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Key China Energy Statistics 2011

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The LBNL China Energy Group

The China Energy Group at Lawrence Berkeley National Laboratory (LBNL) was established in 1988. Over the years the Group has gained recognition as an authoritative source of China energy statistics through the publication of its China Energy Databook (CED). In 2008 the Group published the Seventh Edition of the CED (http://china.lbl.gov/research/china-energy-databook). This handbook summarizes key statistics from the CED and is expressly modeled on the International Energy Agency's "Key World Energy Statistics" series of publications. The handbook contains timely, clearly-presented data on the supply, transformation, and consumption of all major energy sources.

Gathering and analyzing data is one important function of the LBNL China Energy Group. The Group, located within the Environmental Energy Technologies Division of the Lawrence Berkeley National Laboratory, has the mission to:

- develop and enhance the capabilities of Chinese institutions that promote energy efficiency;
- better understand the dynamics of energy use in China; and
- create links between Chinese, U.S., and international institutions.

Major achievements of the Group over the years include:

- introduction of appliance energy efficiency standards to China
- pilot policy programs that led to the Top 1000 enterprise program
- analysis of long-term energy demand in China to 2020, 2030 and 2050
- key role in creation of the Beijing Energy Efficiency Center and the Energy Foundation Sustainable Energy Program with collaborators
- leadership of the U.S.-China Clean Energy Research Center – Building Energy Efficiency

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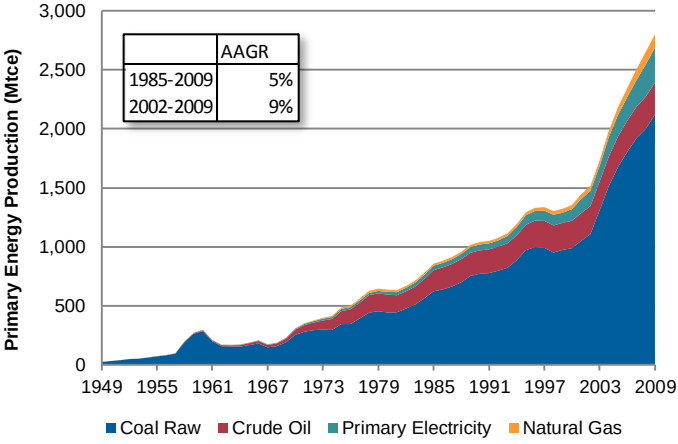
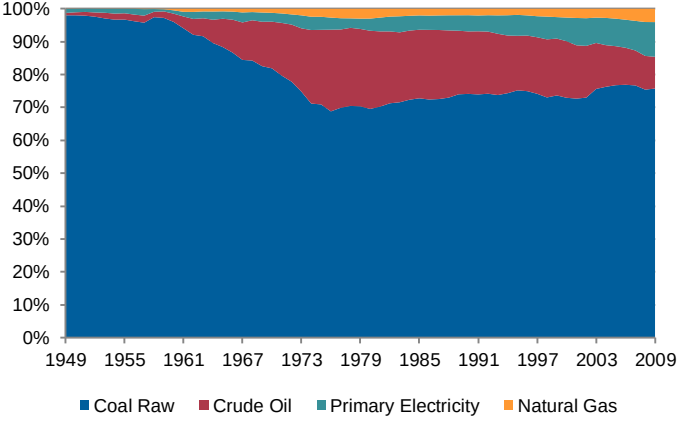
Supply

Maps of China

Growth of China's Total Primary Energy Production (TPE) by Fuel (Mtce)

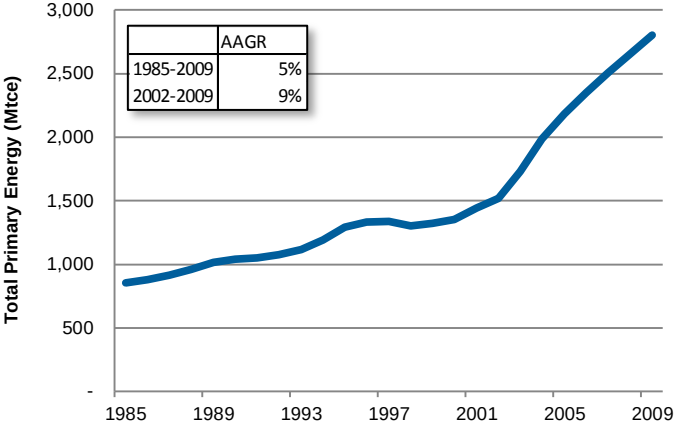


TPE by Fuel Shares *

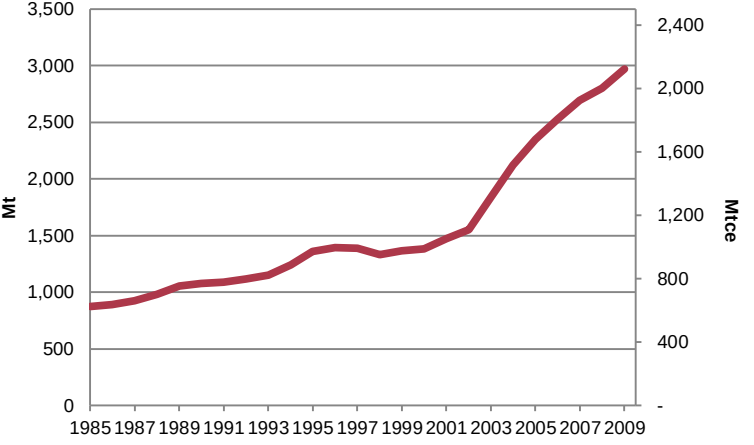


* Excludes international marine bunkers and trade.

Growth of China's Total Primary Energy Production (Mtce)



Coal Production (1985-2009)



Top 10 Coal-Producing Provinces (2009)

Region	Province	Mt	% of Total
North	Shanxi	615	20%
North	Inner Mongolia	601	20%
West	Shaanxi	296	10%
South Central	Henan	230	8%
South Central	Shandong	144	5%
West	Guizhou	137	4%
East	Anhui	129	4%
North	Heilongjiang	97	3%
West	Sichuan	95	3%
West	Yunnan	89	3%
	Others	612	20%
	Total	**3,045**	**100%**

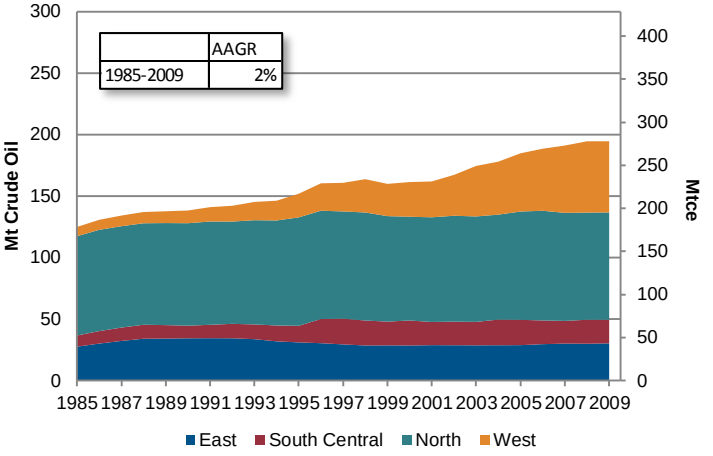
China's Coal Exports (2010)

Export Sources	Mt	% of Total
Republic of Korea	7.24	38%
Japan	6.47	34%
Hong Kong	0.39	2%
Democratic People's Republic of Korea	0.22	1%
Turkey	0.19	1%
Belgium	0.02	0.1%
Vietnam	0.02	0.1%
Malaysia	0.01	0.1%
Indonesia	0.01	0.1%
Others	4.43	23%
Total	**19**	**100%**

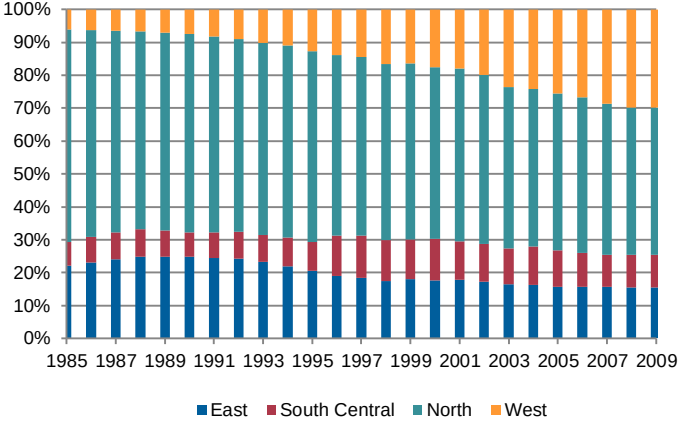
China's Coal Imports (2010)

Import Sources	Mt	% of Total
Indonesia	56.2	34%
Australia	37.0	22%
Viet Nam	18.0	11%
Mongolia	16.6	10%
Russia	11.6	7%
South Africa	7.0	4%
Canada	5.2	3%
USA	4.8	3%
Democratic People's Republic of Korea	4.6	3%
Others	4.9	3%
Total	**166**	**100%**

Crude Oil Production by Region (1985-2009)



Chinese Crude Oil Production by Regional Shares



Top 10 Crude Oil Producing Provinces (2009)

Region	Province	Mt	% of Total
North	Heilongjiang	40	21%
South Central	Shandong	28	15%
West	Shaanxi	27	14%
West	Xinjiang	25	13%
North	Tianjin	23	12%
South Central	Guangdong	13	7%
North	Liaoning	10	5%
North	Jilin	6	3%
North	Hebei	6	3%
South Central	Henan	5	2%
	Others	11	11%
	Total	**195**	**100%**

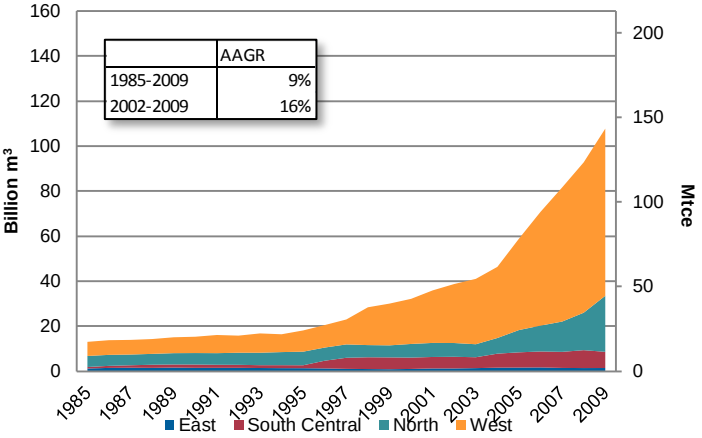
China's Crude Oil Exports (2010)

Export Sources	Mt	% of Total
Republic of Korea	0.6	21%
Japan	0.6	20%
Democratic People's Republic of Korea	0.5	17%
USA	0.5	17%
Thailand	0.2	8%
Vietnam	0.1	5%
Malaysia	0.1	4%
Indonesia	0.1	3%
Singapore	0.1	3%
Australia	0.1	2%
Philippines	0.0	1%
Total	**3.0**	**100%**

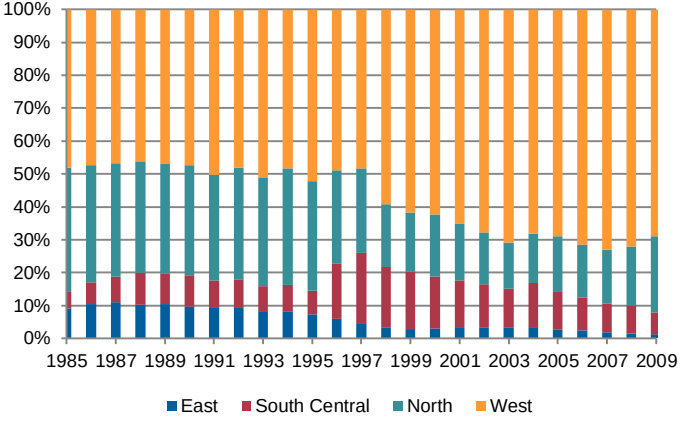
China's Crude Oil Imports (2010)

Import Sources	Mt	% of Total
Saudi Arabia	44.64	19%
Angola	39.38	16%
Iran	21.32	9%
Oman	15.87	7%
Russia	15.24	6%
Sudan	12.60	5%
Iraq	11.24	5%
Kazakhstan	10.05	4%
Kuwait	9.83	4%
Brazil	8.05	3%
Others	50.37	21%
Total	**239**	**100%**

Natural Gas Production by Region (1985-2009)



Chinese Natural Gas Production by Regional Shares



China's Liquefied Natural Gas Imports (2010)

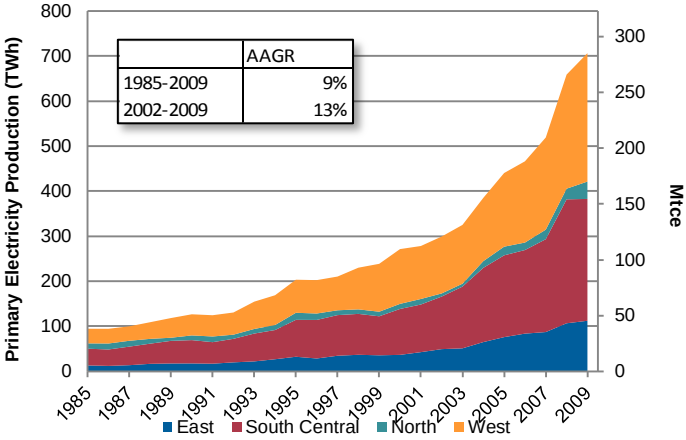
Import Sources	Billion m^3	% of Total
Australia	3.92	42%
Indonesia	1.71	18%
Qatar	1.21	13%
Malaysia	1.18	13%
Yemen	0.53	6%
Russia	0.38	4%
Nigeria	0.13	1%
United Arab Emirates	0.06	1%
Equatorial Guinea	0.06	1%
Egypt	0.06	1%
Belgium	0.06	1%
Trinidad and Tobago	0.05	1%
Total	**9.4**	**100%**

China's Gaseous Natural Gas Imports (2010)

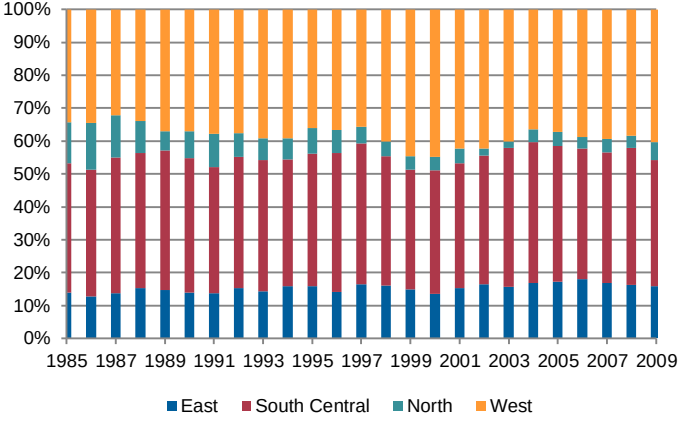
Imports Sources	Billion m^3	% of Total
Turkmenistan	2.6	100%

Transformation

Primary Electricity Production by Region (1985-2009)



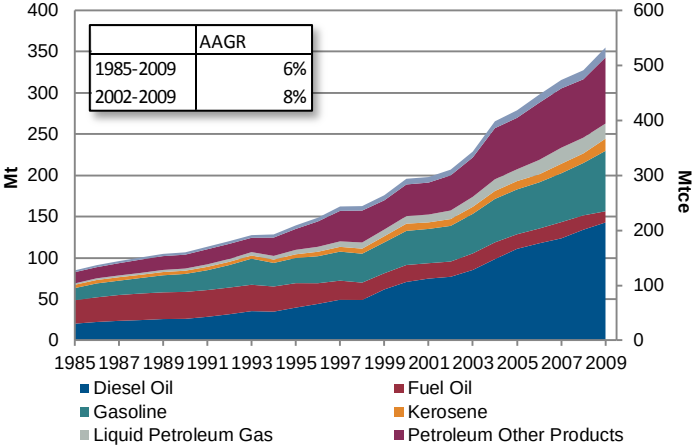
Primary Electricity Production by Regional Shares



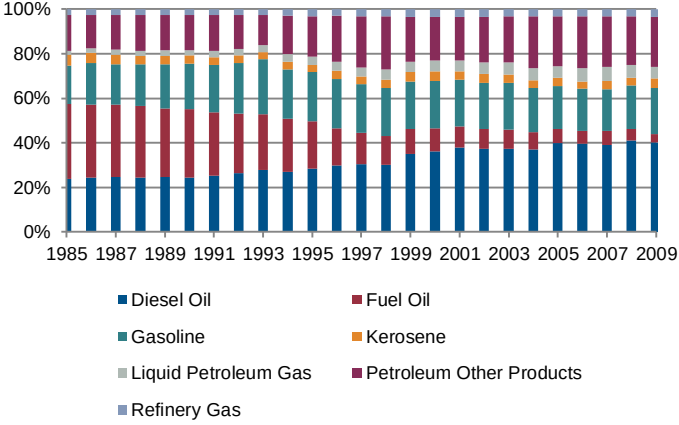
Top 10 Primary Electricity Producing Provinces (2009)

Region	Province	TWh	% of Total
South Central	Hubei	118	17%
West	Sichuan	98	14%
West	Yunnan	63	9%
South Central	Guangdong	52	7%
South Central	Guangxi	48	7%
South Central	Hunan	41	6%
West	Guizhou	40	6%
East	Zhejiang	40	6%
East	Fujian	37	5%
West	Qinghai	27	4%
	Others	143	20%
	Total	**707**	**100%**

Oil Refining by Product (1985-2009)

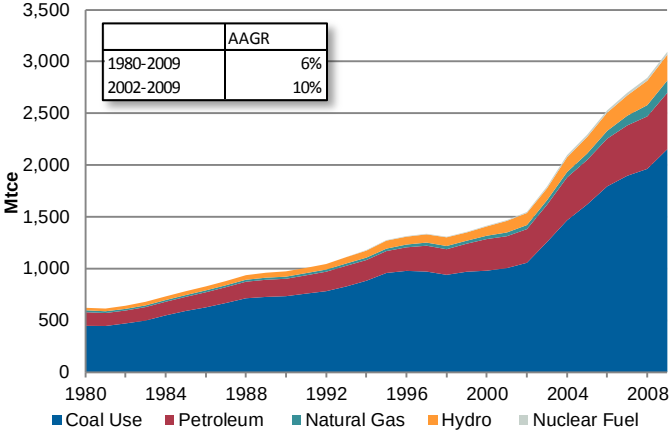


Refinery Production by Product Shares

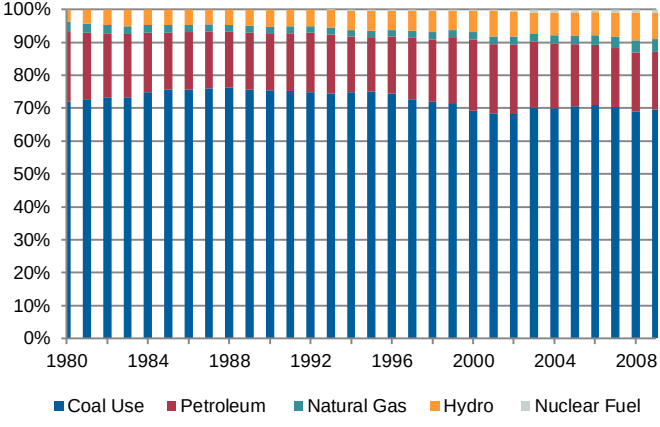


Consumption

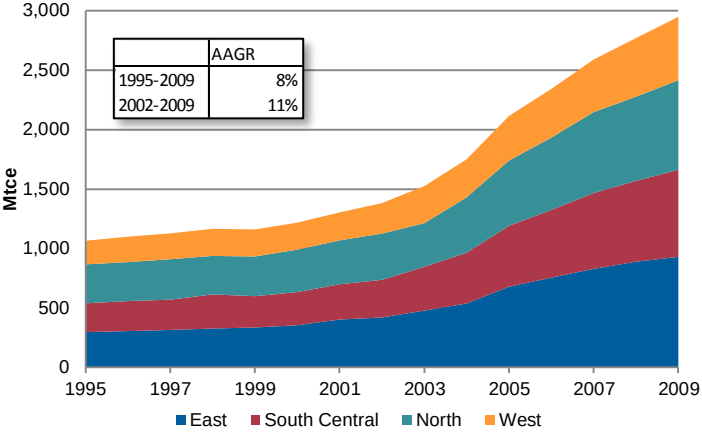
Total Primary Energy Consumption by Source (1980-2009)



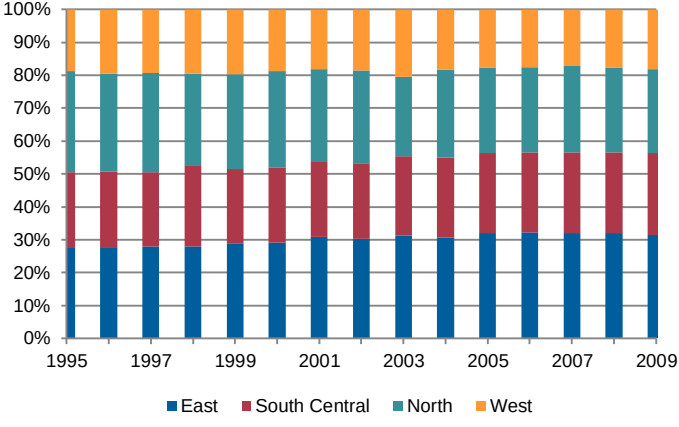
Total Primary Energy Consumption by Fuel Shares



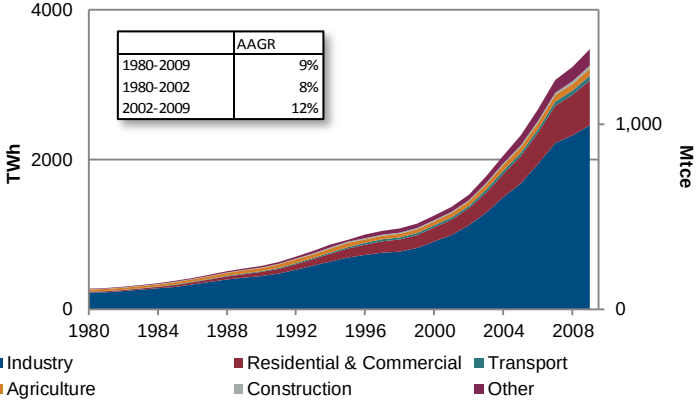
Total Final Energy Consumption by Region (1995-2009)



Total Final Energy Consumption by Regional Shares

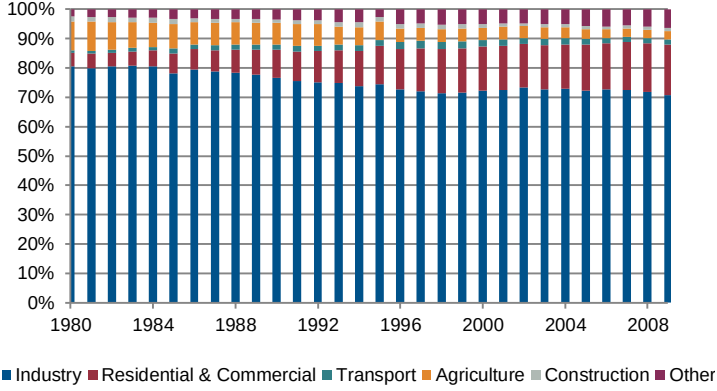


Electricity End-Use by Sector (1980-2009)

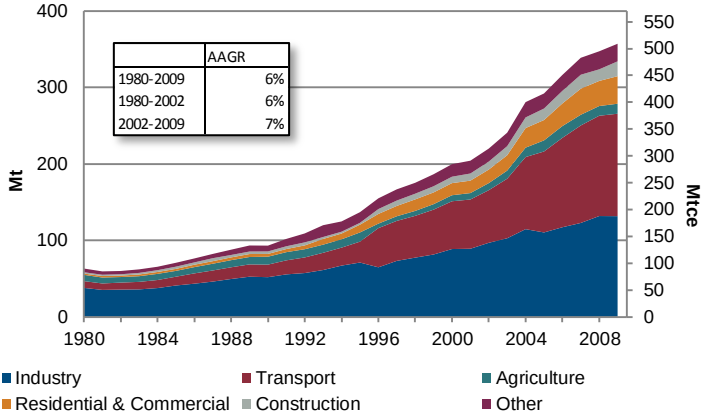


Note: Starting in 1991, energy use in the "Non-Material Sector" (government, schools, hospitals, etc.) was reclassified as "Other".

Electricity Consumption by Sectoral Shares

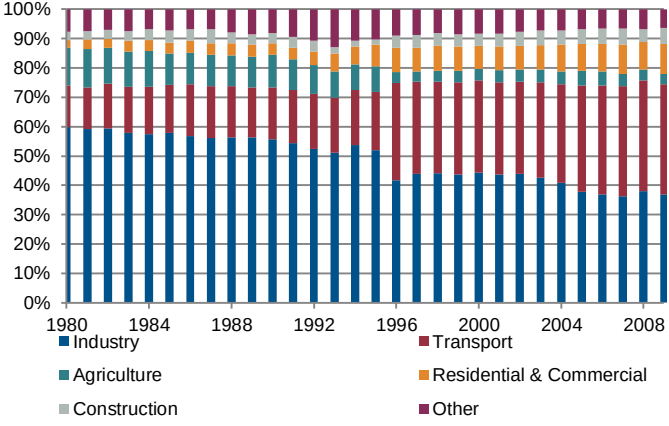


Oil Consumption by Sector (1980-2009)

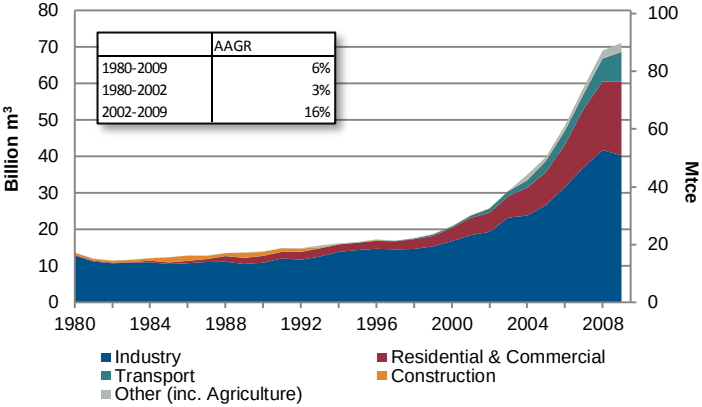


Note: Starting in 1991, energy use in the "Non-Material Sector" (government, schools, hospitals, etc.) was reclassified to "Other".

Final Oil Consumption by Sectoral Shares

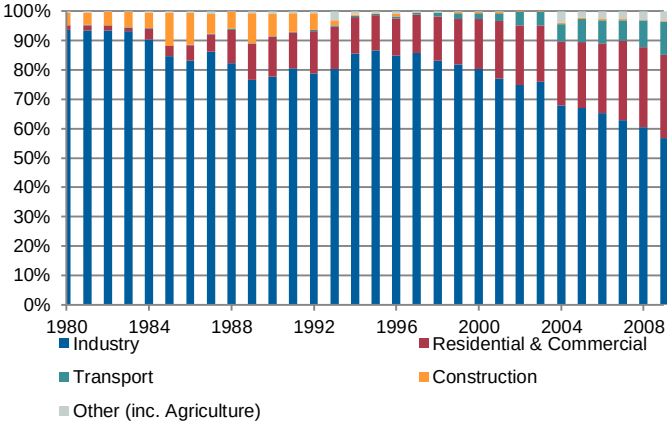


Natural Gas Consumption by Sector (1980-2009)



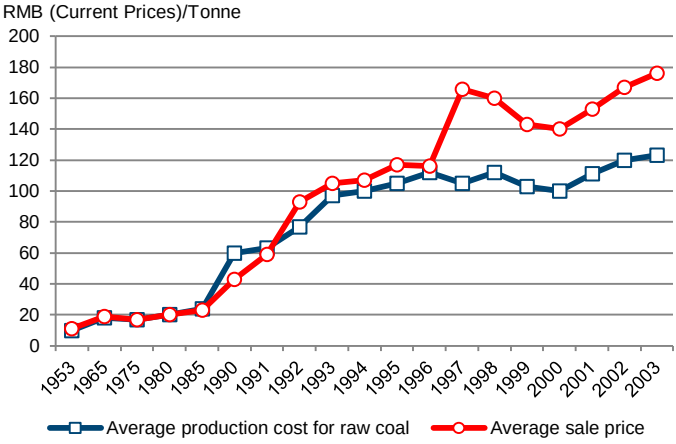
Note: Starting in 1991, energy use in the "Non-Material Sector" (government, schools, hospitals, etc.) was reclassified to "Other".

Final Natural Gas Consumption by Sectoral Shares

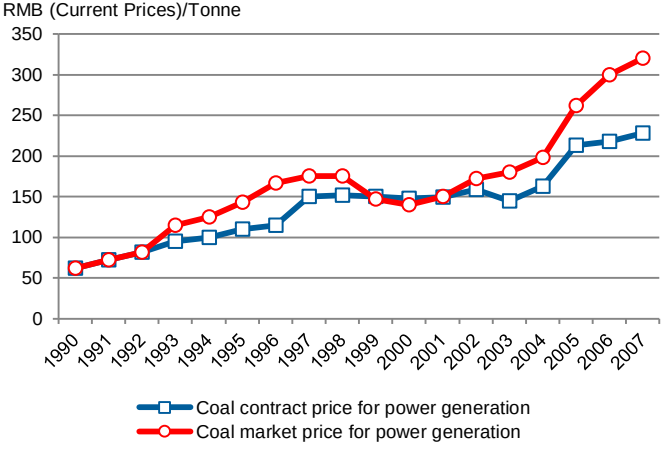


Prices

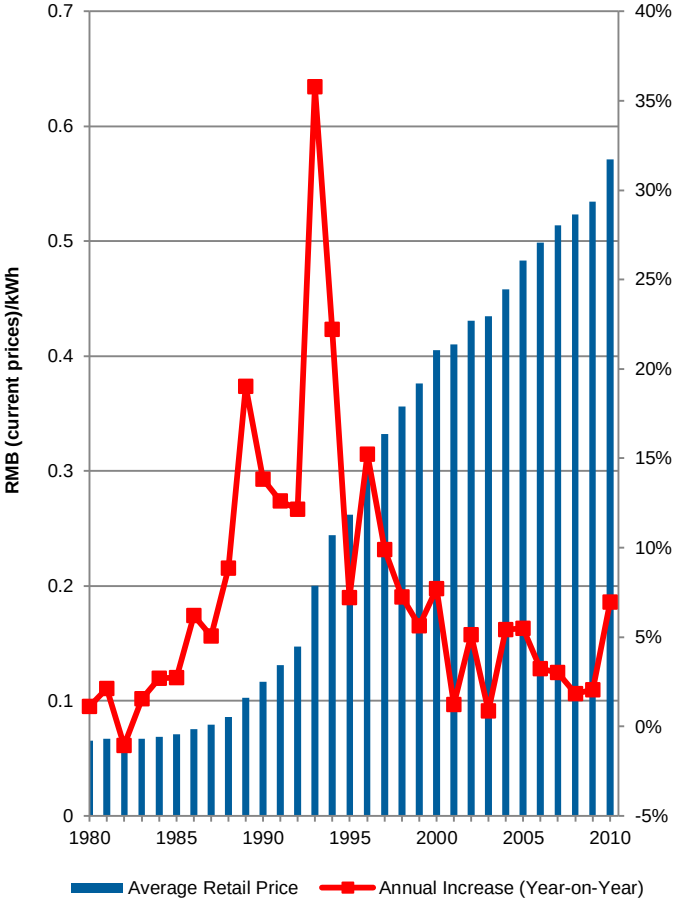
Production Cost and Average Sale Price of State-Owned Coal Mines



Average Coal Contract Price and Coal Market Price for Power Generation



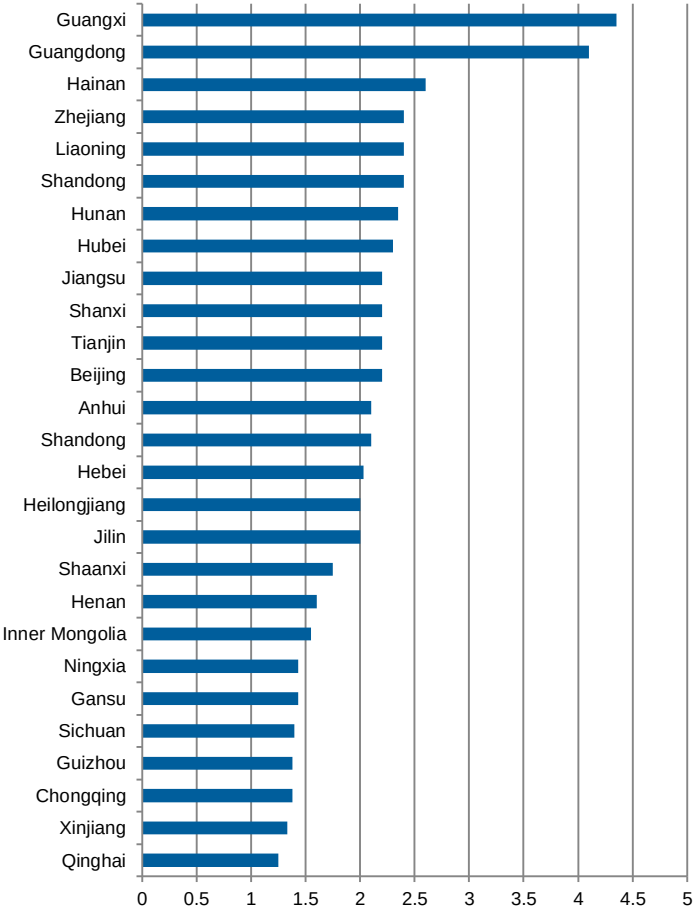
Average Retail Price of Electricity (1980-2010)



Average Residential Electricity Price by Province

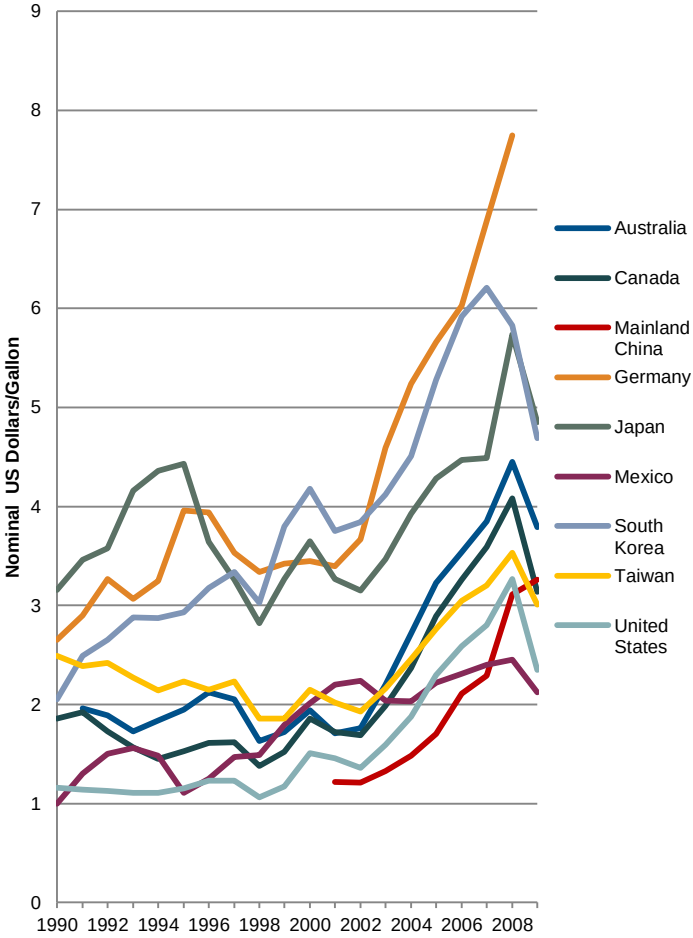
Province	2008		2009		2010	
	(RMB/kWh)	(RMB/kgce)	(RMB/kWh)	(RMB/kgce)	(RMB/kWh)	(RMB/kgce)
Guangdong	0.628	1.55	0.628	1.55	0.628	1.55
Hainan	0.592	1.47	0.599	1.48	0.600	1.48
Jiangxi	0.598	1.48	0.599	1.48	0.599	1.48
Hubei	0.559	1.38	0.560	1.39	0.563	1.39
Henan	0.544	1.35	0.545	1.35	0.546	1.35
Anhui	0.553	1.37	0.549	1.36	0.545	1.35
Shanghai	0.543	1.35	0.541	1.34	0.537	1.33
Hunan	0.528	1.31	0.526	1.30	0.530	1.31
Zhejiang	0.528	1.31	0.526	1.30	0.527	1.30
Jilin	0.521	1.29	0.521	1.29	0.522	1.29
Shandong	0.504	1.25	0.520	1.29	0.519	1.29
Guangxi	0.490	1.21	0.514	1.27	0.518	1.28
Chongqing	0.517	1.28	0.517	1.28	0.517	1.28
Sichuan	0.507	1.25	0.507	1.25	0.508	1.26
Jiangsu	0.504	1.25	0.504	1.25	0.503	1.25
Xinjiang	0.494	1.22	0.499	1.23	0.500	1.24
Shaanxi	0.475	1.17	0.496	1.23	0.497	1.23
Tibet	0.563	1.39	0.532	1.32	0.497	1.23
Liaoning	0.495	1.23	0.496	1.23	0.497	1.23
Tianjin	0.488	1.21	0.488	1.21	0.488	1.21
Gansu	0.483	1.20	0.489	1.21	0.487	1.21
Hebei (South Grid)	0.487	1.21	0.485	1.20	0.487	1.21
Hebei (North Grid)	0.483	1.20	0.484	1.20	0.485	1.20
Fujian	0.471	1.17	0.473	1.17	0.474	1.17
Beijing	0.475	1.18	0.473	1.17	0.472	1.17
Shanxi	0.465	1.15	0.465	1.15	0.464	1.15
Heilongjiang	0.463	1.15	0.460	1.14	0.459	1.14
Yunnan	0.452	1.12	0.451	1.12	0.452	1.12
Ningxia	0.448	1.11	0.457	1.13	0.452	1.12
Inner Mongolia (East)	0.455	1.13	0.432	1.07	0.448	1.11
Guizhou	0.434	1.08	0.435	1.08	0.438	1.08
Inner Mongolia (West)	0.385	0.95	0.386	0.95	0.368	0.91
Qinghai	0.345	0.85	0.344	0.85	0.356	0.88

Residential Gas Price by Province (As of the end of October 2008)



(2008 RMB/m^3)

Retail Gasoline Price (Including Tax) in Selected Countries and Regions (1990-2008)



Note: prices are those actually paid, (i.e., net of rebates), and include transport costs and not refundable taxes. Prices in national currencies are converted to U.S. dollars using exchange rates published by the International Monetary Fund.

Commercial and Industrial Gas Prices in Major Cities (2007-2008)

City	Province	Commercial (RMB/m^3)		Commercial (RMB/tce)		Industrial (RMB/m^3)		Industrial (RMB/tce)	
		Oct. 2007	Oct. 2008	Oct. 2007	Oct. 2008	Oct. 2007	Oct. 2008	Oct. 2007	Oct. 2008
Beijing		2.55	2.55	1.92	1.92	1.95	2.35	1.47	1.77
Tianjin		2.40	2.40	1.80	1.80	2.40	2.40	1.80	1.80
Shijiazhuang	Hebei	2.40	2.40	1.80	1.80	2.00	2.00	1.50	1.50
Hohhot	Inner Mongolia	1.92	1.92	1.44	1.44	1.27	1.67	0.95	1.26
Shenyang	Liaoning	3.60	3.60	2.71	2.71	3.00	3.00	2.26	2.26
Changchun	Jilin	1.80	1.80	1.35	1.35	1.80	1.80	1.35	1.35
Harbin	Heilongjiang	3.00	3.00	2.26	2.26	2.50	2.50	1.88	1.88
Shanghai		3.30	3.30	2.48	2.48	2.50	2.90	1.88	2.18
Nanjing	Jiangsu	3.00	3.00	2.26	2.26	3.30	2.75	2.48	2.07
Hangzhou	Zhejiang	2.40	2.40	1.80	1.80	2.35	2.35	1.77	1.77
Ningbo	Zhejiang	-	3.40	-	2.56	-	3.40	-	2.56
Hefei	Anhui	2.10	2.10	1.58	1.58	2.05	2.48	1.54	1.86
Jinan	Shandong	2.82	3.29	2.12	2.47	2.82	3.29	2.12	2.47
Qingdao	Shandong	3.60	3.60	2.71	2.71	2.88	3.60	2.17	2.71
Zhengzhou	Henan	2.40	2.40	1.80	1.80	2.10	2.50	1.58	1.88
Wuhan	Hubei	3.28	3.28	2.47	2.47	2.20	2.63	1.65	1.98
Changsha	Hunan	2.55	2.55	1.92	1.92	2.28	2.28	1.71	1.71
Nanning	Guangxi	4.19	4.19	3.15	3.15	4.19	4.19	3.15	3.15
Haikou	Hainan	3.10	3.73	2.33	2.80	2.35	3.30	1.77	2.48
Chongqing		2.21	2.21	1.66	1.66	1.24	1.67	0.93	1.26
Chengdu	Sichuan	1.71	1.71	1.29	1.29	1.23	1.66	0.92	1.25
Xi'an	Shaanxi	1.75	1.75	1.32	1.32	1.75	1.75	1.32	1.32
Lanzhou	Gansu	1.88	1.88	1.41	1.41	1.25	1.25	0.94	0.94
Xining	Qinghai	1.75	1.75	1.32	1.32	1.07	1.47	0.80	1.11
Yinchuan	Qinghai	1.98	1.98	1.49	1.49	1.38	1.38	1.04	1.04
Urumqi	Xinjiang	1.88	1.88	1.41	1.41	-	-	-	-
National Average		**2.54**	**2.62**	**1.91**	**1.97**	**2.16**	**2.42**	**1.62**	**1.82**

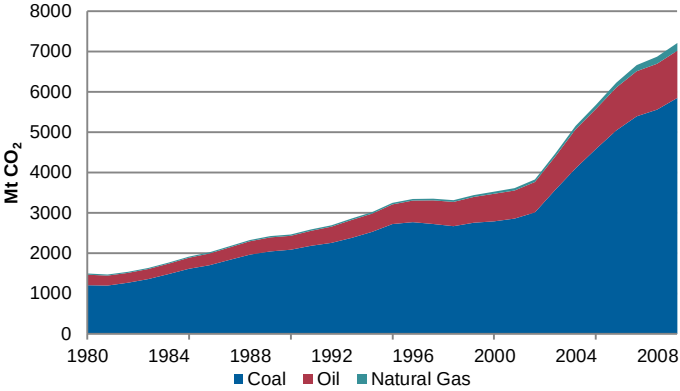
Price Cap on Gasoline and Diesel Prices by Province and Major City (April 7, 2011)

City/Province	90# Gasoline (II)		90# Gasoline (III)		0# Diesel	
	(RMB/t)	(RMB/tce)	(RMB/t)	(RMB/tce)	(RMB/t)	(RMB/tce)
Beijing			9,780	6,647	9,000	6,177
Tianjin	9,335	6,344			8,485	5,823
Hebei	9,335	6,344			8,485	5,823
Shanxi	9,405	6,392			8,540	5,861
Liaoning	9,335	6,344			8,485	5,823
Jilin	9,335	6,344			8,485	5,823
Heilongjiang	9,335	6,344			8,485	5,823
Shanghai			9,760	6,633	8,970	6,156
Jiangsu	9,390	6,382			8,525	5,851
Zhejiang	9,390	6,382			8,540	5,861
Anhui	9,385	6,378			8,535	5,858
Shandong	9,345	6,351			8,495	5,830
Hubei	9,360	6,361			8,510	5,840
Hunan	9,400	6,388			8,570	5,882
Henan	9,355	6,358			8,505	5,837
Hainan	9,480	6,443			8,620	5,916
Chongqing	9,550	6,490			8,695	5,967
Guangdong	9,415	6,399	9,645	6,555	8,555	5,871
Guangxi	9,480	6,443			8,620	5,916
Ningxia	9,340	6,348			8,485	5,823
Gansu	9,320	6,334			8,505	5,837
Xinjiang	9,115	6,195			8,380	5,751
City	**90# Gasoline (II)**		**90# Gasoline (III)**		**0# Diesel**	
	(RMB/t)	**(RMB/tce)**	**(RMB/t)**	**(RMB/tce)**	**(RMB/t)**	**(RMB/tce)**
Hohhot	9,350	6,354			8,500	5,834
Fuzhou	9,390	6,382			8,530	5,854
Nanchang	9,355	6,358			8,505	5,837
Chengdu	9,555	6,494			8,720	5,984
Guiyang	9,515	6,467			8,645	5,933
Kunming	9,545	6,487			8,675	5,954
Xi'an	9,320	6,334			8,495	5,830
Xining	9,300	6,321			8,530	5,854

Note: Except for Beijing and Shanghai, Gasoline (II) and (III) refer to vehicle gasoline that meets the quality requirements of the Chinese National Standard: GB 17930-2006 "Gasoline for Motor Vehicles". In Beijing and Shanghai, the quality requirements refer to the Beijing local standard (DB 11/238-2007) and Shanghai local standard (DB 31/427-2009, DB 31/428-2009).

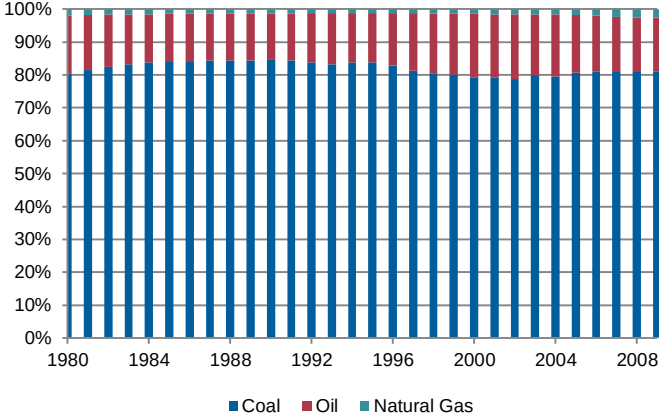
Emissions

Growth of China's Fuel Combustion CO_2 Emissions by Fuel

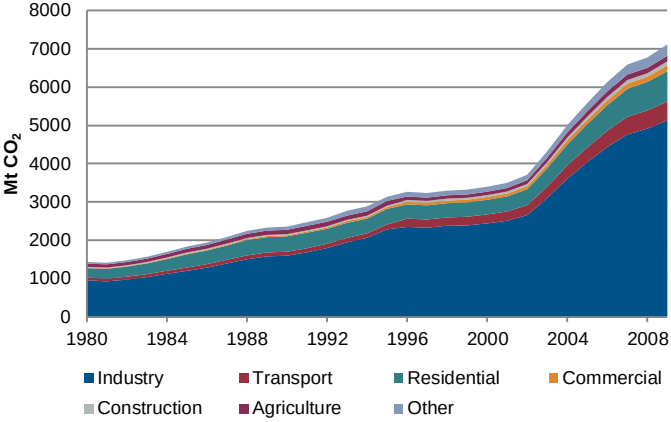


Note: Data based on total final consumption and energy used for energy transformation. CO_2 emissions are calculated using IPCC carbon emission factors. Emissions data include the sequestered carbon in non-energy use petroleum products such as asphalt and lubricants.

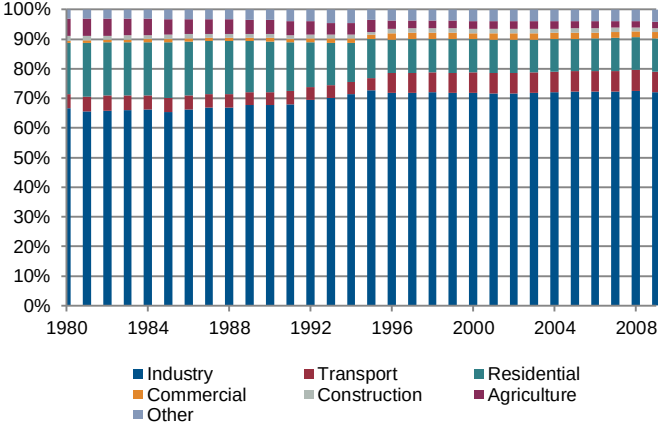
CO_2 Emissions by Fuel Shares



Growth of Energy-Related CO_2 Emissions by Sector (1980-2009)



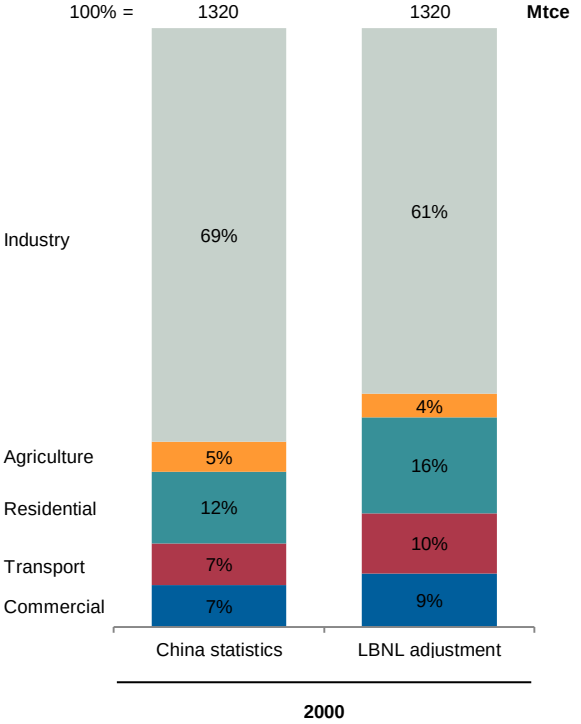
Energy-Related CO_2 Emissions by Sectoral Shares



Analysis

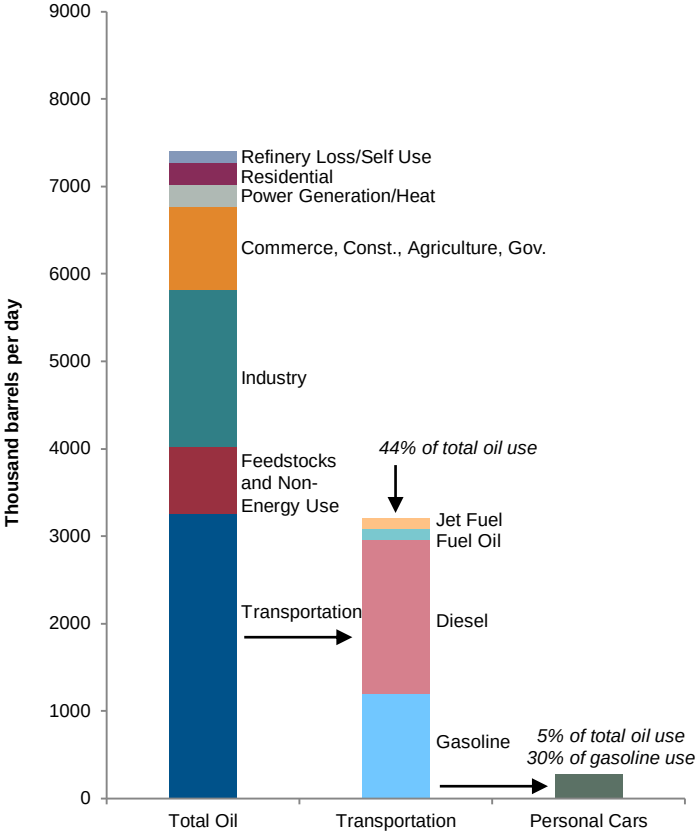
Adjustment of China Energy Use Data (Mtce)

LBNL's China Energy Group has extensive expertise both in end use energy demand modeling in general, and energy dynamics in China in particular. We have developed the China End-Use Energy Model to provide analysis of trends in sectoral energy consumption over the past decade and we have evaluated future scenarios based on the assumptions of likely patterns of economic activity demand for energy services, and energy intensities.



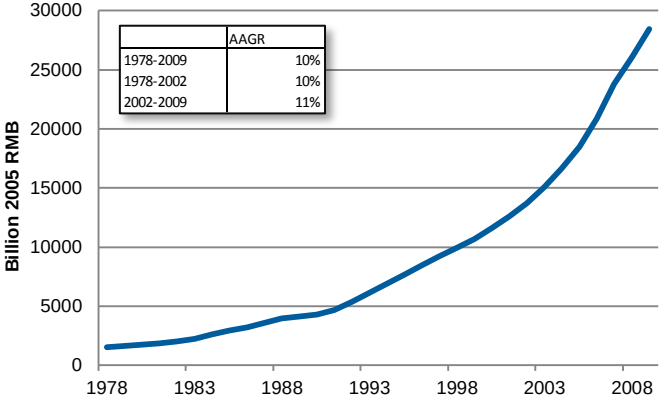
Source: Zhou, N., and J. Lin. 2008. "The Reality and Future Scenarios of Commercial Building Energy Consumption in China." Energy and Buildings, Volume 40 (12), June: 2121-2127.

Composition of 2007 China Oil Use

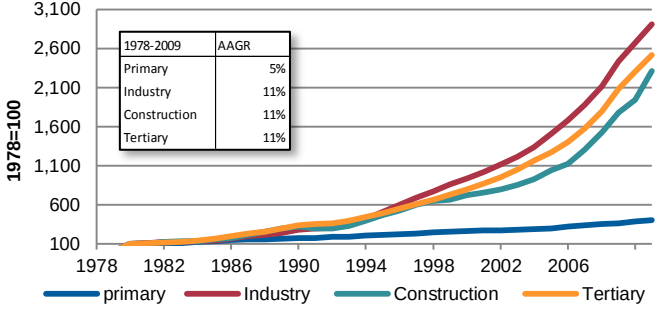


Economic and Demographic Indicators

Growth of China's Gross Domestic Product (1978-2009)



Growth of Chinese GDP by Sector, 1978-2009 (1978=100 index values)



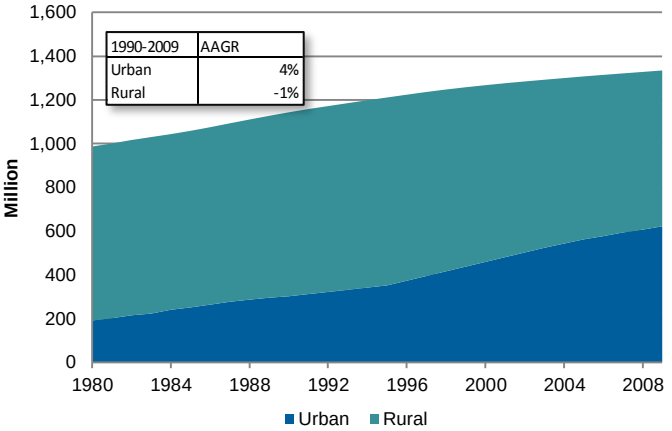
Primary --agriculture (farming, foresting, animal husbandry, sideline production and fishery).

Industry --including mining and quarrying, manufacturing, water supply, electricity generation and supply, steam, hot water and gas.

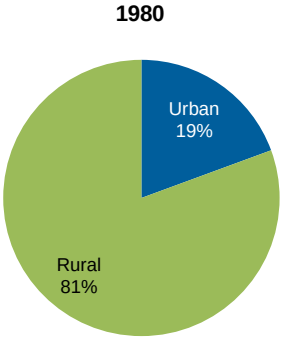
Construction -- including preparation of land and construction, alteration, and repair of buildings, structures, and other real property.

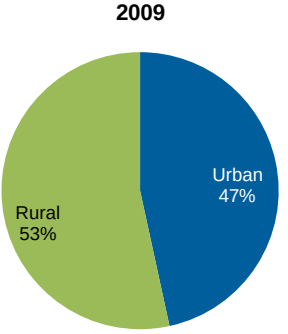
Tertiary--all the other industries not included in primary, industry, and construction. Residential and commercial building energy use is included in the tertiary sector. Energy use of buildings that belong to plants or factories is included in the industry sector.

Growth of Chinese Population (1980-2009)



1990-2009	AAGR
Urban	4%
Rural	-1%

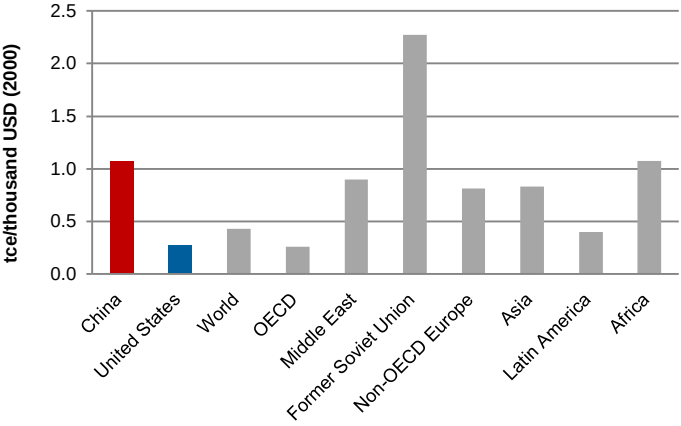




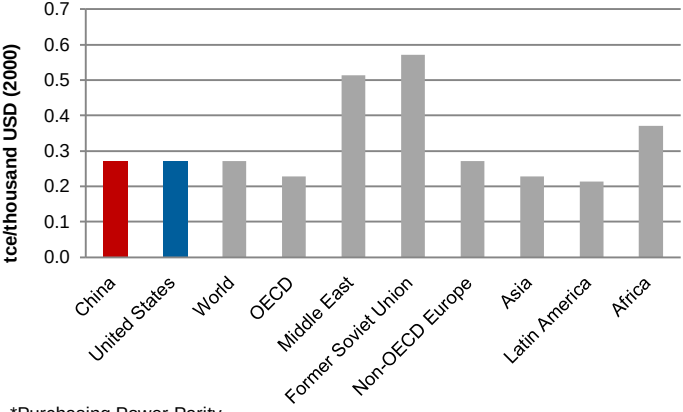
1,335 million

International Comparison

Total Primary Energy Production per GDP (2008)

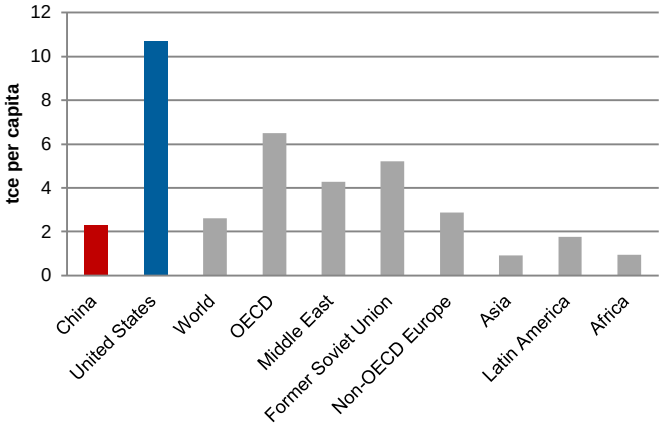


Total Primary Energy Production per GDP (PPP*) (2008)

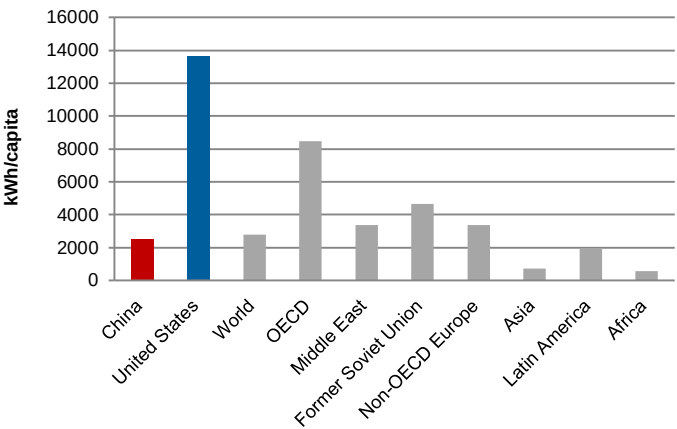


*Purchasing Power Parity

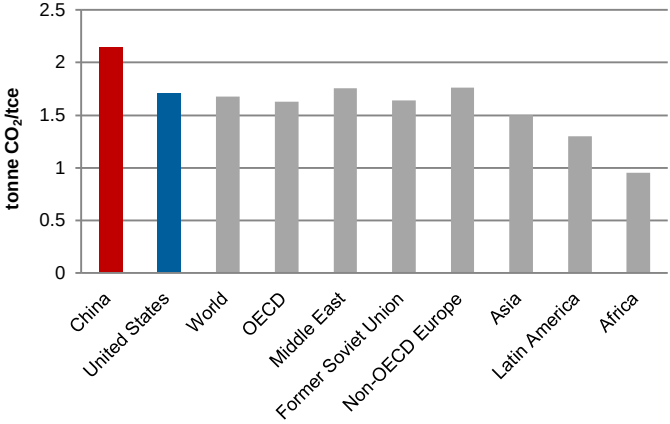
Total Primary Energy Production per Capita (2008)



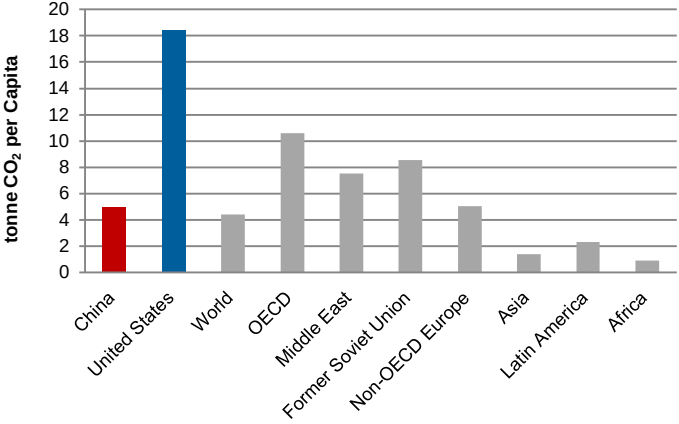
Electricity Consumption per Capita (2008)



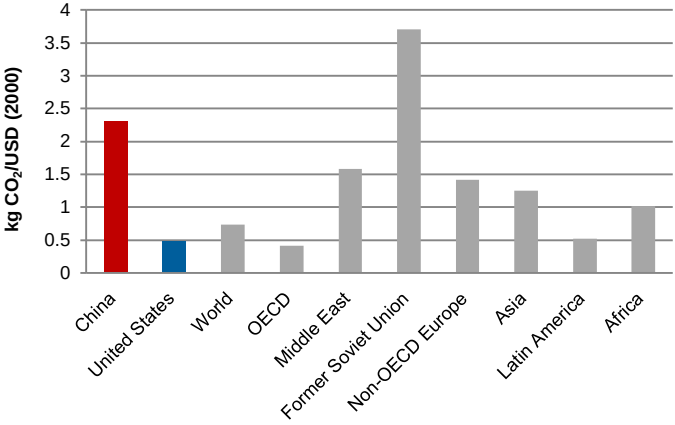
Energy-Related CO_2 Emissions per Total Primary Energy Supply (2008)



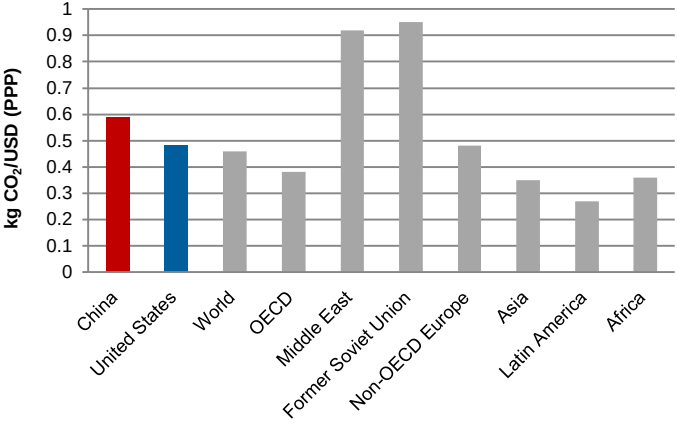
Energy-Related CO_2 Emissions per Capita (2008)



Energy-Related CO_2 Emissions per GDP (2008)



Energy-Related CO_2 Emissions per GDP (PPP*) (2008)



* Purchasing Power Parity

Appendix 1 – Table of Abbreviations

Abbreviation	Full Form
AAGR	average annual growth rate
bm^3	billion cubic meters
bm^3/yr	billion cubic meters/year
kgce	kilogram of coal equivalent
kgce/cap	kilogram of coal equivalent/capita
kWh	kilowatt-hours
kWh/cap	kilowatt-hour/capita
Mt	million tonnes
Mt/yr	million tonnes/year
Mtce	million tonnes of coal equivalent
Mtce/yr	million tonnes of coal equivalent/year
MWh	megawatt-hours
MWh/t	megawatt-hour/tonne
MWh/yr	megawatt-hour/year
RMB	renminbi (Chinese currency)
RMB/kWh	renminbi/kilowatt-hour
RMB/m^3	renminbi/cubic meter
RMB/tce	renminbi/tonnes of coal equivalent
tce	tonnes of coal equivalent
TWh	terawatt-hours

Glossary

Coal	Coal includes both primary (raw coal, cleaned coal, washed coal, briquettes) and derived fuels (coke, coke oven gas, and other coking products).
Crude Oil	Crude oil includes crude oil, natural gas liquids, refinery feedstock, additives and other hydrocarbon.
Petroleum Products	Petroleum products include gasoline, kerosene, diesel oil, fuel oil, LPG, refinery gas and other petroleum products.
Gas	Gas includes natural gas.
Nuclear	Nuclear shows the primary heat equivalent of the electricity produced by a nuclear power plant.
Hydro	Hydro shows the energy content of the electricity produced by a hydro power plant.
Indigenous Production	Indigenous production is the production of primary energy.
International Marine Bunkers	International marine bunker cover those quantities delivered to sea-going ships of all flags, including warships.
OECD	Organization for Economic Co-operation and Development, which includes 34 member countries.
Region – East	The east region of China is defined to include provinces of Anhui, Fujian, Jiangsu, Jiangxi, Shandong and Zhejiang.
Region – West	The east region of China is defined to include cities and provinces of Gansu, Ningxia, Qinghai, Shaanxi, Xinjiang, Chongqing, Guizhou, Sichuan, Tibet and Yunnan.
Region – North	The south region of China is defined to include cities and provinces of Beijing, Hebei, Inner Mongolia, Shanxi, Heilongjiang, Jilin and Liaoning.
Region – South	The south region of China is defined to include provinces of Guangdong, Guangxi, Hainan, Henan, Hubei and Hunan.
Stock Changes	Stock changes reflect the difference between opening stock levels on the first day of the year and closing levels of the last day of the year of stocks on national territory held by producers, importers, energy transformation industries and large consumers.
Total Primary Energy Supply	Total primary energy supply equals to the total of indigenous production and imports, and minus exports and international marine bunkers and add the stock changes.
Transfer	Transformation includes both interproduct transfer and products transfer.
Statistical Differences	Statistical differences is a category that includes the sum of unexplained statistical differences for individual fuels.
Distribution and Transmission Losses	Distribution and transmission losses are losses in gas distribution, electricity transmission and coal transport.
Total Final Consumption	Total final consumption is the sum of consumption by end-use sectors. Electricity is converted to primary energy, at 0.404 kgce/kWh.

Appendix 2 – Conversion Factors from Physical Unit to Coal Equivalent

For this energy form...	1 unit of	equals in Mtce
Coal Total	Mt	0.714
Raw Coal	Mt	0.714
Cleaned Coal	Mt	0.9
Other Washed Coal	Mt	0.525
Briquettes	Mt	0.6
Coke	Mt	0.971
Coke Oven Gas	Billion m^3	0.593
Other Gas	Billion m^3	0.288
Other Coking Products	Mt	1.107
Petroleum Products	Mt	1.43
Crude Oil	Mt	1.429
Gasoline	Mt	1.471
Kerosene	Mt	1.471
Diesel Oil	Mt	1.457
Fuel Oil	Mt	1.429
LPG	Mt	1.714
Refinery Gas	Mt	1.571
Other Petroleum Products	Mt	1.31
Natural Gas	Billion m^3	1.33
Heat	TJ	3.4×10^{-5}
Heat	PJ	0.034
Primary Electricity (source)*	TWh	0.404
Primary Electricity (source)*	GWh	4.04×10^{-4}
Primary Electricity (site)*	TWh	0.123
Primary Electricity (site)*	GWh	1.23×10^{-4}
Thermal Power	TWh	0.404
Thermal Power	GWh	4.04×10^{-4}
Total Power	TWh	0.404
Total Power	GWh	4.04×10^{-4}
Other Energy	Mt	1
Fuelwood	Mt	0.571
Crop Residues	Mt	0.43
Dried Dung	Mt	0.471

* In aggregate energy accounts, electricity can be counted two ways, i.e., as the energy content of electricity at the point of end use (site value), or as the energy value of the fuel needed to generate and deliver a given amount of electricity to the point of end-use (replacement or primary energy value). Unless otherwise noted, Chinese energy accounts typically convert electricity at its primary value, since most is generated by coal-fired plants.

Appendix 3: Energy Balance/China 2009

Mtce					
	Total Coal	**Coal Raw**	**Washed Coal**	**Other Washed Coal**	**Coal Briquettes**
Total Primary Energy Supply	**2,151.17**	**2,153.63**	**3.70**	**(3.94)**	**(0.04)**
Indigenous Production	2,122.72	2,122.72			
Indigenous Production - Hydro Power					
Indigenous Production - Nuclear Power					
Recovery of Energy					
Import	89.85	75.23	14.78	2.13	
Chinese Vessels Refueling Abroad					
Export	(15.99)	(15.50)	(0.57)	(0.00)	(0.03)
Foreign Vessels Refueling in China					
Stock Change	(45.41)	(28.82)	(10.50)	(6.07)	(0.01)
Total Transformation	**(1,514.63)**	**(1,599.39)**	**24.54**	**42.07**	**6.80**
Thermal Power	(1,027.93)	(1,003.98)	(0.15)	(17.52)	
Heating Supply	(109.67)	(105.24)	(0.03)	(3.24)	
Coal Washing	(55.45)	(446.73)	374.81	69.07	
Coking	(311.96)	(37.84)	(344.74)	(0.46)	
Petroleum Refineries					
Gas Works	(8.22)	(3.97)	(5.35)		
Gas Works - Coke input					
Briquettes	(1.41)	(1.63)		(5.78)	6.80
Losses in Transformation					
Total Consumption	**597.62**	**518.28**	**26.34**	**37.58**	**6.16**
Agriculture	11.30	11.05		0.18	
Industry	483.78	417.27	26.25	31.42	2.48
Industry - NonEnergy Use	30.70	27.71	1.35	1.32	0.10
Construction	4.54	4.47	0.01	0.05	
Transportation, Telecommunications, Postal	4.58	4.40	0.08	0.08	
Wholesale, Retail Trade, and Catering Service	14.12	13.70		0.17	0.16
Other	14.18	13.06		0.77	0.06
Residential consumption	65.13	54.33		4.91	3.47
Residential consumption - Rural	49.73	42.53		3.23	2.35
Residential consumption - Urban	15.40	11.79		1.68	1.12
Statistical Difference	**38.92**	**35.95**	**1.89**	**0.55**	**0.60**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009 (cont'd)

Mtce	Coke	Coke Oven Gas	Coal Gas not Coke Source	Coke Other Products	Total Petroleum
Total Primary Energy Supply	**(22.17)**		**65.06**	**1.58**	**550.02**
Indigenous Production					270.97
Indigenous Production - Hydro Power					
Indigenous Production - Nuclear Power					
Recovery of Energy			65.06		
Import	0.15			2.08	359.41
Chinese Vessels Refueling Abroad					7.27
Export	(0.53)			(0.50)	(47.14)
Foreign Vessels Refueling in China					(8.86)
Stock Change	(21.79)				(31.63)
Total Transformation	**330.95**	**30.62**	**(0.09)**	**7.44**	**(35.83)**
Thermal Power		(5.24)	(3.16)		(7.17)
Heating Supply		(0.99)	(1.32)		(5.48)
Coal Washing					
Coking	330.24	35.74	0.20	7.14	
Petroleum Refineries					(23.18)
Gas Works	2.27	1.12	4.19	0.40	(0.00)
Gas Works - Coke input	(1.56)			(0.10)	
Briquettes					
Losses in Transformation					**2.70**
Total Consumption	**307.71**	**30.21**	**64.95**	**8.94**	**510.37**
Agriculture	0.43				18.71
Industry	306.67	27.71	60.89	8.94	188.10
Industry - NonEnergy Use	12.27	0.28		2.06	56.73
Construction	0.06				27.77
Transportation, Telecommunications, Postal	0.00		0.01		191.52
Wholesale, Retail Trade, and Catering Service	0.04	0.05	0.39		6.14
Other	0.03	0.14			32.84
Residential consumption	0.47	2.32	3.67		45.29
Residential consumption - Rural	0.19		0.04		11.82
Residential consumption - Urban	0.29	2.32	3.62		33.46
Statistical Difference	**1.08**	**0.41**	**0.02**	**0.08**	**1.12**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009 (cont'd)

Mtce					
	Crude Oil	**Gasoline**	**Kerosene**	**Diesel Oil**	**Fuel Oil**
Total Primary Energy Supply	**544.88**	**(16.75)**	**(0.47)**	**(7.58)**	**21.09**
Indigenous Production	270.78				
Indigenous Production - Hydro Power					
Indigenous Production - Nuclear Power					
Recovery of Energy					
Import	291.02	0.07	9.00	2.68	34.40
Chinese Vessels Refueling Abroad			2.70	0.13	4.53
Export	(7.25)	(7.24)	(8.74)	(6.57)	(12.32)
Foreign Vessels Refueling in China			(3.41)	(0.41)	(5.14)
Stock Change	(9.67)	(9.58)	(0.02)	(3.41)	(0.36)
Total Transformation	**(530.38)**	**107.69**	**21.78**	**205.97**	**15.14**
Thermal Power	(0.06)	(0.00)		(2.21)	(2.76)
Heating Supply	(0.03)				(1.44)
Coal Washing					
Coking					
Petroleum Refineries	(530.29)	107.69	21.78	208.18	19.34
Gas Works					(0.00)
Gas Works - Coke input					
Briquettes					
Losses in Transformation	**2.67**				
Total Consumption	**11.81**	**90.80**	**21.17**	**198.22**	**36.21**
Agriculture		2.47	0.01	16.52	0.02
Industry	11.81	9.87	0.47	32.01	17.54
Industry - NonEnergy Use	1.57	0.32	0.06	0.60	1.05
Construction		3.46	0.15	6.05	0.49
Transportation, Telecommunications, Postal		42.39	19.33	114.99	17.87
Wholesale, Retail Trade, and Catering Service		2.17	0.43	2.65	0.12
Other		15.74	0.50	16.49	0.18
Residential consumption		14.70	0.28	9.51	
Residential consumption - Rural		4.34	0.26	2.36	
Residential consumption - Urban		10.35	0.02	7.16	
Statistical Difference	**0.03**	**0.13**	**0.13**	**0.17**	**0.02**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009 (cont'd)

Mtce				
	Liquid Petroleum Gas	Refinery Gas	Petroleum Other Products	Natural Gas
Total Primary Energy Supply	**5.59**		**2.90**	**119.29**
Indigenous Production				113.41
Indigenous Production - Hydro Power				
Indigenous Production - Nuclear Power				
Recovery of Energy				
Import	6.99		15.11	10.15
Chinese Vessels Refueling Abroad				
Export	(1.46)		(4.00)	(4.27)
Foreign Vessels Refueling in China				
Stock Change	0.05		(8.20)	
Total Transformation	**31.38**	**15.06**	**102.49**	**(21.68)**
Thermal Power		(0.80)	(1.33)	(17.85)
Heating Supply	(0.02)	(3.01)	(1.15)	(3.42)
Coal Washing				
Coking				
Petroleum Refineries	31.40	18.87	104.97	
Gas Works				(0.41)
Gas Works - Coke input				
Briquettes				
Losses in Transformation	**0.03**			**2.89**
Total Consumption	**36.85**	**14.65**	**105.20**	**94.49**
Agriculture	0.07			
Industry	8.18	14.65	88.95	53.56
Industry - NonEnergy Use	0.89	0.13	47.90	13.39
Construction	0.11		16.25	0.13
Transportation, Telecommunications, Postal	0.94			10.84
Wholesale, Retail Trade, and Catering Service	1.08			3.19
Other	0.83			3.14
Residential consumption	25.64			23.63
Residential consumption - Rural	6.04			0.08
Residential consumption - Urban	19.60			23.55
Statistical Difference	**0.08**	**0.41**	**0.20**	**0.23**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009 (cont'd)

Mtce				
	Electricity	**Heat**	**Other Energy**	**Total Energy**
Total Primary Energy Supply	**291.08**		**11.31**	**3,167.34**
Indigenous Production	295.68			2,802.78
Indigenous Production - Hydro Power	248.72			248.72
Indigenous Production - Nuclear Power	28.33			28.33
Recovery of Energy			11.31	76.37
Import	2.43			464.07
Chinese Vessels Refueling Abroad				7.27
Export	(7.02)			(75.46)
Foreign Vessels Refueling in China				(8.86)
Stock Change				(98.84)
Total Transformation	**1,205.04**	**90.69**	**(6.04)**	**86.48**
Thermal Power	1,205.04		(3.78)	139.91
Heating Supply		90.69	(2.22)	(32.41)
Coal Washing				(55.45)
Coking				61.36
Petroleum Refineries			(0.03)	(23.22)
Gas Works				(0.65)
Gas Works - Coke input				(1.65)
Briquettes				(1.41)
Losses in Transformation	**91.23**	**1.08**		**97.90**
Total Consumption	**1,404.87**	**89.61**	**5.20**	**3,113.97**
Agriculture	37.97	0.03		68.44
Industry	993.69	62.52	5.20	2,191.06
Industry - NonEnergy Use			0.40	115.81
Construction	17.04	0.22		49.76
Transportation, Telecommunications, Postal	24.93	0.51		232.38
Wholesale, Retail Trade, and Catering Service	45.93	1.16		71.01
Other	88.47	2.41		141.21
Residential consumption	196.84	22.78		360.12
Residential consumption - Rural	82.42			144.29
Residential consumption - Urban	114.41	22.78		215.83
Statistical Difference	**0.02**	**0.00**	**0.07**	**41.94**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009

Physical Quantity					
	Total Coal	Coal Raw	Washed Coal	Other Washed Coal	Coal Briquettes
	Mt	Mt	Mt	Mt	Mt
Total Primary Energy Supply	**3,012.84**	**3,016.29**	**4.11**	**(7.50)**	**(0.06)**
Indigenous Production	2,973.00	2,973.00			
Indigenous Production - Hydro Power					
Indigenous Production - Nuclear Power					
Recovery of Energy					
Import	125.84	105.36	16.42	4.06	
Chinese Vessels Refueling Abroad					
Export	(22.40)	(21.71)	(0.64)	(0.01)	(0.05)
Foreign Vessels Refueling in China					
Stock Change	(63.61)	(40.37)	(11.67)	(11.55)	(0.01)
Total Transformation	**2,121.33)**	**(2,240.05)**	**27.27**	**80.13**	**11.33**
Thermal Power	(1,439.67)	(1,406.13)	(0.17)	(33.37)	
Heating Supply	(153.60)	(147.39)	(0.03)	(6.17)	
Coal Washing	(77.66)	(625.68)	416.46	131.56	
Coking	(436.92)	(53.00)	(383.04)	(0.88)	
Petroleum Refineries					
Gas Works	(11.51)	(5.56)	(5.95)		
Gas Works - Coke input					
Briquettes	(1.98)	(2.29)		(11.02)	11.33
Losses in Transformation					
Total Consumption	**837.00**	**725.88**	**29.27**	**71.59**	**10.26**
Agriculture	15.82	15.48		0.35	
Industry	677.56	584.41	29.17	59.86	4.13
Industry - NonEnergy Use	42.99	38.80	1.50	2.51	0.17
Construction	6.36	6.26	0.01	0.09	
Transportation, Telecommunications, Postal	6.41	6.17	0.09	0.15	
Wholesale, Retail Trade, and Catering Service	19.78	19.19		0.33	0.26
Residential consumption	91.22	76.09		9.35	5.78
Residential consumption - Rural	69.66	59.57		6.15	3.92
Residential consumption - Urban	21.56	16.51		3.20	1.86
Other	19.86	18.29		1.48	0.10
Statistical Difference	**54.51**	**50.36**	**2.10**	**1.04**	**1.00**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009 (cont'd)

Physical Quantity					
	Coke	Coke Oven Gas	Coal Gas not Coke Source	Coke Other Products	Total Petroleum
	Mt	bm³	bm³	Mt	Mt
Total Primary Energy Supply	**(22.83)**		**225.89**	**1.43**	**384.63**
Indigenous Production					189.49
Indigenous Production - Hydro Power					
Indigenous Production - Nuclear Power					
Recovery of Energy			225.89		
Import	0.16			1.88	251.34
Chinese Vessels Refueling Abroad					5.09
Export	(0.55)			(0.45)	(32.97)
Foreign Vessels Refueling in China					(6.20)
Stock Change	(22.44)				(22.12)
Total Transformation	**340.84**	**51.64**	**(0.30)**	**6.72**	**(25.06)**
Thermal Power		(8.84)	(10.96)		(5.01)
Heating Supply		(1.67)	(4.60)		(3.83)
Coal Washing					
Coking	340.10	60.27	0.70	6.45	
Petroleum Refineries					(16.21)
Gas Works	2.34	1.88	14.56	0.36	(0.00)
Gas Works - Coke input	(1.60)			(0.09)	
Briquettes					
Losses in Transformation					**1.89**
Total Consumption	**316.90**	**50.95**	**225.52**	**8.08**	**356.90**
Agriculture	0.45				13.08
Industry	315.83	46.72	211.42	8.08	131.54
Industry - NonEnergy Use	12.63	0.47		1.86	39.67
Construction	0.06				19.42
Transportation, Telecommunications, Postal	0.00		0.03		133.93
Wholesale, Retail Trade, and Catering Service	0.04	0.09	1.34		4.30
Residential consumption	0.49	3.91	12.73		31.67
Residential consumption - Rural	0.19		0.15		8.27
Residential consumption - Urban	0.30	3.91	12.58		23.40
Other	0.03	0.23			22.96
Statistical Difference	**1.11**	**0.69**	**0.07**	**0.07**	**0.78**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009 (cont'd)

Physical Quantity					
	Crude Oil	**Gasoline**	**Kerosene**	**Diesel Oil**	**Fuel Oil**
	Mt	**Mt**	**Mt**	**Mt**	**Mt**
Total Primary Energy Supply	**381.31**	**(11.39)**	**(0.32)**	**(5.21)**	**14.76**
Indigenous Production	189.49				
Indigenous Production - Hydro Power					
Indigenous Production - Nuclear Power					
Recovery of Energy					
Import	203.65	0.04	6.12	1.84	24.07
Chinese Vessels Refueling Abroad			1.83	0.09	3.17
Export	(5.07)	(4.92)	(5.94)	(4.51)	(8.62)
Foreign Vessels Refueling in China			(2.32)	(0.28)	(3.60)
Stock Change	(6.77)	(6.51)	(0.01)	(2.34)	(0.26)
Total Transformation	**(371.16)**	**73.21**	**14.80**	**141.37**	**10.59**
Thermal Power	(0.04)	(0.00)		(1.52)	(1.93)
Heating Supply	(0.02)				(1.01)
Coal Washing					
Coking					
Petroleum Refineries	(371.09)	73.21	14.80	142.89	13.53
Gas Works					(0.00)
Gas Works - Coke input					
Briquettes					
Losses in Transformation	**1.87**				
Total Consumption	**8.26**	**61.73**	**14.39**	**136.05**	**25.34**
Agriculture		1.68	0.01	11.34	0.01
Industry	8.26	6.71	0.32	21.97	12.27
Industry - NonEnergy Use	1.10	0.22	0.04	0.42	0.74
Construction		2.35	0.10	4.15	0.34
Transportation, Telecommunications, Postal		28.82	13.14	78.92	12.51
Wholesale, Retail Trade, and Catering Service		1.48	0.29	1.82	0.08
Residential consumption		9.99	0.19	6.53	
Residential consumption - Rural		2.95	0.18	1.62	
Residential consumption - Urban		7.04	0.02	4.91	
Other		10.70	0.34	11.32	0.12
Statistical Difference	**0.02**	**0.09**	**0.09**	**0.11**	**0.02**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009 (cont'd)

Physical Quantity				
	Liquid Petroleum Gas	Refinery Gas	Petroleum Other Products	Natural Gas
	Mt	Mt	Mt	bm^3
Total Primary Energy Supply	**3.26**		**2.22**	**89.69**
Indigenous Production				85.27
Indigenous Production - Hydro Power				
Indigenous Production - Nuclear Power				
Recovery of Energy				
Import	4.08		11.53	7.63
Chinese Vessels Refueling Abroad				
Export	(0.85)		(3.05)	(3.21)
Foreign Vessels Refueling in China				
Stock Change	0.03		(6.26)	
Total Transformation	**18.31**	**9.59**	**78.24**	**(16.30)**
Thermal Power		(0.51)	(1.01)	(13.42)
Heating Supply	(0.01)	(1.92)	(0.88)	(2.57)
Coal Washing				
Coking				
Petroleum Refineries	18.32	12.01	80.13	
Gas Works				(0.31)
Gas Works - Coke input				
Briquettes				
Losses in Transformation	**0.02**			**2.18**
Total Consumption	**21.50**	**9.33**	**80.30**	**71.04**
Agriculture	0.04			
Industry	4.77	9.33	67.90	40.27
Industry - NonEnergy Use	0.52	0.08	36.56	10.07
Construction	0.07		12.40	0.10
Transportation, Telecommunications, Postal	0.55			8.15
Wholesale, Retail Trade, and Catering Service	0.63			2.40
Residential consumption	14.96			17.77
Residential consumption - Rural	3.52			0.06
Residential consumption - Urban	11.43			17.71
Other	0.49			2.36
Statistical Difference	**0.05**	**0.26**	**0.15**	**0.17**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 3: Energy Balance/China 2009 (cont'd)

Physical Quantity				
	Electricity	Heat	Other Energy	Total Energy
	TWh	PJ	Mtce	Mtce
Total Primary Energy Supply	**720.49**		**11.31**	**3,167.34**
Indigenous Production	731.87			2,802.78
Indigenous Production - Hydro Power	615.64			248.72
Indigenous Production - Nuclear Power	70.13			28.33
Recovery of Energy			11.31	76.37
Import	6.01			464.07
Chinese Vessels Refueling Abroad				7.27
Export	(17.39)			(75.46)
Foreign Vessels Refueling in China				(8.86)
Stock Change				(98.84)
Total Transformation	**2,982.78**	**2,667.48**	**(6.04)**	**86.48**
Thermal Power	2,982.78		(3.78)	139.91
Heating Supply		2,667.48	(2.22)	(32.41)
Coal Washing				(55.45)
Coking				61.36
Petroleum Refineries			(0.03)	(23.22)
Gas Works				(0.65)
Gas Works - Coke input				(1.65)
Briquettes				(1.41)
Losses in Transformation	**225.82**	**31.69**		**97.90**
Total Consumption	**3,477.39**	**2,635.73**	**5.20**	**3,113.97**
Agriculture	93.99	0.83		68.44
Industry	2,459.63	1,838.74	5.20	2,191.06
Industry - NonEnergy Use			0.40	115.81
Construction	42.19	6.42		49.76
Transportation, Telecommunications, Postal	61.70	14.89		232.38
Wholesale, Retail Trade, and Catering Service	113.68	34.02		71.01
Residential consumption	487.22	670.00		360.12
Residential consumption - Rural	204.02			144.29
Residential consumption - Urban	283.20	670.00		215.83
Other	218.99	70.83		141.21
Statistical Difference	**0.06**	**0.06**	**0.07**	**41.94**

Source: National Bureau of Statistics (NBS), China Energy Statistical Yearbook, 2010

Appendix 4: Data Sources

1. Supply

United Nations. *United Nations Commodity Trade Statistics Database*. New York: United Nations.

National Bureau of Statistics of the People's Republic of China, various years. *China Energy Statistical Yearbook*. Beijing: China Statistics Press.

2. Transformation

National Bureau of Statistics of the People's Republic of China, various years. *China Energy Statistical Yearbook*. Beijing: China Statistics Press.

3. Consumption

National Bureau of Statistics of the People's Republic of China, various years. *China Energy Statistical Yearbook*. Beijing: China Statistics Press.

4. Prices

Department of Price, National Development and Reform Commission, China.

State Electricity Regulatory Commission of the People's Republic of China, various years. *Annual Report of Electricity Regulation*. Beijing: State Electricity Regulatory Commission.

Energy Information Administration, United States. *International Energy Statistics*.

Ni, C. 2009. *China Energy Primer*. Berkeley, CA: Lawrence Berkeley National Laboratory (LBNL-2860E).

Appendix 4: Data Sources

5. Emissions

National Bureau of Statistics of the People's Republic of China, various years. *China Energy Statistical Yearbook*. Beijing: China Statistics Press.

National Bureau of Statistics of the People's Republic of China, various years. *China Statistical Yearbook*. Beijing: China Statistics Press.

Intergovernmental Panel on Climate Change (IPCC), 1996. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual (Volume 3).*

6. Analysis

Zhou, N., and J. Lin. 2008. "The Reality and Future Scenarios of Commercial Building Energy Consumption in China." Energy and Buildings, Volume 40 (12), June: 2121-2127.

LBNL adjustment. Berkeley, CA: Lawrence Berkeley National Laboratory.

7. Economic and Demographic Indicators

National Bureau of Statistics of the People's Republic of China, various years. *China Statistical Yearbook*. Beijing: China Statistics Press.

8. International Comparison

International Energy Agency (IEA). 2010. *Key World Energy Statistics* 2009. Paris, France: IEA.

Appendices:

National Bureau of Statistics of the People's Republic of China, 2011. *2010 China Energy Statistical Yearbook*. Beijing: China Statistics Press.

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China Energy Group

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