

# A vision for the 2020 RECS:

## Preparing for the next Residential Energy Consumption Survey



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*Webinar*

*July 11, 2019 at 3 p.m. EDT*

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*Chip Berry, Survey Manager*

*Kevin Jarzomski, Senior Analyst*

# Comments from Consumption Statistics Office Director Ian Mead



## Introducing the 2020 RECS: Purpose of today's webinar

- Recap 2015 RECS and program innovations
- RECS and the Annual Energy Outlook
- 2020 RECS scope and key design features
- Collect user feedback on content



## There are 3 major phases for each RECS

- 1) Household Survey to collect residential energy characteristics
- 2) Energy Supplier Surveys to collect monthly bills and bulk fuel deliveries
- 3) Energy end-use modeling and estimation



# Household Survey includes over 200 items in a 30-minute questionnaire

**YOUR HOME**

**APPLIANCES**

**ELECTRONICS**

**SPACE HEATING**

**AIR CONDITIONING**

**WATER HEATING**

**LIGHTING**

**ENERGY PROGRAMS**

**ENERGY BILLS**

**HOUSEHOLD CHARACTERISTICS**

**ENERGY ASSISTANCE**

**ENERGY SUPPLIERS AND USE**



## Collect billing data from energy suppliers

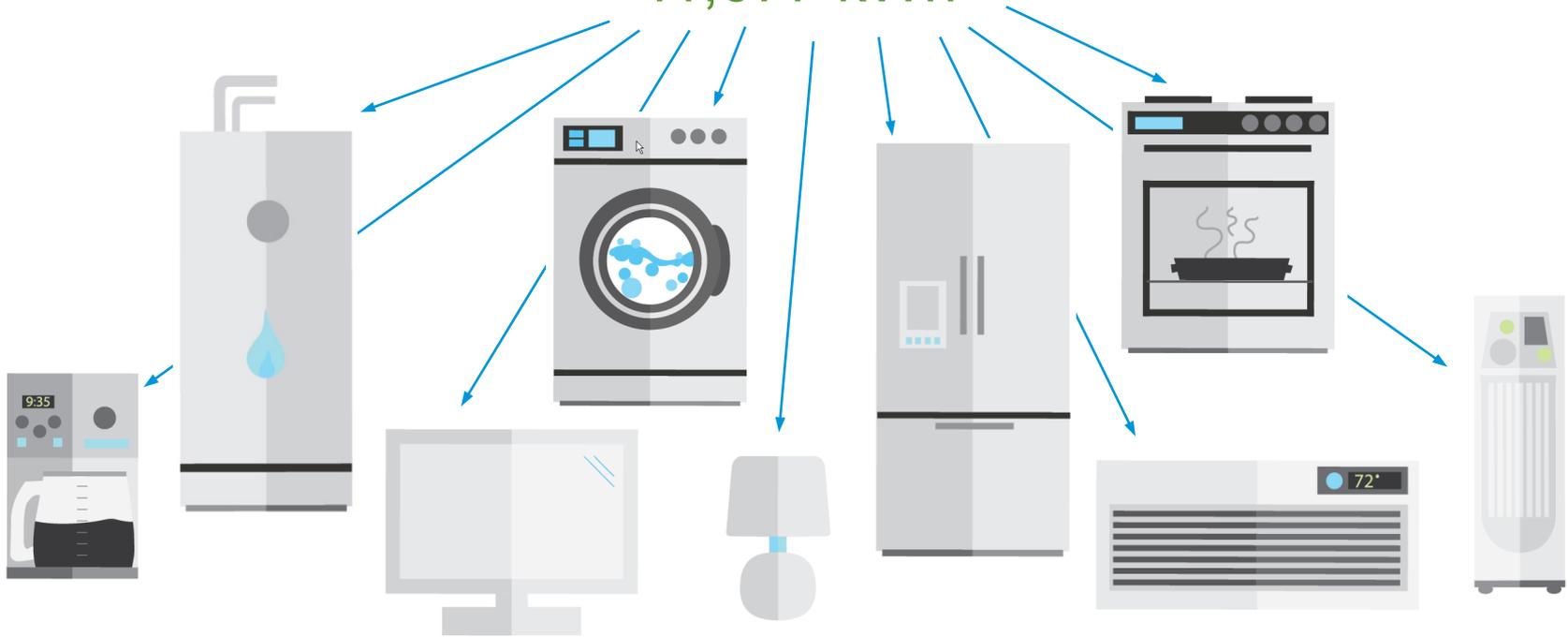


- Request bills for each fuel used in the household
- Suppliers report in the way the records are kept
- Nearly 100% response
- Monthly bills are summed to produce annual consumption estimates



# Disaggregate annual fuel totals into energy end-use estimates

11,677 kWh



# 2015 RECS featured two key innovations

## Web/mail forms

**RESIDENTIAL ENERGY CONSUMPTION SURVEY**  
A Nationwide Study of Energy Use in American Homes  
To be completed by the adult who is most knowledgeable about your home.



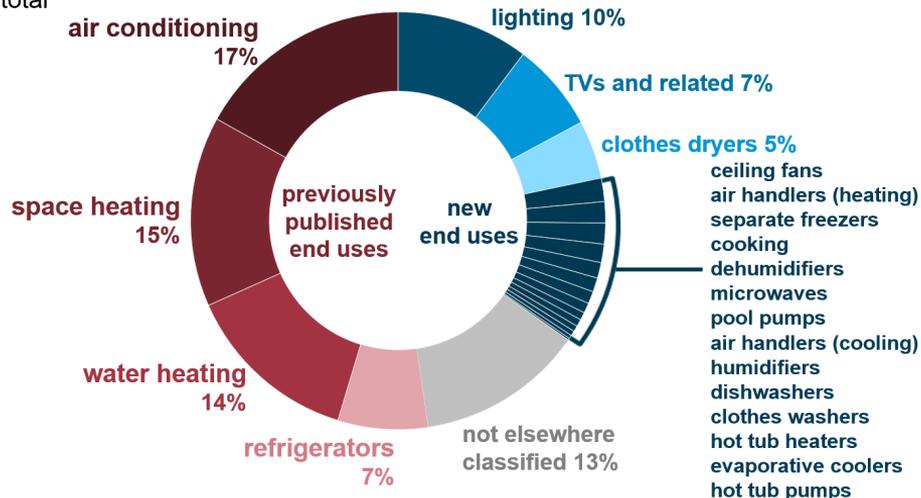
2015 RECS  
EPA Form 1072 (2015)

If you have questions about this survey,  
please email us at [recls@eia.org](mailto:recls@eia.org) or  
call toll free at 1-866-930-9177.  
Para pedir una copia de la versión del cuestionario en  
español, por favor llame al 1-866-309-4560.

  U.S. Energy Information Administration

## Expanded end-use estimation program

Residential electricity consumption by end use, 2015  
percent of total



Source: U.S. Energy Information Administration, 2015 Residential Energy Consumption Survey

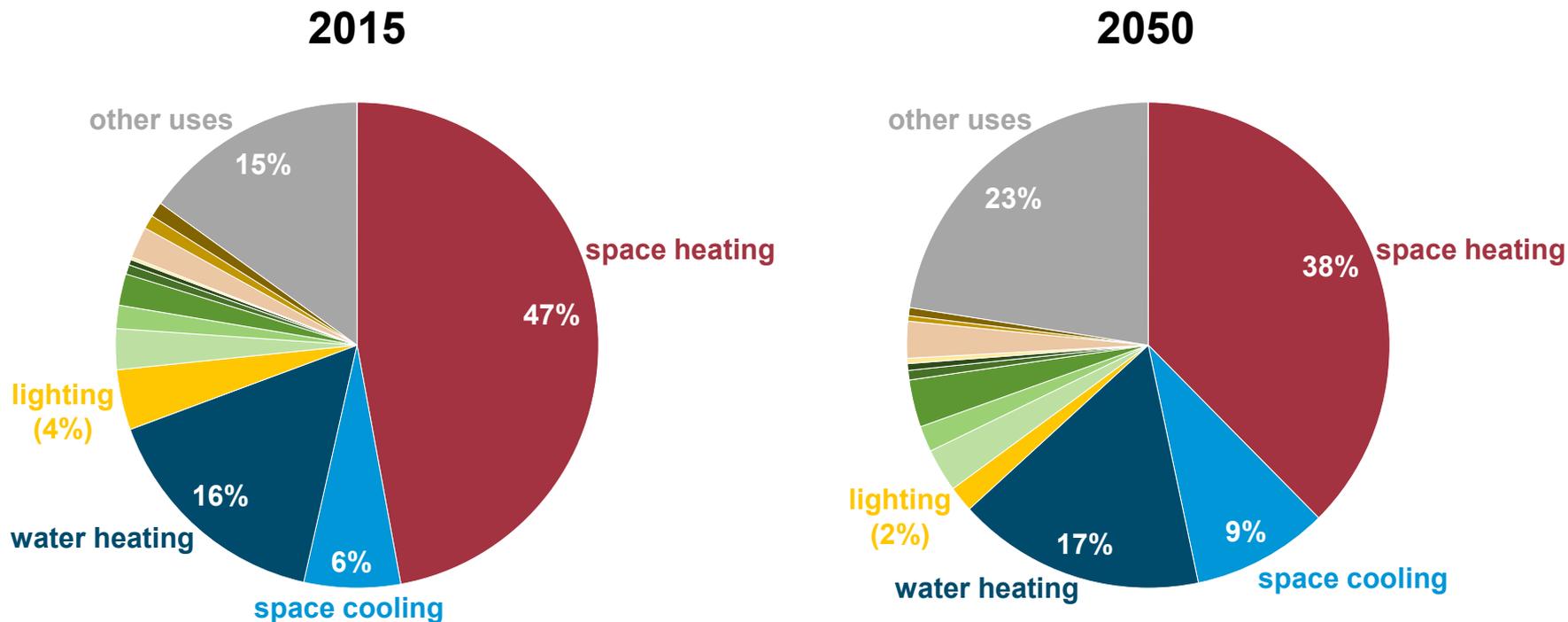


## RECS microdata define the residential sector for *Annual Energy Outlook* (AEO) projections

- Number of existing housing units, geographic distribution, equipment stocks, and average annual equipment energy consumption used for base year of NEMS projections
  - housing stock growth rates projected by separate Macroeconomic Activity model
  - portion of housing stock and associated equipment assumed to retire each year
- RECS includes only energy consumption within occupied housing units, so gaps exist between RECS consumption and historical sector totals
  - Unoccupied or vacation homes not included
  - Multifamily common areas not included



# Delivered end-use consumption shares change over time

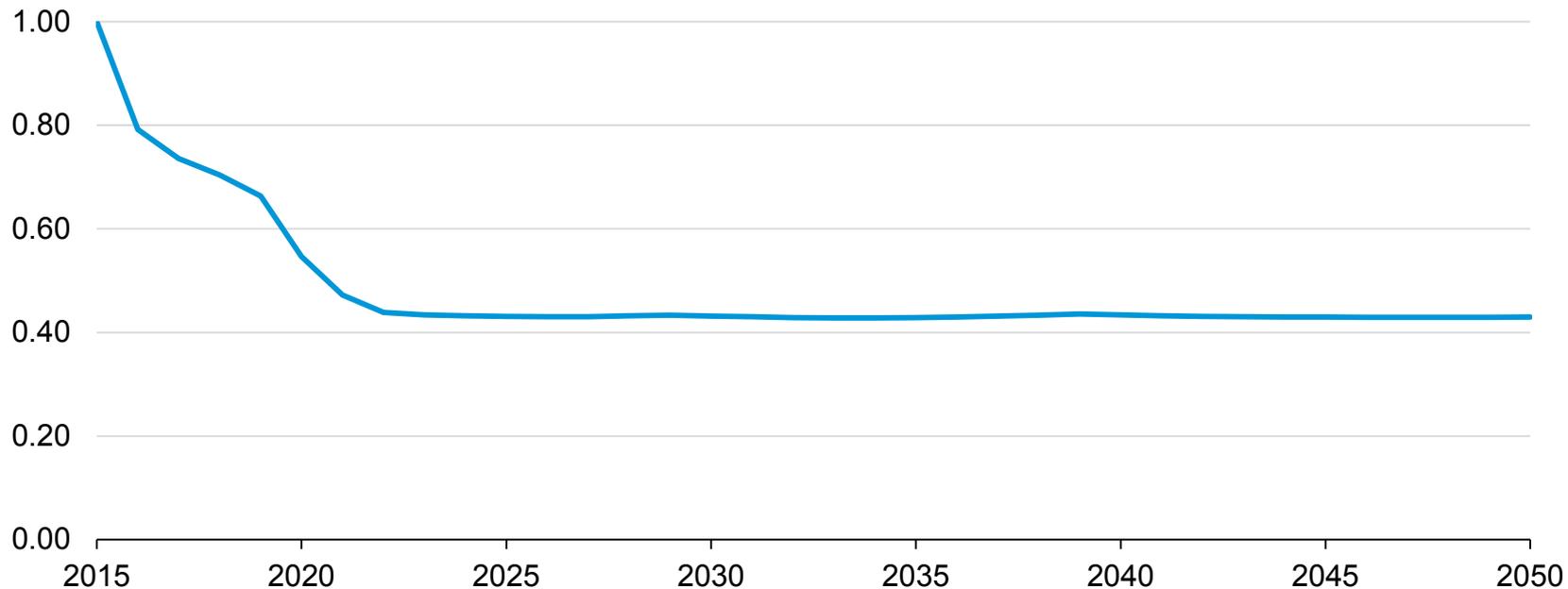


AEO2019 Reference case



# Driven by energy efficiency standards, improving technology, and reduced cost, lighting consumption is expected to continue dropping

indexed purchased electricity for lighting  
index (2015=1.0)

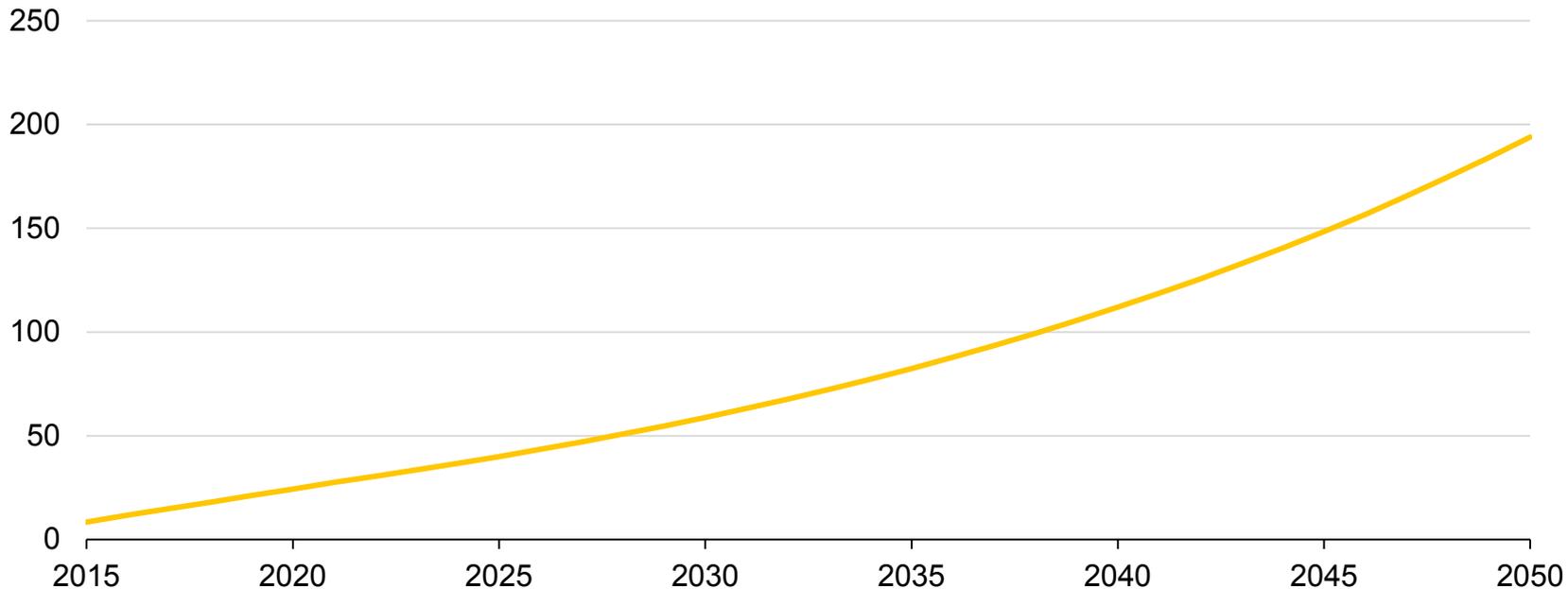


AEO2019 Reference case



# Residential solar photovoltaic (PV) generation expected to increasingly offset consumption of grid-purchased electricity

residential solar PV generation  
billion kilowatthours



AEO2019 Reference case



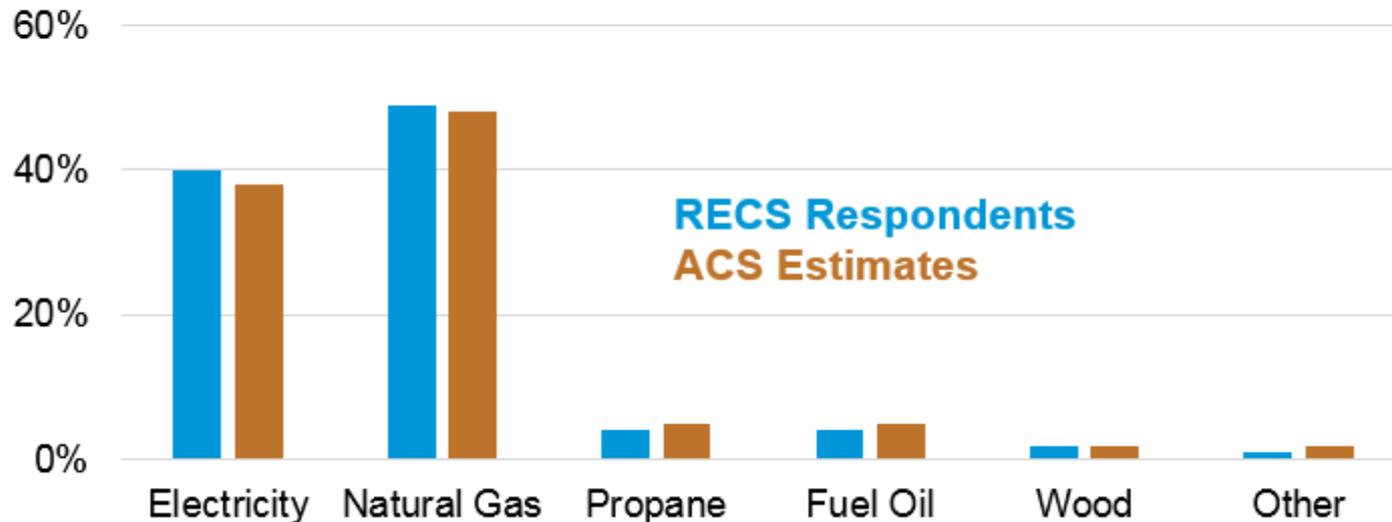
## 2020 RECS design based on confidence in Web/mail modes

- 3 pilot tests of Web/mail proved those modes are viable options for future RECS
- Despite lower response rates, Web/mail responds are representative of the nation's households
- Web/mail data quality is comparable to traditional in-person response data quality



# RECS Pilot Web/Mail test vs. American Community Survey (ACS)

**Main Heating Fuel, RECS Respondents and ACS**  
percent of households



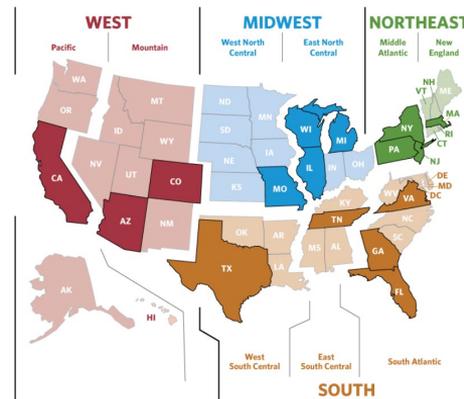


# 2020 RECS to include largest sample ever; estimates for more than 20 states

- Goal is responses from 15,000 to 18,000 households

- **16** states from the 2009 RECS

- Northeast: MA, NY, PA, NJ
- Midwest: MI, WI, IL, MO
- South: VA, GA, FL, TN, TX
- West: AZ, CO, CA



- **Up to 9 more** states chosen based on population, geography, climate, etc.
- Option to provide some statistics for all 50 states and D.C.



## Larger sample means greater precision for all estimates

- More confidence in **key subpopulations**: rural households, newer homes, mobile homes, fuel oil, energy insecure households
- Jump-start analysis of **emerging** subpopulations
  - Electric vehicles
  - Geothermal heat pumps
  - Solar PV



## Potential investments to close data gaps and pursue alternative data sources

- Explore a **multifamily** and mixed-use building study
- Collect and analyze **smart meter** data and data from in-home **load disaggregation** devices



# Motivations and criteria for updating Household Survey

- Add questions on emerging technologies
- Delete items less relevant or of poor quality
- Modify to improve response quality
- Where can we improve inputs for energy end-use modeling?



## Emerging technologies

- Add: Electric vehicle charging patterns and infrastructure
- Add: Solar PV capacity
- Add: Heat pump water heaters

## Space heating and air-conditioning

- Add: Heat pump type (geothermal, ductless mini-splits)
- Add: Heat pump backup sources (electric resistance, gas furnace)
- Modify: improve quality of apartment heating and cooling responses

# Appliances and Electronics

- Add: Usage indicators for TV peripherals
- Modify: TV types (smart TVs, OLED)

# Energy programs

- Delete: Energy Star appliance questions
- Delete or modify: Energy program participation (appliance rebates, refrigerator recycling)



## Alternative square footage estimation techniques

- Trained interviewers measured homes according to strict protocol
- RECS square footage definition is unique and reflects energy-consuming space in homes; includes all basements
- How do we estimate square footage without widespread use of interviewers measuring homes?
- Alternative solutions include:
  - Respondent estimates
  - Administrative records
  - Modeling



## Let's continue this conversation!

Comments on RECS encouraged...

- What three questionnaire updates would you like to see?
- How would a 50-state RECS impact your work?

Chip Berry

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# Questions?

(Please submit them through the Chat box)

# Contact us!

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## For more information

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

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

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

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

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

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)