

# Buildings Working Group Meeting

*AEO2019 debrief and AEO2020 updates*



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*Office of Energy Consumption and Efficiency Analysis*

*May 23, 2019 | Washington, DC*

*By*

*Buildings Energy Analysis Team*

# Overview

- AEO2019 debrief
- AEO2020
  - Major model updates
  - Policy assumptions
  - Historical updates
- Medium-term projects
- Long-term projects
- Discussion

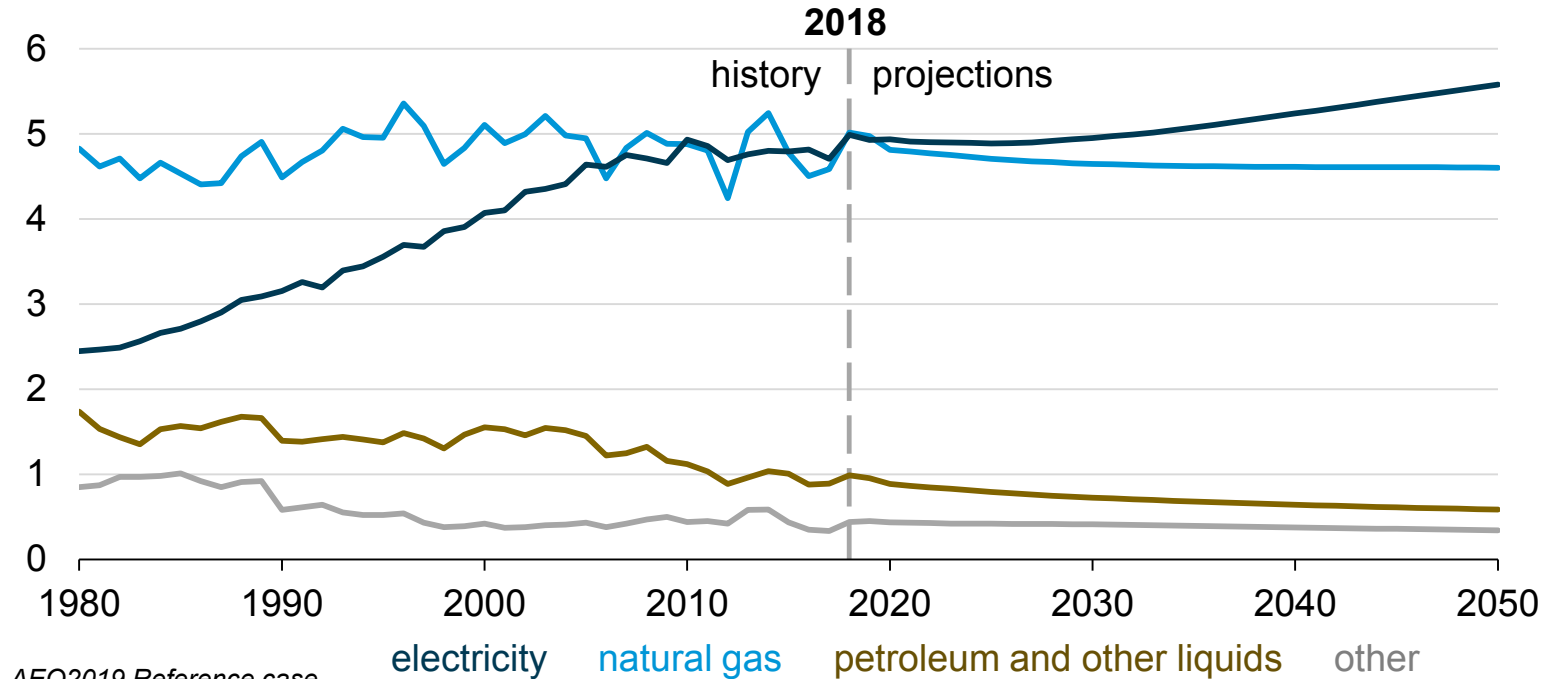
# AEO2019 debrief

# AEO2019 debrief

- AEO2019 includes updated major end-use technology menus
  - Residential and commercial space heating and cooling, water heating, residential appliances, and commercial cooking
  - Updated report data posted to the web: [www.eia.gov/analysis/studies/buildings/equipcosts](http://www.eia.gov/analysis/studies/buildings/equipcosts)
- AEO2019 also incorporates the *2015 Residential Energy Consumption Survey* (RECS)
  - Consumption and revised characteristic microdata posted to the web: [www.eia.gov/consumption/residential](http://www.eia.gov/consumption/residential)

# AEO2019 Reference case residential sector energy consumption

quadrillion British thermal units



AEO2019 Reference case

electricity

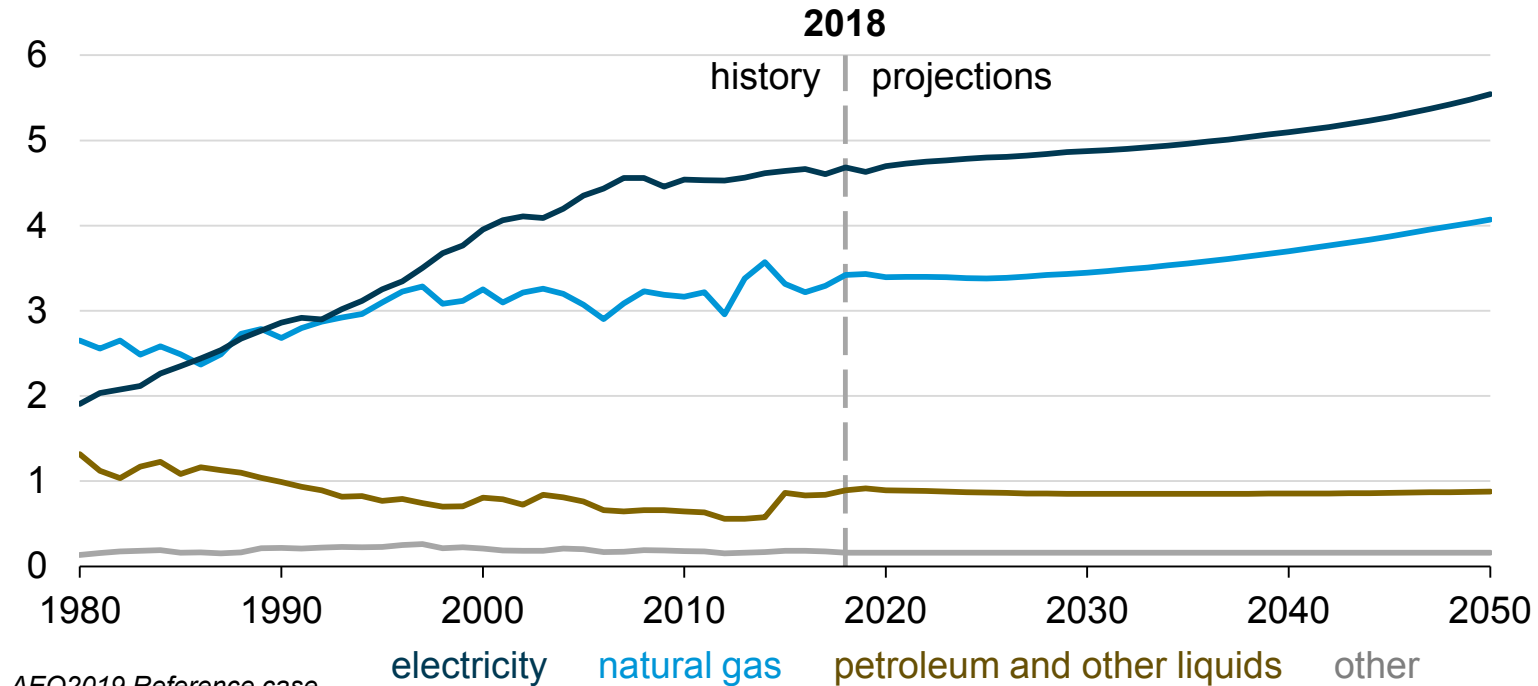
natural gas

petroleum and other liquids

other

# AEO2019 Reference case commercial sector energy consumption

quadrillion British thermal units

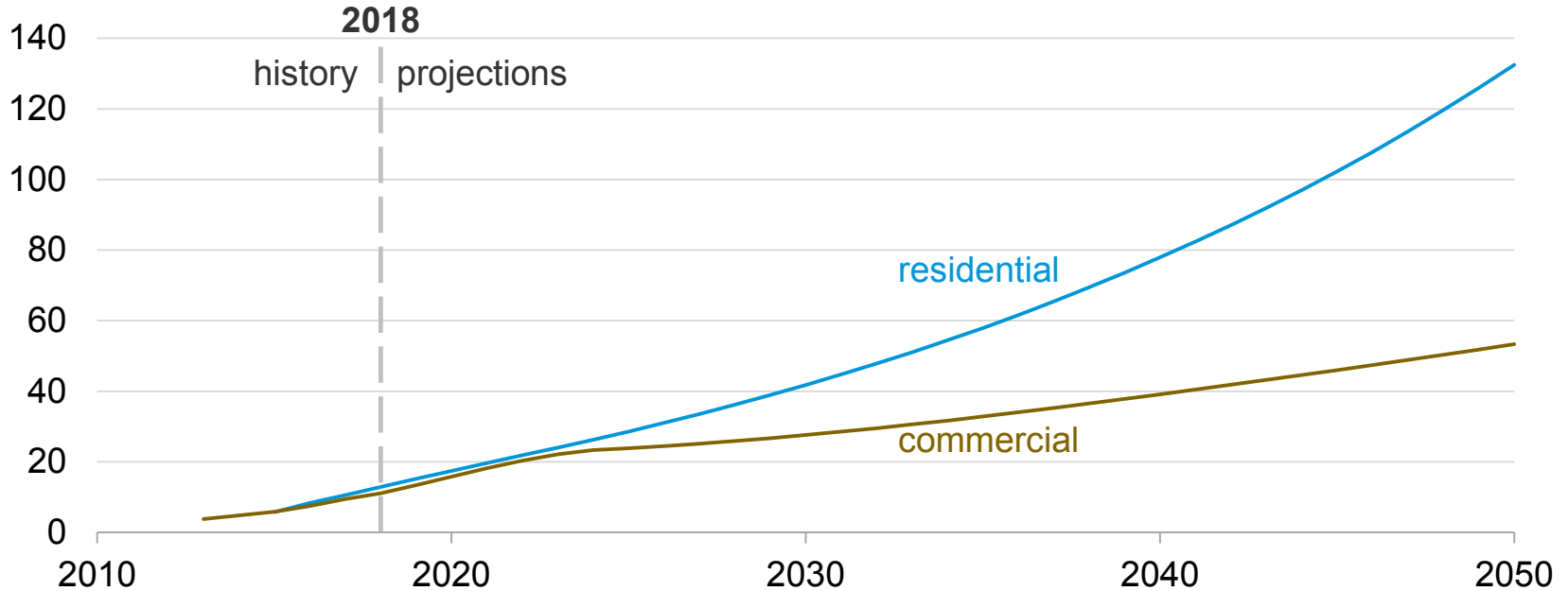


AEO2019 Reference case



# AEO2019 Reference case buildings solar photovoltaic capacity

direct-current gigawatts



AEO2019 Reference case



# AEO2020 (and beyond)



# AEO2020 major model updates

- Update distributed generation and combined heat and power (CHP) cost and characteristic inputs
  - Updated report data will be posted to the web here:  
[www.eia.gov/analysis/studies/buildings/distrigen](http://www.eia.gov/analysis/studies/buildings/distrigen)
  - Report will include discussion of residential and commercial battery storage
- Incorporate data from Stanford University's DeepSolar program into residential solar photovoltaic (PV) econometric hurdle model
  - Uses satellite imagery to identify existing solar PV installed in the Lower 48 states in 2018
  - [web.stanford.edu/group/deepsolar/home.html](http://web.stanford.edu/group/deepsolar/home.html)
- Continue to incorporate data from the 2015 RECS
  - Wood consumption data published after modeling for AEO2019 was completed
  - Residential sub-census division niches for fuel cells and small wind

## AEO2020 major model updates (continued)

- Update representation of commercial distributed generation
  - Refresh methodology to calibrate distributed generation model builds to recent historical data
  - Use statistical methods to estimate the shape, speed, and maximum levels of distributed generation diffusion
  - Ensure that assumptions such as diffusion start year, PV-suitable roof area, and treatment of existing and new buildings reflect the most recent available information
- Update for commercial minor fuel projections
  - Includes propane, motor gasoline, residual fuel oil, kerosene and coal
  - Current econometric method is based on historical consumption and energy prices

## AEO2020 policy assumptions

- Identify any new ENERGY STAR specifications as they affect major end-use equipment and miscellaneous electric loads (MELs)
  - Also working with other DOE offices and national labs to develop consistent terminology and characterization of MELs
- Incorporate new federal rulemakings if finalized
  - A notice of proposed rulemaking (NPR) issued in February 2019 proposes to roll back the 2017 expansion of General Service Lamp (GSL) and General Service Incandescent Lamp (GSIL) definitions
  - Proposed standards pending for appliances
- Review representation of state energy efficiency programs and policies

## AEO2020 historical updates

- Update sectoral energy consumption by fuel
  - *Monthly Energy Review* (MER)
  - *Short-Term Energy Outlook* (STEO)
- Include the National Oceanic and Atmospheric Administration's (NOAA) updated weather data and forecast
- Calibrate new residential heating equipment shares based on the U.S. Census Bureau's Survey of Construction
- Continue to refine historical (and projected) impacts of utility energy efficiency incentives
  - Working with Northeast Energy Efficiency Partnerships (NEEP) to improve data collection for and understanding of utility energy efficiency programs, particularly for Middle Atlantic and South Atlantic Census Divisions

## Medium-term projects

- Investigating impacts of low income energy efficiency and weatherization projects
- Characterizing whole-building sensor and control technologies

## Long-term projects

- Research alternate distributed generation electricity rate policies (i.e., retail versus wholesale rate for sales back to the grid)
- Investigate modeling of battery storage technologies for buildings

## Some reminders

- Interactive graphs are available as part of our online data table browser
  - [www.eia.gov/outlooks/aeo/data/browser](http://www.eia.gov/outlooks/aeo/data/browser)
- AEO and other select EIA data are available as part of our Application Programming Interface (API) tools
  - [www.eia.gov/opendata](http://www.eia.gov/opendata)

Questions or comments?



## For more buildings information

**Kevin Jarzomski** | phone: 202-586-3208  
| email: [kevin.jarzomski@eia.gov](mailto:kevin.jarzomski@eia.gov)

**Meera Fickling** | phone: 202-586-0765  
| email: [meera.fickling@eia.gov](mailto:meera.fickling@eia.gov)

**Behjat Hojjati** | phone: 202-586-1068  
| email: [behjat.hojjati@eia.gov](mailto:behjat.hojjati@eia.gov)

**Erin Boedecker** | phone: 202-586-4791  
Team Lead | email: [erin.boedecker@eia.gov](mailto:erin.boedecker@eia.gov)

# For more information

U.S. Energy Information Administration homepage | [www.eia.gov](http://www.eia.gov)

Buildings Working Group materials | [www.eia.gov/outlooks/aeo/workinggroup/buildings](http://www.eia.gov/outlooks/aeo/workinggroup/buildings)

Today in Energy | [www.eia.gov/todayinenergy](http://www.eia.gov/todayinenergy)

Annual Energy Outlook | [www.eia.gov/aeo](http://www.eia.gov/aeo)

Short-Term Energy Outlook | [www.eia.gov/steo](http://www.eia.gov/steo)

State Energy Data System | [www.eia.gov/state/seds](http://www.eia.gov/state/seds)

Monthly Energy Review | [www.eia.gov/mer](http://www.eia.gov/mer)

Residential Energy Consumption Survey | [www.eia.gov/consumption/residential](http://www.eia.gov/consumption/residential)

Commercial Building Energy Consumption Survey | [www.eia.gov/consumption/commercial](http://www.eia.gov/consumption/commercial)

International Energy Portal | [www.eia.gov/international](http://www.eia.gov/international)

# Bonus Slides

## Buildings-related reports

- Updated Buildings Sector Appliance and Equipment Costs and Efficiency: [www.eia.gov/analysis/studies/buildings/equipcosts](http://www.eia.gov/analysis/studies/buildings/equipcosts)
- Analysis and Representation of Miscellaneous Electric Loads (MELs) in NEMS: [www.eia.gov/analysis/studies/demand/miscelectric](http://www.eia.gov/analysis/studies/demand/miscelectric)
- Distributed Generation System Characteristics and Costs in the Buildings Sector: [www.eia.gov/analysis/studies/buildings/distrigen](http://www.eia.gov/analysis/studies/buildings/distrigen)
- Modeling Distributed Generation in the Buildings Sectors: [www.eia.gov/outlooks/aeo/nems/2017/buildings](http://www.eia.gov/outlooks/aeo/nems/2017/buildings)
- Price Elasticities for Energy Use in Buildings of the United States: [www.eia.gov/analysis/studies/buildings/energyuse](http://www.eia.gov/analysis/studies/buildings/energyuse)