Energy Data 2018

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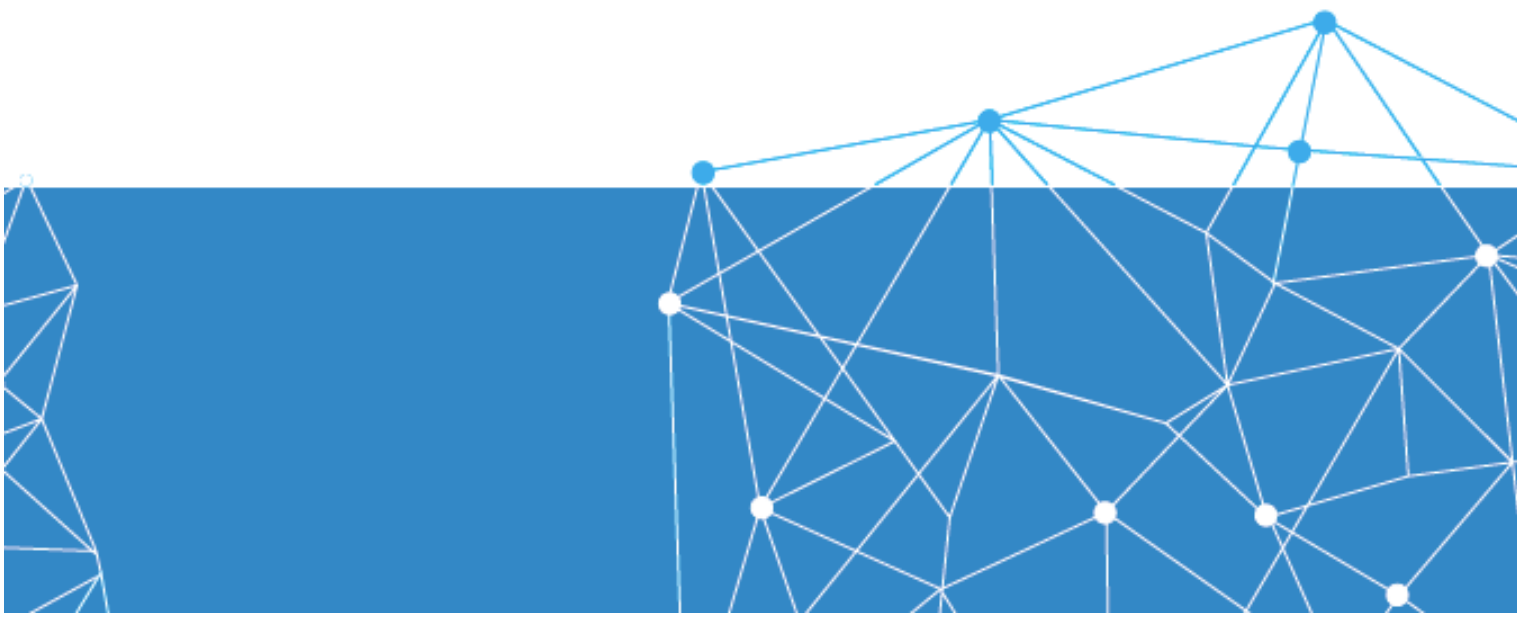
Edited by
innovative Green Development Program

February 2019



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innovation Green Development Program (iGDP) is a non-governmental Chinese think tank that focuses on green and low-carbon development. It works to strengthen China's low-carbon environmental policy design and implementation through interdisciplinary, systematic and empirical policy research. Initiated by Energy Foundation China., iGDP is the secretariat of China's Green and Low-Carbon Development Think Tank Partnership, sits on China's Green Finance Association Experts Committee, and is a member of the North-East Asian Subregional Programme for Environmental Cooperation's Low Carbon City Platform.

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Energy Foundation China (EFC), established in Beijing in 1999, is a grantmaking charity organization dedicated to China's sustainable energy development. It is registered under the Beijing Municipal Public Security Bureau and supervised by the National Development and Reform Commission of China. EFC's mission is to achieve decarbonization, world-class air quality, and green growth through dramatically expanding renewable energy, significantly improving energy efficiency and optimizing economic structure.

Introduction

Energy Data 2018 was authored by Mr. Wang Qingyi, one of China's leading energy experts, with financial support from Energy Foundation China and research and editing assistance from innovative Green Development Program. The Energy Data publication series (annual editions from 2014 to the present year) collates and organizes data published by China's official statistics bureaus and industry associations, as well as authoritative international energy agencies, across key sectors. The goal is to facilitate access by researchers and policymakers to comprehensive, multi-dimensional and long time-scale energy data that accurately captures China's energy profile. The English version of the 2018 Energy Data report contains 40 data energy indicator tables covering China's energy economy, energy production and consumption, energy efficiency and technology, energy prices, and energy-related pollutant emissions and carbon emissions.

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Table 1 **China energy and economy key indices**

	1978	1990	2000	2005	2010	2015	2016	2017
Population (millions)	96529	114333	126743	130756	133920	137462	138271	139008
Proportion of city and town population (%)	17.9	26.4	36.2	43.0	49.7	56.1	57.4	58.5
GDP growth rate (%)	11.7	3.8	8.4	11.4	10.6	6.9	6.7	6.9
GDP (100 million Chinese yuan)	3650	18668	99215	187319	413030	689052	744127	827122
Economic structure								
Primary industry (%)	27.9	27.1	15.1	12.1	10.1	9.0	8.6	7.9
Secondary industry (%)	47.9	41.3	45.9	47.4	46.7	40.5	39.8	40.5
Tertiary industry (%)	24.2	31.6	39.0	40.5	43.2	50.5	51.6	51.6
GDP per capita (USD)	149	344	949	1748	4556	8007	8127	8836
Primary energy consumption (Mtce)	571.4	987.0	1469.6	2613.7	3606.5	4299.1	4358.2	4490.0
Crude oil import dependency/%	-12.4	-18.4	26.4	36.4	54.5	60.7	65.5	68.6
Urban resident disposable income per capita (Chinese yuan)	343	1510	6280	10493	19109	31195	33616	36396
Rural resident net income per capita (Chinese yuan)	134	686	2253	3255	5919	11422	12363	13432
Civil vehicle ownership(10000 vehicle)	135.8	551.4	1608.9	3159.7	7801.8	16284.5	18574.5	20906.7
Energy consumption per capita (kgce)	594	864	1160	1999	2693	3128	3152	3230
Electricity per capita (kWh)	218	535	1063	1624	2752	4142	4312	4538
Electricity production (TWh)	256.6	621.2	1355.6	2500.3	4207.1	5814.6	6133.2	6495.1
Steel output (Mt)	31.8	66.4	128.5	353.2	637.2	803.8	808.4	831.7
Cement output (Mt)	65.2	209.7	597.0	1068.9	1881.9	2359	2414	2340
Total amount of export goods (USD 100 million)	97.5	620.9	2492.0	7619.5	15777.5	22739.7	20976.3	22635.2
Total amount of import goods (USD 100 million)	108.9	533.5	2250.9	6599.5	3962.4	16795.6	15879.3	18409.8
SO_2 emissions (Mt)		15.02	19.95	25.49	21.85	18.59	17.55	16.15
Chinese yuan/USD exchange rate	1.53	4.7832	8.2785	8.1943	6.7695	6.2284	6.6423	6.7518

Notes: 1. GDP is calculated at current prices and the growth rate is calculated at constant price. 2017 GDP at constant price was 125753 million Chinese yuan.

2. The urbanization rate of household registered population in 2017 was 47.6%.

3. In 2017, urban residential revenue per capita at constant price was 8218 Chinese yuan, and rural residential revenue per capita was 3197 Chinese yuan

4. Energy industry investment in fixed assets includes coal mining and washing industries, petroleum and natural gas extraction, petroleum processing and coking industries, electric power and hot water production and supply, gas production and supply industries. In 1990, they refer to state-owned industries. Between 2000 and 2017, they refer to urban fixed-assets investment.

Sources: National Bureau of Statistics; General Administration of Customs; China Electricity Council; Ministry of Ecology and Environment.

Table 2 International comparisons of key energy and economic indices per capita (2017)

	China	US	EU	Japan	Russia	India	World
Population (millions)	1390.1	325.8	513.6	126.9	146.3	1326.8	7467
GDP per capita (USD)	8836	59495	32294	38550	10248	1852	10006
Fossil fuel recoverable reserves per capita							
Coal (t)	187	770	149	2.8	1096	60	138
Oil (t)	2.55	18.42	1.17	0.05	99.11	0.45	32.03
Natural gas (m^3)	3971	26703	2336	164	239234	904	25914
Primary energy consumption per capita (kgce)	3230	9800	4698	5138	6819	812	2585
Electricity production per capita (kWh)	4673	13142	6399	8038	7459	1126	3422
Steel output per capita (kg)	598	250	328	825	487	76	226
Vehicle ownership per thousand people	156	834	657	715	377	36	173
CO_2 emissions per capita (t)	6.29	15.62	6.90	9.27	10.43	1.77	4.48

Note: 1. China's fossil fuel recoverable reserves data are from Ministry of Natural Resources.
Sources: NBS; IEA; World Bank; IMF; BP Statistical Review of World Energy, June 2018; IEEJ, Handbook of Energy and Economic Statistics in Japan, 2016 version; World Steel Association; Organization of Motor Vehicle Manufactures.

Table 3 China economic and energy consumption gap between regions, urban and rural areas, and rich and poor

Economy	
GDP per capita (USD) (2017)	National average: 8836 Max: Ordos 34644 Min: Gansu 4356
Urban resident disposable income per capita /Chinese yuan (2017)	National average: 36396 Max: Shanghai 62596 Min: Gansu 27763
Rural resident disposable income per capita /Chinese yuan (2017)	National average: 13432 Max: Shanghai 27825 Min: Gansu 6855
Energy consumption	
Regional	
Energy consumption per capita /kgce (2017)	National average: 3230 Max: Ningxia 8284 Min: Tibet 1383
Electricity consumption per capita/kWh (2017)	National average: 4538 Max: Ningxia 14345 Min: Tibet 1940
Residential electricity consumption per capita /kWh (2017)	National average: 626 Max: Fujian 984* Min: Tibet 306*
Urban and rural	
Energy consumption per capita /kgce (2017)	National average: 3230 Urban: 4320 Rural: 1470
Electricity consumption per capita /kWh (2017)	National average: 4538 Urban: Suzhou 14072 Rural: Tibet 1567
Residential electricity consumption per capita /kWh (2017)	National average: 626 Urban: Shenzhen 1128* Rural: Gansu 264*
Rich and poor	
Rich and poor gap	In 2017, 1% of China's highest income families had the wealth of the national 1/3, and the lowest income 1/4 family owned only 1% of the country's wealth.
Urban resident disposable income per capita / yuan (2017)	20% highest income households: 77097 20% lowest income households: 13723
Rural resident disposable income per capita / yuan (2017)	20% highest income households: 31299 20% lowest income households: 3302
Home computer ownership /100 households (2017)	National average: 58.7 Urban: 80.8 Rural: 29.2 Max: Shanghai140.2 Min: Tibetan rural areas 0.2
Air conditioner ownership/100 households (2017)	National average: 96.1 Urban: 128.6 Rural: 52.6 Max: Dongguan 272.0** Min: Tibetan rural areas 0.0
Private car ownership/100 households (2017)	National average: 29.7 Urban: 37.5 Rural: 19.43 Max: Shenzhen 70 Min: Hainan rural areas 6.3

Note: 1.*2016;**2014.
Sources: National Bureau of Statistics (NBS); Province Bureau of Statistics; China Social Science Survey Center of Peking University; China Electricity Council; China's report on the development of the people's livelihood 2017.

Table 4 International comparison of living standards in China's most affluent cities (2016)

	Beijing	Shanghai	Shenzhen	Dongguan	Tokyo (Japan)
Total population (10,000)	2171	2418	1253	825	1332
Disposable income per capita (USD)	8476	8737	7841	6732	16930
Housing area per capita (m^2)	35	37	40	32	35
Durable consumer goods ownership					
Private cars (per 100 households)	49.2	31.5	75	80	46
Air conditioners (per 100 households)	169.8	210.2	167	272	275
Color TV sets (per 100 households)	127.8	187.6	128	187	211
Computers (per 100 households)	104.8	140.2	119	123	127

Note: 1. Private car data in Beijing, Shanghai and Dongguan refers only to urban households.
2. Data on air conditioners, color TVs and computers in Shenzhen and Dongguan is from 2011.
3. Data on air conditioners, color TVs and computers in Tokyo is the country average from 2014.
4. Rich and poor gap. National Bureau of Statistics; Province Bureau of Statistics; China Social Science Survey Center of Peking University.
Source: China Statistical Yearbook 2018; Beijing, Shanghai, Shenzhen and Dongguan statistics bureaus; IEEJ, Handbook of Energy and Economic Statistics in Japan, 2016; income per capita and housing area per capita in Tokyo, Statistical Bureau of the Ministry of Internal Affairs; Number of private cars per 100 households in Tokyo, Automobile Inspection & Registration Information Association.

Table 5 China urban and rural resident living standards and energy consumption

	2000	2010	2015	2016	2017
Per capita GDP (USD)	949	4556	8007	8127	8836
Urban resident disposable income per capita (Chinese yuan)	6280	19109	31195	33616	36396
Rural resident net income per capita (Chinese yuan)	2253	5919	11422	12363	13432
Engel's coefficient, urban households (%)	39.4	35.7	29.7	29.3	28.6
Engel's coefficient, rural households (%)	49.1	41.1	33.0	32.2	31.2
Housings area per capita (m^2)					
Urban (building area)	20.3	31.6	33.5	37.0	40.0
Rural (living area)	24.9	27.3	31.2	32.0	33.6
Penetration of energy-consuming appliances (per 100 households)					
Indoor air conditioners					
Urban	30.8	112.1	114.6	123.7	128.6
Rural	1.3	16.0	38.8	47.6	52.8
Refrigerators					
Urban	80.1	96.6	94.0	96.4	98.0
Rural	12.3	45.2	82.6	89.5	91.7
Color TVs					
Urban	116.6	137.4	122.3	122.3	123.8
Rural	48.7	111.8	116.9	118.8	120.8
Home computers					
Urban	9.7	71.2	78.5	80.0	80.8
Rural	0.5	10.4	25.7	27.9	29.2
Private cars					
Urban	0.5	13.1	30.0	35.5	37.5
Rural	30.8	112.1	114.6	123.7	128.6
Energy consumption per capita (kgce)	1160	2693	3128	3153	3230
Electricity consumption per capita (kWh)					
Urban	2574	4519	6212	6370	6587
Rural	205	989	1496	1566	1652

Note: 1. In 2017, urban residential revenue per capita at constant price was 8218 Chinese yuan, and rural residential revenue per capita was 3197 Chinese yuan.

2. Urban living area per capita in 2017 was 32.2 m^2

Sources: NBS; China Electricity Council.

Table 6 China rural electrification and poverty status

	1978	2000	2010	2015	2016	2017
Rural population /million	790.14	808.37	674.15	603.46	589.73	576.61
Poverty standard /Chinese yuan /people	100	625	1274	2300	2300	3000
Population poverty /million	250.0	32.1	26.9	55.8	43.4	30.46
Population without access to electricity /million	450.0	35.0	5.3	0	0	0
Electricity consumption per capita /kWh	218	205	989	1496	1566	1652

Note: 1. The amount of population from rural and town in 2017 was 718 million.

2.According to the World Bank poverty level of below 1 USD for day per capita, there were 235 million people in China living below the poverty line in 2016**.**

2. In 2015, electricity was provided to the remaining 39800 population without access to electricity

Sources: NBS; China Electricity Council; National Energy Administration; State Electricity Regulatory Commission.

Table 7 China coal, oil and natural gas resources and reserves

Coal	
	The forecast resource amount is 3879.6 billion t. At the end of 2017, the proven reserves were 1.67 trilion t, and the remaining recoverable reserves are 256 billion t.
Petroleum	
	Crude oil: the amount of geological resources is 125.7 billion t, and the recoverable resource is 30.1 billion t. The recoverable reserves of the remaining technology in 2017 were 3.54 billion t. Oil sand: the amount of geological resources is 6 billion t, and the recoverable resource were 2.3 billion t. Oil shale: the technical recoverable resources is 243.2 billion t, and the recovery shale oil is 12 billion t.
Natural gas	
	Conventional natural gas: the geological resources amount is 90 trillion m^3, the recoverable resources volume is 50 trillion m^3 .in 2017, the total proven geological reserves were 14.74 trillion m^3, and the remaining technology recoverable reserves were 5.52 trillion m^3.
	. Coal bed gas: the amount of geological resources is 30 trillion m^3, and the recoverable resources are 12.5 trillion m^3. In 2017, the accumulated geological reserves were 584.5 billion m^3, and the remaining recoverable reserves were 302.5 billion m^3.
	Shale gas: the amount of geological resources is 122 trillion m^3, and the recoverable resources are 22 trillion m^3. In 2017, the proven geological reserves were 916.8 billion m^3, and the technical recoverable reserves were 198.3 billion m^3.

Source: Ministry of Natural Resources.

Table 8 **China energy output by product catalogue**

Year	Raw coal (Mt)	Crude oil (Mt)	Natural gas (100 million m^3)	Electric production (TWh)	Hydropower (TWh)
1990	1080	138.3	153.0	621.2	126.7
1991	1087	141.0	160.7	677.5	124.7
1992	1116	142.1	157.9	753.9	130.7
1993	1150	145.2	167.7	839.5	151.8
1994	1240	146.1	175.6	928.1	167.4
1995	1361	150.1	179.5	1007.0	190.6
1996	1397	157.3	201.1	1081.3	188.0
1997	1388	160.7	227.0	1135.6	196.0
1998	1332	161.0	232.8	1167.0	198.9
1999	1364	160.0	252.0	1239.3	196.6
2000	1384	163.0	272.0	1355.6	222.4
2001	1472	164.0	303.3	1480.8	277.4
2002	1550	167.0	326.6	1654.0	288.0
2003	1835	169.6	350.2	1910.6	283.7
2004	2123	175.87	414.6	2203.3	353.5
2005	2365	181.35	493.2	2500.3	397.0
2006	2570	184.77	585.5	2865.7	435.8
2007	2760	186.32	692.4	3281.6	485.3
2008	2903	190.43	803.0	3495.76	637.0
2009	3115	189.49	852.7	3714.65	615.6
2010	3428	202.41	957.9	4207.16	722.17
2011	3764	202.88	1053.4	4713.02	698.95
2012	3945	207.48	1106.1	4987.60	872.10
2013	3974	209.92	1208.6	5431.64	920.29
2014	3874	211.43	1301.6	5794.46	1072.88
2015	3747	214.36	1346.1	5810.58	1126.42
2016	3411	199.69	1368.7	6142.49	1193.37
2017	3524	191.51	1480.3	6495.14	1189.84

Source: NBS.

Table 9 China crude oil and natural gas output of 10 biggest oil and gas fields

	2016 Oil and gas production / 10000 toe	2017		
		Oil and gas / 10000 toe	Crude oil / 10000 t	Natural gas / 100 million m^3
1. PetroChina Changqing Oilfield	5301	5316	2372.0	396.4
2. PetroChina Daqing Oilfield	3973	4272	3952.0	40.1
3. CNOOC Bohai Oilfield	2450	3115	2900.0	25.0
4. PetroChina Tarim Oilfield	2427	2533	520.1	252.6
5. Sinopec Shengli Oilfield	2422	2377	2340.0	3.7
6. PetroChina southwest oil and gas field	1606	1683	15.0	210.2
7. PetroChina Xinjiang oil field	1340	1357	1131.0	28.4
8. Yanchang oil group	1266	1105	1127.0	20.0
9. CNOOC Nanhai Oilfield	1070	1068	912.0	61.0
10. PetroChina Liaohe Oilfield	1037	1023	976.4	5.9

Note: 1255m^3 natural gas =1t crude oil.
Source: China Petroleum Enterprise Association.

Table 10 China crude oil refining processing and products output Unit:Mt

	2000	2010	2014	2015	2016	2017
Crude refining volume	210.8	426.8	503.0	522.0	541.0	567.77
Production of major products						
Total of Gasoline, kerosene and diesel	120.83	252.09	316.83	335.17	347.8	328.62
Gasoline	41.32	76.76	110.29	119.99	129.0	121.03
Kerosene	8.78	17.08	30.01	35.19	39.8	30.01
Diesel	70.73	158.25	176.53	179.99	179.0	177.58
Fuel oil	20.54	25.37	25.42	23.84	25.87	26.93

Sources: NBS; CPCIF.

Table 11 **China 10 largest coal companies** **Unit: Mt**

	2014	2015	2016	2017
1. National Energy Group	541.7	495.9	506.0	510.0
2. China Coal Energy Group	183.0	159.4	146.0	163.7
3. Shanxi Coal and Chemical Industry Group	127.1	127.0	129.0	144.0
4. Shandong Energy Group	139.3	133.0	130.0	141.4
5.Yankuang Group	102.1	108.0	114.0	135.1
6. Datong Coal Mine Group	167.5	173.5	117.9	127.0
7. Shanxi Coking Coal Group	107.0	105.3	91.2	96.1
8. Yang Quan Coal Group	69.6	76.2	63.0	82.0
9. Lu'an Mining	90.2	98.4	74.3	80.6
10. Jizhong Energy Group	102.0	101.0	81.4	79.3

Source: China Coal Industry Association.

Table 12 **China power installed capacity and output**

	1990	2000	2010	2013	2014	2015	2016	2017
Electricity installed capacity by year end /GW	137.89	319.32	966.41	1257.68	1370.18	1508.28	1645.75	1777.03
Hydropower	36.05	79.35	216.06	280.44	304.86	319.37	332.11	341.19
Thermal power	101.84	237.54	709.67	870.09	923.63	990.21	1053.88	1106.04
Nuclear power	—	2.10	10.82	14.66	20.08	26.08	33.64	35.82
Wind power		0.35	44.7	91.4	114.8	145.4	168.7	188.3
Electricity generation/TWh	621.32	1386.5	4207.2	5397.59	5649.58	5814.57	6133.16	6495.14
Hydropower	126.35	243.1	722.2	911.64	1064.34	1130.27	1184.05	1189.84
Thermal power	494.97	1107.9	3331.9	4235.87	4233.73	4284.19	4437.07	4662.74
Nuclear power	—	16.7	73.9	111.5	132.54	170.79	213.29	248.07
Wind power			72.2	159.8	200.3	251.2	294.4	305.7

Note: In 2017, the share of coal power, wind power and thermal power in total electricity generation were 63.9%, 4.7%, and 1.8% sepearately.
Sources: NBS; China Electricity Council.

Table 13 China 5 biggest power companies (2017)

	National Energy Group	Huaneng Group	Datang Group	Huadian Group	China Power Investment Corp
Installed capacity (GW)	226.0	171.8	137.8	148.3	126.1
Clean energy ratio (%)	24.0	31.0	33.9	38.6	45.1
Power generation (TWh)	888.0	646.0	516.9	512.3	422.6
Net coal consumption (gce/kWh)	307.9	300.1	305.3	300.8	302.7
Utilization hours (h)	3993	3933	3899	3534	3532
Coal output (Mt)	510	71	5	45	75

Note: National Energy Group was found by the reconstruction of China Guodian Coporation and China Shenhua Group in Nov. 28th, 2017.
Source: China Electricity Council.

Table 14 China power industry key indices

	2000	2005	2010	2013	2014	2015	2016	2017
Net coal consumption rate (gce/kWh)	392	370	333	321	319	315	312	309
Gross coal consumption rate (gce/kWh)	363	343	312	302	300	297	294	292
Power consumption for plant use rate (%)	7.31	6.80	6.33	6.01	5.84	6.04	6.01	6.04
Line loss factor (%)	7.70	7.21	6.53	6.68	6.64	6.64	6.49	6.48
Utilization hour for generating equipment	4517	5425	4650	4521	4318	3988	3779	3786
Hydropower	3258	3664	3404	3359	3669	3590	3619	3579
Thermal power	4848	5865	5031	5021	4739	4364	4186	4209

Source: China Electricity Council.

Table 15 China renewable energy development and utilization quantity

		2000	2005	2010	2015	2016	2017
Hydropower	/GW	79.4	117.4	213.4	319.4	332.1	341.2
	TWh	243.1	397.0	722.2	1126.4	1193.4	1194.5
	Mtce	88.2	136.2	225.3	335.6	352.1	348.8
Small hydropower	/GW	24.8	38.5	59.0	75.0	77.9	79.3
	TWh	80.0	120.9	202.3	240.0	268.2	247.7
	Mtce	29.0	41.5	63.1	71..5	79.1	72.3
Solar energy	Mtce	3.1	9.6	22.6	64.6	75.1	85.5
Photovoltaic power generation	/10,000kW	1.8	7.0	122.0	4318.0	7742.0	13025.0
	100MkWh	0.19	0.74	12.9	392.0	662.0	967.0
	Mtce	0.01	0.03	0.40	11.64	19.53	28.2
Water heaters	10,000 m^2	2600	8000	18500	44200	46400	47780
	Mtce	3.1	9.6	22.2	53.0	55.6	57.3
Wind power generation	/GW	0.34	1.22	44.78	145.4	168.7	188.3
	TWh	0.5	2.0	72.2	251.2	294.4	305.7
	Mtce	0.2	0.7	22.5	74.6	86.8	89.3
Rural biogas	100Mm^3	23	86	145	168	174	184
	Mtce	1.6	6.1	10.4	12.0	12.1	13.1
Biomass and garbage power generation	/ GW	0.8	2.0	6.7	16.0	12.3	14.8
	TWh	3.5	8.7	29.0	68.9	66.1	79.5
	Mtce	1.3	3.0	9.0	20.4	19.3	23.2
Geothermal utilization	//Mtce	0.7	1.2	6.7	24.1	31.1	37.0
Total		86.3	197.8	284.3	491.1	580.5	596.5

Note: 1. Small hydropower refers to stations with installed capacity of less than 50MW.

2. In 2017 photovoltaic utilization hours came to 1133 and wind power utilization hours was 1948.

3. Energy provided by solar water heaters was 120kgce/m^2/a.

4. In 2016, combined to the grid of wind power was 164 GW.

5. Geothermal energy, ground source heat pumps generated every heating season 25 kgce/m^2 of energy and geothermal space heating generated every heating season 28 kgce/m^2.

6. Renewable energy power generation was converted to standard coal equivalent using coal consumed in thermal power generation for the same year, the gross coal consumption rate (gce / kWh) in 2000, 2005, 2010, 2013, 2014, 2015, 2016 and 2017 was 363, 343, 312, 302, 300, 297, 294 and 292 respectively.

Sources: National Bureau of Statistics; China Energy Statistical Yearbook 2017; National Development and Reform Commission; National Energy Bureau; Ministry of Water Resources; Ministry of Agriculture; Ministry of Housing and Urban-Rural Development; Ministry of Natural Resources; China Electricity Council; China Solar Energy Society; China Association of Rural Energy Industry (CAREI); China Resource Comprehensive Utilization Association; China Wind Energy Association; National Geothermal Energy Center; Building Energy Conservation Research Center of Tsinghua University.

Table 16 China's renewable energy consumption for buildings

	2010		2015		2016		2017	
	Physical quantity /Mt	Standard quantity /Mtce	Pysical quantity /Mt	Standard quantity /Mtce	Pysical quantity /Mt	Standard quantity /Mtce	Physical quantity /Mt	Standard quantity /Mtce
Direct combustion of biomass energy	Firewood 133 Straw 136	140	Firewood 107 Straw 82	100		90		80
New energy								
Solar water heaters	185 M m^2	22.2	442M m^2	53.0	476 M m^2	57.1	478 M m^2	57.3
Photovoltaic power generation	320 GWh	0.1	687 GWh	0.2	1170 GWh	0.3	3363 GWh	0.9
Ground source heat pumps	227 M m^2	5.7	410 M m^2	10.3	478 M m^2	12.0	618 M m^2	15.5
Geothermal space heating	35 M m^2	1.0	494 M m^2	13.8	690 M m^2	19.3	770 M m^2	21.5
Rural biogas	14.5 BN m^3	10.4	16.8 BN m^3	12.0	17.4 BN m^3	12.4	18.4 BN m^3	13.1
Subtotal		39.4		89.3		101.1		
Total		179.4		189.3		197.1		198.3

Note: 1. Biomass energy for direct combustion includes straw and firewood.

2. Solar water heaters provided 120kgce/m^2/a of energy, geothermal heating, 28kgce/m^2/heating season and ground source heat pump 25kgce/m^2/ heating season.

3. Power generation was converted into coal equivalent according to the gross coal consumption rate of thermal power generation.

Sources: National Bureau of Statistics; National Development and Reform Commission; National Energy Bureau; Department of Education, Science & Technology, Ministry of Agriculture; Building Energy Conservation Research Center of Tsinghua University; Ministry of Housing and Urban-Rural Development; Solar Thermal Utilization Specialty Committee of CAREI; Energy Saving Stove Professional Committee of CAREI; China Solar Energy Society; Ministry of Natural Resources; Geothermal Specialty Committee, China Energy Research Society (CERS); National Geothermal Energy Center.

Table 17 China primary energy consumption and mix

Year	Total energy consumption (10,000 tce)	Share (total energy consumption =100)			
		Coal	Oil	Natural gas	Hydro, nuclear and wind power
1978	57144	70.7	22.7	3.2	3.4
1980	60275	72.2	20.7	3.1	4.0
1985	76682	75.8	17.1	2.2	4.9
1990	98703	76.2	16.6	2.1	5.1
1991	103783	76.1	17.1	2.0	4.8
1992	109170	75.7	17.5	1.9	4.9
1993	115993	74.7	18.2	1.9	5.2
1994	122737	75.0	17.4	1.9	5.7
1995	131176	74.6	17.5	1.8	6.1
1996	135192	73.5	18.7	1.8	6.0
1997	135909	71.4	20.4	1.8	6.4
1998	136184	70.9	20.8	1.8	6.5
1999	140569	70.6	21.5	2.0	5.9
2000	146946	68.5	22.0	2.2	7.3
2001	155547	68.0	21.2	2.4	8.4
2002	169577	68.5	21.0	2.3	8.2
2003	197083	70.2	20.1	2.3	7.4
2004	230281	70.2	19.9	2.3	7.6
2005	261369	72.4	17.8	2.4	7.4
2006	286467	72.4	17.5	2.7	7.4
2007	311442	72.5	17.0	3.0	7.5
2008	320611	71.5	16.7	3.4	8.4
2009	336126	71.6	16.4	3.5	8.5
2010	360648	69.2	17.4	4.0	9.4
2011	387043	70.2	16.8	4.6	8.4
2012	402138	68.5	17.0	4.8	9.7
2013	416913	67.4	17.1	5.3	10.2
2014	425806	65.6	17.4	5.7	11.3
2015	429905	63.7	18.3	5.9	12.1
2016	435819	62.0	18.5	6.2	13.3
2017	449000	60.4	18.8	7.0	13.8

Source: National Bureau of Statistics.

Table 18 China final energy consumption and mix by sector

	2010		2015		2016	
	Mtce	%	Mtce	%	Mtce	%
Agriculture	78.7	3.1	98.4	3.1	96.8	2.9
Industry	1610.9	62.7	1803.3	56.7	1814.6	55.3
Transportation	330.2	12.9	448.4	14.1	503.5	15.3
Buildings	368.0	14.3	638.2	20.1	672.9	20.5
Renewable energy	179.4	7.0	189.3	6.0	197.1	6.0
Total	2567.2	100.0	3177.7	100.0	3284.9	100.0

Note: This table is based on China's energy balance sheet, but calculated according to internationally-agreed definitions of energy balance and methodology. Electricity is converted to standard coal equivalent by heat value equivalent. Final energy consumption is calculated by losses from processing, conversion and transportation and the energy consumption of the energy industry. Intermediate links losses include thermal power generation, transmission, coal transport by rail, coal preparation, coking and oil refining comprised 29.6% of primary energy consumption in 2016. The energy industry's energy consumption was calculated by adding the energy consumption of the coal mining and washing industry, the oil and natural gas mining industry, oil processing, coking and nuclear fuel processing industries, the power production and supply industries and the gas production and supply industry, and then deducting 95% of gasoline and 35% of diesel consumption, representing 6.6 % of primary energy consumption in 2016. The final energy consumption in China's energy balance sheet did not deduct the energy consumption from the energy industry.

The consumption of agricultural diesel oil, residential coal and transport gasoline and diesel oil was on the low side. In 2016, agricultural diesel oil consumption in China's energy balance sheet was 14.93Mt; whereas the China Petroleum and Chemical Industry Federation (CPCIF) and the China Association of Rural Energy Industry (CAREI) reported 23.56 Mt. In 2065, residential coal consumption in China's energy balance sheet was 94.9 Mt, whereas the Ministry of Environmental Protection reported it was around 300 Mt.

China's energy balance sheet only reports data on oil consumed by vehicles used by the transportation sector, and does not include oil consumed by other sectors and private vehicles. In 2016, gasoline consumed by other sectors and private vehicles accounted for 52.7% of gasoline consumption used in transportation. The World Bank developed a formula to calculate China's transportation industry's actual energy consumption; this formula uses data from China's energy balance sheet, 95% of gasoline and 35% of diesel consumed by the industrial sector and construction industry, commerce (wholesale, retail, accommodation and catering), other industries (finance, real estate, business and residential services, geological surveying, information transmission, computer services and software, warehousing and postal services, scientific research and technology services, education, culture, sports and entertainment, water conservancy management, environment and public facilities management, health, social security and social welfare, public management and social organization and national defense) and 100% of oil used in agricultural consumption and 100% of gasoline and 95% of diesel oil used by private individuals.

Table 19 **China oil product consumption by kinds** **Unit: Mt**

	2000	2005	2010	2014	2015	2016	2017
Gasoline	35.05	48.53	68.56	105.35	115.99	119.83	122.20
Diesel	67.74	109.73	146.99	171.65	174.07	164.69	166.70
Kerosene	8.70	10.77	17.65	23.35	27.90	30.23	33.45
Fuel oil	38.73	42.42	37.58	33.84	29.20	29.03	29.40

Sources: National Bureau of Statistics; China Petroleum and Chemical Industry Federation; CNPC Economics &Technology Research Institute.

Table 20 **China natural gas consumption and mix**

	2010		2013		2014		2015		2016		2017	
	100 million m^3	%	100 million m^3	%	100 million m^3	%	100 million m^3	%	100 million m^3	%	100 million m^3	%
Power generation	192.4	17.9	302	18.0	352	18.8	395	20.5	446	21.4	467	19.5
Chemicals	187.3	17.4	218	13.0	264	14.1	245	12.7	254	12.2	273	11.4
Industry	381.3	35.4	469	28.0	480	25.7	454	23.5	493	23.6	727	30.4
Transportation	79.7	7.4	188	11.2	224	12.0	243	12.6	261	12.5	272	11.3
Buildings	235.1	21.9	499	29.8	549	29.4	594	30.7	631	30.3	655	27.4
Total	1075.8	100.0	1676	100.0	1869	100.0	1931	100.0	2085	100.0	2394	100.0

Sources: National Bureau of Statistics; Gas use industry.

Table 21 China electricity consumption per capita **Unit: kWh**

	Nation	Urban	Rural
1978	218	1072	32
1995	535	1747	100
2000	1063	2574	205
2005	1624	2999	587
2010	2752	4519	989
2015	4142	6212	1496
2016	4321	6370	1566
2017	4538	6578	1652

Table 22 China's energy consumption for manufacturing industry (2017)

	energy consumption per unit product	2017 production	2017 energy consumption (Mtce)
Steel	890 kgce/t	831.7 Mt	740.2
Electrolytic aluminum	13577 kWh/t	33.29 Mt	139.7
Copper smelting	359 kgce/t	8.97 Mt	3.2
Cement	135 kgce/t	2340 Mt	315.9
Building ceramics	6.8 kgce/m^2	10.15 billion m^2	69.0
Wall materials	429 kgce/10,000 block standard bricks	1.1850 TN standard bricks	48.5
Sheet glass	14.2 kgce/ weight case	790 million weight cases	11.2
Coking	143 kgce/t	270 Mt	38.6
Oil refining	97 kgce/t	568 Mt (process load)	55.1
Ethylene	841 kgce/t	18.22 Mt	15.3
Synthetic ammonia	1463 kgce/t	51.91 Mt	75.9
Caustic soda	875 kgce/t	33.65 Mt	29.4
sodium carbonate	333 kgce/t	26.77 Mt	8.9
Calcium carbide	3279 kWh/t	24.47 Mt	24.8
Paper and paperboard	326 kgce/t	125.4 Mt	40.9
Total			1616.7 2310

Note: 1. The comprehensive energy consumption of products is industrywide. Wall materials energy consumption is a weighted average of clay solid bricks and new wall materials.

2. Product power consumption is converted into coal equivalent according to gross coal consumption rate.

3. The energy consumption of the 15 products of six industries shown in the above table accounts for about 70% of the energy consumption of the manufacturing industry.

Sources: National Bureau of Statistics; National Development and Reform Commission; Ministry of Industry and Information; China Iron and Steel Association; China Nonferrous Metals Industry Association; China Electricity Council; China Building Materials Industry Association; China Petroleum and Chemical Industry Federation; China Chemical Energy Conservation Technology Association; China Ceramics Industry Association; China Carbide Industry Association; China Paper Making Association.

Table 23 **China transport energy consumption**

	2005	2010	2012	2013	2014	2015	2016	2017
Highways								
Gasoline (Mt)	46.08	67.5	85.1	95.5	101.7	112.0	118.0	120.4
Diesel (Mt)	54.60	77.9	96.9	106.0	108.0	105.3	90.2	108.6
Railways								
Diesel (Mt)	5.61	6.72	6.94	6.81	6.58	6.25	7.03	8.28
Electricity (100 million kWh)	198.1	307.0	394.3	428.4	478.0	507.7	571.2	595.0
Waterways								
Diesel and Fuel oil (Mt)	14.83	22.45	25.80	26.80	27.49	26.19	27.50	27.8
Civil aviation								
Kerosene (Mt)	9.52	16.01	18.4	19.8	23.4	25.6	30.3	33.45

Sources: National Bureau of Statistics; National Development and Reform Commission; National Railway Administration; State Railway Administration; Ministry of Transport; The National Civil Aviation Authority; Chinese Automotive Technology Research Center; CNPC Economics & Technology Research Institute, 2016 CNPC/ETRI Energy Statistical Review.

Table 24 **China agricultural and rural energy indicators**

	2000	2010	2014	2015	2016	2017
Total power of agricultural machinery (10,000 kW)	52574	92786	108057	111728	97250	99017
Effective irrigation area (10,000 ha)	5382.0	6034.8	6454.0	6587.3	6714.9	6785.1
Water-saving irrigation area (10,000 ha)	1640	2731	2902	3106	3317	3461
Chemical fertilizers application (10,000 t)	4145	5562	5996	6023	5984	5859
Installed capacity of small rural hydropower plants (10,000 kW)	698.5	5924.0	7332.0	7588.0	7791.0	7927.0
Rural electricity consumption (100 million kWh)	2421.3	6632.3	8884.4	9026.9	9238.3	9524.4

Source: National Bureau of Statistics.

Table 25 China household electric appliance electricity consumption (2017)

	Ownership (100 million)		Electricity consumption (100 million kWh)	
	Households	Whole society	Households	Whole society
Air conditioners	4.02	6.18	2171	3337
Refrigerators	3.99	4.03	1165	1294
Color TVs	5.11	5.68	644	716
Rice cookers	3.50	3.50	341	341
Electric fans	6.10	8.70	120	171
Electric shower water heaters	1.88	2.09	893	992
Kitchen ventilators	2.13	2.37	258	287
Microwave ovens	1.67	1.86	75	84
Washing machines	4.05	4.50	162	180
Total			5829	7402

Note: 1. The ownership of household was calculated by multiplying the total number of households (418.2 million) by households per 100 households in the whole country.

2. The ratio of ownership of household to ownership of whole society: electric cooker, 100%; room air conditioner, 65%; electric fan, 70%; and all the other appliances, 90%.

3. The average power and annual utilization hours per appliance: room air conditioner 1200W, 450h; color TV 120W, 1050h; electric cooker, 650W, 150h; electric fan 55W, 360h; electric shower water heater 2500W, 190h; lampblack machine 220W, 550h; microwave oven 750W 60h; washing machine 400W, 100h; refrigerators had an average daily power consumption of 0.8kWh.

Sources: National Bureau of Statistics; Average power and annual utilization hours of household appliances compiled by Wang Qingyi, Energy Data in 2014.

Table 26 China energy saving (2017) Unit:Mtce

	Energy saving in 2017 compared with 2016	Share %
Technology energy saving	99.72	60.0
Industry	29.92	18.0
Transportation	9.77	5.9
Building	60.03	36.1
Structural energy saving	66.48	40.0
Total energy saving	166.20	100.0

Notes: In industrial energy saving, manufacturing contributed 14.96 Mtce and power generation, 14.00 Mtce.

Table 27 China energy saving for manufacturing industry (2017)

	Product energy consumption						Production in 2017	Energy saving in 2017 compared with 2016 (Mtce)
	Unit	2010	2014	2015	2016	2017		
Steel	kgce/t	950	913	899	898	890	831.7 Mt	6.65
Electrolytic aluminum	kWh/t	13979	13596	13562	13599	13577	33.29 Mt	0.23
Copper	kgce/t	500	420	372	337	321	8.97 Mt	0.14
Cement	kgce/t	143	138	137	135	135	2340 Mt	0
Building ceramics	kgce/m^2	7.7	7.1	7.0	6.9	6.8	10.15 billion m^2	1.02
Wall materials	kgce/10,000 standard bricks	468	454	444	434	429	1185 billion standard bricks	0.50
Sheet glass	kgce/ weight case	16.9	15.0	14.7	14.4	14.2	794 million weight cases	0.16
Oil refining	kgce/t	100	97	96	97	97	568Mt (processing amount)	0
Ethylene	kgce/t	950	860	854	842	841	18.22 Mt	0.02
Synthetic ammonia	kgce/t	1587	1540	1495	1486	1463	51.91 Mt	1.19
Caustic soda	kgce/t	1006	949	897	878	875	33.65 Mt	0.10
Calcium carbide	kWh/t	3340	3272	3303	3224	3279	24.47 Mt	+0.42
Paper and paperboard	kgce/t	390	340	339	333	326	125.4 Mt	0.88
Total								10.47
Total of manufactural industry								14.96

Note: 1. In product energy consumption, electricity consumption was converted into standard coal equivalent by coal consumption in power generation.

2. Each product's energy consumption is the average of the whole industry.

3. In this table, the 13 products listed came from six industries whose energy consumption accounted for 70% of the aggregate consumption in manufacturing in 2017.

Sources: National Bureau of Statistics; 2018 China Statistical Abstract; China Energy Statistical Yearbook 2017; National Development and Reform Commission; Ministry of Industry and Information Technology; China Electricity Council; China Iron and Steel Industry Association; China Nonferrous Metals Industry Association; China Building Materials Industry Association; China Cement Association; China Ceramics Industrial Association; China Petroleum and Chemical Industry Federation; China Chemical Energy Conservation Technology Association; China Soda Industry Association; China Carbide Industry Association; China Paper-making Association.

Table 28 2017 China transportation energy saving amount

	Unit workload energy consumption (kgce/10,000 conversion t-km)				Workload in 2017 (100 million converted t-km)	Energy saving amount (10,000 tce) in 2017 compared with 2016
	2014	2015	2016	2017		
Highways	526.0	506.5	492.0	480.0	67749	813
Railways	45.5	47.1	47.1	43.3	40419	154
Waterways	42.7	41.3	40.8	40.7	98689	10
Civil aviation	5147	5152	5134	5134	929	0
Total						977

Sources: National Bureau of Statistics; State Railway Administration; Ministry of Transport; China Electricity Council; China Association of Automobile Manufacturers; China Automotive Technology Research Center; CNPC Economics & Technology Research Institute; Statistical Bulletin of Transportation Industry Development in 2017; Statistical Bulletin of China Civil Aviation in 2017; 2017 Railway Statistics Bulletin.

Table 29 2017 China building energy saving amount Unit：Mtce

	2012	2013	2014	2015	2016	2017
New buildings	10.00	13.00	10.65	10.20	15.67	16.00
Existing residential buildings	2.42	2.46	1.92	1.67	1.32	1.60
Lighting	11.10	13.10	12.80	22.10	24.50	30.60
Renewable energy applications	7.20	11.20	14.60	12.0	10.71	11.83
Total	30.72	39.76	39.97	45.97	52.20	60.03

Note: 1. The indicator of new buildings in 2017 refers to energy saving capacity of the newly built saving buildings that adopt the buildings code (1.73 billion m^2).

2. The indicator of existing residential buildings in 2017 refers to energy saving capacity of buildings, which achieved through improvements by energy saving technology in the north (107million m^2).

3. Energy saving from lighting was achieved by the replacement of incandescent lamp with LED lighting.

4. Renewable energy applications include solar water heaters, photovoltaic power generation, ground source heat pumps, geothermal heating and biogas in rural areas.

Sources: Ministry of Housing and Urban-Rural Development; National Development and Reform Commission; Ministry of Land and Resources; Ministry of Agriculture; China Association of Rural Energy Industry; China Association of Solar Energy; National Semiconductor Lighting Industry Development and Industry Alliance.

Table 30 **China physical energy efficiency** **Unit：%**

	2000	2005	2010	2014	2015	2017
1.Mining efficiency	33.0	33.3	35.9	36.2	36.2	36.3
2. Intermediate efficiency	68.5	70.8	70.9	68.7	67.5	70.7
3. End-use efficiency						
Agriculture	32.0	33.0	34.0	36.2	36.5	36.6
Industry	46.0	47.3	50.5	53.8	54.0	54.8
Transportation	28.9	29.2	29.1	33.1	33.3	34.5
Residential and commercial	66.0	68.4	74.2	74.2	74.5	74.8
Total	46.7	48.3	51.0	53.5	54.8	55.2
4. Energy efficiency (2×3)	32.0	34.2	36.0	36.8	37.0	39.0
5. Overall efficiency of energy system (1×4)	10.6	11.4	12.9	13.3	13.4	14.1

Notes: 1. This table was calculated according to internationally accepted definitions of energy balance and calculation method.

2. Intermediate refers to energy processing, conversion, storage and transportation.

Table 31 **China energy consumption for high energy intensive product**

	2000	2010	2015	2016	2017	International advanced level
Coal mining and preparation						
Full energy consumption (kgce/t)	38.2	32.7	29.5	31.0	30.5	
Electricity consumption (kWh/t)	29	24.0	23.6	24.8	25.8	17.0
Petroleum and natural gas recovery						
Full energy consumption (kgce/toe)	208	141	121	117	115	105
Electricity consumption (kWh/toe)	172	121	137	132	129	90
Gross heat consumption of thermal power generation (gce/kWh)	363	312	298	294	292	287
Net heat consumption of thermal power plants (gce/kWh)	392	333	315	312	309	275
Full energy consumption for steel (kgce/t)						
Whole industry	1475	950	899	898	890	
Large and medium-sized enterprises	906	701	663	676	670	
Comparable energy consumption for steel (kgce/t)	784	681	644	640	634	576
AC power consumption for electrolytic aluminum (kWh/t)	15418	13979	13562	13599	13577	12900
Full energy consumption for copper smelting (kgce/t)	1227	500	372	337	321	360
Full energy consumption for cement (kgce/t)	172	143	137	135	135	97
Full energy consumption for wall materials (kgce/10,000 standard bricks)	763	468	444	434	429	300
Full energy consumption for building ceramics (kgce/m^2)	8.6	7.7	7.0	6.9	6.8	3.4

Full energy consumption for coking /kgce/t		160	145	144	143	120
Full energy consumption for sheet glass (kgce/weight case)	25.0	16.9	14.7	14.4	14.2	13.0
Full energy consumption for crude oil processing (kgce/t)	118	100	96	97	97	73
Full energy consumption for ethylene (kgce/t)	1125	950	854	842	841	629
Full energy consumption for synthetic ammonia (kgce/t)	1699	1587	1495	1486	1464	990
Full energy consumption for caustic soda (kgce/t)	1439	1006	897	878	875	670
Full energy consumption for sodium carbonate (kgce/t)	406	385	329	336	333	255
Electricity consumption for calcium carbide (kWh/t)	3475	3340	3303	3224	3279	3000
Full energy consumption for paper and paperboard (kgce/t)						
Whole industry	912	390	339	333	326	
Home made pulp and paper enterprises	1540	1200	1045	1027	1006	506

Note: 1. International advanced level is an average of the leading nations.

2. For full energy consumption in China and overseas for all years, electricity consumption was converted to coal equivalent by gross coal consumption.

3. The US is the world's leading nation in mining and washing coal. In 2016, surface mines output made up 65.8% of all mines in the US, the percentage in China was 17.8%; electricity consumption per ton of coal in surface mining made up about 1/5 of mines in the US.

4. The international leading level for electricity consumption of the oil and gas recovery industry is an estimated value from Shell and British Petroleum Company.

5. The gross heat consumption rate and net heat consumption rate in China were calculated from generators above 6MW; the international advance level is Japan, and net heat consumption is Italy. In 2010, in China, coal made up 94.3% of all thermal power stations, oil 0.5%; and gas 2.3%. In Japan those ratios were 38.0%, 14.0% and 43.4%. In Italy, were 29.5%, 9.9%, 70.9%.

6. The full energy consumption for steel in China is from large and medium-sized enterprises, whose production accounted for 80.3% of the whole country. In 2016, it was reduced by 0.08% compared to the level of the previous year. The international advance level was from Germany.

7. The full energy consumption for cement is split into the heat consumption of clinker and full electricity consumption for cement. Electricity consumption was calculated as standard coal equivalent. Here, the international advance level was from Germany. In 2014, substitution rate of alternative fuel (petrol coke, waste plastics, waste tire, city garbage, and so on) was 63.4%.

8. The international leading level of full energy consumption for wall materials was the US.

9. Most ethylene in China is manufactured from naphtha. In the Middle East, classified as an international advanced leading country here, ethylene is manufactured from ethane.

10. International advanced level of caustie soda is Germany and Italy joint venture Wu dydy Nora Corp.

11. Full energy consumption for synthetic ammonia was calculated from the average value of large-, medium and small-sized enterprises with coal, oil and gas as raw materials. In 2016, 76% of China's synthetic ammonia production was from coal. The international advance was from the US, which uses natural gas for 98% of ammonia production.

Sources: National Bureau of Statistics; Ministry of Industry and Information Technology; China Coal Industry Association; China Electricity Council; China Iron and Steel Industry Association; China Nonferrous Metals Industry Association; China Building Materials Industry Association; Sinopec and Chemical Industry Federation; China Ceramics Industrial Association; China Paper Association; China Chemical Fibers Association; Institute of Energy Economics, Japan; Handbook of Energy and Economic Statistics, 2015 version; The Germany Iron and Steel Enterprises Association; The Germany Cement Engineering Association.

Table 32 **China industrial production capacity eleminated**

	Production capacity eleminated					2017 Production
	2006～2010	2014	2015	2016	2017	
Coal	450.0 Mt	108 Mt	90 Mt	290 Mt	150 Mt	3520 Mt
Charcoal	10.38 Mt	12.0 Mt	19.35 Mt	40 Mt	16.8 Mt	431.4 Mt
Thermal powe	72.1 GW	3.3 GW	4.23 GW	4 GW	5.0 GW	1106.0 GW
Steel	68.6 Mt	90.0 Mt	17.1 Mt	65 Mt	50 Mt	831.7 Mt
Electrolytic aluminum	0.80 Mt	0.57 Mt	0.34 Mt	0.88 Mt	2.4 Mt	33.29 Mt
Cement	403 Mt	81 Mt	39 Mt	0.11 Mt	50 Mt	2340 Mt
Sheet glass	152million weight cases	38million weight cases	11million weight cases	33million weight cases	230million weight cases	790million weight cases
Calcium carbide	4.0 Mt	1.92 Mt	2.0 Mt	2.52 Mt	3.5 Mt	24.47 Mt
paper and paperboard	10.3 Mt	4.92 Mt	5.90 Mt	10.0 Mt	3.0 Mt	125.4 Mt

Sources: National Bureau of Statistics; Ministry of Industry and Information Technology; China Electricity Council; China Iron and Steel Industry Association; China Building Materials Industry Association; China Cement Association; China Ceramics Industrial Association; China Petroleum and Chemical Industry Federation; China Chemical Energy Conservation Technology Association China Paper-making Association.

Table 33 China energy import and export

	2000	2005	2010	2012	2013	2014	2015	2016	2017
Crude oil (Mt)									
Exports	10.44	8.07	3.04	2.44	1.62	0.60	2.87	2.94	4.86
Imports	70.27	127.08	239.31	271.09	282.14	308.36	335.49	381.04	419.97
Petroleum products (Mt)									
Exports	10.30	16.88	30.44	28.44	32.78	33.84	40.92	53.07	52.16
Imports	24.32	41.45	47.84	52.91	56.48	46.55	52.63	53.27	60.56
Natural gas (100 million m^3)									
Exports	31.4	29.7	40.3	28.5	27.1	25.7	32.0	33.3	34.8
Imports			164.7	398.9	518.2	583.5	603.2	736.2	943.6
Coal (Mt)									
Exports	58.84	71.68	19.03	9.26	7.51	5.74	5.33	8.78	8.17
Imports	2.02	26.17	164.78	288.51	327.08	291.22	204.06	255.51	270.90

Note: 1. 2017, in natural gas imports, pipeline natural gas was 41.39 billion m^3 and LNG 52.07 billion m^3.
2.2011~2017, coal imports included brown coal. In 2017, imported brown coal 82.6 Mt.
3. In 2017, sources of coal imports, Australia 29.6%; Indonesia 40.3%; Mongolia 12.5%; Russia 10.4%. Pipeline gas import source, Central Asia 93.5%; LNG, Australia 49%, Qatar 22%.
Source: National Customs General Administration.

Table 34 China energy prices (2016)

	Steam coal for power generation Yuan/t Sep. 2017	No.92 gasoline retail price Yuan/litre Jun.2017	Civil natural gas Yuan/m3 Dec.2017	Electricity for residens Yuan/MWh Nov.2017
Nationwide	536	6.73	2.44	511
Beijing	487	6.86	2.28	488
Liaoning	559	6.81	2.45	500
Shanghai	634	6.80	3.00	637
Hubei	646	6.85	2.5	554
Guangdong	641	6.86	3.45	592
Shanxi	454	6.73	1.98	498

Sources: National Development and Reform Commission.

Table 35 China R&D expenditure in energy and energy intensive industry enterprises

Unit: 100 million Chinese yuan

	2010	2013	2014	2015	2016	2017
Industry total	4015.4	8318.4	9254.3	10013.9	10944.7	12013.0
Coal mining and washing	108.7	156.6	151.5	143.3	132.1	148.9
Petroleum and natural gas exploitation	88.1	80.7	84.4	62.5	63.9	57.3
Petroleum processing, coking and nuclear fuel processing	43.8	89.3	106.6	100.8	119.6	146.6
Production and supply of electric power and heating	31.9	58.4	61.9	81.4	81.6	85.8
Steel	402.1	633.0	642.0	561.2	537.7	638.7
Non-ferrous metals	118.9	301.1	330.6	371.5	406.8	461.6
Building materials	81.3	215.0	246.5	277.6	323.1	362.8
Chemical industry	247.5	660.4	746.5	794.4	840.7	912.5
Chemical fibers	41.0	66.8	75.0	78.5	83.8	106.1
Food, beverages and tobacco	98.8	203.4	232.4	246.2	274.8	267.7
Textile and apparel	101.2	227.8	251.9	297.8	236.9	343.7
Paper and paper products	36.7	87.8	91.4	107.6	122.8	144.6
Transportation equipment	582.2	1052.3	1213.3	1340.1	1348.3	1593.4
Electrical machinery and apparatus	425.1	815.4	922.9	1012.7	1102.4	1242.4
Communications equipment, computers and other electronic equipment manufacture	686.3	1252.5	1392.5	1611.7	1811.0	2002.8
General and special machinery manufacture	472.2	1060.2	1161.5	1199.7	1242.8	1333.7

Note: 2010 data was from large and medium-sized enterprises; 2011~2017 data was from enterprises above designated size.
Source: National Bureau of Statistics.

Table 36 China clean coal technology (2017)

Coal preparation	Raw coal preparation rate in 2017 was 70.2% and 2470 Mt raw coal was washed, saving coal 247 Mt.
Briquette	Annual production and sales for residential use was more than 100 Mt.
Coal water slurry	Capacity in 2017 was 150 Mt, of which 30 Mt was for fuel and 120 Mt was for gasification raw material.
Ultra supercritical thermal power units	In 2017, China had 104 units of 1,000 MW ultra supercritical power units in operation, saving energy 11.8 Mtce.
Circulating fluidized bed boilers	In 2017, there were a total capacity of 130 GW. 600 MW supercritical CFBC have been built.
Integrated gasification combined-cycle, IGCC	A 250 MW demonstration plant went into operation in Tianjin in 2012. By 2016, cumulative generation reached 3.9TWh.
Power plant air pollution control	By 2017, China had built 920 GW fuel gas desulphurization systems, which accounted for 93.9% of coal power installed capacity. China had also built 960 GW denitration systems, accounting for 98.0% of coal power installed capacity.
Coal chemical industry	In 2017, China used coal to manufacture 2.2 billion m^3 of synthetic natural gas; 30.7 Mt of methanol; 1.55 Mt of oil.

Sources: China Coal Processing & Utilization Association; Coal Industry Clean Coal Engineering Technology Research Center; China Electricity Council; China Petroleum and Chemical Industry Federation.

Table 37 China energy intensive industry energy-saving technical progress

	2000	2010	2013	2014	2015	2016	2017	Energy-saving technology
Coal								
Raw coal washing rate (%)	24.3	50.9	60.0	62.5	65.9	68.9	70.2	Washing reduces coal consumption by 10%. In 20167 emissions of SO_2 were cut by 12 Mt.
Tens of millions of ton of coal mine	1	35	50	53	57	59	43	The production efficiency of a 10-million-ton mine has reached world advanced level.
Electricitiy generation industry								
Proportion of 300 MW and above 300 MW units in thermal power installed capacity (%)	42.7	72.7	76.3	77.7	78.6	80.3	88.0	In 2017, 1000 MW plants consumed 285.3 gce/kWh while 300 MW consumed 318.5 gce/kWh.
GW ultra-supercritical units	0	33	63	70	82	100	104	Average coal consumption for electricity generation is less than the average of thermal power by 30gce/kWh
Steel								
	118	149	149	146	143	142		Spray 1t coal instead of coke reduced energy consumption by 90kgce/t
Penetration rate of coke dry quenching (%)	6	80	90	92	95	95	95	Processing 1Mt red coke saves 100,000 tce in energy.
Electrolytic aluminum								
Proportion of large capacity preroaster in output (%)	52	90	95	98	98	98	98	Large scale pre-roaster 160kA uses 9% less power than self-roaster.
Chemical industry								
Proportion of caustic soda production by ion exchange membrane (%)	24.9	76.0	87.1	87.6	88.4	88.2	83.1	Ion exchange membranes saved 123 kWh more for per ton of caustic soda compared with diaphragms.
Petrochemical industry								
Tens of millions of ton of refinery number	4	20	22	25	24	24	27	Energy consumption per ton was 22% lower than the industry average
Proportion of new dry technique for cement production in cement output (%)	12	80	93	95	97	97	98	Heat consumption of large-scale new dry process was 40% lower than mechanical shaft kiln
Cement unpackaged rate (%)	28	48.1	55.9	57.6	58.4	57.9	62.7	Compared with bagged cement, 100 million t unbagged cement saved 3.3 million m3 in wood, avoiding the 4.5% rate of bag damage, or 2.37 million tce.
Proportion of floating shaping output in sheet glass output (%)	57	85	86	87	88	89	90	Full energy consumption in the float process is 16% lower than the Fourcault process

Note: Penetration rate of coke dry quenching is the proportion of coke dry quenching processing capacity in total coke output.
Sources: China Coal Processing & Utilization Association; China Electricity Council; China Iron and Steel Industry Association; China Non-ferrous Metals Industry Association; China Building Materials Industry Association; China Building Glass and Industrial Glass Association.

Table 38 Comparison between China and US in coal industry major indicators (2017)

	China	US
Raw coal production (Mt)	3520	807
Coal exports (Mt)	8.17	87.94
Coal imports (Mt)	270.90	7.05
Coal consumption (Mt)	3797	602.9
Percentage of coal used in power generation (%)	49.1	92.7
Percentage of production in surface mines (%)	18.0	65.4
Average mining exploitation depth (m)	510	90
Average coal price on mine (USD/t)	63.88	27.21*
Coal mines in operation/individual	6794	978
Coal industry employees (10,000 people)	557*	8.28
Raw coal production efficiency ton per capita each year	604*	9746
Coal miners average wage/USD/year	10041 *	8205*
Death number of mine accidents	375	15
Death rate of mine accidents (person/Mt)	0.107	0.019

Note: 1. The average mining depth of China's mine is large and medium mine.
2. The average coal mining price in China is the key state coal mine.
3. * for 2014.

Source: National Bureau of Statistics; China Coal Industry Association; DOE/EIA; National Mining Association.

Table 39 **China major pollutant emissions**

Year	PM2.5 (ug/m^3)	SO_2 (Mt)	NOx (Mt)	Chemical oxygen demand (COD) (Mt)
2000	22	23.70		14.45
2001		19.48		14.05
2002		19.27		13.67
2003		21.59		13.34
2004		22.55		13.39
2005		25.49		14.14
2006	28	25.89	15.24	14.28
2007		24.68	16.40	13.82
2008		23.21	16.25	13.21
2009		22.14	16.93	12.78
2010		21.85	18.52	12.38
2011		22.18	24.04	25.00
2012		21.18	23.38	24.24
2013	72	20.44	22.27	23.53
2014	61	19.74	20.78	22.95
2015	50	18.59	18.51	22.24
2016	47	17.55	17.77	21.66
2017	43	16.15	16.90	20.99

Note: From the beginning of 2011, the COD statistics collection method has changed, thus post 2011 data cannot be directly compared with data collected before 2011.
Source: Ministry of Ecology and Environmen.

Table 40 **China and world CO_2 emissions**

	Total emissions /Mt-CO_2				2017 Emissions per capita /t-CO_2
	2010	2015	2016	2017	
China	7530 (8138)	8674 (9534)	8661 （9485）	8737 （9667）	6.29
United States	5508	5214	5130	5088	15.62
India	1662	2146	2251	2344	1.77
Russia	1490	1496	1511	1525	10.43
Japan	1182	1197	1181	1177	9.27
Germany	780	754	765	764	9.58
South Korea	610	656	665	680	13.47
Iran	530	596	599	634	8.03
Saudi Arabia	485	587	591	595	19.79
Canada	526	530	543	560	15.61
EU	3934	3488	3499	3542	6.90
World	31074	32852	33018	33444	4.48

Note: China's emissions were calculated by fossil fuel consumption and its CO_2 emissions factors. CO_2 emissions related to coal consumption are based on commercial coal metrology, the number in the parentheses () represents CO_2 emissions based on raw coal. Commercial coal refers to coal on sale after the process of washing. In 2017, the washing rate of raw coal in China was 70.2%, the share of removal waste rock in raw rock washed was 18%. CO_2 emissons calculated by BP in 2010,2015, 2016 and 2017 were 8105 Mt, 9163 Mt, 9114 Mt and 9233 Mt respectively.
Sources: BP Statistical Review of World Energy, June 2018.