

**Table K1. Industrial sector energy consumption by region and sector, Low Zero-carbon Technology Cost case**

quadrillion British thermal units

Region and sector	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
<b>Americas</b>								
<b>United States</b>								
Energy-intensive manufacturing	17.5	17.4	18.2	18.7	19.1	19.6	20.2	0.5%
Non-energy-intensive manufacturing	2.9	2.8	3.0	3.1	3.3	3.5	3.7	0.9%
Nonmanufacturing	6.3	6.3	6.4	6.5	6.7	6.9	7.0	0.4%
Unclassified	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	--
<b>Total</b>	<b>26.6</b>	<b>26.4</b>	<b>27.5</b>	<b>28.2</b>	<b>29.0</b>	<b>29.8</b>	<b>30.8</b>	<b>0.5%</b>
<b>Canada</b>								
Energy-intensive manufacturing	2.1	2.2	2.6	3.0	3.4	3.8	4.1	2.5%
Non-energy-intensive manufacturing	1.5	1.6	1.7	1.8	2.0	2.1	2.3	1.5%
Nonmanufacturing	2.4	2.4	2.4	2.5	2.6	2.7	2.8	0.5%
<b>Total</b>	<b>6.0</b>	<b>6.2</b>	<b>6.8</b>	<b>7.3</b>	<b>8.0</b>	<b>8.6</b>	<b>9.1</b>	<b>1.5%</b>
<b>Mexico</b>								
Energy-intensive manufacturing	1.2	1.2	1.3	1.4	1.5	1.7	1.9	1.7%
Non-energy-intensive manufacturing	1.2	1.3	1.4	1.6	1.7	1.8	1.8	1.3%
Nonmanufacturing	0.6	0.7	0.9	0.9	0.9	0.9	0.9	1.4%
<b>Total</b>	<b>3.1</b>	<b>3.2</b>	<b>3.6</b>	<b>3.9</b>	<b>4.1</b>	<b>4.4</b>	<b>4.6</b>	<b>1.5%</b>
<b>Brazil</b>								
Energy-intensive manufacturing	3.6	3.6	3.9	4.1	4.2	4.3	4.3	0.7%
Non-energy-intensive manufacturing	1.7	1.8	2.0	2.2	2.4	2.5	2.6	1.5%
Nonmanufacturing	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.6%
<b>Total</b>	<b>6.1</b>	<b>6.2</b>	<b>6.8</b>	<b>7.3</b>	<b>7.6</b>	<b>7.8</b>	<b>7.9</b>	<b>0.9%</b>
<b>Other Americas</b>								
Energy-intensive manufacturing	2.3	2.3	2.5	2.7	3.0	3.2	3.5	1.5%
Non-energy-intensive manufacturing	2.2	2.4	2.7	3.1	3.5	3.9	4.4	2.4%
Nonmanufacturing	1.2	1.2	1.3	1.4	1.5	1.6	1.6	1.1%
<b>Total</b>	<b>5.7</b>	<b>5.9</b>	<b>6.6</b>	<b>7.2</b>	<b>7.9</b>	<b>8.7</b>	<b>9.5</b>	<b>1.8%</b>
<b>Europe and Eurasia</b>								
<b>Western Europe</b>								
Energy-intensive manufacturing	16.2	16.1	16.2	16.7	17.4	18.2	19.0	0.6%
Non-energy-intensive manufacturing	7.1	7.0	6.9	6.9	6.9	7.0	7.1	0.0%
Nonmanufacturing	2.9	2.9	3.0	3.0	3.0	3.1	3.1	0.2%
<b>Total</b>	<b>26.3</b>	<b>26.0</b>	<b>26.1</b>	<b>26.6</b>	<b>27.4</b>	<b>28.2</b>	<b>29.2</b>	<b>0.4%</b>
<b>Russia</b>								
Energy-intensive manufacturing	9.5	9.9	10.0	10.4	10.9	11.4	11.9	0.8%
Non-energy-intensive manufacturing	3.7	4.0	4.3	4.5	4.9	5.4	6.0	1.7%
Nonmanufacturing	2.5	1.9	2.0	2.0	2.1	2.1	2.1	-0.5%
<b>Total</b>	<b>15.6</b>	<b>15.9</b>	<b>16.3</b>	<b>17.0</b>	<b>17.9</b>	<b>18.9</b>	<b>20.0</b>	<b>0.9%</b>
<b>Eastern Europe and Eurasia</b>								
Energy-intensive manufacturing	2.1	2.3	2.7	2.9	3.3	3.7	4.2	2.5%
Non-energy-intensive manufacturing	0.8	0.8	0.7	0.7	0.8	0.8	0.9	0.8%
Nonmanufacturing	0.8	0.8	1.0	1.1	1.3	1.4	1.5	2.4%
<b>Total</b>	<b>3.6</b>	<b>3.9</b>	<b>4.4</b>	<b>4.8</b>	<b>5.3</b>	<b>5.9</b>	<b>6.6</b>	<b>2.2%</b>
<b>Asia Pacific</b>								
<b>Japan</b>								
Energy-intensive manufacturing	4.6	4.6	4.4	4.1	4.0	3.8	3.7	-0.8%
Non-energy-intensive manufacturing	1.4	1.5	1.4	1.3	1.3	1.2	1.2	-0.7%
Nonmanufacturing	0.4	0.3	0.3	0.3	0.3	0.3	0.3	-0.5%
<b>Total</b>	<b>6.4</b>	<b>6.4</b>	<b>6.1</b>	<b>5.8</b>	<b>5.6</b>	<b>5.3</b>	<b>5.1</b>	<b>-0.8%</b>
<b>South Korea</b>								
Energy-intensive manufacturing	4.4	4.4	4.6	4.6	4.6	4.6	4.5	0.1%

Non-energy-intensive manufacturing	1.1	1.1	1.2	1.3	1.4	1.4	1.5	1.1%
Nonmanufacturing	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-0.6%
<b>Total</b>	<b>5.7</b>	<b>5.8</b>	<b>6.0</b>	<b>6.1</b>	<b>6.1</b>	<b>6.2</b>	<b>6.2</b>	<b>0.3%</b>
<b>Australia and New Zealand</b>								
Energy-intensive manufacturing	1.1	1.2	1.3	1.3	1.3	1.4	1.4	0.8%
Non-energy-intensive manufacturing	0.5	0.5	0.6	0.6	0.7	0.7	0.7	1.1%
Nonmanufacturing	1.0	1.0	1.0	1.1	1.2	1.3	1.4	1.3%
<b>Total</b>	<b>2.6</b>	<b>2.7</b>	<b>2.9</b>	<b>3.1</b>	<b>3.2</b>	<b>3.4</b>	<b>3.5</b>	<b>1.1%</b>
<b>China</b>								
Energy-intensive manufacturing	56.5	58.0	56.3	54.0	51.2	48.8	46.1	-0.7%
Non-energy-intensive manufacturing	22.4	24.0	25.1	26.0	26.2	26.1	25.4	0.4%
Nonmanufacturing	5.8	5.8	5.9	5.9	5.9	5.9	5.9	0.1%
<b>Total</b>	<b>84.8</b>	<b>87.8</b>	<b>87.4</b>	<b>86.0</b>	<b>83.2</b>	<b>80.8</b>	<b>77.4</b>	<b>-0.3%</b>
<b>India</b>								
Energy-intensive manufacturing	8.6	9.3	11.9	14.8	17.8	21.1	24.7	3.8%
Non-energy-intensive manufacturing	8.2	9.0	11.8	14.8	17.7	20.4	23.1	3.8%
Nonmanufacturing	1.8	2.0	2.4	2.7	2.9	3.1	3.3	2.1%
<b>Total</b>	<b>18.6</b>	<b>20.3</b>	<b>26.0</b>	<b>32.3</b>	<b>38.4</b>	<b>44.7</b>	<b>51.1</b>	<b>3.7%</b>
<b>Other Asia Pacific</b>								
Energy-intensive manufacturing	7.2	7.9	9.4	10.2	11.1	12.0	12.9	2.1%
Non-energy-intensive manufacturing	8.6	9.5	11.3	13.0	14.5	15.8	16.9	2.4%
Nonmanufacturing	1.8	1.8	1.9	2.0	2.1	2.2	2.3	0.9%
<b>Total</b>	<b>17.6</b>	<b>19.2</b>	<b>22.6</b>	<b>25.2</b>	<b>27.7</b>	<b>30.1</b>	<b>32.2</b>	<b>2.2%</b>
<b>Africa and Middle East</b>								
<b>Africa</b>								
Energy-intensive manufacturing	3.2	3.4	3.8	4.3	4.8	5.5	6.3	2.4%
Non-energy-intensive manufacturing	5.7	6.2	7.4	8.7	10.2	11.7	13.1	3.0%
Nonmanufacturing	1.4	1.3	1.3	1.4	1.5	1.5	1.5	0.3%
<b>Total</b>	<b>10.3</b>	<b>11.0</b>	<b>12.6</b>	<b>14.4</b>	<b>16.5</b>	<b>18.7</b>	<b>20.9</b>	<b>2.6%</b>
<b>Middle East</b>								
Energy-intensive manufacturing	7.4	7.6	7.9	8.3	8.7	9.1	9.3	0.8%
Non-energy-intensive manufacturing	7.9	7.9	8.1	8.7	9.3	9.7	10.0	0.8%
Nonmanufacturing	2.7	3.2	3.8	3.9	4.3	4.9	5.6	2.7%
<b>Total</b>	<b>18.0</b>	<b>18.6</b>	<b>19.7</b>	<b>21.0</b>	<b>22.4</b>	<b>23.7</b>	<b>24.9</b>	<b>1.2%</b>
<b>World</b>								
Energy-intensive manufacturing	147.5	151.5	156.9	161.6	166.4	172.1	177.9	0.7%
Non-energy-intensive manufacturing	76.9	81.4	89.8	98.6	106.7	114.1	120.5	1.6%
Nonmanufacturing	32.6	32.8	34.6	35.8	37.4	39.0	40.7	0.8%
Unclassified	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	--
<b>Total</b>	<b>257.0</b>	<b>265.6</b>	<b>281.3</b>	<b>296.0</b>	<b>310.3</b>	<b>325.1</b>	<b>339.0</b>	<b>1.0%</b>

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lz\_230821.151531 and Annual Energy Outlook 2023 (March 2023), [www.eia.gov/aeo](http://www.eia.gov/aeo)

Note: Totals may not equal sum of components due to independent rounding. Nonmanufacturing includes agriculture, construction, and mining; energy-intensive manufacturing includes food, pulp and paper, basic chemicals, refining, iron and steel, nonferrous metals, and nonmetallic minerals; non-energy-intensive manufacturing includes all other manufacturing industries.