

Table N1. Total world buildings delivered energy consumption by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	1.3	1.3	1.4	1.4	1.4	1.4	1.5	0.5%
Electricity	18.4	19.2	20.9	22.3	23.9	25.6	27.3	1.4%
Liquid fuels	3.5	3.6	3.7	3.8	4.0	4.1	4.1	0.6%
Natural gas	9.4	9.6	10.1	10.5	10.8	11.2	11.5	0.7%
Renewables	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4%
Total	32.8	34.0	36.4	38.3	40.4	42.6	44.8	1.1%
Residential buildings								
Coal	3.6	3.5	3.5	3.4	3.4	3.3	3.2	-0.4%
Electricity	25.4	26.7	29.7	32.5	36.0	40.2	44.4	2.0%
Liquid fuels	9.4	9.5	9.9	10.3	10.7	11.1	11.5	0.7%
Natural gas	23.1	23.7	24.9	26.0	27.0	28.2	29.4	0.9%
Renewables	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0.1%
Total	63.1	65.1	69.5	73.8	78.7	84.4	90.2	1.3%
Total buildings								
Coal	4.9	4.9	4.8	4.8	4.8	4.7	4.7	-0.2%
Electricity	43.8	45.9	50.6	54.9	60.0	65.8	71.7	1.8%
Liquid fuels	12.8	13.1	13.7	14.2	14.7	15.2	15.6	0.7%
Natural gas	32.5	33.4	35.0	36.4	37.9	39.4	41.0	0.8%
Renewables	1.9	1.8	1.8	1.8	1.9	1.9	1.9	0.1%
Total	96.0	99.1	105.9	112.1	119.1	127.0	135.0	1.2%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N2. Buildings delivered energy consumption in the Americas by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4%
Electricity	6.4	6.5	6.7	7.0	7.2	7.6	8.0	0.8%
Liquid fuels	1.1	1.1	1.1	1.1	1.2	1.2	1.2	0.2%
Natural gas	4.3	4.3	4.4	4.5	4.5	4.5	4.5	0.2%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1%
Total	12.0	12.0	12.4	12.8	13.1	13.4	13.8	0.5%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1%
Electricity	7.5	7.5	7.8	8.0	8.4	8.7	9.2	0.7%
Liquid fuels	1.8	1.7	1.7	1.6	1.6	1.6	1.6	-0.4%
Natural gas	6.3	6.2	6.2	6.2	6.2	6.2	6.2	0.0%
Renewables	0.6	0.5	0.5	0.4	0.4	0.4	0.4	-1.7%
Total	16.2	15.9	16.2	16.3	16.6	17.0	17.4	0.3%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4%
Electricity	14.0	14.0	14.5	15.0	15.6	16.3	17.2	0.7%
Liquid fuels	2.9	2.8	2.8	2.8	2.8	2.8	2.8	-0.2%
Natural gas	10.6	10.4	10.7	10.7	10.7	10.8	10.8	0.1%
Renewables	0.7	0.7	0.6	0.6	0.5	0.5	0.5	-1.3%
Total	28.2	27.9	28.6	29.1	29.6	30.4	31.3	0.4%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N3. Buildings delivered energy consumption in the United States by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4%
Electricity	4.6	4.5	4.6	4.7	4.8	4.9	5.1	0.4%
Liquid fuels	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.0%
Natural gas	3.6	3.5	3.7	3.7	3.6	3.6	3.6	0.0%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0%
Total	9.2	9.1	9.3	9.4	9.4	9.5	9.7	0.2%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	5.1	5.2	5.3	5.4	5.6	5.9	6.2	0.7%
Liquid fuels	0.9	0.8	0.8	0.7	0.7	0.7	0.6	-1.3%
Natural gas	5.1	5.0	5.0	4.9	4.9	4.9	4.9	-0.2%
Renewables	0.5	0.5	0.4	0.4	0.4	0.3	0.3	-2.0%
Total	11.8	11.4	11.5	11.5	11.6	11.8	12.0	0.1%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4%
Electricity	9.7	9.7	9.9	10.2	10.4	10.8	11.3	0.5%
Liquid fuels	1.8	1.7	1.6	1.6	1.6	1.5	1.5	-0.6%
Natural gas	8.8	8.5	8.7	8.6	8.5	8.5	8.5	-0.1%
Renewables	0.7	0.6	0.5	0.5	0.5	0.4	0.4	-1.5%
Total	21.0	20.5	20.8	20.9	21.0	21.3	21.7	0.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N4. Buildings delivered energy consumption in Canada by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.5	0.6	0.6	0.7	0.7	0.8	0.8	1.6%
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4%
Natural gas	0.6	0.6	0.7	0.7	0.8	0.8	0.8	1.1%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Total	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.3%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.7%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-0.1%
Natural gas	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.5%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Total	1.3	1.3	1.3	1.4	1.4	1.5	1.5	0.6%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	1.2	1.2	1.3	1.3	1.4	1.5	1.6	1.1%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1%
Natural gas	1.2	1.3	1.3	1.4	1.4	1.5	1.5	0.8%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Total	2.5	2.5	2.7	2.8	2.9	3.1	3.2	0.9%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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Table N5. Buildings delivered energy consumption in Mexico by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.2	0.2	0.2	0.2	0.2	0.2	0.3	1.8%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.4%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.2	0.2	0.3	0.3	0.3	0.3	0.4	1.7%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.3	0.3	0.3	0.4	0.4	0.4	0.5	1.1%
Liquid fuels	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.5	0.5	0.5	0.6	0.6	0.7	0.7	1.3%
Liquid fuels	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.9%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.0%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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Table N6. Buildings delivered energy consumption in Brazil by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.9%
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.9%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9%
Liquid fuels	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	1.0	1.0	1.0	1.1	1.1	1.2	1.2	0.8%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	1.2	1.3	1.4	1.5	1.5	1.5	1.6	0.9%
Liquid fuels	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6%
Renewables	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.8%
Total	1.6	1.7	1.8	1.9	1.9	2.0	2.1	0.8%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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Table N7. Buildings delivered energy consumption in Other Americas by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5%
Electricity	0.5	0.6	0.6	0.7	0.8	0.9	1.0	2.2%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.0%
Natural gas	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.2%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.7	0.8	0.8	0.9	1.0	1.1	1.3	2.0%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1%
Electricity	0.8	0.7	0.8	0.8	0.9	0.9	1.0	0.8%
Liquid fuels	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5%
Natural gas	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	1.6	1.6	1.7	1.7	1.8	1.9	1.9	0.7%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1%
Electricity	1.3	1.3	1.4	1.5	1.7	1.8	2.0	1.5%
Liquid fuels	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6%
Natural gas	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	2.3	2.4	2.5	2.7	2.8	3.0	3.2	1.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N8. Buildings delivered energy consumption in Europe and Eurasia by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-0.3%
Electricity	4.2	4.4	4.7	5.0	5.3	5.6	5.9	1.2%
Liquid fuels	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.2%
Natural gas	3.1	3.2	3.4	3.5	3.6	3.8	4.0	0.9%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	8.5	8.8	9.2	9.7	10.1	10.6	11.1	0.9%
Residential buildings								
Coal	1.0	1.0	1.0	1.0	1.0	0.9	0.9	-0.3%
Electricity	4.7	4.8	5.1	5.4	5.7	6.0	6.3	1.0%
Liquid fuels	2.4	2.4	2.4	2.3	2.3	2.3	2.2	-0.2%
Natural gas	10.3	10.6	10.9	11.1	11.4	11.7	12.0	0.5%
Renewables	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.8%
Total	18.6	19.0	19.4	19.9	20.5	21.0	21.6	0.5%
Total buildings								
Coal	1.4	1.5	1.4	1.4	1.4	1.3	1.3	-0.3%
Electricity	9.0	9.2	9.7	10.3	11.0	11.5	12.2	1.1%
Liquid fuels	3.2	3.2	3.1	3.1	3.1	3.1	3.0	-0.1%
Natural gas	13.4	13.8	14.2	14.6	15.0	15.5	16.0	0.6%
Renewables	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.8%
Total	27.2	27.8	28.6	29.6	30.7	31.5	32.7	0.7%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N9. Buildings delivered energy consumption in Western Europe by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-0.5%
Electricity	3.5	3.6	3.8	4.0	4.2	4.3	4.5	0.9%
Liquid fuels	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0%
Natural gas	2.1	2.1	2.2	2.2	2.2	2.2	2.2	0.3%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	6.4	6.6	6.7	7.0	7.2	7.3	7.5	0.6%
Residential buildings								
Coal	0.5	0.5	0.4	0.4	0.4	0.4	0.4	-0.6%
Electricity	3.7	3.7	3.9	4.1	4.3	4.5	4.7	0.8%
Liquid fuels	1.5	1.5	1.5	1.4	1.4	1.3	1.2	-0.8%
Natural gas	5.3	5.3	5.4	5.4	5.5	5.5	5.6	0.3%
Renewables	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.8%
Total	11.1	11.2	11.3	11.5	11.7	11.9	12.1	0.3%
Total buildings								
Coal	0.7	0.7	0.7	0.6	0.6	0.6	0.6	-0.5%
Electricity	7.2	7.3	7.6	8.1	8.5	8.8	9.2	0.9%
Liquid fuels	2.1	2.1	2.1	2.0	2.0	1.9	1.8	-0.6%
Natural gas	7.3	7.5	7.5	7.6	7.7	7.8	7.9	0.3%
Renewables	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.8%
Total	17.5	17.7	18.0	18.5	18.9	19.2	19.7	0.4%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N10. Buildings delivered energy consumption in Russia by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-1.3%
Electricity	0.6	0.6	0.6	0.7	0.7	0.8	0.8	1.2%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5%
Natural gas	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.8%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Total	1.3	1.4	1.4	1.4	1.5	1.6	1.6	0.8%
Residential buildings								
Coal	0.3	0.3	0.3	0.2	0.2	0.2	0.2	-0.9%
Electricity	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1.3%
Liquid fuels	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.4%
Natural gas	3.7	3.8	4.0	4.2	4.4	4.5	4.7	0.9%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Total	5.2	5.4	5.7	5.9	6.1	6.3	6.6	0.8%
Total buildings								
Coal	0.4	0.4	0.3	0.3	0.3	0.3	0.3	-1.0%
Electricity	1.2	1.3	1.3	1.4	1.5	1.6	1.7	1.3%
Liquid fuels	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.4%
Natural gas	4.2	4.4	4.6	4.8	5.0	5.2	5.4	0.9%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Total	6.5	6.7	7.1	7.3	7.6	7.9	8.2	0.8%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N11. Buildings delivered energy consumption in Eastern Europe and Eurasia by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.0%
Electricity	0.2	0.2	0.3	0.3	0.4	0.5	0.6	4.1%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.3%
Natural gas	0.5	0.6	0.6	0.7	0.8	1.0	1.1	2.9%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.8	0.9	1.1	1.2	1.4	1.6	1.9	3.0%
Residential buildings								
Coal	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4%
Electricity	0.4	0.4	0.5	0.5	0.6	0.7	0.7	2.0%
Liquid fuels	0.2	0.2	0.2	0.2	0.2	0.2	0.3	1.0%
Natural gas	1.4	1.5	1.5	1.5	1.5	1.6	1.6	0.5%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	2.3	2.4	2.5	2.6	2.7	2.8	2.9	0.9%
Total buildings								
Coal	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6%
Electricity	0.6	0.7	0.8	0.9	1.0	1.2	1.3	2.8%
Liquid fuels	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1.1%
Natural gas	1.9	2.0	2.1	2.2	2.4	2.5	2.7	1.3%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	3.1	3.3	3.5	3.8	4.1	4.4	4.8	1.6%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N12. Buildings delivered energy consumption in Asia Pacific by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.8	0.8	0.9	0.9	0.9	1.0	1.0	0.8%
Electricity	6.0	6.5	7.4	8.0	8.9	9.8	10.6	2.1%
Liquid fuels	1.5	1.6	1.7	1.8	1.9	2.0	2.1	1.1%
Natural gas	1.3	1.4	1.6	1.7	1.9	2.0	2.1	1.7%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8%
Total	9.7	10.5	11.7	12.6	13.7	14.9	15.9	1.8%
Residential buildings								
Coal	2.5	2.4	2.3	2.3	2.3	2.2	2.2	-0.5%
Electricity	10.2	11.3	13.4	15.3	17.9	20.9	23.8	3.1%
Liquid fuels	4.3	4.6	5.0	5.5	5.9	6.3	6.7	1.6%
Natural gas	3.9	4.3	5.0	5.6	6.2	6.9	7.6	2.4%
Renewables	0.9	0.9	0.9	1.0	1.0	1.1	1.1	0.8%
Total	21.9	23.5	26.7	29.7	33.3	37.4	41.4	2.3%
Total buildings								
Coal	3.3	3.2	3.2	3.2	3.2	3.2	3.2	-0.1%
Electricity	16.2	17.7	20.8	23.4	26.8	30.7	34.4	2.7%
Liquid fuels	5.9	6.2	6.8	7.3	7.8	8.3	8.8	1.4%
Natural gas	5.3	5.8	6.6	7.4	8.1	8.9	9.7	2.2%
Renewables	1.0	1.0	1.1	1.1	1.1	1.2	1.2	0.8%
Total	31.6	33.9	38.4	42.3	47.1	52.3	57.3	2.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N13. Buildings delivered energy consumption in Japan by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4%
Electricity	1.2	1.2	1.2	1.2	1.2	1.2	1.2	-0.1%
Liquid fuels	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.1%
Natural gas	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.7%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	1.9	2.0	2.0	2.0	2.0	2.0	2.0	0.1%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0%
Liquid fuels	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-0.1%
Natural gas	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	1.8	1.9	1.9	1.8	1.8	1.9	1.9	0.1%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4%
Electricity	2.2	2.2	2.3	2.2	2.1	2.2	2.2	0.0%
Liquid fuels	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.0%
Natural gas	0.7	0.8	0.8	0.8	0.8	0.9	0.9	0.5%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	3.7	3.8	3.9	3.8	3.8	3.8	3.9	0.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N14. Buildings delivered energy consumption in South Korea by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.5%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-0.4%
Natural gas	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3%
Total	0.9	0.9	0.9	0.9	0.9	1.0	1.0	0.4%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.5%
Electricity	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.9%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3%
Natural gas	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.6%
Total	0.8	0.9	0.9	0.9	0.9	1.0	1.0	0.6%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.5%
Electricity	0.9	0.9	0.9	0.9	1.0	1.0	1.0	0.6%
Liquid fuels	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0%
Natural gas	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.5%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.3%
Total	1.7	1.8	1.8	1.8	1.9	1.9	2.0	0.5%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N15. Buildings delivered energy consumption in Australia and New Zealand by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.1%
Electricity	0.3	0.3	0.4	0.4	0.4	0.5	0.5	1.7%
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6%
Natural gas	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.4%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.4	0.4	0.5	0.5	0.6	0.6	0.6	1.6%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-4.9%
Electricity	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4%
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1%
Natural gas	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.0%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.5%
Electricity	0.6	0.6	0.6	0.7	0.7	0.8	0.8	1.1%
Liquid fuels	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.5%
Natural gas	0.2	0.2	0.3	0.3	0.3	0.3	0.3	1.1%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.1%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N16. Buildings delivered energy consumption in China by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-0.5%
Electricity	2.0	2.2	2.6	2.8	3.2	3.6	3.8	2.4%
Liquid fuels	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.3%
Natural gas	0.6	0.7	0.8	0.8	0.9	1.0	1.1	2.2%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8%
Total	3.8	4.1	4.7	5.0	5.6	6.0	6.4	1.8%
Residential buildings								
Coal	2.3	2.1	2.1	2.0	2.0	2.0	1.9	-0.6%
Electricity	5.0	5.6	6.8	7.9	9.2	10.6	12.0	3.2%
Liquid fuels	1.8	1.9	2.1	2.3	2.5	2.7	2.9	1.8%
Natural gas	2.3	2.7	3.2	3.8	4.3	4.9	5.5	3.1%
Renewables	0.8	0.8	0.9	0.9	0.9	1.0	1.0	0.8%
Total	12.1	13.1	15.0	16.9	18.9	21.1	23.3	2.4%
Total buildings								
Coal	2.8	2.7	2.6	2.5	2.5	2.4	2.4	-0.6%
Electricity	6.9	7.8	9.4	10.7	12.4	14.2	15.8	3.0%
Liquid fuels	2.4	2.5	2.8	3.1	3.3	3.6	3.8	1.7%
Natural gas	2.9	3.3	3.9	4.6	5.2	5.9	6.6	2.9%
Renewables	0.9	0.9	1.0	1.0	1.0	1.1	1.1	0.8%
Total	16.0	17.3	19.7	21.9	24.5	27.2	29.7	2.2%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N17. Buildings delivered energy consumption in India by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.2	0.3	0.3	0.4	0.4	0.5	0.5	2.6%
Electricity	0.4	0.5	0.7	0.9	1.1	1.3	1.5	4.6%
Liquid fuels	0.1	0.1	0.1	0.2	0.2	0.2	0.2	3.2%
Natural gas	0.1	0.1	0.1	0.1	0.2	0.2	0.2	2.8%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.9	1.0	1.3	1.5	1.8	2.2	2.5	3.8%
Residential buildings								
Coal	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.6%
Electricity	1.5	1.7	2.2	2.9	3.8	5.0	6.2	5.3%
Liquid fuels	1.3	1.4	1.6	1.8	2.0	2.1	2.3	2.1%
Natural gas	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.0%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8%
Total	3.0	3.3	4.1	5.0	6.1	7.4	8.8	4.0%
Total buildings								
Coal	0.4	0.4	0.5	0.5	0.6	0.6	0.7	2.0%
Electricity	1.9	2.2	2.9	3.8	4.9	6.3	7.7	5.1%
Liquid fuels	1.4	1.5	1.7	1.9	2.1	2.3	2.5	2.2%
Natural gas	0.1	0.2	0.2	0.2	0.3	0.3	0.3	2.9%
Renewables	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.8%
Total	3.8	4.3	5.4	6.5	7.9	9.6	11.3	3.9%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N18. Buildings delivered energy consumption in Other Asia Pacific by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7%
Electricity	1.5	1.6	1.9	2.1	2.4	2.6	2.9	2.5%
Liquid fuels	0.3	0.3	0.3	0.3	0.4	0.4	0.4	1.3%
Natural gas	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.4%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	1.8	2.0	2.3	2.6	2.9	3.2	3.5	2.3%
Residential buildings								
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3%
Electricity	2.2	2.4	2.7	3.0	3.3	3.7	4.0	2.1%
Liquid fuels	0.8	0.8	0.8	0.9	0.9	1.0	1.0	0.9%
Natural gas	0.5	0.6	0.6	0.7	0.7	0.7	0.8	1.4%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	3.6	3.8	4.3	4.6	5.0	5.4	5.9	1.8%
Total buildings								
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4%
Electricity	3.7	4.0	4.6	5.1	5.7	6.3	6.9	2.3%
Liquid fuels	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.0%
Natural gas	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1.5%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	5.4	5.8	6.6	7.2	7.9	8.6	9.3	1.9%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N19. Buildings delivered energy consumption in Africa and Middle East by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.4%
Electricity	1.8	1.9	2.1	2.4	2.5	2.7	2.9	1.7%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4%
Natural gas	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.2%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	2.6	2.8	3.0	3.3	3.5	3.7	3.9	1.5%
Residential buildings								
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.6%
Electricity	2.9	3.1	3.4	3.8	4.0	4.6	5.1	2.0%
Liquid fuels	0.8	0.8	0.9	0.9	0.9	0.9	1.0	0.6%
Natural gas	2.5	2.7	2.8	3.0	3.2	3.4	3.6	1.3%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	6.4	6.7	7.2	7.8	8.3	9.1	9.8	1.5%
Total buildings								
Coal	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.9%
Electricity	4.7	5.0	5.5	6.1	6.5	7.3	7.9	1.9%
Liquid fuels	0.9	0.9	1.0	1.0	1.0	1.0	1.1	0.5%
Natural gas	3.2	3.3	3.6	3.8	4.0	4.3	4.5	1.3%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	8.9	9.5	10.3	11.1	11.7	12.8	13.7	1.5%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N20. Buildings delivered energy consumption in Africa by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.4%
Electricity	0.5	0.5	0.6	0.7	0.7	0.8	0.8	2.0%
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.9%
Residential buildings								
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.6%
Electricity	0.9	1.1	1.3	1.6	1.8	2.2	2.6	3.7%
Liquid fuels	0.5	0.6	0.6	0.6	0.6	0.7	0.7	1.0%
Natural gas	0.6	0.6	0.7	0.8	0.9	1.0	1.2	2.7%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	2.1	2.4	2.7	3.2	3.5	4.1	4.6	2.8%
Total buildings								
Coal	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.9%
Electricity	1.4	1.6	1.9	2.3	2.5	3.0	3.5	3.2%
Liquid fuels	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9%
Natural gas	0.6	0.6	0.7	0.8	1.0	1.1	1.2	2.7%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	2.8	3.0	3.5	4.0	4.3	5.0	5.7	2.6%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

Table N21. Buildings delivered energy consumption in Middle East by end-use sector and fuel, Reference case

quadrillion British thermal units

sector_fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Commercial buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	1.3	1.4	1.6	1.7	1.8	1.9	2.0	1.6%
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1%
Natural gas	0.6	0.6	0.7	0.7	0.8	0.8	0.8	1.1%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	2.0	2.1	2.3	2.5	2.6	2.8	2.9	1.4%
Residential buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1%
Electricity	2.0	2.0	2.1	2.2	2.2	2.3	2.4	0.8%
Liquid fuels	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-0.3%
Natural gas	2.0	2.0	2.1	2.2	2.3	2.4	2.5	0.8%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	4.2	4.3	4.5	4.6	4.8	5.0	5.2	0.7%
Total buildings								
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1%
Electricity	3.3	3.4	3.7	3.9	4.0	4.3	4.5	1.1%
Liquid fuels	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-0.3%
Natural gas	2.6	2.7	2.8	2.9	3.1	3.2	3.3	0.9%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
Total	6.2	6.5	6.8	7.1	7.4	7.8	8.1	1.0%

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run r_230822.081459 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. The commercial sector includes businesses, institutions, and service organizations. Most commercial energy use occurs in buildings or structures to provide space heating, water heating, lighting, cooking, and cooling. Energy consumed for services not associated with buildings, such as for traffic lights and city water and sewer services, is also categorized as commercial energy use. The residential sector includes households but excludes motor vehicle fuel consumption, which is covered in the transportation sector. Buildings electricity consumption and buildings delivered energy consumption do not include electrical system energy losses incurred in the generation, transmission, and distribution of electricity. Electricity-related losses include energy losses during generation due to thermal efficiency, energy losses during transmission and distribution, and parasitic load. In all regions except the United States, fuel consumption in buildings includes fuel used to produce district heat that is delivered to the residential and commercial sectors. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).