CHINA

1. Overview of national energy policy

China has not enacted an integrated energy law, and there is no oil or gas law either. The overall energy sector policies and objectives were set up in the national 11th Five Year Plan, with more details in subsequent sub-policies such as the Medium-to-Long-Term Conservation Plan, etc.

The following table lists key laws and decrees relevant to the Chinese energy sector

Table 1. Relevant Decrees, Regulations, Policies and Laws Affecting the Chinese Energy Sector

Law	Purpose
11th 5-year plan (2006)	Designs the blueprint for the development in energy and energy efficiency areas. It forms the current basis for the Government's economic and social development efforts.
Medium and long-term Energy Conservation plan (MLTEC Plan) (2006)	Sets up detailed energy conservation targets in four apects and macro-management goals.
Coal Law (1996)	Rationally develop, utilize and protect the coal resources, standardize the production and marketing of coal, and promote and ensure the development of the coal industry
Construction Law (1998)	
Energy Conservation Law (1998)	Sets up detailed energy conservation targets in four aspects and macro-management goals.
Electric Power Law (1996)	Guarantee and promote the development of electric power industry, and guarantee the safe operation of electric power
Environmental Protection Law (1989)	Preventing and controlling pollution and other public hazards, safeguarding human health and facilitating the development of socialist modernization
Prevention and control of Atmospheric Pollution Law (2000)	Preventing and controlling atmospheric pollution

Cleaner Production Promotion Law (2003)	To promote cleaner production, increase resources' utilization efficiency, reduce and avoid the generation of pollutants, and protect and improve environments
Renewable Energy Law (2006)	Establishes the overall framework for the development of national renewable energy
Measures for Operation and Management of CDM Projects (2005)	China's policies, regulation and procedures for CDM are embodied in this decree
Mineral Resources Law (MRL) (1996)	Develop the mining industry, promote the exploration, development, utilization and protection of mineral resources, and ensure the socialist modernization *Energy Conservation Law* To promote energy conservation by all sectors of the society, increase the energy efficiency, ensure national economic and social development

Medium- and Long-term Energy Conservation Plan

In the year 2004, NDRC launched the MLTEC Plan, which covers 2 phases – 2005-2010 and 2010 to 2020. It sets up detailed energy conservation targets in 4 areas, as well as micromanagement goals. The four areas comprise a relatively sound system of energy conservation laws and standards, policy support systems, supervisory systems, and technical service systems. The plan requires that the four systems be compatible with China's market oriented reform and be in place by 2010. It also clearly outlines so-called 'Ten Key Energy Conservation Programmes' through which it experts to save 240 MTce in total between 2006 and 2010, about 40% of the 11th Five Year energy savings goal (per unit GDP).

Other laws and sub-laws are integrated into clean energy development (see Table 1).

2. National Programs/Policies and Targets for Renewable Energy

The following policies relate to renewable energy:

China's 11th Five Year Plan (2006-2010). This legislation was formulated in 2005 and endorsed by the National People's Congress with 2 goals:

- Achieve annual GDP growth of 7.5% with the goal of doubling 2000 GDP per capita by 2010

- Reduce energy consumption per unit of GDP by 20% as compared to 2005 levels, and the total discharge of major pollutants by 10% by 2010. The average annual energy savings rate should be 4.4%, with a total of 560 MTce saved during this period.

These energy conservation goals are mandatory for both central and local governments.

A complete policy framework has been established under the RE Law (2006). In this framework, NDRC plays a key role. It operates the national RE development planning program, and oversees the electricity tariff bidding process. Additionally, there are 12 regulations supporting the implementation of the RE law as shown below:

Table 2: Regulations and Agencies for Renewable Energy Law

Regulations	Responsible Agency
Specific Provisions on Hydro-power relevant to the RE Law	NDRC
Technological Specifications on Renewable Energy Resources Survey	NDRC
National Targets for Renewable Energy Development	NDRC
Renewable Energy Development Planning	NDRC
Renewable Energy industrial development directory	NDRC
Feed-in-Tariffs for renewable energy power	NDRC Pricing Bureau
Cost-sharing methodologies	NDRC Pricing Bureau
Special fund for renewable energy development	MOF
Fiscal support policies for renewable energy development in rural areas	MOF
Interest subsidy loans and preferential tax policies for renewable energy	MOF
Technical specifications of solar systems integrated in buildings	MOC
Technical specification for grid-connection and national standards for AQSIQ renewable energy technologies & products	AQSIQ

Renewable Energy Development Planning Programme

A draft Renewable Energy Development Scheme under the programme was completed by the office of the National Energy Leading Group in 2006 and is being reviewed and enriched by NDRC. The Scheme aims to increase the proportion of renewable energies in the national energy consumption structure to 16%, with main goals listed below:

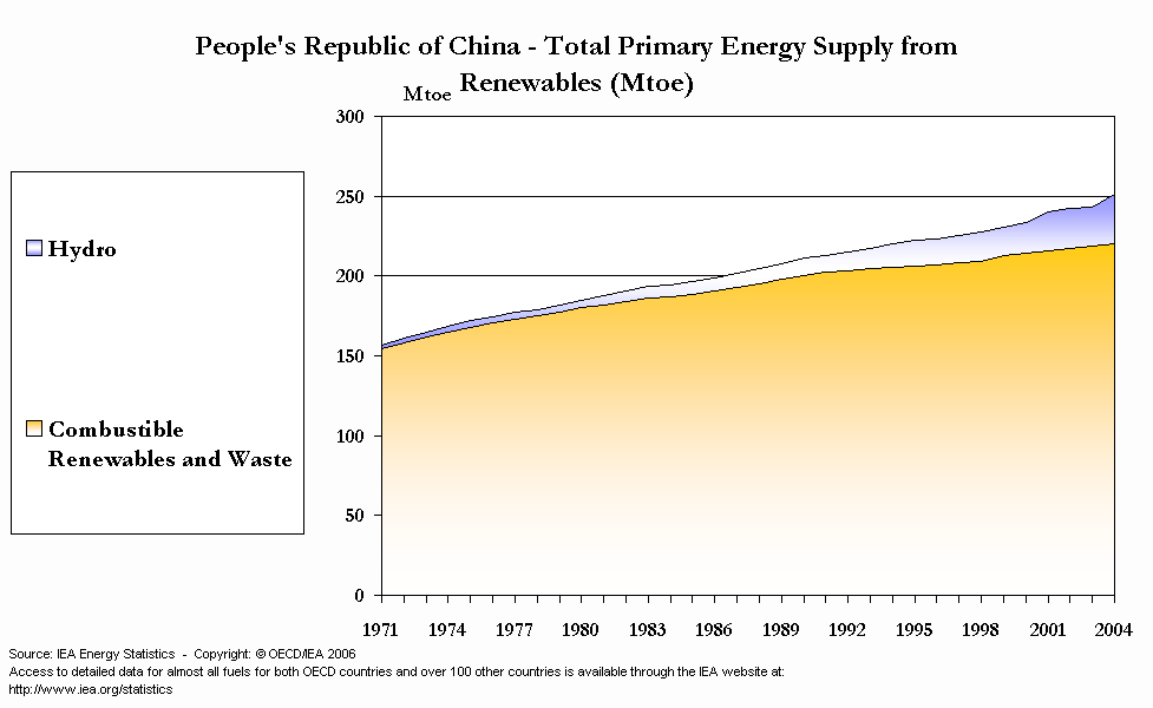
- Hydropower: installed capacity will reach 180GW in 2010, and reach 300 GW by 2020 with an overall development rate of 70%;
- Wind power: installed capacity will reach 5GW in 2010, and 30GW in 2020;

- Solar: Solar water heaters will reach 300 million square meters in 2020, replacing conventional fossil fuel of 40 Mtce; And Solar PV will reach 2GW in 2020;
- Biomass (combustion of compressed pallets): to reach 1 Mtce by 2010, and 50 Mtce by 2020;
- Biomass power capacity will reach 5GW by 2010, and 20GW by 2020;
- Biogas and biomass gasification: produce 11 billion cubic meters per year by 2010, and 24 billion cubic meters per year by 2020;

Laws governing China's energy sector are neither integrated nor comprehensive, resulting in legal barriers and inconsistencies for the further development of clean energy utilization. The Chinese Government attaches particular importance to strengthening two laws:
1) a new Energy Law.: China started to draft this law in early 2006 as the first comprehensive law governing the entire energy sector and energy-related issues. It should benefit from foreign experience in making the law enforceable and effective.
2) Amendment to Energy Conservation Law: since early 2006 China has prepared to amend the EC Law because its effect was unsatisfactory. To make the amendment more relevant and effective, training on the content of the law and subsequent regulations, rules, standards is necessary.

Renewable Energy Utilization
Currently China's renewable energy mainly consists of hydropower. In 2005, hydropower, with total installed capacity of 117 GW, generated 401 TWh of electricity, accounting for about 6%, or 129 Mtce, of China's primary energy consumption. Other renewable energies account for only a small share in the energy consumption structure. For example, as of 2005, wind power had 1,226 MW of installed capacity and generated 1.5 TWh of electricity. The share of renewables is anticipated to rise due to the introduction of the 11th Five Year Plan and MLTEC Plan. By 2020, renewable energies will supply 370 Mtce, or 10.62% of total primary energy consumption. Renewable energy development will need to focus on Grid-connected Wind Power, Small Hydro Development, Biomass development and Rural Electrification.

Renewable electricity usually has a higher cost than coal-generated electricity, resulting in a barrier to grid connection. Since the promulgation of the Renewable Energy Law in 2006, this biggest barrier against renewable energy's development has been removed. The RE Law establishes a framework for the bidding process for grid-connection of renewable electricity, which allows the renewable energy generated electricity to be connected to the grid at favorable prices, about 40% higher than coal-fired electricity. After this law was established, investment in renewables increased significantly.



3. National Programs/Policies and Targets for Energy Efficiency

Overall, there was a huge national energy conservation programme sponsored by the Chinese Government in 2005 for energy efficiency: 1000 Enterprise Initiatives. So far, 1008 large companies, which consumed 670 Mtce in 2004, have been identified from nine energy intensive sectors from both the demand side and the supply side. The goal is to save 100Mtce during 2006-2010.

Demand Side Energy Efficiency

The ELTEC Plan set up principles to promote demand side energy efficiency management. In 2004, the Energy Bureau of NDRC and SERC together issued Guidelines on Enhancing Demand Side Management (DSM) Works. In addition, the Chinese Government introduced energy efficiency labels for refrigerators and air conditioners in 2004, and started the mandatory implementation of energy labels for refrigerators and air conditioners on March 1st, 2005.

Supply Side Energy Efficiency and Clean Fuels

The ELTEC Plan also covers the supply side. It encourages the application of advanced technologies such as ultra-super critical, IGCC, and large scale (over 600 MW) coal-fired generator units. Small scale generator units will be phased out and the grid networks will be upgraded. The ELTEC Plan sets the following unit energy consumption thresholds for coal-fired power plant: 360 gce per kWh generated by 2010, and 320 gce per kWh generated by 2020, as compared to the 2005 level of 377 gce / kWh.

There is huge potential for clean energy development in the Energy Efficiency (EE) fields. A primary example is industry, which comprises a 70% share of China's entire energy consumption, and has great EE potential. The total energy consumption of 1008 energy-intensive industrial enterprises as selected in the 1000 Enterprise Initiatives was 670 Mtce in 2004, accounting for 33% of the national total energy consumption and 47% of the industrial energy consumption. It is anticipated that this programme can generate 100 Mtce of energy savings by 2010, mainly due to improvements in energy efficiency.

At present energy consumption of heating per unit of building in area in China is two to three times as much as in developed countries with similar climatic conditions.

On the supply side, energy efficiency efforts are more likely to have the power supplier's cooperation. With help from the government, the power industry is striving to develop over 600 MW supercritical and ultra supercritical units, and large scale combined cycle power plant technology. It is also focusing on the development of high-efficiency clean combustion technology and improvement in unit capacity through the "Large-scale Substitute Small-scale" programme. It is anticipated that high-efficiency technologies, such as ultra-supercritical units, will be universally applied by 2010, and that energy consumption of coal-fired power will be lowered to 360 g/kWh as required by MLTEC Plan. Since the five national power investment companies are all huge players in China, with hundreds of billions of assets, they usually are able to find enough financing sources to invest in economically feasible energy efficiency projects.

4. National Programs/Policies and Targets for Other Clean Energy Technologies

Nuclear. Mainland China has nine nuclear power reactors in commercial operation, a further two units grid connected, four more under construction, and at least four more about to start constuction in 2007. Additional reactors are planned, including some of the world's most advanced, to give a fivefold increase in nuclear capacity to 40 GWe by 2020 and then a further three to fourfold increase to 120-160 GWe by 2030. Moves to build nuclear power commenced in mainland China commenced in 1970 and the industry has now moved to a steady development phase. Technology has been drawn from France, Canada and Russia, with local development based largely on the French element. The State Power Grid Corporation expects to supply 3810 billion kWh in 2010 from 852 GWe. Growth is then expected to slow to 2020, when capacity is expected to reach 1330 GWe.

Nuclear power has an important role, especially in the coastal areas remote from the coalfields and where the economy is developing rapidly. In 2006 it provided 51.8 billion kWh - 1.9% of total, and there is now 8.6 GWe installed. Because of the heavy reliance on old coal-fired plant, electricity generation accounts for much of the country's air pollution, which is a strong reason to increase nuclear share. China is the second-largest contributor to energy-related carbon dioxide emissions after the USA. The IEA (2004) predicted that its share in global emissions - mainly from the power sector - would

increase from 14% in 202 to 19% in 2030, but this now looks conservative. The government plans to increase nuclear generating capacity to 40 GWe by 2020 (of total 1000 GWe then), with a further 18 GWe nuclear being under construction then, requiring an average of 2 GWe per year being added. In May 2007 the National Development and Reform Commission announced that its target for nuclear generation capacity in 2030 was 160 GWe. The country aims to become self-sufficient in reactor design and construction, as well as other aspects of the fuel cycle. Mainland China is starting to rely heavily on imported uranium to fuel its nuclear power program.

Natural Gas. In 2005, 2.7% of China's energy consumption or 60 Mtce was from natural gas. Natural gas was used in the chemical (32.2%), manufacturing (38%), residential and commercial (22.4%) sectors. The usage share of gas in transportation increased to 3.4% by 2005 and will continue to increase as an alternative resource to oil. By 2020, it is forecasted that China will consume 240~290 Mtce of natural gas per year.

Until recently, China's natural gas consumption has been limited to local natural gas producing provinces. For example, Sichuan province, which is well known for its production of natural gas, has a local gas transport network. In the northwest, areas near the Daqing field in Heilongjiang province and the Liaohe oil field in Liaoning province have benefited from associated gas sent via gas pipeline. Since natural gas transportation was limited to areas near the production site, low cost gas supply was possible.

Conversely, the demand for natural gas has recently grown in large cities, where the use of coal gas has already spread with modernization. In consideration of such trends, China set out a policy to raise the share of natural gas in the country's energy mix in its Ninth 5-Year Plan (1996-2000). Encouraged by the successful discovery and development of the Ordos gas field in the 1990s, Beijing started fuel switching from coal to natural gas. They also constructed a pipeline extending a total length of 865 km from the gas field to Beijing to start gas supply in 1997. This pipeline now transports as much as 2.8 billion m3 of natural gas per year. Backed by Beijing's environmental protection policy (e.g., designating coal use restricted areas), the amount of gas being transported is expected to reach 4.8 billion m3 in 2010. Moreover, another 953 km of pipeline extending from the Qinghai Qaidam gas field to Lanzhou in Gansu province were completed at the end of 2001 to accelerate the fuel conversion from coal and coal gas to natural gas.

Gas prices have been gradually rising due to long-haul transport and higher production costs. To date, gas prices have remained above reasonable market prices to profit the natural gas companies. China is now considering a system in which both buyer and seller may discuss to determine shipment prices based on a pricing mechanism recommended by the government. This pricing system is expected to drive down the market price of natural gas in the future.

There are 60 natural gas companies in China. The Big Three – China National Petroleum Corporation, China Petroleum and Chemical Corporation, and China National Offshore Oil Corporation) account for more than 90% of total production. On the demand side, natural gas consumption is significantly less than other fossil fuels in China. It is

primarily used as a raw material for chemical fertilizer to operate oil and gas fields. Accordingly, most natural gas is consumed for production of fertilizers. Only a little over 10% of natural gas is consumed as a fuel for cogeneration and residential use. As the natural gas market evolves in the future, however, natural gas will primarily be used for electric power and residential use as an alternative to coal.

Clean Coal. In 2005, China consumed 2,225 Mtce of primary energy, 69.6% coming from coal. Coal is primarily used for power generation and in industry. In 2005, China produced 2,140 Mt (or 1,528 Mtce) of coal, of which 1,031 Mt or 49% was used in coal-fired plants with a total capacity of 391 GW and generating 2018 TWh. By the end of 2005, the coal-fired power generating units installed with Flue Gas Desulfurization (FGD) reached 46 GW, accounting for 9% of total installed capacity. The coal supply will continue to grow, as coal has a cost advantage and China has large coal reserves. By 2020, China is forecasted to consume about 2,800 Mt (or 2,000 Mtce) coal per year. The massive usage of coal leads to the increasing importance of clean energy technologies. Clean coal and high sulfur coal treatment technologies are very much needed by power plants. Governments and enterprises are more interested in the circulating fluidized bed boiler technology, and high-efficiency burner and absorption heat pump technologies, etc. By 2010, FGD-installed capacity should reach 380 GW.