

Kaya Identity factor projections

- *Carbon dioxide intensity*
- *Energy intensity*
- *GDP per capita*
- *Population*

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Table J1. World carbon dioxide intensity of energy use by region, Reference case, 2011–40
(metric tons per billion Btu)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	53.6	53.0	52.3	51.7	51.1	50.6	49.9	-0.2
United States ^a	55.7	55.0	54.5	54.0	53.6	53.2	52.5	-0.2
Canada	38.8	38.9	37.0	37.0	36.1	36.2	35.8	-0.3
Mexico and Chile	55.1	55.3	52.4	50.7	49.5	49.0	48.2	-0.5
OECD Europe	51.2	50.7	48.3	47.7	47.1	46.4	46.2	-0.3
OECD Asia	57.5	59.6	54.4	53.0	52.1	51.9	51.8	-0.5
Japan	55.9	60.1	53.7	52.6	51.9	51.6	51.8	-0.5
South Korea	56.7	56.1	52.8	50.6	49.5	49.9	50.3	-0.4
Australia and New Zealand	63.8	63.8	59.4	58.4	57.2	55.9	54.6	-0.6
Total OECD	53.4	53.3	51.3	50.6	49.9	49.4	49.0	-0.3
Non-OECD								
Non-OECD Europe and Eurasia	57.0	58.0	56.2	55.5	55.5	55.3	55.0	-0.2
Russia	54.9	56.0	54.7	53.7	54.0	54.2	54.0	-0.1
Other	60.4	61.3	58.9	58.6	57.8	57.0	56.5	-0.3
Non-OECD Asia	70.1	69.3	64.9	62.9	60.7	59.2	58.0	-0.6
China	74.2	72.8	67.0	65.1	62.4	60.2	58.1	-0.8
India	66.6	68.0	65.4	62.3	60.0	59.9	59.9	-0.5
Other	59.3	58.7	57.5	56.4	56.0	55.9	56.0	-0.2
Middle East	61.2	59.8	58.8	57.4	56.9	56.0	55.7	-0.2
Africa	55.7	55.0	55.0	53.2	52.1	51.4	50.9	-0.3
Non-OECD Americas	40.7	41.0	41.7	41.1	40.5	39.9	39.4	-0.1
Brazil	32.1	32.9	33.7	33.0	32.5	31.9	31.4	-0.2
Other	48.8	48.7	49.4	48.9	48.5	48.1	47.9	-0.1
Total Non-OECD	63.0	62.7	60.3	58.7	57.2	56.1	55.2	-0.5
Total World	58.7	58.6	56.7	55.5	54.5	53.7	53.0	-0.4

^aIncludes the 50 States and the District of Columbia.

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

Sources: U.S. Energy Information Administration (EIA), *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table J2. World energy intensity by region, Reference case, 2011–40
(thousand Btu per 2010 dollar of GDP)

Region	History		Projections				Average annual percent change, 2012–40	
	2011	2012	2020	2025	2030	2035		2040
OECD								
OECD Americas	6.5	6.2	5.4	4.8	4.4	4.0	3.7	-1.9
United States ^a	6.4	6.1	5.4	4.8	4.3	3.9	3.5	-2.0
Canada	10.4	10.2	8.9	8.3	7.8	7.5	7.1	-1.3
Mexico and Chile	4.2	4.0	3.4	3.1	2.9	2.8	2.7	-1.4
OECD Europe	4.4	4.4	3.9	3.7	3.5	3.3	3.2	-1.1
OECD Asia	5.7	5.5	5.4	5.3	5.1	4.9	4.8	-0.5
Japan	4.9	4.7	4.7	4.6	4.4	4.3	4.1	-0.5
South Korea	7.4	7.3	7.1	6.9	6.6	6.4	6.1	-0.6
Australia and New Zealand	6.4	6.1	5.5	5.2	4.9	4.6	4.5	-1.1
Total OECD	5.5	5.3	4.8	4.4	4.1	3.9	3.6	-1.4
Non-OECD								
Non-OECD Europe and Eurasia	9.3	9.2	7.8	7.1	6.3	5.5	4.9	-2.2
Russia	9.7	9.8	9.1	8.4	7.6	6.9	6.1	-1.7
Other	8.6	8.2	6.3	5.5	4.8	4.2	3.7	-2.8
Non-OECD Asia	6.4	6.3	5.0	4.4	3.9	3.5	3.2	-2.4
China	8.2	8.0	6.4	5.4	4.7	4.1	3.7	-2.8
India	4.4	4.4	3.2	2.9	2.6	2.5	2.3	-2.3
Other	4.6	4.5	3.9	3.7	3.4	3.2	3.0	-1.5
Middle East	6.0	6.2	5.9	5.3	4.9	4.7	4.4	-1.3
Africa	4.6	4.7	4.0	3.6	3.2	2.9	2.6	-2.2
Non-OECD Americas	4.7	4.7	4.2	4.0	3.8	3.6	3.5	-1.1
Brazil	5.1	5.1	4.8	4.6	4.4	4.3	4.3	-0.7
Other	4.5	4.3	3.8	3.5	3.3	3.1	2.9	-1.4
Total Non-OECD	6.3	6.3	5.2	4.6	4.1	3.7	3.4	-2.2
Total World	5.9	5.8	5.0	4.5	4.1	3.8	3.4	-1.9

^aIncludes the 50 States and the District of Columbia.

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

Sources: **United States:** U.S. Energy Information Administration (EIA), *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo. **Other countries:** Oxford Economic Model (June 2015), www.oxfordeconomics.com (subscription site); and EIA, World Energy Projections Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table J3. World gross domestic product (GDP) per capita by region expressed in purchasing power parity, Reference case, 2011–40
(2010 dollars per person)

Region	History		Projections					Average annual percent change, 2012–40
	2011	2012	2020	2025	2030	2035	2040	
OECD								
OECD Americas	38,441	39,055	44,716	48,842	53,114	57,747	63,278	1.7
United States ^a	48,094	48,865	56,285	61,453	66,639	72,107	78,670	1.7
Canada	40,487	40,781	45,027	47,641	50,396	53,676	57,265	1.2
Mexico and Chile	16,000	16,448	19,098	21,503	24,229	27,343	30,941	2.3
OECD Europe	34,070	33,869	38,062	41,353	44,611	48,001	51,742	1.5
OECD Asia	33,996	34,614	38,765	41,195	43,684	46,505	49,456	1.3
Japan	33,771	34,382	37,500	39,720	41,754	43,805	45,297	1.0
South Korea	31,272	31,813	38,529	41,320	44,559	48,357	52,905	1.8
Australia and New Zealand	39,986	40,699	44,228	46,433	48,930	52,325	56,869	1.2
Total OECD	35,771	36,030	40,862	44,407	48,024	51,915	56,376	1.6
Non-OECD								
Non-OECD Europe and Eurasia	15,706	16,151	19,285	22,782	26,713	31,322	36,054	2.9
Russia	22,091	22,891	26,081	30,069	34,557	39,819	44,388	2.4
Other	11,116	11,326	14,611	17,904	21,590	25,896	30,841	3.6
Non-OECD Asia	7,115	7,484	10,998	13,519	16,254	19,363	22,959	4.1
China	9,679	10,359	16,134	20,356	24,981	30,183	36,094	4.6
India	4,643	4,787	7,474	9,420	11,559	14,081	17,120	4.7
Other	6,672	6,927	8,881	10,346	11,993	13,931	16,246	3.1
Middle East	23,731	23,663	27,961	31,681	35,181	38,484	41,600	2.0
Africa	4,168	4,261	5,094	5,804	6,672	7,717	8,949	2.7
Non-OECD Americas	13,749	13,963	15,432	17,150	18,778	20,562	22,646	1.7
Brazil	14,743	14,874	16,103	18,109	20,133	22,364	24,948	1.9
Other	13,020	13,299	14,965	16,500	17,886	19,413	21,223	1.7
Total Non-OECD	8,236	8,522	11,273	13,372	15,592	18,057	20,812	3.2
Total World	13,102	13,355	16,250	18,466	20,795	23,370	26,274	2.4

^aIncludes the 50 States and the District of Columbia.

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

Sources: U.S. Energy Information Administration (EIA), *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo; and World Energy Projection System Plus (2016), run IEO2016-reference_final_2016.02.19_115008.

Table J4. World population by region, Reference case, 2011–2040
(millions)

Region	History		Projections				Average annual percent change, 2012–40	
	2011	2012	2020	2025	2030	2035		2040
OECD								
OECD Americas	484	489	523	544	564	581	597	0.7
United States ^a	312	315	334	347	359	370	380	0.7
Canada	34	35	38	39	41	43	44	0.8
Mexico and Chile	137	139	151	158	164	169	173	0.8
OECD Europe	548	550	565	571	576	579	581	0.2
OECD Asia	203	204	207	208	208	207	206	0.0
Japan	127	127	125	123	120	117	114	-0.4
South Korea	49	49	51	52	52	52	52	0.2
Australia and New Zealand	27	27	31	33	36	38	40	1.3
Total OECD	1,235	1,243	1,295	1,323	1,348	1,368	1,384	0.4
Non-OECD								
Non-OECD Europe and Eurasia	343	343	343	341	337	333	329	-0.1
Russia	143	143	140	137	133	130	127	-0.4
Other	199	200	203	204	204	203	203	0.1
Non-OECD Asia	3,691	3,730	4,013	4,159	4,278	4,373	4,443	0.6
China	1,373	1,381	1,435	1,450	1,453	1,448	1,434	0.1
India	1,229	1,244	1,360	1,425	1,482	1,530	1,569	0.8
Other	1,089	1,104	1,218	1,284	1,343	1,396	1,441	1.0
Middle East	210	214	249	271	293	316	340	1.7
Africa	1,045	1,070	1,284	1,429	1,583	1,745	1,916	2.1
Non-OECD Americas	467	473	515	540	562	583	601	0.9
Brazil	198	200	212	218	223	227	230	0.5
Other	270	273	304	322	339	356	372	1.1
Total Non-OECD	5,756	5,830	6,404	6,739	7,054	7,351	7,630	1.0
Total World	6,991	7,073	7,699	8,063	8,402	8,719	9,014	0.9

^aIncludes the 50 States and the District of Columbia.

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

Sources: **United States:** U.S. Energy Information Administration (EIA), *Annual Energy Outlook 2015*, DOE/EIA-0383(2015) (Washington, DC: April 2015); AEO2015 National Energy Modeling System, run REF2015.D021915A, www.eia.gov/aeo. **Other countries:** Oxford Economic Model (June 2015), www.oxfordeconomics.com (subscription site).