



ELECTRICITY EXPLAINED

USE OF ELECTRICITY



BASICS

Electricity consumption in the United States was about 3.95 trillion kilowatthours (kWh) in 2018

Electricity is an essential part of modern life and important to the U.S. economy. People use electricity for lighting, heating, cooling, and refrigeration and for operating appliances, computers, electronics, machinery, and public transportation systems. Electricity use in the United States in 2018 was more than 16 times greater than electricity use in 1950.

Total electricity consumption includes retail sales of electricity to consumers and *direct use* electricity. Direct use electricity is both produced by and used by the consumer. The industrial sector generates and uses nearly all of the direct use electricity. In 2018, retail sales of electricity were about 3.80 trillion kWh, equal to 96% of total electricity consumption. Direct use of electricity by all end-use sectors was about 0.14 trillion kWh, or about 4% of total electricity consumption.

The sales of electricity to major consuming sectors and percentage share of total electricity sales in 2018 were

38.5%

1.46 trillion kWh
residential

36.2%

1.38 trillion kWh
commercial

25.1%

0.95 trillion kWh
industrial

0.2%

0.01 trillion kWh
transportation (mostly to public transit systems)

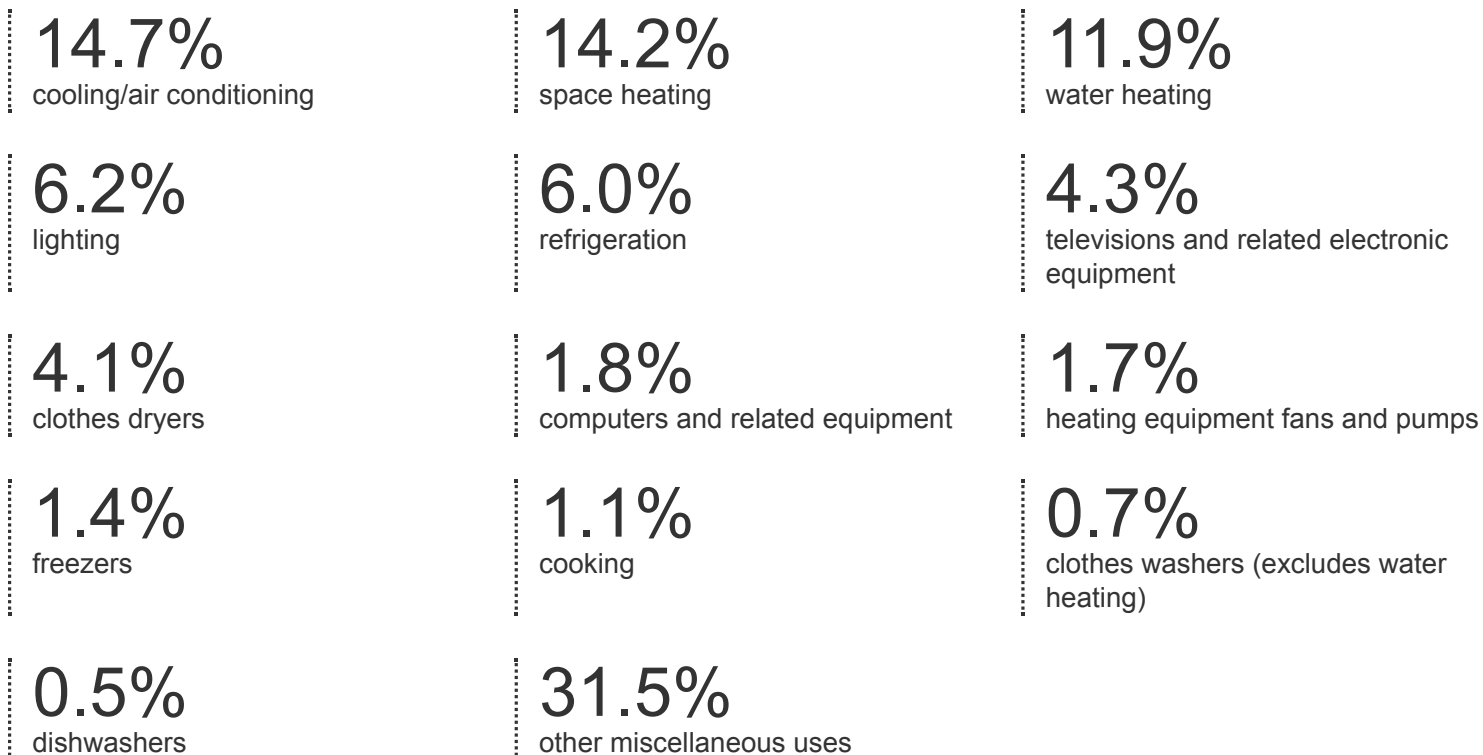
did you
know ?

Electricity was first sold in the United States in 1879 by the California Electric Light Company in San Francisco, which produced and sold only enough electricity to power 21 electric lights (Brush arc light lamps).

Cooling accounts for the largest share of annual U.S. residential sector electricity consumption

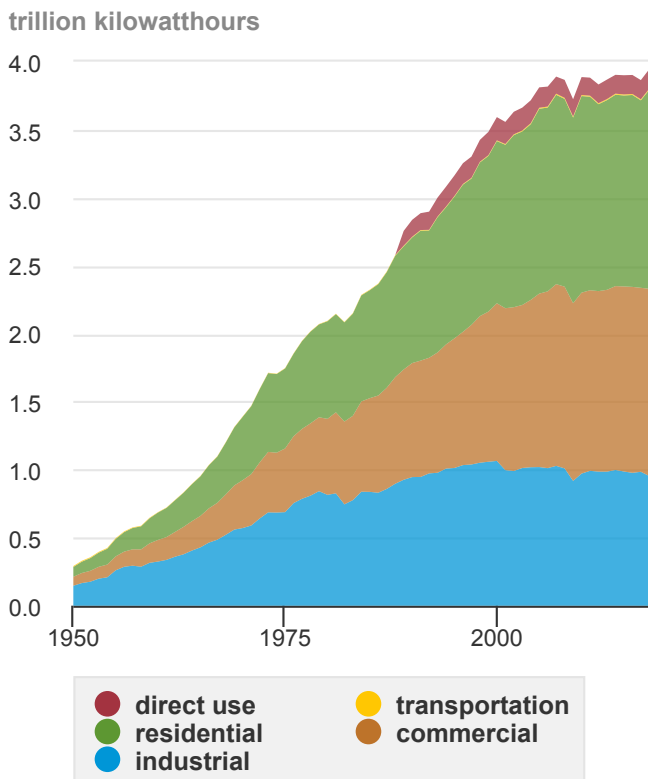
The U.S. Energy Information Administration (EIA) estimates that electricity use by fans and air-conditioning equipment for cooling the interior space of homes was the single largest use of electricity by the U.S. residential sector in 2018.¹

The major uses of electricity and their shares of total residential sector electricity use in 2018 were



The other miscellaneous uses in the list above include the many, mostly small, electrical appliances in U.S. houses, apartments, and related property.

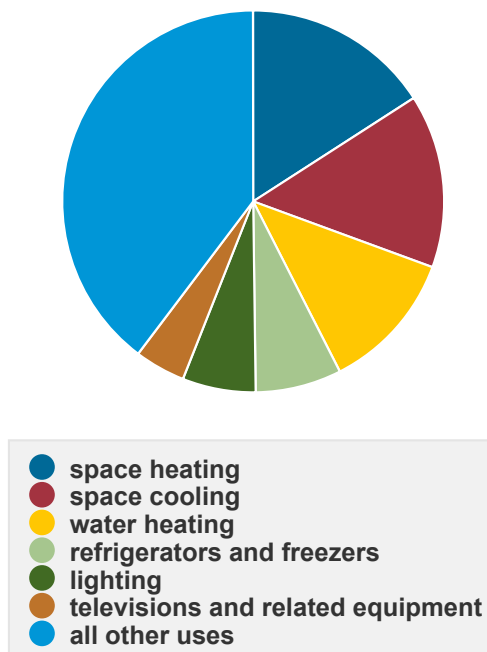
U.S. electricity retail sales to major end-use sectors and electricity direct use by all sectors, 1950-2018



Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 7.6 March 2019

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U.S. residential sector electricity consumption by major end uses, 2018



Note: Space heating includes consumption for heat and operating furnace fans and boiler pumps. All other uses includes miscellaneous appliances, clothes washers and dryers, computers and related equipment, stoves, dishwashers, heating elements, and motors not included in other uses.

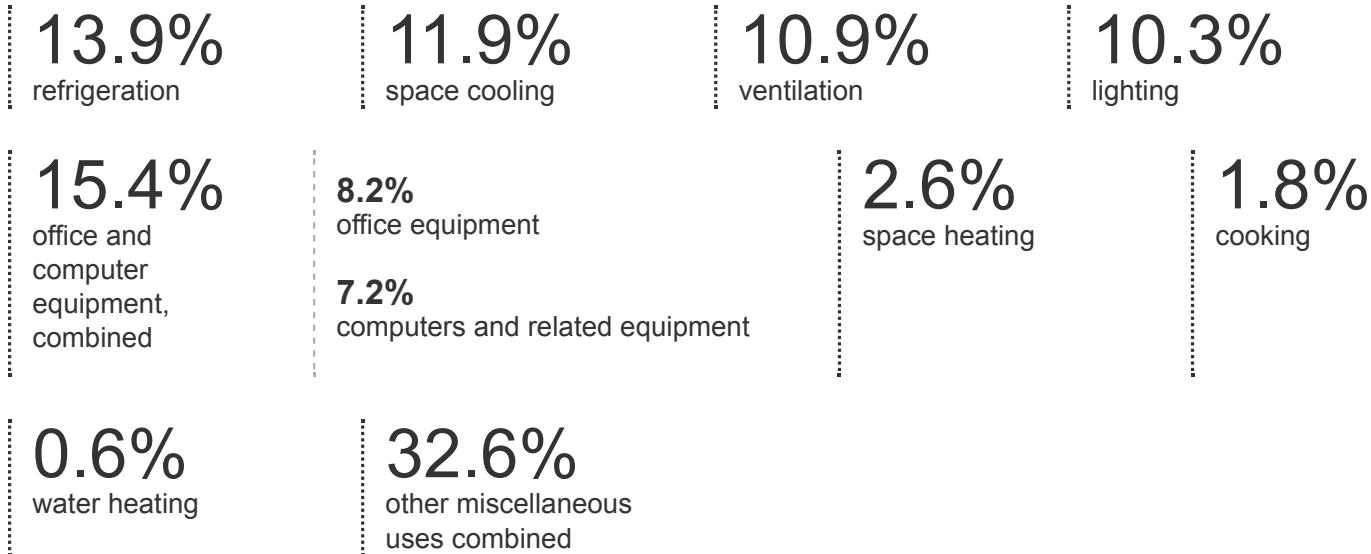
Source: U.S. Energy Information Administration, *Annual Energy Outlook, 2019*, Table 4, January 2019

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Refrigeration accounts for the largest share of annual electricity use by the U.S. commercial sector

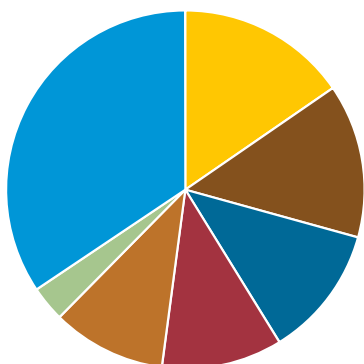
EIA estimates that in 2018, refrigeration was the largest single use of electricity in the commercial sector.² The commercial sector includes retail, office, education, institutional, public, and government facilities, and public services such as water supply, sewage treatment, telecommunications equipment, and outdoor and public street lighting.

The major uses of electricity and their shares of total electricity use by the commercial sector in 2018 were




Other miscellaneous uses in the list above include the numerous other electrical appliances and equipment in commercial and institutional buildings and related property.

U.S. commercial sector electricity consumption by major end uses, 2018

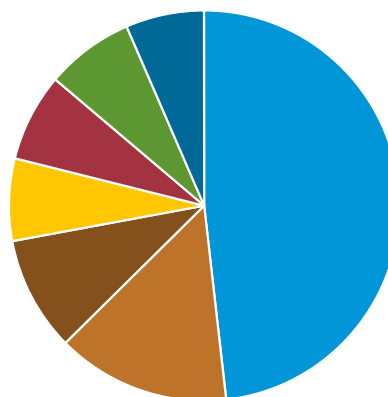


- computers and office equipment
- refrigeration
- space cooling
- ventilation
- lighting
- space and water heating
- all other uses


 Source: U.S. Energy Information Administration, *Annual Energy Outlook, 2019*, Table 5, January 2019

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U.S. manufacturing electricity consumption by major end uses, 2014



- machine drive
- process and boiler heating
- facility heating, ventilation, air conditionin...
- electrochemical processes
- process cooling and refrigeration
- other processes and facility uses
- lighting

 Source: U.S. Energy Information Administration, *Manufacturing Energy Consumption Survey, 2014*, Table 5.1, October 2017

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Machine drives are the largest use of electricity by U.S. manufacturers

In 2014, nearly half of electricity used by U.S. manufacturers was for operating machinery.³

The major uses of electricity and their shares of total electricity use by the commercial sector in 2014 were

<p>48.2% machine drives (motors)</p>	<p>14.4% process heating and boiler use</p>	<p>9.5% facility heating, ventilation, air conditioning, and cooling</p>
<p>6.8% electrochemical processes</p>	<p>7.3% process cooling and refrigeration</p>	<p>6.5% lighting</p>
<p>7.3% other miscellaneous processes and facility uses</p>		

Electricity use in the United States is projected to grow slowly

Total electricity consumption in the United States increased in all but three years between 1950 and 2007, with an average annual increase of about 5%. Between 2008 and 2018 growth in total U.S. electricity use was nearly flat, with total electricity consumption in 2018 only 2% greater than consumption in 2008. Retail electricity sales to the industrial sector peaked in 2000 and then generally declined each year through 2018. During the same period, the industrial sector's share of total U.S. electricity retail sales dropped from 30% to 24%. Commercial and residential sector electricity consumption in 2017 was about equal to consumption in 2007. A relatively warm summer and cold winter in most regions of the country in 2018 contributed to an increase of about 6% in total residential electricity consumption in 2018.

Electricity demand growth in the future may be moderate because of various factors such as efficiency improvements associated with new appliance standards in buildings sectors and overall improvements in the efficiency of technologies powered by electricity. In the [Annual Energy Outlook 2019](#) Reference case, EIA projects total U.S. electricity use to grow an average of less than 1% annually from 2018 through 2050.

World electricity use may grow fastest in non-OECD countries

The member countries of the [Organization for Economic Cooperation and Development \(OECD\)](#) accounted for about 45% of total world electricity consumption in 2016. In the [International Energy Outlook 2017](#), OECD nations' share of world electricity use is projected to be 37% in 2050.

¹ *Annual Energy Outlook 2019*, Table 4, January 2019.

² *Annual Energy Outlook 2019*, Table 5, January 2019.

³ *Manufacturing Energy Consumption Survey 2014*, Table 5.1, October 2017.

Last updated: April 29, 2019