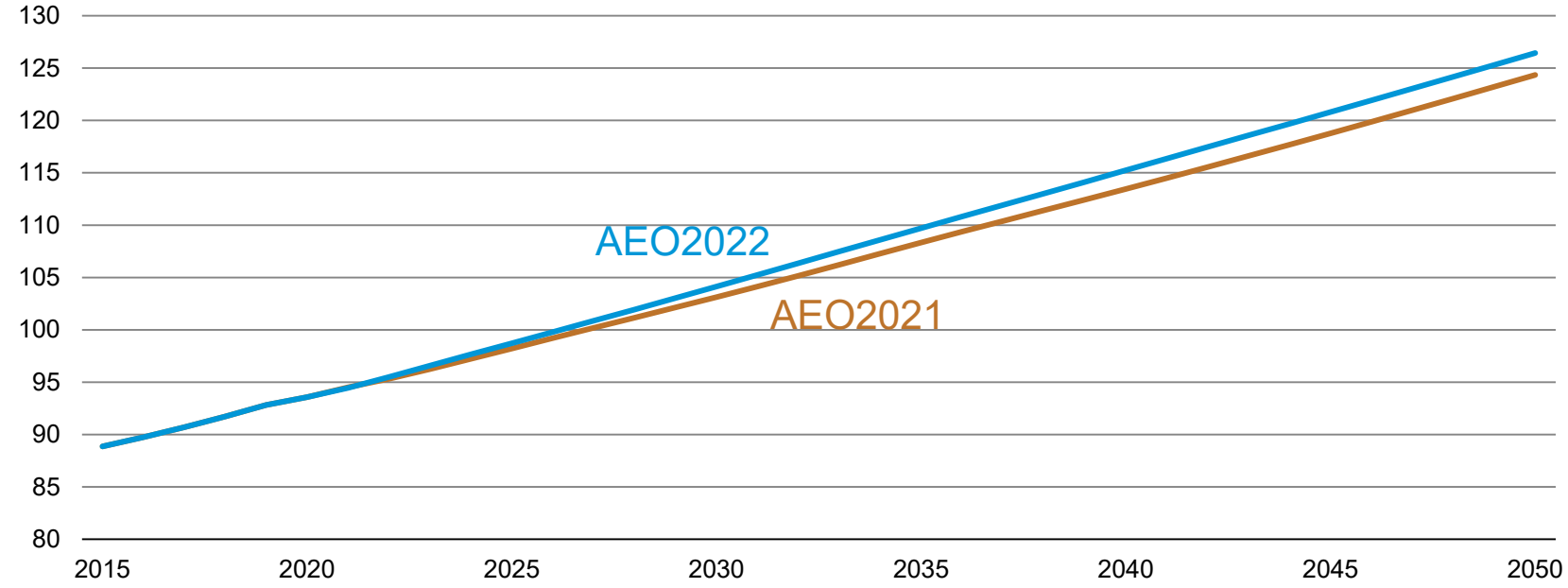


Sources: AEO2022 preliminary, AEO2021

Projected commercial floorspace grows at 1% per year as pandemic mitigation efforts ease

commercial floorspace

billion square feet

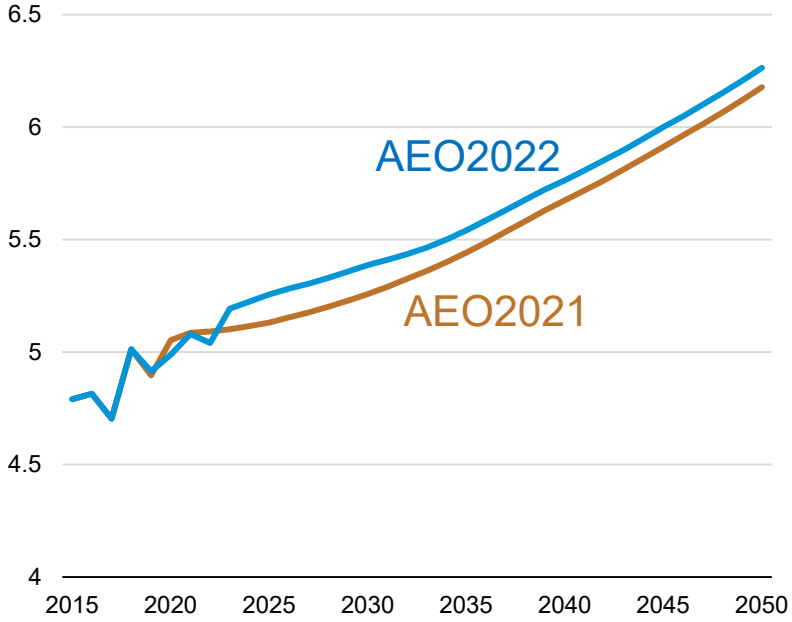


Sources: AEO2022 preliminary, AEO2021

Recent and near-term consumption changes and more housing units drive residential energy use

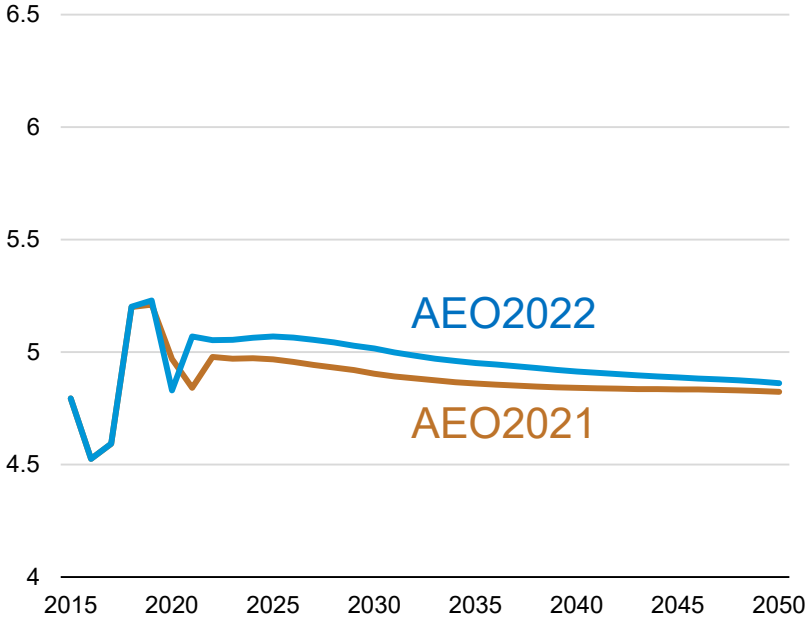
residential purchased electricity consumption

quadrillion British thermal units



residential natural gas consumption

quadrillion British thermal units

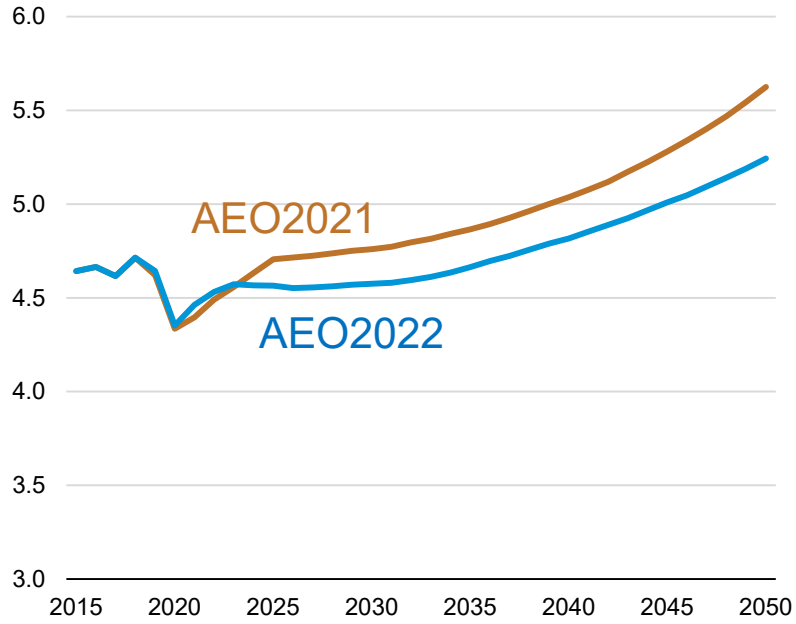


Sources: AEO2022 preliminary, AEO2021

Recent and near-term consumption changes and revised miscellaneous electric loads drive commercial energy

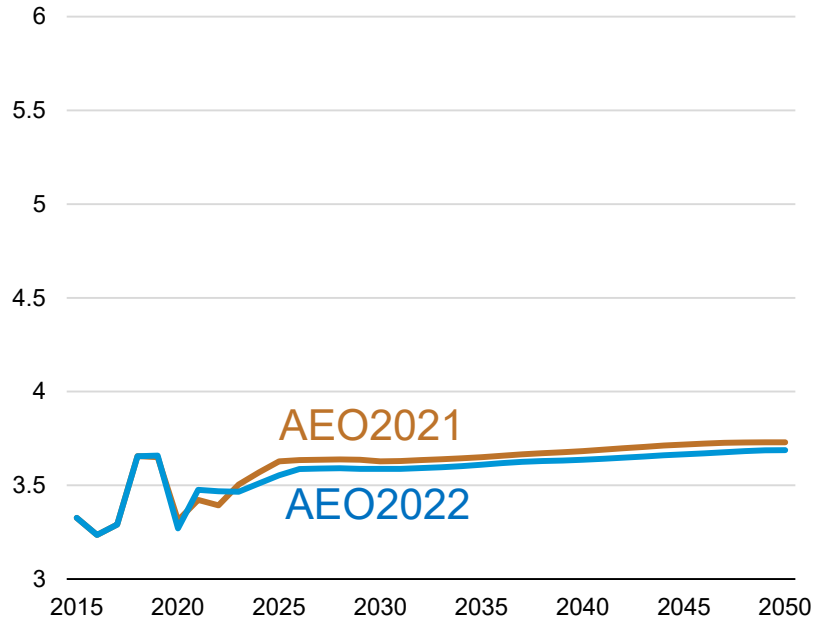
commercial purchased electricity consumption

quadrillion British thermal units



commercial natural gas consumption

quadrillion British thermal units

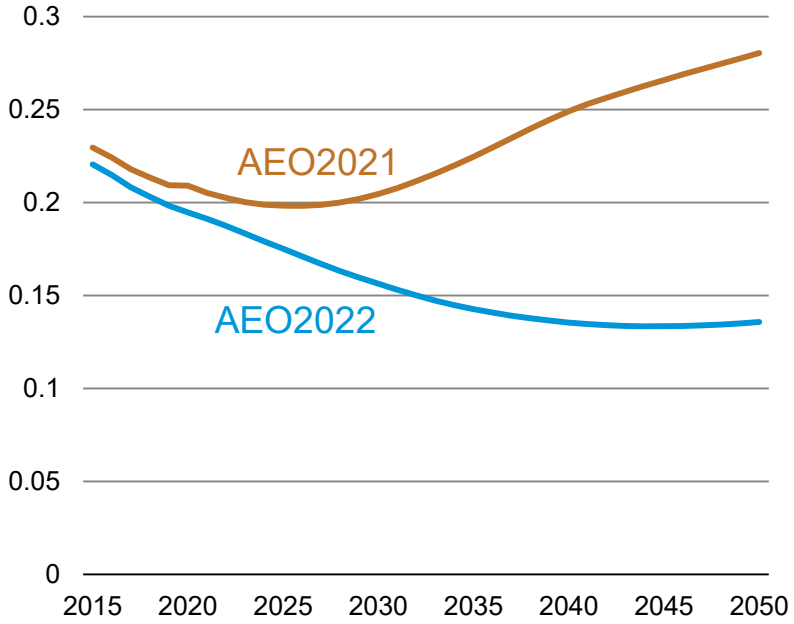


Sources: AEO2022 preliminary, AEO2021

Television, computer, and related equipment trends have changed a lot since 2013

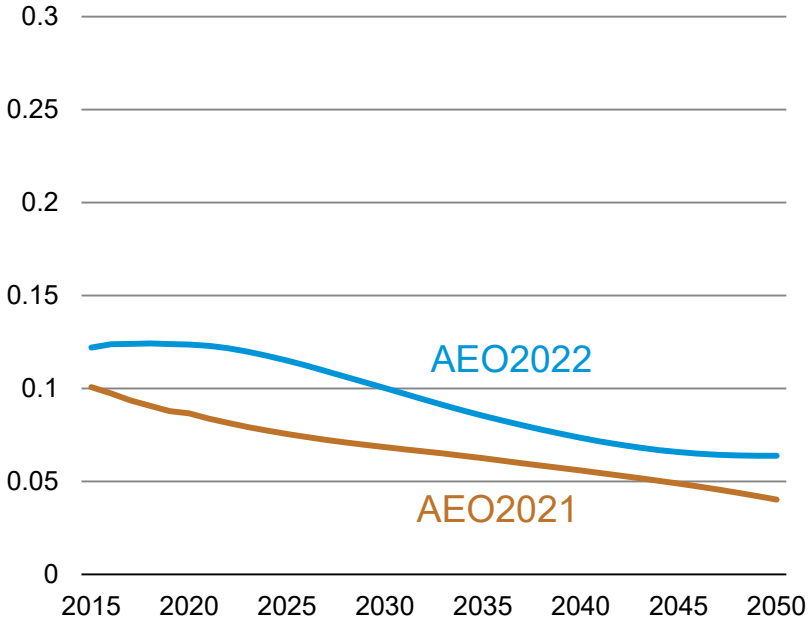
residential television and related consumption

quadrillion British thermal units



residential computer and related consumption

quadrillion British thermal units

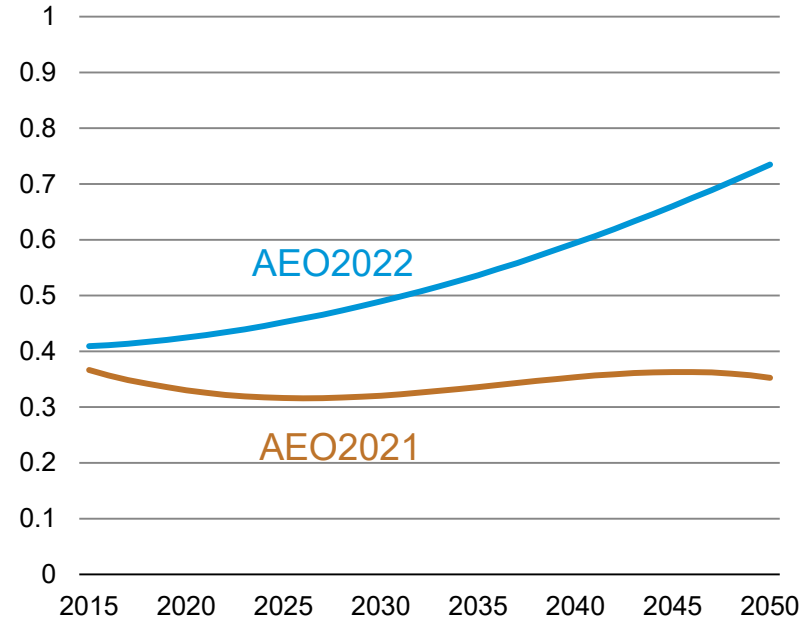


Sources: AEO2022 preliminary, AEO2021

MELs report shows increased use of data center servers, while efficient video displays drive down non-PC office equipment energy use

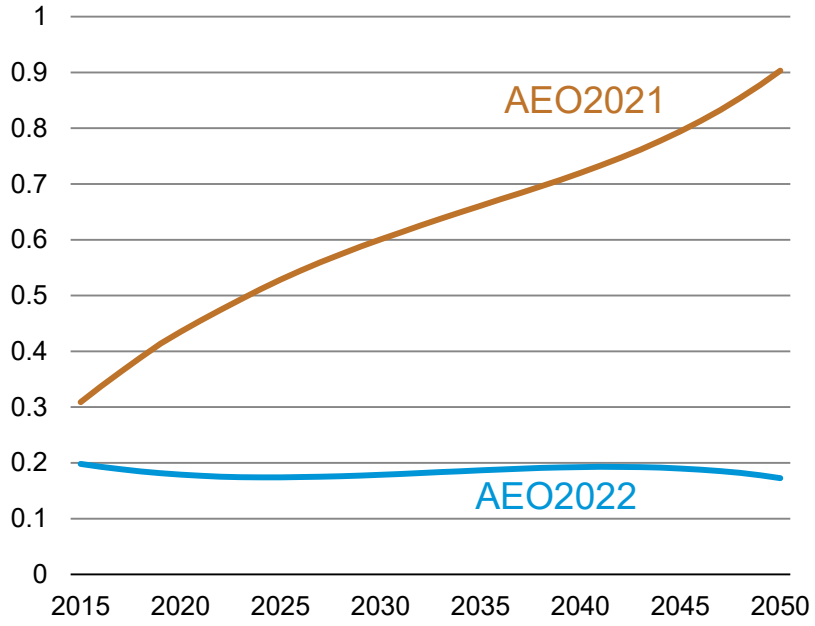
commercial computing consumption

quadrillion British thermal units



commercial office equipment consumption

quadrillion British thermal units

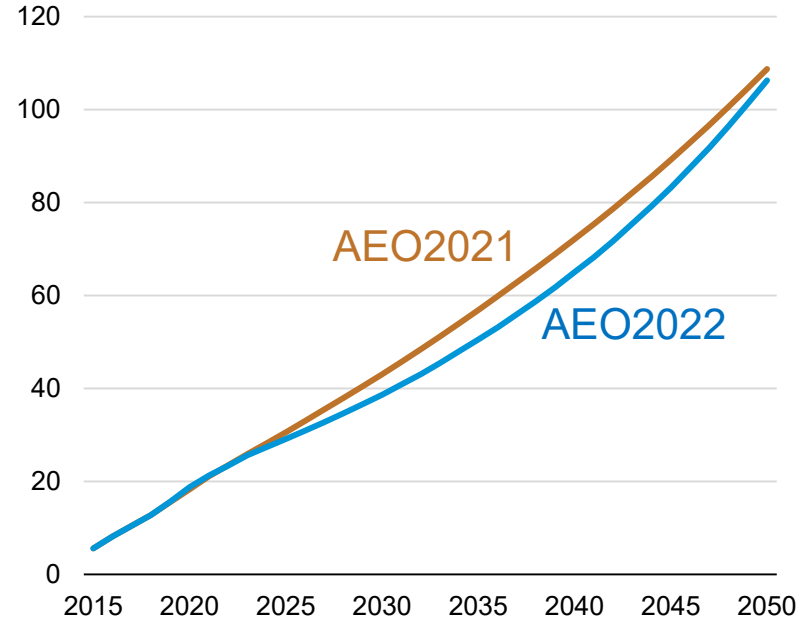


Sources: AEO2022 preliminary, AEO2021

Differences in electricity prices and historical system characteristics affect buildings PV projections

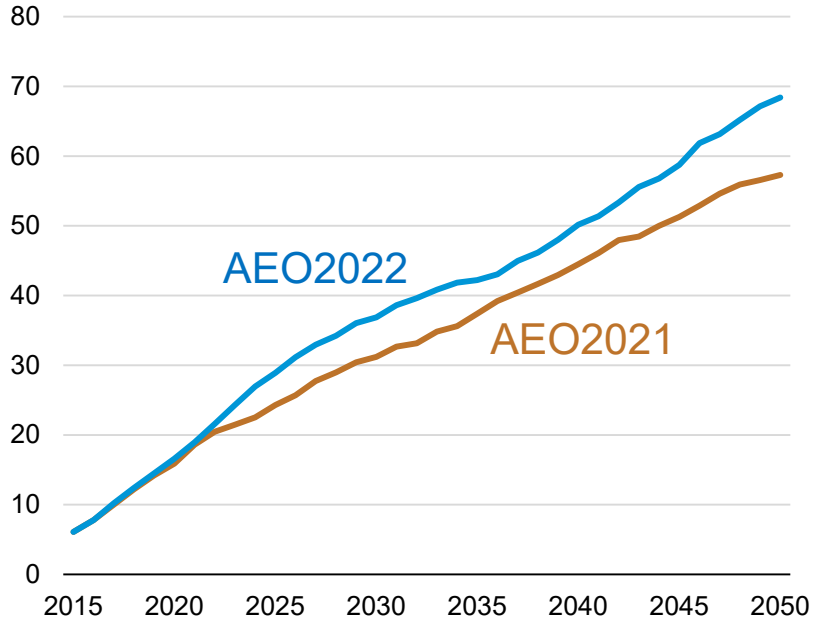
residential PV capacity

gigawatts-direct current (GW-DC)



commercial PV capacity

gigawatts-direct current (GW-DC)



Sources: AEO2022 preliminary, AEO2021

EIA Energy Consumption Survey updates

- *2018 Commercial Buildings Energy Consumption Survey* (CBECS)
  - Building characteristics data tables released last week; characteristics microdata will be released in November; consumption and expenditure data will be released in Spring/Summer 2022
  - 2018 CBECS data will make it into AEO2023 at the earliest
  - 2018 CBECS will not capture long-term changes in commercial consumption caused by the pandemic (e.g., remote work, ventilation consumption); the AEO will capture such effects at the sector level from historical data and *Short Term Energy Outlook* forecasts

- *2020 Residential Energy Consumption Survey* (RECS)
  - Some estimates will be available in all 50 states (for example, number of homes with AC in each state)
  - Household characteristics data will be available in early 2022

Buildings-related reports

- *Updated Buildings Sector Appliance and Equipment Costs and Efficiency*
- *Analysis and Representation of Miscellaneous Electric Loads (MELs) in NEMS*
- *Distributed Generation System Characteristics and Costs in the Buildings Sector*
- *Modeling Distributed Generation in the Buildings Sectors*
- *Price Elasticities for Energy Use in Buildings of the United States*
- *Trends in Commercial Whole-Building Sensors and Controls*
- *Development of Commercial Building Shell Heating and Cooling Load Factors*
- *Residential and Commercial sector Energy Code Adoption and Compliance Rates*

For more buildings information

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Questions or comments