

Housing characteristics overview from the 2020 *Residential Energy Consumption Survey (RECS)*



Webinar

September 2022

By

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Agenda

- Introduction
 - Data release schedule
- Housing characteristics highlights
- Methodology
- Next steps
- Q&A

RECS measures the characteristics that contribute to energy consumption in primary, occupied housing units

- The 2020 RECS was fielded between September 2020 and April 2021 using self-administered web and mail questionnaires.
- The 2020 RECS resulted in the largest responding sample in RECS history, with 18,496 respondents completing surveys.
- For the first time, the RECS includes estimates for all 50 states and DC.
- We collaborated with IMG-Crown and RTI International on the 2020 RECS Household Survey.

2020 RECS Release Schedule

Product	Release Date
Housing characteristics tables, National and Regional – Group 1	March 2022
Housing characteristics tables, National and Regional – Group 2	May 2022
Housing characteristics tables - State tables Housing characteristics preliminary public use microdata and codebook Technical documentation	July 2022
Consumption and expenditure tables Final complete public use microdata and codebook	Spring 2023

2020 RECS and COVID

- According to the survey, about 30% of households (36 million) had at least one person working from home at least one day a week. In Washington, DC, nearly 60% of households had one person working from home at least one day per week. In West Virginia, less than 15% of households had someone working from home.
- Despite people spending more time at home, [our supply-side surveys of natural gas, electricity, and petroleum product suppliers show residential energy use declined by 4% in 2020](#) from 2019. The warmer winter months in 2020 reduced heating demand, which typically accounts for about 40% of energy use in homes.

Highlights from the 2020 RECS Household Survey

Where can you find these results (and more)?

www.eia.gov/recs



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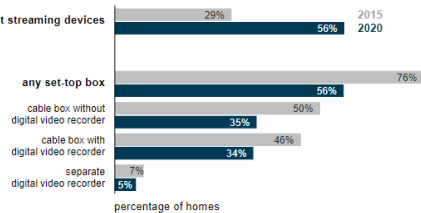
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More than half of U.S. homes used a streaming device with their TVs in 2020

U.S. residential television-related equipment (2015 and 2020)



Source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey (RECS)

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2020 RECS Housing Characteristics Data: 2020 RECS state-level housing characteristics tables are now available

Release Date: July 6, 2022

The third set of 2020 RECS housing characteristics tables are now available. The third data release contains data highlights for housing characteristics at the state-level. This is the first time in program history that data have been released for all 50 states and the District of Columbia. Previous 2020 RECS releases contained data for housing characteristics at the national, regional, and division level.

[2020 RECS State data](#)

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How do
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State Data

[Highlights for air conditioning in U.S. homes by state, 2020](#)

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[Highlights for appliances in U.S. homes by state, 2020](#)

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[Highlights for electronics and lighting in U.S. homes by state, 2020](#)

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[Highlights for fuels used in U.S. homes by state, 2020](#)

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[Highlights for household characteristics of U.S. homes by state, 2020](#)

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[Highlights for space heating fuel in U.S. homes by state, 2020](#)

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2020 Residential Energy Consumption Survey,
September 2022

Where can you find these results (and more)?

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Preliminary data release date: June 2022

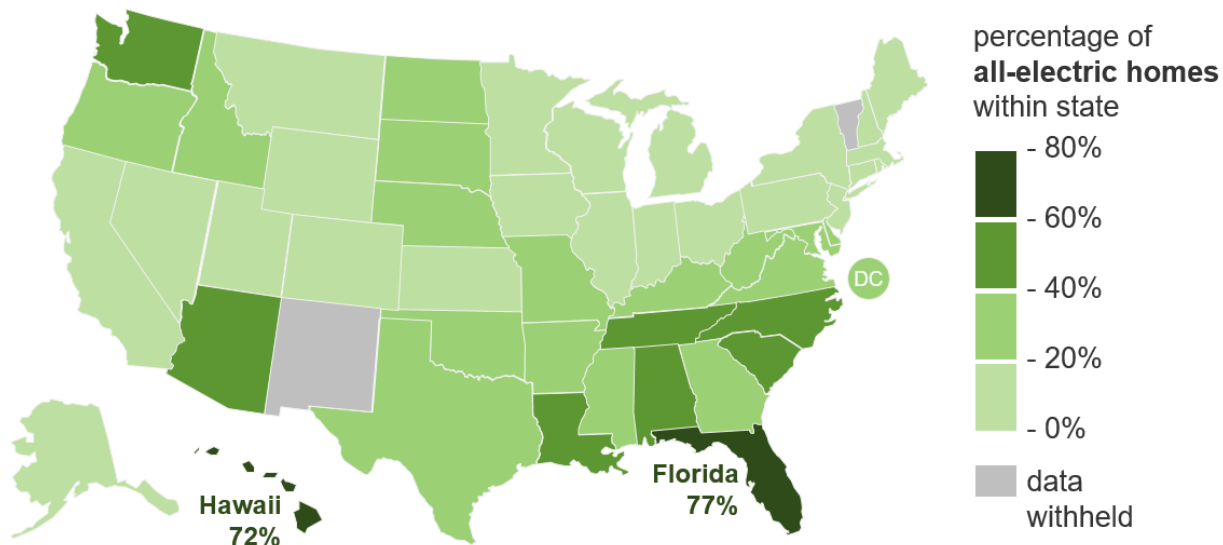
Highlights for fuels used in U.S. homes by state, 2020

Number (million) and percentage of housing units

	Fuels used in home for any use										
	Total ^a	Home is all-electric ^b		Natural gas		Propane ^c		Wood		Fuel oil or kerosene	
All homes	123.53	32.25	26%	74.65	60%	11.68	9%	10.83	9%	5.72	5%
Alabama	1.90	0.77	41%	0.80	42%	0.25	13%	0.20	10%	Q	Q
Alaska	0.26	0.03	11%	0.16	62%	0.03	10%	0.06	23%	0.07	26%
Arizona	2.68	1.07	40%	1.37	51%	0.17	6%	0.19	7%	Q	Q
Arkansas	1.14	0.36	32%	0.57	50%	0.17	15%	0.16	14%	N	N
California	13.18	1.11	8%	11.54	88%	0.77	6%	1.00	8%	Q	Q
Colorado	2.26	0.26	11%	1.85	82%	0.14	6%	0.20	9%	Q	Q
Connecticut	1.38	0.15	11%	0.66	48%	0.20	15%	0.21	15%	0.55	40%
Delaware	0.38	0.11	29%	0.18	47%	0.08	22%	Q	Q	0.04	10%
District of Columbia	0.32	0.08	24%	0.23	74%	Q	Q	Q	Q	Q	Q
Florida	8.06	6.22	77%	1.25	16%	0.38	5%	0.34	4%	N	N

Florida and Hawaii had the highest percentage of all-electric homes in 2020

All-electric homes by state (2020)

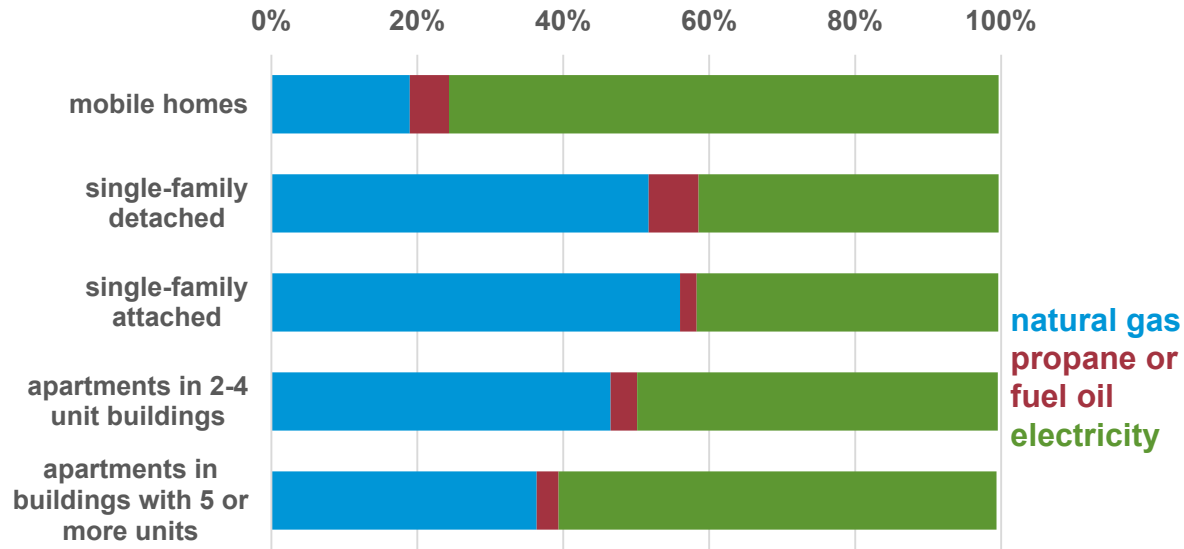


Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey



Single family homes are more likely to use natural gas for water heating, mobile homes are more likely to use electricity

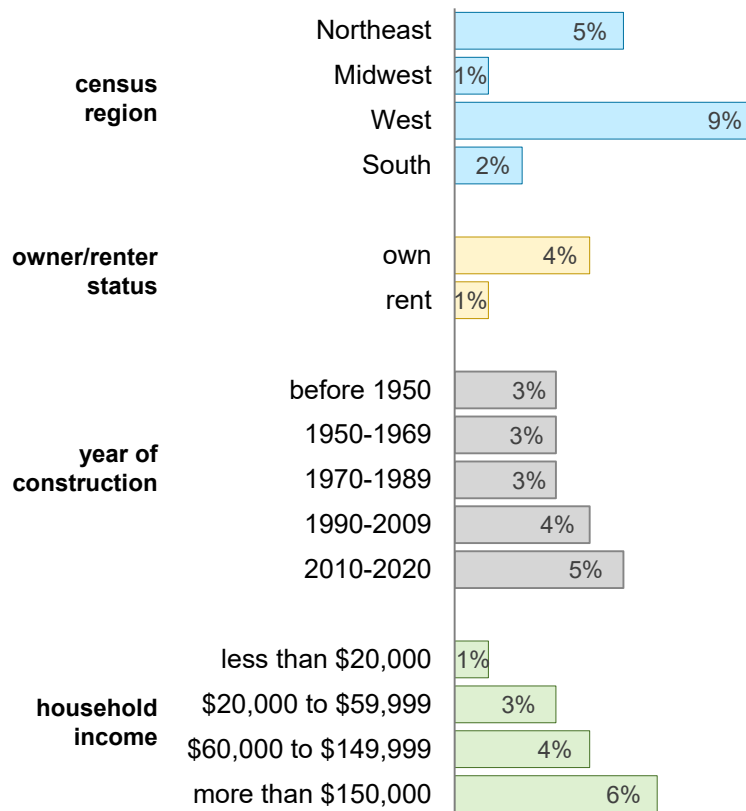
Water heating fuel by housing type
percentage of U.S. households



Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

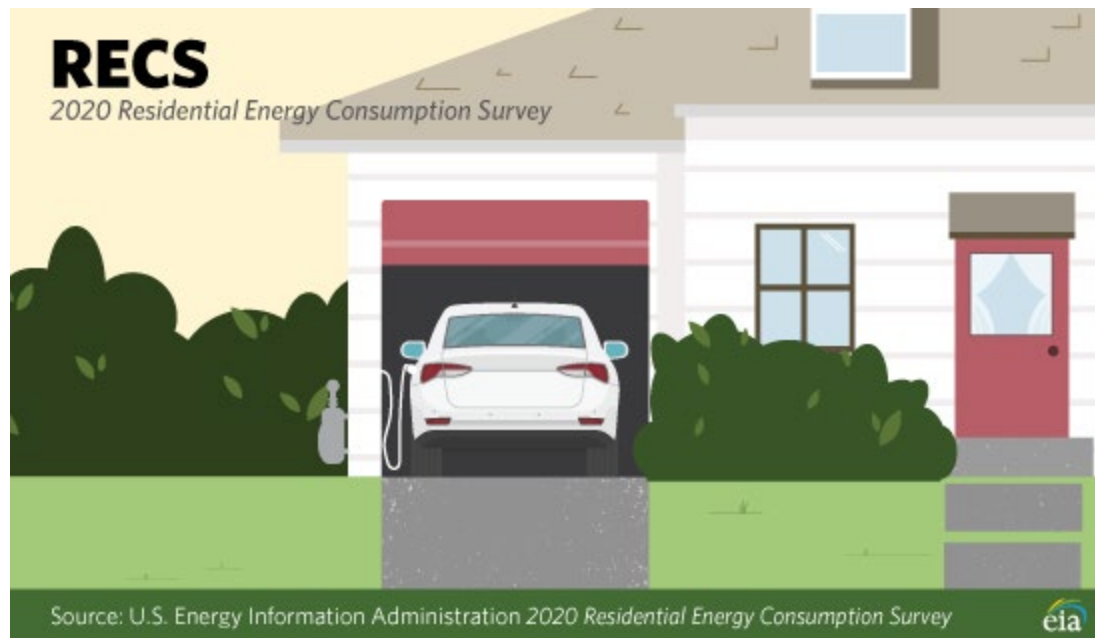
2020 RECS beginning to reveal more about characteristics of single-family homes with solar

U.S. single-family households that reported solar equipment (2020)
percentage of U.S. single-family households within each category



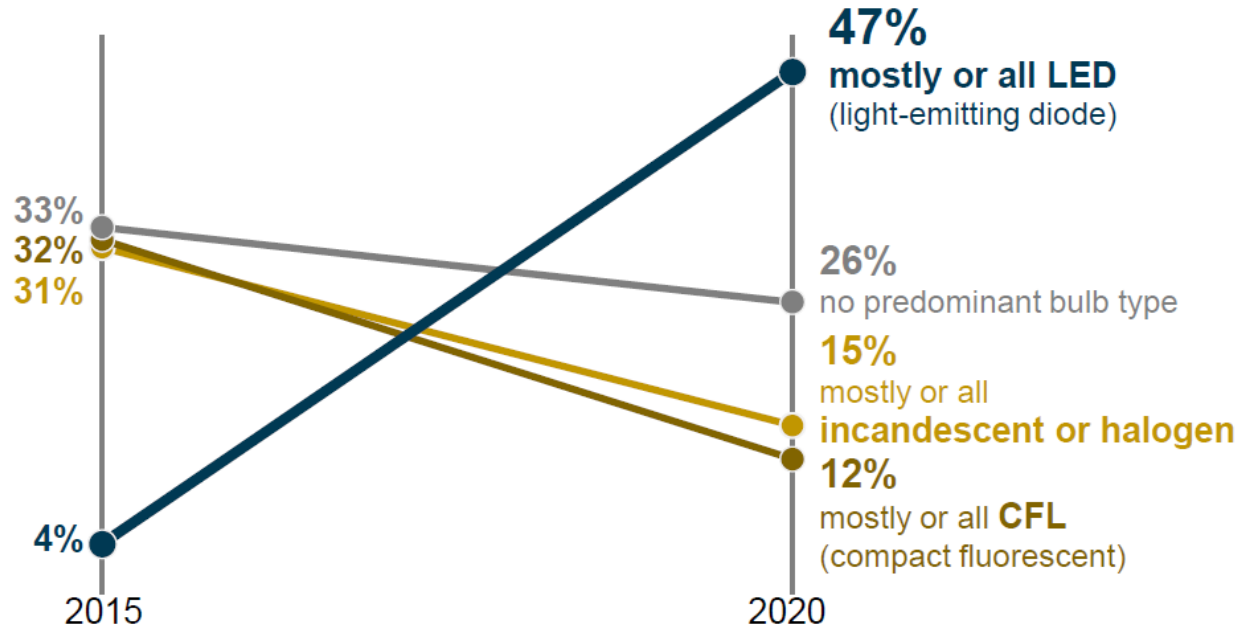
Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

More than three-quarters of electric vehicle owners reported that they charged their electric vehicle at home



Households using LED lights for most or all of their lighting increased from 4% in 2015 to 47% in 2020

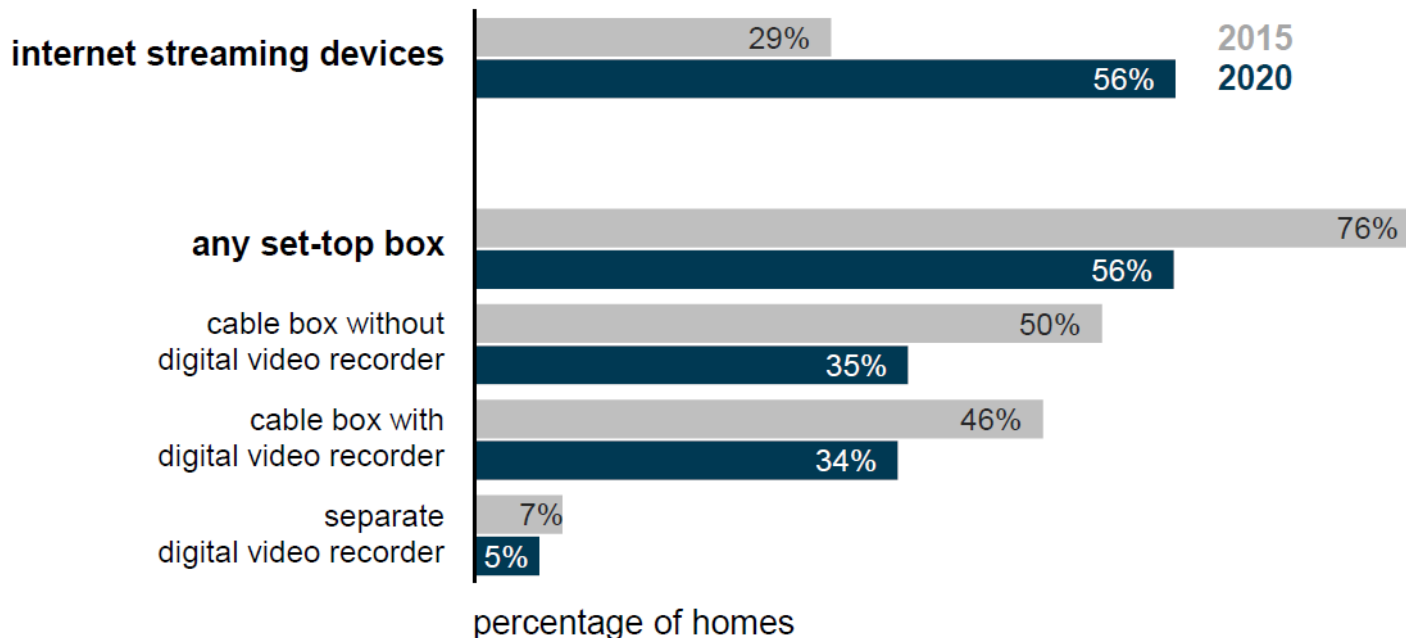
Homes with most or all indoor bulbs of a single type (2015 and 2020)
percentage of households



Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

Use of internet streaming devices increased from 29% of homes in 2015 to 56% in 2020

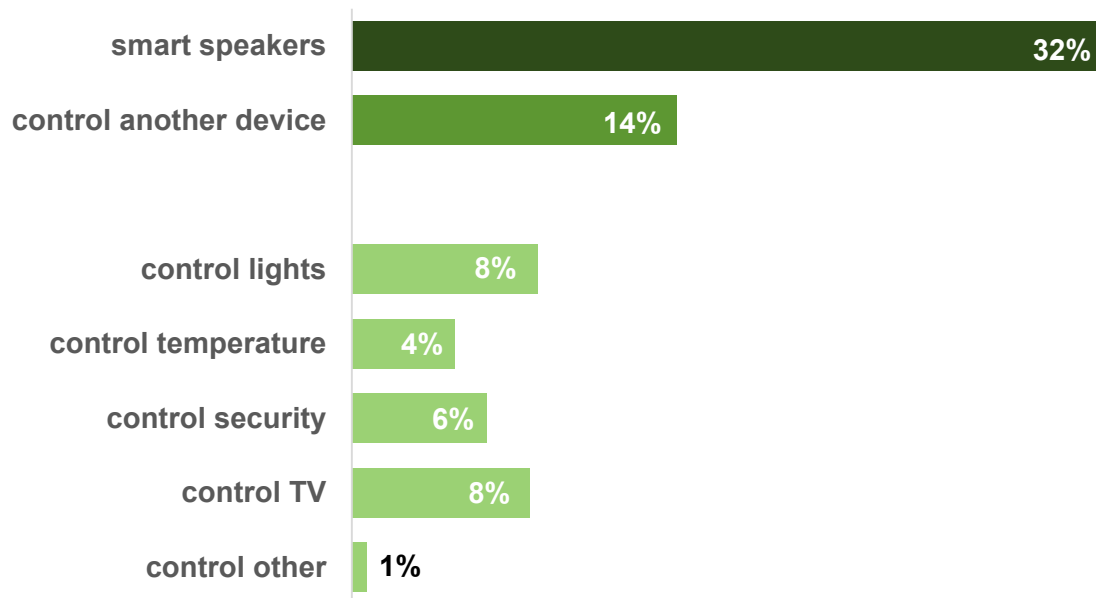
U.S. residential television-related equipment (2015 and 2020)



Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

About 40 million households had smart speakers in 2020

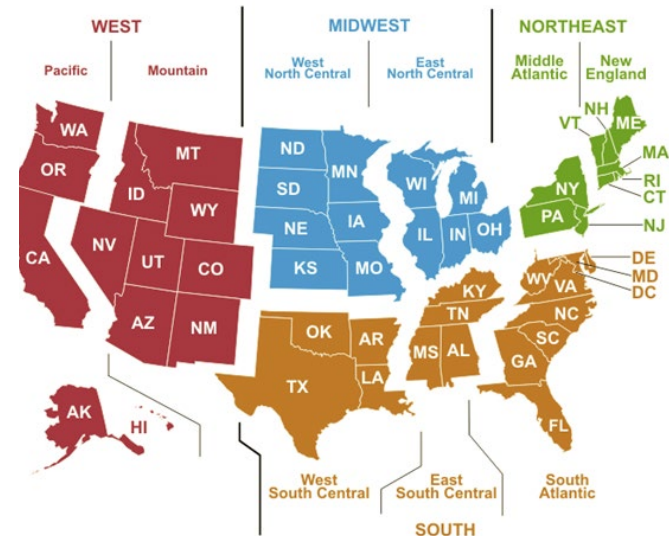
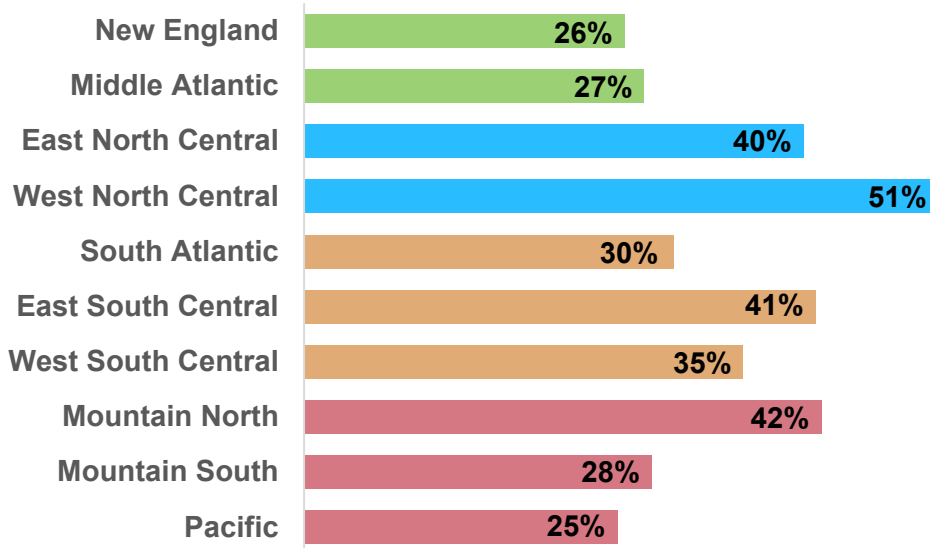
Presence and usage of *smart speakers*
percentage of U.S. households



Data source: U.S. Energy Information Administration, 2020 *Residential Energy Consumption Survey*

Half of homes in the West North Central division had separate freezers

Households with separate freezers
percentage of U.S. households



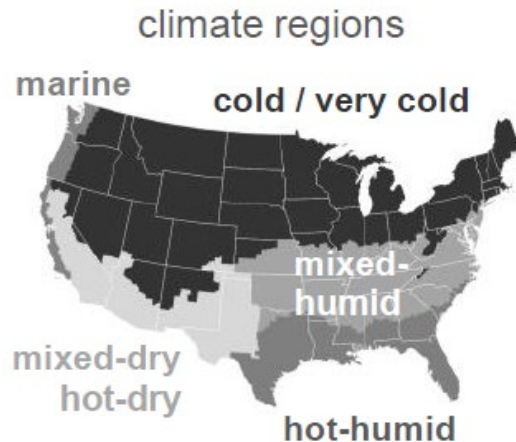
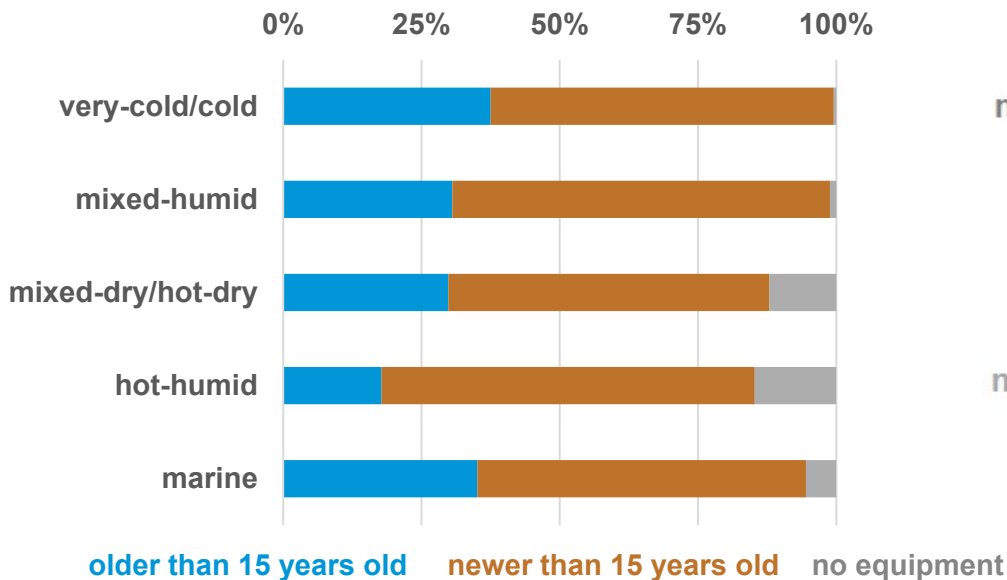
Mountain North contains MT, ID, WY, UT, and CO.
Mountain South contains NV, AZ, and NM.



Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

31% of households reported that their main heating equipment was 15 years old or older

Presence and age of heating equipment by climate region
percentage of U.S. households



Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

Near 90% of households used air conditioning in 2020

Air-conditioning equipment usage in U.S. homes by climate region and year of initial construction

percentage of homes

100%

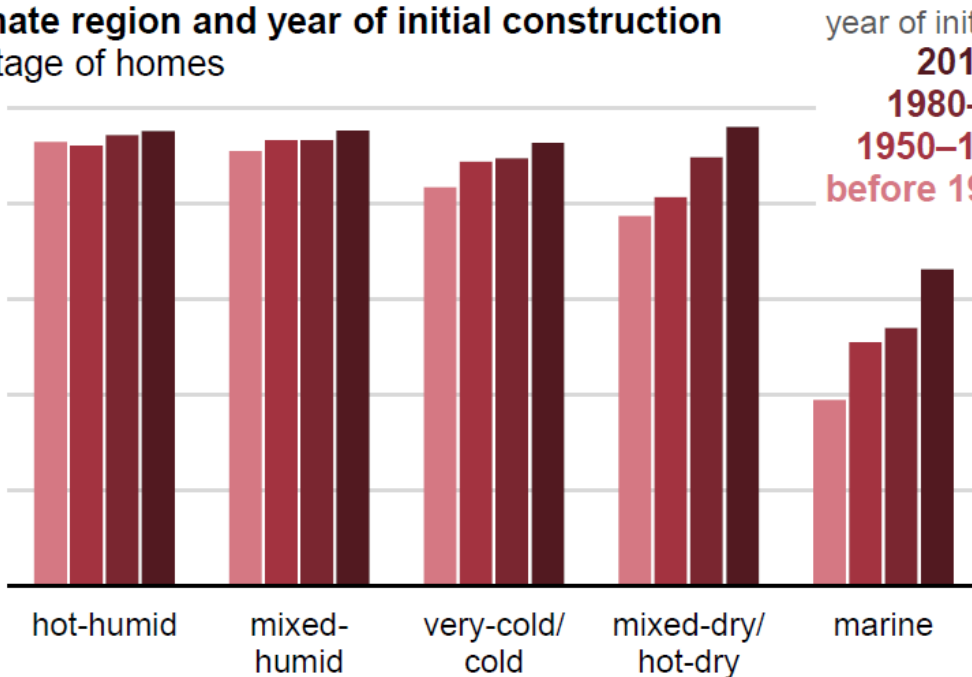
80%

60%

40%

20%

0%



year of initial construction

2010–2020

1980–2009

1950–1979

before 1950

climate regions

marine

cold / very cold



mixed-dry
hot-dry

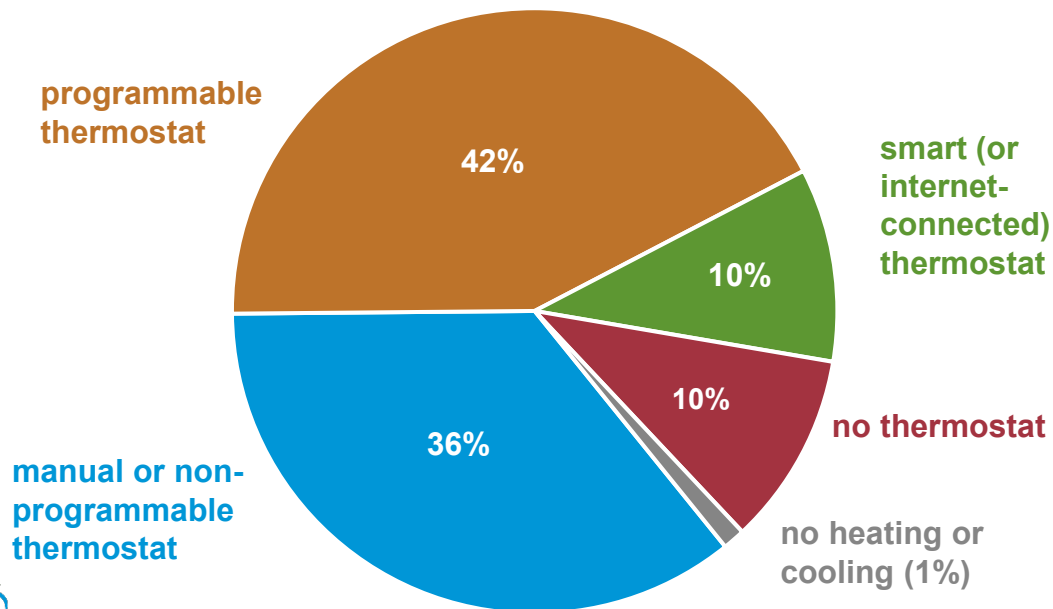
hot-humid



Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

Programmable or smart thermostats were used in 53% of households

Type of thermostat used to control household temperature
percentage of U.S. households



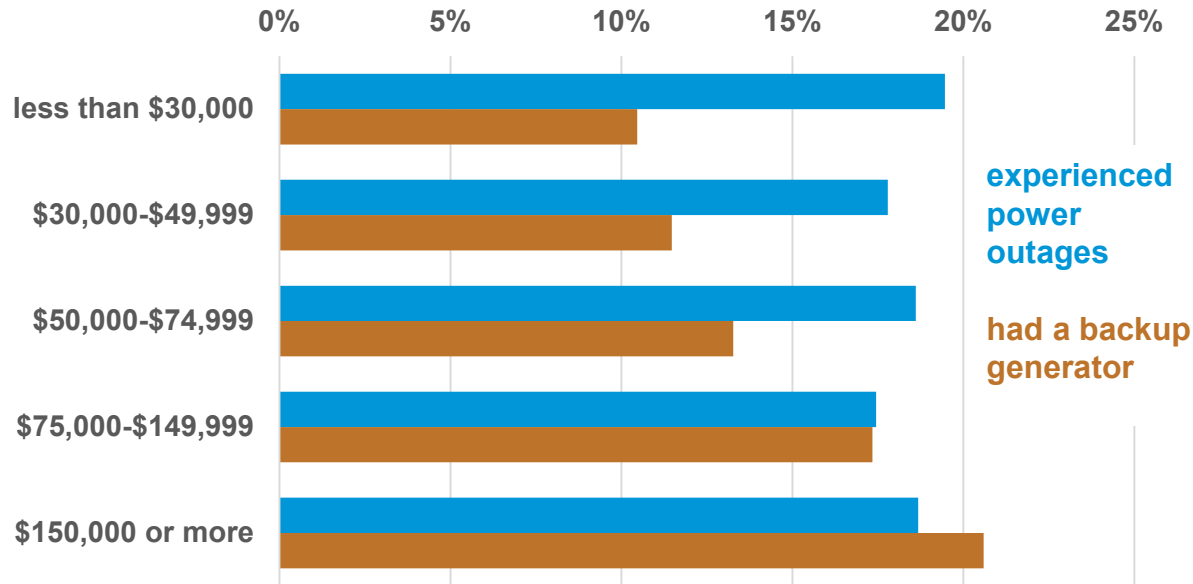
Only one-third of households with programmable or smart thermostats actually use the programmable or smart capabilities to control the temperature.



Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

Households with higher incomes were more likely to have backup generation

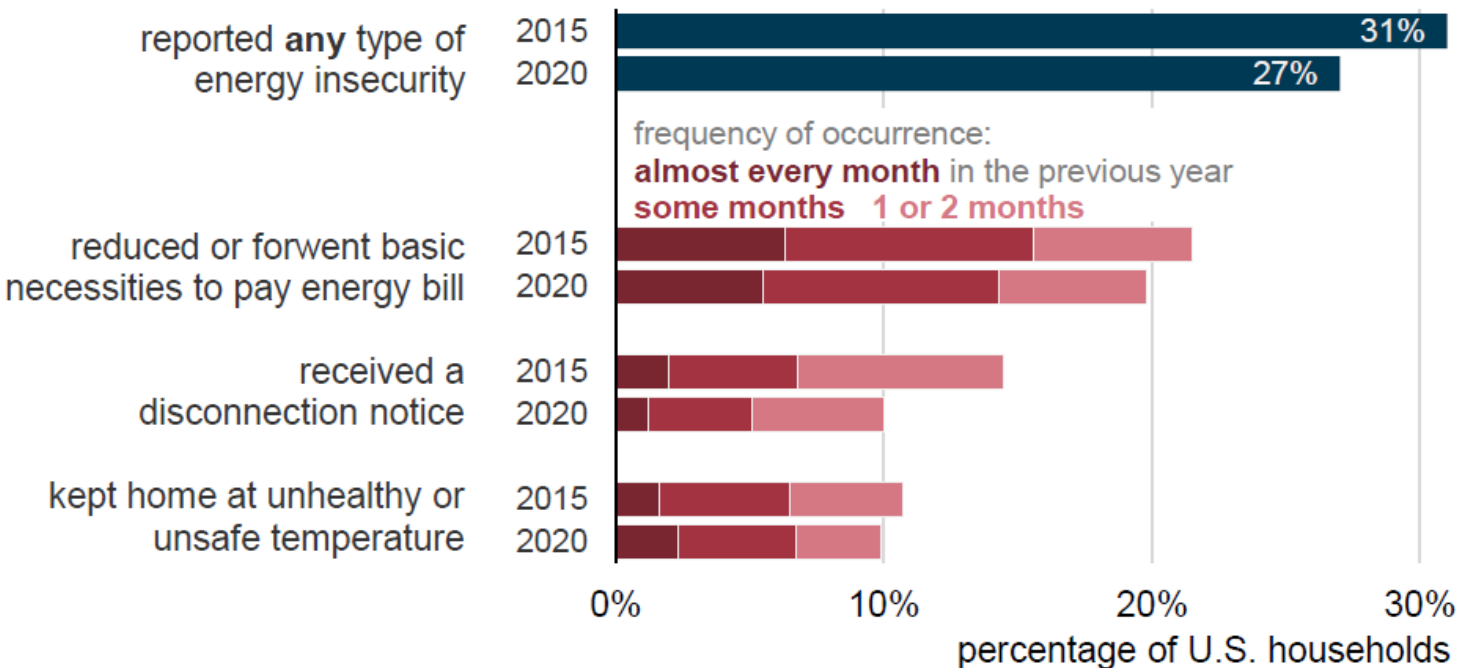
Power outages and backup equipment by household income
percentage of U.S. households



Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

27% of households experienced energy insecurity in 2020

U.S. household energy insecurity measures (2015 and 2020)

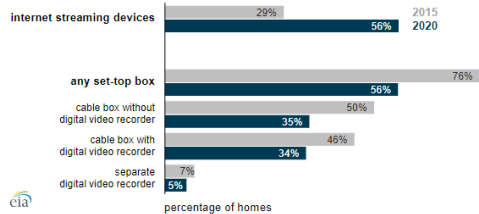


Data source: U.S. Energy Information Administration, 2020 Residential Energy Consumption Survey

Where can you find microdata to do your own analysis?

More than half of U.S. homes used a streaming device with their TVs in 2020

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2020 RECS State data

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2020 RECS state-level preliminary housing characteristics public use microdata file available

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Learn more

Learn how people use energy in various rooms in their homes

2020 RECS Survey Data

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Microdata

The 2020 study represents the 15th iteration of the RECS program. First conducted in 1978, the Residential Energy Consumption Survey is a national sample survey that collects energy-related data for housing units occupied as a primary residence and the households that live in them. Data were collected from nearly 18,500 households in housing units statistically selected to represent the 123.5 million housing units that are occupied as a primary residence. This first version of the 2020 RECS microdata file, released in July 2022, reflects preliminary household characteristics data.

Users are strongly encouraged to read Using the 2020 microdata file to compute estimates and standard errors (RSEs).

Data files	Variable and response codebook	Survey forms	Release date
SAS	CSV	EIA-457 A-G	July 2022

Methodology

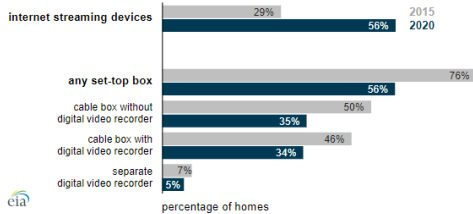
Where can you find technical details on our survey methods?

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OVERVIEW DATA ANALYSIS & PROJECTIONS

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Methodology

- [2020 Residential Energy Consumption Survey \(RECS\) Household Characteristics Technical Documentation Summary](#)
- [2020 Residential Energy Consumption Survey \(RECS\) Household Characteristics Technical Documentation Brief](#)

We selected a representative sample from a list of housing unit addresses in each state

- The survey frame is based on the USPS Computerized Delivery Sequence File, which covers 99.6% of eligible RECS addresses in the United States.
- We selected a sample of addresses to represent the 123.5 million occupied, primary residences in the 50 states and DC.
- Our 2020 RECS sampling method changed from what was used for the 2015 RECS.
 - The 2015 RECS used a multistage sample to select addresses. This method allowed for geographic clustering, which is needed to make cost-efficient in-person interviewer assignments.
 - The 2020 RECS used an unclustered sample design because the survey was self-administered.

The 2020 RECS adopted an entirely self-administered questionnaire

- The questionnaire design process included:
 - Reviewing content from 2015 RECS
 - Adding and dropping questions based on current household technologies
 - Soliciting data user input
 - Pretesting most of the new or substantially revised questions
- Households completed the RECS questionnaire using one of two self-administered methods: web or mail

We filled missing responses using hot deck imputation

- We used item imputation to fill in missing values in the data set.
 - Variables imputed: 263
 - Median imputation rate: 3.0%
- **Hot-deck** imputation method was used, meaning that a *recipient* household was matched with a similar *donor* household and borrowed its value.

Responding cases are assigned weights to represent entire population of primary, occupied housing units

- Weights are calculated for each responding housing unit.
- The sum of all weights is 123.53 million, which is the total number of U.S. primary, occupied housing units in 2020.
- If you're using the public microdata file, use the NWEIGHT variable.
 - If you're not sure how to do this, you can review our documentation or ask us how to accurately use the weights.

Next steps

2020 RECS consumption and expenditures estimates are coming in 2023

- Finish processing billing data from the Energy Supplier Survey.
- Produce consumption and expenditures estimates.
- Complete end-use modeling tasks.
- Release final data file with consumption and expenditures data and updated characteristics data.

We are exploring options for the next RECS

- Increased frequency and timeliness.
- Similar design to 2020, 50-state sample, all self-administered.
- Explore opportunities to expand our Residential Demand Program.
 - Puerto Rico and territories? Multifamily building study? Community estimation?

Q&A

Contact us

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- Carolyn Hronis, Survey Manager
 - eiainfoconsumption&efficiency@eia.gov
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