

Differences in Fuel Usage in the United States Housing Stock

American Housing Survey Report

By Jeremy Engelberg and Evan Brassell
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INTRODUCTION

The American Housing Survey (AHS), which began in 1973, is a nationally representative longitudinal survey administered once every 2 years by the U.S. Census Bureau on behalf of the U.S. Department of Housing and Urban Development. It is the most comprehensive national housing survey in the United States. The AHS is a leading source of information on housing characteristics such as the size and composition of the nation's housing inventory, vacancies, home values, and the physical condition of homes.

The AHS collects data on a wide range of equipment and fuels used in homes throughout the United States. For example, the survey collects information on how homes are heated and cooled, what cooking equipment is used, and what types of fuel are used to power the equipment. These data are collected for both occupied and vacant homes.¹ Using data from the 2017 AHS, this report describes the relationship between the year homes were built and what types of fuel and equipment they use.² Both occupied and

vacant homes were included in the analyses.³ Figure 1 displays the decade in which homes were built as reported in the 2017 AHS.

AIR-CONDITIONING

The AHS reported that there were approximately 137 million homes in the United States in 2017. Of these, 93.8 million reported having central air-conditioning (AC), 32.9 million reported having one or more room AC units as a means of cooling their home, and 16.2 million reported not having AC of any kind.⁴ The likelihood that a home would have some form of AC in 2017, and in particular, central AC, was related to the year in which it was constructed. A higher percentage of homes built from 2000 to 2009 had central air compared to the earliest collected decade

The figures and statistics in this brief display how the prevalence of fuels and equipment are related to the year in which homes were built. Changes in energy policy may have played a role in influencing these rates.

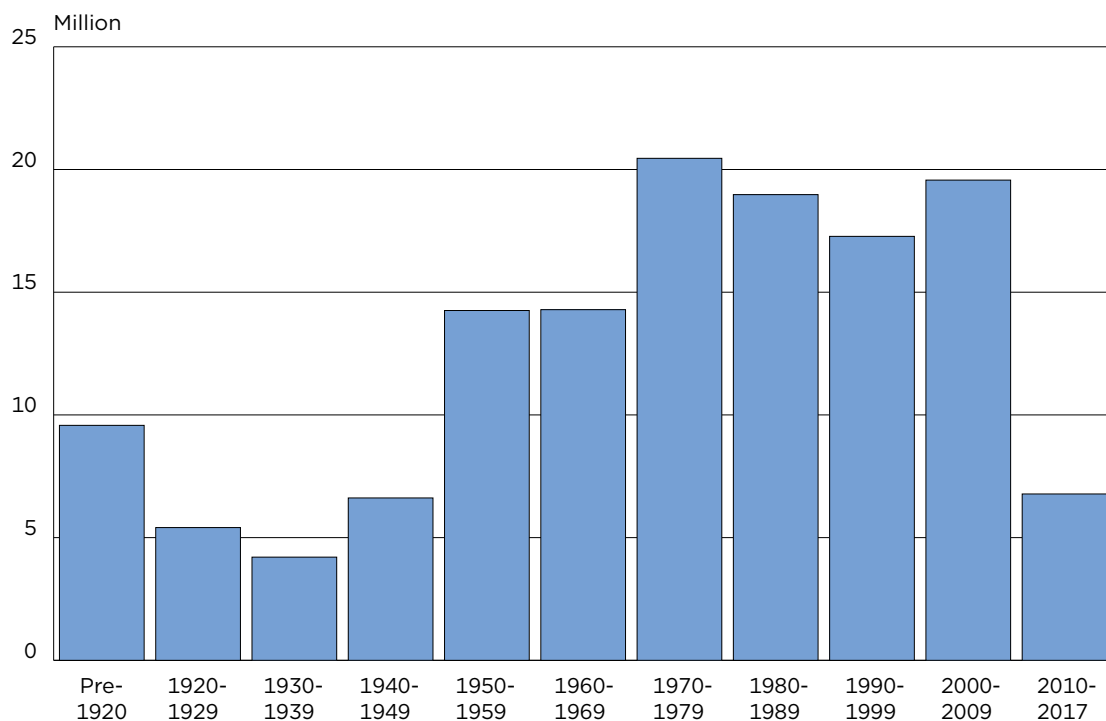
¹ The Census Bureau reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied to this release. CBDRB-FY19-ROSS-B0060.

² Statistics from surveys are subject to error from different sources. Information on the source of the data and accuracy of the estimates are available at <www.census.gov/programs-surveys/ahs/tech-documentation/def-errors-changes/appendix-archive-2017.html>.

³ Data for vacant homes were collected from individuals knowledgeable about the property such as a neighbor or realtor.

⁴ These numbers add to over 100 percent because some houses use central AC as the primary system for cooling and room AC units as a secondary system.

Figure 1.
Decade Built for Homes in the 2017 Housing Stock



Source: U.S. Census Bureau, 2017 American Housing Survey.

(1920–1929) (Figure 2),⁵ Older homes had a higher prevalence of room AC units, while newer homes had more central air systems. For example, 33.3 percent of homes built between 1920 and 1929 had central AC, and 43.8 percent used room AC units as the primary form of cooling their home. In comparison, 88.1 percent of homes built between 2000 and 2009 had central AC, and 6.1 percent used room AC units.⁶ Note that these years

⁵ All comparative statements have undergone statistical testing and, unless otherwise noted, are statistically significant at the 10 percent significance level.

⁶ The decades 1920–1929 and 2000–2009 were used because they were, respectively, the earliest and latest complete decades available. All homes built before 1920 are grouped together. As a result, the pre-1920 group includes homes built in multiple decades.

specifically indicate when the homes were constructed. Older homes may have been retrofitted to accommodate central AC since their construction.

HOME HEATING

Most homes in the United States (98.9 percent) reported having some form of home heating equipment in 2017.⁷ Home heating can be powered using different fuels such as electricity, natural gas, and fuel oil. Overall, 43.9 percent of homes used electricity, 42.8 percent used natural gas, 4.7 percent used propane, 4.8 percent

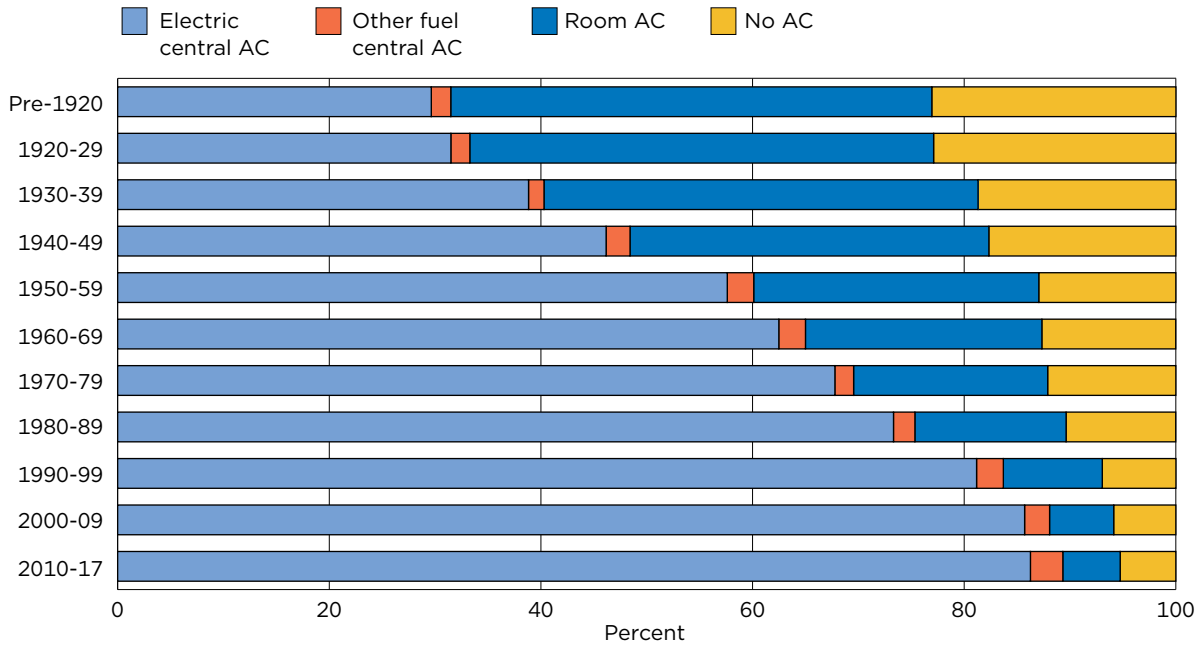
⁷ Estimates may differ from other surveys due to differences in sample design, survey universe, and differences in data collection methodology.

used fuel oil,⁸ and 2.8 percent used some other type of fuel such as coal or wood. Although most used electricity or natural gas to heat their homes, the majority of older homes built between 1920 and 1929 used natural gas. In comparison, more recently built homes used electricity at a higher rate than other fuels (Figure 3). For example, 21.5 percent of homes built between 1920 and 1929 used electricity to heat their household and 61.3 percent used natural gas. In comparison, 54.5 percent of homes built between 2000 and 2009 used electricity and 36.3 percent used natural gas.

⁸ There is not a statistically significant difference between the prevalence of propane and fuel oil home heating at the 90 percent confidence level.

Figure 2.

Air-Conditioning (AC) Usage by Decade Home Was Built

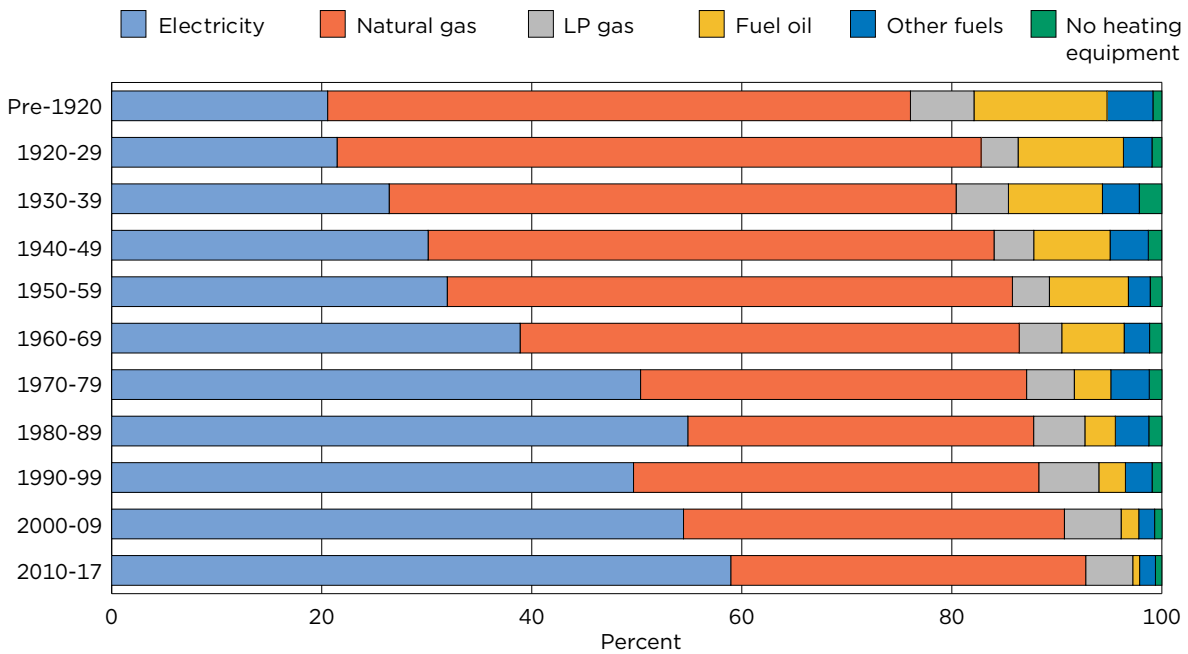


Note: Data include primary cooling systems for both occupied and vacant homes, secondary systems are not included.

Source: U.S. Census Bureau, 2017 American Housing Survey.

Figure 3.

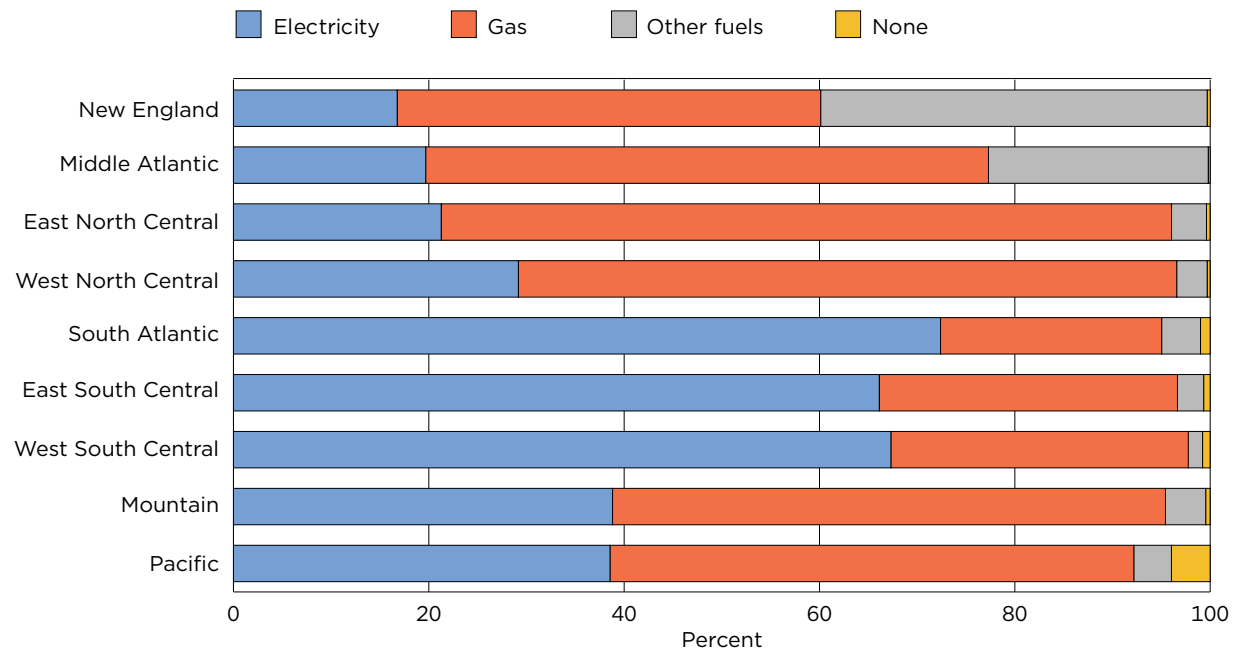
Home Heating Fuel by Decade Home Was Built



Note: Data include primary heating systems for both occupied and vacant homes, secondary systems are not included. Other fuels include fuel oil, wood, kerosene, and any other fuel.

Source: U.S. Census Bureau, 2017 American Housing Survey.

Figure 4.
Heating Fuels for All Homes by Census Division



Note: Data include types of heating fuel for occupied and vacant homes. Gas includes natural gas and propane. Other fuels includes fuel oil, wood, kerosene, and any other fuel.
 Source: U.S. Census Bureau, 2017 American Housing Survey.

The prevalence of home heating fuels sometimes varied by census division (Figure 4).⁹

WATER HEATING

Most homes in the United States (98.8 percent) reported having

⁹ The New England division includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. The Middle Atlantic division states are New York, New Jersey, and Pennsylvania. The East North Central division includes Ohio, Indiana, Illinois, Michigan, and Wisconsin. The West North Central division includes Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. The South Atlantic division comprises Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. The East South Central division states are Kentucky, Tennessee, Alabama, and Mississippi. The West South Central division includes Arkansas, Louisiana, Oklahoma, and Texas. The Mountain division states are Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada. The Pacific division includes Washington, Oregon, California, Alaska, and Hawaii.

hot and cold running water in 2017. Water can be heated using different types of fuels such as electricity, natural gas, propane, and fuel oil. Overall, 45.7 percent used electricity to heat their water, 46.0 percent used natural gas,¹⁰ 3.9 percent of homes used propane, 2.9 percent used fuel oil, and 0.3 percent used some other type of fuel such as wood. While most homes used natural gas or electricity, the majority of older homes built between 1920 and 1929 used natural gas to heat their water (Figure 5). In comparison, more recently built homes, such as those built between 2000 and 2009, were more likely to use electricity. For example, 25.6 percent of homes built between

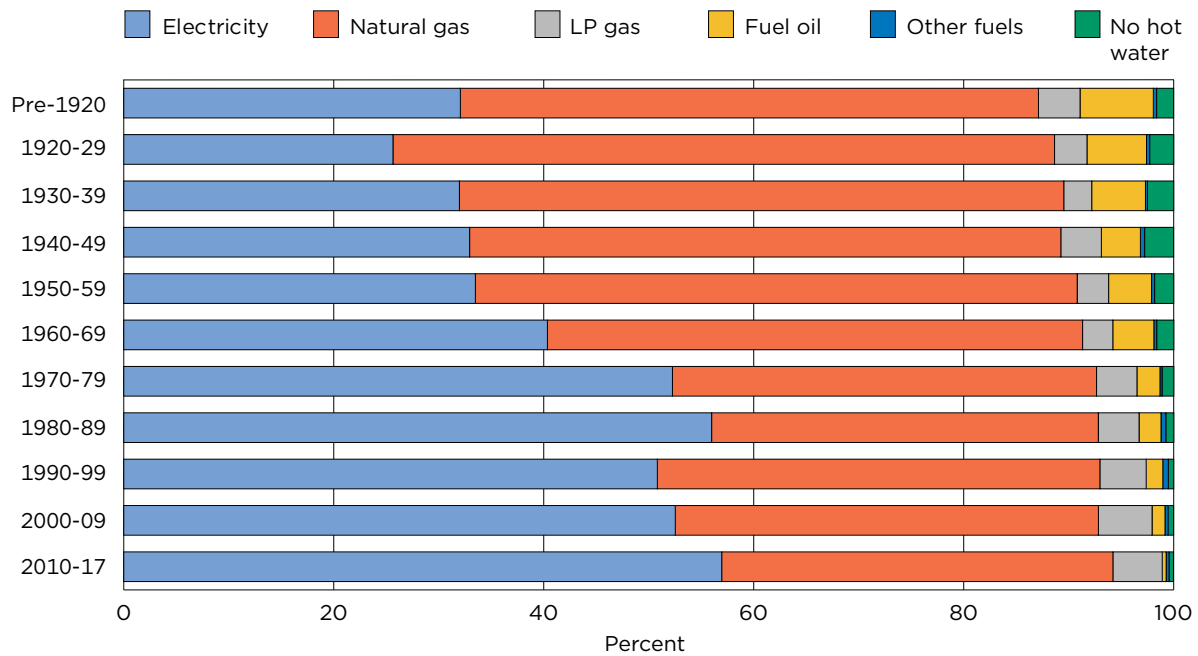
¹⁰ There is not a statistically significant difference between the prevalence of electricity and natural gas water heating at the 90 percent confidence level.

1920 and 1929 used electricity to heat their water and 63.0 percent used natural gas. In comparison, 52.5 percent of homes built between 2000 and 2009 used electricity and 40.3 percent used natural gas.

COOKING

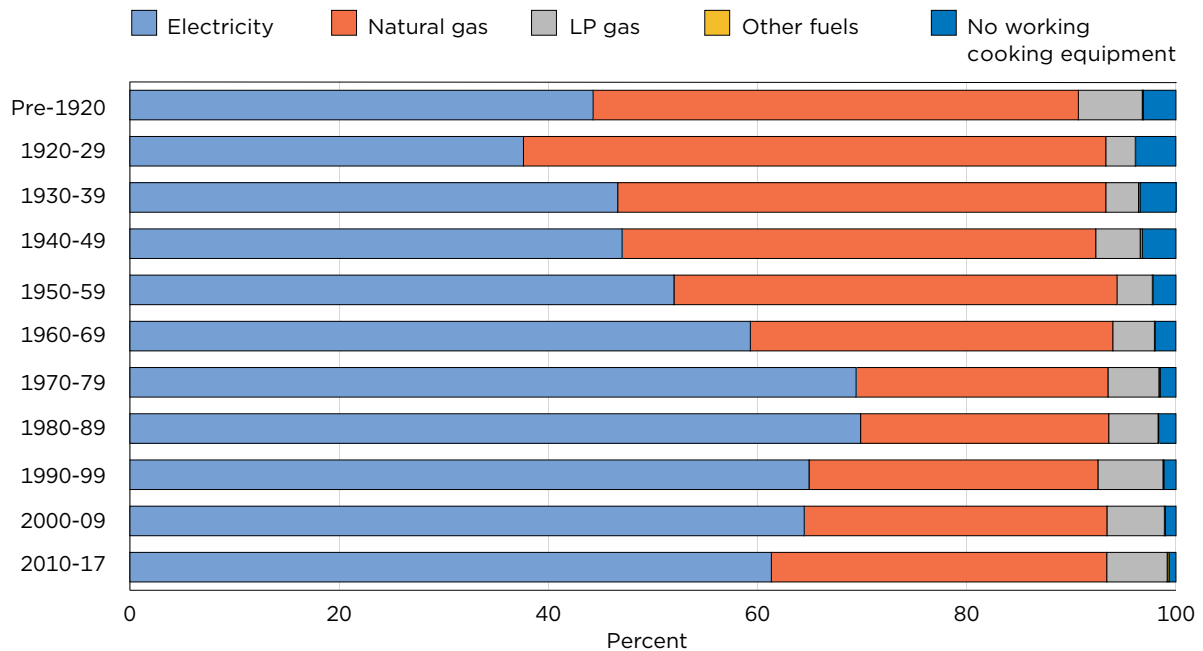
Homes predominantly used electricity and natural gas to fuel their cooking equipment (60.2 percent and 33.1 percent, respectively), while a significant minority used propane (4.8 percent) in 2017. While the majority of homes used electricity or natural gas, their relative usage varied depending on the year in which they were built. For example, 37.6 percent of homes built between 1920 and 1929 used electricity and 55.7 percent used natural gas. However, as illustrated in Figure 6,

Figure 5.
Water Heating Fuel by Decade Home Was Built



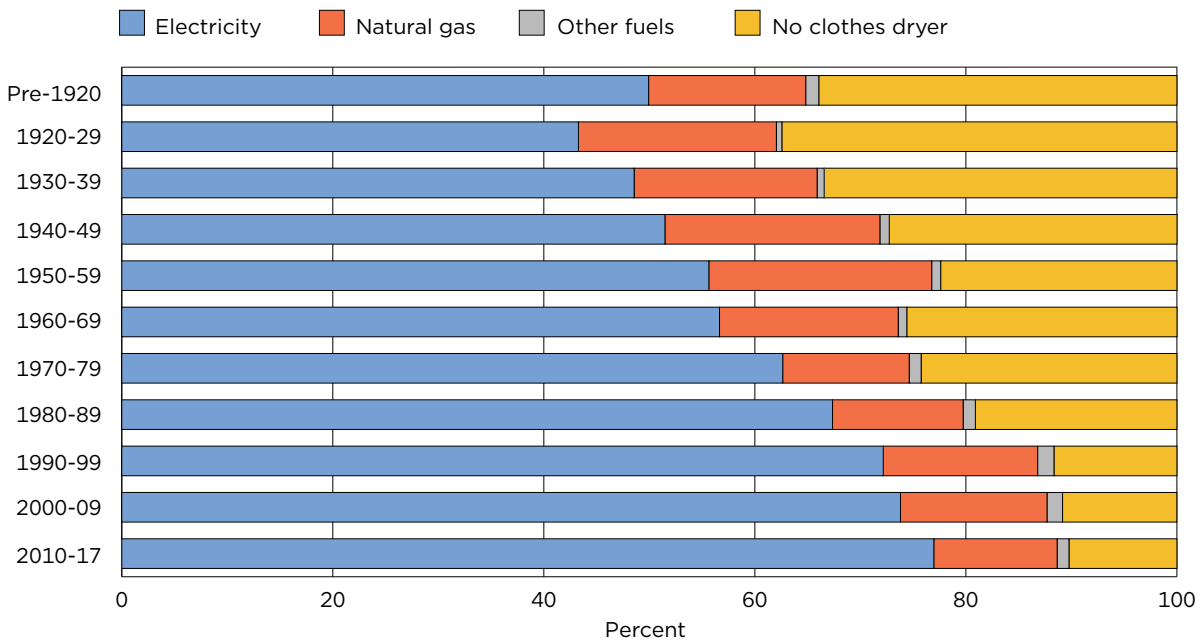
Note: Data include types of fuel to heat water for occupied and vacant homes. Other fuels include fuel oil, wood, kerosene, and any other fuel.
 Source: U.S. Census Bureau, 2017 American Housing Survey.

Figure 6.
Cooking Fuels by Decade Home Was Built



Note: Data include types of cooking fuel for occupied and vacant homes. Other fuels include fuel oil, wood, kerosene, and any other fuel.
 Source: U.S. Census Bureau, 2017 American Housing Survey.

Figure 7.
Clothes Dryer Fuels by Decade Home Was Built



Note: Data include types of fuel used by clothes dryers for occupied and vacant homes. Other fuels include fuel oil, wood, kerosene, and any other fuel.
 Source: U.S. Census Bureau, 2017 American Housing Survey.

there was an increase electricity prevalence in the following few decades. For example, 64.5 percent of the homes built between 2000 and 2009 used electricity and 28.9 percent used natural gas. Electricity appears to peak as a cooking fuel in homes built in the 1970s and 1980s (69.4 percent and 69.8 percent, respectively), after which there is a decline in electric usage as gas powered cooking equipment increases again with more recently built homes.

CLOTHES DRYER

The majority of U.S. homes, approximately 108.7 million, had a clothes dryer in 2017. Of these homes, 79.4 percent reported

using electricity to power the dryer, 19.1 percent used natural gas, and 1.4 percent used propane. Figure 7 shows the relative prevalence of these fuels by decade of home construction. Homes built from 2000 to 2009 had a greater likelihood of having a clothes dryer compared to the earliest collected decade (1920-1929). For example, 62.6 percent of homes built between 1920 and 1929 had a clothes dryer. In comparison, 89.2 percent of homes built between 2000 and 2009 had one.

CONCLUSION

The AHS provides an extensive amount of data on the equipment

and fuels used by homes in the United States. These nationally representative data are uniquely available in the AHS and may allow researchers to better understand how fuels are used in the home and how prevalent they are nationwide. Data on equipment and fuel, as well as on housing characteristics such as the composition of the nation's housing inventory, home values, and the physical condition of homes, are available for review and analysis on the Census Bureau Web site: <www.census.gov/programs-surveys/ahs.html>.