

**Table F1. Total world delivered energy consumption by end-use sector and fuel, Low Oil Price 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          | 9.8          | 10.2         | 10.6         | 11.0         | 11.4         | 11.8         | 0.8%  |
| Natural gas                      | 23.1         | 23.8         | 24.9         | 25.9         | 27.0         | 28.2         | 29.4         | 0.9%  |
| Coal                             | 3.6          | 3.5          | 3.5          | 3.4          | 3.3          | 3.3          | 3.2          | -0.4%                                       |
| Electricity                      | 25.4         | 26.8         | 29.9         | 32.8         | 36.5         | 40.6         | 44.8         | 2.0%  |
| Renewables                       | 1.6          | 1.5          | 1.5          | 1.5          | 1.5          | 1.6          | 1.6          | -0.1%                                       |
| <b>Total</b>                     | <b>63.1</b>  | <b>65.4</b>  | <b>69.9</b>  | <b>74.3</b>  | <b>79.4</b>  | <b>85.0</b>  | <b>90.8</b>  | <b>1.3%</b>                                 |
| <b>Commercial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 3.5          | 3.8          | 3.9          | 4.1          | 4.2          | 4.3          | 4.4          | 0.8%  |
| 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         | 19.3         | 20.9         | 22.4         | 24.0         | 25.7         | 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>34.2</b>  | <b>36.6</b>  | <b>38.5</b>  | <b>40.7</b>  | <b>42.9</b>  | <b>45.0</b>  | <b>1.1%</b>                                 |
| <b>Industrial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 62.4         | 65.5         | 70.0         | 74.4         | 78.5         | 82.5         | 86.2         | 1.2%  |
| Natural gas                      | 63.9         | 65.0         | 69.8         | 74.0         | 78.5         | 83.1         | 87.7         | 1.1%  |
| Coal                             | 62.8         | 63.1         | 63.5         | 63.5         | 63.7         | 64.5         | 65.3         | 0.1%  |
| Electricity                      | 41.5         | 43.3         | 46.4         | 49.0         | 51.2         | 53.4         | 55.4         | 1.0%  |
| Renewables                       | 24.1         | 26.7         | 30.2         | 33.6         | 36.8         | 39.8         | 42.7         | 2.1%  |
| <b>Total</b>                     | <b>254.6</b> | <b>263.8</b> | <b>279.9</b> | <b>294.5</b> | <b>308.5</b> | <b>323.3</b> | <b>337.2</b> | <b>1.0%</b>                                 |
| <b>Transportation</b>            |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 109.7        | 114.5        | 116.9        | 120.0        | 124.2        | 130.0        | 136.5        | 0.8%  |
| Natural gas                      | 4.2          | 4.4          | 4.3          | 4.3          | 4.4          | 4.6          | 5.2          | 0.8%  |
| Coal                             | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0%  |
| Electricity                      | 1.9          | 2.1          | 2.6          | 3.3          | 4.0          | 4.6          | 5.1          | 3.5%  |
| <b>Total</b>                     | <b>115.8</b> | <b>121.0</b> | <b>123.8</b> | <b>127.6</b> | <b>132.6</b> | <b>139.3</b> | <b>146.8</b> | <b>0.9%</b>                                 |
| <b>Components of energy use</b>  |              |              |              |              |              |              |              |   |
| <b>End-use consumption</b>       |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 184.9        | 193.5        | 201.0        | 209.1        | 217.9        | 228.3        | 239.0        | 0.9%  |
| Natural gas                      | 100.5        | 102.8        | 109.0        | 114.7        | 120.6        | 127.1        | 133.8        | 1.0%  |
| Coal                             | 67.7         | 68.0         | 68.3         | 68.3         | 68.4         | 69.2         | 70.0         | 0.1%  |
| Electricity                      | 87.3         | 91.6         | 99.9         | 107.4        | 115.6        | 124.4        | 132.5        | 1.5%  |
| Renewables                       | 25.9         | 28.5         | 31.9         | 35.4         | 38.6         | 41.6         | 44.5         | 2.0%  |
| <b>Total end-use consumption</b> | <b>466.4</b> | <b>484.4</b> | <b>510.1</b> | <b>534.9</b> | <b>561.2</b> | <b>590.5</b> | <b>619.8</b> | <b>1.0%</b>                                 |
| Electricity-related losses       | 171.3        | 178.9        | 192.6        | 205.9        | 216.4        | 228.6        | 240.0        | 1.2%  |
| Discrepancy                      | 0.0          | -0.5         | -0.1         | 0.2          | 0.5          | 0.8          | 1.0          | 12.7%                                       |
| <b>Total</b>                     | <b>637.7</b> | <b>662.7</b> | <b>702.6</b> | <b>741.0</b> | <b>778.1</b> | <b>819.9</b> | <b>860.9</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         | 50.8         | 50.1         | 51.1         | 54.0         | 57.5         | 61.1         | 0.5%  |
| Coal                             | 98.3         | 97.8         | 99.9         | 103.8        | 102.5        | 102.0        | 101.9        | 0.1%  |
| Nuclear                          | 27.7         | 29.3         | 32.0         | 33.4         | 34.0         | 34.0         | 34.9         | 0.8%  |
| Renewables                       | 74.5         | 86.1         | 106.4        | 122.9        | 140.1        | 158.3        | 173.6        | 3.1%  |
| <b>Total</b>                     | <b>258.4</b> | <b>270.3</b> | <b>292.3</b> | <b>313.1</b> | <b>331.8</b> | <b>352.7</b> | <b>372.2</b> | <b>1.3%</b>                                 |
| <b>Total energy consumption</b>  |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 190.3        | 199.4        | 204.7        | 211.2        | 219.5        | 229.9        | 240.8        | 0.8%  |
| Natural gas                      | 153.2        | 153.7        | 159.3        | 166.0        | 174.9        | 184.7        | 195.0        | 0.9%  |
| Coal                             | 166.0        | 165.8        | 168.3        | 172.1        | 171.0        | 171.3        | 172.0        | 0.1%  |
| Nuclear                          | 27.7         | 29.3         | 32.0         | 33.4         | 34.0         | 34.0         | 34.9         | 0.8%  |
| Renewables                       | 100.4        | 114.6        | 138.3        | 158.2        | 178.7        | 200.0        | 218.2        | 2.8%  |

|              |              |              |              |              |              |              |              |             |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| <b>Total</b> | <b>637.7</b> | <b>662.7</b> | <b>702.6</b> | <b>741.0</b> | <b>778.1</b> | <b>819.9</b> | <b>860.9</b> | <b>1.1%</b> |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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          | 1.8          | 1.7          | 1.7          | 1.7          | 1.7          | 1.7          | -0.2%                                       |
| 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          | 7.6          | 7.8          | 8.1          | 8.4          | 8.8          | 9.2          | 0.7%  |
| Renewables                       | 0.6          | 0.4          | 0.4          | 0.4          | 0.3          | 0.3          | 0.3          | -2.3%                                       |
| <b>Total</b>                     | <b>16.2</b>  | <b>15.9</b>  | <b>16.2</b>  | <b>16.4</b>  | <b>16.6</b>  | <b>17.0</b>  | <b>17.5</b>  | <b>0.3%</b>                                 |
| <b>Commercial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 1.1          | 1.2          | 1.2          | 1.2          | 1.2          | 1.2          | 1.2          | 0.4%  |
| 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          | 0.3%  |
| Electricity                      | 6.4          | 6.5          | 6.7          | 7.0          | 7.2          | 7.5          | 7.9          | 0.7%  |
| 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>12.1</b>  | <b>12.5</b>  | <b>12.8</b>  | <b>13.1</b>  | <b>13.4</b>  | <b>13.9</b>  | <b>0.5%</b>                                 |
| <b>Industrial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 15.2         | 15.7         | 16.4         | 17.3         | 18.1         | 18.9         | 19.9         | 1.0%  |
| Natural gas                      | 17.6         | 16.8         | 17.9         | 18.8         | 19.7         | 20.7         | 21.9         | 0.8%  |
| Coal                             | 1.8          | 1.7          | 1.8          | 1.8          | 1.8          | 1.8          | 1.8          | 0.2%  |
| Electricity                      | 6.2          | 6.2          | 6.7          | 7.0          | 7.4          | 7.7          | 8.1          | 0.9%  |
| Renewables                       | 6.6          | 6.7          | 7.3          | 7.9          | 8.3          | 8.7          | 9.0          | 1.1%  |
| <b>Total</b>                     | <b>47.4</b>  | <b>47.2</b>  | <b>50.2</b>  | <b>52.8</b>  | <b>55.3</b>  | <b>57.9</b>  | <b>60.7</b>  | <b>0.9%</b>                                 |
| <b>Transportation</b>            |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 38.5         | 38.3         | 37.6         | 37.7         | 38.4         | 39.8         | 41.8         | 0.3%  |
| Natural gas                      | 1.4          | 1.2          | 1.0          | 1.0          | 0.9          | 0.9          | 0.9          | -1.6%                                       |
| Coal                             | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0%  |
| Electricity                      | 0.1          | 0.2          | 0.3          | 0.4          | 0.5          | 0.6          | 0.7          | 7.4%  |
| <b>Total</b>                     | <b>40.0</b>  | <b>39.6</b>  | <b>38.9</b>  | <b>39.1</b>  | <b>39.9</b>  | <b>41.4</b>  | <b>43.4</b>  | <b>0.3%</b>                                 |
| <b>Components of energy use</b>  |              |              |              |              |              |              |              |   |
| <b>End-use consumption</b>       |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 56.7         | 56.9         | 57.0         | 57.9         | 59.4         | 61.7         | 64.6         | 0.5%  |
| Natural gas                      | 29.6         | 28.4         | 29.6         | 30.5         | 31.4         | 32.3         | 33.5         | 0.4%  |
| Coal                             | 1.8          | 1.8          | 1.8          | 1.8          | 1.8          | 1.9          | 1.9          | 0.2%  |
| Electricity                      | 20.3         | 20.4         | 21.4         | 22.5         | 23.5         | 24.7         | 26.0         | 0.9%  |
| Renewables                       | 7.3          | 7.3          | 7.9          | 8.4          | 8.8          | 9.2          | 9.5          | 0.9%  |
| <b>Total end-use consumption</b> | <b>115.7</b> | <b>114.8</b> | <b>117.7</b> | <b>121.1</b> | <b>124.9</b> | <b>129.7</b> | <b>135.5</b> | <b>0.6%</b>                                 |
| Electricity-related losses       | 37.2         | 37.0         | 38.1         | 39.4         | 40.5         | 42.2         | 44.0         | 0.6%  |
| Discrepancy                      | -0.3         | -0.2         | -0.1         | -0.1         | -0.1         | -0.1         | -0.1         | --  |
| <b>Total</b>                     | <b>152.6</b> | <b>151.6</b> | <b>155.7</b> | <b>160.4</b> | <b>165.4</b> | <b>171.8</b> | <b>179.5</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          | -10.6%                                      |
| Natural gas                      | 16.1         | 13.5         | 11.5         | 11.3         | 11.9         | 12.5         | 13.1         | -0.8%                                       |
| Coal                             | 9.5          | 8.9          | 4.7          | 5.0          | 5.1          | 5.3          | 5.1          | -2.2%                                       |
| Nuclear                          | 9.4          | 9.3          | 9.5          | 8.8          | 8.2          | 7.6          | 7.5          | -0.8%                                       |
| Renewables                       | 21.3         | 24.2         | 33.2         | 36.4         | 38.8         | 41.5         | 44.3         | 2.6%  |
| <b>Total</b>                     | <b>57.5</b>  | <b>57.4</b>  | <b>59.6</b>  | <b>61.9</b>  | <b>64.0</b>  | <b>66.9</b>  | <b>70.0</b>  | <b>0.7%</b>                                 |
| <b>Total energy consumption</b>  |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 57.6         | 58.2         | 57.6         | 58.1         | 59.4         | 61.6         | 64.6         | 0.4%  |
| Natural gas                      | 45.7         | 41.9         | 41.1         | 41.8         | 43.3         | 44.8         | 46.6         | 0.1%  |
| Coal                             | 11.3         | 10.7         | 6.5          | 6.8          | 6.9          | 7.1          | 7.0          | -1.7%                                       |
| Nuclear                          | 9.4          | 9.3          | 9.5          | 8.8          | 8.2          | 7.6          | 7.5          | -0.8%                                       |
| Renewables                       | 28.6         | 31.5         | 41.0         | 44.9         | 47.6         | 50.6         | 53.8         | 2.3%  |

|              |              |              |              |              |              |              |              |             |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| <b>Total</b> | <b>152.6</b> | <b>151.6</b> | <b>155.7</b> | <b>160.4</b> | <b>165.4</b> | <b>171.8</b> | <b>179.5</b> | <b>0.6%</b> |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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 F3. Delivered energy consumption in the United States by end-use sector and fuel, Low Oil Price 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         | 0.9         | 0.8         | 0.8         | 0.8         | 0.7          | 0.7          | -0.9%                                       |
| 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          | 0.6%  |
| Renewables                       | 0.5         | 0.4         | 0.4         | 0.3         | 0.3         | 0.3          | 0.3          | -2.7%                                       |
| <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          | 0.2%  |
| Natural gas                      | 3.6         | 3.5         | 3.6         | 3.6         | 3.6         | 3.6          | 3.6          | 0.0%  |
| Coal                             | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0          | 0.0          | 0.3%  |
| Electricity                      | 4.6         | 4.5         | 4.6         | 4.7         | 4.7         | 4.9          | 5.0          | 0.3%  |
| 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         | 9.3         | 9.5         | 9.7         | 10.0        | 10.3         | 10.7         | 0.6%  |
| Natural gas                      | 10.9        | 9.9         | 10.3        | 10.5        | 10.8        | 11.1         | 11.5         | 0.2%  |
| Coal                             | 0.9         | 0.8         | 0.8         | 0.7         | 0.7         | 0.7          | 0.6          | -1.1%                                       |
| Electricity                      | 3.5         | 3.3         | 3.5         | 3.6         | 3.7         | 3.8          | 3.9          | 0.4%  |
| Renewables                       | 2.4         | 2.4         | 2.5         | 2.6         | 2.6         | 2.7          | 2.8          | 0.5%  |
| <b>Total</b>                     | <b>26.6</b> | <b>25.7</b> | <b>26.5</b> | <b>27.2</b> | <b>27.8</b> | <b>28.5</b>  | <b>29.5</b>  | <b>0.4%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |              |              |   |
| Liquid fuels                     | 26.6        | 25.8        | 24.9        | 24.5        | 24.6        | 25.3         | 26.5         | 0.0%  |
| Natural gas                      | 1.0         | 0.8         | 0.6         | 0.6         | 0.6         | 0.6          | 0.6          | -1.6%                                       |
| Coal                             | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0          | 0.0          | 0.0%  |
| Electricity                      | 0.1         | 0.1         | 0.2         | 0.3         | 0.4         | 0.5          | 0.6          | 8.5%  |
| <b>Total</b>                     | <b>27.6</b> | <b>26.7</b> | <b>25.8</b> | <b>25.5</b> | <b>25.7</b> | <b>26.4</b>  | <b>27.7</b>  | <b>0.0%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |              |              |   |
| <b>End-use consumption</b>       |             |             |             |             |             |              |              |   |
| Liquid fuels                     | 37.3        | 36.9        | 36.1        | 36.0        | 36.3        | 37.2         | 38.8         | 0.1%  |
| Natural gas                      | 20.7        | 19.2        | 19.5        | 19.7        | 20.0        | 20.2         | 20.6         | 0.0%  |
| Coal                             | 0.9         | 0.8         | 0.8         | 0.8         | 0.7         | 0.7          | 0.6          | -1.1%                                       |
| Electricity                      | 13.3        | 13.1        | 13.6        | 14.0        | 14.5        | 15.0         | 15.7         | 0.6%  |
| Renewables                       | 3.1         | 2.9         | 2.9         | 3.0         | 3.1         | 3.1          | 3.1          | 0.1%  |
| <b>Total end-use consumption</b> | <b>75.2</b> | <b>72.9</b> | <b>73.0</b> | <b>73.5</b> | <b>74.5</b> | <b>76.2</b>  | <b>78.9</b>  | <b>0.2%</b>                                 |
| Electricity-related losses       | 24.3        | 23.9        | 24.1        | 24.7        | 25.1        | 25.9         | 26.9         | 0.4%  |
| Discrepancy                      | -0.6        | -0.2        | -0.2        | -0.2        | -0.1        | -0.1         | -0.1         | --  |
| <b>Total</b>                     | <b>98.9</b> | <b>96.6</b> | <b>97.0</b> | <b>98.1</b> | <b>99.5</b> | <b>102.0</b> | <b>105.6</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          | -3.0%                                       |
| Natural gas                      | 12.2        | 9.3         | 6.6         | 6.4         | 6.9         | 7.5          | 8.0          | -1.5%                                       |
| Coal                             | 8.8         | 8.3         | 4.0         | 3.9         | 3.4         | 3.5          | 3.3          | -3.5%                                       |
| Nuclear                          | 8.1         | 8.2         | 8.0         | 7.3         | 7.0         | 6.7          | 6.7          | -0.7%                                       |
| Renewables                       | 8.3         | 11.1        | 19.0        | 21.0        | 22.2        | 23.2         | 24.5         | 3.9%  |
| <b>Total</b>                     | <b>37.6</b> | <b>37.0</b> | <b>37.7</b> | <b>38.8</b> | <b>39.6</b> | <b>40.9</b>  | <b>42.5</b>  | <b>0.4%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |              |              |   |
| Liquid fuels                     | 36.8        | 36.8        | 36.0        | 35.9        | 36.2        | 37.1         | 38.8         | 0.2%  |
| Natural gas                      | 32.9        | 28.5        | 26.2        | 26.1        | 26.9        | 27.7         | 28.5         | -0.5%                                       |
| Coal                             | 9.7         | 9.2         | 4.8         | 4.7         | 4.2         | 4.2          | 3.9          | -3.2%                                       |
| Nuclear                          | 8.1         | 8.2         | 8.0         | 7.3         | 7.0         | 6.7          | 6.7          | -0.7%                                       |
| Renewables                       | 11.4        | 13.9        | 22.0        | 24.1        | 25.3        | 26.4         | 27.6         | 3.2%  |

|              |             |             |             |             |             |              |              |             |
|--------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|-------------|
| <b>Total</b> | <b>98.9</b> | <b>96.6</b> | <b>97.0</b> | <b>98.1</b> | <b>99.5</b> | <b>102.0</b> | <b>105.6</b> | <b>0.2%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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 F4. Delivered energy consumption in Canada by end-use sector and fuel, Low Oil Price 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         | 0.2%  |
| 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         | 0.6%  |
| 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         | 2.9         | 3.1         | 3.3         | 1.5%  |
| Natural gas                      | 2.5         | 2.6         | 2.8         | 3.1         | 3.4         | 3.7         | 4.1         | 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>6.1</b>  | <b>6.7</b>  | <b>7.3</b>  | <b>7.9</b>  | <b>8.6</b>  | <b>9.3</b>  | <b>1.6%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 2.5         | 2.5         | 2.4         | 2.4         | 2.5         | 2.5         | 2.6         | 0.2%  |
| Natural gas                      | 0.1         | 0.1         | 0.0         | 0.0         | 0.0         | 0.0         | 0.1         | -1.9%                                       |
| 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         | 7.8%  |
| <b>Total</b>                     | <b>2.6</b>  | <b>2.6</b>  | <b>2.5</b>  | <b>2.5</b>  | <b>2.6</b>  | <b>2.6</b>  | <b>2.7</b>  | <b>0.2%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 4.7         | 4.9         | 5.0         | 5.2         | 5.5         | 5.7         | 6.0         | 0.9%  |
| Natural gas                      | 3.8         | 3.9         | 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         | 1.5%  |
| 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>11.3</b> | <b>11.9</b> | <b>12.6</b> | <b>13.4</b> | <b>14.3</b> | <b>15.2</b> | <b>1.2%</b>                                 |
| Electricity-related losses       | 3.8         | 3.5         | 3.8         | 4.1         | 4.3         | 4.7         | 5.0         | 1.0%  |
| Discrepancy                      | -0.1        | -0.3        | -0.3        | -0.3        | -0.3        | -0.3        | -0.3        | --  |
| <b>Total</b>                     | <b>14.7</b> | <b>14.6</b> | <b>15.5</b> | <b>16.4</b> | <b>17.5</b> | <b>18.7</b> | <b>19.9</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         | 1.1         | 1.1         | 1.0         | 1.2         | 2.7%  |
| 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         | 5.9         | 6.4         | 1.8%  |
| <b>Total</b>                     | <b>5.7</b>  | <b>5.5</b>  | <b>6.0</b>  | <b>6.4</b>  | <b>6.8</b>  | <b>7.4</b>  | <b>7.9</b>  | <b>1.2%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 4.6         | 4.6         | 4.7         | 4.9         | 5.2         | 5.4         | 5.7         | 0.7%  |
| Natural gas                      | 4.4         | 4.5         | 5.2         | 5.6         | 5.9         | 6.3         | 6.8         | 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         | 7.0         | 1.7%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>14.7</b> | <b>14.6</b> | <b>15.5</b> | <b>16.4</b> | <b>17.5</b> | <b>18.7</b> | <b>19.9</b> | <b>1.1%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 0.4%  |
| 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>0.7</b> | <b>0.7</b>  | <b>0.7</b>  | <b>0.9%</b>                                 |
| <b>Commercial</b>                |            |            |            |            |            |             |             |   |
| Liquid fuels                     | 0.1        | 0.1        | 0.1        | 0.1        | 0.1        | 0.1         | 0.1         | 1.9%  |
| 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         | 1.9%  |
| 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>1.8%</b>                                 |
| <b>Industrial</b>                |            |            |            |            |            |             |             |   |
| Liquid fuels                     | 0.8        | 0.9        | 0.9        | 1.0        | 1.1        | 1.1         | 1.2         | 1.5%  |
| Natural gas                      | 1.4        | 1.5        | 1.7        | 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                      | 0.6        | 0.6        | 0.6        | 0.7        | 0.7        | 0.8         | 0.8         | 1.5%  |
| 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>3.6</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        | 2.2        | 2.3        | 2.5         | 2.7         | 0.9%  |
| Natural gas                      | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 5.2%  |
| 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         | 7.5%  |
| <b>Total</b>                     | <b>2.1</b> | <b>2.1</b> | <b>2.1</b> | <b>2.2</b> | <b>2.4</b> | <b>2.5</b>  | <b>2.7</b>  | <b>1.0%</b>                                 |
| <b>Components of energy use</b>  |            |            |            |            |            |             |             |   |
| <b>End-use consumption</b>       |            |            |            |            |            |             |             |   |
| Liquid fuels                     | 3.1        | 3.2        | 3.3        | 3.5        | 3.7        | 4.0         | 4.2         | 1.1%  |
| 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                      | 1.1        | 1.1        | 1.2        | 1.3        | 1.4        | 1.5         | 1.6         | 1.4%  |
| Renewables                       | 0.2        | 0.2        | 0.2        | 0.3        | 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>7.1</b> | <b>7.5</b> | <b>8.0</b>  | <b>8.5</b>  | <b>1.3%</b>                                 |
| Electricity-related losses       | 1.6        | 1.6        | 1.8        | 1.8        | 1.9        | 2.0         | 2.1         | 1.1%  |
| Discrepancy                      | 0.2        | 0.1        | 0.1        | 0.1        | 0.1        | 0.1         | 0.1         | -4.7%                                       |
| <b>Total</b>                     | <b>7.7</b> | <b>7.8</b> | <b>8.5</b> | <b>8.9</b> | <b>9.4</b> | <b>10.0</b> | <b>10.7</b> | <b>1.2%</b>                                 |
| <b>Electric power</b>            |            |            |            |            |            |             |             |   |
| Liquid fuels                     | 0.4        | 0.5        | 0.3        | 0.1        | 0.0        | 0.0         | 0.0         | -18.3%                                      |
| Natural gas                      | 1.3        | 1.4        | 1.5        | 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>3.0</b> | <b>3.1</b> | <b>3.3</b> | <b>3.5</b>  | <b>3.7</b>  | <b>1.3%</b>                                 |
| <b>Total energy consumption</b>  |            |            |            |            |            |             |             |   |
| Liquid fuels                     | 3.7        | 3.8        | 3.7        | 3.7        | 3.8        | 4.0         | 4.3         | 0.5%  |
| Natural gas                      | 2.8        | 2.9        | 3.2        | 3.4        | 3.8        | 3.9         | 4.0         | 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>8.5</b> | <b>8.9</b> | <b>9.4</b> | <b>10.0</b> | <b>10.7</b> | <b>1.2%</b> |
|--------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 0.8         | 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>1.1</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         | 0.9%  |
| 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         | 0.9%  |
| 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         | 3.8         | 3.9         | 3.9         | 4.0         | 4.1         | 4.2         | 0.6%  |
| Natural gas                      | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.0         | 0.0         | -3.2%                                       |
| 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         | 2.8%  |
| <b>Total</b>                     | <b>3.7</b>  | <b>3.9</b>  | <b>4.0</b>  | <b>4.1</b>  | <b>4.2</b>  | <b>4.2</b>  | <b>4.3</b>  | <b>0.5%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 5.3         | 5.5         | 5.7         | 5.9         | 6.1         | 6.2         | 6.3         | 0.6%  |
| Natural gas                      | 0.8         | 0.9         | 0.9         | 1.0         | 1.0         | 1.0         | 1.0         | 0.7%  |
| 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>11.8</b> | <b>12.6</b> | <b>13.2</b> | <b>13.7</b> | <b>14.0</b> | <b>14.2</b> | <b>0.8%</b>                                 |
| Electricity-related losses       | 3.5         | 3.8         | 4.1         | 4.3         | 4.3         | 4.4         | 4.5         | 0.9%  |
| Discrepancy                      | 0.0         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | --  |
| <b>Total</b>                     | <b>14.9</b> | <b>15.7</b> | <b>16.7</b> | <b>17.6</b> | <b>18.1</b> | <b>18.5</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         | -14.6%                                      |
| 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         | 0.2         | 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         | 5.0         | 5.5         | 5.7         | 6.0         | 6.3         | 1.1%  |
| <b>Total</b>                     | <b>5.6</b>  | <b>5.9</b>  | <b>6.3</b>  | <b>6.6</b>  | <b>6.7</b>  | <b>6.8</b>  | <b>7.0</b>  | <b>0.8%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 5.5         | 5.8         | 5.9         | 6.0         | 6.2         | 6.3         | 6.4         | 0.6%  |
| Natural gas                      | 1.4         | 1.5         | 1.8         | 1.7         | 1.5         | 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         | 8.2         | 9.0         | 9.4         | 9.8         | 10.1        | 1.1%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>14.9</b> | <b>15.7</b> | <b>16.7</b> | <b>17.6</b> | <b>18.1</b> | <b>18.5</b> | <b>18.8</b> | <b>0.8%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 0.4         | 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         | 0.8         | 0.8         | 0.8         | 0.9         | 0.9         | 1.0         | 0.9%  |
| 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>1.8</b>  | <b>1.8</b>  | <b>1.9</b>  | <b>2.0</b>  | <b>0.7%</b>                                 |
| <b>Commercial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 1.2%  |
| 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         | 2.3%  |
| 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         | 0.2         | 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         | 1.3         | 1.5         | 1.6         | 2.2%  |
| <b>Total</b>                     | <b>5.7</b>  | <b>5.9</b>  | <b>6.5</b>  | <b>7.2</b>  | <b>7.9</b>  | <b>8.7</b>  | <b>9.5</b>  | <b>1.8%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 3.8         | 4.1         | 4.3         | 4.6         | 5.0         | 5.4         | 5.8         | 1.5%  |
| Natural gas                      | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.1         | 0.1         | -1.5%                                       |
| 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         | 0.0         | 10.1%                                       |
| <b>Total</b>                     | <b>4.0</b>  | <b>4.3</b>  | <b>4.6</b>  | <b>4.8</b>  | <b>5.1</b>  | <b>5.5</b>  | <b>6.0</b>  | <b>1.4%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 6.1         | 6.4         | 6.8         | 7.3         | 7.9         | 8.5         | 9.2         | 1.5%  |
| Natural gas                      | 2.8         | 2.9         | 3.2         | 3.4         | 3.6         | 3.8         | 4.1         | 1.4%  |
| Coal                             | 0.2         | 0.2         | 0.3         | 0.3         | 0.3         | 0.3         | 0.4         | 2.1%  |
| Electricity                      | 2.1         | 2.2         | 2.3         | 2.6         | 2.8         | 3.1         | 3.3         | 1.7%  |
| Renewables                       | 0.9         | 0.9         | 1.1         | 1.2         | 1.3         | 1.5         | 1.7         | 2.2%  |
| <b>Total end-use consumption</b> | <b>12.1</b> | <b>12.7</b> | <b>13.6</b> | <b>14.7</b> | <b>15.9</b> | <b>17.3</b> | <b>18.7</b> | <b>1.6%</b>                                 |
| Electricity-related losses       | 4.0         | 4.1         | 4.3         | 4.5         | 4.9         | 5.2         | 5.6         | 1.2%  |
| Discrepancy                      | 0.3         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | -0.6%                                       |
| <b>Total</b>                     | <b>16.4</b> | <b>16.9</b> | <b>18.1</b> | <b>19.4</b> | <b>20.9</b> | <b>22.7</b> | <b>24.5</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         | -17.3%                                      |
| 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         | 7.5%  |
| 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         | 4.9         | 5.6         | 1.6%  |
| <b>Total</b>                     | <b>6.1</b>  | <b>6.3</b>  | <b>6.7</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         | 7.3         | 7.6         | 8.1         | 8.7         | 9.4         | 1.1%  |
| Natural gas                      | 4.3         | 4.5         | 4.8         | 5.0         | 5.2         | 5.5         | 5.8         | 1.0%  |
| 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         | 6.4         | 7.3         | 1.7%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>16.4</b> | <b>16.9</b> | <b>18.1</b> | <b>19.4</b> | <b>20.9</b> | <b>22.7</b> | <b>24.5</b> | <b>1.4%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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          | 2.5          | 2.4          | 2.4          | 2.4          | 2.3          | 2.3          | -0.1%                                       |
| Natural gas                      | 10.3         | 10.6         | 10.8         | 11.1         | 11.4         | 11.6         | 11.9         | 0.5%  |
| Coal                             | 1.0          | 1.0          | 1.0          | 1.0          | 1.0          | 0.9          | 0.9          | -0.4%                                       |
| Electricity                      | 4.7          | 4.8          | 5.1          | 5.4          | 5.8          | 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>19.1</b>  | <b>19.5</b>  | <b>20.0</b>  | <b>20.6</b>  | <b>21.1</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          | 0.4%  |
| Natural gas                      | 3.1          | 3.2          | 3.3          | 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>8.9</b>   | <b>9.2</b>   | <b>9.7</b>   | <b>10.2</b>  | <b>10.6</b>  | <b>11.1</b>  | <b>0.9%</b>                                 |
| <b>Industrial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 11.8         | 12.0         | 12.3         | 12.9         | 13.5         | 14.2         | 15.1         | 0.9%  |
| Natural gas                      | 16.5         | 16.5         | 16.7         | 17.1         | 17.7         | 18.3         | 19.2         | 0.5%  |
| Coal                             | 6.2          | 6.2          | 6.4          | 6.6          | 6.9          | 7.2          | 7.6          | 0.7%  |
| Electricity                      | 7.0          | 7.1          | 7.4          | 7.8          | 8.3          | 8.8          | 9.3          | 1.0%  |
| Renewables                       | 3.1          | 3.1          | 3.2          | 3.2          | 3.3          | 3.4          | 3.5          | 0.5%  |
| <b>Total</b>                     | <b>44.5</b>  | <b>45.0</b>  | <b>46.0</b>  | <b>47.6</b>  | <b>49.7</b>  | <b>52.0</b>  | <b>54.7</b>  | <b>0.7%</b>                                 |
| <b>Transportation</b>            |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 22.6         | 22.8         | 21.6         | 20.8         | 20.4         | 20.4         | 20.8         | -0.3%                                       |
| Natural gas                      | 0.5          | 0.8          | 0.9          | 0.9          | 0.9          | 0.9          | 1.0          | 2.2%  |
| Coal                             | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0%  |
| Electricity                      | 0.8          | 0.8          | 0.9          | 1.1          | 1.4          | 1.6          | 1.8          | 3.0%  |
| <b>Total</b>                     | <b>23.9</b>  | <b>24.4</b>  | <b>23.3</b>  | <b>22.8</b>  | <b>22.7</b>  | <b>23.0</b>  | <b>23.5</b>  | <b>-0.1%</b>                                |
| <b>Components of energy use</b>  |              |              |              |              |              |              |              |   |
| <b>End-use consumption</b>       |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 37.5         | 38.1         | 37.2         | 36.9         | 37.1         | 37.8         | 39.0         | 0.1%  |
| Natural gas                      | 30.4         | 31.2         | 31.8         | 32.6         | 33.5         | 34.7         | 36.1         | 0.6%  |
| Coal                             | 7.6          | 7.7          | 7.8          | 8.0          | 8.3          | 8.6          | 8.9          | 0.6%  |
| Electricity                      | 16.8         | 17.1         | 18.1         | 19.3         | 20.7         | 21.9         | 23.2         | 1.2%  |
| Renewables                       | 3.2          | 3.2          | 3.3          | 3.4          | 3.5          | 3.6          | 3.7          | 0.5%  |
| <b>Total end-use consumption</b> | <b>95.5</b>  | <b>97.3</b>  | <b>98.1</b>  | <b>100.2</b> | <b>103.1</b> | <b>106.6</b> | <b>110.9</b> | <b>0.5%</b>                                 |
| Electricity-related losses       | 34.9         | 36.3         | 37.4         | 39.2         | 41.0         | 42.8         | 44.7         | 0.9%  |
| Discrepancy                      | -0.4         | -0.5         | -0.5         | -0.5         | -0.5         | -0.6         | -0.6         | --  |
| <b>Total</b>                     | <b>130.0</b> | <b>133.0</b> | <b>135.0</b> | <b>138.9</b> | <b>143.6</b> | <b>148.9</b> | <b>155.1</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         | 16.3         | 17.3         | 1.0%  |
| Coal                             | 8.9          | 8.5          | 7.0          | 6.8          | 6.6          | 7.3          | 7.5          | -0.6%                                       |
| Nuclear                          | 10.4         | 10.6         | 11.1         | 11.3         | 11.2         | 11.0         | 11.1         | 0.2%  |
| Renewables                       | 18.2         | 19.7         | 22.0         | 24.9         | 27.7         | 29.3         | 31.3         | 1.9%  |
| <b>Total</b>                     | <b>51.5</b>  | <b>53.2</b>  | <b>55.3</b>  | <b>58.3</b>  | <b>61.5</b>  | <b>64.5</b>  | <b>67.7</b>  | <b>1.0%</b>                                 |
| <b>Total energy consumption</b>  |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 38.0         | 38.8         | 37.9         | 37.3         | 37.4         | 38.1         | 39.2         | 0.1%  |
| Natural gas                      | 43.7         | 44.5         | 45.9         | 47.1         | 49.0         | 51.0         | 53.5         | 0.7%  |
| Coal                             | 16.5         | 16.2         | 14.7         | 14.8         | 14.9         | 15.9         | 16.4         | 0.0%  |
| Nuclear                          | 10.4         | 10.6         | 11.1         | 11.3         | 11.2         | 11.0         | 11.1         | 0.2%  |
| Renewables                       | 21.4         | 22.9         | 25.3         | 28.3         | 31.2         | 32.8         | 35.0         | 1.8%  |

|              |              |              |              |              |              |              |              |             |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| <b>Total</b> | <b>130.0</b> | <b>133.0</b> | <b>135.0</b> | <b>138.9</b> | <b>143.6</b> | <b>148.9</b> | <b>155.1</b> | <b>0.6%</b> |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 1.6         | 1.5         | 1.5         | 1.4         | 1.4         | 1.3         | -0.6%                                       |
| Natural gas                      | 5.2         | 5.3         | 5.4         | 5.4         | 5.5         | 5.6         | 5.6         | 0.3%  |
| Coal                             | 0.5         | 0.5         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | -0.6%                                       |
| Electricity                      | 3.7         | 3.8         | 3.9         | 4.1         | 4.4         | 4.5         | 4.7         | 0.9%  |
| 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>11.3</b> | <b>11.4</b> | <b>11.6</b> | <b>11.8</b> | <b>12.0</b> | <b>12.2</b> | <b>0.3%</b>                                 |
| <b>Commercial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.1%  |
| Natural gas                      | 2.1         | 2.1         | 2.1         | 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>6.8</b>  | <b>7.0</b>  | <b>7.2</b>  | <b>7.4</b>  | <b>7.6</b>  | <b>0.6%</b>                                 |
| <b>Industrial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 8.0         | 8.0         | 8.1         | 8.4         | 8.7         | 9.1         | 9.5         | 0.6%  |
| Natural gas                      | 8.1         | 8.0         | 7.9         | 7.9         | 7.9         | 8.0         | 8.1         | 0.0%  |
| 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         | 2.8         | 2.8         | 2.9         | 2.9         | 3.0         | 3.1         | 0.4%  |
| <b>Total</b>                     | <b>25.9</b> | <b>25.9</b> | <b>26.0</b> | <b>26.6</b> | <b>27.3</b> | <b>28.0</b> | <b>28.9</b> | <b>0.4%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 18.4        | 18.5        | 17.3        | 16.4        | 15.9        | 15.7        | 15.9        | -0.5%                                       |
| Natural gas                      | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.3         | 0.4         | 4.3%  |
| 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         | 1.3         | 5.2%  |
| <b>Total</b>                     | <b>18.9</b> | <b>19.0</b> | <b>17.9</b> | <b>17.3</b> | <b>17.1</b> | <b>17.2</b> | <b>17.6</b> | <b>-0.2%</b>                                |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 28.6        | 28.7        | 27.5        | 26.9        | 26.6        | 26.8        | 27.3        | -0.2%                                       |
| Natural gas                      | 15.5        | 15.7        | 15.6        | 15.7        | 15.9        | 16.1        | 16.4        | 0.2%  |
| Coal                             | 3.5         | 3.4         | 3.3         | 3.3         | 3.4         | 3.4         | 3.4         | 0.0%  |
| Electricity                      | 11.9        | 12.1        | 12.7        | 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>62.8</b> | <b>62.1</b> | <b>62.5</b> | <b>63.4</b> | <b>64.5</b> | <b>66.4</b> | <b>0.2%</b>                                 |
| Electricity-related losses       | 21.8        | 23.6        | 25.4        | 26.8        | 28.2        | 29.5        | 30.8        | 1.2%  |
| Discrepancy                      | 0.1         | -0.1        | -0.1        | -0.1        | -0.1        | -0.1        | -0.1        | --  |
| <b>Total</b>                     | <b>84.2</b> | <b>86.3</b> | <b>87.4</b> | <b>89.2</b> | <b>91.6</b> | <b>94.0</b> | <b>97.1</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         | 6.7         | 6.5         | 6.4         | 6.4         | 0.9%  |
| Coal                             | 5.0         | 4.7         | 3.4         | 3.4         | 3.2         | 3.9         | 4.1         | -0.7%                                       |
| Nuclear                          | 7.6         | 7.6         | 7.8         | 7.8         | 7.7         | 7.5         | 7.5         | 0.0%  |
| Renewables                       | 15.5        | 17.0        | 19.1        | 21.8        | 24.7        | 26.2        | 28.2        | 2.2%  |
| <b>Total</b>                     | <b>33.6</b> | <b>35.7</b> | <b>38.0</b> | <b>40.2</b> | <b>42.6</b> | <b>44.5</b> | <b>46.6</b> | <b>1.2%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 29.2        | 29.4        | 28.3        | 27.5        | 27.1        | 27.2        | 27.8        | -0.2%                                       |
| Natural gas                      | 20.5        | 21.3        | 22.5        | 22.4        | 22.4        | 22.5        | 22.8        | 0.4%  |
| Coal                             | 8.5         | 8.2         | 6.7         | 6.8         | 6.6         | 7.3         | 7.5         | -0.4%                                       |
| Nuclear                          | 7.6         | 7.6         | 7.8         | 7.8         | 7.7         | 7.5         | 7.5         | 0.0%  |
| Renewables                       | 18.4        | 19.9        | 22.1        | 24.8        | 27.8        | 29.4        | 31.5        | 1.9%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>84.2</b> | <b>86.3</b> | <b>87.4</b> | <b>89.2</b> | <b>91.6</b> | <b>94.0</b> | <b>97.1</b> | <b>0.5%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 0.5%  |
| Natural gas                      | 3.7         | 3.8         | 4.0         | 4.2         | 4.3         | 4.5         | 4.7         | 0.8%  |
| 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>5.6</b>  | <b>5.8</b>  | <b>6.1</b>  | <b>6.3</b>  | <b>6.5</b>  | <b>0.8%</b>                                 |
| <b>Commercial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.8%  |
| 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         | 0.7         | 0.8         | 1.1%  |
| 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>1.5</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         | 4.0         | 4.3         | 4.6         | 1.3%  |
| Natural gas                      | 7.2         | 7.1         | 7.3         | 7.6         | 8.0         | 8.5         | 9.0         | 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         | 2.2         | 2.3         | 2.4         | 2.5         | 0.9%  |
| Renewables                       | 0.2         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 1.2%  |
| <b>Total</b>                     | <b>15.1</b> | <b>15.3</b> | <b>15.8</b> | <b>16.5</b> | <b>17.4</b> | <b>18.4</b> | <b>19.5</b> | <b>0.9%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 3.1         | 3.2         | 3.2         | 3.1         | 3.1         | 3.1         | 3.1         | 0.0%  |
| Natural gas                      | 0.2         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 1.0%  |
| 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         | 0.2         | -1.2%                                       |
| <b>Total</b>                     | <b>3.6</b>  | <b>3.8</b>  | <b>3.8</b>  | <b>3.7</b>  | <b>3.7</b>  | <b>3.7</b>  | <b>3.6</b>  | <b>0.0%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 7.0         | 7.4         | 7.5         | 7.7         | 7.9         | 8.2         | 8.5         | 0.7%  |
| Natural gas                      | 11.6        | 11.8        | 12.2        | 12.7        | 13.3        | 13.9        | 14.7        | 0.8%  |
| Coal                             | 2.9         | 2.9         | 3.0         | 3.1         | 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         | 1.2%  |
| <b>Total end-use consumption</b> | <b>25.2</b> | <b>25.8</b> | <b>26.6</b> | <b>27.6</b> | <b>28.6</b> | <b>29.9</b> | <b>31.2</b> | <b>0.8%</b>                                 |
| Electricity-related losses       | 8.8         | 8.7         | 8.2         | 8.5         | 8.6         | 8.8         | 8.9         | 0.0%  |
| Discrepancy                      | -0.5        | -0.5        | -0.6        | -0.6        | -0.6        | -0.6        | -0.6        | --  |
| <b>Total</b>                     | <b>33.5</b> | <b>34.0</b> | <b>34.3</b> | <b>35.5</b> | <b>36.7</b> | <b>38.1</b> | <b>39.5</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         | -6.7%                                       |
| Natural gas                      | 5.9         | 5.6         | 5.4         | 6.1         | 6.6         | 7.0         | 7.3         | 0.8%  |
| Coal                             | 1.9         | 2.0         | 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         | 1.9         | 1.9         | 1.9         | 0.0%  |
| <b>Total</b>                     | <b>12.3</b> | <b>12.2</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         | 7.1         | 7.2         | 7.2         | 7.4         | 7.7         | 8.0         | 0.6%  |
| Natural gas                      | 17.6        | 17.3        | 17.7        | 18.8        | 19.9        | 20.9        | 22.0        | 0.8%  |
| Coal                             | 4.8         | 5.0         | 4.8         | 4.6         | 4.7         | 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         | 2.1         | 2.2         | 2.4         | 2.2         | 2.2         | 2.3         | 0.2%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>33.5</b> | <b>34.0</b> | <b>34.3</b> | <b>35.5</b> | <b>36.7</b> | <b>38.1</b> | <b>39.5</b> | <b>0.6%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 0.6%  |
| 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         | 1.7%  |
| 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>1.7</b>  | <b>1.9</b>  | <b>3.0%</b>                                 |
| <b>Industrial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.6         | 0.6         | 0.7         | 0.8         | 0.8         | 0.9         | 1.0         | 1.7%  |
| Natural gas                      | 1.2         | 1.4         | 1.5         | 1.6         | 1.7         | 1.9         | 2.0         | 1.8%  |
| 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         | 0.1         | 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>6.3</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         | 0.3         | 0.3         | 0.3         | 1.4%  |
| 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         | 0.2         | 0.2         | 1.7%  |
| <b>Total</b>                     | <b>1.4</b>  | <b>1.6</b>  | <b>1.7</b>  | <b>1.8</b>  | <b>1.9</b>  | <b>2.1</b>  | <b>2.3</b>  | <b>1.8%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 1.9         | 2.0         | 2.2         | 2.3         | 2.6         | 2.9         | 3.2         | 1.8%  |
| Natural gas                      | 3.3         | 3.7         | 4.0         | 4.2         | 4.4         | 4.7         | 5.0         | 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>8.7</b>  | <b>9.4</b>  | <b>10.1</b> | <b>11.1</b> | <b>12.2</b> | <b>13.4</b> | <b>1.9%</b>                                 |
| Electricity-related losses       | 4.3         | 3.9         | 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>12.7</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         | -1.0%                                       |
| 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         | 2.6         | 2.8         | 3.1         | 3.4         | 1.8%  |
| Natural gas                      | 5.7         | 5.9         | 5.8         | 6.0         | 6.7         | 7.6         | 8.7         | 1.5%  |
| 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>12.7</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> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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          | 5.1          | 5.6          | 6.0          | 6.4          | 6.8          | 1.6%  |
| Natural gas                      | 3.9          | 4.4          | 5.1          | 5.7          | 6.3          | 7.0          | 7.7          | 2.4%  |
| Coal                             | 2.5          | 2.4          | 2.3          | 2.3          | 2.2          | 2.2          | 2.2          | -0.5%                                       |
| Electricity                      | 10.2         | 11.4         | 13.7         | 15.6         | 18.3         | 21.3         | 24.2         | 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>23.7</b>  | <b>27.1</b>  | <b>30.2</b>  | <b>33.9</b>  | <b>38.0</b>  | <b>42.0</b>  | <b>2.4%</b>                                 |
| <b>Commercial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 1.5          | 1.7          | 1.8          | 1.9          | 2.0          | 2.1          | 2.2          | 1.3%  |
| 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          | 7.5          | 8.1          | 9.0          | 9.9          | 10.7         | 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>10.6</b>  | <b>11.9</b>  | <b>12.7</b>  | <b>13.9</b>  | <b>15.1</b>  | <b>16.1</b>  | <b>1.8%</b>                                 |
| <b>Industrial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 28.0         | 30.3         | 33.3         | 35.6         | 37.6         | 39.4         | 40.7         | 1.3%  |
| Natural gas                      | 16.1         | 17.4         | 19.6         | 21.3         | 22.8         | 24.5         | 25.9         | 1.7%  |
| Coal                             | 52.7         | 52.8         | 52.7         | 52.0         | 51.4         | 51.2         | 51.1         | -0.1%                                       |
| Electricity                      | 26.6         | 28.3         | 30.4         | 32.1         | 33.3         | 34.6         | 35.5         | 1.0%  |
| Renewables                       | 11.0         | 13.3         | 15.3         | 17.4         | 19.2         | 20.9         | 22.5         | 2.6%  |
| <b>Total</b>                     | <b>134.5</b> | <b>142.2</b> | <b>151.3</b> | <b>158.4</b> | <b>164.3</b> | <b>170.6</b> | <b>175.7</b> | <b>1.0%</b>                                 |
| <b>Transportation</b>            |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 35.8         | 39.7         | 42.9         | 45.5         | 48.1         | 51.0         | 53.6         | 1.5%  |
| Natural gas                      | 1.8          | 1.9          | 1.9          | 2.0          | 2.1          | 2.3          | 2.7          | 1.6%  |
| Coal                             | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0%  |
| Electricity                      | 1.0          | 1.2          | 1.4          | 1.7          | 2.0          | 2.2          | 2.4          | 3.2%  |
| <b>Total</b>                     | <b>38.6</b>  | <b>42.7</b>  | <b>46.2</b>  | <b>49.2</b>  | <b>52.2</b>  | <b>55.6</b>  | <b>58.8</b>  | <b>1.5%</b>                                 |
| <b>Components of energy use</b>  |              |              |              |              |              |              |              |   |
| <b>End-use consumption</b>       |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 69.6         | 76.3         | 83.1         | 88.7         | 93.7         | 99.0         | 103.4        | 1.4%  |
| Natural gas                      | 23.1         | 25.1         | 28.1         | 30.7         | 33.1         | 35.8         | 38.4         | 1.8%  |
| Coal                             | 56.0         | 56.1         | 55.9         | 55.2         | 54.5         | 54.4         | 54.3         | -0.1%                                       |
| Electricity                      | 43.8         | 47.4         | 53.0         | 57.5         | 62.6         | 68.0         | 72.9         | 1.8%  |
| Renewables                       | 12.0         | 14.3         | 16.4         | 18.5         | 20.3         | 22.1         | 23.7         | 2.5%  |
| <b>Total end-use consumption</b> | <b>204.6</b> | <b>219.2</b> | <b>236.4</b> | <b>250.5</b> | <b>264.2</b> | <b>279.3</b> | <b>292.6</b> | <b>1.3%</b>                                 |
| Electricity-related losses       | 86.8         | 91.7         | 103.2        | 112.5        | 119.4        | 127.2        | 133.8        | 1.6%  |
| Discrepancy                      | 1.1          | 0.7          | 1.0          | 1.3          | 1.5          | 1.8          | 2.1          | 2.2%  |
| <b>Total</b>                     | <b>292.6</b> | <b>311.6</b> | <b>340.5</b> | <b>364.3</b> | <b>385.1</b> | <b>408.3</b> | <b>428.5</b> | <b>1.4%</b>                                 |
| <b>Electric power</b>            |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 0.7          | 0.8          | 0.4          | 0.2          | 0.1          | 0.1          | 0.1          | -7.6%                                       |
| Natural gas                      | 12.1         | 12.5         | 12.6         | 12.4         | 13.2         | 14.6         | 15.9         | 1.0%  |
| Coal                             | 77.6         | 78.4         | 86.1         | 89.4         | 88.1         | 86.5         | 86.5         | 0.4%  |
| Nuclear                          | 7.6          | 8.7          | 10.5         | 12.0         | 13.2         | 14.0         | 14.9         | 2.4%  |
| Renewables                       | 32.7         | 38.7         | 46.4         | 55.9         | 67.4         | 80.0         | 89.3         | 3.7%  |
| <b>Total</b>                     | <b>130.7</b> | <b>139.1</b> | <b>156.2</b> | <b>170.0</b> | <b>182.0</b> | <b>195.2</b> | <b>206.6</b> | <b>1.7%</b>                                 |
| <b>Total energy consumption</b>  |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 71.4         | 77.7         | 84.4         | 90.1         | 95.3         | 100.8        | 105.5        | 1.4%  |
| Natural gas                      | 35.2         | 37.6         | 40.8         | 43.0         | 46.2         | 50.4         | 54.3         | 1.6%  |
| Coal                             | 133.7        | 134.5        | 142.1        | 144.7        | 142.7        | 141.0        | 140.8        | 0.2%  |
| Nuclear                          | 7.6          | 8.7          | 10.5         | 12.0         | 13.2         | 14.0         | 14.9         | 2.4%  |
| Renewables                       | 44.7         | 53.0         | 62.8         | 74.4         | 87.7         | 102.1        | 113.0        | 3.4%  |

|              |              |              |              |              |              |              |              |             |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| <b>Total</b> | <b>292.6</b> | <b>311.6</b> | <b>340.5</b> | <b>364.3</b> | <b>385.1</b> | <b>408.3</b> | <b>428.5</b> | <b>1.4%</b> |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 0.0%  |
| Natural gas                      | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.5         | 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         | 0.1%  |
| 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>1.9</b>  | <b>1.9</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         | 0.3%  |
| 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>2.1</b>  | <b>2.0</b>  | <b>2.0</b>  | <b>2.0</b>  | <b>2.0</b>  | <b>0.2%</b>                                 |
| <b>Industrial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 2.7         | 2.8         | 2.6         | 2.4         | 2.3         | 2.2         | 2.1         | -0.8%                                       |
| Natural gas                      | 0.7         | 0.7         | 0.7         | 0.7         | 0.6         | 0.6         | 0.6         | -0.5%                                       |
| 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         | 1.0%  |
| Renewables                       | 0.5         | 0.5         | 0.5         | 0.4         | 0.4         | 0.4         | 0.3         | -1.3%                                       |
| <b>Total</b>                     | <b>6.4</b>  | <b>6.5</b>  | <b>6.2</b>  | <b>5.9</b>  | <b>5.6</b>  | <b>5.4</b>  | <b>5.2</b>  | <b>-0.8%</b>                                |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 3.0         | 3.0         | 2.8         | 2.6         | 2.4         | 2.3         | 2.3         | -1.0%                                       |
| Natural gas                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 9.9%  |
| 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         | -1.9%                                       |
| <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>2.4</b>  | <b>-1.0%</b>                                |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 6.5         | 6.6         | 6.2         | 5.9         | 5.6         | 5.4         | 5.2         | -0.8%                                       |
| Natural gas                      | 1.5         | 1.5         | 1.5         | 1.5         | 1.5         | 1.5         | 1.5         | 0.2%  |
| Coal                             | 1.7         | 1.6         | 1.5         | 1.4         | 1.2         | 1.1         | 1.0         | -1.8%                                       |
| Electricity                      | 3.1         | 3.3         | 3.4         | 3.3         | 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>13.6</b> | <b>13.0</b> | <b>12.4</b> | <b>12.0</b> | <b>11.7</b> | <b>11.5</b> | <b>-0.5%</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>18.5</b> | <b>18.6</b> | <b>17.2</b> | <b>16.7</b> | <b>16.3</b> | <b>16.1</b> | <b>15.9</b> | <b>-0.5%</b>                                |
| <b>Electric power</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.1         | 0.2         | 0.1         | 0.1         | 0.0         | 0.0         | 0.0         | -4.1%                                       |
| Natural gas                      | 2.7         | 2.7         | 2.5         | 2.2         | 2.0         | 2.0         | 1.9         | -1.3%                                       |
| Coal                             | 2.7         | 2.7         | 1.6         | 1.8         | 1.8         | 1.8         | 1.8         | -1.5%                                       |
| 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         | 1.8%  |
| <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>7.9</b>  | <b>-0.1%</b>                                |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 6.8         | 6.6         | 6.2         | 5.8         | 5.5         | 5.3         | 5.1         | -1.0%                                       |
| Natural gas                      | 4.2         | 4.3         | 4.0         | 3.7         | 3.5         | 3.5         | 3.4         | -0.7%                                       |
| Coal                             | 4.4         | 4.3         | 3.1         | 3.1         | 3.0         | 2.9         | 2.8         | -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>18.5</b> | <b>18.6</b> | <b>17.2</b> | <b>16.7</b> | <b>16.3</b> | <b>16.1</b> | <b>15.9</b> | <b>-0.5%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | -0.2%                                       |
| 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         | 0.6%  |
| 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>1.0</b>  | <b>1.0</b>  | <b>1.0</b>  | <b>0.5%</b>                                 |
| <b>Industrial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 2.8         | 2.9         | 3.0         | 3.1         | 3.1         | 3.2         | 3.2         | 0.5%  |
| 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         | 0.3%  |
| 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>5.9</b>  | <b>6.1</b>  | <b>6.2</b>  | <b>6.2</b>  | <b>6.2</b>  | <b>6.3</b>  | <b>0.3%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 2.0         | 2.1         | 2.0         | 1.9         | 1.8         | 1.7         | 1.6         | -0.8%                                       |
| Natural gas                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 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         | 5.5%  |
| <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>1.8</b>  | <b>-0.6%</b>                                |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 5.0         | 5.2         | 5.2         | 5.2         | 5.1         | 5.1         | 5.0         | 0.0%  |
| 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>9.8</b>  | <b>10.0</b> | <b>10.0</b> | <b>10.0</b> | <b>10.0</b> | <b>10.0</b> | <b>0.2%</b>                                 |
| Electricity-related losses       | 3.2         | 3.5         | 3.7         | 3.8         | 3.9         | 4.0         | 4.0         | 0.8%  |
| Discrepancy                      | 0.2         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 1.1%  |
| <b>Total</b>                     | <b>13.0</b> | <b>13.6</b> | <b>14.0</b> | <b>14.2</b> | <b>14.3</b> | <b>14.3</b> | <b>14.4</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         | 0.5%  |
| Natural gas                      | 1.3         | 1.2         | 1.1         | 1.0         | 1.0         | 0.9         | 0.9         | -1.4%                                       |
| 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>5.5</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         | 5.6         | 5.6         | 5.5         | 5.4         | 5.3         | 0.1%  |
| Natural gas                      | 2.6         | 2.6         | 2.5         | 2.4         | 2.3         | 2.3         | 2.3         | -0.4%                                       |
| Coal                             | 2.6         | 2.6         | 2.6         | 2.7         | 2.8         | 2.8         | 2.8         | 0.4%  |
| 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         | 3.6%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>13.0</b> | <b>13.6</b> | <b>14.0</b> | <b>14.2</b> | <b>14.3</b> | <b>14.3</b> | <b>14.4</b> | <b>0.4%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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        | 0.8%  |
| 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        | 1.1        | 1.1        | 1.4%  |
| Natural gas                      | 1.1        | 1.1        | 1.1        | 1.1        | 1.2        | 1.2        | 1.3        | 0.6%  |
| 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>1.1%</b>                                 |
| <b>Transportation</b>            |            |            |            |            |            |            |            |   |
| Liquid fuels                     | 1.7        | 1.9        | 1.9        | 1.9        | 1.9        | 1.9        | 1.9        | 0.5%  |
| Natural gas                      | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 2.3%  |
| 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        | 2.7%  |
| <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        | 2.9        | 2.9        | 2.9        | 3.0        | 3.1        | 0.8%  |
| Natural gas                      | 1.3        | 1.3        | 1.3        | 1.4        | 1.4        | 1.5        | 1.6        | 0.7%  |
| Coal                             | 0.2        | 0.3        | 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        | 2.4        | 2.6        | 1.1%  |
| 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>8.1</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        | -7.2%                                       |
| Natural gas                      | 0.4        | 0.4        | 0.4        | 0.3        | 0.3        | 0.3        | 0.3        | -1.4%                                       |
| Coal                             | 1.3        | 1.2        | 1.4        | 1.5        | 1.5        | 1.5        | 1.5        | 0.5%  |
| 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        | 2.0        | 2.3        | 2.5%  |
| <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>4.0</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        | 0.5%  |
| Natural gas                      | 1.7        | 1.7        | 1.8        | 1.7        | 1.7        | 1.8        | 1.9        | 0.3%  |
| 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        | 2.6        | 2.4%  |

|              |            |            |            |            |            |            |            |             |
|--------------|------------|------------|------------|------------|------------|------------|------------|-------------|
| <b>Total</b> | <b>7.2</b> | <b>7.2</b> | <b>7.7</b> | <b>8.1</b> | <b>8.4</b> | <b>8.8</b> | <b>9.2</b> | <b>0.9%</b> |
|--------------|------------|------------|------------|------------|------------|------------|------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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          | 3.3          | 3.8          | 4.4          | 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          | 5.7          | 6.9          | 8.0          | 9.4          | 10.8         | 12.1         | 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>13.3</b>  | <b>15.3</b>  | <b>17.1</b>  | <b>19.2</b>  | <b>21.4</b>  | <b>23.5</b>  | <b>2.4%</b>                                 |
| <b>Commercial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 0.6          | 0.7          | 0.8          | 0.8          | 0.9          | 0.9          | 1.0          | 1.6%  |
| Natural gas                      | 0.6          | 0.7          | 0.8          | 0.9          | 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          | 2.9          | 3.3          | 3.6          | 3.9          | 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>4.2</b>   | <b>4.8</b>   | <b>5.1</b>   | <b>5.6</b>   | <b>6.1</b>   | <b>6.5</b>   | <b>1.9%</b>                                 |
| <b>Industrial</b>                |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 14.5         | 15.9         | 16.9         | 17.6         | 17.8         | 18.0         | 17.6         | 0.7%  |
| Natural gas                      | 7.4          | 7.8          | 8.1          | 8.2          | 8.3          | 8.4          | 8.3          | 0.4%  |
| Coal                             | 39.1         | 38.4         | 36.0         | 32.9         | 29.9         | 27.4         | 24.9         | -1.6%                                       |
| Electricity                      | 19.2         | 20.3         | 20.9         | 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>87.2</b>  | <b>86.8</b>  | <b>85.0</b>  | <b>82.0</b>  | <b>79.6</b>  | <b>76.1</b>  | <b>-0.3%</b>                                |
| <b>Transportation</b>            |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 13.6         | 15.0         | 15.4         | 14.9         | 13.9         | 13.4         | 13.0         | -0.2%                                       |
| Natural gas                      | 1.4          | 1.4          | 1.4          | 1.3          | 1.2          | 1.2          | 1.3          | -0.1%                                       |
| Coal                             | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0%  |
| Electricity                      | 0.7          | 0.8          | 1.0          | 1.2          | 1.4          | 1.6          | 1.7          | 3.2%  |
| <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>16.0</b>  | <b>0.1%</b>                                 |
| <b>Components of energy use</b>  |              |              |              |              |              |              |              |   |
| <b>End-use consumption</b>       |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 30.5         | 33.5         | 35.2         | 35.6         | 35.1         | 35.0         | 34.5         | 0.4%  |
| Natural gas                      | 11.6         | 12.6         | 13.5         | 14.2         | 14.8         | 15.6         | 16.3         | 1.2%  |
| Coal                             | 41.9         | 41.1         | 38.6         | 35.4         | 32.4         | 29.8         | 27.2         | -1.5%                                       |
| Electricity                      | 26.9         | 29.0         | 31.5         | 33.3         | 35.2         | 37.1         | 38.4         | 1.3%  |
| Renewables                       | 4.2          | 5.7          | 5.9          | 5.9          | 5.9          | 5.9          | 5.8          | 1.1%  |
| <b>Total end-use consumption</b> | <b>115.2</b> | <b>121.8</b> | <b>124.6</b> | <b>124.5</b> | <b>123.4</b> | <b>123.3</b> | <b>122.1</b> | <b>0.2%</b>                                 |
| Electricity-related losses       | 57.1         | 59.0         | 64.0         | 67.4         | 69.5         | 71.8         | 73.4         | 0.9%  |
| Discrepancy                      | 0.2          | 0.3          | 0.4          | 0.5          | 0.5          | 0.6          | 0.7          | 4.8%  |
| <b>Total</b>                     | <b>172.4</b> | <b>181.1</b> | <b>189.0</b> | <b>192.4</b> | <b>193.4</b> | <b>195.8</b> | <b>196.2</b> | <b>0.5%</b>                                 |
| <b>Electric power</b>            |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | -10.8%                                      |
| Natural gas                      | 2.7          | 2.9          | 3.1          | 4.0          | 5.4          | 6.9          | 8.3          | 4.1%  |
| Coal                             | 54.9         | 54.9         | 57.2         | 57.9         | 54.9         | 52.6         | 52.1         | -0.2%                                       |
| Nuclear                          | 4.0          | 4.4          | 5.7          | 7.1          | 8.4          | 9.5          | 10.4         | 3.5%  |
| Renewables                       | 22.4         | 25.9         | 29.6         | 31.9         | 36.1         | 40.1         | 41.1         | 2.2%  |
| <b>Total</b>                     | <b>84.1</b>  | <b>88.1</b>  | <b>95.6</b>  | <b>100.9</b> | <b>104.8</b> | <b>109.1</b> | <b>111.9</b> | <b>1.0%</b>                                 |
| <b>Total energy consumption</b>  |              |              |              |              |              |              |              |   |
| Liquid fuels                     | 30.6         | 33.7         | 35.4         | 35.9         | 35.5         | 35.4         | 35.0         | 0.5%  |
| Natural gas                      | 14.4         | 15.5         | 16.6         | 18.2         | 20.2         | 22.5         | 24.6         | 1.9%  |
| Coal                             | 96.9         | 96.0         | 95.7         | 93.4         | 87.3         | 82.4         | 79.3         | -0.7%                                       |
| Nuclear                          | 4.0          | 4.4          | 5.7          | 7.1          | 8.4          | 9.5          | 10.4         | 3.5%  |
| Renewables                       | 26.6         | 31.6         | 35.5         | 37.8         | 42.0         | 46.0         | 46.8         | 2.0%  |

|              |              |              |              |              |              |              |              |             |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
| <b>Total</b> | <b>172.4</b> | <b>181.1</b> | <b>189.0</b> | <b>192.4</b> | <b>193.4</b> | <b>195.8</b> | <b>196.2</b> | <b>0.5%</b> |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 2.2         | 2.4          | 2.2%  |
| 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         | 2.3         | 3.0         | 3.9         | 5.1         | 6.4          | 5.4%  |
| 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>3.4</b>  | <b>4.2</b>  | <b>5.1</b>  | <b>6.2</b>  | <b>7.6</b>  | <b>9.1</b>   | <b>4.1%</b>                                 |
| <b>Commercial</b>                |             |             |             |             |             |             |              |   |
| Liquid fuels                     | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.2          | 3.4%  |
| 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          | 2.7%  |
| 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>1.6</b>  | <b>1.9</b>  | <b>2.2</b>  | <b>2.5</b>   | <b>3.8%</b>                                 |
| <b>Industrial</b>                |             |             |             |             |             |             |              |   |
| Liquid fuels                     | 3.8         | 4.1         | 5.2         | 6.3         | 7.5         | 8.7         | 9.9          | 3.5%  |
| Natural gas                      | 1.8         | 2.1         | 3.0         | 3.8         | 4.5         | 5.4         | 6.2          | 4.4%  |
| Coal                             | 6.1         | 6.5         | 8.2         | 10.0        | 11.9        | 13.8        | 15.7         | 3.5%  |
| Electricity                      | 3.1         | 3.4         | 4.3         | 5.2         | 6.1         | 7.0         | 7.8          | 3.4%  |
| Renewables                       | 3.9         | 4.3         | 5.6         | 7.0         | 8.3         | 9.6         | 11.0         | 3.8%  |
| <b>Total</b>                     | <b>18.6</b> | <b>20.4</b> | <b>26.4</b> | <b>32.4</b> | <b>38.3</b> | <b>44.4</b> | <b>50.6</b>  | <b>3.6%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |              |   |
| Liquid fuels                     | 4.8         | 5.5         | 7.1         | 9.1         | 11.3        | 13.3        | 15.2         | 4.2%  |
| Natural gas                      | 0.2         | 0.2         | 0.3         | 0.3         | 0.4         | 0.5         | 0.6          | 4.7%  |
| 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         | 0.4          | 3.9%  |
| <b>Total</b>                     | <b>5.1</b>  | <b>5.8</b>  | <b>7.5</b>  | <b>9.7</b>  | <b>11.9</b> | <b>14.2</b> | <b>16.2</b>  | <b>4.2%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |              |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |              |   |
| Liquid fuels                     | 9.9         | 11.1        | 14.1        | 17.4        | 20.9        | 24.4        | 27.7         | 3.7%  |
| Natural gas                      | 2.2         | 2.4         | 3.5         | 4.4         | 5.2         | 6.2         | 7.1          | 4.4%  |
| Coal                             | 6.4         | 6.9         | 8.7         | 10.6        | 12.4        | 14.4        | 16.4         | 3.4%  |
| Electricity                      | 5.1         | 5.8         | 7.4         | 9.3         | 11.3        | 13.7        | 16.1         | 4.2%  |
| Renewables                       | 3.9         | 4.4         | 5.7         | 7.1         | 8.4         | 9.7         | 11.0         | 3.8%  |
| <b>Total end-use consumption</b> | <b>27.5</b> | <b>30.6</b> | <b>39.4</b> | <b>48.8</b> | <b>58.3</b> | <b>68.4</b> | <b>78.3</b>  | <b>3.8%</b>                                 |
| Electricity-related losses       | 10.5        | 12.3        | 16.7        | 20.5        | 23.7        | 27.4        | 30.7         | 3.9%  |
| Discrepancy                      | 0.2         | 0.7         | 0.9         | 1.1         | 1.3         | 1.5         | 1.7          | 7.3%  |
| <b>Total</b>                     | <b>38.3</b> | <b>43.6</b> | <b>56.9</b> | <b>70.3</b> | <b>83.3</b> | <b>97.3</b> | <b>110.7</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          | -14.0%                                      |
| Natural gas                      | 0.5         | 0.4         | 0.7         | 0.7         | 0.7         | 0.7         | 0.7          | 1.6%  |
| Coal                             | 11.2        | 12.0        | 15.5        | 16.0        | 16.3        | 15.8        | 14.5         | 0.9%  |
| Nuclear                          | 0.5         | 0.5         | 0.6         | 0.7         | 0.7         | 0.7         | 0.7          | 1.6%  |
| Renewables                       | 3.5         | 5.1         | 7.3         | 12.3        | 17.2        | 23.8        | 30.7         | 8.1%  |
| <b>Total</b>                     | <b>15.6</b> | <b>18.0</b> | <b>24.0</b> | <b>29.7</b> | <b>34.9</b> | <b>41.0</b> | <b>46.7</b>  | <b>4.0%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |              |   |
| Liquid fuels                     | 10.3        | 11.9        | 15.1        | 18.6        | 22.3        | 26.1        | 29.6         | 3.9%  |
| Natural gas                      | 2.6         | 2.9         | 4.2         | 5.0         | 5.9         | 6.9         | 7.8          | 4.0%  |
| Coal                             | 17.6        | 19.0        | 24.1        | 26.6        | 28.7        | 30.2        | 30.9         | 2.0%  |
| Nuclear                          | 0.5         | 0.5         | 0.6         | 0.7         | 0.7         | 0.7         | 0.7          | 1.6%  |
| Renewables                       | 7.4         | 9.4         | 12.9        | 19.4        | 25.5        | 33.5        | 41.7         | 6.4%  |

|              |             |             |             |             |             |             |              |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|
| <b>Total</b> | <b>38.3</b> | <b>43.6</b> | <b>56.9</b> | <b>70.3</b> | <b>83.3</b> | <b>97.3</b> | <b>110.7</b> | <b>3.9%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 1.0         | 1.0         | 0.9%  |
| Natural gas                      | 0.5         | 0.6         | 0.6         | 0.7         | 0.7         | 0.8         | 0.8         | 1.5%  |
| Coal                             | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.3%  |
| Electricity                      | 2.2         | 2.4         | 2.8         | 3.0         | 3.4         | 3.7         | 4.1         | 2.2%  |
| 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>3.9</b>  | <b>4.4</b>  | <b>4.7</b>  | <b>5.1</b>  | <b>5.6</b>  | <b>6.0</b>  | <b>1.8%</b>                                 |
| <b>Commercial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.3         | 0.3         | 0.3         | 0.4         | 0.4         | 0.4         | 0.4         | 1.5%  |
| Natural gas                      | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 2.5%  |
| 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         | 2.7         | 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>2.4</b>  | <b>2.6</b>  | <b>2.9</b>  | <b>3.2</b>  | <b>3.5</b>  | <b>2.4%</b>                                 |
| <b>Industrial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 3.5         | 3.9         | 4.6         | 5.2         | 5.8         | 6.3         | 6.8         | 2.4%  |
| Natural gas                      | 4.5         | 5.1         | 6.1         | 6.9         | 7.6         | 8.3         | 8.9         | 2.4%  |
| Coal                             | 4.5         | 4.9         | 5.6         | 6.2         | 6.9         | 7.5         | 8.0         | 2.1%  |
| Electricity                      | 2.1         | 2.3         | 2.7         | 3.1         | 3.4         | 3.8         | 4.1         | 2.5%  |
| Renewables                       | 3.0         | 3.3         | 4.0         | 4.6         | 5.2         | 5.7         | 6.1         | 2.6%  |
| <b>Total</b>                     | <b>17.6</b> | <b>19.4</b> | <b>22.9</b> | <b>25.9</b> | <b>28.9</b> | <b>31.5</b> | <b>33.9</b> | <b>2.4%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 10.7        | 12.2        | 13.7        | 15.2        | 16.8        | 18.4        | 19.6        | 2.2%  |
| Natural gas                      | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 0.5         | 0.7         | 4.7%  |
| 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         | 8.8%  |
| <b>Total</b>                     | <b>10.9</b> | <b>12.5</b> | <b>13.9</b> | <b>15.5</b> | <b>17.2</b> | <b>19.0</b> | <b>20.4</b> | <b>2.3%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 15.3        | 17.2        | 19.5        | 21.7        | 23.9        | 26.1        | 27.8        | 2.2%  |
| Natural gas                      | 5.3         | 5.9         | 7.0         | 7.9         | 8.8         | 9.6         | 10.5        | 2.5%  |
| Coal                             | 4.6         | 5.0         | 5.7         | 6.3         | 7.0         | 7.6         | 8.1         | 2.1%  |
| Electricity                      | 5.8         | 6.3         | 7.4         | 8.3         | 9.3         | 10.3        | 11.3        | 2.4%  |
| Renewables                       | 3.0         | 3.3         | 4.0         | 4.6         | 5.2         | 5.7         | 6.1         | 2.6%  |
| <b>Total end-use consumption</b> | <b>33.9</b> | <b>37.8</b> | <b>43.6</b> | <b>48.7</b> | <b>54.2</b> | <b>59.3</b> | <b>63.8</b> | <b>2.3%</b>                                 |
| Electricity-related losses       | 9.0         | 9.8         | 12.4        | 14.1        | 15.5        | 17.0        | 18.4        | 2.6%  |
| Discrepancy                      | 0.3         | -0.2        | -0.2        | -0.2        | -0.2        | -0.2        | -0.2        | --  |
| <b>Total</b>                     | <b>43.2</b> | <b>47.3</b> | <b>55.7</b> | <b>62.6</b> | <b>69.4</b> | <b>76.0</b> | <b>82.0</b> | <b>2.3%</b>                                 |
| <b>Electric power</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.4         | 0.5         | 0.2         | 0.1         | 0.1         | 0.0         | 0.0         | -14.4%                                      |
| Natural gas                      | 4.5         | 4.8         | 4.7         | 4.1         | 3.8         | 3.8         | 3.8         | -0.5%                                       |
| Coal                             | 6.1         | 6.3         | 9.1         | 10.7        | 12.1        | 13.3        | 15.0        | 3.2%  |
| 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         | 9.8         | 10.5        | 4.2%  |
| <b>Total</b>                     | <b>14.8</b> | <b>16.1</b> | <b>19.9</b> | <b>22.4</b> | <b>24.8</b> | <b>27.3</b> | <b>29.7</b> | <b>2.5%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 16.0        | 17.4        | 19.4        | 21.5        | 23.7        | 25.8        | 27.5        | 2.0%  |
| Natural gas                      | 9.8         | 10.7        | 11.7        | 12.0        | 12.6        | 13.5        | 14.4        | 1.4%  |
| Coal                             | 10.7        | 11.3        | 14.8        | 17.1        | 19.2        | 21.0        | 23.2        | 2.8%  |
| Nuclear                          | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | -0.5%                                       |
| Renewables                       | 6.3         | 7.6         | 9.4         | 11.6        | 13.6        | 15.4        | 16.6        | 3.5%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>43.2</b> | <b>47.3</b> | <b>55.7</b> | <b>62.6</b> | <b>69.4</b> | <b>76.0</b> | <b>82.0</b> | <b>2.3%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 0.9         | 0.9         | 0.9         | 0.9         | 1.0         | 1.0         | 0.7%  |
| Natural gas                      | 2.5         | 2.6         | 2.8         | 2.9         | 3.1         | 3.3         | 3.5         | 1.2%  |
| Coal                             | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.6%  |
| Electricity                      | 2.9         | 3.0         | 3.4         | 3.7         | 4.1         | 4.6         | 5.0         | 1.9%  |
| 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>6.7</b>  | <b>7.2</b>  | <b>7.7</b>  | <b>8.3</b>  | <b>9.0</b>  | <b>9.6</b>  | <b>1.5%</b>                                 |
| <b>Commercial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.7%  |
| Natural gas                      | 0.6         | 0.7         | 0.7         | 0.8         | 0.8         | 0.8         | 0.9         | 1.1%  |
| Coal                             | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 1.4%  |
| Electricity                      | 1.8         | 1.9         | 2.1         | 2.3         | 2.5         | 2.7         | 2.8         | 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>2.7</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         | 7.5         | 8.0         | 8.6         | 9.4         | 10.0        | 10.5        | 1.3%  |
| Natural gas                      | 13.8        | 14.3        | 15.6        | 16.8        | 18.2        | 19.5        | 20.7        | 1.5%  |
| Coal                             | 2.1         | 2.3         | 2.7         | 3.1         | 3.6         | 4.1         | 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         | 5.1         | 5.9         | 6.8         | 7.6         | 2.9%  |
| <b>Total</b>                     | <b>28.3</b> | <b>29.5</b> | <b>32.4</b> | <b>35.7</b> | <b>39.3</b> | <b>42.8</b> | <b>46.2</b> | <b>1.8%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 12.8        | 13.8        | 14.8        | 16.0        | 17.3        | 18.7        | 20.4        | 1.7%  |
| Natural gas                      | 0.5         | 0.5         | 0.5         | 0.4         | 0.5         | 0.5         | 0.6         | 1.0%  |
| 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         | 0.1         | 4.4%  |
| <b>Total</b>                     | <b>13.3</b> | <b>14.3</b> | <b>15.3</b> | <b>16.5</b> | <b>17.8</b> | <b>19.4</b> | <b>21.1</b> | <b>1.7%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 21.1        | 22.2        | 23.8        | 25.7        | 27.7        | 29.8        | 32.0        | 1.5%  |
| Natural gas                      | 17.4        | 18.0        | 19.5        | 21.0        | 22.6        | 24.2        | 25.7        | 1.4%  |
| Coal                             | 2.3         | 2.5         | 2.8         | 3.3         | 3.8         | 4.4         | 5.0         | 2.8%  |
| Electricity                      | 6.4         | 6.7         | 7.4         | 8.1         | 8.9         | 9.7         | 10.4        | 1.8%  |
| Renewables                       | 3.4         | 3.7         | 4.4         | 5.1         | 6.0         | 6.8         | 7.6         | 2.9%  |
| <b>Total end-use consumption</b> | <b>50.6</b> | <b>53.1</b> | <b>57.9</b> | <b>63.1</b> | <b>68.9</b> | <b>74.9</b> | <b>80.8</b> | <b>1.7%</b>                                 |
| Electricity-related losses       | 12.4        | 13.9        | 13.9        | 14.8        | 15.4        | 16.4        | 17.4        | 1.2%  |
| Discrepancy                      | -0.4        | -0.5        | -0.4        | -0.4        | -0.4        | -0.4        | -0.4        | --  |
| <b>Total</b>                     | <b>62.5</b> | <b>66.5</b> | <b>71.4</b> | <b>77.5</b> | <b>83.9</b> | <b>91.0</b> | <b>97.9</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        | 12.9        | 13.6        | 14.2        | 14.8        | 1.0%  |
| Coal                             | 2.2         | 1.9         | 2.1         | 2.5         | 2.8         | 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         | 6.3         | 7.6         | 8.8         | 4.8%  |
| <b>Total</b>                     | <b>18.7</b> | <b>20.5</b> | <b>21.3</b> | <b>22.9</b> | <b>24.3</b> | <b>26.1</b> | <b>27.8</b> | <b>1.4%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 23.3        | 24.7        | 24.8        | 25.8        | 27.4        | 29.4        | 31.5        | 1.1%  |
| Natural gas                      | 28.6        | 29.7        | 31.5        | 34.0        | 36.3        | 38.6        | 40.7        | 1.3%  |
| Coal                             | 4.6         | 4.5         | 5.0         | 5.8         | 6.5         | 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         | 9.1         | 10.7        | 12.2        | 14.4        | 16.4        | 3.8%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>62.5</b> | <b>66.5</b> | <b>71.4</b> | <b>77.5</b> | <b>83.9</b> | <b>91.0</b> | <b>97.9</b> | <b>1.6%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | 0.7         | 0.7         | 0.7         | 1.1%  |
| 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         | 1.9         | 2.3         | 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>3.7</b>  | <b>4.2</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         | 0.9%  |
| 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>0.9</b>  | <b>1.0</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         | 2.2%  |
| Natural gas                      | 2.4         | 2.4         | 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         | 1.7         | 1.9         | 2.1%  |
| Renewables                       | 3.4         | 3.7         | 4.3         | 5.1         | 5.9         | 6.8         | 7.6         | 2.9%  |
| <b>Total</b>                     | <b>10.3</b> | <b>10.9</b> | <b>12.5</b> | <b>14.3</b> | <b>16.4</b> | <b>18.6</b> | <b>20.8</b> | <b>2.6%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 5.5         | 6.1         | 6.8         | 7.6         | 8.7         | 9.9         | 11.2        | 2.6%  |
| Natural gas                      | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.3         | 2.5%  |
| 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         | 0.1         | 0.1         | 2.5%  |
| <b>Total</b>                     | <b>5.7</b>  | <b>6.2</b>  | <b>7.0</b>  | <b>7.8</b>  | <b>8.9</b>  | <b>10.1</b> | <b>11.5</b> | <b>2.6%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 7.6         | 8.3         | 9.3         | 10.4        | 11.7        | 13.2        | 14.9        | 2.4%  |
| Natural gas                      | 3.1         | 3.2         | 3.5         | 3.9         | 4.4         | 4.9         | 5.3         | 2.0%  |
| Coal                             | 2.0         | 2.3         | 2.6         | 3.0         | 3.5         | 4.1         | 4.7         | 3.1%  |
| Electricity                      | 2.5         | 2.7         | 3.1         | 3.7         | 4.3         | 4.9         | 5.4         | 2.8%  |
| Renewables                       | 3.4         | 3.7         | 4.4         | 5.1         | 5.9         | 6.8         | 7.6         | 2.9%  |
| <b>Total end-use consumption</b> | <b>18.7</b> | <b>20.2</b> | <b>22.9</b> | <b>26.1</b> | <b>29.8</b> | <b>33.9</b> | <b>38.0</b> | <b>2.6%</b>                                 |
| Electricity-related losses       | 5.4         | 5.5         | 6.2         | 6.9         | 7.6         | 8.5         | 9.5         | 2.0%  |
| Discrepancy                      | 0.3         | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 0.3         | 1.0%  |
| <b>Total</b>                     | <b>24.3</b> | <b>25.9</b> | <b>29.3</b> | <b>33.3</b> | <b>37.7</b> | <b>42.7</b> | <b>47.8</b> | <b>2.4%</b>                                 |
| <b>Electric power</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 0.4         | 0.4         | 0.2         | 0.0         | 0.0         | 0.0         | 0.0         | -16.3%                                      |
| Natural gas                      | 3.1         | 3.1         | 3.2         | 3.5         | 3.8         | 4.0         | 4.3         | 1.1%  |
| Coal                             | 2.2         | 1.9         | 2.1         | 2.5         | 2.8         | 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         | 4.8         | 6.0         | 7.1         | 4.7%  |
| <b>Total</b>                     | <b>7.9</b>  | <b>8.2</b>  | <b>9.3</b>  | <b>10.6</b> | <b>11.9</b> | <b>13.4</b> | <b>14.8</b> | <b>2.3%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 8.3         | 9.0         | 9.7         | 10.7        | 12.0        | 13.5        | 15.2        | 2.2%  |
| Natural gas                      | 6.2         | 6.4         | 6.8         | 7.4         | 8.2         | 8.9         | 9.7         | 1.6%  |
| Coal                             | 4.3         | 4.2         | 4.7         | 5.5         | 6.3         | 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         | 7.8         | 9.2         | 10.7        | 12.8        | 14.8        | 3.7%  |

|              |             |             |             |             |             |             |             |             |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Total</b> | <b>24.3</b> | <b>25.9</b> | <b>29.3</b> | <b>33.3</b> | <b>37.7</b> | <b>42.7</b> | <b>47.8</b> | <b>2.4%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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, Low Oil Price 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         | -0.2%                                       |
| Natural gas                      | 2.0         | 2.0         | 2.1         | 2.1         | 2.2         | 2.3         | 2.4         | 0.7%  |
| Coal                             | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -0.1%                                       |
| Electricity                      | 2.0         | 2.0         | 2.1         | 2.1         | 2.2         | 2.3         | 2.3         | 0.6%  |
| 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>4.4</b>  | <b>4.5</b>  | <b>4.7</b>  | <b>4.8</b>  | <b>5.0</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                      | 1.3         | 1.4         | 1.5         | 1.7         | 1.8         | 1.9         | 2.0         | 1.5%  |
| 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>2.1</b>  | <b>2.3</b>  | <b>2.4</b>  | <b>2.6</b>  | <b>2.7</b>  | <b>2.8</b>  | <b>1.4%</b>                                 |
| <b>Industrial</b>                |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 5.8         | 5.8         | 6.1         | 6.6         | 7.0         | 7.4         | 7.7         | 1.0%  |
| Natural gas                      | 11.4        | 11.9        | 12.9        | 13.9        | 15.0        | 15.9        | 16.8        | 1.4%  |
| 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>18.5</b> | <b>19.9</b> | <b>21.4</b> | <b>22.9</b> | <b>24.2</b> | <b>25.4</b> | <b>1.2%</b>                                 |
| <b>Transportation</b>            |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 7.3         | 7.7         | 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         | 0.3%  |
| 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         | 0.1         | 0.1         | 7.3%  |
| <b>Total</b>                     | <b>7.7</b>  | <b>8.1</b>  | <b>8.3</b>  | <b>8.6</b>  | <b>8.9</b>  | <b>9.2</b>  | <b>9.6</b>  | <b>0.8%</b>                                 |
| <b>Components of energy use</b>  |             |             |             |             |             |             |             |   |
| <b>End-use consumption</b>       |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 13.4        | 13.9        | 14.5        | 15.2        | 16.0        | 16.6        | 17.2        | 0.9%  |
| Natural gas                      | 14.3        | 14.8        | 16.0        | 17.0        | 18.2        | 19.3        | 20.4        | 1.3%  |
| Coal                             | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.2%  |
| Electricity                      | 3.8         | 3.9         | 4.2         | 4.4         | 4.6         | 4.8         | 5.0         | 1.0%  |
| Renewables                       | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.6%  |
| <b>Total end-use consumption</b> | <b>31.9</b> | <b>33.0</b> | <b>35.0</b> | <b>37.0</b> | <b>39.0</b> | <b>41.1</b> | <b>42.9</b> | <b>1.1%</b>                                 |
| Electricity-related losses       | 7.0         | 8.4         | 7.8         | 7.9         | 7.8         | 7.9         | 8.0         | 0.5%  |
| Discrepancy                      | -0.7        | -0.7        | -0.7        | -0.7        | -0.7        | -0.7        | -0.7        | --  |
| <b>Total</b>                     | <b>38.2</b> | <b>40.6</b> | <b>42.1</b> | <b>44.2</b> | <b>46.2</b> | <b>48.3</b> | <b>50.1</b> | <b>1.0%</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         | 8.6         | 9.4         | 9.8         | 10.2        | 10.5        | 1.0%  |
| Coal                             | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -6.1%                                       |
| 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         | 1.6         | 5.5%  |
| <b>Total</b>                     | <b>10.8</b> | <b>12.3</b> | <b>12.0</b> | <b>12.2</b> | <b>12.4</b> | <b>12.7</b> | <b>13.0</b> | <b>0.6%</b>                                 |
| <b>Total energy consumption</b>  |             |             |             |             |             |             |             |   |
| Liquid fuels                     | 15.0        | 15.7        | 15.1        | 15.1        | 15.4        | 15.8        | 16.3        | 0.3%  |
| Natural gas                      | 22.4        | 23.4        | 24.8        | 26.6        | 28.1        | 29.7        | 31.0        | 1.2%  |
| 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>40.6</b> | <b>42.1</b> | <b>44.2</b> | <b>46.2</b> | <b>48.3</b> | <b>50.1</b> | <b>1.0%</b> |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run Ip\_230823.090253 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).