

**Table F1. Total world delivered energy consumption by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0.1%
<b>Total</b>	<b>63.1</b>	<b>65.1</b>	<b>69.5</b>	<b>73.8</b>	<b>78.7</b>	<b>84.4</b>	<b>90.2</b>	<b>1.3%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4%
<b>Total</b>	<b>32.8</b>	<b>34.0</b>	<b>36.4</b>	<b>38.3</b>	<b>40.4</b>	<b>42.6</b>	<b>44.8</b>	<b>1.1%</b>
<b>Industrial</b>								
Liquid fuels	62.4	65.2	69.3	73.8	78.0	82.0	85.5	1.1%
Natural gas	63.9	65.8	70.2	74.2	78.7	83.3	88.0	1.1%
Coal	62.8	62.8	63.0	63.2	63.4	64.2	65.2	0.1%
Electricity	41.5	43.4	46.2	48.9	51.1	53.4	55.4	1.0%
Renewables	24.1	26.8	30.1	33.5	36.6	39.7	42.6	2.1%
<b>Total</b>	<b>254.7</b>	<b>263.9</b>	<b>278.8</b>	<b>293.5</b>	<b>307.8</b>	<b>322.6</b>	<b>336.6</b>	<b>1.0%</b>
<b>Transportation</b>								
Liquid fuels	109.7	114.1	115.4	117.2	119.9	124.2	129.1	0.6%
Natural gas	4.2	4.5	4.7	5.0	5.3	5.9	6.7	1.7%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	1.9	2.2	2.7	3.5	4.4	5.2	5.9	4.1%
<b>Total</b>	<b>115.8</b>	<b>120.8</b>	<b>122.9</b>	<b>125.7</b>	<b>129.6</b>	<b>135.3</b>	<b>141.7</b>	<b>0.7%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	184.9	192.4	198.4	205.2	212.5	221.3	230.3	0.8%
Natural gas	100.6	103.7	109.9	115.6	121.8	128.6	135.7	1.1%
Coal	67.7	67.7	67.8	68.0	68.1	68.9	69.9	0.1%
Electricity	87.3	91.4	99.5	107.3	115.5	124.4	133.0	1.5%
Renewables	25.9	28.6	31.9	35.3	38.5	41.6	44.5	2.0%
<b>Total end-use consumption</b>	<b>466.5</b>	<b>483.8</b>	<b>507.6</b>	<b>531.3</b>	<b>556.5</b>	<b>584.8</b>	<b>613.4</b>	<b>1.0%</b>
Electricity-related losses	171.3	178.1	190.9	205.0	215.4	228.1	240.5	1.2%
Discrepancy	0.1	-0.6	-0.2	0.1	0.3	0.6	0.9	9.4%
<b>Total</b>	<b>637.8</b>	<b>661.4</b>	<b>698.2</b>	<b>736.4</b>	<b>772.2</b>	<b>813.6</b>	<b>854.7</b>	<b>1.1%</b>
<b>Electric power</b>								
Liquid fuels	5.4	6.4	3.9	2.0	1.1	0.8	0.7	-7.2%
Natural gas	52.5	51.5	51.3	51.6	54.4	57.8	61.1	0.5%
Coal	98.2	96.1	98.2	102.4	101.1	101.4	102.1	0.1%
Nuclear	27.7	29.3	31.9	33.4	33.6	33.9	34.7	0.8%
Renewables	74.5	86.2	104.9	122.6	140.4	158.4	174.5	3.1%
<b>Total</b>	<b>258.4</b>	<b>269.3</b>	<b>290.2</b>	<b>312.0</b>	<b>330.6</b>	<b>352.2</b>	<b>373.2</b>	<b>1.3%</b>
<b>Total energy consumption</b>								
Liquid fuels	190.4	198.2	202.0	207.3	214.0	222.8	231.9	0.7%
Natural gas	153.3	155.4	161.4	167.4	176.4	186.5	197.0	0.9%
Coal	166.0	163.8	166.1	170.4	169.3	170.5	172.1	0.1%
Nuclear	27.7	29.3	31.9	33.4	33.6	33.9	34.7	0.8%
Renewables	100.5	114.8	136.8	157.9	178.9	199.9	219.0	2.8%

<b>Total</b>	<b>637.8</b>	<b>661.4</b>	<b>698.2</b>	<b>736.4</b>	<b>772.2</b>	<b>813.6</b>	<b>854.7</b>	<b>1.1%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F2. Delivered energy consumption in the Americas by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.6	0.5	0.5	0.4	0.4	0.4	0.4	-1.7%
<b>Total</b>	<b>16.2</b>	<b>15.9</b>	<b>16.2</b>	<b>16.3</b>	<b>16.6</b>	<b>17.0</b>	<b>17.4</b>	<b>0.3%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1%
<b>Total</b>	<b>12.0</b>	<b>12.0</b>	<b>12.4</b>	<b>12.8</b>	<b>13.1</b>	<b>13.4</b>	<b>13.8</b>	<b>0.5%</b>
<b>Industrial</b>								
Liquid fuels	15.2	15.4	16.3	17.2	18.1	19.0	19.9	1.0%
Natural gas	17.6	17.6	19.0	19.9	20.9	22.0	23.2	1.0%
Coal	1.8	1.7	1.8	1.8	1.8	1.8	1.9	0.2%
Electricity	6.2	6.4	6.8	7.1	7.5	7.8	8.2	1.0%
Renewables	6.6	6.8	7.4	7.9	8.3	8.7	9.1	1.1%
<b>Total</b>	<b>47.4</b>	<b>47.9</b>	<b>51.2</b>	<b>53.9</b>	<b>56.7</b>	<b>59.4</b>	<b>62.2</b>	<b>1.0%</b>
<b>Transportation</b>								
Liquid fuels	38.5	38.2	37.1	36.4	36.4	37.1	38.3	0.0%
Natural gas	1.4	1.3	1.2	1.2	1.2	1.3	1.4	0.1%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.1	0.2	0.3	0.5	0.8	0.9	1.1	8.8%
<b>Total</b>	<b>40.0</b>	<b>39.6</b>	<b>38.6</b>	<b>38.1</b>	<b>38.4</b>	<b>39.3</b>	<b>40.8</b>	<b>0.1%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	56.7	56.4	56.1	56.4	57.3	58.9	60.9	0.3%
Natural gas	29.6	29.3	30.9	31.8	32.9	34.1	35.5	0.6%
Coal	1.8	1.8	1.8	1.8	1.8	1.8	1.9	0.2%
Electricity	20.3	20.5	21.6	22.7	23.8	25.1	26.5	1.0%
Renewables	7.3	7.5	8.0	8.5	8.9	9.2	9.6	1.0%
<b>Total end-use consumption</b>	<b>115.7</b>	<b>115.4</b>	<b>118.4</b>	<b>121.2</b>	<b>124.7</b>	<b>129.1</b>	<b>134.3</b>	<b>0.5%</b>
Electricity-related losses	37.2	37.0	37.6	39.3	40.4	42.3	44.5	0.6%
Discrepancy	-0.3	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	--
<b>Total</b>	<b>152.6</b>	<b>152.3</b>	<b>155.8</b>	<b>160.3</b>	<b>165.0</b>	<b>171.2</b>	<b>178.7</b>	<b>0.6%</b>
<b>Electric power</b>								
Liquid fuels	1.3	1.5	0.8	0.3	0.1	0.1	0.1	-10.7%
Natural gas	16.1	14.2	12.9	11.9	12.6	12.9	13.2	-0.7%
Coal	9.5	8.4	4.3	4.6	4.7	4.7	4.3	-2.8%
Nuclear	9.4	9.3	9.4	8.8	7.7	7.5	7.3	-0.9%
Renewables	21.3	24.1	31.9	36.3	39.1	42.3	46.1	2.8%
<b>Total</b>	<b>57.5</b>	<b>57.5</b>	<b>59.2</b>	<b>62.0</b>	<b>64.2</b>	<b>67.3</b>	<b>71.0</b>	<b>0.8%</b>
<b>Total energy consumption</b>								
Liquid fuels	57.6	57.6	56.7	56.5	57.3	58.8	60.8	0.2%
Natural gas	45.7	43.5	43.8	43.8	45.5	47.0	48.7	0.2%
Coal	11.3	10.1	6.1	6.5	6.5	6.5	6.2	-2.1%
Nuclear	9.4	9.3	9.4	8.8	7.7	7.5	7.3	-0.9%
Renewables	28.6	31.6	39.9	44.8	48.0	51.5	55.7	2.4%

<b>Total</b>	<b>152.6</b>	<b>152.3</b>	<b>155.8</b>	<b>160.3</b>	<b>165.0</b>	<b>171.2</b>	<b>178.7</b>	<b>0.6%</b>
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**Table F3. Delivered energy consumption in the United States by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.5	0.5	0.4	0.4	0.4	0.3	0.3	-2.0%
<b>Total</b>	<b>11.8</b>	<b>11.4</b>	<b>11.5</b>	<b>11.5</b>	<b>11.6</b>	<b>11.8</b>	<b>12.0</b>	<b>0.1%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0%
<b>Total</b>	<b>9.2</b>	<b>9.1</b>	<b>9.3</b>	<b>9.4</b>	<b>9.4</b>	<b>9.5</b>	<b>9.7</b>	<b>0.2%</b>
<b>Industrial</b>								
Liquid fuels	9.0	8.9	9.3	9.6	10.0	10.3	10.6	0.6%
Natural gas	10.9	10.7	11.3	11.6	12.0	12.4	12.8	0.6%
Coal	0.9	0.8	0.8	0.7	0.7	0.6	0.6	-1.1%
Electricity	3.5	3.5	3.6	3.7	3.8	3.9	4.0	0.6%
Renewables	2.4	2.5	2.5	2.6	2.6	2.7	2.8	0.5%
<b>Total</b>	<b>26.6</b>	<b>26.3</b>	<b>27.5</b>	<b>28.2</b>	<b>29.0</b>	<b>29.9</b>	<b>30.9</b>	<b>0.5%</b>
<b>Transportation</b>								
Liquid fuels	26.6	25.9	24.6	23.6	23.2	23.3	23.9	-0.4%
Natural gas	1.0	0.8	0.8	0.8	0.8	0.9	1.0	0.0%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.1	0.1	0.2	0.4	0.6	0.7	0.8	9.7%
<b>Total</b>	<b>27.7</b>	<b>26.8</b>	<b>25.6</b>	<b>24.8</b>	<b>24.6</b>	<b>24.9</b>	<b>25.7</b>	<b>-0.3%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	37.3	36.5	35.5	34.9	34.7	35.1	36.1	-0.1%
Natural gas	20.7	20.0	20.7	21.0	21.3	21.8	22.3	0.3%
Coal	0.9	0.8	0.8	0.8	0.7	0.7	0.6	-1.0%
Electricity	13.3	13.3	13.8	14.3	14.8	15.4	16.1	0.7%
Renewables	3.1	3.1	3.0	3.1	3.1	3.1	3.2	0.2%
<b>Total end-use consumption</b>	<b>75.2</b>	<b>73.7</b>	<b>73.9</b>	<b>73.9</b>	<b>74.6</b>	<b>76.1</b>	<b>78.3</b>	<b>0.1%</b>
Electricity-related losses	24.3	23.9	23.6	24.6	24.9	25.9	26.9	0.4%
Discrepancy	-0.6	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	--
<b>Total</b>	<b>98.9</b>	<b>97.3</b>	<b>97.4</b>	<b>98.3</b>	<b>99.4</b>	<b>101.9</b>	<b>105.1</b>	<b>0.2%</b>
<b>Electric power</b>								
Liquid fuels	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-3.2%
Natural gas	12.2	10.0	8.0	6.9	7.4	7.8	8.0	-1.5%
Coal	8.8	7.8	3.6	3.6	3.1	2.9	2.6	-4.3%
Nuclear	8.1	8.2	7.9	7.3	6.5	6.5	6.5	-0.8%
Renewables	8.4	11.0	17.9	21.0	22.6	24.0	25.9	4.1%
<b>Total</b>	<b>37.6</b>	<b>37.1</b>	<b>37.4</b>	<b>38.8</b>	<b>39.7</b>	<b>41.3</b>	<b>43.0</b>	<b>0.5%</b>
<b>Total energy consumption</b>								
Liquid fuels	36.8	36.4	35.5	34.8	34.6	35.1	36.0	-0.1%
Natural gas	32.9	30.0	28.7	27.9	28.8	29.6	30.3	-0.3%
Coal	9.7	8.6	4.4	4.3	3.8	3.5	3.2	-3.9%
Nuclear	8.1	8.2	7.9	7.3	6.5	6.5	6.5	-0.8%
Renewables	11.4	14.1	20.9	24.0	25.6	27.1	29.1	3.4%

<b>Total</b>	<b>98.9</b>	<b>97.3</b>	<b>97.4</b>	<b>98.3</b>	<b>99.4</b>	<b>101.9</b>	<b>105.1</b>	<b>0.2%</b>
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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](http://www.eia.gov/aeo)

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**Table F4. Delivered energy consumption in Canada by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
<b>Total</b>	<b>1.3</b>	<b>1.3</b>	<b>1.3</b>	<b>1.4</b>	<b>1.4</b>	<b>1.5</b>	<b>1.5</b>	<b>0.6%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
<b>Total</b>	<b>1.2</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>1.5</b>	<b>1.6</b>	<b>1.7</b>	<b>1.3%</b>
<b>Industrial</b>								
Liquid fuels	2.2	2.3	2.5	2.7	3.0	3.2	3.3	1.5%
Natural gas	2.5	2.7	2.8	3.1	3.4	3.7	4.0	1.7%
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3%
Electricity	0.7	0.7	0.8	0.9	1.0	1.1	1.2	2.0%
Renewables	0.4	0.4	0.5	0.5	0.5	0.5	0.6	1.1%
<b>Total</b>	<b>6.0</b>	<b>6.3</b>	<b>6.8</b>	<b>7.4</b>	<b>8.0</b>	<b>8.6</b>	<b>9.2</b>	<b>1.6%</b>
<b>Transportation</b>								
Liquid fuels	2.5	2.5	2.4	2.4	2.4	2.4	2.4	-0.1%
Natural gas	0.1	0.1	0.1	0.0	0.0	0.1	0.1	-0.6%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.0	0.1	0.1	0.1	0.1	11.5%
<b>Total</b>	<b>2.6</b>	<b>2.6</b>	<b>2.5</b>	<b>2.5</b>	<b>2.5</b>	<b>2.5</b>	<b>2.6</b>	<b>0.1%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	4.7	4.9	5.0	5.2	5.4	5.6	5.8	0.7%
Natural gas	3.8	4.0	4.2	4.5	4.8	5.2	5.6	1.4%
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3%
Electricity	1.9	1.9	2.1	2.3	2.5	2.7	2.9	1.6%
Renewables	0.4	0.4	0.5	0.5	0.5	0.5	0.6	1.1%
<b>Total end-use consumption</b>	<b>11.0</b>	<b>11.4</b>	<b>11.9</b>	<b>12.6</b>	<b>13.4</b>	<b>14.3</b>	<b>15.1</b>	<b>1.1%</b>
Electricity-related losses	3.8	3.5	3.9	4.1	4.4	4.8	5.3	1.2%
Discrepancy	-0.1	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	--
<b>Total</b>	<b>14.7</b>	<b>14.7</b>	<b>15.5</b>	<b>16.4</b>	<b>17.5</b>	<b>18.7</b>	<b>20.1</b>	<b>1.1%</b>
<b>Electric power</b>								
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-10.2%
Natural gas	0.6	0.6	1.0	1.2	1.2	1.1	1.3	3.0%
Coal	0.3	0.2	0.0	0.0	0.0	0.0	0.0	-100.0%
Nuclear	0.9	0.8	0.8	0.8	0.5	0.4	0.3	-3.8%
Renewables	3.9	4.0	4.2	4.5	5.2	6.0	6.7	2.0%
<b>Total</b>	<b>5.7</b>	<b>5.5</b>	<b>6.0</b>	<b>6.5</b>	<b>6.9</b>	<b>7.5</b>	<b>8.3</b>	<b>1.4%</b>
<b>Total energy consumption</b>								
Liquid fuels	4.6	4.7	4.7	4.9	5.1	5.3	5.5	0.6%
Natural gas	4.4	4.6	5.2	5.6	6.0	6.3	6.9	1.6%
Coal	0.4	0.3	0.1	0.1	0.1	0.1	0.1	-4.2%
Nuclear	0.9	0.8	0.8	0.8	0.5	0.4	0.3	-3.8%
Renewables	4.3	4.4	4.6	5.0	5.7	6.5	7.3	1.9%

<b>Total</b>	<b>14.7</b>	<b>14.7</b>	<b>15.5</b>	<b>16.4</b>	<b>17.5</b>	<b>18.7</b>	<b>20.1</b>	<b>1.1%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F5. Delivered energy consumption in Mexico by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>0.7</b>	<b>0.7</b>	<b>0.7%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>	<b>1.7%</b>
<b>Industrial</b>								
Liquid fuels	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.4%
Natural gas	1.4	1.5	1.8	1.9	2.0	2.1	2.2	1.6%
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.9%
Electricity	0.5	0.6	0.6	0.7	0.7	0.8	0.8	1.4%
Renewables	0.2	0.2	0.2	0.2	0.2	0.3	0.3	1.3%
<b>Total</b>	<b>3.1</b>	<b>3.2</b>	<b>3.7</b>	<b>3.9</b>	<b>4.1</b>	<b>4.4</b>	<b>4.6</b>	<b>1.5%</b>
<b>Transportation</b>								
Liquid fuels	2.1	2.1	2.1	2.1	2.2	2.4	2.5	0.6%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0%
<b>Total</b>	<b>2.1</b>	<b>2.1</b>	<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>2.6</b>	<b>0.8%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	3.1	3.2	3.3	3.4	3.6	3.8	4.0	0.9%
Natural gas	1.4	1.5	1.8	1.9	2.1	2.2	2.3	1.7%
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.9%
Electricity	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.5%
Renewables	0.2	0.2	0.2	0.2	0.3	0.3	0.3	1.3%
<b>Total end-use consumption</b>	<b>6.0</b>	<b>6.1</b>	<b>6.6</b>	<b>7.0</b>	<b>7.4</b>	<b>7.8</b>	<b>8.3</b>	<b>1.2%</b>
Electricity-related losses	1.6	1.6	1.8	1.8	1.9	2.0	2.2	1.1%
Discrepancy	0.2	0.1	0.1	0.1	0.1	0.1	0.1	-4.4%
<b>Total</b>	<b>7.7</b>	<b>7.8</b>	<b>8.4</b>	<b>8.9</b>	<b>9.3</b>	<b>9.9</b>	<b>10.5</b>	<b>1.1%</b>
<b>Electric power</b>								
Liquid fuels	0.4	0.5	0.3	0.1	0.0	0.0	0.0	-18.4%
Natural gas	1.3	1.4	1.4	1.5	1.7	1.8	1.8	1.1%
Coal	0.1	0.1	0.2	0.2	0.2	0.2	0.2	4.1%
Nuclear	0.1	0.1	0.2	0.3	0.2	0.2	0.2	1.5%
Renewables	0.8	0.7	0.9	1.0	1.0	1.3	1.6	2.6%
<b>Total</b>	<b>2.6</b>	<b>2.7</b>	<b>2.9</b>	<b>3.1</b>	<b>3.2</b>	<b>3.5</b>	<b>3.7</b>	<b>1.3%</b>
<b>Total energy consumption</b>								
Liquid fuels	3.7	3.7	3.6	3.6	3.7	3.8	4.1	0.3%
Natural gas	2.8	2.9	3.3	3.5	3.8	4.0	4.1	1.4%
Coal	0.2	0.2	0.3	0.3	0.3	0.3	0.3	2.4%
Nuclear	0.1	0.1	0.2	0.3	0.2	0.2	0.2	1.5%
Renewables	1.0	0.9	1.1	1.2	1.3	1.6	1.8	2.4%

<b>Total</b>	<b>7.7</b>	<b>7.8</b>	<b>8.4</b>	<b>8.9</b>	<b>9.3</b>	<b>9.9</b>	<b>10.5</b>	<b>1.1%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F6. Delivered energy consumption in Brazil by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>1.0</b>	<b>1.0</b>	<b>1.0</b>	<b>1.1</b>	<b>1.1</b>	<b>1.2</b>	<b>1.2</b>	<b>0.8%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.6</b>	<b>0.7</b>	<b>0.7</b>	<b>0.8</b>	<b>0.8</b>	<b>0.8</b>	<b>0.8</b>	<b>0.9%</b>
<b>Industrial</b>								
Liquid fuels	1.4	1.4	1.5	1.6	1.7	1.7	1.7	0.7%
Natural gas	0.7	0.7	0.8	0.8	0.9	0.9	0.9	1.0%
Coal	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7%
Electricity	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.4%
Renewables	2.7	2.8	3.1	3.4	3.6	3.7	3.8	1.2%
<b>Total</b>	<b>6.1</b>	<b>6.2</b>	<b>6.8</b>	<b>7.3</b>	<b>7.6</b>	<b>7.7</b>	<b>7.9</b>	<b>0.9%</b>
<b>Transportation</b>								
Liquid fuels	3.6	3.7	3.7	3.8	3.9	4.0	4.1	0.4%
Natural gas	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-1.1%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.0	0.0	0.1	0.1	0.1	3.5%
<b>Total</b>	<b>3.7</b>	<b>3.8</b>	<b>3.9</b>	<b>4.0</b>	<b>4.1</b>	<b>4.1</b>	<b>4.2</b>	<b>0.5%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	5.3	5.5	5.6	5.8	5.9	6.1	6.2	0.5%
Natural gas	0.8	0.8	0.9	1.0	1.0	1.0	1.0	0.8%
Coal	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7%
Electricity	2.0	2.1	2.2	2.3	2.4	2.5	2.5	0.8%
Renewables	2.7	2.9	3.2	3.5	3.7	3.8	3.8	1.2%
<b>Total end-use consumption</b>	<b>11.4</b>	<b>11.7</b>	<b>12.4</b>	<b>13.1</b>	<b>13.5</b>	<b>13.9</b>	<b>14.2</b>	<b>0.8%</b>
Electricity-related losses	3.5	3.8	4.0	4.2	4.3	4.4	4.5	0.9%
Discrepancy	0.0	0.0	0.1	0.1	0.1	0.1	0.1	--
<b>Total</b>	<b>14.9</b>	<b>15.6</b>	<b>16.5</b>	<b>17.4</b>	<b>17.9</b>	<b>18.3</b>	<b>18.8</b>	<b>0.8%</b>
<b>Electric power</b>								
Liquid fuels	0.1	0.2	0.1	0.0	0.0	0.0	0.0	-14.8%
Natural gas	0.5	0.7	0.9	0.7	0.6	0.5	0.5	-0.4%
Coal	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1%
Nuclear	0.1	0.1	0.2	0.2	0.2	0.2	0.2	1.0%
Renewables	4.7	4.8	4.9	5.5	5.7	6.0	6.3	1.1%
<b>Total</b>	<b>5.6</b>	<b>5.9</b>	<b>6.2</b>	<b>6.5</b>	<b>6.7</b>	<b>6.8</b>	<b>7.0</b>	<b>0.9%</b>
<b>Total energy consumption</b>								
Liquid fuels	5.5	5.7	5.8	5.9	6.0	6.2	6.3	0.5%
Natural gas	1.4	1.5	1.8	1.7	1.6	1.5	1.5	0.3%
Coal	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6%
Nuclear	0.1	0.1	0.2	0.2	0.2	0.2	0.2	1.0%
Renewables	7.4	7.6	8.1	9.0	9.4	9.8	10.1	1.1%

<b>Total</b>	<b>14.9</b>	<b>15.6</b>	<b>16.5</b>	<b>17.4</b>	<b>17.9</b>	<b>18.3</b>	<b>18.8</b>	<b>0.8%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F7. Delivered energy consumption in Other Americas by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>1.6</b>	<b>1.6</b>	<b>1.7</b>	<b>1.7</b>	<b>1.8</b>	<b>1.9</b>	<b>1.9</b>	<b>0.7%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.7</b>	<b>0.8</b>	<b>0.8</b>	<b>0.9</b>	<b>1.0</b>	<b>1.1</b>	<b>1.3</b>	<b>2.0%</b>
<b>Industrial</b>								
Liquid fuels	1.8	1.9	2.0	2.2	2.4	2.7	2.9	1.7%
Natural gas	2.0	2.1	2.3	2.5	2.7	3.0	3.3	1.7%
Coal	0.2	0.2	0.3	0.3	0.3	0.3	0.4	2.1%
Electricity	0.8	0.8	0.9	1.0	1.1	1.2	1.3	1.8%
Renewables	0.9	0.9	1.1	1.2	1.4	1.5	1.7	2.3%
<b>Total</b>	<b>5.7</b>	<b>5.9</b>	<b>6.6</b>	<b>7.2</b>	<b>8.0</b>	<b>8.7</b>	<b>9.6</b>	<b>1.9%</b>
<b>Transportation</b>								
Liquid fuels	3.8	4.0	4.2	4.4	4.7	5.1	5.4	1.2%
Natural gas	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.5%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.0	0.0	0.0	0.0	0.1	12.3%
<b>Total</b>	<b>4.0</b>	<b>4.3</b>	<b>4.5</b>	<b>4.7</b>	<b>5.0</b>	<b>5.4</b>	<b>5.7</b>	<b>1.2%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	6.1	6.4	6.7	7.1	7.7	8.3	8.9	1.4%
Natural gas	2.8	2.9	3.2	3.4	3.7	3.9	4.2	1.5%
Coal	0.2	0.2	0.3	0.3	0.3	0.3	0.4	2.1%
Electricity	2.1	2.1	2.3	2.6	2.8	3.1	3.3	1.7%
Renewables	0.9	0.9	1.1	1.2	1.4	1.5	1.7	2.3%
<b>Total end-use consumption</b>	<b>12.1</b>	<b>12.6</b>	<b>13.6</b>	<b>14.6</b>	<b>15.8</b>	<b>17.1</b>	<b>18.5</b>	<b>1.5%</b>
Electricity-related losses	4.0	4.1	4.3	4.5	4.9	5.2	5.6	1.2%
Discrepancy	0.3	0.1	0.1	0.1	0.1	0.1	0.2	-2.1%
<b>Total</b>	<b>16.4</b>	<b>16.8</b>	<b>18.0</b>	<b>19.3</b>	<b>20.8</b>	<b>22.4</b>	<b>24.2</b>	<b>1.4%</b>
<b>Electric power</b>								
Liquid fuels	0.6	0.7	0.3	0.1	0.0	0.0	0.0	-17.4%
Natural gas	1.5	1.5	1.6	1.6	1.6	1.6	1.6	0.3%
Coal	0.2	0.2	0.4	0.8	1.3	1.5	1.5	7.4%
Nuclear	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.5%
Renewables	3.6	3.7	4.1	4.4	4.6	5.0	5.6	1.6%
<b>Total</b>	<b>6.1</b>	<b>6.2</b>	<b>6.6</b>	<b>7.1</b>	<b>7.7</b>	<b>8.3</b>	<b>8.9</b>	<b>1.4%</b>
<b>Total energy consumption</b>								
Liquid fuels	7.0	7.2	7.2	7.4	7.8	8.4	9.0	0.9%
Natural gas	4.3	4.4	4.8	5.1	5.3	5.6	5.9	1.1%
Coal	0.4	0.4	0.7	1.1	1.6	1.9	1.9	5.6%
Nuclear	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.5%
Renewables	4.5	4.6	5.2	5.6	5.9	6.5	7.3	1.7%

<b>Total</b>	<b>16.4</b>	<b>16.8</b>	<b>18.0</b>	<b>19.3</b>	<b>20.8</b>	<b>22.4</b>	<b>24.2</b>	<b>1.4%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F8. Delivered energy consumption in Europe and Eurasia by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.8%
<b>Total</b>	<b>18.6</b>	<b>19.0</b>	<b>19.4</b>	<b>19.9</b>	<b>20.5</b>	<b>21.0</b>	<b>21.6</b>	<b>0.5%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>8.5</b>	<b>8.8</b>	<b>9.2</b>	<b>9.7</b>	<b>10.1</b>	<b>10.6</b>	<b>11.1</b>	<b>0.9%</b>
<b>Industrial</b>								
Liquid fuels	11.8	12.1	12.2	12.7	13.3	14.1	14.9	0.8%
Natural gas	16.5	16.5	16.7	17.0	17.6	18.3	19.1	0.5%
Coal	6.2	6.2	6.3	6.6	6.9	7.2	7.6	0.7%
Electricity	7.0	7.1	7.4	7.8	8.3	8.7	9.3	1.0%
Renewables	3.1	3.1	3.1	3.2	3.3	3.4	3.5	0.5%
<b>Total</b>	<b>44.5</b>	<b>45.0</b>	<b>45.8</b>	<b>47.3</b>	<b>49.4</b>	<b>51.7</b>	<b>54.4</b>	<b>0.7%</b>
<b>Transportation</b>								
Liquid fuels	22.6	22.6	21.3	20.5	20.0	20.0	20.1	-0.4%
Natural gas	0.5	0.8	0.9	1.0	1.0	1.1	1.2	2.9%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.8	0.8	0.9	1.2	1.4	1.7	1.8	3.1%
<b>Total</b>	<b>23.9</b>	<b>24.2</b>	<b>23.1</b>	<b>22.6</b>	<b>22.5</b>	<b>22.7</b>	<b>23.1</b>	<b>-0.1%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	37.5	37.8	36.7	36.3	36.5	37.1	38.0	0.0%
Natural gas	30.4	31.2	31.8	32.6	33.7	34.9	36.3	0.6%
Coal	7.6	7.7	7.8	8.0	8.3	8.6	8.9	0.6%
Electricity	16.8	17.1	18.0	19.3	20.7	21.9	23.3	1.2%
Renewables	3.2	3.2	3.3	3.3	3.4	3.5	3.7	0.5%
<b>Total end-use consumption</b>	<b>95.5</b>	<b>97.0</b>	<b>97.6</b>	<b>99.5</b>	<b>102.6</b>	<b>106.0</b>	<b>110.2</b>	<b>0.5%</b>
Electricity-related losses	34.9	36.4	37.3	39.2	41.0	42.8	44.8	0.9%
Discrepancy	-0.4	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	--
<b>Total</b>	<b>130.1</b>	<b>132.9</b>	<b>134.3</b>	<b>138.1</b>	<b>143.1</b>	<b>148.3</b>	<b>154.4</b>	<b>0.6%</b>
<b>Electric power</b>								
Liquid fuels	0.8	1.1	1.1	0.7	0.6	0.5	0.5	-1.4%
Natural gas	13.2	13.3	14.1	14.5	15.4	16.4	17.3	1.0%
Coal	8.9	8.6	7.0	6.8	6.6	7.2	7.5	-0.6%
Nuclear	10.4	10.6	11.1	11.3	11.2	11.0	11.1	0.2%
Renewables	18.2	19.8	21.8	24.8	27.7	29.3	31.4	2.0%
<b>Total</b>	<b>51.5</b>	<b>53.3</b>	<b>55.1</b>	<b>58.2</b>	<b>61.5</b>	<b>64.5</b>	<b>67.8</b>	<b>1.0%</b>
<b>Total energy consumption</b>								
Liquid fuels	38.1	38.5	37.4	36.7	36.7	37.3	38.2	0.0%
Natural gas	43.7	44.5	46.0	47.2	49.1	51.2	53.7	0.7%
Coal	16.5	16.2	14.7	14.8	14.9	15.8	16.4	0.0%
Nuclear	10.4	10.6	11.1	11.3	11.2	11.0	11.1	0.2%
Renewables	21.4	23.0	25.1	28.2	31.1	32.9	35.1	1.8%

<b>Total</b>	<b>130.1</b>	<b>132.9</b>	<b>134.3</b>	<b>138.1</b>	<b>143.1</b>	<b>148.3</b>	<b>154.4</b>	<b>0.6%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F9. Delivered energy consumption in Western Europe by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.8%
<b>Total</b>	<b>11.1</b>	<b>11.2</b>	<b>11.3</b>	<b>11.5</b>	<b>11.7</b>	<b>11.9</b>	<b>12.1</b>	<b>0.3%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>6.4</b>	<b>6.6</b>	<b>6.7</b>	<b>7.0</b>	<b>7.2</b>	<b>7.3</b>	<b>7.5</b>	<b>0.6%</b>
<b>Industrial</b>								
Liquid fuels	8.0	8.0	8.0	8.3	8.7	9.0	9.5	0.6%
Natural gas	8.1	8.1	8.0	7.9	8.0	8.1	8.2	0.1%
Coal	2.8	2.7	2.7	2.7	2.7	2.8	2.8	0.1%
Electricity	4.4	4.4	4.5	4.7	4.9	5.1	5.4	0.8%
Renewables	2.8	2.7	2.8	2.9	2.9	3.0	3.1	0.4%
<b>Total</b>	<b>25.9</b>	<b>25.9</b>	<b>25.9</b>	<b>26.4</b>	<b>27.2</b>	<b>28.0</b>	<b>29.0</b>	<b>0.4%</b>
<b>Transportation</b>								
Liquid fuels	18.4	18.4	17.1	16.2	15.6	15.4	15.4	-0.6%
Natural gas	0.1	0.2	0.2	0.2	0.3	0.4	0.5	5.4%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.3	0.4	0.5	0.7	1.0	1.2	1.4	5.4%
<b>Total</b>	<b>18.9</b>	<b>18.9</b>	<b>17.8</b>	<b>17.1</b>	<b>16.9</b>	<b>17.0</b>	<b>17.3</b>	<b>-0.3%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	28.6	28.5	27.2	26.5	26.2	26.3	26.7	-0.2%
Natural gas	15.5	15.7	15.7	15.8	16.0	16.2	16.6	0.2%
Coal	3.5	3.4	3.3	3.3	3.4	3.4	3.4	0.0%
Electricity	11.8	12.0	12.6	13.5	14.4	15.1	15.9	1.1%
Renewables	2.9	2.9	3.0	3.0	3.1	3.2	3.3	0.4%
<b>Total end-use consumption</b>	<b>62.3</b>	<b>62.6</b>	<b>61.8</b>	<b>62.1</b>	<b>63.1</b>	<b>64.2</b>	<b>65.9</b>	<b>0.2%</b>
Electricity-related losses	21.8	23.7	25.3	26.7	28.2	29.5	30.9	1.3%
Discrepancy	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	--
<b>Total</b>	<b>84.2</b>	<b>86.1</b>	<b>86.9</b>	<b>88.7</b>	<b>91.2</b>	<b>93.6</b>	<b>96.7</b>	<b>0.5%</b>
<b>Electric power</b>								
Liquid fuels	0.5	0.8	0.8	0.6	0.5	0.5	0.5	-0.6%
Natural gas	5.0	5.6	6.9	6.6	6.5	6.4	6.4	0.9%
Coal	5.0	4.7	3.4	3.4	3.2	3.8	4.1	-0.7%
Nuclear	7.6	7.6	7.8	7.8	7.7	7.5	7.5	0.0%
Renewables	15.5	16.9	18.9	21.7	24.7	26.3	28.3	2.2%
<b>Total</b>	<b>33.6</b>	<b>35.6</b>	<b>37.8</b>	<b>40.1</b>	<b>42.5</b>	<b>44.5</b>	<b>46.7</b>	<b>1.2%</b>
<b>Total energy consumption</b>								
Liquid fuels	29.3	29.3	28.0	27.1	26.7	26.8	27.1	-0.3%
Natural gas	20.5	21.3	22.5	22.4	22.5	22.6	23.0	0.4%
Coal	8.5	8.1	6.7	6.7	6.6	7.2	7.5	-0.4%
Nuclear	7.6	7.6	7.8	7.8	7.7	7.5	7.5	0.0%
Renewables	18.4	19.8	21.9	24.7	27.8	29.5	31.6	2.0%

<b>Total</b>	<b>84.2</b>	<b>86.1</b>	<b>86.9</b>	<b>88.7</b>	<b>91.2</b>	<b>93.6</b>	<b>96.7</b>	<b>0.5%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F10. Delivered energy consumption in Russia by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
<b>Total</b>	<b>5.2</b>	<b>5.4</b>	<b>5.7</b>	<b>5.9</b>	<b>6.1</b>	<b>6.3</b>	<b>6.6</b>	<b>0.8%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
<b>Total</b>	<b>1.3</b>	<b>1.4</b>	<b>1.4</b>	<b>1.4</b>	<b>1.5</b>	<b>1.6</b>	<b>1.6</b>	<b>0.8%</b>
<b>Industrial</b>								
Liquid fuels	3.2	3.4	3.5	3.7	3.9	4.2	4.5	1.2%
Natural gas	7.1	7.1	7.2	7.5	7.9	8.4	8.9	0.8%
Coal	2.5	2.6	2.6	2.7	2.8	2.9	3.0	0.7%
Electricity	1.9	2.0	2.0	2.1	2.3	2.4	2.5	0.9%
Renewables	0.2	0.3	0.3	0.3	0.3	0.3	0.3	1.1%
<b>Total</b>	<b>15.1</b>	<b>15.3</b>	<b>15.6</b>	<b>16.3</b>	<b>17.2</b>	<b>18.2</b>	<b>19.2</b>	<b>0.9%</b>
<b>Transportation</b>								
Liquid fuels	3.1	3.0	3.0	3.0	3.0	3.0	2.9	-0.1%
Natural gas	0.2	0.3	0.3	0.3	0.3	0.3	0.3	1.2%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.3	0.3	0.3	0.3	0.3	0.3	0.3	-1.1%
<b>Total</b>	<b>3.6</b>	<b>3.7</b>	<b>3.7</b>	<b>3.6</b>	<b>3.6</b>	<b>3.6</b>	<b>3.5</b>	<b>-0.1%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	7.0	7.2	7.3	7.5	7.7	8.0	8.3	0.6%
Natural gas	11.6	11.7	12.1	12.6	13.2	13.9	14.6	0.8%
Coal	2.9	2.9	3.0	3.0	3.1	3.2	3.3	0.5%
Electricity	3.5	3.5	3.7	3.8	4.0	4.2	4.4	0.8%
Renewables	0.2	0.3	0.3	0.3	0.3	0.3	0.3	1.1%
<b>Total end-use consumption</b>	<b>25.2</b>	<b>25.7</b>	<b>26.4</b>	<b>27.3</b>	<b>28.4</b>	<b>29.6</b>	<b>30.9</b>	<b>0.7%</b>
Electricity-related losses	8.8	8.8	8.3	8.5	8.6	8.8	8.9	0.0%
Discrepancy	-0.5	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	--
<b>Total</b>	<b>33.5</b>	<b>33.9</b>	<b>34.1</b>	<b>35.3</b>	<b>36.4</b>	<b>37.8</b>	<b>39.2</b>	<b>0.6%</b>
<b>Electric power</b>								
Liquid fuels	0.2	0.3	0.2	0.1	0.1	0.0	0.0	-6.8%
Natural gas	5.9	5.6	5.5	6.1	6.6	7.0	7.4	0.8%
Coal	1.9	2.1	1.8	1.5	1.5	1.5	1.5	-0.8%
Nuclear	2.3	2.4	2.5	2.5	2.5	2.5	2.4	0.2%
Renewables	1.9	1.9	1.9	2.1	2.0	1.9	1.9	0.0%
<b>Total</b>	<b>12.3</b>	<b>12.3</b>	<b>11.8</b>	<b>12.3</b>	<b>12.6</b>	<b>12.9</b>	<b>13.2</b>	<b>0.3%</b>
<b>Total energy consumption</b>								
Liquid fuels	6.7	7.0	7.0	7.1	7.3	7.5	7.8	0.5%
Natural gas	17.6	17.3	17.6	18.7	19.8	20.9	22.0	0.8%
Coal	4.8	5.0	4.8	4.6	4.6	4.7	4.8	0.0%
Nuclear	2.3	2.4	2.5	2.5	2.5	2.5	2.4	0.2%
Renewables	2.2	2.2	2.2	2.4	2.2	2.2	2.2	0.2%

<b>Total</b>	<b>33.5</b>	<b>33.9</b>	<b>34.1</b>	<b>35.3</b>	<b>36.4</b>	<b>37.8</b>	<b>39.2</b>	<b>0.6%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F11. Delivered energy consumption in Eastern Europe and Eurasia by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>2.3</b>	<b>2.4</b>	<b>2.5</b>	<b>2.6</b>	<b>2.7</b>	<b>2.8</b>	<b>2.9</b>	<b>0.9%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.8</b>	<b>0.9</b>	<b>1.1</b>	<b>1.2</b>	<b>1.4</b>	<b>1.6</b>	<b>1.9</b>	<b>3.0%</b>
<b>Industrial</b>								
Liquid fuels	0.6	0.7	0.7	0.7	0.8	0.9	1.0	1.6%
Natural gas	1.2	1.4	1.5	1.6	1.7	1.8	2.0	1.7%
Coal	0.9	1.0	1.1	1.2	1.4	1.5	1.8	2.4%
Electricity	0.7	0.8	0.9	1.0	1.1	1.3	1.4	2.6%
Renewables	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.7%
<b>Total</b>	<b>3.5</b>	<b>3.8</b>	<b>4.2</b>	<b>4.6</b>	<b>5.0</b>	<b>5.6</b>	<b>6.2</b>	<b>2.1%</b>
<b>Transportation</b>								
Liquid fuels	1.1	1.1	1.2	1.3	1.4	1.6	1.8	1.9%
Natural gas	0.2	0.4	0.4	0.4	0.4	0.4	0.3	2.1%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.1	0.1	0.1	0.1	0.2	0.2	0.2	1.8%
<b>Total</b>	<b>1.4</b>	<b>1.6</b>	<b>1.7</b>	<b>1.8</b>	<b>2.0</b>	<b>2.1</b>	<b>2.3</b>	<b>1.9%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	1.9	2.0	2.2	2.3	2.5	2.8	3.1	1.7%
Natural gas	3.3	3.8	4.0	4.2	4.5	4.7	5.1	1.5%
Coal	1.3	1.3	1.5	1.6	1.8	2.0	2.2	2.0%
Electricity	1.4	1.5	1.8	2.0	2.3	2.6	2.9	2.6%
Renewables	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.7%
<b>Total end-use consumption</b>	<b>8.0</b>	<b>8.8</b>	<b>9.4</b>	<b>10.2</b>	<b>11.1</b>	<b>12.2</b>	<b>13.3</b>	<b>1.8%</b>
Electricity-related losses	4.3	4.0	3.8	3.9	4.2	4.6	5.1	0.6%
Discrepancy	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.0%
<b>Total</b>	<b>12.3</b>	<b>12.8</b>	<b>13.3</b>	<b>14.2</b>	<b>15.4</b>	<b>16.8</b>	<b>18.5</b>	<b>1.5%</b>
<b>Electric power</b>								
Liquid fuels	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-1.3%
Natural gas	2.3	2.1	1.8	1.8	2.3	2.9	3.6	1.6%
Coal	2.0	1.8	1.8	1.9	1.9	1.9	1.9	-0.1%
Nuclear	0.5	0.6	0.8	1.1	1.1	1.1	1.2	3.3%
Renewables	0.8	0.9	1.0	1.0	1.0	1.1	1.1	1.2%
<b>Total</b>	<b>5.6</b>	<b>5.4</b>	<b>5.5</b>	<b>5.8</b>	<b>6.4</b>	<b>7.0</b>	<b>7.9</b>	<b>1.2%</b>
<b>Total energy consumption</b>								
Liquid fuels	2.1	2.2	2.4	2.5	2.8	3.0	3.3	1.7%
Natural gas	5.7	5.9	5.8	6.0	6.8	7.7	8.7	1.6%
Coal	3.2	3.1	3.3	3.5	3.7	3.9	4.1	0.8%
Nuclear	0.5	0.6	0.8	1.1	1.1	1.1	1.2	3.3%
Renewables	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2%

<b>Total</b>	<b>12.3</b>	<b>12.8</b>	<b>13.3</b>	<b>14.2</b>	<b>15.4</b>	<b>16.8</b>	<b>18.5</b>	<b>1.5%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F12. Delivered energy consumption in Asia Pacific by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.9	0.9	0.9	1.0	1.0	1.1	1.1	0.8%
<b>Total</b>	<b>21.9</b>	<b>23.5</b>	<b>26.7</b>	<b>29.7</b>	<b>33.3</b>	<b>37.4</b>	<b>41.4</b>	<b>2.3%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8%
<b>Total</b>	<b>9.7</b>	<b>10.5</b>	<b>11.7</b>	<b>12.6</b>	<b>13.7</b>	<b>14.9</b>	<b>15.9</b>	<b>1.8%</b>
<b>Industrial</b>								
Liquid fuels	28.0	30.1	32.8	35.1	37.0	38.8	40.1	1.3%
Natural gas	16.1	17.4	19.2	21.0	22.6	24.2	25.7	1.7%
Coal	52.7	52.5	52.2	51.7	51.1	51.0	50.9	-0.1%
Electricity	26.7	28.1	30.2	31.9	33.2	34.4	35.4	1.0%
Renewables	11.0	13.2	15.1	17.2	19.0	20.7	22.3	2.5%
<b>Total</b>	<b>134.5</b>	<b>141.3</b>	<b>149.5</b>	<b>157.0</b>	<b>162.9</b>	<b>169.1</b>	<b>174.4</b>	<b>0.9%</b>
<b>Transportation</b>								
Liquid fuels	35.8	39.6	42.3	44.5	46.4	48.7	50.8	1.3%
Natural gas	1.8	1.9	2.1	2.3	2.5	2.8	3.3	2.3%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	1.0	1.2	1.4	1.8	2.1	2.5	2.8	3.7%
<b>Total</b>	<b>38.6</b>	<b>42.7</b>	<b>45.8</b>	<b>48.5</b>	<b>51.1</b>	<b>54.0</b>	<b>56.9</b>	<b>1.4%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	69.7	75.9	81.9	87.0	91.2	95.7	99.7	1.3%
Natural gas	23.2	25.1	27.9	30.6	33.2	36.0	38.7	1.9%
Coal	56.0	55.7	55.4	54.9	54.3	54.2	54.1	-0.1%
Electricity	43.8	47.0	52.5	57.0	62.2	67.6	72.6	1.8%
Renewables	12.0	14.2	16.2	18.3	20.1	21.9	23.5	2.4%
<b>Total end-use consumption</b>	<b>204.7</b>	<b>217.9</b>	<b>233.8</b>	<b>247.8</b>	<b>261.0</b>	<b>275.4</b>	<b>288.6</b>	<b>1.2%</b>
Electricity-related losses	86.8	90.9	102.0	111.5	118.7	126.6	133.5	1.6%
Discrepancy	1.1	0.6	0.9	1.2	1.4	1.7	2.0	2.0%
<b>Total</b>	<b>292.6</b>	<b>309.4</b>	<b>336.6</b>	<b>360.5</b>	<b>381.1</b>	<b>403.7</b>	<b>424.1</b>	<b>1.3%</b>
<b>Electric power</b>								
Liquid fuels	0.7	0.8	0.4	0.2	0.1	0.1	0.1	-7.5%
Natural gas	12.1	12.5	12.4	12.2	12.8	14.3	15.7	0.9%
Coal	77.6	77.2	84.7	88.1	87.3	86.7	87.5	0.4%
Nuclear	7.6	8.7	10.5	12.0	13.2	14.0	14.9	2.4%
Renewables	32.7	38.8	46.4	56.0	67.5	79.2	88.0	3.6%
<b>Total</b>	<b>130.7</b>	<b>138.0</b>	<b>154.4</b>	<b>168.6</b>	<b>180.9</b>	<b>194.2</b>	<b>206.1</b>	<b>1.6%</b>
<b>Total energy consumption</b>								
Liquid fuels	71.4	77.2	83.1	88.3	92.8	97.5	101.7	1.3%
Natural gas	35.3	37.5	40.3	42.8	46.0	50.2	54.4	1.6%
Coal	133.7	133.0	140.2	143.1	141.6	140.9	141.6	0.2%
Nuclear	7.6	8.7	10.5	12.0	13.2	14.0	14.9	2.4%
Renewables	44.7	53.0	62.5	74.3	87.6	101.1	111.5	3.3%

<b>Total</b>	<b>292.6</b>	<b>309.4</b>	<b>336.6</b>	<b>360.5</b>	<b>381.1</b>	<b>403.7</b>	<b>424.1</b>	<b>1.3%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F13. Delivered energy consumption in Japan by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>1.8</b>	<b>1.9</b>	<b>1.9</b>	<b>1.8</b>	<b>1.8</b>	<b>1.9</b>	<b>1.9</b>	<b>0.1%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>1.9</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>0.1%</b>
<b>Industrial</b>								
Liquid fuels	2.7	2.7	2.5	2.4	2.3	2.2	2.1	-1.0%
Natural gas	0.7	0.8	0.7	0.7	0.7	0.6	0.6	-0.6%
Coal	1.7	1.6	1.5	1.4	1.2	1.1	1.0	-1.8%
Electricity	0.8	0.9	1.0	1.0	1.0	1.1	1.1	0.9%
Renewables	0.5	0.5	0.5	0.4	0.4	0.4	0.3	-1.3%
<b>Total</b>	<b>6.5</b>	<b>6.6</b>	<b>6.2</b>	<b>5.8</b>	<b>5.6</b>	<b>5.3</b>	<b>5.1</b>	<b>-0.8%</b>
<b>Transportation</b>								
Liquid fuels	3.0	3.0	2.8	2.6	2.4	2.3	2.2	-1.1%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-0.8%
<b>Total</b>	<b>3.1</b>	<b>3.1</b>	<b>2.9</b>	<b>2.7</b>	<b>2.5</b>	<b>2.4</b>	<b>2.3</b>	<b>-1.0%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	6.5	6.6	6.1	5.7	5.5	5.3	5.1	-0.9%
Natural gas	1.5	1.6	1.5	1.5	1.5	1.5	1.5	0.1%
Coal	1.7	1.6	1.5	1.4	1.2	1.1	1.0	-1.8%
Electricity	3.1	3.2	3.3	3.2	3.2	3.3	3.3	0.2%
Renewables	0.5	0.5	0.5	0.4	0.4	0.4	0.4	-1.2%
<b>Total end-use consumption</b>	<b>13.3</b>	<b>13.5</b>	<b>13.0</b>	<b>12.3</b>	<b>11.9</b>	<b>11.6</b>	<b>11.3</b>	<b>-0.6%</b>
Electricity-related losses	5.2	5.3	4.4	4.5	4.5	4.5	4.6	-0.4%
Discrepancy	0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	--
<b>Total</b>	<b>18.6</b>	<b>18.6</b>	<b>17.1</b>	<b>16.5</b>	<b>16.2</b>	<b>15.9</b>	<b>15.8</b>	<b>-0.6%</b>
<b>Electric power</b>								
Liquid fuels	0.1	0.2	0.1	0.1	0.0	0.0	0.0	-4.0%
Natural gas	2.7	2.7	2.5	2.2	2.0	2.0	1.9	-1.2%
Coal	2.7	2.7	1.6	1.7	1.7	1.7	1.7	-1.6%
Nuclear	0.8	1.2	1.5	1.5	1.3	1.1	1.1	1.0%
Renewables	1.9	1.7	2.0	2.2	2.7	3.0	3.2	1.9%
<b>Total</b>	<b>8.2</b>	<b>8.5</b>	<b>7.7</b>	<b>7.7</b>	<b>7.7</b>	<b>7.8</b>	<b>8.0</b>	<b>-0.1%</b>
<b>Total energy consumption</b>								
Liquid fuels	6.8	6.5	6.1	5.6	5.4	5.2	5.0	-1.1%
Natural gas	4.2	4.3	4.1	3.7	3.5	3.5	3.5	-0.7%
Coal	4.4	4.3	3.1	3.1	3.0	2.8	2.7	-1.6%
Nuclear	0.8	1.2	1.5	1.5	1.3	1.1	1.1	1.0%
Renewables	2.4	2.2	2.5	2.6	3.1	3.3	3.5	1.4%

<b>Total</b>	<b>18.6</b>	<b>18.6</b>	<b>17.1</b>	<b>16.5</b>	<b>16.2</b>	<b>15.9</b>	<b>15.8</b>	<b>-0.6%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F14. Delivered energy consumption in South Korea by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.6%
<b>Total</b>	<b>0.8</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>1.0</b>	<b>1.0</b>	<b>0.6%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3%
<b>Total</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>0.9</b>	<b>1.0</b>	<b>1.0</b>	<b>0.4%</b>
<b>Industrial</b>								
Liquid fuels	2.8	2.8	3.0	3.1	3.1	3.1	3.1	0.4%
Natural gas	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.2%
Coal	1.2	1.1	1.2	1.2	1.2	1.2	1.2	0.2%
Electricity	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.2%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-0.2%
<b>Total</b>	<b>5.7</b>	<b>5.8</b>	<b>6.0</b>	<b>6.1</b>	<b>6.1</b>	<b>6.2</b>	<b>6.2</b>	<b>0.3%</b>
<b>Transportation</b>								
Liquid fuels	2.0	2.1	2.0	1.9	1.8	1.7	1.6	-0.9%
Natural gas	0.0	0.0	0.0	0.0	0.1	0.1	0.1	1.4%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.0	0.1	0.1	0.1	0.1	6.0%
<b>Total</b>	<b>2.1</b>	<b>2.2</b>	<b>2.1</b>	<b>2.0</b>	<b>1.9</b>	<b>1.8</b>	<b>1.7</b>	<b>-0.7%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	5.0	5.1	5.2	5.1	5.0	5.0	4.9	-0.1%
Natural gas	1.3	1.3	1.3	1.3	1.3	1.4	1.4	0.4%
Coal	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.1%
Electricity	2.0	2.0	2.1	2.1	2.2	2.2	2.3	0.6%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-0.3%
<b>Total end-use consumption</b>	<b>9.5</b>	<b>9.7</b>	<b>9.9</b>	<b>9.9</b>	<b>9.9</b>	<b>9.9</b>	<b>9.9</b>	<b>0.1%</b>
Electricity-related losses	3.2	3.4	3.6	3.8	3.9	4.0	4.1	0.8%
Discrepancy	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.9%
<b>Total</b>	<b>13.0</b>	<b>13.5</b>	<b>13.8</b>	<b>14.1</b>	<b>14.2</b>	<b>14.2</b>	<b>14.3</b>	<b>0.3%</b>
<b>Electric power</b>								
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5%
Natural gas	1.3	1.2	1.1	1.0	1.0	0.9	0.9	-1.3%
Coal	1.4	1.4	1.4	1.5	1.6	1.6	1.6	0.5%
Nuclear	2.0	2.3	2.4	2.4	2.4	2.3	2.3	0.5%
Renewables	0.5	0.5	0.7	0.9	1.1	1.4	1.5	4.3%
<b>Total</b>	<b>5.2</b>	<b>5.4</b>	<b>5.7</b>	<b>5.9</b>	<b>6.1</b>	<b>6.2</b>	<b>6.3</b>	<b>0.7%</b>
<b>Total energy consumption</b>								
Liquid fuels	5.3	5.5	5.5	5.5	5.4	5.3	5.2	0.0%
Natural gas	2.6	2.5	2.5	2.4	2.3	2.3	2.3	-0.4%
Coal	2.6	2.5	2.6	2.7	2.8	2.8	2.8	0.3%
Nuclear	2.0	2.3	2.4	2.4	2.4	2.3	2.3	0.5%
Renewables	0.6	0.6	0.8	1.1	1.3	1.5	1.7	3.7%

<b>Total</b>	<b>13.0</b>	<b>13.5</b>	<b>13.8</b>	<b>14.1</b>	<b>14.2</b>	<b>14.2</b>	<b>14.3</b>	<b>0.3%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F15. Delivered energy consumption in Australia and New Zealand by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.5</b>	<b>0.6</b>	<b>0.6%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.4</b>	<b>0.4</b>	<b>0.5</b>	<b>0.5</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>1.6%</b>
<b>Industrial</b>								
Liquid fuels	0.8	0.8	0.9	0.9	1.0	1.0	1.1	1.3%
Natural gas	1.1	1.1	1.1	1.1	1.2	1.2	1.3	0.7%
Coal	0.2	0.2	0.3	0.3	0.3	0.3	0.3	1.2%
Electricity	0.3	0.4	0.4	0.5	0.5	0.5	0.6	1.8%
Renewables	0.2	0.2	0.3	0.3	0.3	0.3	0.3	1.4%
<b>Total</b>	<b>2.6</b>	<b>2.7</b>	<b>2.9</b>	<b>3.1</b>	<b>3.3</b>	<b>3.4</b>	<b>3.6</b>	<b>1.2%</b>
<b>Transportation</b>								
Liquid fuels	1.7	1.9	1.9	1.9	1.8	1.9	1.9	0.4%
Natural gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.1	0.1	0.1	0.1	0.1	0.1	3.2%
<b>Total</b>	<b>1.7</b>	<b>2.0</b>	<b>2.0</b>	<b>1.9</b>	<b>1.9</b>	<b>2.0</b>	<b>2.0</b>	<b>0.6%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	2.5	2.8	2.8	2.9	2.9	3.0	3.1	0.7%
Natural gas	1.3	1.3	1.3	1.4	1.5	1.5	1.6	0.8%
Coal	0.2	0.2	0.3	0.3	0.3	0.3	0.3	1.1%
Electricity	1.0	1.0	1.1	1.2	1.3	1.4	1.5	1.5%
Renewables	0.2	0.3	0.3	0.3	0.3	0.3	0.4	1.4%
<b>Total end-use consumption</b>	<b>5.2</b>	<b>5.6</b>	<b>5.9</b>	<b>6.1</b>	<b>6.3</b>	<b>6.5</b>	<b>6.8</b>	<b>1.0%</b>
Electricity-related losses	1.9	1.9	2.1	2.2	2.3	2.5	2.6	1.2%
Discrepancy	0.0	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	--
<b>Total</b>	<b>7.2</b>	<b>7.2</b>	<b>7.7</b>	<b>8.0</b>	<b>8.4</b>	<b>8.8</b>	<b>9.2</b>	<b>0.9%</b>
<b>Electric power</b>								
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-7.3%
Natural gas	0.4	0.4	0.4	0.3	0.3	0.3	0.3	-1.4%
Coal	1.3	1.2	1.3	1.5	1.5	1.5	1.5	0.4%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Renewables	1.1	1.3	1.4	1.6	1.9	2.1	2.3	2.6%
<b>Total</b>	<b>2.8</b>	<b>2.9</b>	<b>3.2</b>	<b>3.4</b>	<b>3.6</b>	<b>3.8</b>	<b>4.1</b>	<b>1.3%</b>
<b>Total energy consumption</b>								
Liquid fuels	2.5	2.6	2.7	2.7	2.7	2.8	2.9	0.4%
Natural gas	1.7	1.7	1.8	1.7	1.7	1.8	1.9	0.4%
Coal	1.5	1.4	1.6	1.7	1.8	1.8	1.8	0.6%
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Renewables	1.4	1.5	1.7	1.9	2.2	2.4	2.7	2.4%

<b>Total</b>	<b>7.2</b>	<b>7.2</b>	<b>7.7</b>	<b>8.0</b>	<b>8.4</b>	<b>8.8</b>	<b>9.2</b>	<b>0.9%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F16. Delivered energy consumption in China by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.8	0.8	0.9	0.9	0.9	1.0	1.0	0.8%
<b>Total</b>	<b>12.1</b>	<b>13.1</b>	<b>15.0</b>	<b>16.9</b>	<b>18.9</b>	<b>21.1</b>	<b>23.3</b>	<b>2.4%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8%
<b>Total</b>	<b>3.8</b>	<b>4.1</b>	<b>4.7</b>	<b>5.0</b>	<b>5.6</b>	<b>6.0</b>	<b>6.4</b>	<b>1.8%</b>
<b>Industrial</b>								
Liquid fuels	14.5	15.7	16.8	17.5	17.8	17.9	17.5	0.7%
Natural gas	7.4	7.7	8.0	8.2	8.3	8.4	8.3	0.4%
Coal	39.1	38.2	35.7	32.8	29.8	27.3	24.8	-1.6%
Electricity	19.2	20.1	20.8	21.2	21.2	21.1	20.7	0.3%
Renewables	3.3	4.8	4.9	4.9	4.9	4.8	4.6	1.2%
<b>Total</b>	<b>83.5</b>	<b>86.4</b>	<b>86.2</b>	<b>84.6</b>	<b>81.9</b>	<b>79.4</b>	<b>76.0</b>	<b>-0.3%</b>
<b>Transportation</b>								
Liquid fuels	13.6	15.0	15.3	14.7	13.6	13.0	12.5	-0.3%
Natural gas	1.4	1.4	1.5	1.4	1.4	1.5	1.6	0.7%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.7	0.8	1.0	1.3	1.5	1.7	1.8	3.4%
<b>Total</b>	<b>15.7</b>	<b>17.2</b>	<b>17.8</b>	<b>17.4</b>	<b>16.6</b>	<b>16.2</b>	<b>15.9</b>	<b>0.1%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	30.5	33.2	34.9	35.3	34.7	34.4	33.8	0.4%
Natural gas	11.6	12.4	13.4	14.3	15.0	15.8	16.5	1.3%
Coal	41.9	40.9	38.3	35.3	32.3	29.7	27.2	-1.5%
Electricity	26.9	28.7	31.2	33.1	35.1	37.0	38.3	1.3%
Renewables	4.2	5.7	5.8	5.9	5.9	5.9	5.8	1.1%
<b>Total end-use consumption</b>	<b>115.2</b>	<b>120.9</b>	<b>123.6</b>	<b>123.9</b>	<b>123.0</b>	<b>122.8</b>	<b>121.6</b>	<b>0.2%</b>
Electricity-related losses	57.1	58.4	63.2	67.0	69.2	71.5	73.2	0.9%
Discrepancy	0.2	0.3	0.4	0.5	0.6	0.6	0.7	4.3%
<b>Total</b>	<b>172.5</b>	<b>179.7</b>	<b>187.2</b>	<b>191.4</b>	<b>192.8</b>	<b>194.9</b>	<b>195.4</b>	<b>0.4%</b>
<b>Electric power</b>								
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-10.9%
Natural gas	2.7	2.9	3.1	3.9	5.4	6.9	8.3	4.1%
Coal	54.9	54.0	56.2	57.4	54.8	52.3	51.9	-0.2%
Nuclear	4.0	4.4	5.7	7.1	8.4	9.5	10.4	3.5%
Renewables	22.4	26.0	29.6	31.8	35.9	40.0	41.0	2.2%
<b>Total</b>	<b>84.1</b>	<b>87.3</b>	<b>94.6</b>	<b>100.2</b>	<b>104.5</b>	<b>108.6</b>	<b>111.6</b>	<b>1.0%</b>
<b>Total energy consumption</b>								
Liquid fuels	30.6	33.5	35.2	35.6	35.1	34.9	34.3	0.4%
Natural gas	14.4	15.3	16.5	18.2	20.4	22.6	24.9	2.0%
Coal	96.9	94.9	94.4	92.7	87.0	82.0	79.1	-0.7%
Nuclear	4.0	4.4	5.7	7.1	8.4	9.5	10.4	3.5%
Renewables	26.6	31.7	35.4	37.8	41.9	45.9	46.7	2.0%

<b>Total</b>	<b>172.5</b>	<b>179.7</b>	<b>187.2</b>	<b>191.4</b>	<b>192.8</b>	<b>194.9</b>	<b>195.4</b>	<b>0.4%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F17. Delivered energy consumption in India by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8%
<b>Total</b>	<b>3.0</b>	<b>3.3</b>	<b>4.1</b>	<b>5.0</b>	<b>6.1</b>	<b>7.4</b>	<b>8.8</b>	<b>4.0%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.9</b>	<b>1.0</b>	<b>1.3</b>	<b>1.5</b>	<b>1.8</b>	<b>2.2</b>	<b>2.5</b>	<b>3.8%</b>
<b>Industrial</b>								
Liquid fuels	3.8	4.1	5.1	6.3	7.5	8.7	10.0	3.5%
Natural gas	1.8	2.2	3.0	3.9	4.9	6.0	7.0	4.9%
Coal	6.1	6.5	8.1	10.0	11.8	13.7	15.7	3.4%
Electricity	3.1	3.4	4.3	5.2	6.0	6.9	7.8	3.4%
Renewables	3.9	4.3	5.5	6.9	8.2	9.5	10.8	3.7%
<b>Total</b>	<b>18.6</b>	<b>20.5</b>	<b>26.0</b>	<b>32.2</b>	<b>38.4</b>	<b>44.8</b>	<b>51.3</b>	<b>3.7%</b>
<b>Transportation</b>								
Liquid fuels	4.8	5.4	6.9	8.8	10.7	12.5	14.1	4.0%
Natural gas	0.2	0.2	0.3	0.5	0.6	0.7	0.9	6.0%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.1	0.1	0.2	0.2	0.3	0.3	0.5	4.4%
<b>Total</b>	<b>5.1</b>	<b>5.7</b>	<b>7.4</b>	<b>9.4</b>	<b>11.5</b>	<b>13.6</b>	<b>15.5</b>	<b>4.1%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	9.9	11.0	13.7	17.0	20.3	23.6	26.7	3.6%
Natural gas	2.2	2.6	3.5	4.6	5.8	7.0	8.2	4.9%
Coal	6.4	6.9	8.6	10.5	12.4	14.3	16.3	3.4%
Electricity	5.1	5.7	7.4	9.1	11.2	13.5	16.0	4.2%
Renewables	3.9	4.3	5.6	6.9	8.3	9.6	10.9	3.7%
<b>Total end-use consumption</b>	<b>27.5</b>	<b>30.5</b>	<b>38.7</b>	<b>48.2</b>	<b>57.8</b>	<b>68.0</b>	<b>78.0</b>	<b>3.8%</b>
Electricity-related losses	10.5	12.2	16.6	20.2	23.3	27.2	30.7	3.9%
Discrepancy	0.2	0.7	0.9	1.1	1.3	1.5	1.7	7.2%
<b>Total</b>	<b>38.3</b>	<b>43.5</b>	<b>56.2</b>	<b>69.4</b>	<b>82.5</b>	<b>96.7</b>	<b>110.4</b>	<b>3.9%</b>
<b>Electric power</b>								
Liquid fuels	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-14.3%
Natural gas	0.5	0.4	0.6	0.6	0.6	0.6	0.6	0.7%
Coal	11.2	11.9	15.5	15.5	15.7	15.9	15.4	1.2%
Nuclear	0.5	0.5	0.6	0.7	0.7	0.7	0.7	1.6%
Renewables	3.5	5.1	7.3	12.4	17.4	23.4	29.8	8.0%
<b>Total</b>	<b>15.6</b>	<b>17.9</b>	<b>23.8</b>	<b>29.2</b>	<b>34.4</b>	<b>40.6</b>	<b>46.5</b>	<b>4.0%</b>
<b>Total energy consumption</b>								
Liquid fuels	10.3	11.8	14.7	18.2	21.7	25.3	28.6	3.7%
Natural gas	2.6	3.0	4.0	5.1	6.3	7.5	8.6	4.4%
Coal	17.6	18.8	24.1	26.0	28.1	30.2	31.8	2.1%
Nuclear	0.5	0.5	0.6	0.7	0.7	0.7	0.7	1.6%
Renewables	7.4	9.4	12.8	19.4	25.6	33.0	40.7	6.3%

<b>Total</b>	<b>38.3</b>	<b>43.5</b>	<b>56.2</b>	<b>69.4</b>	<b>82.5</b>	<b>96.7</b>	<b>110.4</b>	<b>3.9%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F18. Delivered energy consumption in Other Asia Pacific by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>3.6</b>	<b>3.8</b>	<b>4.3</b>	<b>4.6</b>	<b>5.0</b>	<b>5.4</b>	<b>5.9</b>	<b>1.8%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>1.8</b>	<b>2.0</b>	<b>2.3</b>	<b>2.6</b>	<b>2.9</b>	<b>3.2</b>	<b>3.5</b>	<b>2.3%</b>
<b>Industrial</b>								
Liquid fuels	3.5	3.9	4.5	5.0	5.4	5.9	6.3	2.1%
Natural gas	4.5	5.0	5.8	6.5	6.9	7.4	7.9	2.0%
Coal	4.5	4.8	5.5	6.2	6.8	7.4	7.9	2.1%
Electricity	2.1	2.3	2.6	3.0	3.4	3.7	4.0	2.4%
Renewables	3.0	3.3	3.9	4.5	5.1	5.6	6.0	2.5%
<b>Total</b>	<b>17.6</b>	<b>19.3</b>	<b>22.4</b>	<b>25.1</b>	<b>27.6</b>	<b>30.0</b>	<b>32.1</b>	<b>2.2%</b>
<b>Transportation</b>								
Liquid fuels	10.7	12.2	13.5	14.8	16.1	17.4	18.5	2.0%
Natural gas	0.2	0.2	0.2	0.3	0.3	0.5	0.7	4.6%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.0	0.1	0.1	0.2	0.3	11.9%
<b>Total</b>	<b>10.9</b>	<b>12.4</b>	<b>13.7</b>	<b>15.1</b>	<b>16.6</b>	<b>18.0</b>	<b>19.4</b>	<b>2.1%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	15.3	17.2	19.1	21.0	22.8	24.6	26.2	1.9%
Natural gas	5.3	5.9	6.7	7.5	8.1	8.7	9.5	2.1%
Coal	4.6	4.9	5.6	6.3	6.9	7.5	8.0	2.0%
Electricity	5.8	6.3	7.3	8.1	9.2	10.2	11.2	2.4%
Renewables	3.0	3.3	3.9	4.5	5.1	5.6	6.0	2.5%
<b>Total end-use consumption</b>	<b>33.9</b>	<b>37.6</b>	<b>42.7</b>	<b>47.4</b>	<b>52.1</b>	<b>56.6</b>	<b>60.9</b>	<b>2.1%</b>
Electricity-related losses	9.0	9.7	12.1	13.9	15.3	16.9	18.4	2.6%
Discrepancy	0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	--
<b>Total</b>	<b>43.1</b>	<b>46.9</b>	<b>54.5</b>	<b>61.1</b>	<b>67.1</b>	<b>73.2</b>	<b>78.9</b>	<b>2.2%</b>
<b>Electric power</b>								
Liquid fuels	0.4	0.5	0.2	0.1	0.1	0.0	0.0	-14.5%
Natural gas	4.5	4.8	4.7	4.1	3.7	3.7	3.7	-0.7%
Coal	6.1	6.1	8.7	10.5	12.0	13.6	15.3	3.3%
Nuclear	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-0.5%
Renewables	3.3	4.3	5.4	7.0	8.4	9.4	10.2	4.1%
<b>Total</b>	<b>14.8</b>	<b>16.0</b>	<b>19.5</b>	<b>22.1</b>	<b>24.5</b>	<b>27.1</b>	<b>29.6</b>	<b>2.5%</b>
<b>Total energy consumption</b>								
Liquid fuels	15.9	17.3	19.0	20.7	22.4	24.1	25.7	1.7%
Natural gas	9.8	10.7	11.4	11.6	11.8	12.4	13.2	1.1%
Coal	10.7	11.1	14.4	16.8	19.0	21.2	23.4	2.8%
Nuclear	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-0.5%
Renewables	6.3	7.6	9.3	11.5	13.5	15.0	16.2	3.5%

<b>Total</b>	<b>43.1</b>	<b>46.9</b>	<b>54.5</b>	<b>61.1</b>	<b>67.1</b>	<b>73.2</b>	<b>78.9</b>	<b>2.2%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F19. Delivered energy consumption in Africa and Middle East by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>6.4</b>	<b>6.7</b>	<b>7.2</b>	<b>7.8</b>	<b>8.3</b>	<b>9.1</b>	<b>9.8</b>	<b>1.5%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>2.6</b>	<b>2.8</b>	<b>3.0</b>	<b>3.3</b>	<b>3.5</b>	<b>3.7</b>	<b>3.9</b>	<b>1.5%</b>
<b>Industrial</b>								
Liquid fuels	7.3	7.6	8.1	8.8	9.5	10.1	10.6	1.3%
Natural gas	13.8	14.3	15.3	16.2	17.5	18.8	19.9	1.3%
Coal	2.1	2.3	2.7	3.1	3.6	4.2	4.8	3.0%
Electricity	1.6	1.7	1.9	2.0	2.2	2.4	2.5	1.6%
Renewables	3.4	3.7	4.4	5.2	6.0	6.9	7.8	3.0%
<b>Total</b>	<b>28.3</b>	<b>29.7</b>	<b>32.3</b>	<b>35.3</b>	<b>38.8</b>	<b>42.3</b>	<b>45.7</b>	<b>1.7%</b>
<b>Transportation</b>								
Liquid fuels	12.8	13.8	14.7	15.8	17.0	18.4	19.9	1.6%
Natural gas	0.5	0.5	0.5	0.5	0.5	0.6	0.7	1.7%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.1	0.1	0.1	0.1	0.2	5.6%
<b>Total</b>	<b>13.3</b>	<b>14.3</b>	<b>15.3</b>	<b>16.4</b>	<b>17.7</b>	<b>19.2</b>	<b>20.9</b>	<b>1.6%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	21.1	22.3	23.8	25.6	27.5	29.6	31.7	1.5%
Natural gas	17.4	18.2	19.3	20.5	22.1	23.6	25.2	1.3%
Coal	2.3	2.5	2.9	3.3	3.8	4.4	5.0	2.8%
Electricity	6.4	6.8	7.5	8.2	8.8	9.8	10.7	1.9%
Renewables	3.4	3.7	4.4	5.2	6.0	6.9	7.8	3.0%
<b>Total end-use consumption</b>	<b>50.6</b>	<b>53.5</b>	<b>57.8</b>	<b>62.8</b>	<b>68.2</b>	<b>74.3</b>	<b>80.3</b>	<b>1.7%</b>
Electricity-related losses	12.4	13.8	14.0	15.0	15.2	16.5	17.7	1.3%
Discrepancy	-0.4	-0.5	-0.4	-0.4	-0.4	-0.4	-0.4	--
<b>Total</b>	<b>62.5</b>	<b>66.9</b>	<b>71.4</b>	<b>77.4</b>	<b>83.1</b>	<b>90.4</b>	<b>97.6</b>	<b>1.6%</b>
<b>Electric power</b>								
Liquid fuels	2.7	3.1	1.6	0.7	0.3	0.1	0.0	-15.2%
Natural gas	11.1	11.5	11.9	13.0	13.6	14.3	14.9	1.1%
Coal	2.2	2.0	2.2	2.8	2.5	2.9	2.9	0.9%
Nuclear	0.4	0.6	0.9	1.2	1.4	1.4	1.4	4.9%
Renewables	2.3	3.4	4.8	5.5	6.2	7.6	9.1	5.0%
<b>Total</b>	<b>18.7</b>	<b>20.6</b>	<b>21.5</b>	<b>23.2</b>	<b>24.0</b>	<b>26.2</b>	<b>28.3</b>	<b>1.5%</b>
<b>Total energy consumption</b>								
Liquid fuels	23.3	24.8	24.8	25.8	27.3	29.1	31.1	1.0%
Natural gas	28.6	29.8	31.4	33.6	35.8	38.1	40.3	1.2%
Coal	4.6	4.5	5.1	6.1	6.3	7.2	7.9	2.0%
Nuclear	0.4	0.6	0.9	1.2	1.4	1.4	1.4	4.9%
Renewables	5.7	7.1	9.2	10.7	12.2	14.5	16.8	3.9%

<b>Total</b>	<b>62.5</b>	<b>66.9</b>	<b>71.4</b>	<b>77.4</b>	<b>83.1</b>	<b>90.4</b>	<b>97.6</b>	<b>1.6%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F20. Delivered energy consumption in Africa by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>2.1</b>	<b>2.4</b>	<b>2.7</b>	<b>3.2</b>	<b>3.5</b>	<b>4.1</b>	<b>4.6</b>	<b>2.8%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>0.6</b>	<b>0.6</b>	<b>0.7</b>	<b>0.8</b>	<b>0.8</b>	<b>0.9</b>	<b>1.0</b>	<b>1.9%</b>
<b>Industrial</b>								
Liquid fuels	1.5	1.6	1.8	2.1	2.3	2.6	2.9	2.3%
Natural gas	2.4	2.5	2.7	2.9	3.3	3.6	3.9	1.7%
Coal	1.9	2.1	2.4	2.8	3.3	3.9	4.5	3.2%
Electricity	1.1	1.1	1.3	1.4	1.6	1.8	1.9	2.1%
Renewables	3.4	3.7	4.4	5.2	6.0	6.9	7.7	3.0%
<b>Total</b>	<b>10.2</b>	<b>11.0</b>	<b>12.6</b>	<b>14.4</b>	<b>16.5</b>	<b>18.8</b>	<b>21.0</b>	<b>2.6%</b>
<b>Transportation</b>								
Liquid fuels	5.5	6.1	6.7	7.5	8.4	9.5	10.8	2.4%
Natural gas	0.1	0.1	0.2	0.2	0.2	0.3	0.4	3.8%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.0	0.0	0.1	0.1	0.1	3.5%
<b>Total</b>	<b>5.7</b>	<b>6.2</b>	<b>6.9</b>	<b>7.8</b>	<b>8.7</b>	<b>9.9</b>	<b>11.2</b>	<b>2.5%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	7.6	8.3	9.2	10.3	11.5	12.9	14.4	2.3%
Natural gas	3.1	3.2	3.6	4.0	4.5	5.0	5.5	2.0%
Coal	2.0	2.3	2.6	3.0	3.5	4.1	4.8	3.1%
Electricity	2.5	2.7	3.2	3.7	4.1	4.8	5.5	2.8%
Renewables	3.4	3.7	4.4	5.2	6.0	6.9	7.7	3.0%
<b>Total end-use consumption</b>	<b>18.7</b>	<b>20.3</b>	<b>23.0</b>	<b>26.2</b>	<b>29.6</b>	<b>33.7</b>	<b>37.8</b>	<b>2.6%</b>
Electricity-related losses	5.4	5.5	6.3	7.1	7.3	8.5	9.6	2.1%
Discrepancy	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.8%
<b>Total</b>	<b>24.3</b>	<b>26.0</b>	<b>29.5</b>	<b>33.6</b>	<b>37.2</b>	<b>42.5</b>	<b>47.8</b>	<b>2.4%</b>
<b>Electric power</b>								
Liquid fuels	0.4	0.4	0.2	0.1	0.0	0.0	0.0	-16.3%
Natural gas	3.1	3.1	3.2	3.4	3.6	3.9	4.2	1.1%
Coal	2.2	2.0	2.2	2.8	2.5	2.9	2.9	0.9%
Nuclear	0.1	0.1	0.3	0.4	0.5	0.5	0.5	5.2%
Renewables	2.0	2.6	3.5	4.1	4.7	6.0	7.4	4.9%
<b>Total</b>	<b>7.9</b>	<b>8.3</b>	<b>9.4</b>	<b>10.9</b>	<b>11.4</b>	<b>13.3</b>	<b>15.1</b>	<b>2.3%</b>
<b>Total energy consumption</b>								
Liquid fuels	8.3	8.9	9.6	10.6	11.8	13.2	14.8	2.1%
Natural gas	6.2	6.4	6.8	7.4	8.1	8.9	9.7	1.6%
Coal	4.3	4.2	4.8	5.8	6.0	6.9	7.6	2.1%
Nuclear	0.1	0.1	0.3	0.4	0.5	0.5	0.5	5.2%
Renewables	5.3	6.3	7.9	9.3	10.7	12.9	15.2	3.8%

<b>Total</b>	<b>24.3</b>	<b>26.0</b>	<b>29.5</b>	<b>33.6</b>	<b>37.2</b>	<b>42.5</b>	<b>47.8</b>	<b>2.4%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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 F21. Delivered energy consumption in Middle East by end-use sector and fuel, Reference case**

quadrillion British thermal units

Sector and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Residential</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>4.2</b>	<b>4.3</b>	<b>4.5</b>	<b>4.6</b>	<b>4.8</b>	<b>5.0</b>	<b>5.2</b>	<b>0.7%</b>
<b>Commercial</b>								
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%
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%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8%
<b>Total</b>	<b>2.0</b>	<b>2.1</b>	<b>2.3</b>	<b>2.5</b>	<b>2.6</b>	<b>2.8</b>	<b>2.9</b>	<b>1.4%</b>
<b>Industrial</b>								
Liquid fuels	5.8	5.9	6.2	6.7	7.2	7.5	7.8	1.0%
Natural gas	11.4	11.9	12.6	13.3	14.2	15.2	16.1	1.2%
Coal	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2%
Electricity	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.3%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5%
<b>Total</b>	<b>18.0</b>	<b>18.7</b>	<b>19.7</b>	<b>20.8</b>	<b>22.3</b>	<b>23.6</b>	<b>24.7</b>	<b>1.1%</b>
<b>Transportation</b>								
Liquid fuels	7.3	7.8	8.0	8.3	8.6	8.9	9.2	0.8%
Natural gas	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Electricity	0.0	0.0	0.0	0.0	0.1	0.1	0.1	8.7%
<b>Total</b>	<b>7.7</b>	<b>8.1</b>	<b>8.3</b>	<b>8.6</b>	<b>8.9</b>	<b>9.3</b>	<b>9.7</b>	<b>0.8%</b>
<b>Components of energy use</b>								
<b>End-use consumption</b>								
Liquid fuels	13.4	14.0	14.5	15.3	16.1	16.7	17.2	0.9%
Natural gas	14.3	14.9	15.7	16.5	17.6	18.7	19.7	1.2%
Coal	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2%
Electricity	3.8	4.0	4.3	4.5	4.7	5.0	5.2	1.1%
Renewables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7%
<b>Total end-use consumption</b>	<b>31.9</b>	<b>33.2</b>	<b>34.8</b>	<b>36.6</b>	<b>38.6</b>	<b>40.6</b>	<b>42.4</b>	<b>1.0%</b>
Electricity-related losses	7.0	8.3	7.8	7.9	7.9	8.0	8.1	0.5%
Discrepancy	-0.7	-0.7	-0.6	-0.6	-0.7	-0.7	-0.7	--
<b>Total</b>	<b>38.2</b>	<b>40.8</b>	<b>42.0</b>	<b>43.9</b>	<b>45.9</b>	<b>47.9</b>	<b>49.8</b>	<b>0.9%</b>
<b>Electric power</b>								
Liquid fuels	2.3	2.7	1.4	0.6	0.3	0.1	0.0	-15.0%
Natural gas	7.9	8.4	8.7	9.6	10.0	10.4	10.7	1.1%
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5.9%
Nuclear	0.2	0.4	0.6	0.8	0.9	0.9	0.9	4.7%
Renewables	0.4	0.8	1.3	1.4	1.5	1.6	1.6	5.5%
<b>Total</b>	<b>10.8</b>	<b>12.3</b>	<b>12.0</b>	<b>12.4</b>	<b>12.6</b>	<b>12.9</b>	<b>13.2</b>	<b>0.7%</b>
<b>Total energy consumption</b>								
Liquid fuels	15.0	15.9	15.2	15.2	15.5	15.9	16.4	0.3%
Natural gas	22.4	23.4	24.5	26.2	27.7	29.2	30.6	1.1%
Coal	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1%
Nuclear	0.2	0.4	0.6	0.8	0.9	0.9	0.9	4.7%
Renewables	0.4	0.8	1.3	1.4	1.5	1.6	1.7	5.3%

<b>Total</b>	<b>38.2</b>	<b>40.8</b>	<b>42.0</b>	<b>43.9</b>	<b>45.9</b>	<b>47.9</b>	<b>49.8</b>	<b>0.9%</b>
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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](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. End-use sector electricity consumption and end-use sector 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 consumed to produce district heat is allocated to the residential, commercial, and industrial end-use sectors according to their respective share of heat demand. 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).