International Energy Outlook 2023

Release date: October 2023

Table A1. World total primary energy consumption by region, Low Oil Price case

quadrillion British thermal units

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**152.6**	**151.6**	**155.7**	**160.4**	**165.4**	**171.8**	**179.5**	**0.6%**
United States	98.9	96.6	97.0	98.1	99.5	102.0	105.6	0.2%
Canada	14.7	14.6	15.5	16.4	17.5	18.7	19.9	1.1%
Mexico	7.7	7.8	8.5	8.9	9.4	10.0	10.7	1.2%
Brazil	14.9	15.7	16.7	17.6	18.1	18.5	18.8	0.8%
Other Americas	16.4	16.9	18.1	19.4	20.9	22.7	24.5	1.4%
Europe and Eurasia	**130.0**	**133.0**	**135.0**	**138.9**	**143.6**	**148.9**	**155.1**	**0.6%**
Western Europe	84.2	86.3	87.4	89.2	91.6	94.0	97.1	0.5%
Russia	33.5	34.0	34.3	35.5	36.7	38.1	39.5	0.6%
Eastern Europe and Eurasia	12.3	12.7	13.3	14.2	15.4	16.8	18.5	1.5%
Asia Pacific	**292.6**	**311.6**	**340.5**	**364.3**	**385.1**	**408.3**	**428.5**	**1.4%**
Japan	18.5	18.6	17.2	16.7	16.3	16.1	15.9	-0.5%
South Korea	13.0	13.6	14.0	14.2	14.3	14.3	14.4	0.4%
Australia and New Zealand	7.2	7.2	7.7	8.1	8.4	8.8	9.2	0.9%
China	172.4	181.1	189.0	192.4	193.4	195.8	196.2	0.5%
India	38.3	43.6	56.9	70.3	83.3	97.3	110.7	3.9%
Other Asia Pacific	43.2	47.3	55.7	62.6	69.4	76.0	82.0	2.3%
Africa and Middle East	**62.5**	**66.5**	**71.4**	**77.5**	**83.9**	**91.0**	**97.9**	**1.6%**
Africa	24.3	25.9	29.3	33.3	37.7	42.7	47.8	2.4%
Middle East	38.2	40.6	42.1	44.2	46.2	48.3	50.1	1.0%
World	**637.7**	**662.7**	**702.6**	**741.0**	**778.1**	**819.9**	**860.9**	**1.1%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

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Table A2. World total primary energy consumption by region and fuel, Low Oil Price case

quadrillion British thermal units

Region and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas								
Liquid fuels	57.6	58.2	57.6	58.1	59.4	61.6	64.6	0.4%
Natural gas	45.7	41.9	41.1	41.8	43.3	44.8	46.6	0.1%
Coal	11.3	10.7	6.5	6.8	6.9	7.1	7.0	-1.7%
Nuclear	9.4	9.3	9.5	8.8	8.2	7.6	7.5	-0.8%
Other	28.6	31.5	41.0	44.9	47.6	50.6	53.8	2.3%
Total	**152.6**	**151.6**	**155.7**	**160.4**	**165.4**	**171.8**	**179.5**	**0.6%**
Europe and Eurasia								
Liquid fuels	38.0	38.8	37.9	37.3	37.4	38.1	39.2	0.1%
Natural gas	43.7	44.5	45.9	47.1	49.0	51.0	53.5	0.7%
Coal	16.5	16.2	14.7	14.8	14.9	15.9	16.4	0.0%
Nuclear	10.4	10.6	11.1	11.3	11.2	11.0	11.1	0.2%
Other	21.4	22.9	25.3	28.3	31.2	32.8	35.0	1.8%
Total	**130.0**	**133.0**	**135.0**	**138.9**	**143.6**	**148.9**	**155.1**	**0.6%**
Asia Pacific								
Liquid fuels	71.4	77.7	84.4	90.1	95.3	100.8	105.5	1.4%
Natural gas	35.2	37.6	40.8	43.0	46.2	50.4	54.3	1.6%
Coal	133.7	134.5	142.1	144.7	142.7	141.0	140.8	0.2%
Nuclear	7.6	8.7	10.5	12.0	13.2	14.0	14.9	2.4%
Other	44.7	53.0	62.8	74.4	87.7	102.1	113.0	3.4%
Total	**292.6**	**311.6**	**340.5**	**364.3**	**385.1**	**408.3**	**428.5**	**1.4%**
Africa and Middle East								
Liquid fuels	23.3	24.7	24.8	25.8	27.4	29.4	31.5	1.1%
Natural gas	28.6	29.7	31.5	34.0	36.3	38.6	40.7	1.3%
Coal	4.6	4.5	5.0	5.8	6.5	7.2	7.9	2.0%
Nuclear	0.4	0.6	0.9	1.2	1.4	1.4	1.4	4.9%
Other	5.7	7.1	9.1	10.7	12.2	14.4	16.4	3.8%
Total	**62.5**	**66.5**	**71.4**	**77.5**	**83.9**	**91.0**	**97.9**	**1.6%**
World								
Liquid fuels	190.3	199.4	204.7	211.2	219.5	229.9	240.8	0.8%
Natural gas	153.2	153.7	159.3	166.0	174.9	184.7	195.0	0.9%
Coal	166.0	165.8	168.3	172.1	171.0	171.3	172.0	0.1%
Nuclear	27.7	29.3	32.0	33.4	34.0	34.0	34.9	0.8%
Other	100.4	114.6	138.3	158.2	178.7	200.0	218.2	2.8%
Total	**637.7**	**662.7**	**702.6**	**741.0**	**778.1**	**819.9**	**860.9**	**1.1%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

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Table A3. World GDP by region expressed in purchasing power parity, Low Oil Price case

billion 2015 dollars

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**$32,285**	**$33,712**	**$37,362**	**$41,232**	**$45,679**	**$50,594**	**$56,063**	**2.0%**
United States	$20,671	$21,390	$23,476	$25,859	$28,813	$32,149	$35,937	2.0%
Canada	$1,791	$1,873	$2,103	$2,298	$2,504	$2,721	$2,952	1.8%
Mexico	$2,367	$2,486	$2,760	$3,020	$3,279	$3,549	$3,831	1.7%
Brazil	$3,182	$3,333	$3,715	$3,982	$4,140	$4,256	$4,330	1.1%
Other Americas	$4,273	$4,630	$5,308	$6,073	$6,943	$7,920	$9,013	2.7%
Europe and Eurasia	**$31,730**	**$33,316**	**$36,049**	**$38,645**	**$41,526**	**$44,605**	**$47,970**	**1.5%**
Western Europe	$26,269	$27,476	$29,496	$31,340	$33,339	$35,398	$37,593	1.3%
Russia	$3,763	$3,934	$4,179	$4,340	$4,520	$4,729	$4,963	1.0%
Eastern Europe and Eurasia	$1,698	$1,906	$2,374	$2,965	$3,667	$4,478	$5,415	4.2%
Asia Pacific	**$58,793**	**$67,724**	**$84,309**	**$100,688**	**$116,752**	**$133,587**	**$149,581**	**3.4%**
Japan	$5,292	$5,518	$5,707	$5,713	$5,731	$5,745	$5,783	0.3%
South Korea	$2,292	$2,453	$2,663	$2,799	$2,878	$2,952	$3,014	1.0%
Australia and New Zealand	$1,524	$1,647	$1,912	$2,137	$2,347	$2,552	$2,756	2.1%
China	$26,404	$30,635	$37,925	$44,805	$50,780	$56,834	$61,670	3.1%
India	$10,049	$12,138	$16,867	$22,038	$27,511	$33,413	$39,542	5.0%
Other Asia Pacific	$13,232	$15,332	$19,235	$23,195	$27,505	$32,091	$36,816	3.7%
Africa and Middle East	**$12,838**	**$13,810**	**$15,871**	**$17,973**	**$20,050**	**$22,094**	**$24,083**	**2.3%**
Africa	$7,050	$7,645	$9,009	$10,421	$11,884	$13,415	$14,991	2.7%
Middle East	$5,788	$6,165	$6,862	$7,552	$8,166	$8,679	$9,091	1.6%
World	**$135,647**	**$148,560**	**$173,590**	**$198,537**	**$224,007**	**$250,880**	**$277,696**	**2.6%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo; Oxford Economics, Global Economic Model (February 2023), www.oxfordeconomics.com (subscription site)

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

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Table A4. World GDP by region expressed in market exchange rates, Low Oil Price case

billion 2015 dollars

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**$28,078**	**$29,230**	**$32,292**	**$35,579**	**$39,429**	**$43,699**	**$48,469**	**2.0%**
United States	$20,671	$21,390	$23,476	$25,859	$28,813	$32,149	$35,937	2.0%
Canada	$1,748	$1,828	$2,053	$2,243	$2,444	$2,656	$2,881	1.8%
Mexico	$1,242	$1,305	$1,449	$1,585	$1,721	$1,863	$2,010	1.7%
Brazil	$1,900	$1,990	$2,218	$2,377	$2,472	$2,541	$2,585	1.1%
Other Americas	$2,516	$2,717	$3,096	$3,515	$3,979	$4,491	$5,055	2.5%
Europe and Eurasia	**$22,949**	**$23,986**	**$25,765**	**$27,378**	**$29,179**	**$31,107**	**$33,197**	**1.3%**
Western Europe	$20,883	$21,781	$23,286	$24,608	$26,065	$27,591	$29,218	1.2%
Russia	$1,456	$1,522	$1,617	$1,679	$1,749	$1,830	$1,921	1.0%
Eastern Europe and Eurasia	$610	$683	$861	$1,091	$1,365	$1,685	$2,058	4.4%
Asia Pacific	**$32,233**	**$36,682**	**$44,577**	**$52,084**	**$59,181**	**$66,517**	**$73,207**	**3.0%**
Japan	$4,521	$4,714	$4,875	$4,881	$4,896	$4,908	$4,940	0.3%
South Korea	$1,738	$1,860	$2,019	$2,122	$2,182	$2,238	$2,285	1.0%
Australia and New Zealand	$1,671	$1,806	$2,097	$2,344	$2,574	$2,799	$3,022	2.1%
China	$16,177	$18,769	$23,236	$27,451	$31,112	$34,821	$37,784	3.1%
India	$2,927	$3,537	$4,915	$6,422	$8,017	$9,737	$11,523	5.0%
Other Asia Pacific	$5,199	$5,997	$7,435	$8,864	$10,399	$12,014	$13,652	3.5%
Africa and Middle East	**$5,526**	**$5,953**	**$6,817**	**$7,705**	**$8,589**	**$9,460**	**$10,316**	**2.3%**
Africa	$2,723	$2,951	$3,472	$4,016	$4,587	$5,186	$5,802	2.7%
Middle East	$2,803	$3,002	$3,345	$3,689	$4,002	$4,275	$4,513	1.7%
World	**$88,786**	**$95,851**	**$109,451**	**$122,746**	**$136,378**	**$150,783**	**$165,188**	**2.2%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo; Oxford Economics, Global Economic Model (February 2023), www.oxfordeconomics.com (subscription site)

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

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Table A5. World liquid fuels consumption by region, Low Oil Price case

million barrels per day

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**30.6**	**31.0**	**30.8**	**31.1**	**31.9**	**33.0**	**34.6**	**0.4%**
United States	19.9	20.0	19.7	19.6	19.9	20.4	21.3	0.2%
Canada	2.3	2.3	2.4	2.5	2.6	2.7	2.8	0.8%
Mexico	1.9	1.9	1.9	1.9	2.0	2.1	2.3	0.6%
Brazil	3.0	3.1	3.2	3.2	3.3	3.4	3.4	0.6%
Other Americas	3.5	3.7	3.7	3.9	4.1	4.5	4.8	1.1%
Europe and Eurasia	**18.8**	**19.1**	**18.7**	**18.4**	**18.5**	**18.8**	**19.4**	**0.1%**
Western Europe	14.3	14.3	13.8	13.4	13.2	13.3	13.6	-0.2%
Russia	3.4	3.6	3.7	3.7	3.8	3.9	4.1	0.6%
Eastern Europe and Eurasia	1.1	1.2	1.2	1.3	1.4	1.6	1.8	1.7%
Asia Pacific	**36.1**	**39.3**	**42.7**	**45.7**	**48.4**	**51.3**	**53.7**	**1.4%**
Japan	3.4	3.3	3.1	2.9	2.7	2.6	2.5	-1.0%
South Korea	2.6	2.7	2.8	2.7	2.7	2.7	2.6	0.0%
Australia and New Zealand	1.2	1.3	1.3	1.3	1.3	1.4	1.4	0.5%
China	15.2	16.7	17.7	18.0	17.8	17.8	17.6	0.5%
India	5.1	5.9	7.5	9.3	11.2	13.1	14.8	3.9%
Other Asia Pacific	8.7	9.4	10.5	11.5	12.7	13.8	14.7	1.9%
Africa and Middle East	**13.5**	**14.3**	**14.5**	**15.0**	**15.9**	**16.9**	**18.0**	**1.0%**
Africa	4.4	4.8	5.2	5.7	6.3	7.1	8.0	2.1%
Middle East	9.1	9.6	9.3	9.4	9.6	9.8	10.0	0.3%
World	**99.0**	**103.8**	**106.7**	**110.3**	**114.7**	**120.1**	**125.8**	**0.9%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253; Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo; and Short-Term Energy Outlook (April 2023)

Note: Totals may not equal sum of components due to independent rounding. Liquid fuels include motor gasoline, distillate, residual, kerosene, jet fuel, liquid petroleum gases, sequestered petroleum, other petroleum, petroleum coke, crude oil (including lease and plant condensate), ethanol, and other biofuels across all demand sectors. EIA's Glossary includes descriptions of individual liquid fuel components.

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Table A6. World natural gas consumption by region, Low Oil Price case

trillion cubic feet

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**45.0**	**41.5**	**40.6**	**41.4**	**42.8**	**44.3**	**46.2**	**0.1%**
United States	32.3	28.3	26.0	26.0	26.6	27.5	28.4	-0.5%
Canada	4.3	4.4	5.0	5.4	5.8	6.1	6.6	1.6%
Mexico	2.7	2.8	3.1	3.3	3.6	3.8	3.9	1.4%
Brazil	1.3	1.5	1.7	1.6	1.5	1.4	1.4	0.3%
Other Americas	4.3	4.5	4.8	5.0	5.3	5.5	5.8	1.1%
Europe and Eurasia	**42.3**	**43.1**	**44.5**	**45.7**	**47.5**	**49.5**	**51.8**	**0.7%**
Western Europe	19.8	20.6	21.7	21.6	21.6	21.7	22.0	0.4%
Russia	17.0	16.8	17.1	18.2	19.3	20.3	21.4	0.8%
Eastern Europe and Eurasia	5.5	5.7	5.6	5.8	6.6	7.4	8.5	1.6%
Asia Pacific	**34.9**	**37.3**	**40.5**	**42.8**	**46.0**	**50.1**	**53.9**	**1.6%**
Japan	4.1	4.1	3.9	3.6	3.4	3.4	3.3	-0.7%
South Korea	2.5	2.5	2.4	2.3	2.2	2.2	2.2	-0.4%
Australia and New Zealand	2.0	2.1	2.3	2.3	2.4	2.5	2.7	1.0%
China	14.1	15.2	16.3	17.8	19.8	21.9	23.9	1.9%
India	2.5	2.7	4.0	4.8	5.7	6.6	7.5	4.0%
Other Asia Pacific	9.7	10.6	11.6	12.0	12.6	13.4	14.3	1.4%
Africa and Middle East	**28.4**	**29.5**	**31.2**	**33.6**	**35.9**	**38.0**	**40.0**	**1.2%**
Africa	6.2	6.4	6.8	7.4	8.2	8.9	9.6	1.6%
Middle East	22.1	23.1	24.5	26.2	27.7	29.1	30.4	1.1%
World	**150.5**	**151.3**	**156.8**	**163.5**	**172.1**	**181.8**	**192.0**	**0.9%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. Natural gas consumption excludes nonhydrocarbon gases.

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Table A7. World coal consumption by region, Low Oil Price case

million short tons

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**574**	**539**	**319**	**331**	**330**	**339**	**330**	**-2.0%**
United States	499	472	245	237	211	212	200	-3.2%
Canada	25	15	5	6	6	6	6	-5.2%
Mexico	7	7	13	14	15	15	15	2.7%
Brazil	25	26	26	28	33	29	29	0.6%
Other Americas	17	19	29	46	66	78	80	5.6%
Europe and Eurasia	**1,018**	**996**	**856**	**857**	**849**	**931**	**960**	**-0.2%**
Western Europe	642	616	483	488	472	542	560	-0.5%
Russia	238	247	232	219	222	225	228	-0.2%
Eastern Europe and Eurasia	138	133	140	149	156	164	172	0.8%
Asia Pacific	**6,694**	**6,744**	**7,182**	**7,327**	**7,262**	**7,195**	**7,198**	**0.3%**
Japan	193	191	134	137	132	127	122	-1.6%
South Korea	110	111	113	117	120	121	121	0.3%
Australia and New Zealand	100	93	106	114	115	116	117	0.5%
China	4,676	4,619	4,593	4,464	4,180	3,951	3,820	-0.7%
India	1,063	1,152	1,467	1,608	1,724	1,794	1,815	1.9%
Other Asia Pacific	551	578	768	888	992	1,085	1,202	2.8%
Africa and Middle East	**177**	**168**	**189**	**226**	**256**	**281**	**306**	**2.0%**
Africa	165	156	177	215	244	269	293	2.1%
Middle East	12	12	11	12	12	12	12	0.1%
World	**8,464**	**8,447**	**8,545**	**8,741**	**8,697**	**8,746**	**8,793**	**0.1%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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

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Table A8. World nuclear energy consumption by region (net nuclear electricity generation), Low Oil Price case

billion kilowatthours

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**889**	**891**	**903**	**842**	**779**	**730**	**719**	**-0.8%**
United States	772	782	766	703	666	640	641	-0.7%
Canada	79	71	77	72	51	39	28	-3.7%
Mexico	11	11	20	28	23	17	17	1.4%
Brazil	14	14	23	23	23	18	18	0.9%
Other Americas	12	12	18	15	15	15	15	0.8%
Europe and Eurasia	**995**	**1,003**	**1,044**	**1,062**	**1,055**	**1,036**	**1,039**	**0.2%**
Western Europe	734	723	733	727	720	702	702	-0.2%
Russia	217	229	234	234	234	234	227	0.2%
Eastern Europe and Eurasia	44	52	77	101	101	101	111	3.4%
Asia Pacific	**746**	**837**	**993**	**1,143**	**1,253**	**1,329**	**1,420**	**2.3%**
Japan	78	115	139	139	121	102	102	0.9%
South Korea	201	228	228	228	228	218	214	0.2%
Australia and New Zealand	0	0	0	0	0	0	0	0.0%
China	383	416	538	674	799	903	998	3.5%
India	41	42	52	67	70	70	70	1.9%
Other Asia Pacific	43	36	36	36	36	36	36	-0.6%
Africa and Middle East	**37**	**54**	**87**	**116**	**135**	**135**	**135**	**4.8%**
Africa	13	13	30	43	52	52	52	5.1%
Middle East	24	41	58	73	83	83	83	4.6%
World	**2,666**	**2,786**	**3,028**	**3,163**	**3,221**	**3,230**	**3,313**	**0.8%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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

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Table A9. World consumption of renewable energy by region, Low Oil Price case

quadrillion British thermal units

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**28.6**	**31.5**	**41.0**	**44.9**	**47.6**	**50.6**	**53.8**	**2.3%**
United States	11.4	13.9	22.0	24.1	25.3	26.4	27.6	3.2%
Canada	4.3	4.4	4.6	5.0	5.7	6.5	7.0	1.7%
Mexico	1.0	0.9	1.1	1.2	1.3	1.6	1.8	2.4%
Brazil	7.4	7.6	8.2	9.0	9.4	9.8	10.1	1.1%
Other Americas	4.5	4.6	5.2	5.6	5.9	6.4	7.3	1.7%
Europe and Eurasia	**21.4**	**22.9**	**25.3**	**28.3**	**31.2**	**32.8**	**35.0**	**1.8%**
Western Europe	18.4	19.9	22.1	24.8	27.8	29.4	31.5	1.9%
Russia	2.2	2.1	2.2	2.4	2.2	2.2	2.3	0.2%
Eastern Europe and Eurasia	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2%
Asia Pacific	**44.7**	**53.0**	**62.8**	**74.4**	**87.7**	**102.1**	**113.0**	**3.4%**
Japan	2.4	2.2	2.5	2.6	3.1	3.3	3.5	1.4%
South Korea	0.6	0.6	0.8	1.1	1.3	1.5	1.7	3.6%
Australia and New Zealand	1.4	1.5	1.7	1.9	2.2	2.4	2.6	2.4%
China	26.6	31.6	35.5	37.8	42.0	46.0	46.8	2.0%
India	7.4	9.4	12.9	19.4	25.5	33.5	41.7	6.4%
Other Asia Pacific	6.3	7.6	9.4	11.6	13.6	15.4	16.6	3.5%
Africa and Middle East	**5.7**	**7.1**	**9.1**	**10.7**	**12.2**	**14.4**	**16.4**	**3.8%**
Africa	5.3	6.3	7.8	9.2	10.7	12.8	14.8	3.7%
Middle East	0.4	0.8	1.3	1.4	1.5	1.6	1.7	5.3%
World	**100.4**	**114.6**	**138.3**	**158.2**	**178.7**	**200.0**	**218.2**	**2.8%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

Note: Totals may not equal sum of components due to independent rounding. We converted electricity generation from renewable sources such as hydroelectric, wind, or solar to British thermal units at a rate of 8,124 British thermal units per kilowatthour, which reflects the average projected conversion efficiency of the U.S. fossil-fueled generating fleet in the Annual Energy Outlook 2021 over the projection period (2022–2050).

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Table A10. World carbon dioxide emissions by region, Low Oil Price case

million metric tons of carbon dioxide

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**6,992**	**6,758**	**6,206**	**6,263**	**6,418**	**6,647**	**6,899**	**0.0%**
United States	4,842	4,550	3,936	3,892	3,894	3,984	4,104	-0.6%
Canada	548	535	517	536	567	602	637	0.5%
Mexico	419	429	449	464	489	513	539	0.9%
Brazil	439	472	493	497	508	505	510	0.5%
Other Americas	744	771	810	874	961	1,043	1,109	1.4%
Europe and Eurasia	**6,361**	**6,425**	**6,289**	**6,304**	**6,396**	**6,631**	**6,868**	**0.3%**
Western Europe	3,803	3,834	3,678	3,613	3,563	3,642	3,708	-0.1%
Russia	1,815	1,840	1,837	1,876	1,945	2,018	2,092	0.5%
Eastern Europe and Eurasia	742	752	773	815	888	971	1,068	1.3%
Asia Pacific	**18,703**	**19,300**	**20,600**	**21,327**	**21,650**	**22,067**	**22,560**	**0.7%**
Japan	1,036	1,023	868	831	791	770	749	-1.2%
South Korea	639	656	657	652	646	642	637	0.0%
Australia and New Zealand	404	396	424	435	439	450	462	0.5%
China	11,498	11,655	11,785	11,674	11,185	10,840	10,646	-0.3%
India	2,446	2,689	3,446	3,933	4,406	4,816	5,138	2.7%
Other Asia Pacific	2,680	2,881	3,420	3,802	4,183	4,548	4,927	2.2%
Africa and Middle East	**3,606**	**3,757**	**3,896**	**4,168**	**4,469**	**4,785**	**5,106**	**1.2%**
Africa	1,331	1,375	1,494	1,679	1,881	2,091	2,312	2.0%
Middle East	2,275	2,382	2,402	2,489	2,588	2,695	2,794	0.7%
World	**35,661**	**36,240**	**36,991**	**38,062**	**38,934**	**40,130**	**41,433**	**0.5%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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

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Table A11. World carbon dioxide emissions from liquid fuels use by region, Low Oil Price case

million metric tons of carbon dioxide

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**3,501**	**3,523**	**3,452**	**3,460**	**3,537**	**3,666**	**3,847**	**0.3%**
United States	2,189	2,169	2,096	2,070	2,086	2,135	2,231	0.1%
Canada	271	270	273	282	294	308	322	0.6%
Mexico	253	256	247	247	255	269	289	0.5%
Brazil	310	331	338	345	352	360	364	0.6%
Other Americas	478	497	498	515	550	594	642	1.1%
Europe and Eurasia	**2,474**	**2,523**	**2,452**	**2,394**	**2,381**	**2,412**	**2,472**	**0.0%**
Western Europe	1,905	1,924	1,843	1,779	1,744	1,748	1,780	-0.2%
Russia	435	456	456	452	457	465	473	0.3%
Eastern Europe and Eurasia	134	143	153	164	180	199	219	1.8%
Asia Pacific	**4,139**	**4,510**	**4,907**	**5,256**	**5,586**	**5,937**	**6,234**	**1.5%**
Japan	404	393	366	342	326	316	307	-1.0%
South Korea	262	279	278	271	263	257	250	-0.2%
Australia and New Zealand	168	170	176	178	181	187	194	0.5%
China	1,579	1,746	1,837	1,866	1,848	1,848	1,830	0.5%
India	610	710	897	1,105	1,323	1,542	1,746	3.8%
Other Asia Pacific	1,116	1,213	1,352	1,493	1,645	1,788	1,907	1.9%
Africa and Middle East	**1,660**	**1,761**	**1,755**	**1,815**	**1,924**	**2,058**	**2,204**	**1.0%**
Africa	597	643	693	763	856	965	1,084	2.2%
Middle East	1,062	1,118	1,062	1,052	1,068	1,093	1,120	0.2%
World	**11,773**	**12,317**	**12,566**	**12,925**	**13,428**	**14,073**	**14,757**	**0.8%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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

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Table A12. World carbon dioxide emissions from natural gas use by region, Low Oil Price case

million metric tons of carbon dioxide

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**2,405**	**2,208**	**2,124**	**2,147**	**2,224**	**2,304**	**2,392**	**0.0%**
United States	1,724	1,500	1,375	1,371	1,407	1,448	1,493	-0.5%
Canada	231	237	231	240	259	280	301	1.0%
Mexico	147	153	171	183	199	208	214	1.4%
Brazil	72	82	95	88	81	78	78	0.3%
Other Americas	230	237	252	266	277	290	305	1.0%
Europe and Eurasia	**2,317**	**2,361**	**2,436**	**2,501**	**2,599**	**2,707**	**2,837**	**0.7%**
Western Europe	1,085	1,128	1,192	1,187	1,188	1,194	1,209	0.4%
Russia	931	920	938	998	1,054	1,110	1,169	0.8%
Eastern Europe and Eurasia	300	313	307	317	357	403	460	1.5%
Asia Pacific	**1,845**	**1,990**	**2,157**	**2,278**	**2,447**	**2,667**	**2,875**	**1.6%**
Japan	223	227	214	197	184	185	182	-0.7%
South Korea	137	137	132	125	122	120	122	-0.4%
Australia and New Zealand	91	91	94	92	91	95	98	0.3%
China	738	816	876	959	1,068	1,188	1,299	2.0%
India	137	151	221	267	312	364	412	4.0%
Other Asia Pacific	519	568	621	638	671	715	762	1.4%
Africa and Middle East	**1,517**	**1,577**	**1,674**	**1,805**	**1,928**	**2,046**	**2,159**	**1.3%**
Africa	331	337	359	394	435	471	512	1.6%
Middle East	1,186	1,239	1,315	1,411	1,493	1,575	1,647	1.2%
World	**8,084**	**8,135**	**8,391**	**8,731**	**9,198**	**9,724**	**10,262**	**0.9%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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

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Table A13. World carbon dioxide emissions from coal use by region, Low Oil Price case

million metric tons of carbon dioxide

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**1,085**	**1,026**	**630**	**656**	**658**	**677**	**661**	**-1.8%**
United States	929	881	465	451	401	402	381	-3.1%
Canada	45	29	13	13	14	14	14	-4.2%
Mexico	19	19	32	34	35	35	36	2.4%
Brazil	57	59	61	65	74	67	68	0.6%
Other Americas	35	38	59	93	134	159	162	5.6%
Europe and Eurasia	**1,570**	**1,542**	**1,401**	**1,409**	**1,415**	**1,512**	**1,559**	**0.0%**
Western Europe	813	782	644	648	631	701	720	-0.4%
Russia	449	464	444	427	434	442	450	0.0%
Eastern Europe and Eurasia	308	296	313	334	351	369	390	0.8%
Asia Pacific	**12,719**	**12,800**	**13,535**	**13,793**	**13,618**	**13,463**	**13,451**	**0.2%**
Japan	409	403	288	292	281	270	260	-1.6%
South Korea	240	240	246	256	261	265	265	0.4%
Australia and New Zealand	145	135	154	165	167	169	170	0.6%
China	9,181	9,094	9,072	8,848	8,269	7,804	7,517	-0.7%
India	1,699	1,828	2,328	2,562	2,772	2,910	2,980	2.0%
Other Asia Pacific	1,045	1,099	1,447	1,670	1,868	2,045	2,259	2.8%
Africa and Middle East	**429**	**420**	**467**	**548**	**616**	**681**	**743**	**2.0%**
Africa	403	394	442	522	589	654	715	2.1%
Middle East	26	26	25	26	27	27	27	0.1%
World	**15,804**	**15,788**	**16,034**	**16,406**	**16,307**	**16,333**	**16,413**	**0.1%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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

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Table A14. World carbon dioxide emissions from power generation by region and fossil fuel type, Low Oil Price case

million metric tons of carbon dioxide

Region and fuel	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas								
Liquid fuels	92	110	56	23	11	4	4	-10.5%
Natural gas	852	712	567	546	575	607	632	-1.1%
Coal	907	850	448	473	474	491	474	-2.3%
Total	**1,851**	**1,671**	**1,071**	**1,043**	**1,060**	**1,102**	**1,111**	**-1.8%**
United States								
Liquid fuels	8	8	5	5	5	4	4	-3.0%
Natural gas	646	493	351	338	364	396	422	-1.5%
Coal	842	797	383	374	329	332	315	-3.4%
Total	**1,496**	**1,298**	**739**	**717**	**698**	**731**	**741**	**-2.5%**
Canada								
Liquid fuels	2	2	0	0	0	0	0	-10.3%
Natural gas	27	29	8	3	3	3	3	-7.9%
Coal	33	16	0	0	0	0	0	-100.0%
Total	**61**	**47**	**9**	**3**	**3**	**3**	**3**	**-10.5%**
Mexico								
Liquid fuels	28	36	19	9	3	0	0	-18.2%
Natural gas	70	73	77	82	92	95	96	1.1%
Coal	7	8	19	21	21	21	21	4.1%
Total	**105**	**117**	**116**	**112**	**117**	**117**	**117**	**0.4%**
Brazil								
Liquid fuels	10	14	6	1	0	0	0	-14.7%
Natural gas	28	36	46	37	29	27	25	-0.4%
Coal	9	10	8	9	17	9	9	0.1%
Total	**47**	**60**	**60**	**46**	**46**	**36**	**34**	**-1.2%**
Other Americas								
Liquid fuels	44	50	25	8	3	0	0	-17.3%
Natural gas	81	80	84	86	86	86	86	0.3%
Coal	17	19	38	69	107	129	129	7.5%
Total	**142**	**149**	**147**	**164**	**196**	**216**	**216**	**1.5%**
Europe and Eurasia								
Liquid fuels	58	80	81	56	43	41	40	-1.3%
Natural gas	701	706	749	770	817	864	919	1.0%
Coal	848	812	663	650	630	699	715	-0.6%
Total	**1,607**	**1,599**	**1,493**	**1,476**	**1,491**	**1,604**	**1,673**	**0.1%**
Western Europe								
Liquid fuels	40	57	62	47	35	35	35	-0.5%
Natural gas	263	297	365	353	346	341	339	0.9%
Coal	481	454	324	327	308	377	392	-0.7%
Total	**784**	**809**	**751**	**727**	**690**	**753**	**765**	**-0.1%**
Russia								
Liquid fuels	13	19	16	5	4	3	2	-6.7%
Natural gas	315	295	289	322	349	370	389	0.8%
Coal	179	190	166	142	142	142	142	-0.8%
Total	**508**	**505**	**470**	**470**	**494**	**514**	**533**	**0.2%**
Eastern Europe and Eurasia								
Liquid fuels	4	4	3	3	3	3	3	-1.0%
Natural gas	123	113	95	94	123	153	191	1.6%
Coal	187	168	174	181	181	181	181	-0.1%
Total	**315**	**284**	**272**	**279**	**307**	**337**	**375**	**0.6%**
Asia Pacific								

Liquid fuels	49	55	33	18	10	7	6	-7.5%
Natural gas	618	657	665	652	692	769	840	1.1%
Coal	7,386	7,461	8,209	8,524	8,407	8,259	8,256	0.4%
Total	**8,052**	**8,173**	**8,906**	**9,194**	**9,109**	**9,034**	**9,101**	**0.4%**
Japan								
Liquid fuels	9	13	9	5	3	3	3	-4.1%
Natural gas	145	145	134	117	104	105	101	-1.3%
Coal	251	249	147	165	165	165	165	-1.5%
Total	**406**	**406**	**290**	**287**	**272**	**272**	**268**	**-1.5%**
South Korea								
Liquid fuels	2	3	4	3	2	2	2	0.5%
Natural gas	69	65	61	55	50	47	47	-1.4%
Coal	130	131	134	143	147	151	151	0.5%
Total	**202**	**200**	**199**	**200**	**200**	**200**	**200**	**0.0%**
Australia and New Zealand								
Liquid fuels	1	1	0	0	0	0	0	-7.2%
Natural gas	22	21	23	18	14	15	15	-1.4%
Coal	123	112	129	138	139	140	140	0.5%
Total	**145**	**134**	**151**	**157**	**153**	**155**	**155**	**0.2%**
China								
Liquid fuels	2	2	1	0	0	0	0	-10.9%
Natural gas	121	148	160	205	283	361	436	4.7%
Coal	5,206	5,202	5,418	5,490	5,204	4,983	4,937	-0.2%
Total	**5,328**	**5,352**	**5,580**	**5,695**	**5,487**	**5,344**	**5,373**	**0.0%**
India								
Liquid fuels	3	2	1	0	0	0	0	-14.2%
Natural gas	24	24	38	37	37	37	37	1.6%
Coal	1,077	1,158	1,492	1,542	1,572	1,522	1,401	0.9%
Total	**1,104**	**1,184**	**1,531**	**1,579**	**1,609**	**1,560**	**1,439**	**1.0%**
Other Asia Pacific								
Liquid fuels	33	34	18	10	5	2	0	-14.4%
Natural gas	237	254	249	219	204	204	204	-0.5%
Coal	598	609	889	1,047	1,180	1,299	1,462	3.2%
Total	**867**	**897**	**1,156**	**1,276**	**1,388**	**1,504**	**1,667**	**2.4%**
Africa and Middle East								
Liquid fuels	205	230	119	50	21	8	2	-15.2%
Natural gas	587	612	630	684	719	752	784	1.0%
Coal	212	182	197	239	260	269	269	0.9%
Total	**1,004**	**1,025**	**946**	**973**	**1,000**	**1,029**	**1,055**	**0.2%**
Africa								
Liquid fuels	31	31	12	2	0	0	0	-16.3%
Natural gas	166	167	171	185	201	212	228	1.1%
Coal	212	182	197	239	260	269	269	0.9%
Total	**409**	**379**	**380**	**427**	**460**	**481**	**498**	**0.7%**
Middle East								
Liquid fuels	174	200	107	48	21	8	2	-15.0%
Natural gas	421	445	458	499	519	540	555	1.0%
Coal	0	0	0	0	0	0	0	-6.1%
Total	**595**	**645**	**566**	**547**	**540**	**548**	**557**	**-0.2%**
World								
Liquid fuels	404	475	289	147	84	60	51	-7.1%
Natural gas	2,757	2,686	2,610	2,652	2,804	2,991	3,175	0.5%
Coal	9,353	9,306	9,518	9,887	9,771	9,718	9,714	0.1%
Total	**12,514**	**12,468**	**12,416**	**12,685**	**12,659**	**12,769**	**12,940**	**0.1%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo

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

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Table A15. World population by region, Low Oil Price case

million persons

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**1,036**	**1,057**	**1,091**	**1,120**	**1,143**	**1,161**	**1,175**	**0.4%**
United States	333	338	346	354	361	367	372	0.4%
Canada	39	40	43	45	47	48	50	0.9%
Mexico	128	130	135	138	141	143	144	0.4%
Brazil	216	219	224	228	230	231	231	0.2%
Other Americas	320	330	343	355	364	372	378	0.6%
Europe and Eurasia	**920**	**923**	**928**	**932**	**934**	**935**	**933**	**0.1%**
Western Europe	633	636	639	641	641	641	638	0.0%
Russia	144	143	141	138	136	134	132	-0.3%
Eastern Europe and Eurasia	142	144	149	152	156	160	162	0.5%
Asia Pacific	**4,287**	**4,358**	**4,474**	**4,568**	**4,640**	**4,690**	**4,712**	**0.3%**
Japan	126	124	121	117	114	110	106	-0.6%
South Korea	52	52	51	51	49	48	46	-0.4%
Australia and New Zealand	31	33	35	37	39	40	42	1.1%
China	1,427	1,424	1,415	1,399	1,377	1,349	1,312	-0.3%
India	1,422	1,456	1,516	1,569	1,613	1,647	1,671	0.6%
Other Asia Pacific	1,229	1,270	1,335	1,396	1,449	1,496	1,535	0.8%
Africa and Middle East	**1,658**	**1,771**	**1,967**	**2,168**	**2,373**	**2,579**	**2,782**	**1.9%**
Africa	1,386	1,486	1,661	1,843	2,031	2,221	2,410	2.0%
Middle East	273	286	306	325	342	358	372	1.1%
World	**7,901**	**8,110**	**8,461**	**8,788**	**9,091**	**9,365**	**9,602**	**0.7%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo; Oxford Economics, Global Economic Model (February 2023), www.oxfordeconomics.com (subscription site)

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

International Energy Outlook 2023

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Table A16. World gross output by region and sector, Low Oil Price case

billion 2015 dollars

Region and sector	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas								
Energy-intensive manufacturing	$4,946	$5,142	$5,644	$6,106	$6,596	$7,147	$7,741	1.6%
Non-energy-intensive manufacturing	$6,357	$6,782	$7,646	$8,526	$9,542	$10,671	$11,954	2.3%
Nonmanufacturing	$5,265	$5,597	$6,106	$6,663	$7,294	$7,979	$8,744	1.8%
Services	$40,510	$43,230	$47,778	$52,541	$57,981	$63,913	$70,417	2.0%
Total	**$57,077**	**$60,751**	**$67,174**	**$73,836**	**$81,414**	**$89,710**	**$98,856**	**2.0%**
United States								
Energy-intensive manufacturing	$2,388	$2,430	$2,614	$2,802	$3,043	$3,333	$3,652	1.5%
Non-energy-intensive manufacturing	$3,493	$3,776	$4,261	$4,786	$5,445	$6,193	$7,056	2.5%
Nonmanufacturing	$2,394	$2,618	$2,828	$3,109	$3,483	$3,912	$4,418	2.2%
Services	$28,881	$30,922	$33,878	$37,189	$41,247	$45,805	$50,945	2.0%
Total	**$37,155**	**$39,745**	**$43,580**	**$47,885**	**$53,218**	**$59,243**	**$66,072**	**2.1%**
Canada								
Energy-intensive manufacturing	$256	$266	$304	$339	$375	$413	$449	2.0%
Non-energy-intensive manufacturing	$332	$359	$413	$458	$503	$548	$593	2.1%
Nonmanufacturing	$498	$497	$537	$577	$616	$655	$696	1.2%
Services	$1,724	$1,835	$2,076	$2,269	$2,479	$2,704	$2,945	1.9%
Total	**$2,810**	**$2,957**	**$3,331**	**$3,644**	**$3,973**	**$4,320**	**$4,684**	**1.8%**
Mexico								
Energy-intensive manufacturing	$535	$564	$625	$679	$732	$796	$876	1.8%
Non-energy-intensive manufacturing	$983	$1,056	$1,156	$1,258	$1,381	$1,535	$1,728	2.0%
Nonmanufacturing	$466	$486	$537	$577	$609	$639	$668	1.3%
Services	$1,999	$2,100	$2,348	$2,587	$2,828	$3,074	$3,319	1.8%
Total	**$3,982**	**$4,206**	**$4,667**	**$5,101**	**$5,550**	**$6,044**	**$6,591**	**1.8%**
Brazil								
Energy-intensive manufacturing	$868	$919	$1,010	$1,065	$1,090	$1,108	$1,116	0.9%
Non-energy-intensive manufacturing	$612	$657	$753	$825	$875	$919	$956	1.6%
Nonmanufacturing	$710	$741	$817	$872	$913	$952	$987	1.2%
Services	$3,392	$3,571	$3,973	$4,249	$4,402	$4,499	$4,540	1.0%
Total	**$5,583**	**$5,889**	**$6,553**	**$7,011**	**$7,280**	**$7,477**	**$7,598**	**1.1%**
Other Americas								
Energy-intensive manufacturing	$899	$964	$1,090	$1,221	$1,356	$1,498	$1,648	2.2%
Non-energy-intensive manufacturing	$937	$934	$1,063	$1,199	$1,338	$1,476	$1,620	2.0%
Nonmanufacturing	$1,197	$1,256	$1,387	$1,529	$1,674	$1,821	$1,975	1.8%
Services	$4,514	$4,801	$5,503	$6,246	$7,025	$7,831	$8,667	2.4%
Total	**$7,546**	**$7,955**	**$9,043**	**$10,195**	**$11,393**	**$12,627**	**$13,911**	**2.2%**
Europe and Eurasia								
Energy-intensive manufacturing	$6,107	$6,309	$6,513	$6,839	$7,219	$7,632	$8,089	1.0%
Non-energy-intensive manufacturing	$9,080	$9,704	$10,351	$11,104	$11,925	$12,788	$13,713	1.5%
Nonmanufacturing	$6,410	$6,599	$7,163	$7,584	$8,021	$8,424	$8,832	1.2%
Services	$36,030	$37,943	$41,055	$43,954	$47,193	$50,719	$54,636	1.5%
Total	**$57,627**	**$60,555**	**$65,083**	**$69,481**	**$74,359**	**$79,562**	**$85,270**	**1.4%**
Western Europe								
Energy-intensive manufacturing	$4,982	$5,067	$5,149	$5,328	$5,549	$5,781	$6,055	0.7%
Non-energy-intensive manufacturing	$8,440	$8,976	$9,564	$10,246	$10,979	$11,737	$12,552	1.4%
Nonmanufacturing	$4,377	$4,569	$4,860	$5,096	$5,345	$5,566	$5,796	1.0%
Services	$31,098	$32,632	$35,232	$37,509	$39,965	$42,529	$45,273	1.4%
Total	**$48,897**	**$51,244**	**$54,804**	**$58,180**	**$61,838**	**$65,613**	**$69,676**	**1.3%**
Russia								
Energy-intensive manufacturing	$895	$978	$1,050	$1,134	$1,219	$1,311	$1,396	1.6%
Non-energy-intensive manufacturing	$544	$609	$643	$691	$753	$824	$896	1.8%

Nonmanufacturing	$1,282	$1,226	$1,294	$1,320	$1,334	$1,351	$1,367	0.2%
Services	$3,823	$4,050	$4,223	$4,353	$4,529	$4,758	$5,045	1.0%
Total	**$6,544**	**$6,862**	**$7,210**	**$7,498**	**$7,834**	**$8,245**	**$8,704**	**1.0%**
Eastern Europe and Eurasia								
Energy-intensive manufacturing	$230	$265	$315	$377	$451	$539	$638	3.7%
Non-energy-intensive manufacturing	$96	$119	$145	$167	$193	$226	$264	3.7%
Nonmanufacturing	$750	$805	$1,009	$1,168	$1,343	$1,507	$1,669	2.9%
Services	$1,109	$1,260	$1,600	$2,092	$2,700	$3,432	$4,319	5.0%
Total	**$2,185**	**$2,449**	**$3,068**	**$3,804**	**$4,687**	**$5,705**	**$6,890**	**4.2%**
Asia Pacific								
Energy-intensive manufacturing	$21,179	$24,137	$28,604	$33,051	$37,323	$41,818	$46,142	2.8%
Non-energy-intensive manufacturing	$42,102	$48,279	$58,004	$66,482	$73,679	$80,330	$85,447	2.6%
Nonmanufacturing	$24,048	$26,427	$31,134	$35,017	$38,486	$41,984	$44,957	2.3%
Services	$58,764	$68,248	$86,904	$105,808	$124,701	$144,527	$163,478	3.7%
Total	**$146,093**	**$167,090**	**$204,646**	**$240,359**	**$274,190**	**$308,659**	**$340,024**	**3.1%**
Japan								
Energy-intensive manufacturing	$941	$978	$952	$916	$893	$872	$854	-0.3%
Non-energy-intensive manufacturing	$2,737	$3,022	$3,174	$3,223	$3,247	$3,265	$3,291	0.7%
Nonmanufacturing	$670	$689	$707	$699	$695	$690	$687	0.1%
Services	$5,761	$6,025	$6,236	$6,240	$6,255	$6,270	$6,313	0.3%
Total	**$10,110**	**$10,714**	**$11,069**	**$11,078**	**$11,090**	**$11,097**	**$11,146**	**0.3%**
South Korea								
Energy-intensive manufacturing	$1,067	$1,146	$1,178	$1,182	$1,162	$1,137	$1,107	0.1%
Non-energy-intensive manufacturing	$1,692	$1,810	$2,050	$2,177	$2,262	$2,345	$2,423	1.3%
Nonmanufacturing	$362	$383	$391	$398	$404	$408	$411	0.5%
Services	$2,565	$2,739	$2,962	$3,120	$3,211	$3,297	$3,368	1.0%
Total	**$5,686**	**$6,077**	**$6,582**	**$6,877**	**$7,040**	**$7,187**	**$7,309**	**0.9%**
Australia and New Zealand								
Energy-intensive manufacturing	$173	$189	$206	$221	$235	$249	$262	1.5%
Non-energy-intensive manufacturing	$130	$139	$150	$159	$169	$177	$184	1.2%
Nonmanufacturing	$590	$628	$734	$810	$881	$948	$1,011	1.9%
Services	$1,958	$2,132	$2,474	$2,776	$3,054	$3,322	$3,590	2.2%
Total	**$2,852**	**$3,088**	**$3,564**	**$3,966**	**$4,339**	**$4,696**	**$5,047**	**2.1%**
China								
Energy-intensive manufacturing	$10,799	$12,272	$13,787	$14,826	$15,448	$15,965	$16,158	1.4%
Non-energy-intensive manufacturing	$25,771	$30,083	$35,863	$40,570	$43,877	$46,544	$47,683	2.2%
Nonmanufacturing	$12,744	$13,961	$16,040	$17,454	$18,486	$19,544	$20,194	1.7%
Services	$25,046	$29,460	$38,340	$47,386	$55,826	$64,557	$72,088	3.8%
Total	**$74,360**	**$85,775**	**$104,029**	**$120,237**	**$133,636**	**$146,609**	**$156,123**	**2.7%**
India								
Energy-intensive manufacturing	$3,724	$4,368	$6,124	$8,215	$10,394	$12,772	$15,227	5.2%
Non-energy-intensive manufacturing	$3,007	$3,450	$4,836	$6,417	$8,127	$9,984	$11,938	5.0%
Nonmanufacturing	$4,474	$5,056	$6,404	$7,718	$8,927	$10,151	$11,300	3.4%
Services	$7,664	$9,695	$13,917	$18,619	$23,705	$29,196	$34,948	5.6%
Total	**$18,869**	**$22,569**	**$31,280**	**$40,968**	**$51,153**	**$62,103**	**$73,413**	**5.0%**
Other Asia Pacific								
Energy-intensive manufacturing	$4,475	$5,183	$6,358	$7,691	$9,191	$10,823	$12,534	3.7%
Non-energy-intensive manufacturing	$8,764	$9,775	$11,930	$13,935	$15,998	$18,016	$19,927	3.0%
Nonmanufacturing	$5,207	$5,710	$6,858	$7,938	$9,094	$10,243	$11,354	2.8%
Services	$15,770	$18,197	$22,976	$27,668	$32,650	$37,884	$43,170	3.7%
Total	**$34,217**	**$38,866**	**$48,122**	**$57,232**	**$66,933**	**$76,967**	**$86,986**	**3.4%**
Africa and Middle East								
Energy-intensive manufacturing	$2,921	$3,105	$3,493	$3,925	$4,353	$4,790	$5,226	2.1%
Non-energy-intensive manufacturing	$1,721	$1,859	$2,124	$2,422	$2,736	$3,043	$3,348	2.4%
Nonmanufacturing	$5,582	$5,940	$6,508	$7,038	$7,569	$8,087	$8,575	1.5%
Services	$12,133	$12,928	$14,995	$17,071	$19,045	$20,895	$22,639	2.3%
Total	**$22,357**	**$23,831**	**$27,120**	**$30,455**	**$33,703**	**$36,815**	**$39,789**	**2.1%**
Africa								

Energy-intensive manufacturing	$1,364	$1,508	$1,769	$2,056	$2,364	$2,695	$3,048	2.9%
Non-energy-intensive manufacturing	$885	$972	$1,133	$1,307	$1,495	$1,691	$1,892	2.8%
Nonmanufacturing	$3,002	$3,238	$3,610	$3,982	$4,354	$4,721	$5,080	1.9%
Services	$6,408	$6,770	$7,989	$9,192	$10,416	$11,666	$12,929	2.5%
Total	**$11,659**	**$12,489**	**$14,502**	**$16,538**	**$18,629**	**$20,774**	**$22,949**	**2.4%**
Middle East								
Energy-intensive manufacturing	$1,557	$1,596	$1,724	$1,868	$1,989	$2,094	$2,177	1.2%
Non-energy-intensive manufacturing	$836	$886	$991	$1,115	$1,241	$1,352	$1,456	2.0%
Nonmanufacturing	$2,580	$2,701	$2,898	$3,056	$3,215	$3,366	$3,495	1.1%
Services	$5,725	$6,158	$7,005	$7,878	$8,629	$9,229	$9,711	1.9%
Total	**$10,697**	**$11,342**	**$12,618**	**$13,918**	**$15,074**	**$16,041**	**$16,840**	**1.6%**
World								
Energy-intensive manufacturing	$35,153	$38,693	$44,254	$49,920	$55,491	$61,386	$67,198	2.3%
Non-energy-intensive manufacturing	$59,259	$66,623	$78,125	$88,534	$97,882	$106,832	$114,462	2.4%
Nonmanufacturing	$41,304	$44,563	$50,912	$56,303	$61,371	$66,475	$71,108	2.0%
Services	$147,437	$162,348	$190,732	$219,374	$248,921	$280,054	$311,170	2.7%
Total	**$283,153**	**$312,227**	**$364,023**	**$414,132**	**$463,665**	**$514,746**	**$563,938**	**2.5%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo; Oxford Economics, Global Industry Model (March 2023), www.oxfordeconomics.com (subscription site)

Note: Totals may not equal sum of components due to independent rounding. Gross output is sales or revenue, including final and intermediate goods and services, measured in purchasing power parity. 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; services includes all other non-industrial output.

International Energy Outlook 2023

Release date: October 2023

Table A17. World employment by region, Low Oil Price case

million persons

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**467**	**487**	**504**	**520**	**533**	**543**	**550**	**0.6%**
United States	158	162	165	170	174	178	182	0.5%
Canada	20	20	21	22	23	24	25	0.9%
Mexico	57	59	62	64	66	67	68	0.6%
Brazil	98	102	105	106	106	104	102	0.1%
Other Americas	134	143	151	157	163	169	173	0.9%
Europe and Eurasia	**415**	**418**	**421**	**420**	**416**	**410**	**404**	**-0.1%**
Western Europe	289	292	293	291	288	285	282	-0.1%
Russia	72	71	70	69	67	64	60	-0.6%
Eastern Europe and Eurasia	54	55	58	60	61	61	61	0.4%
Asia Pacific	**1,855**	**1,925**	**1,990**	**2,031**	**2,048**	**2,062**	**2,056**	**0.4%**
Japan	67	68	65	62	57	53	50	-1.0%
South Korea	28	28	28	26	25	23	21	-1.0%
Australia and New Zealand	16	17	19	20	21	22	23	1.2%
China	750	759	755	742	707	675	633	-0.6%
India	481	509	549	584	620	654	683	1.3%
Other Asia Pacific	512	543	573	598	618	634	645	0.8%
Africa and Middle East	**547**	**591**	**671**	**755**	**841**	**928**	**1,013**	**2.2%**
Africa	470	511	586	665	747	832	917	2.4%
Middle East	77	80	85	90	94	96	97	0.8%
World	**3,283**	**3,421**	**3,586**	**3,726**	**3,838**	**3,942**	**4,022**	**0.7%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo; Oxford Economics, Global Economic Model (February 2023), www.oxfordeconomics.com (subscription site)

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

International Energy Outlook 2023

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Table A18. World disposable income per capita by region, Low Oil Price case

2015 dollars per person (PPP)

Region	2022	2025	2030	2035	2040	2045	2050	Average annual percentage change, 2022–2050
Americas	**$21,783**	**$22,501**	**$23,534**	**$24,826**	**$26,239**	**$27,773**	**$29,357**	**1.1%**
United States	$46,720	$49,787	$52,235	$55,126	$58,555	$62,269	$65,937	1.2%
Canada	$27,994	$28,213	$29,612	$31,281	$32,981	$34,726	$36,505	1.0%
Mexico	$16,588	$15,512	$16,654	$17,755	$18,872	$20,135	$21,570	0.9%
Brazil	$11,919	$11,684	$11,946	$12,579	$12,914	$13,168	$13,372	0.4%
Other Americas	$3,825	$3,788	$4,092	$4,385	$4,651	$4,896	$5,142	1.1%
Europe and Eurasia	**$20,359**	**$20,899**	**$22,108**	**$23,485**	**$25,034**	**$26,733**	**$28,687**	**1.2%**
Western Europe	$24,026	$24,492	$25,664	$26,993	$28,518	$30,158	$32,024	1.0%
Russia	$15,436	$16,083	$17,501	$18,687	$19,761	$20,919	$22,196	1.3%
Eastern Europe and Eurasia	$9,016	$9,811	$11,184	$13,088	$15,325	$17,883	$20,869	3.0%
Asia Pacific	**$8,187**	**$9,311**	**$11,435**	**$13,625**	**$15,809**	**$18,164**	**$20,512**	**3.3%**
Japan	$22,970	$24,370	$25,614	$26,292	$27,110	$27,991	$29,022	0.8%
South Korea	$22,258	$23,449	$25,061	$26,775	$28,219	$29,852	$31,750	1.3%
Australia and New Zealand	$32,814	$32,717	$35,946	$38,118	$39,783	$41,211	$42,589	0.9%
China	$10,529	$12,451	$15,861	$19,607	$23,378	$27,622	$31,932	4.0%
India	$5,497	$6,436	$8,513	$10,790	$13,138	$15,666	$18,277	4.4%
Other Asia Pacific	$5,851	$6,439	$7,621	$8,632	$9,645	$10,668	$11,658	2.5%
Africa and Middle East	**$2,228**	**$2,246**	**$2,356**	**$2,473**	**$2,603**	**$2,737**	**$2,871**	**0.9%**
Africa	$1,652	$1,691	$1,817	$1,942	$2,081	$2,218	$2,358	1.3%
Middle East	$5,155	$5,129	$5,282	$5,483	$5,703	$5,958	$6,190	0.7%
World	**$10,136**	**$10,806**	**$12,056**	**$13,346**	**$14,620**	**$15,962**	**$17,277**	**1.9%**

Data source: U.S. Energy Information Administration, World Energy Projection System (2023), run lp_230823.090253 and Annual Energy Outlook 2023 (March 2023), www.eia.gov/aeo; Oxford Economics, Global Economic Model (February 2023), www.oxfordeconomics.com (subscription site)

Note: Totals may not equal sum of components due to independent rounding. PPP=purchasing power parity.