2015 Residential Energy Consumption Survey (RECS)

Webinar

September 19, 2017 at 2 p.m. EDT

By

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Agenda

- Introduction

  - RECS release schedule

  - Accessing RECS data on the website

- Highlights from the 2015 RECS

- Overview of methods for the 2015 RECS

- A look to the future

- Q&A

2015 RECS release schedule

Product	Release date
Housing characteristics data tables	February 2017
Microdata and methodology	May 2017
Square footage data	Fall 2017
Energy consumption and expenditures data	Spring 2018

The RECS website

www.eia.gov/consumption/residential/

Highlights from the 2015 RECS

RECS results describe the characteristics that contribute to energy consumption in homes

- More than 240 items collected
    - Structure and geography
    - Appliances and electronics
    - HVAC and water heating
    - Lighting
    - Program participation

- New questions for 2015
    - Smart meters and smart thermostats
    - LED lighting
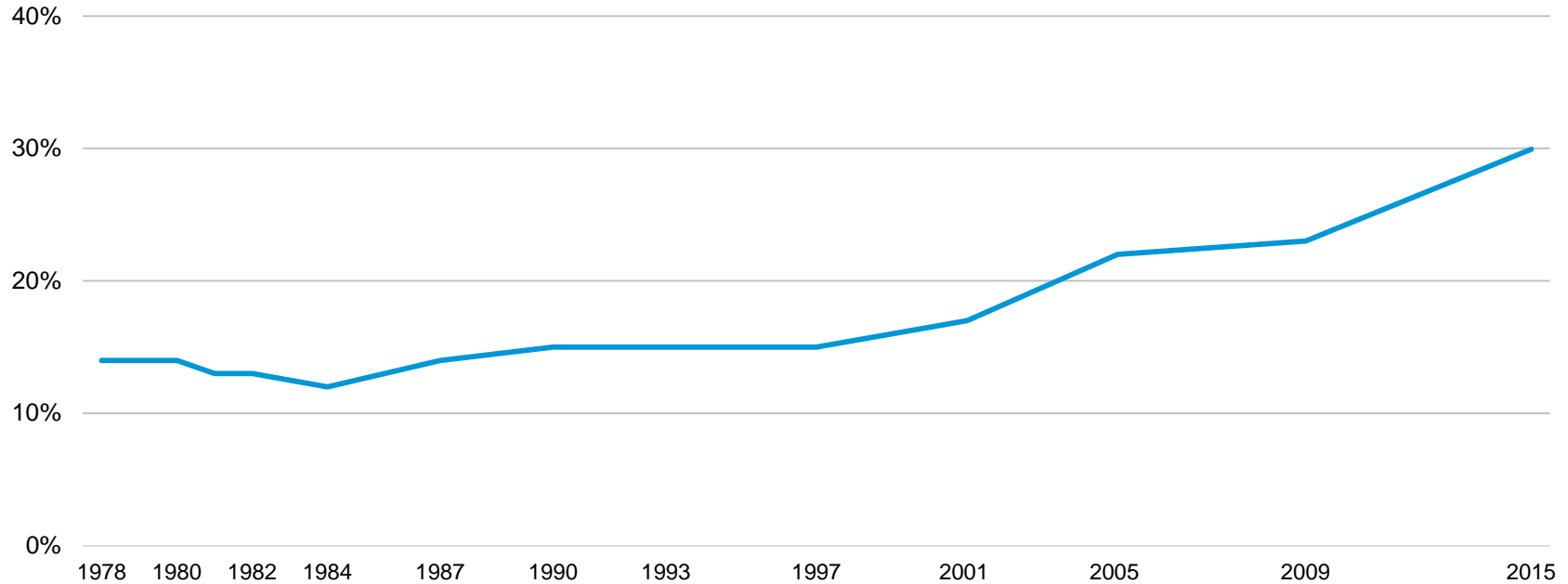   - Thermostat use

- Highlights variability across homes

Newer homes are more likely to have high ceilings and more efficient windows

Percentage of homes

High ceilings
Double- or triple-pane windows
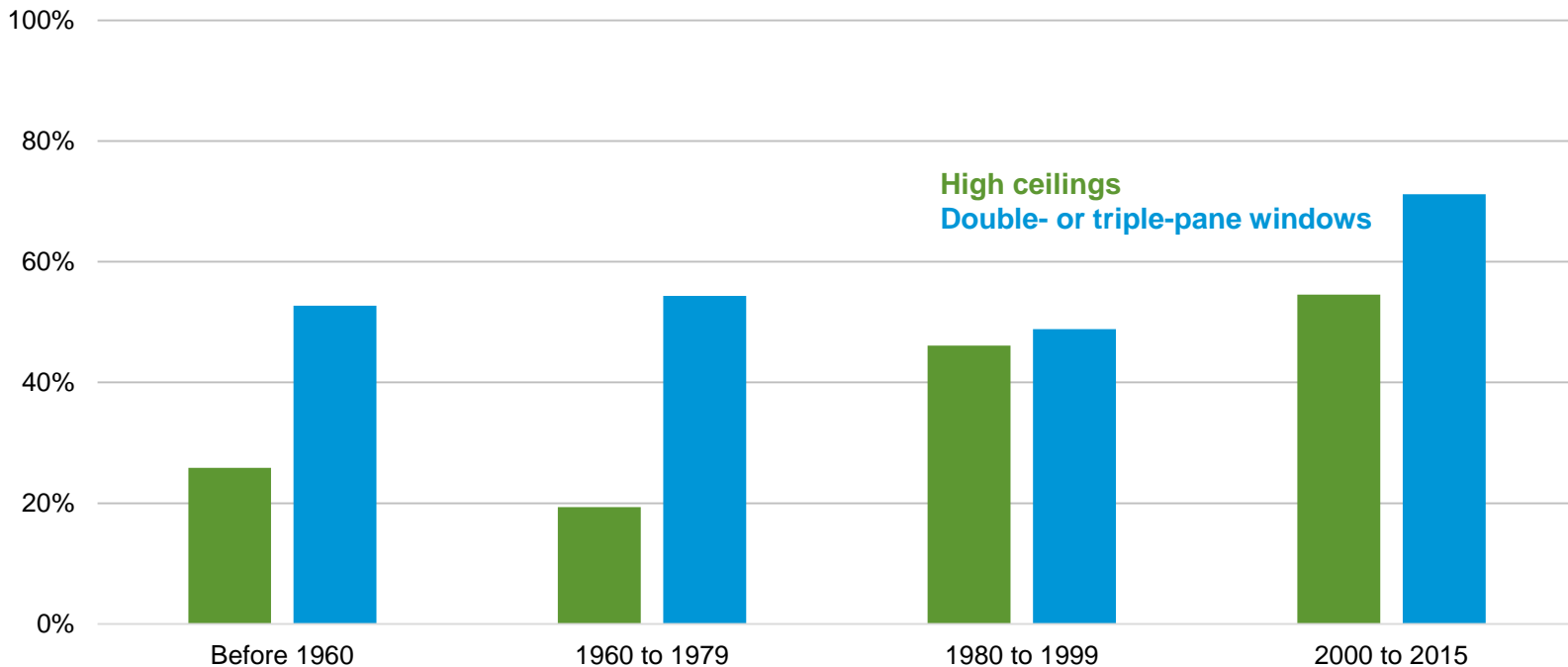
The number of households with a second refrigerator continues to increase
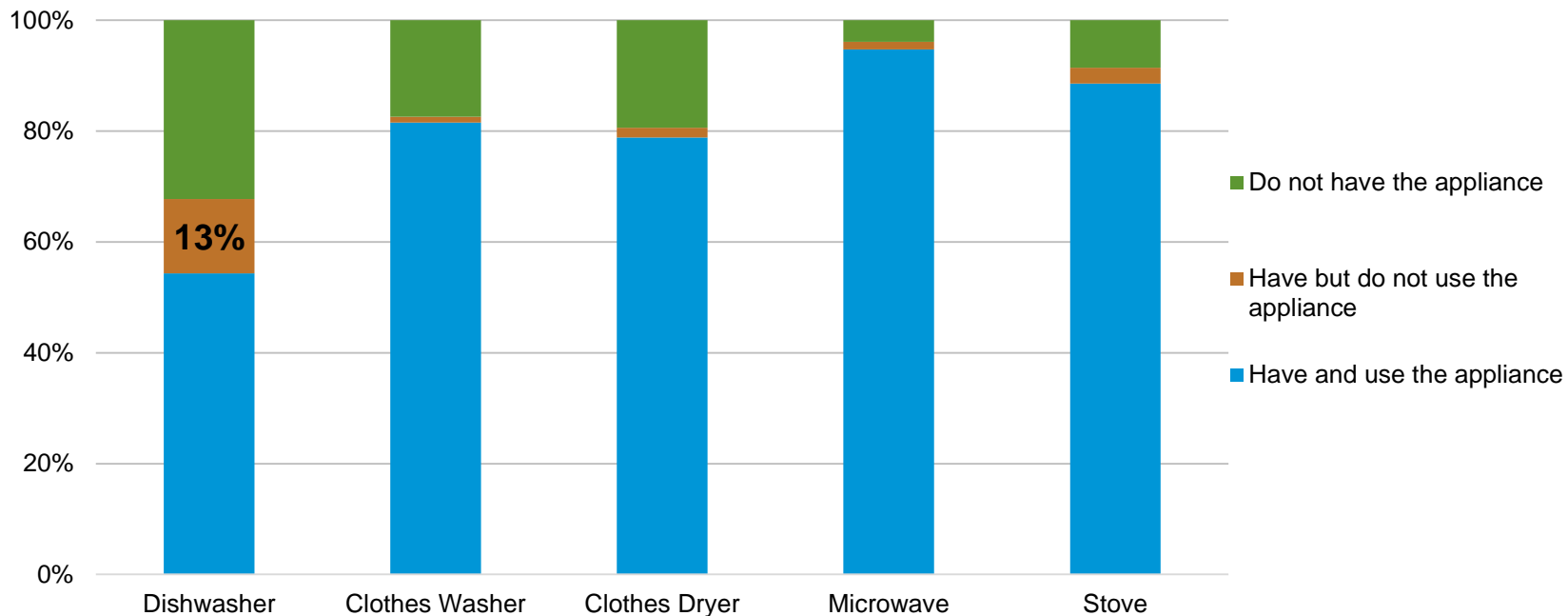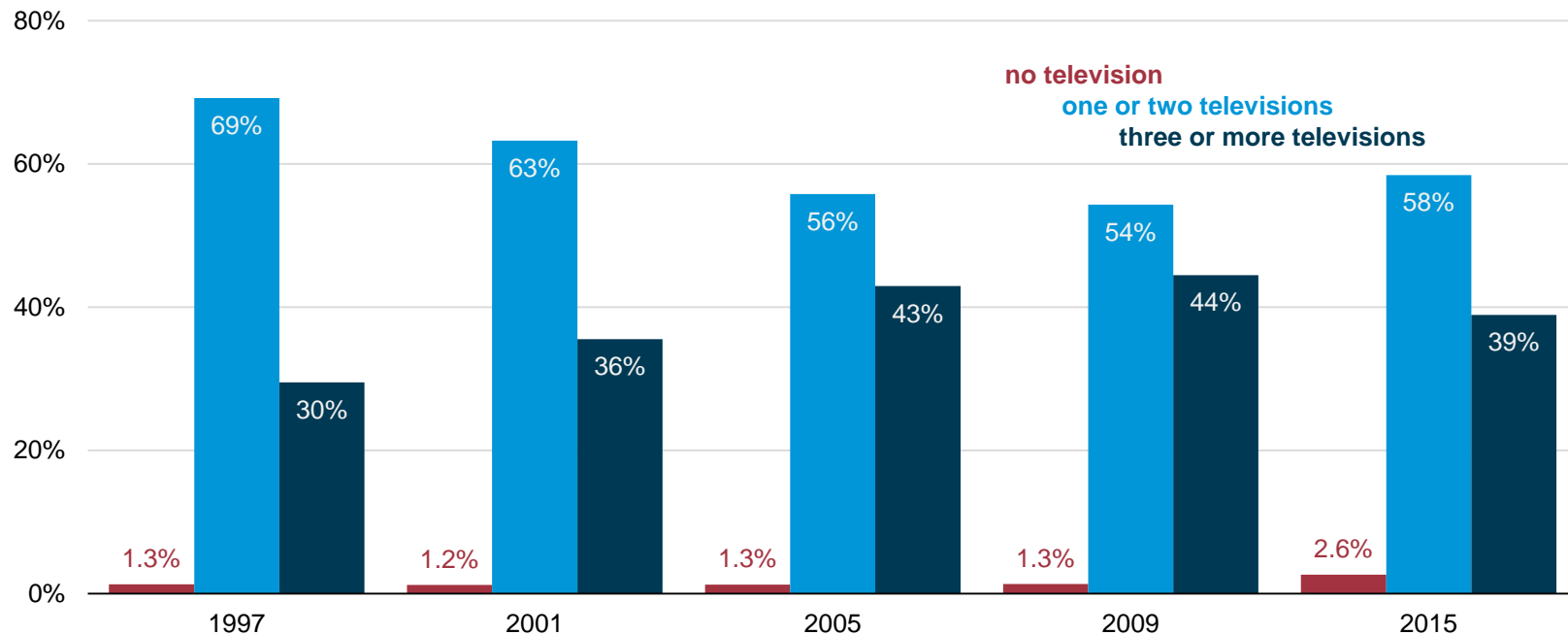
Percentage of homes by survey year

# Dishwashers are the most frequently unused appliance

Percentage of homes

Larger share of households report not using a television

Percentage of homes by survey year

no television
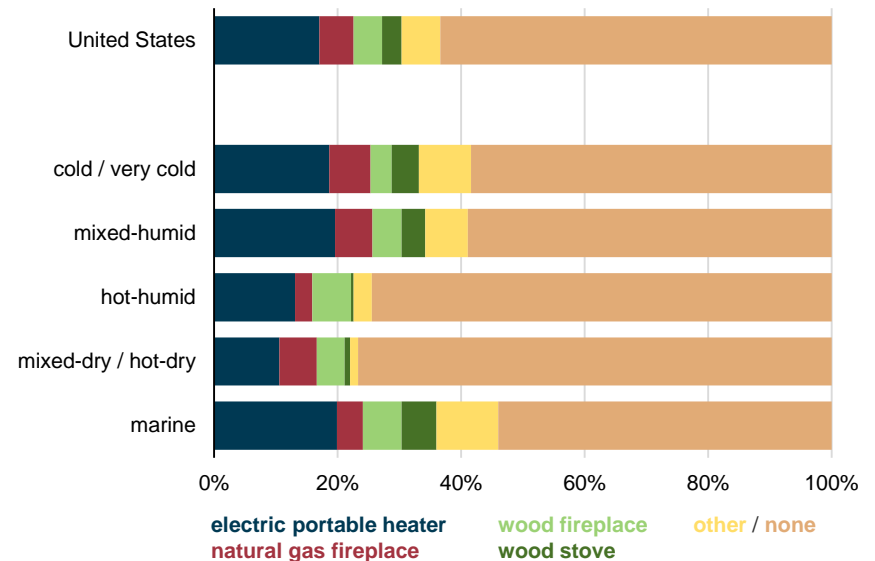one or two televisions
three or more televisions

Choice of heating equipment varies within and across climates

Main heating equipment choice by climate region, 2015
percent of households
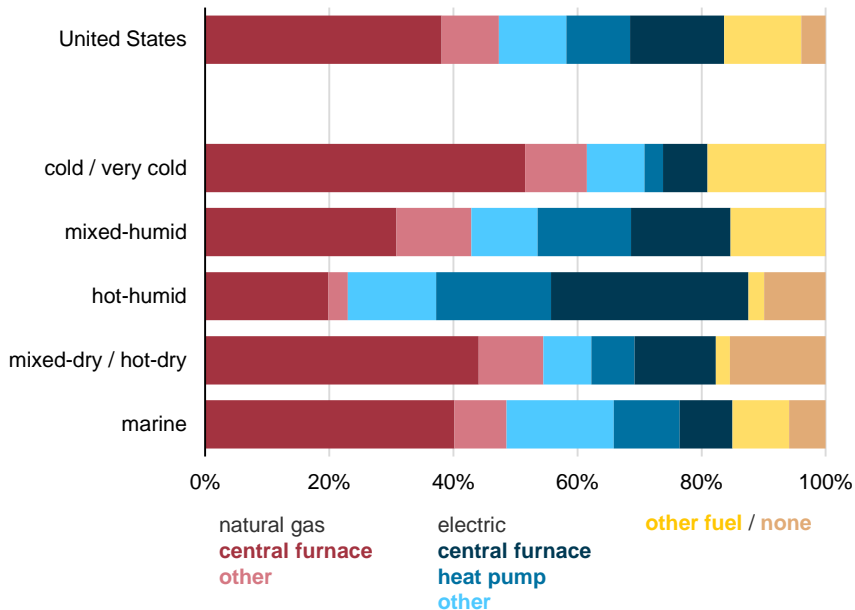
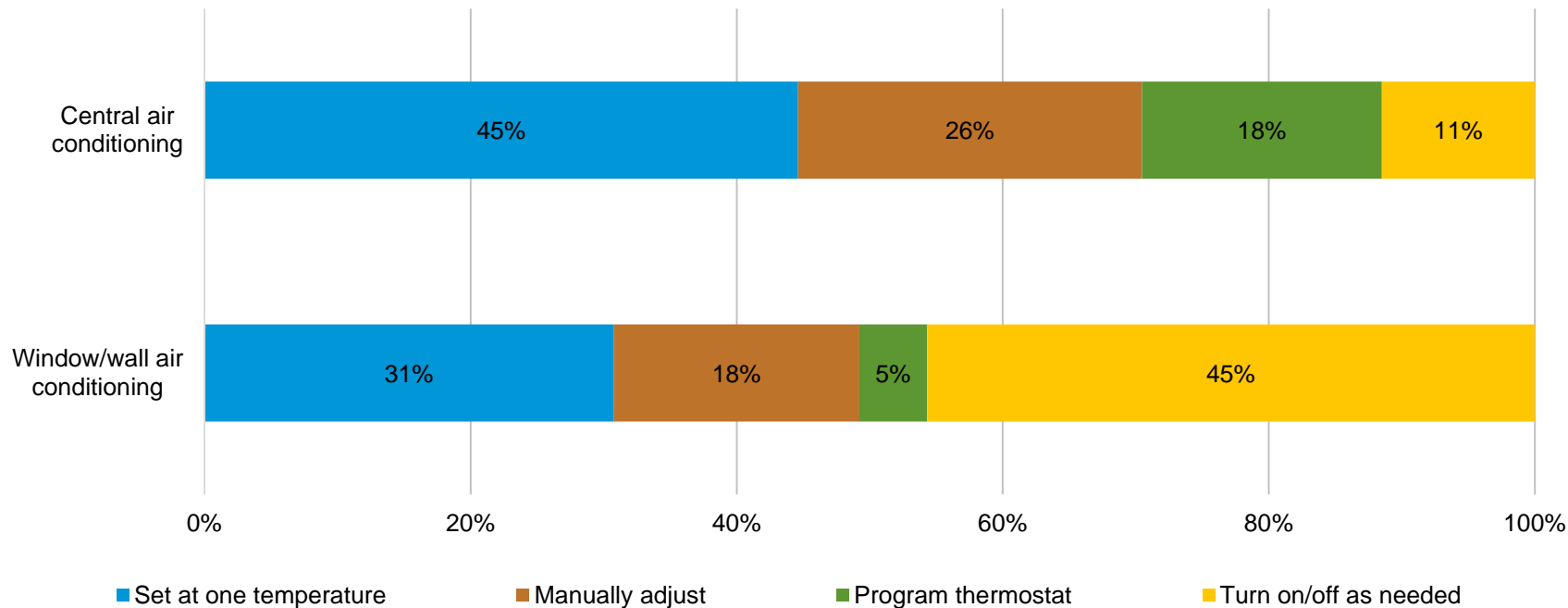**Secondary heating equipment choice by climate region, 2015**
percent of households

"Set it and forget it" is most common method for controlling central AC systems

Percentage of homes using AC

	Set at one temperature	Manually adjust	Program thermostat	Turn on/off as needed
Central air conditioning	45%	26%	18%	11%
Window/wall air conditioning	31%	18%	5%	45%

Most households have a mix of lightbulbs installed

	All	**Some**	**None**
Incandescent	11%	71%	18%
CFL	10%	72%	19%
LED	1%	27%	71%
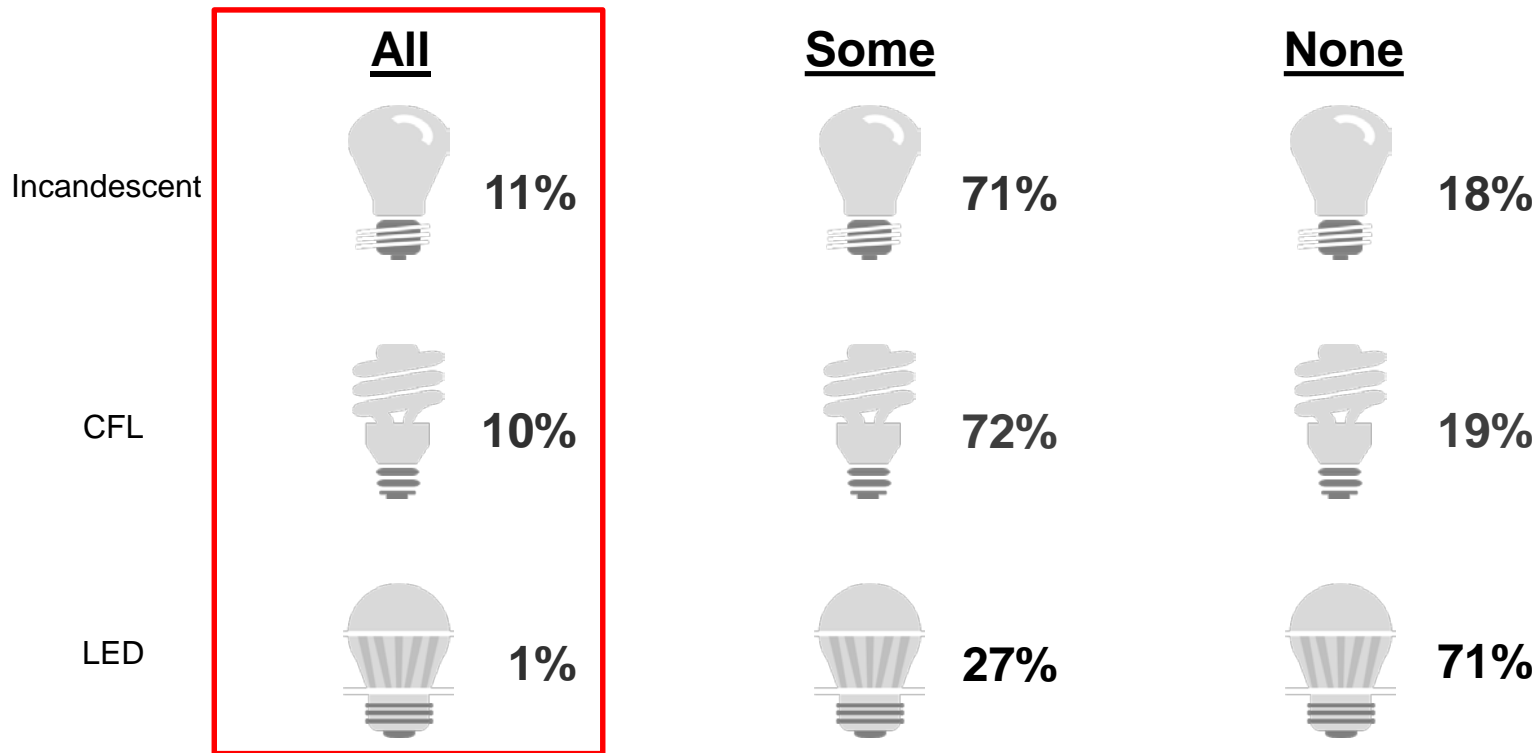
The proportion of all-electric homes is rising, primarily in the South Census region

Percentage of homes by number of fuels used in the home by survey year
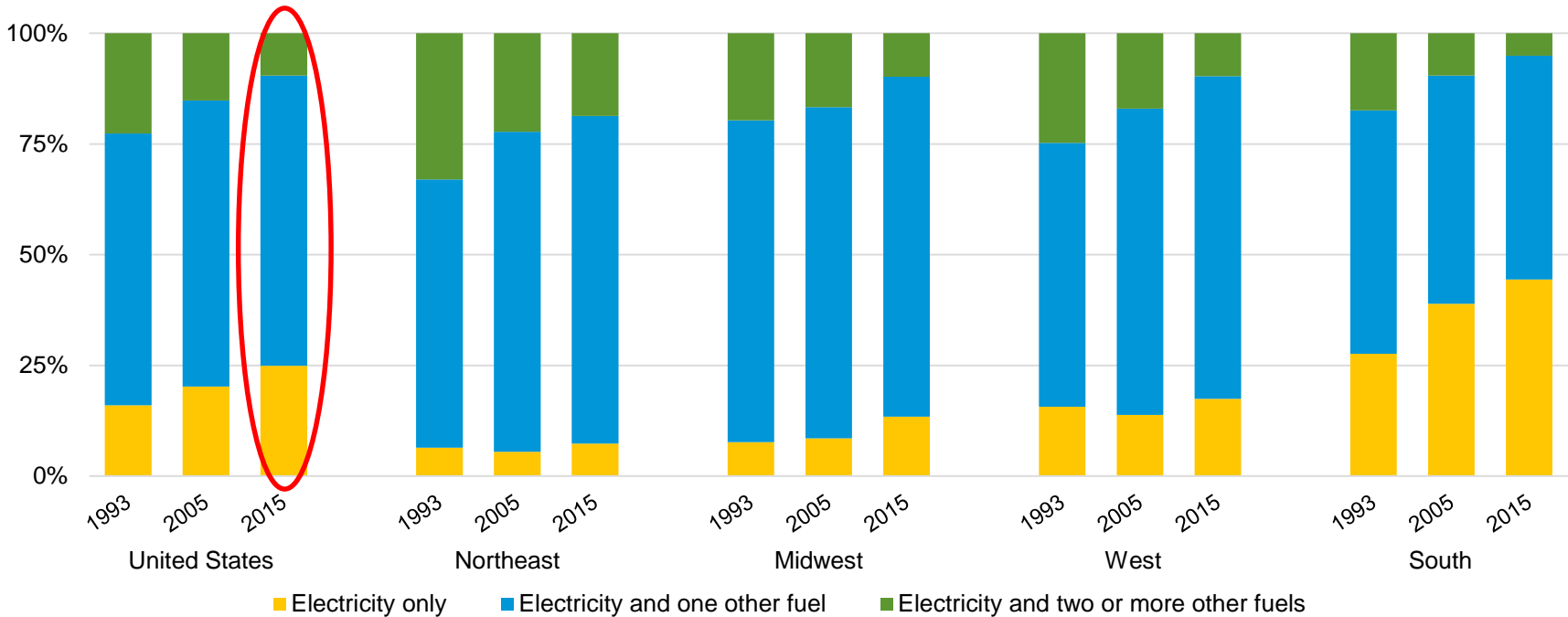
Methods from the 2015 RECS

RECS Methodology: Overview

- Sampling

- Questionnaire Design

- Data Collection Modes (in-person, web, mail)

- Response Rate and Data Quality

- Processing and Editing

- Imputation and Weighting

RECS Methodology: Sampling

- Addresses were selected to represent the 118.2 million occupied, primary residences in the 50 States + DC

- Multi-stage sample designed to produce national, Census Region, and Census Division estimates

- First stage: Public Use Microdata Areas (200)

- Second stage: Census Block Groups (800)

- Final stage: Housing units (12,753)

1. Select PUMAs

2. Select CBGs

3. Select housing units

Main St

Diagonal Ave
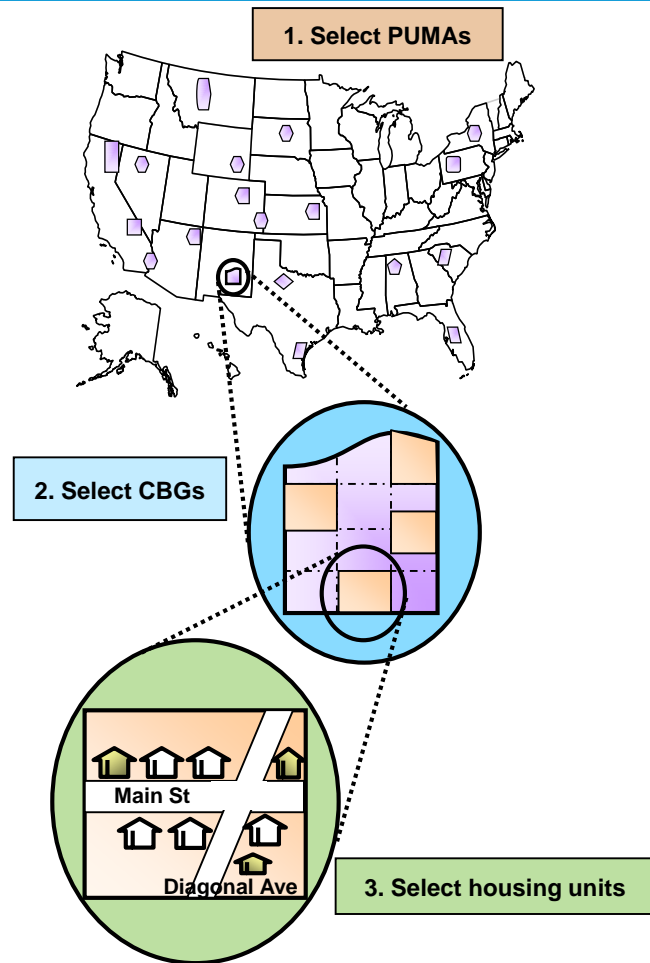
RECS Methodology: Questionnaire Design

- Questionnaire design process included:

  - Reviewing content from 2009 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 RECS questionnaire by one of three methods:

  - **In-person** by computer-assisted personal interview (used since 1997 RECS)

  - Self-administered **web** questionnaire (new!)

  - Self-administered **mail** questionnaire (new!)

RECS Methodology: Questionnaire Sections

- Housing unit characteristics

- Appliances

- Electronics

- Space heating

- Air conditioning

- Water heating

- Lighting

- Energy programs

- Energy bills

- Energy suppliers

- Household characteristics

- Energy assistance

- In-person only: Housing unit measurement

- In-person only: Scanning of sample energy bills

Example: In-person interview vs. Mail

DISHWASH (Changed from 2009)	
ASK	All respondents

Does your household have a dishwasher?
 	
    1 Yes
    0 No	

NEXT	If DISHWASH=1: DWASHUSE Else: IVCOMMBFILTER

64. Does your household have a dishwasher?
- 1 ☐ Yes
- 0 ☐ No ➡ *Go to #68*

65. In a typical week, about how many times is your dishwasher used? *If not used, please enter "0."*
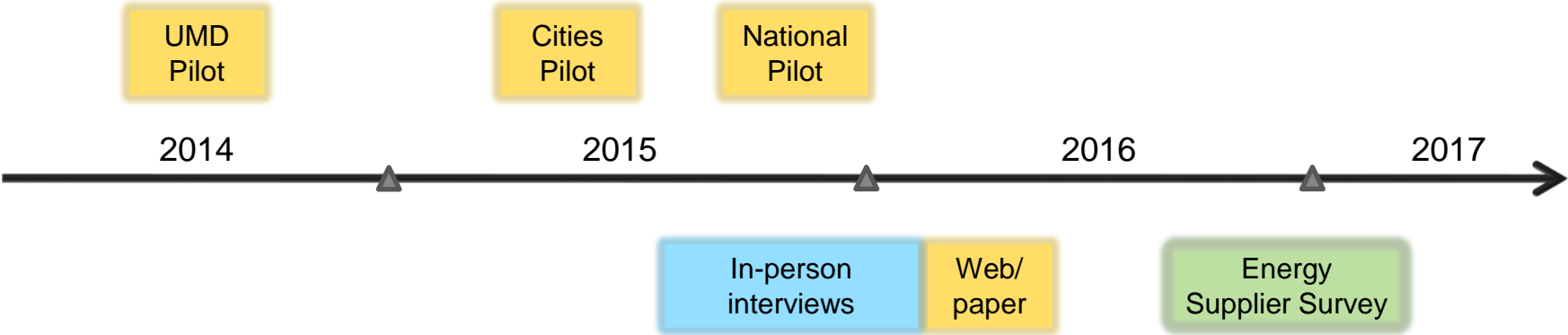
☐ times per week

Example: Web screenshot

RECS Methodology: Data Collection Schedule

Web and mail pilots

2015 RECS

RECS Methodology: Response Rate and Data Quality

- 2015 RECS response rate was 51%, much lower than 79% for 2009 RECS

  – 43% of those were in-person, 37% web, 20% mail

- Data quality analysis included:

  – Comparing to previous RECS and external sources (i.e. American Community Survey conducted by the U.S. Census Bureau)

  – Comparing participation by subgroups within the sample

  – Looking for non-response bias

  – Comparing responses across mode

- We found very few significant differences, and most were not practically different

RECS Methodology: Processing and Editing

- Mail questionnaires were keyed twice

- Validation to ensure the correct household was interviewed

- Post-collection checks included reading comments and reviewing outliers, inconsistent values, and write-in responses

- Data from all modes were combined into one file

- Added auxiliary weather and geographic variables for each household

RECS Methodology: Imputation and Weighting

- Item imputation was used to fill in missing values in the data set

  - 216 variables were imputed

  - Average imputation rate: 3.7%

- **Hot-deck** imputation method was used – a *recipient* household was matched with a similar *donor* household and borrowed its value

- Weights are calculated for each responding housing unit

  - Sum of all weights is 118.2 million, which is the total number of U.S. households in 2015

- If using the public microdata file, please use NWEIGHT variable (see documentation, or ask us how to do this if you aren't sure)

The Future of RECS

Using on-line and paper questionnaires allows for a more flexible RECS program in the future

Opportunities for…

- Large samples to cover more detailed geographies and special populations

- More frequent data collections

- Revisiting sampled households over time for longitudinal analysis

- Expert assessments and end-use measurement via submetering devices

Planning about to begin for the next RECS…2020?

Questions?

(Please submit them through the Chat box)

Contact us!

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