

## **Appendix F**

# **Reference case projections by end-use sector and country groupings**

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

2015-50

quadrillion Btu

| Sector/fuel                     | 2015         | 2020         | 2025         | 2030         | 2035         | 2040         | 2045         | 2050         | Average annual percent change (2015-50) |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------------------------------|
| <b>Residential</b>              |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 8.5          | 8.3          | 8.2          | 8.2          | 8.1          | 8.1          | 8.1          | 8.0          | -0.1                                    |
| Natural gas                     | 20.0         | 21.0         | 22.0         | 22.9         | 23.8         | 24.8         | 25.7         | 26.6         | 0.8                                     |
| Coal                            | 4.4          | 4.1          | 3.8          | 3.6          | 3.4          | 3.2          | 3.1          | 3.0          | -1.1                                    |
| Electricity                     | 20.2         | 22.2         | 24.7         | 27.5         | 30.6         | 33.9         | 37.0         | 40.1         | 2.0                                     |
| Renewables                      | 1.4          | 1.4          | 1.4          | 1.4          | 1.4          | 1.5          | 1.5          | 1.5          | 0.3                                     |
| <b>Total</b>                    | <b>54.4</b>  | <b>57.0</b>  | <b>60.1</b>  | <b>63.6</b>  | <b>67.4</b>  | <b>71.5</b>  | <b>75.4</b>  | <b>79.3</b>  | <b>1.1</b>                              |
| <b>Commercial</b>               |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 3.7          | 3.8          | 3.9          | 3.9          | 4.0          | 4.1          | 4.1          | 4.2          | 0.4                                     |
| Natural gas                     | 8.5          | 8.7          | 8.9          | 9.1          | 9.4          | 9.6          | 9.9          | 10.2         | 0.5                                     |
| Coal                            | 1.6          | 1.6          | 1.6          | 1.6          | 1.6          | 1.6          | 1.6          | 1.6          | 0.0                                     |
| Electricity                     | 16.2         | 17.7         | 19.4         | 21.2         | 23.1         | 25.0         | 27.1         | 29.2         | 1.7                                     |
| Renewables                      | 0.2          | 0.2          | 0.2          | 0.2          | 0.2          | 0.3          | 0.3          | 0.3          | 0.4                                     |
| <b>Total</b>                    | <b>30.3</b>  | <b>32.1</b>  | <b>34.1</b>  | <b>36.1</b>  | <b>38.3</b>  | <b>40.6</b>  | <b>43.0</b>  | <b>45.4</b>  | <b>1.2</b>                              |
| <b>Industrial</b>               |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 69.0         | 69.6         | 72.6         | 75.6         | 78.9         | 82.6         | 86.0         | 89.4         | 0.7                                     |
| Natural gas                     | 52.8         | 54.8         | 58.9         | 62.5         | 67.0         | 71.6         | 76.1         | 80.5         | 1.2                                     |
| Coal                            | 63.2         | 63.1         | 63.1         | 62.1         | 61.4         | 61.1         | 60.5         | 59.8         | -0.2                                    |
| Electricity                     | 34.3         | 36.5         | 38.4         | 39.3         | 40.4         | 41.6         | 42.6         | 43.4         | 0.7                                     |
| Renewables                      | 18.1         | 17.9         | 18.9         | 20.1         | 21.4         | 23.0         | 24.5         | 26.0         | 1.0                                     |
| <b>Total</b>                    | <b>237.3</b> | <b>241.9</b> | <b>251.9</b> | <b>259.7</b> | <b>269.1</b> | <b>279.8</b> | <b>289.6</b> | <b>299.0</b> | <b>0.7</b>                              |
| <b>Transportation</b>           |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 105.2        | 108.4        | 112.2        | 115.2        | 119.4        | 125.3        | 131.3        | 136.8        | 0.8                                     |
| Natural gas                     | 3.9          | 4.7          | 6.1          | 7.7          | 9.8          | 12.5         | 16.1         | 20.8         | 4.9                                     |
| Coal                            | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0                                     |
| Electricity                     | 1.5          | 1.7          | 2.2          | 2.7          | 3.4          | 4.4          | 5.5          | 6.6          | 4.4                                     |
| <b>Total</b>                    | <b>110.5</b> | <b>114.8</b> | <b>120.4</b> | <b>125.5</b> | <b>132.7</b> | <b>142.2</b> | <b>152.9</b> | <b>164.1</b> | <b>1.1</b>                              |
| <b>All end-use sectors</b>      |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 186.3        | 190.1        | 196.9        | 202.9        | 210.5        | 220.1        | 229.6        | 238.5        | 0.7                                     |
| Natural gas                     | 85.3         | 89.2         | 95.8         | 102.2        | 110.0        | 118.5        | 127.7        | 138.0        | 1.4                                     |
| Coal                            | 69.2         | 68.8         | 68.6         | 67.4         | 66.3         | 65.9         | 65.2         | 64.5         | -0.2                                    |
| Electricity                     | 72.1         | 78.2         | 84.6         | 90.8         | 97.6         | 104.9        | 112.2        | 119.3        | 1.4                                     |
| Renewables                      | 19.7         | 19.5         | 20.5         | 21.7         | 23.1         | 24.7         | 26.2         | 27.7         | 1.0                                     |
| <b>Delivered energy</b>         | <b>432.5</b> | <b>445.8</b> | <b>466.5</b> | <b>484.9</b> | <b>507.5</b> | <b>534.1</b> | <b>560.9</b> | <b>588.0</b> | <b>0.9</b>                              |
| Electricity-related losses      | 146.3        | 156.1        | 167.9        | 178.1        | 189.1        | 201.2        | 212.6        | 223.7        | 1.2                                     |
| Discrepancy                     | -3.8         | 2.4          | 0.1          | -0.1         | 0.4          | 0.9          | 1.4          | 1.8          | -                                       |
| <b>Total</b>                    | <b>575.4</b> | <b>604.9</b> | <b>634.9</b> | <b>663.2</b> | <b>697.3</b> | <b>736.5</b> | <b>775.2</b> | <b>813.7</b> | <b>1.0</b>                              |
| <b>Electric power a/</b>        |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 7.7          | 6.9          | 6.4          | 5.0          | 4.9          | 4.7          | 4.5          | 4.4          | -1.6                                    |
| Natural gas                     | 43.7         | 42.5         | 47.6         | 52.1         | 58.6         | 65.5         | 73.2         | 80.1         | 1.8                                     |
| Coal                            | 89.0         | 93.1         | 93.3         | 91.5         | 92.9         | 94.7         | 97.2         | 100.1        | 0.3                                     |
| Nuclear                         | 26.0         | 28.5         | 30.9         | 33.5         | 35.4         | 37.9         | 38.7         | 39.4         | 1.2                                     |
| Renewables                      | 52.1         | 63.2         | 74.3         | 86.7         | 94.9         | 103.3        | 111.1        | 118.9        | 2.4                                     |
| <b>Total</b>                    | <b>218.4</b> | <b>234.3</b> | <b>252.6</b> | <b>268.8</b> | <b>286.7</b> | <b>306.1</b> | <b>324.8</b> | <b>343.0</b> | <b>1.3</b>                              |
| <b>Total energy consumption</b> |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 190.6        | 200.0        | 203.9        | 208.1        | 216.0        | 226.0        | 235.8        | 244.9        | 0.7                                     |
| Natural gas                     | 128.9        | 131.7        | 143.4        | 154.3        | 168.6        | 184.0        | 200.9        | 218.2        | 1.5                                     |
| Coal                            | 158.2        | 161.9        | 161.9        | 158.8        | 159.3        | 160.5        | 162.5        | 164.6        | 0.1                                     |
| Nuclear                         | 26.0         | 28.5         | 30.9         | 33.5         | 35.4         | 37.9         | 38.7         | 39.4         | 1.2                                     |
| Renewables                      | 71.7         | 82.7         | 94.8         | 108.4        | 117.9        | 128.0        | 137.3        | 146.6        | 2.1                                     |
| <b>Total</b>                    | <b>575.4</b> | <b>604.9</b> | <b>634.9</b> | <b>663.2</b> | <b>697.3</b> | <b>736.5</b> | <b>775.2</b> | <b>813.7</b> | <b>1.0</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156 and EIA, *Annual Energy Outlook 2017*, DOE/EIA-0383(2017) (Washington, DC: January 2017); AEO2017 National Energy Modeling System, run ref2017.d120816a, www.eia.gov/aeo.

Table F2. Total OECD delivered energy consumption by end-use sector and fuel, Reference case,

2015-50

quadrillion Btu

| Sector/fuel                     | 2015         | 2020         | 2025         | 2030         | 2035         | 2040         | 2045         | 2050         | Average annual percent change (2015-50) |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------------------------------|
| <b>Residential</b>              |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 3.6          | 3.4          | 3.4          | 3.3          | 3.3          | 3.2          | 3.2          | 3.2          | -0.4                                    |
| Natural gas                     | 11.1         | 11.4         | 11.6         | 11.8         | 11.9         | 12.0         | 12.1         | 12.3         | 0.3                                     |
| Coal                            | 0.5          | 0.5          | 0.5          | 0.4          | 0.4          | 0.4          | 0.4          | 0.4          | -0.8                                    |
| Electricity                     | 10.5         | 10.8         | 11.1         | 11.5         | 11.9         | 12.4         | 12.8         | 13.2         | 0.7                                     |
| Renewables                      | 0.6          | 0.6          | 0.6          | 0.6          | 0.5          | 0.5          | 0.5          | 0.5          | -0.5                                    |
| <b>Total</b>                    | <b>26.3</b>  | <b>26.7</b>  | <b>27.1</b>  | <b>27.5</b>  | <b>28.0</b>  | <b>28.5</b>  | <b>29.0</b>  | <b>29.5</b>  | <b>0.3</b>                              |
| <b>Commercial</b>               |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 2.2          | 2.4          | 2.4          | 2.4          | 2.4          | 2.4          | 2.4          | 2.4          | 0.3                                     |
| Natural gas                     | 6.5          | 6.5          | 6.6          | 6.7          | 6.8          | 7.0          | 7.1          | 7.3          | 0.3                                     |
| Coal                            | 0.2          | 0.2          | 0.2          | 0.2          | 0.2          | 0.2          | 0.2          | 0.2          | -0.6                                    |
| Electricity                     | 10.7         | 11.2         | 11.8         | 12.5         | 13.2         | 14.0         | 14.9         | 16.0         | 1.2                                     |
| Renewables                      | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.2          | 0.2          | 0.1                                     |
| <b>Total</b>                    | <b>19.8</b>  | <b>20.5</b>  | <b>21.2</b>  | <b>21.9</b>  | <b>22.8</b>  | <b>23.7</b>  | <b>24.8</b>  | <b>26.1</b>  | <b>0.8</b>                              |
| <b>Industrial</b>               |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 27.4         | 27.0         | 27.4         | 27.7         | 28.0         | 28.5         | 28.7         | 29.2         | 0.2                                     |
| Natural gas                     | 22.3         | 22.8         | 23.7         | 23.9         | 24.5         | 25.1         | 25.7         | 26.4         | 0.5                                     |
| Coal                            | 7.7          | 7.6          | 7.7          | 7.6          | 7.6          | 7.5          | 7.5          | 7.6          | -0.1                                    |
| Electricity                     | 11.0         | 11.3         | 11.7         | 11.8         | 12.0         | 12.3         | 12.5         | 12.8         | 0.4                                     |
| Renewables                      | 6.1          | 5.9          | 5.9          | 5.9          | 5.8          | 5.8          | 5.8          | 5.8          | -0.2                                    |
| <b>Total</b>                    | <b>74.5</b>  | <b>74.6</b>  | <b>76.4</b>  | <b>77.0</b>  | <b>77.9</b>  | <b>79.2</b>  | <b>80.1</b>  | <b>81.7</b>  | <b>0.3</b>                              |
| <b>Transportation</b>           |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 58.0         | 57.1         | 55.1         | 53.5         | 53.0         | 53.5         | 54.3         | 55.6         | -0.1                                    |
| Natural gas                     | 1.1          | 1.3          | 1.6          | 1.9          | 2.4          | 3.0          | 3.8          | 4.7          | 4.2                                     |
| Coal                            | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0                                     |
| Electricity                     | 0.3          | 0.3          | 0.5          | 0.8          | 1.2          | 1.7          | 2.2          | 2.6          | 6.5                                     |
| <b>Total</b>                    | <b>59.4</b>  | <b>58.8</b>  | <b>57.2</b>  | <b>56.2</b>  | <b>56.6</b>  | <b>58.2</b>  | <b>60.2</b>  | <b>62.8</b>  | <b>0.2</b>                              |
| <b>All end-use sectors</b>      |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 91.2         | 90.0         | 88.3         | 86.9         | 86.7         | 87.6         | 88.6         | 90.3         | 0.0                                     |
| Natural gas                     | 41.1         | 42.1         | 43.4         | 44.3         | 45.6         | 47.2         | 48.7         | 50.7         | 0.6                                     |
| Coal                            | 8.4          | 8.3          | 8.4          | 8.3          | 8.2          | 8.1          | 8.1          | 8.1          | -0.1                                    |
| Electricity                     | 32.4         | 33.7         | 35.2         | 36.6         | 38.4         | 40.4         | 42.3         | 44.5         | 0.9                                     |
| Renewables                      | 6.9          | 6.6          | 6.6          | 6.6          | 6.5          | 6.5          | 6.5          | 6.4          | -0.2                                    |
| <b>Delivered energy</b>         | <b>179.9</b> | <b>180.6</b> | <b>181.9</b> | <b>182.7</b> | <b>185.3</b> | <b>189.7</b> | <b>194.1</b> | <b>200.1</b> | <b>0.3</b>                              |
| Electricity-related losses      | 61.9         | 63.5         | 66.3         | 68.1         | 70.0         | 72.5         | 74.6         | 77.0         | 0.6                                     |
| Discrepancy                     | -2.4         | -0.6         | -0.8         | -0.8         | -0.8         | -0.7         | -0.7         | -0.7         | -                                       |
| <b>Total</b>                    | <b>239.9</b> | <b>244.0</b> | <b>247.8</b> | <b>250.3</b> | <b>254.8</b> | <b>261.8</b> | <b>268.3</b> | <b>276.6</b> | <b>0.4</b>                              |
| <b>Electric power a/</b>        |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 1.5          | 0.9          | 0.7          | 0.6          | 0.6          | 0.6          | 0.5          | 0.5          | -3.1                                    |
| Natural gas                     | 20.1         | 20.0         | 20.8         | 22.8         | 25.9         | 29.0         | 32.5         | 36.1         | 1.7                                     |
| Coal                            | 29.2         | 29.6         | 27.4         | 25.1         | 24.6         | 24.2         | 24.1         | 24.2         | -0.5                                    |
| Nuclear                         | 19.5         | 19.4         | 19.5         | 19.6         | 18.8         | 18.2         | 16.7         | 15.2         | -0.7                                    |
| Renewables                      | 23.9         | 27.3         | 33.1         | 36.6         | 38.3         | 40.9         | 43.1         | 45.4         | 1.9                                     |
| <b>Total</b>                    | <b>94.2</b>  | <b>97.2</b>  | <b>101.5</b> | <b>104.7</b> | <b>108.3</b> | <b>112.9</b> | <b>116.9</b> | <b>121.5</b> | <b>0.7</b>                              |
| <b>Total energy consumption</b> |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 90.8         | 90.8         | 88.6         | 87.0         | 86.8         | 87.7         | 88.6         | 90.4         | 0.0                                     |
| Natural gas                     | 61.1         | 62.1         | 64.2         | 67.1         | 71.5         | 76.2         | 81.2         | 86.8         | 1.0                                     |
| Coal                            | 37.7         | 37.9         | 35.8         | 33.4         | 32.8         | 32.3         | 32.2         | 32.4         | -0.4                                    |
| Nuclear                         | 19.5         | 19.4         | 19.5         | 19.6         | 18.8         | 18.2         | 16.7         | 15.2         | -0.7                                    |
| Renewables                      | 30.7         | 33.8         | 39.7         | 43.2         | 44.9         | 47.4         | 49.6         | 51.9         | 1.5                                     |
| <b>Total</b>                    | <b>239.9</b> | <b>244.0</b> | <b>247.8</b> | <b>250.3</b> | <b>254.8</b> | <b>261.8</b> | <b>268.3</b> | <b>276.6</b> | <b>0.4</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156 and EIA, *Annual Energy Outlook 2017*, DOE/EIA-0383(2017) (Washington, DC: January 2017); AEO2017 National Energy Modeling System, run ref2017.d120816a, www.eia.gov/aeo.

**Table F3. Delivered energy consumption in the United States by end-use sector and fuel, Reference case, 2015-50**

quadrillion Btu

| Sector/fuel                     | 2015        | 2020         | 2025         | 2030        | 2035        | 2040         | 2045         | 2050         | Average annual percent change (2015-50) |
|---------------------------------|-------------|--------------|--------------|-------------|-------------|--------------|--------------|--------------|-----------------------------------------|
| <b>Residential</b>              |             |              |              |             |             |              |              |              |                                         |
| Liquids                         | 1.0         | 0.9          | 0.8          | 0.8         | 0.7         | 0.7          | 0.7          | 0.6          | -1.3                                    |
| Natural gas                     | 4.8         | 4.8          | 4.8          | 4.8         | 4.7         | 4.7          | 4.7          | 4.7          | 0.0                                     |
| Coal                            | 0.0         | 0.0          | 0.0          | 0.0         | 0.0         | 0.0          | 0.0          | 0.0          | 0.0                                     |
| Electricity                     | 4.8         | 4.8          | 4.7          | 4.8         | 4.9         | 5.0          | 5.1          | 5.2          | 0.2                                     |
| Renewables                      | 0.4         | 0.4          | 0.4          | 0.4         | 0.3         | 0.3          | 0.3          | 0.3          | -1.1                                    |
| <b>Total</b>                    | <b>11.0</b> | <b>10.9</b>  | <b>10.7</b>  | <b>10.7</b> | <b>10.7</b> | <b>10.8</b>  | <b>10.8</b>  | <b>10.8</b>  | <b>0.0</b>                              |
| <b>Commercial</b>               |             |              |              |             |             |              |              |              |                                         |
| Liquids                         | 0.6         | 0.7          | 0.7          | 0.7         | 0.7         | 0.7          | 0.7          | 0.7          | 0.7                                     |
| Natural gas                     | 3.3         | 3.2          | 3.2          | 3.3         | 3.4         | 3.5          | 3.6          | 3.8          | 0.4                                     |
| Coal                            | 0.0         | 0.0          | 0.0          | 0.0         | 0.0         | 0.0          | 0.0          | 0.0          | 1.0                                     |
| Electricity                     | 4.6         | 4.6          | 4.6          | 4.7         | 4.8         | 5.0          | 5.2          | 5.5          | 0.5                                     |
| Renewables                      | 0.1         | 0.1          | 0.1          | 0.1         | 0.1         | 0.1          | 0.1          | 0.1          | 0.0                                     |
| <b>Total</b>                    | <b>8.7</b>  | <b>8.7</b>   | <b>8.8</b>   | <b>8.9</b>  | <b>9.1</b>  | <b>9.4</b>   | <b>9.8</b>   | <b>10.2</b>  | <b>0.5</b>                              |
| <b>Industrial</b>               |             |              |              |             |             |              |              |              |                                         |
| Liquids                         | 8.1         | 9.0          | 9.6          | 9.9         | 10.2        | 10.6         | 10.8         | 11.2         | 0.9                                     |
| Natural gas                     | 9.4         | 10.6         | 11.3         | 11.4        | 11.8        | 12.2         | 12.5         | 13.0         | 0.9                                     |
| Coal                            | 1.3         | 1.2          | 1.2          | 1.1         | 1.0         | 1.0          | 0.9          | 0.9          | -1.2                                    |
| Electricity                     | 3.3         | 3.5          | 3.8          | 3.8         | 3.8         | 4.0          | 4.1          | 4.2          | 0.7                                     |
| Renewables                      | 2.3         | 2.4          | 2.5          | 2.5         | 2.5         | 2.5          | 2.6          | 2.6          | 0.4                                     |
| <b>Total</b>                    | <b>24.5</b> | <b>26.7</b>  | <b>28.4</b>  | <b>28.6</b> | <b>29.2</b> | <b>30.2</b>  | <b>31.0</b>  | <b>32.0</b>  | <b>0.8</b>                              |
| <b>Transportation</b>           |             |              |              |             |             |              |              |              |                                         |
| Liquids                         | 27.1        | 27.5         | 26.2         | 24.7        | 24.2        | 24.4         | 25.2         | 26.2         | -0.1                                    |
| Natural gas                     | 0.8         | 0.8          | 0.8          | 0.9         | 1.0         | 1.1          | 1.2          | 1.3          | 1.5                                     |
| Coal                            | 0.0         | 0.0          | 0.0          | 0.0         | 0.0         | 0.0          | 0.0          | 0.0          | 0.0                                     |
| Electricity                     | 0.0         | 0.1          | 0.1          | 0.2         | 0.3         | 0.3          | 0.4          | 0.4          | 7.6                                     |
| <b>Total</b>                    | <b>27.9</b> | <b>28.4</b>  | <b>27.1</b>  | <b>25.9</b> | <b>25.4</b> | <b>25.8</b>  | <b>26.7</b>  | <b>27.8</b>  | <b>0.0</b>                              |
| <b>All end-use sectors</b>      |             |              |              |             |             |              |              |              |                                         |
| Liquids                         | 36.8        | 38.2         | 37.4         | 36.1        | 35.8        | 36.4         | 37.4         | 38.8         | 0.1                                     |
| Natural gas                     | 18.2        | 19.4         | 20.2         | 20.3        | 20.8        | 21.4         | 22.0         | 22.7         | 0.6                                     |
| Coal                            | 1.3         | 1.2          | 1.2          | 1.1         | 1.1         | 1.0          | 0.9          | 0.9          | -1.1                                    |
| Electricity                     | 12.7        | 13.0         | 13.3         | 13.5        | 13.8        | 14.3         | 14.8         | 15.4         | 0.5                                     |
| Renewables                      | 2.9         | 2.9          | 3.0          | 3.0         | 3.0         | 3.0          | 3.1          | 3.1          | 0.2                                     |
| <b>Delivered energy</b>         | <b>72.0</b> | <b>74.7</b>  | <b>75.1</b>  | <b>74.0</b> | <b>74.4</b> | <b>76.2</b>  | <b>78.3</b>  | <b>80.8</b>  | <b>0.3</b>                              |
| Electricity-related losses      | 25.5        | 25.4         | 25.6         | 25.1        | 25.1        | 25.5         | 25.8         | 26.1         | 0.1                                     |
| Discrepancy                     | -0.5        | -0.5         | -0.4         | -0.3        | -0.3        | -0.3         | -0.2         | -0.2         | -                                       |
| <b>Total</b>                    | <b>97.5</b> | <b>100.2</b> | <b>100.7</b> | <b>99.1</b> | <b>99.5</b> | <b>101.6</b> | <b>104.1</b> | <b>106.9</b> | <b>0.3</b>                              |
| <b>Electric power a/</b>        |             |              |              |             |             |              |              |              |                                         |
| Liquids                         | 0.3         | 0.2          | 0.1          | 0.1         | 0.1         | 0.1          | 0.1          | 0.1          | -3.9                                    |
| Natural gas                     | 10.0        | 8.8          | 8.9          | 10.0        | 10.8        | 11.4         | 12.2         | 12.9         | 0.7                                     |
| Coal                            | 14.1        | 14.0         | 12.2         | 10.4        | 9.9         | 9.6          | 9.2          | 8.9          | -1.3                                    |
| Nuclear                         | 8.3         | 8.0          | 8.1          | 8.0         | 7.5         | 7.3          | 6.9          | 6.4          | -0.8                                    |
| Renewables                      | 5.5         | 7.5          | 9.5          | 10.0        | 10.5        | 11.4         | 12.3         | 13.1         | 2.5                                     |
| <b>Total</b>                    | <b>38.2</b> | <b>38.4</b>  | <b>38.9</b>  | <b>38.5</b> | <b>38.9</b> | <b>39.8</b>  | <b>40.7</b>  | <b>41.4</b>  | <b>0.2</b>                              |
| <b>Total energy consumption</b> |             |              |              |             |             |              |              |              |                                         |
| Liquids                         | 37.1        | 38.4         | 37.5         | 36.2        | 35.9        | 36.5         | 37.5         | 38.9         | 0.1                                     |
| Natural gas                     | 28.2        | 28.2         | 29.1         | 30.4        | 31.6        | 32.9         | 34.2         | 35.7         | 0.7                                     |
| Coal                            | 15.5        | 15.2         | 13.5         | 11.5        | 11.0        | 10.5         | 10.2         | 9.8          | -1.3                                    |
| Nuclear                         | 8.3         | 8.0          | 8.1          | 8.0         | 7.5         | 7.3          | 6.9          | 6.4          | -0.8                                    |
| Renewables                      | 8.4         | 10.4         | 12.5         | 13.0        | 13.5        | 14.4         | 15.4         | 16.2         | 1.9                                     |
| <b>Total</b>                    | <b>97.5</b> | <b>100.2</b> | <b>100.7</b> | <b>99.1</b> | <b>99.5</b> | <b>101.6</b> | <b>104.1</b> | <b>106.9</b> | <b>0.3</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156 and EIA, *Annual Energy Outlook 2017*, DOE/EIA-0383(2017) (Washington, DC: January 2017); AEO2017 National Energy Modeling System, run ref2017.d120816a, www.eia.gov/aeo.

Table F4. Delivered energy consumption in Canada by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.0                                     |
| Natural gas                     | 0.7         | 0.7         | 0.7         | 0.8         | 0.8         | 0.8         | 0.8         | 0.8         | 0.4                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.1                                     |
| Electricity                     | 0.7         | 0.7         | 0.7         | 0.7         | 0.8         | 0.8         | 0.8         | 0.9         | 0.8                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| <b>Total</b>                    | <b>1.5</b>  | <b>1.5</b>  | <b>1.5</b>  | <b>1.6</b>  | <b>1.6</b>  | <b>1.7</b>  | <b>1.7</b>  | <b>1.8</b>  | <b>0.5</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.0                                     |
| Natural gas                     | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | -0.1                                    |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| Electricity                     | 0.4         | 0.5         | 0.5         | 0.6         | 0.7         | 0.7         | 0.8         | 0.8         | 1.9                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| <b>Total</b>                    | <b>1.1</b>  | <b>1.1</b>  | <b>1.2</b>  | <b>1.2</b>  | <b>1.3</b>  | <b>1.4</b>  | <b>1.4</b>  | <b>1.5</b>  | <b>0.8</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 1.9         | 1.8         | 1.8         | 1.8         | 1.8         | 1.8         | 1.8         | 1.8         | -0.3                                    |
| Natural gas                     | 2.4         | 2.2         | 2.3         | 2.3         | 2.4         | 2.4         | 2.6         | 2.6         | 0.2                                     |
| Coal                            | 0.1         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 1.7                                     |
| Electricity                     | 0.7         | 0.8         | 0.8         | 0.8         | 0.9         | 0.9         | 0.9         | 0.9         | 0.7                                     |
| Renewables                      | 0.5         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.3         | 0.3         | -1.6                                    |
| <b>Total</b>                    | <b>5.7</b>  | <b>5.5</b>  | <b>5.5</b>  | <b>5.5</b>  | <b>5.6</b>  | <b>5.7</b>  | <b>5.8</b>  | <b>5.8</b>  | <b>0.1</b>                              |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 2.3         | 2.3         | 2.2         | 2.1         | 2.1         | 2.1         | 2.2         | 2.2         | -0.1                                    |
| Natural gas                     | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 0.4         | 3.0                                     |
| Coal                            | 0.0         | 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         | 0.0         | 12.2                                    |
| <b>Total</b>                    | <b>2.4</b>  | <b>2.4</b>  | <b>2.4</b>  | <b>2.3</b>  | <b>2.3</b>  | <b>2.4</b>  | <b>2.5</b>  | <b>2.6</b>  | <b>0.2</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 4.5         | 4.3         | 4.2         | 4.1         | 4.1         | 4.1         | 4.1         | 4.2         | -0.2                                    |
| Natural gas                     | 3.8         | 3.6         | 3.7         | 3.8         | 3.9         | 4.0         | 4.2         | 4.4         | 0.4                                     |
| Coal                            | 0.1         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 1.7                                     |
| Electricity                     | 1.8         | 1.9         | 2.1         | 2.2         | 2.3         | 2.4         | 2.5         | 2.6         | 1.1                                     |
| Renewables                      | 0.5         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.3         | 0.3         | -1.6                                    |
| <b>Delivered energy</b>         | <b>10.7</b> | <b>10.5</b> | <b>10.6</b> | <b>10.7</b> | <b>10.9</b> | <b>11.1</b> | <b>11.4</b> | <b>11.7</b> | <b>0.3</b>                              |
| Electricity-related losses      | 4.2         | 4.4         | 4.4         | 4.6         | 4.8         | 4.9         | 5.0         | 5.1         | 0.6                                     |
| Discrepancy                     | 0.2         | 0.3         | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 0.3         | 1.2                                     |
| <b>Total</b>                    | <b>15.1</b> | <b>15.1</b> | <b>15.3</b> | <b>15.5</b> | <b>15.9</b> | <b>16.2</b> | <b>16.7</b> | <b>17.1</b> | <b>0.4</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -1.0                                    |
| Natural gas                     | 0.4         | 0.8         | 1.2         | 1.4         | 1.6         | 1.9         | 2.0         | 2.2         | 4.9                                     |
| Coal                            | 0.5         | 0.4         | 0.4         | 0.2         | 0.2         | 0.1         | 0.1         | 0.1         | -4.6                                    |
| Nuclear                         | 1.1         | 1.0         | 0.8         | 0.9         | 0.8         | 0.6         | 0.5         | 0.4         | -3.0                                    |
| Renewables                      | 3.9         | 4.1         | 4.1         | 4.2         | 4.4         | 4.7         | 4.9         | 5.0         | 0.7                                     |
| <b>Total</b>                    | <b>6.0</b>  | <b>6.3</b>  | <b>6.5</b>  | <b>6.7</b>  | <b>7.0</b>  | <b>7.3</b>  | <b>7.5</b>  | <b>7.7</b>  | <b>0.7</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 4.7         | 4.6         | 4.5         | 4.4         | 4.3         | 4.4         | 4.4         | 4.5         | -0.1                                    |
| Natural gas                     | 4.2         | 4.4         | 4.9         | 5.2         | 5.5         | 5.9         | 6.2         | 6.6         | 1.3                                     |
| Coal                            | 0.7         | 0.6         | 0.6         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | -1.8                                    |
| Nuclear                         | 1.1         | 1.0         | 0.8         | 0.9         | 0.8         | 0.6         | 0.5         | 0.4         | -3.0                                    |
| Renewables                      | 4.4         | 4.5         | 4.5         | 4.6         | 4.8         | 5.0         | 5.2         | 5.3         | 0.5                                     |
| <b>Total</b>                    | <b>15.1</b> | <b>15.1</b> | <b>15.3</b> | <b>15.5</b> | <b>15.9</b> | <b>16.2</b> | <b>16.7</b> | <b>17.1</b> | <b>0.4</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F5. Delivered energy consumption in Mexico and Chile by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015       | 2020       | 2025       | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |            |            |            |             |             |             |             |             |                                         |
| Liquids                         | 0.3        | 0.3        | 0.3        | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.0                                     |
| Natural gas                     | 0.1        | 0.1        | 0.1        | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 1.6                                     |
| Coal                            | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -0.1                                    |
| Electricity                     | 0.3        | 0.3        | 0.3        | 0.4         | 0.5         | 0.5         | 0.6         | 0.7         | 2.6                                     |
| Renewables                      | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>0.6</b> | <b>0.6</b> | <b>0.7</b> | <b>0.8</b>  | <b>0.8</b>  | <b>0.9</b>  | <b>1.0</b>  | <b>1.0</b>  | <b>1.5</b>                              |
| <b>Commercial</b>               |            |            |            |             |             |             |             |             |                                         |
| Liquids                         | 0.1        | 0.1        | 0.1        | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 2.3                                     |
| Natural gas                     | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 2.0                                     |
| Coal                            | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -0.2                                    |
| Electricity                     | 0.1        | 0.2        | 0.2        | 0.2         | 0.3         | 0.3         | 0.4         | 0.4         | 3.2                                     |
| Renewables                      | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>0.2</b> | <b>0.3</b> | <b>0.3</b> | <b>0.4</b>  | <b>0.5</b>  | <b>0.5</b>  | <b>0.6</b>  | <b>0.7</b>  | <b>2.8</b>                              |
| <b>Industrial</b>               |            |            |            |             |             |             |             |             |                                         |
| Liquids                         | 1.5        | 1.4        | 1.4        | 1.4         | 1.5         | 1.5         | 1.6         | 1.6         | 0.2                                     |
| Natural gas                     | 1.5        | 1.4        | 1.5        | 1.5         | 1.5         | 1.6         | 1.6         | 1.7         | 0.3                                     |
| Coal                            | 0.2        | 0.2        | 0.2        | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2                                     |
| Electricity                     | 0.6        | 0.6        | 0.6        | 0.6         | 0.7         | 0.7         | 0.7         | 0.7         | 0.4                                     |
| Renewables                      | 0.3        | 0.3        | 0.3        | 0.3         | 0.3         | 0.4         | 0.4         | 0.4         | 0.1                                     |
| <b>Total</b>                    | <b>4.2</b> | <b>3.9</b> | <b>3.9</b> | <b>4.0</b>  | <b>4.2</b>  | <b>4.3</b>  | <b>4.4</b>  | <b>4.5</b>  | <b>0.2</b>                              |
| <b>Transportation</b>           |            |            |            |             |             |             |             |             |                                         |
| Liquids                         | 2.8        | 2.7        | 2.8        | 2.8         | 3.0         | 3.2         | 3.3         | 3.5         | 0.6                                     |
| Natural gas                     | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0         | 0.1         | 0.1         | 10.5                                    |
| Coal                            | 0.0        | 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         | 0.0         | 6.7                                     |
| <b>Total</b>                    | <b>2.8</b> | <b>2.8</b> | <b>2.8</b> | <b>2.9</b>  | <b>3.0</b>  | <b>3.2</b>  | <b>3.4</b>  | <b>3.6</b>  | <b>0.7</b>                              |
| <b>All end-use sectors</b>      |            |            |            |             |             |             |             |             |                                         |
| Liquids                         | 4.7        | 4.5        | 4.5        | 4.6         | 4.8         | 5.1         | 5.3         | 5.5         | 0.5                                     |
| Natural gas                     | 1.6        | 1.5        | 1.6        | 1.6         | 1.7         | 1.8         | 1.8         | 1.9         | 0.5                                     |
| Coal                            | 0.2        | 0.2        | 0.2        | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2                                     |
| Electricity                     | 1.1        | 1.1        | 1.2        | 1.3         | 1.4         | 1.6         | 1.7         | 1.9         | 1.6                                     |
| Renewables                      | 0.4        | 0.3        | 0.3        | 0.3         | 0.4         | 0.4         | 0.4         | 0.4         | 0.1                                     |
| <b>Delivered energy</b>         | <b>7.9</b> | <b>7.6</b> | <b>7.8</b> | <b>8.1</b>  | <b>8.5</b>  | <b>9.0</b>  | <b>9.4</b>  | <b>9.8</b>  | <b>0.6</b>                              |
| Electricity-related losses      | 2.0        | 1.9        | 2.0        | 2.4         | 2.7         | 2.9         | 3.1         | 3.3         | 1.5                                     |
| Discrepancy                     | -0.6       | -0.3       | -0.2       | -0.2        | -0.2        | -0.3        | -0.3        | -0.3        | -                                       |
| <b>Total</b>                    | <b>9.3</b> | <b>9.1</b> | <b>9.5</b> | <b>10.2</b> | <b>10.9</b> | <b>11.6</b> | <b>12.2</b> | <b>12.9</b> | <b>0.9</b>                              |
| <b>Electric power a/</b>        |            |            |            |             |             |             |             |             |                                         |
| Liquids                         | 0.4        | 0.1        | 0.2        | 0.2         | 0.1         | 0.1         | 0.1         | 0.1         | -3.3                                    |
| Natural gas                     | 1.2        | 1.4        | 1.6        | 1.7         | 1.7         | 2.0         | 2.3         | 2.5         | 2.1                                     |
| Coal                            | 0.5        | 0.5        | 0.5        | 0.5         | 0.5         | 0.5         | 0.5         | 0.4         | -0.2                                    |
| Nuclear                         | 0.1        | 0.1        | 0.1        | 0.2         | 0.3         | 0.2         | 0.2         | 0.2         | 1.2                                     |
| Renewables                      | 0.8        | 0.8        | 0.8        | 1.1         | 1.5         | 1.6         | 1.8         | 1.9         | 2.4                                     |
| <b>Total</b>                    | <b>3.0</b> | <b>3.0</b> | <b>3.2</b> | <b>3.7</b>  | <b>4.1</b>  | <b>4.5</b>  | <b>4.8</b>  | <b>5.2</b>  | <b>1.5</b>                              |
| <b>Total energy consumption</b> |            |            |            |             |             |             |             |             |                                         |
| Liquids                         | 4.6        | 4.3        | 4.4        | 4.5         | 4.7         | 5.0         | 5.2         | 5.4         | 0.5                                     |
| Natural gas                     | 2.8        | 2.9        | 3.2        | 3.3         | 3.4         | 3.8         | 4.1         | 4.5         | 1.3                                     |
| Coal                            | 0.6        | 0.7        | 0.7        | 0.7         | 0.6         | 0.6         | 0.6         | 0.6         | -0.1                                    |
| Nuclear                         | 0.1        | 0.1        | 0.1        | 0.2         | 0.3         | 0.2         | 0.2         | 0.2         | 1.2                                     |
| Renewables                      | 1.2        | 1.1        | 1.1        | 1.4         | 1.8         | 2.0         | 2.1         | 2.3         | 1.9                                     |
| <b>Total</b>                    | <b>9.3</b> | <b>9.1</b> | <b>9.5</b> | <b>10.2</b> | <b>10.9</b> | <b>11.6</b> | <b>12.2</b> | <b>12.9</b> | <b>0.9</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F6. Delivered energy consumption in OECD Europe by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 1.6         | 1.5         | 1.5         | 1.5         | 1.5         | 1.5         | 1.5         | 1.5         | 0.0                                     |
| Natural gas                     | 4.6         | 4.8         | 4.9         | 5.1         | 5.2         | 5.3         | 5.4         | 5.5         | 0.5                                     |
| Coal                            | 0.5         | 0.5         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | -0.9                                    |
| Electricity                     | 3.2         | 3.3         | 3.6         | 3.7         | 3.9         | 4.1         | 4.3         | 4.4         | 1.0                                     |
| Renewables                      | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.8                                     |
| <b>Total</b>                    | <b>10.0</b> | <b>10.3</b> | <b>10.6</b> | <b>10.9</b> | <b>11.2</b> | <b>11.5</b> | <b>11.7</b> | <b>12.0</b> | <b>0.5</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.7         | 0.7         | 0.7         | 0.7         | 0.7         | 0.7         | 0.7         | 0.7         | -0.1                                    |
| Natural gas                     | 2.1         | 2.2         | 2.2         | 2.3         | 2.3         | 2.4         | 2.3         | 2.4         | 0.4                                     |
| Coal                            | 0.2         | 0.2         | 0.2         | 0.2         | 0.1         | 0.1         | 0.1         | 0.1         | -1.1                                    |
| Electricity                     | 3.2         | 3.5         | 3.8         | 4.1         | 4.4         | 4.7         | 5.0         | 5.4         | 1.5                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>6.2</b>  | <b>6.6</b>  | <b>6.9</b>  | <b>7.2</b>  | <b>7.5</b>  | <b>7.9</b>  | <b>8.2</b>  | <b>8.6</b>  | <b>0.9</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 8.5         | 8.0         | 7.7         | 7.7         | 7.7         | 7.7         | 7.6         | 7.7         | -0.3                                    |
| Natural gas                     | 6.6         | 6.3         | 6.2         | 6.2         | 6.2         | 6.2         | 6.1         | 6.2         | -0.2                                    |
| Coal                            | 2.7         | 2.7         | 2.6         | 2.6         | 2.7         | 2.7         | 2.7         | 2.7         | 0.0                                     |
| Electricity                     | 4.4         | 4.3         | 4.3         | 4.3         | 4.3         | 4.3         | 4.3         | 4.3         | 0.0                                     |
| Renewables                      | 2.1         | 2.0         | 1.9         | 1.9         | 1.9         | 1.8         | 1.7         | 1.7         | -0.5                                    |
| <b>Total</b>                    | <b>24.2</b> | <b>23.2</b> | <b>22.8</b> | <b>22.8</b> | <b>22.8</b> | <b>22.7</b> | <b>22.5</b> | <b>22.7</b> | <b>-0.2</b>                             |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 18.6        | 17.8        | 17.3        | 17.0        | 16.8        | 16.7        | 16.4        | 16.2        | -0.4                                    |
| Natural gas                     | 0.2         | 0.3         | 0.5         | 0.7         | 1.0         | 1.3         | 1.7         | 2.2         | 7.1                                     |
| Coal                            | 0.0         | 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         | 0.8         | 1.2         | 1.5         | 1.8         | 7.8                                     |
| <b>Total</b>                    | <b>18.9</b> | <b>18.3</b> | <b>18.0</b> | <b>18.1</b> | <b>18.6</b> | <b>19.2</b> | <b>19.6</b> | <b>20.3</b> | <b>0.2</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 29.4        | 28.1        | 27.2        | 27.0        | 26.8        | 26.7        | 26.3        | 26.1        | -0.3                                    |
| Natural gas                     | 13.5        | 13.6        | 13.8        | 14.3        | 14.7        | 15.2        | 15.6        | 16.3        | 0.5                                     |
| Coal                            | 3.4         | 3.3         | 3.3         | 3.2         | 3.2         | 3.2         | 3.2         | 3.2         | -0.1                                    |
| Electricity                     | 10.9        | 11.3        | 11.9        | 12.5        | 13.3        | 14.2        | 15.0        | 16.0        | 1.1                                     |
| Renewables                      | 2.2         | 2.2         | 2.1         | 2.1         | 2.0         | 2.0         | 1.9         | 1.9         | -0.4                                    |
| <b>Delivered energy</b>         | <b>59.4</b> | <b>58.5</b> | <b>58.3</b> | <b>59.0</b> | <b>60.1</b> | <b>61.2</b> | <b>62.0</b> | <b>63.6</b> | <b>0.2</b>                              |
| Electricity-related losses      | 21.4        | 21.9        | 23.0        | 24.4        | 25.2        | 26.5        | 27.3        | 28.3        | 0.8                                     |
| Discrepancy                     | -1.0        | 0.1         | -0.3        | -0.4        | -0.4        | -0.5        | -0.5        | -0.5        | -                                       |
| <b>Total</b>                    | <b>79.8</b> | <b>80.5</b> | <b>81.0</b> | <b>83.0</b> | <b>84.8</b> | <b>87.2</b> | <b>88.8</b> | <b>91.4</b> | <b>0.4</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.3         | 0.3         | 0.3         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | -0.9                                    |
| Natural gas                     | 3.8         | 4.2         | 4.2         | 4.3         | 6.2         | 7.6         | 9.5         | 11.5        | 3.2                                     |
| Coal                            | 8.4         | 9.0         | 8.7         | 8.5         | 8.5         | 8.4         | 8.6         | 8.9         | 0.2                                     |
| Nuclear                         | 8.5         | 7.4         | 6.7         | 6.8         | 6.3         | 6.0         | 5.0         | 4.0         | -2.1                                    |
| Renewables                      | 11.4        | 12.3        | 15.1        | 17.1        | 17.4        | 18.4        | 19.0        | 19.7        | 1.6                                     |
| <b>Total</b>                    | <b>32.3</b> | <b>33.2</b> | <b>34.9</b> | <b>36.9</b> | <b>38.6</b> | <b>40.7</b> | <b>42.3</b> | <b>44.3</b> | <b>0.9</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 28.6        | 28.4        | 27.2        | 26.8        | 26.6        | 26.4        | 26.0        | 25.8        | -0.3                                    |
| Natural gas                     | 17.3        | 17.8        | 18.0        | 18.6        | 20.9        | 22.8        | 25.1        | 27.8        | 1.4                                     |
| Coal                            | 11.8        | 12.3        | 11.9        | 11.7        | 11.7        | 11.6        | 11.7        | 12.1        | 0.1                                     |
| Nuclear                         | 8.5         | 7.4         | 6.7         | 6.8         | 6.3         | 6.0         | 5.0         | 4.0         | -2.1                                    |
| Renewables                      | 13.6        | 14.5        | 17.2        | 19.2        | 19.4        | 20.4        | 20.9        | 21.7        | 1.3                                     |
| <b>Total</b>                    | <b>79.8</b> | <b>80.5</b> | <b>81.0</b> | <b>83.0</b> | <b>84.8</b> | <b>87.2</b> | <b>88.8</b> | <b>91.4</b> | <b>0.4</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.



Table F7. Delivered energy consumption in Japan by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | -0.1                                    |
| Natural gas                     | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.1                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| Electricity                     | 1.1         | 1.1         | 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         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>2.0</b>  | <b>2.1</b>  | <b>2.1</b>  | <b>2.1</b>  | <b>2.1</b>  | <b>2.1</b>  | <b>2.1</b>  | <b>2.1</b>  | <b>0.1</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | -0.1                                    |
| Natural gas                     | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.0                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -0.2                                    |
| Electricity                     | 1.4         | 1.5         | 1.5         | 1.5         | 1.6         | 1.6         | 1.6         | 1.6         | 0.4                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>2.4</b>  | <b>2.4</b>  | <b>2.5</b>  | <b>2.5</b>  | <b>2.5</b>  | <b>2.5</b>  | <b>2.5</b>  | <b>2.5</b>  | <b>0.2</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 3.7         | 3.3         | 3.2         | 3.0         | 2.8         | 2.6         | 2.4         | 2.3         | -1.4                                    |
| Natural gas                     | 1.0         | 0.8         | 0.8         | 0.8         | 0.8         | 0.7         | 0.7         | 0.6         | -1.2                                    |
| Coal                            | 2.0         | 1.9         | 1.9         | 1.8         | 1.7         | 1.6         | 1.5         | 1.4         | -1.0                                    |
| Electricity                     | 0.7         | 0.7         | 0.7         | 0.7         | 0.6         | 0.6         | 0.5         | 0.5         | -0.7                                    |
| Renewables                      | 0.5         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.3         | -1.2                                    |
| <b>Total</b>                    | <b>7.9</b>  | <b>7.2</b>  | <b>7.0</b>  | <b>6.6</b>  | <b>6.3</b>  | <b>5.9</b>  | <b>5.5</b>  | <b>5.2</b>  | <b>-1.2</b>                             |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 3.6         | 3.2         | 3.1         | 3.0         | 3.0         | 2.9         | 2.9         | 2.9         | -0.6                                    |
| Natural gas                     | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.1         | 0.2         | 0.3         | 14.3                                    |
| Coal                            | 0.0         | 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         | 0.2         | 2.5                                     |
| <b>Total</b>                    | <b>3.7</b>  | <b>3.3</b>  | <b>3.2</b>  | <b>3.1</b>  | <b>3.1</b>  | <b>3.2</b>  | <b>3.3</b>  | <b>3.4</b>  | <b>-0.2</b>                             |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 8.4         | 7.6         | 7.3         | 7.0         | 6.8         | 6.6         | 6.4         | 6.2         | -0.8                                    |
| Natural gas                     | 1.7         | 1.6         | 1.6         | 1.6         | 1.6         | 1.6         | 1.7         | 1.7         | 0.0                                     |
| Coal                            | 2.0         | 1.9         | 1.9         | 1.8         | 1.7         | 1.6         | 1.5         | 1.4         | -1.0                                    |
| Electricity                     | 3.2         | 3.4         | 3.5         | 3.5         | 3.5         | 3.5         | 3.4         | 3.4         | 0.2                                     |
| Renewables                      | 0.5         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | -1.1                                    |
| <b>Delivered energy</b>         | <b>15.9</b> | <b>15.0</b> | <b>14.7</b> | <b>14.3</b> | <b>14.0</b> | <b>13.7</b> | <b>13.4</b> | <b>13.2</b> | <b>-0.5</b>                             |
| Electricity-related losses      | 4.3         | 4.9         | 5.3         | 5.3         | 5.3         | 5.3         | 5.3         | 5.3         | 0.6                                     |
| Discrepancy                     | -0.6        | -0.7        | -0.3        | -0.2        | -0.2        | -0.2        | -0.2        | -0.2        | -                                       |
| <b>Total</b>                    | <b>19.6</b> | <b>19.2</b> | <b>19.7</b> | <b>19.4</b> | <b>19.1</b> | <b>18.8</b> | <b>18.5</b> | <b>18.3</b> | <b>-0.2</b>                             |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.5         | 0.3         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -8.3                                    |
| Natural gas                     | 3.3         | 3.3         | 3.3         | 3.4         | 3.4         | 3.4         | 3.3         | 3.3         | 0.1                                     |
| Coal                            | 2.2         | 2.2         | 2.2         | 2.1         | 2.1         | 2.1         | 2.0         | 2.0         | -0.3                                    |
| Nuclear                         | 0.1         | 1.0         | 1.3         | 1.2         | 1.2         | 1.2         | 1.2         | 1.2         | 8.4                                     |
| Renewables                      | 1.5         | 1.5         | 1.9         | 2.0         | 2.0         | 2.1         | 2.1         | 2.2         | 1.2                                     |
| <b>Total</b>                    | <b>7.5</b>  | <b>8.3</b>  | <b>8.8</b>  | <b>8.8</b>  | <b>8.8</b>  | <b>8.8</b>  | <b>8.7</b>  | <b>8.7</b>  | <b>0.4</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 8.3         | 7.2         | 7.1         | 6.8         | 6.6         | 6.4         | 6.2         | 6.0         | -0.9                                    |
| Natural gas                     | 5.0         | 4.9         | 4.9         | 5.0         | 5.0         | 5.0         | 5.0         | 5.1         | 0.0                                     |
| Coal                            | 4.3         | 4.2         | 4.1         | 4.0         | 3.8         | 3.7         | 3.5         | 3.4         | -0.6                                    |
| Nuclear                         | 0.1         | 1.0         | 1.3         | 1.2         | 1.2         | 1.2         | 1.2         | 1.2         | 8.4                                     |
| Renewables                      | 2.0         | 1.9         | 2.4         | 2.4         | 2.5         | 2.5         | 2.5         | 2.5         | 0.7                                     |
| <b>Total</b>                    | <b>19.6</b> | <b>19.2</b> | <b>19.7</b> | <b>19.4</b> | <b>19.1</b> | <b>18.8</b> | <b>18.5</b> | <b>18.3</b> | <b>-0.2</b>                             |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F8. Delivered energy consumption in South Korea by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.0                                     |
| Natural gas                     | 0.4         | 0.4         | 0.4         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.9                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -0.1                                    |
| Electricity                     | 0.2         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.4         | 0.4         | 1.4                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>0.8</b>  | <b>0.8</b>  | <b>0.9</b>  | <b>0.9</b>  | <b>1.0</b>  | <b>1.0</b>  | <b>1.0</b>  | <b>1.1</b>  | <b>0.9</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.0                                     |
| Natural gas                     | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| Electricity                     | 0.5         | 0.6         | 0.7         | 0.8         | 0.9         | 1.0         | 1.1         | 1.2         | 2.2                                     |
| Renewables                      | 0.0         | 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>1.0</b>  | <b>1.1</b>  | <b>1.2</b>  | <b>1.3</b>  | <b>1.3</b>  | <b>1.4</b>  | <b>1.7</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 2.7         | 2.7         | 2.9         | 3.1         | 3.2         | 3.3         | 3.4         | 3.5         | 0.7                                     |
| Natural gas                     | 0.4         | 0.5         | 0.5         | 0.6         | 0.6         | 0.7         | 0.7         | 0.8         | 1.6                                     |
| Coal                            | 1.1         | 1.3         | 1.4         | 1.5         | 1.6         | 1.7         | 1.8         | 1.9         | 1.4                                     |
| Electricity                     | 1.0         | 1.0         | 1.1         | 1.2         | 1.3         | 1.4         | 1.4         | 1.5         | 1.3                                     |
| Renewables                      | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 1.0                                     |
| <b>Total</b>                    | <b>5.4</b>  | <b>5.6</b>  | <b>6.1</b>  | <b>6.6</b>  | <b>6.9</b>  | <b>7.2</b>  | <b>7.5</b>  | <b>7.8</b>  | <b>1.1</b>                              |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 1.7         | 1.6         | 1.7         | 1.7         | 1.8         | 1.9         | 2.0         | 2.0         | 0.6                                     |
| Natural gas                     | 0.0         | 0.0         | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.3         | 6.9                                     |
| Coal                            | 0.0         | 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         | 0.1         | 3.5                                     |
| <b>Total</b>                    | <b>1.7</b>  | <b>1.7</b>  | <b>1.8</b>  | <b>1.9</b>  | <b>2.0</b>  | <b>2.1</b>  | <b>2.2</b>  | <b>2.4</b>  | <b>0.9</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 4.6         | 4.6         | 4.8         | 5.1         | 5.2         | 5.4         | 5.6         | 5.8         | 0.6                                     |
| Natural gas                     | 1.0         | 1.1         | 1.2         | 1.3         | 1.4         | 1.5         | 1.6         | 1.7         | 1.5                                     |
| Coal                            | 1.2         | 1.3         | 1.4         | 1.5         | 1.6         | 1.7         | 1.8         | 1.9         | 1.4                                     |
| Electricity                     | 1.7         | 1.9         | 2.2         | 2.4         | 2.5         | 2.7         | 2.9         | 3.1         | 1.6                                     |
| Renewables                      | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 1.0                                     |
| <b>Delivered energy</b>         | <b>8.7</b>  | <b>9.0</b>  | <b>9.8</b>  | <b>10.4</b> | <b>11.0</b> | <b>11.5</b> | <b>12.1</b> | <b>12.7</b> | <b>1.1</b>                              |
| Electricity-related losses      | 2.7         | 3.1         | 3.6         | 4.0         | 4.3         | 4.6         | 4.9         | 5.2         | 1.9                                     |
| Discrepancy                     | 0.3         | 0.7         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.1                                     |
| <b>Total</b>                    | <b>11.7</b> | <b>12.8</b> | <b>13.8</b> | <b>14.7</b> | <b>15.5</b> | <b>16.4</b> | <b>17.2</b> | <b>18.1</b> | <b>1.3</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.0         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.8                                     |
| Natural gas                     | 0.9         | 1.0         | 1.0         | 1.0         | 1.2         | 1.4         | 1.5         | 1.6         | 1.6                                     |
| Coal                            | 1.9         | 1.9         | 2.0         | 2.0         | 2.1         | 2.2         | 2.4         | 2.6         | 0.8                                     |
| Nuclear                         | 1.5         | 1.9         | 2.4         | 2.5         | 2.7         | 2.8         | 2.9         | 3.1         | 2.1                                     |
| Renewables                      | 0.1         | 0.1         | 0.4         | 0.7         | 0.8         | 0.8         | 0.9         | 0.9         | 6.7                                     |
| <b>Total</b>                    | <b>4.5</b>  | <b>5.0</b>  | <b>5.8</b>  | <b>6.4</b>  | <b>6.8</b>  | <b>7.3</b>  | <b>7.8</b>  | <b>8.3</b>  | <b>1.8</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 4.9         | 5.3         | 5.3         | 5.4         | 5.6         | 5.8         | 6.0         | 6.1         | 0.6                                     |
| Natural gas                     | 2.0         | 2.1         | 2.2         | 2.4         | 2.6         | 2.9         | 3.1         | 3.4         | 1.6                                     |
| Coal                            | 3.1         | 3.2         | 3.4         | 3.6         | 3.7         | 3.9         | 4.2         | 4.5         | 1.1                                     |
| Nuclear                         | 1.5         | 1.9         | 2.4         | 2.5         | 2.7         | 2.8         | 2.9         | 3.1         | 2.1                                     |
| Renewables                      | 0.2         | 0.2         | 0.5         | 0.9         | 0.9         | 1.0         | 1.0         | 1.1         | 4.7                                     |
| <b>Total</b>                    | <b>11.7</b> | <b>12.8</b> | <b>13.8</b> | <b>14.7</b> | <b>15.5</b> | <b>16.4</b> | <b>17.2</b> | <b>18.1</b> | <b>1.3</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F9. Delivered energy consumption in Australia and New Zealand by end-use sector and fuel,

2015-50

quadrillion Btu

| Sector/fuel                     | 2015       | 2020       | 2025       | 2030       | 2035       | 2040       | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |            |            |            |            |            |            |             |             |                                         |
| Liquids                         | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0                                     |
| Natural gas                     | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2         | 0.2         | 1.1                                     |
| Coal                            | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | -0.1                                    |
| Electricity                     | 0.3        | 0.3        | 0.3        | 0.3        | 0.4        | 0.4        | 0.5         | 0.5         | 1.9                                     |
| Renewables                      | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>0.4</b> | <b>0.5</b> | <b>0.5</b> | <b>0.6</b> | <b>0.6</b> | <b>0.7</b> | <b>0.7</b>  | <b>0.8</b>  | <b>1.6</b>                              |
| <b>Commercial</b>               |            |            |            |            |            |            |             |             |                                         |
| Liquids                         | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | -0.1                                    |
| Natural gas                     | 0.1        | 0.1        | 0.1        | 0.1        | 0.1        | 0.1        | 0.1         | 0.1         | 0.1                                     |
| Coal                            | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | -0.2                                    |
| Electricity                     | 0.3        | 0.3        | 0.4        | 0.5        | 0.6        | 0.7        | 0.9         | 1.0         | 3.9                                     |
| Renewables                      | 0.0        | 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>0.6</b> | <b>0.7</b> | <b>0.8</b> | <b>1.0</b>  | <b>1.1</b>  | <b>3.2</b>                              |
| <b>Industrial</b>               |            |            |            |            |            |            |             |             |                                         |
| Liquids                         | 0.9        | 0.8        | 0.9        | 0.9        | 0.9        | 1.0        | 1.0         | 1.1         | 0.6                                     |
| Natural gas                     | 1.0        | 1.0        | 1.0        | 1.1        | 1.2        | 1.3        | 1.4         | 1.5         | 1.2                                     |
| Coal                            | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2         | 0.2         | 0.5                                     |
| Electricity                     | 0.4        | 0.4        | 0.4        | 0.4        | 0.5        | 0.5        | 0.5         | 0.6         | 1.4                                     |
| Renewables                      | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2         | 0.2         | 0.4                                     |
| <b>Total</b>                    | <b>2.7</b> | <b>2.5</b> | <b>2.7</b> | <b>2.9</b> | <b>3.0</b> | <b>3.2</b> | <b>3.4</b>  | <b>3.7</b>  | <b>0.9</b>                              |
| <b>Transportation</b>           |            |            |            |            |            |            |             |             |                                         |
| Liquids                         | 1.9        | 1.9        | 2.0        | 2.0        | 2.1        | 2.2        | 2.4         | 2.6         | 0.9                                     |
| Natural gas                     | 0.0        | 0.0        | 0.0        | 0.0        | 0.1        | 0.1        | 0.1         | 0.1         | 6.1                                     |
| Coal                            | 0.0        | 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         | 0.0         | 2.5                                     |
| <b>Total</b>                    | <b>1.9</b> | <b>1.9</b> | <b>2.0</b> | <b>2.1</b> | <b>2.2</b> | <b>2.3</b> | <b>2.5</b>  | <b>2.8</b>  | <b>1.1</b>                              |
| <b>All end-use sectors</b>      |            |            |            |            |            |            |             |             |                                         |
| Liquids                         | 2.8        | 2.7        | 2.9        | 3.0        | 3.1        | 3.3        | 3.5         | 3.7         | 0.8                                     |
| Natural gas                     | 1.2        | 1.2        | 1.3        | 1.4        | 1.5        | 1.7        | 1.8         | 2.0         | 1.4                                     |
| Coal                            | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2         | 0.2         | 0.5                                     |
| Electricity                     | 0.9        | 1.0        | 1.1        | 1.3        | 1.5        | 1.7        | 1.9         | 2.1         | 2.5                                     |
| Renewables                      | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2        | 0.2         | 0.3         | 0.5                                     |
| <b>Delivered energy</b>         | <b>5.4</b> | <b>5.3</b> | <b>5.7</b> | <b>6.1</b> | <b>6.5</b> | <b>7.0</b> | <b>7.6</b>  | <b>8.3</b>  | <b>1.3</b>                              |
| Electricity-related losses      | 1.8        | 2.0        | 2.2        | 2.4        | 2.6        | 2.9        | 3.2         | 3.6         | 2.0                                     |
| Discrepancy                     | -0.2       | -0.1       | -0.1       | -0.1       | -0.1       | -0.1       | -0.1        | -0.1        | -                                       |
| <b>Total</b>                    | <b>6.9</b> | <b>7.2</b> | <b>7.8</b> | <b>8.4</b> | <b>9.1</b> | <b>9.9</b> | <b>10.8</b> | <b>11.9</b> | <b>1.6</b>                              |
| <b>Electric power a/</b>        |            |            |            |            |            |            |             |             |                                         |
| Liquids                         | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | -0.8                                    |
| Natural gas                     | 0.4        | 0.5        | 0.6        | 0.8        | 1.1        | 1.3        | 1.6         | 2.0         | 4.3                                     |
| Coal                            | 1.5        | 1.5        | 1.4        | 1.4        | 1.4        | 1.3        | 1.3         | 1.3         | -0.4                                    |
| Nuclear                         | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0                                     |
| Renewables                      | 0.7        | 1.0        | 1.3        | 1.5        | 1.7        | 1.9        | 2.2         | 2.5         | 3.6                                     |
| <b>Total</b>                    | <b>2.7</b> | <b>3.0</b> | <b>3.3</b> | <b>3.7</b> | <b>4.1</b> | <b>4.6</b> | <b>5.1</b>  | <b>5.8</b>  | <b>2.2</b>                              |
| <b>Total energy consumption</b> |            |            |            |            |            |            |             |             |                                         |
| Liquids                         | 2.6        | 2.6        | 2.8        | 2.9        | 3.0        | 3.2        | 3.4         | 3.7         | 1.0                                     |
| Natural gas                     | 1.7        | 1.7        | 1.9        | 2.2        | 2.6        | 3.0        | 3.5         | 3.9         | 2.5                                     |
| Coal                            | 1.7        | 1.6        | 1.6        | 1.6        | 1.6        | 1.5        | 1.5         | 1.5         | -0.3                                    |
| Nuclear                         | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0         | 0.0         | 0.0                                     |
| Renewables                      | 0.9        | 1.2        | 1.5        | 1.7        | 1.9        | 2.1        | 2.4         | 2.7         | 3.1                                     |
| <b>Total</b>                    | <b>6.9</b> | <b>7.2</b> | <b>7.8</b> | <b>8.4</b> | <b>9.1</b> | <b>9.9</b> | <b>10.8</b> | <b>11.9</b> | <b>1.6</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F10. Total Non-OECD delivered energy consumption by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015         | 2020         | 2025         | 2030         | 2035         | 2040         | 2045         | 2050         | Average annual percent change (2015-50) |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------------------------------|
| <b>Residential</b>              |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 4.9          | 4.9          | 4.9          | 4.9          | 4.9          | 4.9          | 4.9          | 4.9          | 0.0                                     |
| Natural gas                     | 8.9          | 9.6          | 10.4         | 11.1         | 12.0         | 12.8         | 13.5         | 14.3         | 1.4                                     |
| Coal                            | 3.9          | 3.6          | 3.4          | 3.2          | 3.0          | 2.8          | 2.7          | 2.7          | -1.1                                    |
| Electricity                     | 9.7          | 11.4         | 13.6         | 16.0         | 18.7         | 21.5         | 24.3         | 26.9         | 3.0                                     |
| Renewables                      | 0.8          | 0.8          | 0.8          | 0.9          | 0.9          | 0.9          | 1.0          | 1.0          | 0.8                                     |
| <b>Total</b>                    | <b>28.2</b>  | <b>30.3</b>  | <b>33.0</b>  | <b>36.1</b>  | <b>39.4</b>  | <b>42.9</b>  | <b>46.4</b>  | <b>49.8</b>  | <b>1.6</b>                              |
| <b>Commercial</b>               |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 1.4          | 1.5          | 1.5          | 1.6          | 1.6          | 1.7          | 1.7          | 1.8          | 0.6                                     |
| Natural gas                     | 2.0          | 2.2          | 2.3          | 2.4          | 2.5          | 2.7          | 2.8          | 2.9          | 1.0                                     |
| Coal                            | 1.4          | 1.3          | 1.4          | 1.4          | 1.4          | 1.4          | 1.4          | 1.4          | 0.1                                     |
| Electricity                     | 5.6          | 6.5          | 7.6          | 8.8          | 9.9          | 11.0         | 12.2         | 13.2         | 2.5                                     |
| Renewables                      | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.8                                     |
| <b>Total</b>                    | <b>10.5</b>  | <b>11.6</b>  | <b>12.9</b>  | <b>14.2</b>  | <b>15.5</b>  | <b>16.9</b>  | <b>18.2</b>  | <b>19.4</b>  | <b>1.8</b>                              |
| <b>Industrial</b>               |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 41.5         | 42.6         | 45.2         | 47.9         | 50.9         | 54.1         | 57.4         | 60.2         | 1.1                                     |
| Natural gas                     | 30.5         | 32.0         | 35.2         | 38.6         | 42.5         | 46.4         | 50.4         | 54.1         | 1.6                                     |
| Coal                            | 55.5         | 55.6         | 55.5         | 54.5         | 53.8         | 53.5         | 53.0         | 52.3         | -0.2                                    |
| Electricity                     | 23.3         | 25.2         | 26.6         | 27.5         | 28.4         | 29.3         | 30.0         | 30.6         | 0.8                                     |
| Renewables                      | 12.0         | 12.0         | 13.0         | 14.2         | 15.6         | 17.1         | 18.7         | 20.2         | 1.5                                     |
| <b>Total</b>                    | <b>162.8</b> | <b>167.4</b> | <b>175.5</b> | <b>182.7</b> | <b>191.2</b> | <b>200.5</b> | <b>209.5</b> | <b>217.4</b> | <b>0.8</b>                              |
| <b>Transportation</b>           |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 47.2         | 51.3         | 57.1         | 61.7         | 66.5         | 71.8         | 77.1         | 81.2         | 1.6                                     |
| Natural gas                     | 2.7          | 3.3          | 4.5          | 5.7          | 7.4          | 9.5          | 12.3         | 16.0         | 5.2                                     |
| Coal                            | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0                                     |
| Electricity                     | 1.2          | 1.4          | 1.6          | 1.9          | 2.2          | 2.7          | 3.3          | 4.0          | 3.5                                     |
| <b>Total</b>                    | <b>51.1</b>  | <b>56.0</b>  | <b>63.2</b>  | <b>69.3</b>  | <b>76.0</b>  | <b>84.0</b>  | <b>92.7</b>  | <b>101.3</b> | <b>2.0</b>                              |
| <b>All end-use sectors</b>      |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 95.1         | 100.2        | 108.6        | 116.0        | 123.8        | 132.5        | 141.0        | 148.1        | 1.3                                     |
| Natural gas                     | 44.2         | 47.2         | 52.4         | 57.9         | 64.4         | 71.4         | 79.0         | 87.3         | 2.0                                     |
| Coal                            | 60.7         | 60.5         | 60.2         | 59.1         | 58.2         | 57.8         | 57.2         | 56.4         | -0.2                                    |
| Electricity                     | 39.8         | 44.5         | 49.5         | 54.2         | 59.2         | 64.5         | 69.8         | 74.8         | 1.8                                     |
| Renewables                      | 12.8         | 12.9         | 13.9         | 15.1         | 16.6         | 18.2         | 19.8         | 21.3         | 1.5                                     |
| <b>Delivered energy</b>         | <b>252.6</b> | <b>265.2</b> | <b>284.6</b> | <b>302.3</b> | <b>322.1</b> | <b>344.3</b> | <b>366.7</b> | <b>387.8</b> | <b>1.2</b>                              |
| Electricity-related losses      | 84.4         | 92.6         | 101.6        | 110.0        | 119.2        | 128.7        | 138.0        | 146.7        | 1.6                                     |
| Discrepancy                     | -1.4         | 3.0          | 1.0          | 0.7          | 1.1          | 1.7          | 2.1          | 2.5          | -                                       |
| <b>Total</b>                    | <b>335.5</b> | <b>360.9</b> | <b>387.1</b> | <b>413.0</b> | <b>442.4</b> | <b>474.7</b> | <b>506.9</b> | <b>537.1</b> | <b>1.4</b>                              |
| <b>Electric power a/</b>        |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 6.1          | 6.0          | 5.7          | 4.4          | 4.3          | 4.1          | 4.0          | 3.9          | -1.3                                    |
| Natural gas                     | 23.6         | 22.5         | 26.8         | 29.4         | 32.7         | 36.5         | 40.6         | 44.0         | 1.8                                     |
| Coal                            | 59.8         | 63.6         | 65.9         | 66.4         | 68.3         | 70.5         | 73.2         | 75.8         | 0.7                                     |
| Nuclear                         | 6.5          | 9.1          | 11.4         | 13.9         | 16.6         | 19.7         | 22.0         | 24.2         | 3.8                                     |
| Renewables                      | 28.2         | 36.0         | 41.2         | 50.1         | 56.5         | 62.4         | 68.0         | 73.5         | 2.8                                     |
| <b>Total</b>                    | <b>124.2</b> | <b>137.1</b> | <b>151.1</b> | <b>164.2</b> | <b>178.3</b> | <b>193.2</b> | <b>207.9</b> | <b>221.5</b> | <b>1.7</b>                              |
| <b>Total energy consumption</b> |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 99.7         | 109.2        | 115.3        | 121.1        | 129.2        | 138.3        | 147.1        | 154.5        | 1.3                                     |
| Natural gas                     | 67.8         | 69.7         | 79.2         | 87.2         | 97.1         | 107.9        | 119.6        | 131.3        | 1.9                                     |
| Coal                            | 120.5        | 124.1        | 126.1        | 125.5        | 126.5        | 128.2        | 130.3        | 132.2        | 0.3                                     |
| Nuclear                         | 6.5          | 9.1          | 11.4         | 13.9         | 16.6         | 19.7         | 22.0         | 24.2         | 3.8                                     |
| Renewables                      | 41.0         | 48.9         | 55.1         | 65.3         | 73.1         | 80.6         | 87.8         | 94.8         | 2.4                                     |
| <b>Total</b>                    | <b>335.5</b> | <b>360.9</b> | <b>387.1</b> | <b>413.0</b> | <b>442.4</b> | <b>474.7</b> | <b>506.9</b> | <b>537.1</b> | <b>1.4</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F11. Delivered energy consumption in Russia by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.3         | -0.6                                    |
| Natural gas                     | 2.8         | 2.9         | 2.9         | 2.9         | 2.9         | 3.0         | 3.0         | 3.0         | 0.2                                     |
| Coal                            | 0.3         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | -1.3                                    |
| Electricity                     | 0.5         | 0.5         | 0.6         | 0.7         | 0.7         | 0.8         | 0.8         | 0.9         | 1.9                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| <b>Total</b>                    | <b>3.9</b>  | <b>4.1</b>  | <b>4.2</b>  | <b>4.2</b>  | <b>4.3</b>  | <b>4.3</b>  | <b>4.3</b>  | <b>4.4</b>  | <b>0.3</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | -0.6                                    |
| Natural gas                     | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.4         | 0.4         | 0.4         | -0.4                                    |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | -0.9                                    |
| Electricity                     | 0.5         | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.5                                     |
| Renewables                      | 0.0         | 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>1.2</b>  | <b>1.2</b>  | <b>1.2</b>  | <b>1.2</b>  | <b>1.2</b>  | <b>1.2</b>  | <b>0.0</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 3.6         | 3.4         | 3.3         | 3.3         | 3.3         | 3.2         | 3.1         | 3.0         | -0.6                                    |
| Natural gas                     | 5.1         | 4.8         | 4.7         | 4.7         | 4.8         | 4.7         | 4.5         | 4.3         | -0.5                                    |
| Coal                            | 1.9         | 1.7         | 1.7         | 1.8         | 1.8         | 1.8         | 1.7         | 1.6         | -0.5                                    |
| Electricity                     | 1.6         | 1.5         | 1.6         | 1.6         | 1.6         | 1.6         | 1.5         | 1.5         | -0.2                                    |
| Renewables                      | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | -0.8                                    |
| <b>Total</b>                    | <b>12.3</b> | <b>11.6</b> | <b>11.4</b> | <b>11.4</b> | <b>11.6</b> | <b>11.5</b> | <b>11.0</b> | <b>10.4</b> | <b>-0.5</b>                             |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 3.2         | 3.2         | 3.2         | 3.2         | 3.1         | 3.0         | 3.0         | 2.9         | -0.3                                    |
| Natural gas                     | 1.1         | 1.2         | 1.3         | 1.5         | 1.6         | 1.8         | 2.0         | 2.1         | 2.0                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| Electricity                     | 0.3         | 0.3         | 0.4         | 0.4         | 0.4         | 0.3         | 0.3         | 0.3         | -0.3                                    |
| <b>Total</b>                    | <b>4.6</b>  | <b>4.7</b>  | <b>4.9</b>  | <b>5.0</b>  | <b>5.1</b>  | <b>5.2</b>  | <b>5.2</b>  | <b>5.3</b>  | <b>0.4</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 7.4         | 7.2         | 7.1         | 6.9         | 6.9         | 6.7         | 6.5         | 6.3         | -0.5                                    |
| Natural gas                     | 9.4         | 9.3         | 9.4         | 9.5         | 9.8         | 9.9         | 9.9         | 9.9         | 0.1                                     |
| Coal                            | 2.2         | 2.1         | 2.1         | 2.1         | 2.1         | 2.1         | 2.0         | 1.8         | -0.6                                    |
| Electricity                     | 2.9         | 2.9         | 3.1         | 3.2         | 3.3         | 3.3         | 3.3         | 3.3         | 0.4                                     |
| Renewables                      | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | -0.8                                    |
| <b>Delivered energy</b>         | <b>22.1</b> | <b>21.6</b> | <b>21.7</b> | <b>21.8</b> | <b>22.1</b> | <b>22.2</b> | <b>21.8</b> | <b>21.3</b> | <b>-0.1</b>                             |
| Electricity-related losses      | 8.1         | 7.9         | 8.1         | 8.1         | 8.2         | 8.1         | 7.9         | 7.8         | -0.1                                    |
| Discrepancy                     | 0.1         | 0.2         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 1.3                                     |
| <b>Total</b>                    | <b>30.2</b> | <b>29.8</b> | <b>29.8</b> | <b>30.0</b> | <b>30.4</b> | <b>30.3</b> | <b>29.8</b> | <b>29.2</b> | <b>-0.1</b>                             |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.0         | 0.0         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 5.1                                     |
| Natural gas                     | 5.5         | 5.0         | 5.0         | 4.9         | 5.0         | 4.9         | 4.8         | 4.6         | -0.5                                    |
| Coal                            | 1.9         | 1.7         | 1.5         | 1.7         | 1.8         | 1.9         | 1.9         | 1.8         | -0.1                                    |
| Nuclear                         | 2.0         | 2.5         | 2.8         | 2.5         | 2.4         | 2.4         | 2.4         | 2.4         | 0.5                                     |
| Renewables                      | 1.6         | 1.7         | 1.7         | 2.1         | 2.2         | 2.2         | 2.2         | 2.2         | 0.8                                     |
| <b>Total</b>                    | <b>11.0</b> | <b>10.9</b> | <b>11.1</b> | <b>11.3</b> | <b>11.5</b> | <b>11.4</b> | <b>11.3</b> | <b>11.1</b> | <b>0.0</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 7.5         | 7.4         | 7.2         | 7.0         | 7.0         | 6.9         | 6.7         | 6.5         | -0.4                                    |
| Natural gas                     | 14.9        | 14.4        | 14.4        | 14.4        | 14.8        | 14.8        | 14.7        | 14.5        | -0.1                                    |
| Coal                            | 4.2         | 3.8         | 3.6         | 3.8         | 3.9         | 3.9         | 3.8         | 3.7         | -0.4                                    |
| Nuclear                         | 2.0         | 2.5         | 2.8         | 2.5         | 2.4         | 2.4         | 2.4         | 2.4         | 0.5                                     |
| Renewables                      | 1.8         | 1.8         | 1.8         | 2.2         | 2.3         | 2.3         | 2.3         | 2.3         | 0.7                                     |
| <b>Total</b>                    | <b>30.2</b> | <b>29.8</b> | <b>29.8</b> | <b>30.0</b> | <b>30.4</b> | <b>30.3</b> | <b>29.8</b> | <b>29.2</b> | <b>-0.1</b>                             |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generator

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

**Table F12. Delivered energy consumption in Other Non-OECD Europe and Eurasia by end-use sector and fuel, 2015-50**

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.1                                     |
| Natural gas                     | 1.6         | 1.7         | 1.7         | 1.8         | 1.8         | 1.9         | 2.0         | 2.0         | 0.7                                     |
| Coal                            | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.0                                     |
| Electricity                     | 0.6         | 0.6         | 0.6         | 0.7         | 0.7         | 0.8         | 0.9         | 0.9         | 1.4                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>2.5</b>  | <b>2.6</b>  | <b>2.7</b>  | <b>2.8</b>  | <b>2.9</b>  | <b>3.1</b>  | <b>3.2</b>  | <b>3.3</b>  | <b>0.8</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.3                                     |
| Natural gas                     | 0.6         | 0.6         | 0.6         | 0.7         | 0.7         | 0.7         | 0.7         | 0.7         | 0.5                                     |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1                                     |
| Electricity                     | 0.3         | 0.3         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.5         | 1.2                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>1.1</b>  | <b>1.1</b>  | <b>1.1</b>  | <b>1.2</b>  | <b>1.2</b>  | <b>1.3</b>  | <b>1.3</b>  | <b>1.3</b>  | <b>0.7</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 1.4         | 1.4         | 1.3         | 1.3         | 1.3         | 1.2         | 1.2         | 1.2         | -0.5                                    |
| Natural gas                     | 2.3         | 2.3         | 2.3         | 2.3         | 2.3         | 2.3         | 2.4         | 2.5         | 0.2                                     |
| Coal                            | 1.2         | 1.2         | 1.2         | 1.1         | 1.1         | 1.0         | 1.0         | 1.0         | -0.4                                    |
| Electricity                     | 1.0         | 1.0         | 0.9         | 0.9         | 0.9         | 0.9         | 0.9         | 0.9         | -0.4                                    |
| Renewables                      | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | -0.4                                    |
| <b>Total</b>                    | <b>6.0</b>  | <b>5.9</b>  | <b>5.8</b>  | <b>5.7</b>  | <b>5.6</b>  | <b>5.6</b>  | <b>5.6</b>  | <b>5.7</b>  | <b>-0.2</b>                             |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 2.1         | 2.2         | 2.2         | 2.2         | 2.3         | 2.3         | 2.4         | 2.5         | 0.5                                     |
| Natural gas                     | 0.3         | 0.3         | 0.3         | 0.3         | 0.4         | 0.4         | 0.4         | 0.4         | 1.3                                     |
| Coal                            | 0.0         | 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         | 0.1         | 0.5                                     |
| <b>Total</b>                    | <b>2.4</b>  | <b>2.5</b>  | <b>2.6</b>  | <b>2.6</b>  | <b>2.7</b>  | <b>2.8</b>  | <b>2.9</b>  | <b>3.0</b>  | <b>0.6</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 3.7         | 3.7         | 3.8         | 3.8         | 3.7         | 3.8         | 3.9         | 3.9         | 0.2                                     |
| Natural gas                     | 4.8         | 4.8         | 4.9         | 5.1         | 5.2         | 5.3         | 5.4         | 5.7         | 0.5                                     |
| Coal                            | 1.4         | 1.5         | 1.4         | 1.4         | 1.3         | 1.3         | 1.3         | 1.3         | -0.3                                    |
| Electricity                     | 1.9         | 2.0         | 2.0         | 2.0         | 2.1         | 2.1         | 2.2         | 2.3         | 0.6                                     |
| Renewables                      | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | -0.4                                    |
| <b>Delivered energy</b>         | <b>12.0</b> | <b>12.1</b> | <b>12.3</b> | <b>12.3</b> | <b>12.4</b> | <b>12.7</b> | <b>12.9</b> | <b>13.3</b> | <b>0.3</b>                              |
| Electricity-related losses      | 5.4         | 5.3         | 5.3         | 5.3         | 5.5         | 5.7         | 5.9         | 6.1         | 0.4                                     |
| Discrepancy                     | 0.1         | 0.3         | 0.1         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -13.1                                   |
| <b>Total</b>                    | <b>17.5</b> | <b>17.7</b> | <b>17.6</b> | <b>17.7</b> | <b>18.0</b> | <b>18.4</b> | <b>18.8</b> | <b>19.5</b> | <b>0.3</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.0         | 0.0         | 0.0         | 0.1         | 0.1         | 0.1         | 0.1         | -1.1                                    |
| Natural gas                     | 1.9         | 1.9         | 1.8         | 1.8         | 1.9         | 2.0         | 2.0         | 1.9         | 0.0                                     |
| Coal                            | 2.6         | 2.6         | 2.5         | 2.4         | 2.4         | 2.4         | 2.4         | 2.4         | -0.2                                    |
| Nuclear                         | 1.2         | 1.4         | 1.6         | 1.8         | 1.8         | 1.8         | 1.8         | 1.9         | 1.2                                     |
| Renewables                      | 1.4         | 1.4         | 1.4         | 1.4         | 1.4         | 1.6         | 1.8         | 2.1         | 1.2                                     |
| <b>Total</b>                    | <b>7.3</b>  | <b>7.2</b>  | <b>7.3</b>  | <b>7.4</b>  | <b>7.6</b>  | <b>7.9</b>  | <b>8.1</b>  | <b>8.4</b>  | <b>0.4</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 4.0         | 4.0         | 3.9         | 3.8         | 3.9         | 3.9         | 4.0         | 4.0         | 0.0                                     |
| Natural gas                     | 6.8         | 6.7         | 6.7         | 6.8         | 7.1         | 7.3         | 7.4         | 7.7         | 0.3                                     |
| Coal                            | 4.0         | 4.0         | 3.9         | 3.8         | 3.7         | 3.7         | 3.7         | 3.7         | -0.3                                    |
| Nuclear                         | 1.2         | 1.4         | 1.6         | 1.8         | 1.8         | 1.8         | 1.8         | 1.9         | 1.2                                     |
| Renewables                      | 1.5         | 1.5         | 1.5         | 1.5         | 1.5         | 1.7         | 1.9         | 2.2         | 1.1                                     |
| <b>Total</b>                    | <b>17.5</b> | <b>17.7</b> | <b>17.6</b> | <b>17.7</b> | <b>18.0</b> | <b>18.4</b> | <b>18.8</b> | <b>19.5</b> | <b>0.3</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F13. Delivered energy consumption in China by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015         | 2020         | 2025         | 2030         | 2035         | 2040         | 2045         | 2050         | Average annual percent change (2015-50) |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------------------------------|
| <b>Residential</b>              |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 1.2          | 1.2          | 1.2          | 1.3          | 1.3          | 1.3          | 1.3          | 1.3          | 0.1                                     |
| Natural gas                     | 1.4          | 1.8          | 2.2          | 2.6          | 3.0          | 3.5          | 4.0          | 4.4          | 3.3                                     |
| Coal                            | 3.1          | 2.8          | 2.6          | 2.4          | 2.3          | 2.1          | 2.0          | 2.0          | -1.3                                    |
| Electricity                     | 2.8          | 3.5          | 4.4          | 5.5          | 6.8          | 8.3          | 9.9          | 11.6         | 4.1                                     |
| Renewables                      | 0.7          | 0.7          | 0.8          | 0.8          | 0.8          | 0.9          | 0.9          | 0.9          | 0.8                                     |
| <b>Total</b>                    | <b>9.3</b>   | <b>10.1</b>  | <b>11.2</b>  | <b>12.6</b>  | <b>14.2</b>  | <b>16.0</b>  | <b>18.1</b>  | <b>20.2</b>  | <b>2.2</b>                              |
| <b>Commercial</b>               |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 0.7          | 0.7          | 0.7          | 0.7          | 0.7          | 0.7          | 0.7          | 0.7          | 0.2                                     |
| Natural gas                     | 0.4          | 0.5          | 0.6          | 0.7          | 0.7          | 0.8          | 0.8          | 0.9          | 2.0                                     |
| Coal                            | 0.9          | 0.9          | 0.8          | 0.8          | 0.8          | 0.8          | 0.8          | 0.7          | -0.6                                    |
| Electricity                     | 1.1          | 1.4          | 1.8          | 2.1          | 2.4          | 2.8          | 3.1          | 3.4          | 3.3                                     |
| Renewables                      | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.1          | 0.8                                     |
| <b>Total</b>                    | <b>3.2</b>   | <b>3.6</b>   | <b>4.0</b>   | <b>4.3</b>   | <b>4.7</b>   | <b>5.1</b>   | <b>5.5</b>   | <b>5.9</b>   | <b>1.8</b>                              |
| <b>Industrial</b>               |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 10.7         | 11.9         | 12.6         | 13.0         | 13.2         | 13.3         | 13.3         | 12.9         | 0.5                                     |
| Natural gas                     | 4.1          | 5.5          | 6.9          | 8.0          | 9.4          | 10.6         | 11.6         | 12.4         | 3.2                                     |
| Coal                            | 41.5         | 41.1         | 39.5         | 36.7         | 33.7         | 31.0         | 28.0         | 24.9         | -1.4                                    |
| Electricity                     | 14.3         | 16.0         | 16.8         | 16.8         | 16.8         | 16.7         | 16.4         | 16.0         | 0.3                                     |
| Renewables                      | 1.0          | 1.2          | 1.3          | 1.3          | 1.4          | 1.5          | 1.6          | 1.6          | 1.4                                     |
| <b>Total</b>                    | <b>71.6</b>  | <b>75.7</b>  | <b>77.0</b>  | <b>75.8</b>  | <b>74.5</b>  | <b>73.0</b>  | <b>70.9</b>  | <b>67.9</b>  | <b>-0.2</b>                             |
| <b>Transportation</b>           |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 14.8         | 16.7         | 18.4         | 19.5         | 20.1         | 20.1         | 19.8         | 18.8         | 0.7                                     |
| Natural gas                     | 0.2          | 0.3          | 0.6          | 1.0          | 1.5          | 2.2          | 3.1          | 4.3          | 9.9                                     |
| Coal                            | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0                                     |
| Electricity                     | 0.6          | 0.8          | 0.9          | 1.1          | 1.2          | 1.4          | 1.8          | 2.1          | 3.6                                     |
| <b>Total</b>                    | <b>15.6</b>  | <b>17.7</b>  | <b>19.9</b>  | <b>21.5</b>  | <b>22.8</b>  | <b>23.7</b>  | <b>24.7</b>  | <b>25.2</b>  | <b>1.4</b>                              |
| <b>All end-use sectors</b>      |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 27.4         | 30.5         | 32.9         | 34.4         | 35.2         | 35.4         | 35.1         | 33.7         | 0.6                                     |
| Natural gas                     | 6.1          | 8.1          | 10.2         | 12.2         | 14.6         | 17.0         | 19.5         | 22.0         | 3.7                                     |
| Coal                            | 45.5         | 44.8         | 43.0         | 39.9         | 36.8         | 33.9         | 30.8         | 27.6         | -1.4                                    |
| Electricity                     | 18.9         | 21.8         | 23.9         | 25.5         | 27.2         | 29.2         | 31.3         | 33.2         | 1.6                                     |
| Renewables                      | 1.8          | 2.0          | 2.1          | 2.2          | 2.3          | 2.5          | 2.6          | 2.7          | 1.1                                     |
| <b>Delivered energy</b>         | <b>99.7</b>  | <b>107.2</b> | <b>112.1</b> | <b>114.2</b> | <b>116.2</b> | <b>117.9</b> | <b>119.2</b> | <b>119.1</b> | <b>0.5</b>                              |
| Electricity-related losses      | 36.7         | 42.1         | 45.8         | 48.8         | 52.2         | 56.0         | 59.9         | 63.4         | 1.6                                     |
| Discrepancy                     | -3.3         | -2.9         | -2.0         | -1.7         | -1.6         | -1.4         | -1.2         | -1.0         | -                                       |
| <b>Total</b>                    | <b>133.1</b> | <b>146.4</b> | <b>155.9</b> | <b>161.2</b> | <b>166.8</b> | <b>172.5</b> | <b>177.9</b> | <b>181.6</b> | <b>0.9</b>                              |
| <b>Electric power a/</b>        |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          | -1.0                                    |
| Natural gas                     | 1.1          | 1.2          | 2.3          | 3.1          | 3.8          | 4.7          | 6.2          | 7.6          | 5.6                                     |
| Coal                            | 40.0         | 40.2         | 40.7         | 40.5         | 39.8         | 39.2         | 38.5         | 37.9         | -0.2                                    |
| Nuclear                         | 2.0          | 3.2          | 4.4          | 5.6          | 8.1          | 10.8         | 13.2         | 15.1         | 5.9                                     |
| Renewables                      | 12.4         | 19.3         | 22.3         | 25.1         | 27.8         | 30.5         | 33.3         | 36.0         | 3.1                                     |
| <b>Total</b>                    | <b>55.6</b>  | <b>63.9</b>  | <b>69.7</b>  | <b>74.3</b>  | <b>79.5</b>  | <b>85.2</b>  | <b>91.2</b>  | <b>96.5</b>  | <b>1.6</b>                              |
| <b>Total energy consumption</b> |              |              |              |              |              |              |              |              |                                         |
| Liquids                         | 24.1         | 27.6         | 30.9         | 32.6         | 33.6         | 34.0         | 33.9         | 32.8         | 0.9                                     |
| Natural gas                     | 7.2          | 9.3          | 12.5         | 15.3         | 18.4         | 21.7         | 25.7         | 29.5         | 4.1                                     |
| Coal                            | 85.5         | 84.9         | 83.6         | 80.4         | 76.6         | 73.0         | 69.3         | 65.5         | -0.8                                    |
| Nuclear                         | 2.0          | 3.2          | 4.4          | 5.6          | 8.1          | 10.8         | 13.2         | 15.1         | 5.9                                     |
| Renewables                      | 14.2         | 21.3         | 24.5         | 27.3         | 30.1         | 33.0         | 35.8         | 38.7         | 2.9                                     |
| <b>Total</b>                    | <b>133.1</b> | <b>146.4</b> | <b>155.9</b> | <b>161.2</b> | <b>166.8</b> | <b>172.5</b> | <b>177.9</b> | <b>181.6</b> | <b>0.9</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F14. Delivered energy consumption in India by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         | 0.0                                     |
| Natural gas                     | 0.0         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 2.7                                     |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.0                                     |
| Electricity                     | 1.0         | 1.3         | 1.6         | 2.0         | 2.4         | 2.7         | 3.0         | 3.1         | 3.3                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>2.2</b>  | <b>2.5</b>  | <b>2.8</b>  | <b>3.2</b>  | <b>3.6</b>  | <b>4.0</b>  | <b>4.3</b>  | <b>4.4</b>  | <b>2.0</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.0         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 2.9                                     |
| Natural gas                     | 0.0         | 0.0         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 2.4                                     |
| Coal                            | 0.2         | 0.2         | 0.3         | 0.3         | 0.3         | 0.4         | 0.4         | 0.4         | 2.2                                     |
| Electricity                     | 0.4         | 0.5         | 0.7         | 0.8         | 0.9         | 1.0         | 1.1         | 1.2         | 3.3                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>0.7</b>  | <b>0.9</b>  | <b>1.0</b>  | <b>1.2</b>  | <b>1.4</b>  | <b>1.6</b>  | <b>1.7</b>  | <b>1.9</b>  | <b>2.9</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 3.5         | 3.7         | 4.2         | 4.8         | 5.5         | 6.4         | 7.2         | 7.9         | 2.4                                     |
| Natural gas                     | 1.5         | 1.5         | 1.7         | 2.0         | 2.3         | 2.8         | 3.2         | 3.6         | 2.6                                     |
| Coal                            | 5.6         | 6.2         | 7.1         | 8.3         | 9.8         | 11.5        | 13.1        | 14.5        | 2.8                                     |
| Electricity                     | 2.0         | 2.2         | 2.5         | 2.8         | 3.2         | 3.6         | 4.0         | 4.4         | 2.3                                     |
| Renewables                      | 2.1         | 2.2         | 2.5         | 2.9         | 3.5         | 4.1         | 4.7         | 5.3         | 2.6                                     |
| <b>Total</b>                    | <b>14.6</b> | <b>15.8</b> | <b>17.9</b> | <b>20.8</b> | <b>24.3</b> | <b>28.3</b> | <b>32.2</b> | <b>35.7</b> | <b>2.6</b>                              |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 3.6         | 4.3         | 5.3         | 6.2         | 7.4         | 8.7         | 9.9         | 10.7        | 3.2                                     |
| Natural gas                     | 0.1         | 0.1         | 0.2         | 0.4         | 0.5         | 0.8         | 1.2         | 1.9         | 8.7                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| Electricity                     | 0.1         | 0.2         | 0.2         | 0.3         | 0.5         | 0.7         | 0.9         | 1.2         | 6.4                                     |
| <b>Total</b>                    | <b>3.8</b>  | <b>4.6</b>  | <b>5.8</b>  | <b>6.9</b>  | <b>8.4</b>  | <b>10.1</b> | <b>12.0</b> | <b>13.8</b> | <b>3.7</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 8.1         | 9.1         | 10.6        | 12.1        | 14.0        | 16.2        | 18.3        | 19.8        | 2.6                                     |
| Natural gas                     | 1.7         | 1.8         | 2.1         | 2.5         | 3.0         | 3.8         | 4.6         | 5.7         | 3.6                                     |
| Coal                            | 5.9         | 6.5         | 7.5         | 8.8         | 10.3        | 12.0        | 13.6        | 15.0        | 2.7                                     |
| Electricity                     | 3.5         | 4.2         | 5.0         | 5.9         | 6.9         | 8.0         | 9.1         | 10.0        | 3.0                                     |
| Renewables                      | 2.2         | 2.2         | 2.5         | 2.9         | 3.5         | 4.1         | 4.8         | 5.3         | 2.6                                     |
| <b>Delivered energy</b>         | <b>21.4</b> | <b>23.7</b> | <b>27.6</b> | <b>32.2</b> | <b>37.7</b> | <b>44.1</b> | <b>50.3</b> | <b>55.8</b> | <b>2.8</b>                              |
| Electricity-related losses      | 7.1         | 8.7         | 10.2        | 11.9        | 13.9        | 16.2        | 18.3        | 20.1        | 3.0                                     |
| Discrepancy                     | 0.0         | 0.9         | 0.2         | 0.2         | 0.3         | 0.5         | 0.6         | 0.7         | -                                       |
| <b>Total</b>                    | <b>28.4</b> | <b>33.3</b> | <b>38.0</b> | <b>44.3</b> | <b>51.9</b> | <b>60.7</b> | <b>69.2</b> | <b>76.5</b> | <b>2.9</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 2.0                                     |
| Natural gas                     | 0.4         | 0.4         | 0.6         | 0.8         | 1.2         | 1.5         | 1.7         | 1.8         | 4.9                                     |
| Coal                            | 8.0         | 9.2         | 9.8         | 10.6        | 12.4        | 14.3        | 16.7        | 18.6        | 2.4                                     |
| Nuclear                         | 0.4         | 0.7         | 1.2         | 2.2         | 2.4         | 2.7         | 2.5         | 2.5         | 5.4                                     |
| Renewables                      | 1.9         | 2.6         | 3.5         | 4.1         | 4.9         | 5.7         | 6.4         | 7.1         | 3.9                                     |
| <b>Total</b>                    | <b>10.6</b> | <b>12.8</b> | <b>15.2</b> | <b>17.8</b> | <b>20.8</b> | <b>24.2</b> | <b>27.4</b> | <b>30.0</b> | <b>3.0</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 8.1         | 10.0        | 10.8        | 12.3        | 14.3        | 16.7        | 18.9        | 20.5        | 2.7                                     |
| Natural gas                     | 2.0         | 2.1         | 2.7         | 3.3         | 4.2         | 5.2         | 6.3         | 7.5         | 3.9                                     |
| Coal                            | 13.9        | 15.7        | 17.3        | 19.3        | 22.7        | 26.3        | 30.3        | 33.6        | 2.6                                     |
| Nuclear                         | 0.4         | 0.7         | 1.2         | 2.2         | 2.4         | 2.7         | 2.5         | 2.5         | 5.4                                     |
| Renewables                      | 4.0         | 4.9         | 6.0         | 7.1         | 8.3         | 9.8         | 11.2        | 12.4        | 3.3                                     |
| <b>Total</b>                    | <b>28.4</b> | <b>33.3</b> | <b>38.0</b> | <b>44.3</b> | <b>51.9</b> | <b>60.7</b> | <b>69.2</b> | <b>76.5</b> | <b>2.9</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generator

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.



**Table F15. Delivered energy consumption in Other Non-OECD Asia by end-use sector and fuel, 2015-50**

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.0                                     |
| Natural gas                     | 0.4         | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 0.7         | 0.7         | 1.4                                     |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.0                                     |
| Electricity                     | 1.4         | 1.6         | 1.9         | 2.2         | 2.5         | 2.8         | 3.0         | 3.2         | 2.3                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>2.4</b>  | <b>2.7</b>  | <b>3.0</b>  | <b>3.4</b>  | <b>3.7</b>  | <b>4.0</b>  | <b>4.3</b>  | <b>4.5</b>  | <b>1.7</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.2         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.4         | 1.2                                     |
| Natural gas                     | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 1.6                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -0.3                                    |
| Electricity                     | 1.1         | 1.3         | 1.6         | 2.0         | 2.3         | 2.6         | 3.0         | 3.3         | 3.2                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>1.5</b>  | <b>1.7</b>  | <b>2.0</b>  | <b>2.4</b>  | <b>2.8</b>  | <b>3.1</b>  | <b>3.5</b>  | <b>3.8</b>  | <b>2.8</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 7.0         | 7.2         | 7.8         | 8.6         | 9.5         | 10.5        | 11.6        | 13.0        | 1.8                                     |
| Natural gas                     | 3.9         | 4.1         | 4.7         | 5.4         | 6.2         | 7.1         | 8.1         | 9.2         | 2.5                                     |
| Coal                            | 3.1         | 3.2         | 3.6         | 4.0         | 4.5         | 5.1         | 5.8         | 6.6         | 2.2                                     |
| Electricity                     | 1.7         | 1.8         | 2.0         | 2.2         | 2.5         | 2.8         | 3.1         | 3.5         | 2.0                                     |
| Renewables                      | 2.2         | 2.2         | 2.5         | 2.7         | 3.0         | 3.3         | 3.6         | 4.0         | 1.7                                     |
| <b>Total</b>                    | <b>17.8</b> | <b>18.5</b> | <b>20.5</b> | <b>23.0</b> | <b>25.6</b> | <b>28.7</b> | <b>32.2</b> | <b>36.3</b> | <b>2.0</b>                              |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 8.1         | 8.8         | 10.1        | 11.5        | 13.0        | 14.9        | 16.8        | 18.5        | 2.4                                     |
| Natural gas                     | 0.5         | 0.8         | 1.2         | 1.6         | 2.1         | 2.8         | 3.6         | 4.7         | 6.4                                     |
| Coal                            | 0.0         | 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         | 0.1         | 7.1                                     |
| <b>Total</b>                    | <b>8.6</b>  | <b>9.6</b>  | <b>11.3</b> | <b>13.1</b> | <b>15.2</b> | <b>17.8</b> | <b>20.5</b> | <b>23.3</b> | <b>2.9</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 15.8        | 16.7        | 18.8        | 20.9        | 23.3        | 26.3        | 29.3        | 32.5        | 2.1                                     |
| Natural gas                     | 4.9         | 5.4         | 6.5         | 7.7         | 9.0         | 10.6        | 12.5        | 14.7        | 3.2                                     |
| Coal                            | 3.2         | 3.3         | 3.7         | 4.1         | 4.6         | 5.2         | 5.9         | 6.7         | 2.2                                     |
| Electricity                     | 4.2         | 4.8         | 5.6         | 6.5         | 7.3         | 8.2         | 9.1         | 10.0        | 2.5                                     |
| Renewables                      | 2.2         | 2.3         | 2.5         | 2.7         | 3.0         | 3.3         | 3.6         | 4.0         | 1.7                                     |
| <b>Delivered energy</b>         | <b>30.4</b> | <b>32.5</b> | <b>36.9</b> | <b>41.9</b> | <b>47.2</b> | <b>53.6</b> | <b>60.4</b> | <b>67.9</b> | <b>2.3</b>                              |
| Electricity-related losses      | 8.3         | 9.0         | 10.3        | 12.3        | 13.4        | 14.8        | 16.2        | 17.7        | 2.2                                     |
| Discrepancy                     | -0.1        | 0.7         | 0.6         | 0.6         | 0.6         | 0.7         | 0.8         | 0.9         | -                                       |
| <b>Total</b>                    | <b>38.6</b> | <b>42.2</b> | <b>47.9</b> | <b>54.8</b> | <b>61.3</b> | <b>69.1</b> | <b>77.4</b> | <b>86.4</b> | <b>2.3</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 1.1         | 0.8         | 1.0         | 1.0         | 0.9         | 0.9         | 0.9         | 0.8         | -0.8                                    |
| Natural gas                     | 4.4         | 4.0         | 4.8         | 4.8         | 6.2         | 7.3         | 8.2         | 8.8         | 2.0                                     |
| Coal                            | 4.3         | 6.2         | 7.2         | 7.2         | 7.8         | 8.4         | 9.3         | 10.4        | 2.5                                     |
| Nuclear                         | 0.5         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | -0.7                                    |
| Renewables                      | 2.3         | 2.3         | 2.5         | 5.4         | 5.4         | 6.0         | 6.7         | 7.4         | 3.4                                     |
| <b>Total</b>                    | <b>12.5</b> | <b>13.8</b> | <b>15.9</b> | <b>18.8</b> | <b>20.7</b> | <b>23.0</b> | <b>25.3</b> | <b>27.7</b> | <b>2.3</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 16.9        | 18.2        | 20.4        | 22.5        | 24.9        | 27.9        | 31.0        | 34.2        | 2.0                                     |
| Natural gas                     | 9.3         | 9.4         | 11.3        | 12.5        | 15.2        | 17.9        | 20.7        | 23.5        | 2.7                                     |
| Coal                            | 7.5         | 9.5         | 10.9        | 11.3        | 12.4        | 13.6        | 15.1        | 17.1        | 2.4                                     |
| Nuclear                         | 0.5         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | -0.7                                    |
| Renewables                      | 4.5         | 4.6         | 4.9         | 8.1         | 8.4         | 9.3         | 10.3        | 11.3        | 2.7                                     |
| <b>Total</b>                    | <b>38.6</b> | <b>42.2</b> | <b>47.9</b> | <b>54.8</b> | <b>61.3</b> | <b>69.1</b> | <b>77.4</b> | <b>86.4</b> | <b>2.3</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F16. Delivered energy consumption in the Middle East by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.4         | 0.0                                     |
| Natural gas                     | 1.8         | 1.8         | 1.9         | 2.1         | 2.2         | 2.4         | 2.5         | 2.7         | 1.2                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -0.1                                    |
| Electricity                     | 1.5         | 1.6         | 1.9         | 2.2         | 2.5         | 2.9         | 3.3         | 3.7         | 2.6                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>3.7</b>  | <b>3.9</b>  | <b>4.3</b>  | <b>4.7</b>  | <b>5.2</b>  | <b>5.7</b>  | <b>6.2</b>  | <b>6.8</b>  | <b>1.8</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.5                                     |
| Natural gas                     | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.4         | 0.4         | 0.4         | 1.4                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| Electricity                     | 0.9         | 1.0         | 1.1         | 1.3         | 1.5         | 1.6         | 1.8         | 1.9         | 2.3                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>1.2</b>  | <b>1.3</b>  | <b>1.5</b>  | <b>1.7</b>  | <b>1.9</b>  | <b>2.1</b>  | <b>2.3</b>  | <b>2.4</b>  | <b>2.1</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 8.0         | 8.1         | 8.5         | 9.1         | 9.8         | 10.5        | 11.3        | 11.9        | 1.2                                     |
| Natural gas                     | 8.6         | 9.0         | 9.7         | 10.5        | 11.4        | 12.2        | 13.3        | 14.1        | 1.4                                     |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 2.2                                     |
| Electricity                     | 0.5         | 0.5         | 0.6         | 0.6         | 0.7         | 0.8         | 0.8         | 0.9         | 1.6                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.9                                     |
| <b>Total</b>                    | <b>17.2</b> | <b>17.7</b> | <b>18.8</b> | <b>20.3</b> | <b>22.0</b> | <b>23.6</b> | <b>25.6</b> | <b>27.1</b> | <b>1.3</b>                              |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 4.9         | 5.2         | 5.6         | 5.9         | 6.2         | 6.7         | 7.2         | 7.6         | 1.3                                     |
| Natural gas                     | 0.2         | 0.3         | 0.4         | 0.6         | 0.7         | 0.8         | 1.0         | 1.3         | 4.8                                     |
| Coal                            | 0.0         | 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         | 0.0         | 8.3                                     |
| <b>Total</b>                    | <b>5.1</b>  | <b>5.5</b>  | <b>6.0</b>  | <b>6.4</b>  | <b>6.9</b>  | <b>7.6</b>  | <b>8.2</b>  | <b>8.9</b>  | <b>1.6</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 13.4        | 13.8        | 14.6        | 15.4        | 16.5        | 17.7        | 19.0        | 20.0        | 1.2                                     |
| Natural gas                     | 10.8        | 11.4        | 12.3        | 13.4        | 14.6        | 15.8        | 17.3        | 18.4        | 1.5                                     |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 2.2                                     |
| Electricity                     | 2.9         | 3.2         | 3.6         | 4.2         | 4.7         | 5.3         | 5.9         | 6.5         | 2.4                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Delivered energy</b>         | <b>27.2</b> | <b>28.5</b> | <b>30.7</b> | <b>33.2</b> | <b>36.0</b> | <b>39.0</b> | <b>42.4</b> | <b>45.2</b> | <b>1.5</b>                              |
| Electricity-related losses      | 5.8         | 6.3         | 7.4         | 7.7         | 8.5         | 9.3         | 10.1        | 10.9        | 1.8                                     |
| Discrepancy                     | 0.8         | 1.6         | 1.0         | 0.9         | 0.9         | 1.0         | 1.0         | 1.1         | 0.7                                     |
| <b>Total</b>                    | <b>33.9</b> | <b>36.4</b> | <b>39.0</b> | <b>41.8</b> | <b>45.4</b> | <b>49.3</b> | <b>53.5</b> | <b>57.2</b> | <b>1.5</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 2.9         | 3.7         | 3.1         | 1.9         | 1.8         | 1.8         | 1.7         | 1.7         | -1.5                                    |
| Natural gas                     | 5.5         | 5.1         | 6.6         | 8.3         | 9.2         | 10.1        | 11.2        | 12.3        | 2.3                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.1         | 0.2         | 0.2         | 0.3         | 0.4         | 9.6                                     |
| Nuclear                         | 0.0         | 0.5         | 0.6         | 0.8         | 1.0         | 1.2         | 1.2         | 1.3         | 10.6                                    |
| Renewables                      | 0.2         | 0.2         | 0.7         | 0.9         | 1.1         | 1.4         | 1.6         | 1.8         | 6.4                                     |
| <b>Total</b>                    | <b>8.7</b>  | <b>9.4</b>  | <b>11.0</b> | <b>11.9</b> | <b>13.3</b> | <b>14.7</b> | <b>16.0</b> | <b>17.5</b> | <b>2.0</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 17.2        | 19.1        | 18.7        | 18.2        | 19.2        | 20.4        | 21.8        | 22.8        | 0.8                                     |
| Natural gas                     | 16.4        | 16.4        | 18.9        | 21.7        | 23.8        | 25.9        | 28.5        | 30.8        | 1.8                                     |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.2         | 0.3         | 0.3         | 0.4         | 0.5         | 5.3                                     |
| Nuclear                         | 0.0         | 0.5         | 0.6         | 0.8         | 1.0         | 1.2         | 1.2         | 1.3         | 10.6                                    |
| Renewables                      | 0.2         | 0.2         | 0.7         | 0.9         | 1.2         | 1.5         | 1.6         | 1.8         | 6.1                                     |
| <b>Total</b>                    | <b>33.9</b> | <b>36.4</b> | <b>39.0</b> | <b>41.8</b> | <b>45.4</b> | <b>49.3</b> | <b>53.5</b> | <b>57.2</b> | <b>1.5</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F17. Delivered energy consumption in Africa by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.0                                     |
| Natural gas                     | 0.4         | 0.4         | 0.5         | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 1.4                                     |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | -0.1                                    |
| Electricity                     | 0.8         | 1.0         | 1.1         | 1.3         | 1.5         | 1.6         | 1.7         | 1.8         | 2.5                                     |
| Renewables                      | 0.0         | 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>2.5</b>  | <b>2.8</b>  | <b>3.0</b>  | <b>3.1</b>  | <b>3.1</b>  | <b>1.5</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.5                                     |
| Natural gas                     | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| Coal                            | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 1.3                                     |
| Electricity                     | 0.4         | 0.4         | 0.5         | 0.5         | 0.6         | 0.7         | 0.7         | 0.8         | 2.1                                     |
| Renewables                      | 0.0         | 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>0.7</b>  | <b>0.8</b>  | <b>0.9</b>  | <b>1.0</b>  | <b>1.0</b>  | <b>1.8</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 2.2         | 2.1         | 2.2         | 2.5         | 2.7         | 2.9         | 3.2         | 3.4         | 1.3                                     |
| Natural gas                     | 2.1         | 2.1         | 2.3         | 2.5         | 2.7         | 3.0         | 3.3         | 3.6         | 1.6                                     |
| Coal                            | 1.5         | 1.5         | 1.6         | 1.8         | 1.9         | 2.2         | 2.4         | 2.6         | 1.6                                     |
| Electricity                     | 1.0         | 1.0         | 1.1         | 1.2         | 1.3         | 1.4         | 1.5         | 1.6         | 1.4                                     |
| Renewables                      | 3.4         | 3.4         | 3.6         | 3.9         | 4.2         | 4.6         | 5.0         | 5.3         | 1.3                                     |
| <b>Total</b>                    | <b>10.2</b> | <b>10.1</b> | <b>10.7</b> | <b>11.7</b> | <b>12.9</b> | <b>14.1</b> | <b>15.3</b> | <b>16.6</b> | <b>1.4</b>                              |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 4.7         | 5.0         | 5.7         | 6.4         | 7.1         | 8.2         | 9.5         | 11.2        | 2.5                                     |
| Natural gas                     | 0.0         | 0.0         | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.4         | 7.0                                     |
| Coal                            | 0.0         | 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         | 0.1         | 4.0                                     |
| <b>Total</b>                    | <b>4.8</b>  | <b>5.1</b>  | <b>5.8</b>  | <b>6.5</b>  | <b>7.3</b>  | <b>8.4</b>  | <b>9.9</b>  | <b>11.6</b> | <b>2.6</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 7.6         | 7.8         | 8.7         | 9.5         | 10.5        | 11.8        | 13.4        | 15.3        | 2.0                                     |
| Natural gas                     | 2.5         | 2.6         | 2.8         | 3.1         | 3.4         | 3.8         | 4.1         | 4.6         | 1.8                                     |
| Coal                            | 1.7         | 1.7         | 1.8         | 2.0         | 2.2         | 2.4         | 2.6         | 2.8         | 1.5                                     |
| Electricity                     | 2.2         | 2.4         | 2.7         | 3.0         | 3.4         | 3.8         | 4.0         | 4.3         | 2.0                                     |
| Renewables                      | 3.4         | 3.4         | 3.6         | 3.9         | 4.3         | 4.6         | 5.0         | 5.3         | 1.3                                     |
| <b>Delivered energy</b>         | <b>17.4</b> | <b>17.9</b> | <b>19.5</b> | <b>21.5</b> | <b>23.7</b> | <b>26.4</b> | <b>29.2</b> | <b>32.4</b> | <b>1.8</b>                              |
| Electricity-related losses      | 5.2         | 5.4         | 6.0         | 6.7         | 7.5         | 8.2         | 8.7         | 9.1         | 1.6                                     |
| Discrepancy                     | 0.1         | 0.9         | 0.0         | -0.3        | -0.3        | -0.3        | -0.4        | -0.5        | -                                       |
| <b>Total</b>                    | <b>22.7</b> | <b>24.2</b> | <b>25.5</b> | <b>27.9</b> | <b>31.0</b> | <b>34.2</b> | <b>37.5</b> | <b>41.1</b> | <b>1.7</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.7         | 0.3         | 0.3         | 0.3         | 0.3         | 0.2         | 0.2         | 0.2         | -3.0                                    |
| Natural gas                     | 2.7         | 3.0         | 3.5         | 3.4         | 3.3         | 3.5         | 3.8         | 4.0         | 1.1                                     |
| Coal                            | 2.6         | 3.2         | 3.6         | 3.5         | 3.4         | 3.5         | 3.6         | 3.8         | 1.0                                     |
| Nuclear                         | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.3         | 0.4         | 3.2                                     |
| Renewables                      | 1.2         | 1.2         | 1.2         | 2.3         | 3.7         | 4.4         | 4.7         | 5.0         | 4.2                                     |
| <b>Total</b>                    | <b>7.4</b>  | <b>7.9</b>  | <b>8.6</b>  | <b>9.7</b>  | <b>10.9</b> | <b>11.9</b> | <b>12.7</b> | <b>13.5</b> | <b>1.7</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 8.4         | 9.0         | 8.9         | 9.5         | 10.5        | 11.7        | 13.2        | 15.0        | 1.7                                     |
| Natural gas                     | 5.2         | 5.6         | 6.3         | 6.4         | 6.7         | 7.3         | 7.9         | 8.6         | 1.4                                     |
| Coal                            | 4.3         | 4.9         | 5.4         | 5.5         | 5.6         | 5.9         | 6.2         | 6.6         | 1.2                                     |
| Nuclear                         | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.2         | 0.3         | 0.4         | 3.2                                     |
| Renewables                      | 4.6         | 4.6         | 4.7         | 6.2         | 8.0         | 9.0         | 9.7         | 10.4        | 2.3                                     |
| <b>Total</b>                    | <b>22.7</b> | <b>24.2</b> | <b>25.5</b> | <b>27.9</b> | <b>31.0</b> | <b>34.2</b> | <b>37.5</b> | <b>41.1</b> | <b>1.7</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F18. Delivered energy consumption in Brazil by end-use sector and fuel, 2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | -0.1                                    |
| Natural gas                     | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 1.0                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| Electricity                     | 0.5         | 0.5         | 0.6         | 0.6         | 0.7         | 0.7         | 0.8         | 0.8         | 1.3                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0                                     |
| <b>Total</b>                    | <b>0.8</b>  | <b>0.8</b>  | <b>0.9</b>  | <b>0.9</b>  | <b>0.9</b>  | <b>1.0</b>  | <b>1.0</b>  | <b>1.1</b>  | <b>0.9</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.7                                     |
| Natural gas                     | 0.0         | 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         | 0.0                                     |
| Electricity                     | 0.5         | 0.5         | 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         | 0.0                                     |
| <b>Total</b>                    | <b>0.6</b>  | <b>0.6</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>1.0</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 2.8         | 2.6         | 2.9         | 3.1         | 3.3         | 3.5         | 3.6         | 3.8         | 0.9                                     |
| Natural gas                     | 0.7         | 0.7         | 0.9         | 0.9         | 1.0         | 1.1         | 1.1         | 1.2         | 1.6                                     |
| Coal                            | 0.4         | 0.4         | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 0.7         | 1.1                                     |
| Electricity                     | 0.7         | 0.7         | 0.8         | 0.9         | 0.9         | 1.0         | 1.1         | 1.2         | 1.7                                     |
| Renewables                      | 2.4         | 2.3         | 2.5         | 2.6         | 2.7         | 2.9         | 3.0         | 3.1         | 0.8                                     |
| <b>Total</b>                    | <b>6.9</b>  | <b>6.7</b>  | <b>7.5</b>  | <b>8.1</b>  | <b>8.5</b>  | <b>9.0</b>  | <b>9.5</b>  | <b>9.9</b>  | <b>1.0</b>                              |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 2.7         | 2.7         | 3.0         | 3.1         | 3.2         | 3.4         | 3.6         | 3.8         | 1.0                                     |
| Natural gas                     | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.3         | 3.1                                     |
| Coal                            | 0.0         | 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         | 0.0         | 6.1                                     |
| <b>Total</b>                    | <b>2.8</b>  | <b>2.8</b>  | <b>3.1</b>  | <b>3.2</b>  | <b>3.4</b>  | <b>3.6</b>  | <b>3.9</b>  | <b>4.2</b>  | <b>1.1</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 5.8         | 5.5         | 6.1         | 6.5         | 6.7         | 7.2         | 7.5         | 7.9         | 0.9                                     |
| Natural gas                     | 0.8         | 0.8         | 1.0         | 1.1         | 1.1         | 1.3         | 1.4         | 1.5         | 1.8                                     |
| Coal                            | 0.4         | 0.4         | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 0.7         | 1.1                                     |
| Electricity                     | 1.7         | 1.8         | 2.0         | 2.1         | 2.3         | 2.5         | 2.6         | 2.8         | 1.4                                     |
| Renewables                      | 2.4         | 2.3         | 2.5         | 2.6         | 2.7         | 2.9         | 3.0         | 3.1         | 0.8                                     |
| <b>Delivered energy</b>         | <b>11.1</b> | <b>10.8</b> | <b>12.1</b> | <b>12.8</b> | <b>13.5</b> | <b>14.3</b> | <b>15.1</b> | <b>16.0</b> | <b>1.1</b>                              |
| Electricity-related losses      | 3.7         | 3.8         | 4.2         | 4.6         | 4.9         | 5.3         | 5.7         | 6.0         | 1.4                                     |
| Discrepancy                     | 0.1         | 0.2         | 0.2         | 0.1         | 0.1         | 0.1         | 0.1         | 0.0         | -5.5                                    |
| <b>Total</b>                    | <b>14.9</b> | <b>14.8</b> | <b>16.5</b> | <b>17.5</b> | <b>18.5</b> | <b>19.7</b> | <b>20.9</b> | <b>22.0</b> | <b>1.1</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.1         | 0.1         | -1.2                                    |
| Natural gas                     | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.6         | 0.7         | 0.8         | 0.7                                     |
| Coal                            | 0.2         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.2         | 0.2         | 0.7                                     |
| Nuclear                         | 0.1         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.8                                     |
| Renewables                      | 4.2         | 4.3         | 5.1         | 5.6         | 6.1         | 6.6         | 7.0         | 7.4         | 1.6                                     |
| <b>Total</b>                    | <b>5.4</b>  | <b>5.5</b>  | <b>6.2</b>  | <b>6.7</b>  | <b>7.2</b>  | <b>7.8</b>  | <b>8.3</b>  | <b>8.7</b>  | <b>1.4</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 6.1         | 5.9         | 6.5         | 6.8         | 7.0         | 7.4         | 7.7         | 8.1         | 0.8                                     |
| Natural gas                     | 1.4         | 1.4         | 1.6         | 1.7         | 1.7         | 1.9         | 2.1         | 2.3         | 1.4                                     |
| Coal                            | 0.6         | 0.6         | 0.6         | 0.7         | 0.7         | 0.8         | 0.8         | 0.9         | 1.0                                     |
| Nuclear                         | 0.1         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.8                                     |
| Renewables                      | 6.6         | 6.6         | 7.6         | 8.2         | 8.8         | 9.5         | 10.0        | 10.5        | 1.3                                     |
| <b>Total</b>                    | <b>14.9</b> | <b>14.8</b> | <b>16.5</b> | <b>17.5</b> | <b>18.5</b> | <b>19.7</b> | <b>20.9</b> | <b>22.0</b> | <b>1.1</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.

Table F19. Delivered energy consumption in Other Non-OECD Americas by end-use sector and fuel,

2015-50

quadrillion Btu

| Sector/fuel                     | 2015        | 2020        | 2025        | 2030        | 2035        | 2040        | 2045        | 2050        | Average annual percent change (2015-50) |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------------------|
| <b>Residential</b>              |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | -0.1                                    |
| Natural gas                     | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 0.7         | 0.7         | 0.8         | 1.1                                     |
| Coal                            | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | -0.1                                    |
| Electricity                     | 0.6         | 0.7         | 0.7         | 0.7         | 0.8         | 0.8         | 0.9         | 0.9         | 1.1                                     |
| Renewables                      | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.8                                     |
| <b>Total</b>                    | <b>1.4</b>  | <b>1.5</b>  | <b>1.6</b>  | <b>1.6</b>  | <b>1.7</b>  | <b>1.8</b>  | <b>1.9</b>  | <b>2.0</b>  | <b>0.9</b>                              |
| <b>Commercial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.7                                     |
| Natural gas                     | 0.1         | 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         | 0.0         | 0.0                                     |
| Electricity                     | 0.4         | 0.4         | 0.5         | 0.5         | 0.6         | 0.6         | 0.7         | 0.7         | 1.7                                     |
| Renewables                      | 0.0         | 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>0.7</b>  | <b>0.8</b>  | <b>0.8</b>  | <b>0.9</b>  | <b>1.0</b>  | <b>1.5</b>                              |
| <b>Industrial</b>               |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 2.4         | 2.2         | 2.3         | 2.4         | 2.5         | 2.6         | 2.8         | 3.0         | 0.6                                     |
| Natural gas                     | 2.3         | 2.1         | 2.2         | 2.3         | 2.5         | 2.7         | 2.9         | 3.1         | 0.9                                     |
| Coal                            | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 0.3         | 1.0                                     |
| Electricity                     | 0.6         | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 0.7         | 0.7         | 0.7                                     |
| Renewables                      | 0.6         | 0.5         | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 0.7         | 0.5                                     |
| <b>Total</b>                    | <b>6.0</b>  | <b>5.4</b>  | <b>5.7</b>  | <b>6.0</b>  | <b>6.4</b>  | <b>6.8</b>  | <b>7.3</b>  | <b>7.8</b>  | <b>0.7</b>                              |
| <b>Transportation</b>           |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 3.1         | 3.2         | 3.5         | 3.8         | 4.0         | 4.4         | 4.8         | 5.3         | 1.5                                     |
| Natural gas                     | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 0.4         | 0.6         | 0.7         | 3.3                                     |
| Coal                            | 0.0         | 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         | 0.0         | 5.9                                     |
| <b>Total</b>                    | <b>3.4</b>  | <b>3.4</b>  | <b>3.8</b>  | <b>4.0</b>  | <b>4.4</b>  | <b>4.8</b>  | <b>5.4</b>  | <b>6.0</b>  | <b>1.7</b>                              |
| <b>All end-use sectors</b>      |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 5.9         | 5.7         | 6.2         | 6.5         | 6.9         | 7.4         | 8.0         | 8.6         | 1.1                                     |
| Natural gas                     | 3.1         | 2.9         | 3.1         | 3.3         | 3.6         | 3.9         | 4.3         | 4.7         | 1.2                                     |
| Coal                            | 0.2         | 0.2         | 0.2         | 0.2         | 0.2         | 0.3         | 0.3         | 0.3         | 1.0                                     |
| Electricity                     | 1.6         | 1.6         | 1.7         | 1.8         | 2.0         | 2.1         | 2.2         | 2.4         | 1.2                                     |
| Renewables                      | 0.6         | 0.5         | 0.5         | 0.5         | 0.6         | 0.6         | 0.6         | 0.7         | 0.5                                     |
| <b>Delivered energy</b>         | <b>11.4</b> | <b>10.9</b> | <b>11.7</b> | <b>12.4</b> | <b>13.2</b> | <b>14.3</b> | <b>15.5</b> | <b>16.7</b> | <b>1.1</b>                              |
| Electricity-related losses      | 4.2         | 4.1         | 4.3         | 4.5         | 4.9         | 5.1         | 5.4         | 5.6         | 0.8                                     |
| Discrepancy                     | 0.6         | 1.3         | 1.0         | 0.9         | 1.0         | 1.0         | 1.1         | 1.2         | 1.9                                     |
| <b>Total</b>                    | <b>16.2</b> | <b>16.2</b> | <b>17.0</b> | <b>17.9</b> | <b>19.1</b> | <b>20.4</b> | <b>22.0</b> | <b>23.6</b> | <b>1.1</b>                              |
| <b>Electric power a/</b>        |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 1.0         | 0.9         | 1.0         | 1.0         | 0.9         | 0.9         | 0.8         | 0.8         | -0.7                                    |
| Natural gas                     | 1.5         | 1.4         | 1.7         | 1.7         | 1.7         | 1.9         | 2.0         | 2.2         | 1.1                                     |
| Coal                            | 0.2         | 0.3         | 0.3         | 0.3         | 0.3         | 0.3         | 0.4         | 0.4         | 1.6                                     |
| Nuclear                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 1.0                                     |
| Renewables                      | 3.0         | 2.9         | 2.9         | 3.3         | 3.9         | 4.0         | 4.3         | 4.5         | 1.2                                     |
| <b>Total</b>                    | <b>5.8</b>  | <b>5.6</b>  | <b>6.0</b>  | <b>6.4</b>  | <b>6.8</b>  | <b>7.2</b>  | <b>7.6</b>  | <b>8.0</b>  | <b>0.9</b>                              |
| <b>Total energy consumption</b> |             |             |             |             |             |             |             |             |                                         |
| Liquids                         | 7.6         | 7.9         | 8.1         | 8.4         | 8.8         | 9.3         | 10.0        | 10.6        | 1.0                                     |
| Natural gas                     | 4.6         | 4.3         | 4.8         | 5.0         | 5.2         | 5.8         | 6.4         | 6.9         | 1.2                                     |
| Coal                            | 0.5         | 0.5         | 0.5         | 0.5         | 0.5         | 0.6         | 0.6         | 0.7         | 1.3                                     |
| Nuclear                         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 1.0                                     |
| Renewables                      | 3.5         | 3.4         | 3.4         | 3.9         | 4.4         | 4.6         | 4.9         | 5.2         | 1.1                                     |
| <b>Total</b>                    | <b>16.2</b> | <b>16.2</b> | <b>17.0</b> | <b>17.9</b> | <b>19.1</b> | <b>20.4</b> | <b>22.0</b> | <b>23.6</b> | <b>1.1</b>                              |

a/ Fuel inputs used in the production of electricity and heat, excluding captive generators.

Notes: Totals may not equal sum of components due to independent rounding.

Sources: U.S. Energy Information Administration (EIA), World Energy Projection System Plus (2017), run IEO2017\_d2017.08.23\_153156.