

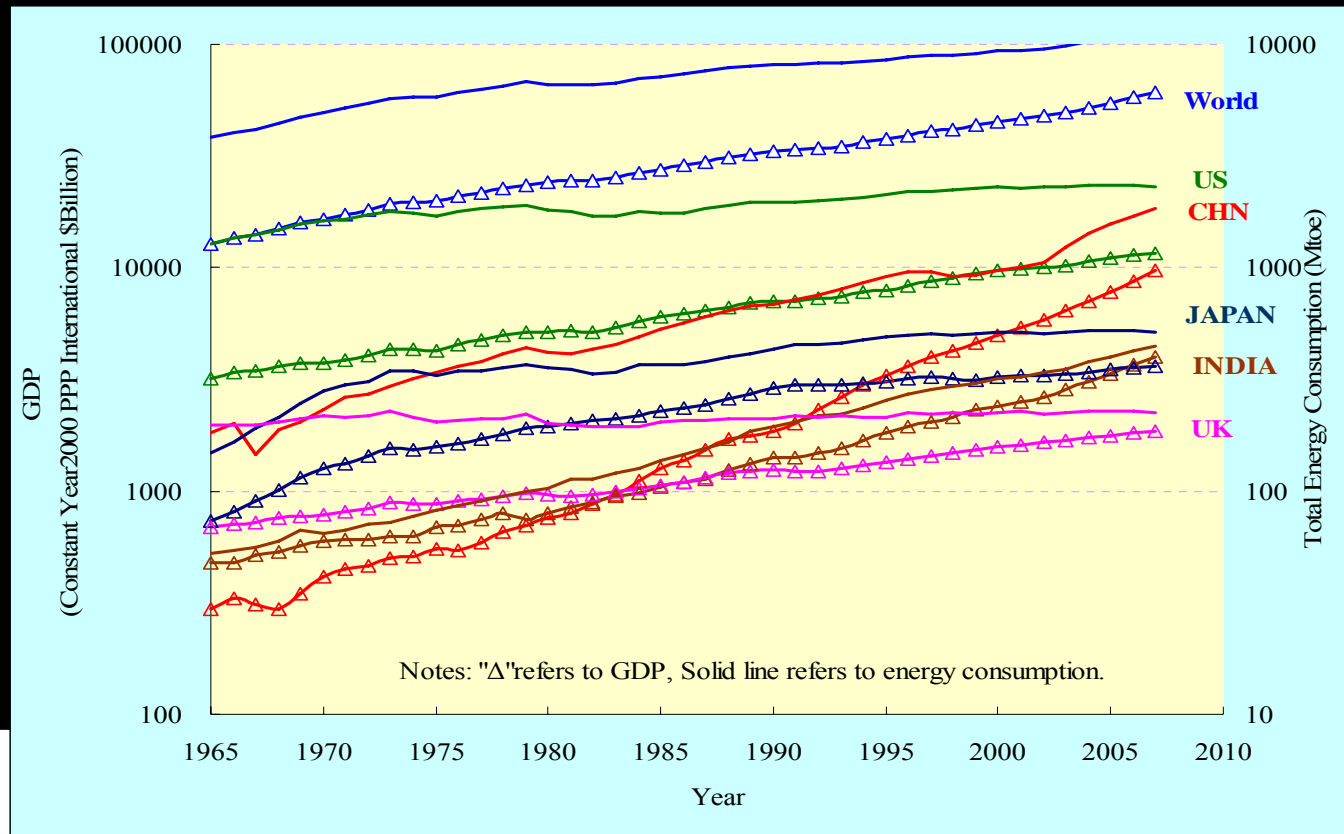
China's CCS-related Policies and public acceptance

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- **General energy plan**
- **Climate change policy in China**
- **China's energy policy**
- **History of China energy management**
- **Administrative departments**

Relationship between energy consumption and GDP of major countries (1965-2007)

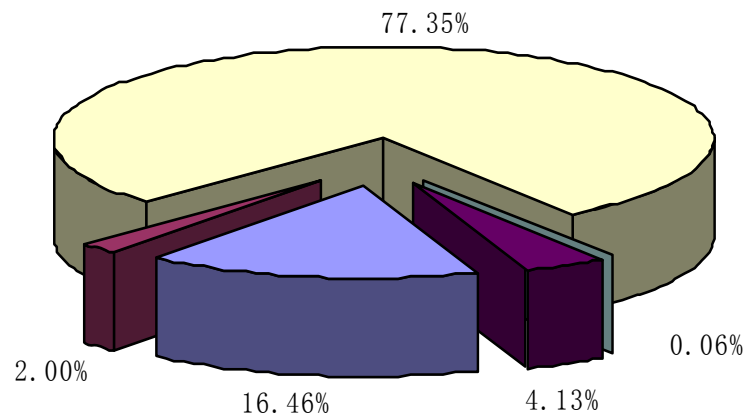


Sources: BP(2007), World Bank (2007) and CEEP's calculations.

General China energy plan

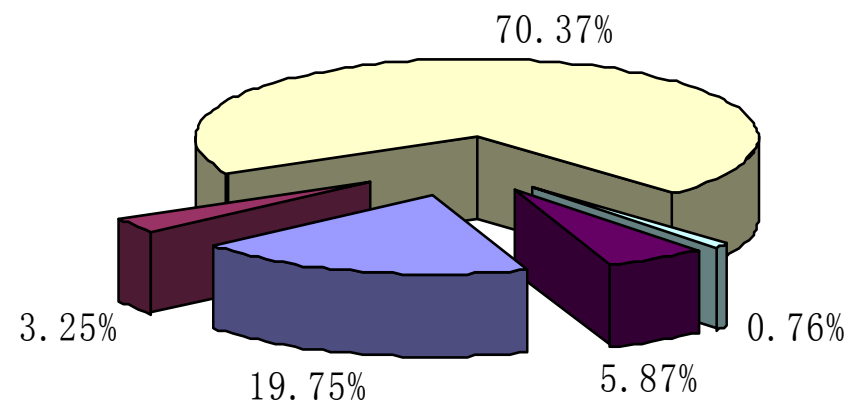
Coal-dominated energy consumption

Primary energy consumption 1990



oil natural gas coal nuclear energy hydro electricity

Primary energy consumption 2007



oil natural gas coal nuclear energy hydro electricity

General China energy plan

The Eleventh five year plan

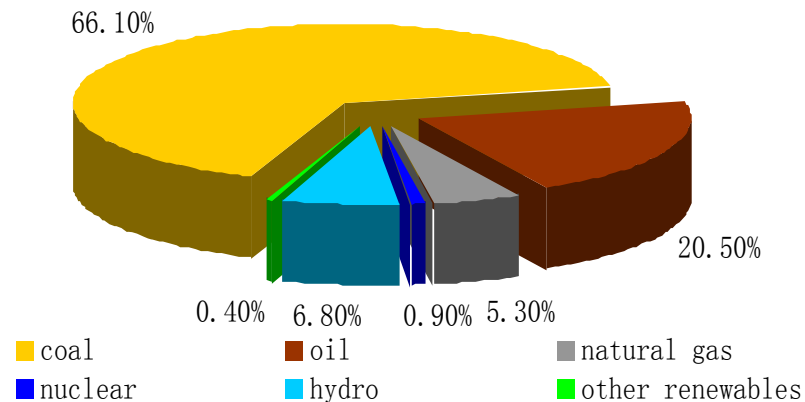
- ◉ Previously always set growth target for output from 1st to 10th five-year plan
- ◉ For the first time, include an input indicator as a constraint – requiring that energy use per unit of GDP is cut by 20% (4.4% cut per year)
- ◉ CO₂ reduction 3.6 hundred million

General China energy plan

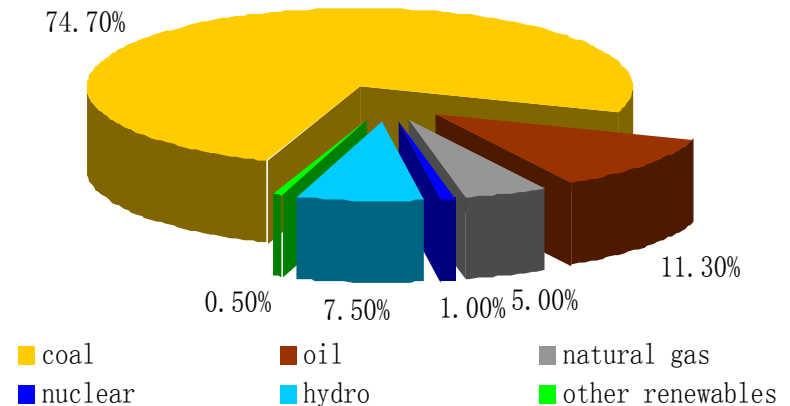
Gross goal of Primary energy to 2010:

- Consumption: 2.7 billion tce; Annual growth rate 4%
- Production: 2.45 billion tce; Annual growth rate 3.5%

Primary energy consumption, 2010



Primary energy production, 2010



General China energy plan

Pivot energy technology in the 11th five year plan

| | | |
|--|-------------------|--|
| Exploration and Development | Applicable | High efficient coal mining; exploration of oil and gas in complex geological condition; marine oil and gas exploration; coalbed methane exploration |
| Clean Coal | Applicable | Coal washing and selection; clean and high efficient power generation; Coal-based liquid fuels and chemical technology |
| Nuclear Power | Applicable | Million kilowatts class advanced pressurized water reactor nuclear power technology |
| Extra Large Scale Power Transmission and Distribution | Applicable | Flexible transmission; High-voltage transmission; Intermittent power grid; Power Quality Monitoring and Control; safety and security of large-scale power grids and scheduling automation technology of power grids |
| Renewable Energy | Applicable | Large-scale wind power unit; Agriculture, forestry, biomass power generation biogas power generation; fuel ethanol; Biodiesel; solid biomass formed fuel; Development and utilization of solar energy and other key technologies |
| Hydrogen Power and Battery | Advanced | High efficient low-cost fossil energy; Hydrogen production with renewable energy; Cost-effective hydrogen storage and distribution; fuel battery |
| Distributed Power Generation | Advanced | Micro and small gas turbine; new thermal energy cycle; terminal energy conversion, storage, thermoelectric cooling system integrated technology |
| Future Nuclear Power | Advanced | HTR and fast neutron breeder reactors, nuclear fusion reactor technology |

General China energy plan

Plan for Coal

Set up modern large coal mining bases

Support large coal enterprises and groups

Adjust and regulate small coal mines

Eliminate lagged productivities

Cut down the supply, adjust the demand-supply
relationship

Provide development potential for new productivity

General China energy plan

Plan for
Power

Still attentive on power development

Increasing investment in transmission network

Increasing demand on efficient power equipment

Institutional reform will bring opportunities

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Climate change policy of China

- **Guidelines:**

- Save resources; Protect environment;
- Control emissions; Improve adaptation capacity;
- Balance development

- **Gross goals**

- Control GHG emissions
- Improve adaptation capacity
- Enhance science and technology R&D
- Improve public awareness and management

Climate change policy of China

Pivot fields of coping climate change

- **Emission reduction**
 - Energy production and conversion
 - Improve energy efficiency and save energy
 - Industry processes
 - Agriculture
 - Forestry
 - Urban wastes
- **Priority industry**
 - Agriculture
 - Forestry and ecosystem
 - Water resource
 - Coastal area

Climate change policy of China

R&D

- **Improve monitoring system**
 - Monitoring technology
 - Emission reduction technology
 - Adaptation technology
- **Improve the capacity of coping climate change and implementation convention**
 - Big scale accurate monitoring technology
 - Clear energy and efficiency improvement technology
 - GHG emission control, treatment and reuse technology
 - Biological Carbon fixed technology

Climate change policy of China

Requirement in international cooperation

- **Technology transfer and cooperation**

- Observation and monitoring
- Emission reduction
- Adaptation

- **Capacity building**

- human resource
- Adaptation capacity
- Public awareness
- Information management
- Publicity mechanism

Climate change policy of China

| Categories | Policies and regulations | Impacts on energy saving |
|-------------------------|--|---|
| Regulations and laws | 1990.2.2 “Regulation on energy saving monitoring” | To provide a scientific basis for improving energy use and reducing pollution levels, but the implementation is not ideal |
| | 1991.3.2 “Regulation on enterprises classing in energy saving” | Hard to meet the requirements of the market mechanism and not conducive to the development of enterprises and the energy-saving behaviors of enterprises |
| | 1996.11.4 “Measures on retrofit of energy saving technology” | Raising the technological level, energy efficiency and economic benefits of technological transformation projects can improve the environment. |
| | 1997.11 “Energy saving law” | Strengthen the comprehensive management of energy-saving legal system, improve energy efficiency and economic benefits, reduce environmental pollution. |
| | 1987. 3. 30 “Regulations on further strengthen energy saving” | Conservation of electricity and coal can ease the contradiction between supply and demand and improve the environment |
| | 1996.4.17 “Ordinance of power supply and usage” | Strengthening the management for legal system can improve the economic efficiency of electricity use and ease the contradiction between supply and demand. |
| Regulations on products | 1997.12.19 “Regulation on the assessment on energy saving measures in fixed assets investment” | Strengthening the management for new energy-saving projects can improve energy efficiency, economic efficiency and reduce environmental pollution. But it ’s difficult to implement fully in place. |
| | 1999.2.11 “Management measures on the authorization of energy saving products ” | Promoting the production and marketing of energy-saving products, but the promotion and the propaganda for certification process are not enough and the implementation scopes are limited. |
| Plans | 2006.2.9 “Program of mid- and long-term development of science and technology” | Adhere to the priority of energy conservation and reduce energy consumption |
| | 2007.4 “The 11 th five year plan for energy development” | In 2010, energy consumption for 10,000 yuan GDP (constant price in 2005) will drop to 0.98 tons standard coals from 1.22 tons standard coals in 2002. |

Climate change policy of China

- In 2007:
structure adjustment, technology advance, efficiency improvement, circular economy, pollution management, regulation and standard, associated policy, publicity
- Energy saving:
 - Energy saving and consumption reduction management
 - Regulation and standard
 - Associated policy

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Energy policy of China

Coal industry

- **Improve operation and adjust structure, aiming to:**
 - improve the ownership regulation, capital marketing
 - reduce burden of the enterprises, improve capacity of profiting
 - set up sustainable development fund
 - energy saving and efficiency improvement policy will reduce the consumption but not change the general demand-supply relation
 - encourage coal industry development, meanwhile neaten the investment and operation

Energy policy of China

Power industry

| | Contents of policies | Impacts |
|------------------------|---|--|
| Industry policy | Improve industry structure; encourage the development of high tech industry; Enhance investment in high technology | Decrease electricity elastic coefficient; Decrease demand on power |
| | The new projects no less than 300,000 kilowatt; Encourage large high-power | Increase the concentration degree; Accelerate closing of small power stations |
| | Close small fire stations; Giving priority to the development of hydro power; Speed nuclear power | Enterprises with cost and scale advantages will enlarge the market share |
| | Reduce energy consumption per unit of GDP | Demand on power will slow down with the energy saving progress |
| Price policy | Increase land prices; Marketing the coal price | Raise the access standards; increase the concentration degree |
| | High electricity price in high energy consumption enterprises; Multiple prices for civil use | Encourage controlling cost |
| | Electricity price changes following the coal price every half year to adapt the marketing of electricity | Ensure the profit margin of electricity industry |
| Tax policy | Imposition mineral resource tax; Raise the generating electricity price | Increasing fire power cost, will raise the hydro power price, and raise the profiting capacity of hydro power stations |
| | Abolish the drawback of high-energy-consume products to limit the development of high-energy industry, and improve industry structure | Reduce power demand |

Energy policy of China

Renewable energy

- **Small hydropower**
- **Wind power**
- **Solar power**
 - Solar photovoltaic
 - Solar heater
- **Biomass power (straw)**

Energy policy of China

- Energy use per unit of GDP:
Reversed a rise of 0.8% in the first half of 2006 and achieved a 1.33% cut over the entire year – a decrease for the first time since 2003

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History of China energy management

Periods of energy system

- **1949 ~ 1978 government dominant**
- **1979 ~ 1988 explore period of market economy system**
- **1989 ~ 1996 beginning of market economy system**
- **1997 ~ now developing market economy system**

History of China energy management

1949~1978 government dominant

- Centralized planed economy
- Government invested and owned
- Limited function of banks
- Government + enterprises

History of China energy management

1979~1988 explore period of market economy system

- 1980: National energy committee
- 1982: National energy committee retracted
- 1988: Oil department, power department and coal department retracted; National energy ministry set up; CNPC, SINOPEC, Coal mining company
- 1988. 6: "Reform plan for investment management"; six special invest companies set up (energy, transportation, raw material, light industry, agriculture and forestry)

History of China energy management

1979 ~ 1988 explore period of market economy system

- Power industry

1985.5: "Regulation on encouraging fund-raising and multiple electricity prices"

- coal mining industry

1983.8: measures to speed the development of small mines;

1984: two regulations on further encourage nongovernmental investment

History of China energy management

1989 ~ 1996 Beginning of market economy system

- Energy enterprises: independent accounting
- government: policy financing
- 1994.4: National Development Bank;
- Project investment: coal 94%, oil 53%, power 44%

History of China energy management

1997~now: developing market economy system

- 2004: "Decision on investment system reform"
 - Cleared the responsibilities of government and enterprises;
 - Simplified the procedure of approval, and enlarge the authority of local government;
 - More strict monitoring on investment of enterprises
- 1998.8: 94 national owned coal mines turn to local government; China national coal group, export and import company set up
- 1996: Transfer the responsibilities of government to national power company;
- 1998: The power department detracted;
- 1999: Management system reform started in provinces
- 1998: reorganization of CNPC, SINOPEC and CNOOC, departed from government

History of China energy management

1997~now: developing market economy system

- 1998: coal department and power department detracted; national bureau of coal industry, national bureau of petrochemistry set up; focus on planning and regulation
- 2001: national bureau of coal industry, national bureau of petrochemistry detracted;
- 2003: state economic and trade commission detracted. Energy bureau in National development and reform commission set up
- 2005: "energy leading group" in the state council set up ;
- 2006: launched the "Energy Law"
- 2008: State energy bureau set up

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Administrative departments

National Development and Reform Commission

- Draws out and implements industry and price policy; monitors the implementation and observes effects; decides and adjusts parts prices of energy production
- Arranges important projects
- Draws out the development plan for oil, gas, coal and power
- Manages the oil reserve
- Advances the sustainable development strategy and relative policies

Administrative departments

State energy bureau

- Energy development strategy
- Annual development plan
- Industry policy
- Suggestion on system reform
- Push the sustainable development
- International cooperation and management
- Balance development of energy enterprises
- Direct local energy development
- National oil reserve

Administrative departments

Ministry of Science and Technology

- Allocation of technology resources; management of national R&D investment
- Policy on basic research and advanced technology; Plans for basic research, high-tech research, national key R&D program, social development
- 2006: Key Basic Research Plan (973 plan)
- Research on EOR (Prof. Zheng Chuguang, Huazhong University of Science and Technology)

Administrative departments

Leading group on climate change and emission reduction

- **Draws important relative strategies and policies**
- **International cooperation and negotiation**
- **Implement relative decisions**
- **Examine important resolutions**

Administrative departments

- **Ministry of Land and Resources**
- **State Electricity Regulatory Commission**
- **State-owned Assets Supervision and Administration Commission**
- **Ministry of Environmental Protection**
- **Ministry of finance**

China's major energy company

COAL

- Shenhua group corporation, limited
- China national coal group corp.
- Datong coal mine group company



神华集团有限责任公司

SHENHUA GROUP CORPORATION, LIMITED



中国中煤能源集团公司

CHINA NATIONAL COAL GROUP CORP.



China's major energy company

OIL & GAS

- China national petroleum corporation
- China petrochemical corporation
- China national offshore oil corp.



China's major energy company

ELECTRICITY

- **Five power generation company**

- China Huaneng group
- China Datang corporation
- China Huadian corporation
- China Guodian corporation
- China power investment corporation

- **Two network company**

- State grid
- China southern power grid



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Thanks for Attention

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