China's Energy Conditions and Policies

Information Office of the State Council
of the People's Republic of China

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Preface

Energy is an essential material basis for human survival and development. Over the entire history of mankind, each and every significant step in the progress of human civilization has been accompanied by energy innovations and substitutions. The development and utilization of energy has enormously boosted the development of the world economy and human society.

Over more than 100 years in the past, developed countries have completed their industrialization, consuming an enormous quantity of natural resources, especially energy resources, in the process. Today, some developing countries are ushering in their own era of industrialization, and an increase of energy consumption is inevitable for their economic and social development.

China is the largest developing country in the world, and developing its economy and eliminating poverty will, for a long time to come, remain the main tasks for the Chinese government and the Chinese people. Since the late 1970s, China, as the fastest growing developing country, has scored brilliant achievements in its economy and society that have attracted worldwide attention, successfully blazed the trail of socialism with Chinese characteristics, and made significant contributions to world development and prosperity.

China is now the world's second-largest energy producer and consumer. The sustained growth of energy supply has provided an important support for the country's economic growth and social progress, while the rapid expansion of energy consumption has created a vast scope for the global energy market. As an irreplaceable component of the world energy market, China plays an increasingly important role in maintaining global energy security.

Guided by the Scientific Outlook on Development, the Chinese government is accelerating its development of a modern energy industry, taking resource conservation and environmental protection as two basic state policies, giving prominence to building a resource-conserving and environment-friendly society in the course of its industrialization and modernization, striving to enhance its capability for sustainable development and making China an innovative country, so as to make greater contributions to the world's economy and prosperity.

I. Current Situation of Energy Development

Energy resources are the basis of energy development. Since New China was founded in 1949, it has made constant endeavors in energy resources prospecting, and conducted several resources assessments. China's energy resources have the following characteristics:

— *Energy resources abound*. China boasts fairly rich fossil energy resources, dominated by coal. By 2006, the reserves of coal stood at 1,034.5 billion tons, and the remaining verified reserves exploitable accounted for 13 percent of the world total, ranking China third in the world. The verified reserves of oil and natural gas are relatively small, while oil shale, coal-bed gas and other unconventional fossil energy resources have huge potential for exploitation. China also boasts fairly abundant renewable energy resources. In 2006, the theoretical reserves of hydropower resources were equal to 6,190 billion kwh, and the economically exploitable annual power output was 1,760 billion kwh, equivalent to 12 percent of global hydropower resources, ranking the country first in the world.

— *China's per-capita average of energy resources is very low.* China has a large population, resulting in a low per-capita average of energy resources in the world. The per-capita average of both coal and hydropower resources is 50 percent of the world's average, while the per-capita average of both oil and natural gas resources is only about one-fifteenth of the world's average. The per-capita average of arable land is less than 30 percent of the world's average, which has hindered the development of biomass energy.

— *The distribution of energy resources is imbalanced.* China's energy resources are scattered widely across the country, but the distribution is uneven. Coal is found mainly in the north and the northwest, hydropower in the southwest, and oil and natural gas in the eastern,

central and western regions and along the coast. But, the consumers of energy resources are mainly in the southeast coastal areas, where the economy is the most developed. Such a great difference of location between the producers and the consumers has led to the following basic framework of China's energy flow: large-scale transportation over long distances of coal and oil from the north to the south, and transmission of natural gas and electricity from the west to the east.

— *The development of energy resources is fairly difficult.* Compared with other parts of the world, China faces severe geological difficulties in tapping its coal resources, and has to get most of its coal by underground mining, as only a small amount can be mined by opencast methods. Oil and gas resources are located in areas with complex geological conditions and at great depths, so advanced and expensive prospecting and tapping techniques are required. Untapped hydropower resources are mostly located in the high mountains and deep valleys of the southwest, far from the centers of consumption, entailing technical difficulties and high costs. Unconventional energy resources are insufficiently prospected, their development is neither economical nor competitive.

Since the reform and opening-up policies were introduced in China in the late 1970s, the country's energy industry has witnessed swift growth and made great contributions to the sustained and rapid growth of the national economy, with the following demonstrations:

— *The energy supply capability has been remarkably enhanced.* Thanks to the efforts made over the past few decades, China has built an energy supply framework with coal as the main energy resource and electricity as the focus, featuring an overall development of oil, gas and renewable resources. A fairly complete energy supply system is now by and large in place. China has built a group of extra-large coalmines each with an annual output of over ten million tons. In 2006, the output of primary energy equaled 2.21 billion tons of standard coal, ranking second in the world. Of this, raw coal accounted for 2.37 billion tons,

ranking first in the world. Daqing, Shengli, Liaohe, Tarim and other large oilfields have been successively built as oil production bases, and the output of crude oil has increased steadily, ranking China the world's fifth-largest oil producer in 2006, with 185 million tons in that year. The output of natural gas ballooned from 14.3 billion cu m in 1980 to 58.6 billion cu m in 2006. The proportion of commercial renewable energy in the structure of primary energy keeps rising. The electricity sector also reported speedy growth in 2006. The installed capacity reached 622 million kw, and the amount of power generated was 2,870 billion kwh, both ranking second in the world. A comprehensive energy transportation system has been developed quickly, with the transport capacity notably improved. Special railways transporting coal from the west to the east and relevant coal ports, and pipelines transporting oil from the north to the south and conveying natural gas from the west to the east have all been built. Now, the power generated in the west can be carried to the east, and the regional power grids have all been connected up.

— *Energy-saving effects are conspicuous*. During the period 1980-2006, China's energy consumption increased by 5.6 percent annually, boosting the 9.8-percent annual growth of the national economy. Calculated at 2005 constant prices, the energy consumption for every 10,000 yuan of GDP dropped from 3.39 tons of standard coal in 1980 to 1.21 tons in 2006, making the annual energy-saving rate 3.9 percent, putting an end to the rising trend of per-unit GDP energy consumption. The comprehensive utilization efficiency in the processing, conversion, storage and end-use of energy was 33 percent in 2006, up eight percentage points over 1980. Per-unit product energy consumption has dropped noticeably, and the gaps between the overall energy consumption, the net energy consumption rate of electricity generation for steel and cement production as well as synthetic ammonia produced by plants with an annual output of 300,000 tons or more and the international levels are narrowing.

— *The consumption structure has been optimized.* China is the world's second-largest energy consumer. In 2006, its total consumption of primary energy was 2.46 billion tons of standard coal. China pays great attention to improving its energy consumption structure. The proportion of coal in primary energy consumption decreased from 72.2 percent in 1980 to 69.4 percent in 2006, and that of other forms of energy rose from 27.8 percent to 30.6 percent, with that of renewable energy and nuclear power rising from 4.0 percent to 7.2 percent. The shares of oil and gas have increased. The end-use energy consumption structure is noticeably optimized, and the proportion of coal converted into power increased from 20.7 percent to 49.6 percent. More commercial energy and clean energy are being used in people's daily life.

— *The scientific and technological level has been rapidly enhanced*. China has scored conspicuous scientific and technological achievements relating to energy. The fundamental research findings, represented by the "continental hydrocarbon generation theory and its application," have greatly promoted the development of the scientific theory of oil geology. A fairly complete system of exploration and development technologies has taken shape in the oil and gas industry, with prospecting and development techniques in geologically complicated regions and the recovery ratio of oilfields leading the world. Large coalmines of the world's advanced level have been built, and the totally mechanized mining of key coalmines has been noticeably improved. In the power industry, advanced generating technology and units with large capacity and high parameters are widely used, and the designing, engineering and equipment manufacturing of hydraulic power plants have reached the world's advanced level. China is now able to independently design and build million-kw pressurized water reactors, and has made outstanding breakthroughs in the development of high-temperature gas-cooled reactors and fast-neutron-breeder reactors. The technologies to deal with pollution such as flue gas desulphurization (FGD) and renewable energy development and utilization are quickly being improved. Models

of ±500 kv DC and 750 kv AC electricity transmission projects have been completed and put into operation, and pilot ±800 kv DC and 1,000 kv AC extra-high-voltage electricity transmission projects are under way.

— *Progress has been made in environmental protection.* The Chinese government sets great store by environmental protection, and has made it a fundamental state policy to strengthen environmental protection. Public awareness of environmental protection has been raised. After the 1992 UN Conference on the Environment and Development, China worked out its "21st Century Agenda," and has reinforced environmental protection in an all-round way through legislative and economic means, making positive progress in this regard. China's energy policies give priority to the reduction and rehabilitation of environmental damage and pollution resulting from energy development and utilization. In 2006, coal-fueled generating units reported a nearly 100-percent installation rate of dust-cleaning facilities and a nearly 100-percent discharge of waste water up to relevant standards. The amount of smoke and dust discharged in 2006 was almost the same as that in 1980, and the dust emission per-unit electricity had decreased by 90 percent. The installation capacity of thermal power units with FGD built and put into operation in 2006 totaled 104 million kw, exceeding the combined total of the previous 10 years. Such thermal power units accounted for only 2 percent of all thermal power units in 2000, but the proportion had risen to 30 percent by 2006.

— *The environment of energy market is gradually improved*. The environment of China's energy market is gradually improved, and the reform in the energy industry is proceeding steadily. Breakthroughs have been made in restructuring energy enterprises, and a modern enterprise system has by and large taken shape. The investors are diversified, energy investment is growing rapidly, and the market is expanding. Market competition has been introduced into the production and distribution of coal. In the power industry, government admin-

istrative functions and enterprises' management have been separated, so has power production from power transmission, and supervisory organizations have also been established. In the oil and gas industry, the upstream and downstream sectors have been integrated, so have the domestic and international trades. Energy pricing reform has been constantly deepened, and the pricing mechanism has been improved continuously.

Along with China's rapid economic development and the acceleration of industrialization and urbanization, the demand for energy keeps increasing, and the construction of a stable, economical, clean and safe energy supply system faces the following challenges:

— *Prominent resources restraint and low energy efficiency.* China's relative dearth of high-quality energy resources hinders its supply capability; its imbalanced distribution makes it difficult to secure a continued and steady supply; and the extensive pattern of economic growth, irrational energy structure, unsatisfactory energy technology and relatively poor management have resulted in higher energy consumption per-unit GDP and for the major energy-consuming products than the average level of major energy-consuming countries, thus further intensifying the energy supply-demand contradiction. Consequently, an increase solely in supply is hard to meet the rising demand for energy.

— *Increasing environmental pressure caused by the consumption of energy, mostly coal*. Coal is the main energy consumed in China, and the energy structure with coal playing the main role will remain unchanged for a long time to come. The relatively backward methods of coal production and consumption have intensified the pressure on environmental protection. Coal consumption has been the main cause of smoke pollution in China, as well as the main source of greenhouse gas. As the number of motor vehicles climbs, the air pollution in some cities is becoming a mixture of coal smoke and exhaust gas. If this situation continues, the ecological environment will face even greater pressure.

— *Incomplete market system and emergency response capability yet to be enhanced.* China's energy market system is yet to be completed, as the energy pricing mechanism fails to fully reflect the scarcity of resources, its supply and demand, and the environmental cost. Order in energy exploration and development must be further standardized, and the energy supervisory system improved. Coal production safety is far from satisfactory, the structure of power grids is not rational, the oil reserves are not sufficient, and an effective emergency pre-warning system is yet to be improved and consolidated to deal with energy supply breakdowns and other major unexpected emergencies.

II. Strategy and Goals of Energy Development

China's energy development emphasizes thrift, cleanness and safety. Believing that development is the only way for its survival, China solves problems emerging in the process of advance through development and reform. To this end, it is applying the Scientific Outlook on Development, persevering in putting people first, changing its concept of development, making innovations in the mode of development, and improving the quality of development. It strives for high scientific and technological content, low resource consumption, minimum of environmental pollution, good economic returns, and guaranteed safety in energy development, so as to realize the coordinated and sustained development of all energy resources to the fullest possible extent.

China's energy development is based on the principle of relying on domestic resources and the basic state policy of opening to the outside world. The country is striving to ensure a stable supply of energy with a steady increase in domestic energy production and promote the common development of energy around the world. China's energy development will bring more opportunities for other countries and expand the global market, and make positive contributions to the world's energy security and stability.

The basic themes of China's energy strategy are giving priority to thrift, relying on domestic resources, encouraging diverse patterns of development, relying on science and technology, protecting the environment, and increasing international cooperation for mutual benefit. It strives to build a stable, economical, clean and safe energy supply system, so as to support the sustained economic and social development with sustained energy development.

— *Giving priority to thrift*. China has made resource-conservation a basic state policy, and stresses both developing and saving, with priority given to saving. For this, it is actively changing the pattern of economic growth, adjusting the industrial structure, encouraging research and development of energy-saving technologies, popularizing energy-saving products, improving energy management expertise, improving energy-saving legislation and standards, and enhancing energy efficiency.

— *Relying on domestic resources*. China mainly relies on itself to increase the supply of energy, and tries to satisfy the rising market demand by way of steadily expanding the domestic supply of reliable energy resources.

— *Encouraging diverse patterns of development.* China will continue to develop its coal resources in an orderly way, spur the power industry, speed up oil and natural gas exploration, encourage coal bed gas tapping, boost hydroelectric power and other renewable energy resources, actively promote nuclear power development, develop substitute energy resources in a scientific way, optimize its energy structure, realize supplementation between multiple energy resources, and guarantee a steady supply of energy.

— *Relying on science and technology.* China fully relies on science and technology to enhance its ability for independent innovation and its ability to digest and improve imported technologies, tackle technological bottlenecks in energy development, improve key technologies and the manufacturing level of key equipment, seek new ways for energy development and utilization, and redouble the strength for further development.

— *Protecting the environment.* China has set the goal of building a resource-conserving, environment-friendly society, and is endeavoring to coordinate energy development with environmental protection. It endeavors to make the two promote each other for sustainable development.

— *Cooperation for mutual benefit.* China works sincerely and pragmatically with international energy organizations and other countries on the principle of equality, mutual benefit and win-win to improve the mechanism, expand the fields of cooperation and safeguard international energy security and stability.

The 17th National Congress of the Communist Party of China, held in October 2007, set the goals of quickening the transformation of the development pattern and quadrupling the per-capita GDP of the year 2000 by 2020 through optimizing the economic structure and improving economic returns while reducing the consumption of energy resources and protecting the environment. The Outline of the 11th Five-Year Plan for National Economic and Social Development of the People's Republic of China projects that the per-unit GDP energy consumption by 2010 will have decreased by 20 percent compared to 2005, and the total amount of major pollutants discharged will have been reduced by 10 percent.

To realize the country's economic and social development goals, the energy industry has set the following targets in the 11th Five-Year Plan (2006-2010): By 2010 the energy supply will basically meet the demands of national economic and social development; and obvious progress will have been made in energy conservation; energy efficiency will have been noticeably enhanced and the energy structure optimized; technological progress, economic benefits and market competitiveness will have been greatly increased; and energy-related macro-control, market regulation, legislation and emergency pre-warning system and mechanism compatible with the socialist market economy will all have been improved. The result will be that the coordinated development will have been achieved between energy production, the economy, the society and the environment.

III. All-round Promotion of Energy Conservation

China is a developing country with a large population but deficient resources. To attain sustainable economic and social development, it must take the path of conserving resources. China started energy conservation work in a planned and organized way in the early 1980s, and achieved the goal of quadrupling economic growth while doubling energy consumption by the late 1990s by implementing the policy of "stressing both development and saving, with priority given to saving." To further promote energy conservation, the Chinese government made conservation of resources a basic state policy, and issued the Decision of the State Council on Strengthening Energy-conservation Work. The Chinese government has always regarded energy conservation as a major factor in macro control and as breakthrough and driving force for transforming the pattern of economic development and optimizing economic structure. While advancing the work of saving energy and reducing emissions, the Chinese government depends on structural adjustment as the fundamental approach, on scientific and technological advances as the key, on improved administration as a crucial measure, on the strengthening of law enforcement as an important guarantee, on the deepening of the reform as an internal motive force, and on public participation as the social foundation. It promulgated and implemented the Medium- and Long-term Special Plan for Energy Conservation, setting the goal for energy consumption reduction during the 11th Five-Year Plan period (2006-2010) and sharing out the tasks and responsibilities to the various provinces, autonomous regions and

municipalities directly under the central government, as well as key enterprises. China is perfecting the index system of energy consumption per-unit GDP. It will incorporate energy consumption into the overall evaluation of economic and social development and the annual performance evaluation of regional governments. It will adopt an announcement system for this index, implement a target responsibility and accountability system for energy conservation and build an energy-conserving industrial system to effect the fundamental transformation of the country's pattern of economic development.

Energy conservation is a realistic choice for China to alleviate the pressure of energy shortage. It is a long and arduous strategic task to keep promoting energy conservation in the course of the country's economic and social development. China will advance energy conservation in all aspects, with the government playing the leading role, the market forming the basis and enterprises playing a major role, with participation of the whole society. China will establish an energy- and resource-saving industrial structure, development pattern and consumption mode by taking improvement of energy efficiency as the core, and transforming the mode of economic development, adjusting the economic structure and accelerating technological advance as the foundation. China will establish an energy-saving industrial system and practice a target-responsibility and performance-evaluation system in this regard. It will improve the mechanism for spreading energy-saving technologies, and encourage R&D of such technologies and products. It will deepen the reform of the energy system, improve the energy pricing mechanism and give full play to economic policies, including fiscal and taxation ones, in promoting energy conservation.

To promote all-round energy conservation, China will take the following measures:

— *Pushing forward structural adjustment.* The major reasons for low efficiency of energy utilization for a long time have been the extensive mode of economic growth and a high proportion of high energy-consuming industries in China. The country will put the transformation of the development pattern and the adjustment of the industrial structure and of the internal structures of industries in the key place for the energy-conservation strategy, and work hard to bring into being a pattern of economic development with "low input, low consumption, less emission and high efficiency." China will accelerate the optimization and upgrading of its industrial structure, make energetic efforts to develop high- and new-tech industries and the service trades, set strict limits on the development of high energy-, material- and water-consuming industries, and eliminate industries with backward productivity, so as to fundamentally change the pattern of economic development and put in place an energy-saving industrial system on an early date.

— *Improving energy conservation in industry.* Industry is a major sector of energy consumption in China. The country is determined to take a new road to industrialization characterized by high scientific and technological content, good economic returns, low resource consumption, minimum of environmental pollution, and full use of human resources. To achieve this, China will accelerate the development of high-tech industries and transform traditional industries with high- and new-technologies, as well as advanced and applicable ones, and in turn upgrade the overall industrial standard. Industries with high energy consumption, such as steel, nonferrous metals, coal, electricity, petroleum and petrochemicals, chemical engineering and building materials, will be the target sectors for saving energy and reducing energy consumption. The Chinese government has launched an energy-conservation drive among 1,000 enterprises, with the focus on tightening control over those consuming 10,000 tons of standard coal or more each year.

It will readjust the product mix, speed up technological reform, improve management and economize on energy. It will support a group of key and demonstration projects aiming to conserve energy and cut consumption so as to rally industries to enhance their energy-saving level. It will continue to raise the standards for energy efficiency of industry, eliminate backward and high energy-consuming products, and perfect the market access system.

— *Launching energy-saving projects.* China is carrying out ten key energy-saving projects, including petroleum substitution, simultaneous generation of heat and power, surplus heat utilization and the construction of energy-saving buildings. The Chinese government supports key and demonstration energy-saving projects, and encourages extensive application of high-efficiency, energy-saving products. China will make vigorous efforts to construct energy- and land-saving buildings, actively promote the energy-saving renovation of existing buildings, and extensively use new walling materials. China will continue to implement petroleum substitution and develop substitute fuels in a scientific way. It will speed up the elimination of old automobiles and ships, actively develop public transport; set limits on high oil-consuming automobiles, and develop energy-saving and environment-friendly automobiles. It will accelerate the innovation of coal-fueled industrial boilers (kilns), regional simultaneous generation of heat and power and surplus heat and pressure utilization, and improve the efficiency of energy utilization. It will save more energy in the sphere of electrical machinery and optimize energy systems, so as to improve the efficiency of both. It will carry out the Green Lighting Project, and spread more rapidly high-performance electrical appliances. It will also spread technologies for firewood- and coal-saving stoves and energy-saving houses in rural areas, and eliminate old, high energy-consuming farm machinery and fishing boats, so as to promote energy conservation in agriculture and the rural areas. It will urge government bodies to save more energy, giving full play to the role of the government in leading energy con-

servation. It will put in place at an early date the system of energy-conservation monitoring and technological support, strengthening energy-conservation monitoring and establishing new energy services platforms.

— *Strengthening the administration of energy conservation.* The Chinese government has established a system of compulsory government procurement of energy-saving products, actively advocating energy-saving (including water-saving) products as a priority for government procurement; and included some products with outstanding results and stable performance on the list of compulsory procurement. It will give full play to the role of governmental purchase in policy guidance and in encouraging all sectors of society to produce and use energy-saving products. It will study and formulate fiscal and taxation policies to encourage energy conservation, implement preferential taxation policies for those effectively making comprehensive use of resources, and set up an energy-saving mechanism with multi-channel financing. It will deepen the reform of energy prices to introduce a pricing mechanism favorable for energy conservation. It will put in force an evaluation and examination system in respect of energy conservation in fixed assets investment projects and strictly control increase of energy consumption at the roots. It will set up a new energy-conservation mechanism for enterprises, adopt an energy efficiency labeling mechanism, and promote contract-based energy management and voluntary energy-conservation agreements. It will improve the legal framework regarding energy conservation, and strengthen energy-conservation management by law. It will improve the overall quality of energy-conservation managerial personnel, and step up efforts in law enforcement, supervision and examination.

— *Advocating energy conservation in society.* The Chinese government energetically advocates the significance of energy conservation by various means, constantly strengthening the public awareness of the importance of resources conservation. It will promote the culture

of energy conservation, and work hard to bring into being a healthy, civilized and economical mode of consumption. It will incorporate energy conservation into the system of elementary education, vocational education, higher education and technical training, and publicize and popularize relevant knowledge by means of mass media. It will enhance the energy-conservation week campaign, and mobilize all sectors of society to participate in it. All these measures will help to build a long-term mechanism of energy conservation with the participation of all sectors of society.

IV. Improving the Energy Supply Capacity

For a long time China has relied largely on domestic energy resources to develop its economy, and the rate of self-sufficiency has been above 90 percent, much higher than that in most developed countries. China is now the second biggest energy producer in the world, and has a relatively strong foundation for the energy production and supply. In the course of building a moderately prosperous society, China will rely mainly on domestic energy resources, give priority to optimizing its energy mix, and work hard to increase its energy supply capacity.

China boasts great potential in energy resources exploitation. Coal resources already verified only account for 13 percent of the total deposits, and recoverable reserves account for 40 percent of the discovered resources. Only 20 percent of the country's hydropower resources have been utilized so far. Verified oil reserves are 33 percent of the total deposits, and China has begun to enter the middle phase of oil prospecting, still seeing a big potential. Proven reserves of natural gas account for 14 percent, showing that China is in the early stage of exploration and indicating bright prospects in this sphere. Regarding non-conventional energy, China is still at the early stage of exploitation and utilization, with a great potential for development. As for renewable energy, China has only just started in its exploitation and utilization, so there is immense room for development in this regard. Good prospects are also seen for conserving, making comprehensive use of and recycling resources.

To increase its energy supply capacity, China will take the following measures:

— *Developing the coal industry in an orderly way*. Coal is a basic energy in China, and it is an urgent need to increase the supply capacity, optimize the energy mix, ensure coal mining safety, reduce environmental pollution, increase resource utilization efficiency and build a new coal industry system, so as to guarantee the development of the national economy. China will step up its efforts in prospecting coal resources, render support to large coal mining bases in conducting resource surveys and detailed geological surveys, set standards for commercial prospecting, improve the level of guarantee for coal resources, and steadily push forward the building of large coal mining bases. By merger and reorganization of enterprises, the country will bring into being some large coal mining conglomerates each with a total annual production capability of 100 million tons. It will continue to push forward the development and integration of coal resources by renovating medium- and small-sized coal mines and closing down, in accordance with the law, small ones not conforming to industrial policies, with poor safety conditions, wasting resources and harming the environment, so as to further optimize the structure of the coal industry. It will promote the coordinated development of related industries, and encourage coal-electricity joint operation or coal-electricity-transport integrated management, so as to extend the coal industry chain. It will further mechanize coalmines and enhance overall mechanization in coal mining, promote the clean production and utilization of coal, encourage R&D and spreading of clean coal technologies, and quicken the research into and demonstration of substitute liquid fuels. China will actively develop a circular economy, step up efforts in environmental protection, promote the comprehensive utilization of resources, and accelerate the industrialized development of coal-bed gas. It will strengthen the building of the coal transport system and steadily increase the coal transport capacity. It will establish a responsibility system for safe production, beef up safety installations and put more

money into gas prevention and control, so as to improve the level of safe production.

— *Actively developing electric power.* Electric power is a highly efficient and clean energy. It is also a basic requirement for the steady development of the national economy and society to establish an economical, highly efficient and stable power supply system. China will optimize the power supply structure based on structural adjustment. On the basis of taking into overall consideration such factors as resources, technology, environmental protection and the market, the Chinese government will develop clean coal-fired electric power by setting up large coal-fired power bases and encouraging the building of power plants at pitheads, with emphasis on large, highly efficient, environment-friendly power generating sets. It will actively develop cogeneration of heat and power, and speed up elimination of small and backward thermal power units. On the condition that the ecological environment is protected and problems affecting local people are properly settled, energetic efforts will be made to develop hydropower. It will also actively develop nuclear power, and appropriately develop natural gas power generation. It will encourage power generation with renewable and new energy resources. It will strengthen the building of regional power grids and power transmission and distribution networks and expand the scope of power transmission from western to eastern China. Uniform planning and distribution of electric power will be adopted, and an emergency response system for power safety will be set up to enhance the safety and reliability of the power system. China will continue to strengthen power demand-side management (DSM), exert control over power use for the purpose of conserving energy and work hard to increase energy utilization efficiency.

— *Expediting development of oil and gas*. China will continue to implement the policy of "simultaneous development of oil and gas," steadily increase crude oil output and make efforts to increase the output of natural gas. The country will step up its efforts in prospecting

for and exploiting oil and natural gas, with the focus on major oil and gas basins, including those of Bohai Bay, Songliao, Tarim and Ordos, and actively explore new areas, fields and strata on the land and major sea areas, so as to increase the amount of recoverable reserves. It will tap the potential of major oil-producing areas, improve renovation for stable yields, increase the recovery ratio and slow down the yield decreasing trend in old oilfields. On the condition of reasonable cost, it will actively develop coal-bed gas, oil shale and tar sand and other non-conventional energy resources. The country will expedite the construction of oil and gas pipeline networks and supporting facilities and gradually improve the national network of oil and gas pipelines.

— *Vigorously developing renewable energy.* China gives top priority to developing renewable energy. The exploration and utilization of renewable energy resources plays a significant role in increasing energy supply, improving the energy mix and helping environmental protection, and is also a strategic choice of China to solve the contradiction between energy supply and demand and achieve sustainable development. China has promulgated the Renewable Energy Law and priority policies for renewable energy electricity, entailing priority to be connected to grids, acquisition in full and preferential price, and public sharing of costs. It has earmarked special funds for renewable energy development to support resource survey, R&D of relevant technologies, building of pilot and demonstration projects, as well as exploration and utilization of renewable energy in rural China. It has released the Medium- and Long-term Program for Renewable Energy Development, putting forward the goal of increasing renewable energy consumption to 10 percent of the total energy consumption by 2010 and 15 percent by 2020. China will further the comprehensive and cascade development of areas with hydropower resources, speed up the construction of large hydropower stations, develop medium- and small-sized hydropower stations based on local conditions, and construct pumped-storage power stations under appropriate circumstances. It will spread the latest tech-

nologies for the utilization of solar energy, methane and other renewable energy sources, and increase their market shares. It will also actively popularize technologies utilizing wind, biomass and solar energy for power generation, and build several million-kw wind power bases to achieve industrialization by means of scale power generation. It will actively implement policies supporting renewable energy development, foster a renewable energy market featuring sustained and stable development, and gradually establish and improve an industrial system and a market and service system of renewable energy, so as to promote renewable energy technological advance and industrial development.

— *Improving energy development in the rural areas*. China has a rural population of 750 million. Due to economic and technical limitations, people in most rural areas still use traditional biomass energy. It is an inevitable demand in the building of a new socialist countryside in all aspects to solve the energy problem for the rural areas. This is also a problem unique to China. The Chinese government sticks to the principle of "development based on local conditions, supplementation between multiple energy resources, comprehensive utilization with focus on actual results," and works hard to improve energy development in the rural areas. The Chinese government has improved the energy conditions for rural people's life and production, and solved the power problem for over 30 million rural people who had no access to electricity and in remote areas not connected to the grid, by carrying out the Lighting Project, "rural grid renovation," "electrification of hydropower-based rural areas" and "connecting villages with the grid" campaigns, and making full use of small-sized hydropower stations, wind energy and solar energy for power generation. Basically, rural and urban residents are connected to the same grid and pay the same rate. China will further actively develop rural household methane and make better use of biomass and solar energy, so as to provide clean energy for the rural people. It will continue popularizing firewood- and energy-saving stoves and small energy facilities, such as small wind-

power and hydropower stations, in rural areas. It will increase the supply of high-quality fossil energy and increase the proportion of commercial energy consumption in rural areas. Continuous efforts will be made to strengthen the construction of the rural grids to expand their coverage. Moreover, China will actively build green-energy counties for demonstration, and accelerate the exploration and utilization of renewable energy resources in rural areas.

V. Accelerating the Progress of Energy Technologies

Science and technology is the primary productive force and the main motive force of energy development. China sets great store by the development of energy science and technology, and has narrowed its technological gap with the developed countries in the energy industry and effectively promoted the overall development of the energy industry. The Chinese government promulgated the Outline of the National Plan for Medium- and Long-term Scientific and Technological Development (2006-2010) in 2005, which gives top priority to the development of energy technologies, and, in line with the principle of making independent innovations and leapfrogging development in key fields, shoring up the economy and keeping in step with leading trends, stresses accelerating progress of energy technologies and strives to provide technological support for the sustainable energy development.

Following the laws and traits of scientific and technological development, China actively develops and popularizes advanced and applicable technologies in the fields of energy saving, substitution, recycling and pollution control, and is creating a favorable policy environment for the progress of energy technologies. The Chinese government strives to gradually establish a market-oriented system for technological innovation, in which enterprises play the leading role and which combines the efforts of enterprises, universities and research institutes. It vigorously promotes R&D and the application of advanced energy technologies, guides enterprises to expedite technological progress and enhance energy utilization efficiency through the

market mechanism. It strengthens the training of talented people in energy science and technology, and improves policies, laws and regulations, and technical standards in this respect to create favorable conditions for the development of energy technologies.

— *Popularizing energy-saving technologies*. China gives priority to the development of energy-saving technologies, with focus on key technologies in the high energy-consumption sectors, to enhance the utilization efficiency of primary and end-use energy resources; implements the policy outline on energy-saving technologies and guides social investment into the application of energy-saving technologies; places emphasis on R&D of energy-saving technologies and equipment for industry, transport and construction, and the application of technologies connected with integrated renewable energy systems and energy-saving construction materials; strengthens energy measurement, control, supervision and management; and actively fosters an energy-saving technological service system.

— *Spurring innovation in key technologies*. China encourages the development of clean coal technology, reinforces R&D of advanced technologies, such as coal gasification, processing and conversion, popularizes advanced power generation technologies, including integrated gasification combined cycle (IGCC), supercritical and ultra-supercritical power generation, and large-scale circulating fluidized bed (CFB), and develops coal gasification-based poly-generation technology. China attaches particular importance to mastering the third-generation pressurized-water reactor (PWR) nuclear power generation and high temperature gas-cooled reactors (HTGR) for industrial experimental technologies. It actively develops technologies in connection with prospecting for and exploitation of petroleum and gas resources under complicated geographical conditions, and highly efficient exploitation of low-grade petroleum and gas resources; encourages the development of technology for substitutes of energy resources, gives priority to the development of technologies for large-scale utilization

of renewable energy; and steadily improves the technology of power transmission at voltages of ± 800 kv DC and 1,000 kv AC and power grid safety technology.

— *Enhancing equipment manufacturing level.* The equipment manufacturing industry is the foundation of the development of energy technologies. China gives impetus to the technological progress of the equipment manufacturing industry through key state projects. The Chinese government encourages the development of comprehensive excavation machinery in coal mining, large comprehensive mining, hoisting, transport and washing equipment for underground coal mining, and heavy-duty open-pit mining machinery. It supports the development of complete sets of large equipment for coal chemicals as well as R&D of coal liquefaction and gasification, and coal-to-olefin conversion equipment, the development of high-efficiency and low-pollution power generation equipment, high-efficiency coal-fired power generation units, hydropower and pumped-storage units, heavy-duty gas turbines, PWR nuclear power generation units with a capacity of one million kw, high-power wind-driven generators, and superhigh-power transmission and transformation machinery. It encourages the development of oil and natural gas prospecting and drilling equipment and support equipment for large offshore oil projects, crude oil carriers with a capacity of 300,000 dwt, liquefied natural gas carriers and high-power diesel engines.

— *Strengthening frontier technology research.* Frontier technology, as a new potential driving force for energy development, can blaze the way for the leapfrogging development of energy industry and technologies. China focuses on research into conversion from fossil, biomass and renewable energy resources to hydrogen, and high-efficiency hydrogen storage, transmission and distribution technology. It also conducts research into the technology for the manufacturing of basic and key components of fuel cells, integration of fuel cell stacks, fuel cell power generation and automotive fuel cell power systems, and strives

to make breakthroughs in the technology for the end-use energy conversion, storage and combined cooling, heating and power projection of fossil energy-based micro-miniature gas turbine systems. Meanwhile, the country is speeding up research into the engineering and core technology of gas-cooled faster reactors (GFR), and technology for developing magnetic confinement fusion (MCF) and natural gas hydrate technology.

— *Developing basic scientific research*. Basic research is the source of independent innovation and it determines the strength and potential of energy development. China concentrates on research into the basic theories of the high-efficiency and low-pollution utilization and conversion of fossil energy, key principles of high-efficiency heat-work conversion, high-efficiency energy saving and storage, basic technology for large-scale utilization of renewable energy, and basic theories concerning technology for large-scale utilization of nuclear and hydrogen energy resources.

VI. Coordinating Energy and Environment Development

Climate change is a significant global issue of worldwide concern. It is both an environmental and development issue, and intrinsically a development issue. The large-scale exploitation and utilization of energy resources is one of the major causes of environmental pollution and climate change. Appropriate handling of the relationship between the exploitation and utilization of energy resources on the one hand, and environmental protection and climate change on the other, is an urgent issue facing all countries. China is a developing country in the primary stage of industrialization, and with low accumulative emissions. From 1950 to 2002, the aggregate amount of China's fossil fuel carbon dioxide emissions accounted for only 9.3 percent of the world's total in the same period. The amount of China's per-capita carbon dioxide emissions ranked 92nd in the world, and the elasticity coefficient of carbon dioxide emissions per-unit GDP was very small.

As a responsible developing country, China attaches great importance to environmental protection and prevention of global climate change. The Chinese government has made environmental protection a fundamental state policy, signed the United Nations Framework Convention on Climate Change, established the National Coordination Committee for Climate Change, submitted to the UN the Initial National Communication on Climate Change of the People's Republic of China, worked out the Management Measures on the Implementation of Clean Development Mechanism Projects, formulated the National Climate Change Program, and adopted a series of proactive policies

and measures regarding environmental protection and climate change. China aims to achieve the goal of basically curbing the trend of ecological deterioration, reducing total emissions of major pollutants by 10 percent, and gain visible results in the control of greenhouse gas emissions during its 11th Five-Year Plan period (2006-2010). Meanwhile, the country is actively adjusting its economic and energy structures, comprehensively advancing energy saving, emphatically preventing and controlling the pressing problems of environmental pollution, and effectively controlling emissions of pollutants to facilitate coordinated development between energy and the environment.

— *Comprehensive control of greenhouse gas emissions.* China is expediting the transformation of its economic development mode, giving full play to the role of energy saving and optimization of energy structure in slowing climate change, and endeavoring to cut fossil energy consumption. It is vigorously developing a circular economy, fostering the comprehensive utilization of resources, enhancing the utilization efficiency of energy, reducing greenhouse gas emissions. It continuously improves the capability of addressing climate change with the aid of scientific and technological progress, thereby making positive contributions to the environmental protection of the Earth.

— *Energetically fighting ecological destruction and environmental pollution.* China will pay more attention to the clean utilization of energy resources, especially coal, and make it a focus of environmental protection, energetically combating ecological destruction and environmental pollution. The country is quickening its pace of control of coal mining subsidence areas and the exploitation and utilization of coal-bed gas, and establishes and improves the compensation mechanism for the exploitation of coal resources and restoration of the eco-environment. It promotes the orderly exploitation of coal resources, restricts the exploitation of high-sulfur and high-ash coal, forbids mining coal with toxic and harmful substances, such as arsenic and radiotoxins, exceeding permissible limits. It actively develops clean coal technology

and encourages the application of coal washing, processing, conversion, clean-burning and smoke-purifying technologies. At the same time, it is expediting the construction of desulfurizing facilities in coal-fired power plants, requiring that newly built coal-fired power plants must install and use desulfurizing facilities according to the permissible emission standards, and such existing plants must speed up their desulfurization upgrading. The Chinese government strictly prohibits the construction of new coal-fired power plants for the sole purpose of power generation in medium and large cities or on their outskirts.

— *Proactive prevention of motor vehicle emission pollution*. The development of the automobile industry and the improvement of the people's livelihood have led to a rapid growth in the number of motor vehicles. Consequently, preventing motor vehicle emission pollution has been put high on the environmental protection agenda. China is actively taking effective measures to this end: strictly enforcing vehicle emission standards; intensifying inspection for the environment-friendly production of vehicles; strictly implementing the annual emission inspection system for motor vehicles; strictly forbidding manufacture, sale and import of motor vehicles exceeding the emission limits. At the same time, China encourages the production and use of vehicles burning clean fuels, and the production of hybrid electric vehicles, and supports the development of rail transport and electric buses.

— *Exercising strict environmental management of energy projects.* Strengthening the environmental management of energy projects is an effective measure to ensure coordinated development between energy construction and environmental protection. China strictly enforces the environmental impact assessment system, restrains extensive mode of economic growth by exercising a strict environment access system. It ensures simultaneous design, construction and launching of environmental protection facilities at new, expansion and rebuilding projects, intensifies safe management of nuclear power projects, reinforces su-

pervision and management of the safety and radiation environment of nuclear power plants, research reactors and fuel cycle facilities in operation, and practices meticulous safety examination and supervision of nuclear power facilities under construction. It further enhances environmental protection efforts in the construction of hydropower projects, pays equal attention to the requirements of comprehensive development and utilization of river basins while protecting the environment, and increasing the level of comprehensive utilization of water resources and eco-environmental benefits.

VII. Deepening Energy System Reform

Improving the environment for development is an intrinsic requirement of China's energy development. In accordance with the requirements of perfecting the socialist market economy, China is steadily advancing its energy system reform to promote the development of the energy industry. In 1998, strategic reorganization was accomplished among petroleum enterprises, featuring the establishment of new vertically integrated management system of oil industry. In 2002, China's power industry realized the separation of government functions from those of enterprises, as well as the separation of power plants from grid operation in line with the power system reform plan. In 2005, after the market-oriented reform of the coal industry, China's coal industry saw deepened reform and further development pursuant to the Opinions on Promoting the Healthy Development of the Coal Industry issued by the State Council. China is further deepening reform of the energy system, elevating the energy marketization level, improving the energy macro-control system, and improving the environment for energy development in accordance with the requirements of innovation in concept, management, system and mechanism.

— *Strengthening energy legislation.* It is an imperative requirement for energy development in China to improve the energy-related legal system to provide a legal guarantee for increasing the energy supply, standardizing the energy market, optimizing the energy structure and maintaining energy security. China sets great store by and actively advances the construction of the energy legal system. China has enacted and put in force the Clean Production Promotion Law and Renewable Energy Law, and has issued a series of supporting policies

and measures. The amended Energy Conservation Law has been promulgated. The Energy Law, Circular Economy Law, Law on the Protection of Oil and Natural Gas Pipelines and Regulations on Energy Conservation of Buildings are being formulated. The Mineral Resources Law, Coal Industry Law, and Electric Power Law are being revised. Meanwhile, active efforts have been made in research into energy legislation concerning oil and natural gas, the crude oil market and atomic energy.

— *Reinforcing production safety.* In the course of energy development, China pays high attention to safeguarding the lives and health of the people, and takes effective measures to halt the trend of frequent occurrences of serious accidents. It adheres to the principle of giving top priority to safety, placing the main emphasis on prevention, and exercising comprehensive control. It has intensified efforts in the control and comprehensive utilization of coal gas, and rectified and shut down small coalmines lacking conditions for safe production. It has enforced safety supervision of coalmines, and guided local governments and enterprises to intensify efforts in technological upgrading for coalmine safety and the construction of safety facilities. It comprehensively carries out education on safe production to enhance the sense of responsibility for safety, continues to consolidate electric power safety and petroleum and gas production safety, intensifies supervision and management measures, and practices a working system in which production safety is supervised by the state and administered by local governments while enterprises take the responsibility. It further implements the safe production responsibility system, and enforces rigorous safe production laws and regulations and a related accountability system.

— *Improving the emergency response system*. As an important aspect of economic security, energy security has a direct bearing on national security and social stability. China practices unified power dispatch, hierarchical power management and operation of power grids

by regions. A safety responsibility system with division of work among government departments, supervision organs and power enterprises has been established, in which the power grids and power generation enterprises work out emergency response plans to cope with large-scale emergencies. Following the principle of unified planning and step-by-step implementation, China has built national oil reserve bases and expanded its oil reserve capacity. It has gradually established a guarantee system for oil and natural gas supply emergencies to ensure secure supplies of energy.

— *Accelerating market system construction.* China sticks to the policy of reform and opening-up, gives full play to the basic role of the market in allocating resources, encourages the entrance of entities of various ownerships into the energy field, and actively facilitates market-oriented reform related to energy. It has improved the coal market system in an all-round manner, established an open, orderly and healthy power market system characterized by separating government functions from those of enterprises and fair competition, paced up reform of the oil and natural gas circulation system, and promoted the healthy and orderly development of the energy market.

— *Deepening reform of management system.* China has stepped up efforts in the reform of its energy management system, improved the national energy management system and decision-making mechanism, strengthened unified planning and coordination among state departments and local governments, and consolidated the state's overall planning and macro-control in the field of energy development, with the focus on changing functions, straightening out relations, optimizing the setup and raising efficiency, so as to form a management system that centralizes control to an appropriate degree, divides work in a rational way, fosters scientific decision-making, and ensures smooth enforcement and effective oversight. The Chinese government has furthered the transformation of government functions, giving priority to guidance by policy measures and attaching importance to information services.

It has deepened the reform of the energy investment system, and established and improved the investment regulation and control system. It has further strengthened standardized management of energy resources, improved the management system of mineral resources development and exploitation, put in place and improved the system for paid use of mineral resources and the system of trade in mining rights, and rectified and regulated the order of mineral resources exploitation market.

— *Advancing price mechanism reform.* The price mechanism is the core of the market mechanism. On the premise of properly handling the relations among various interest groups and taking full account of the acceptability of all social sectors, the Chinese government has advanced energy price reform in a vigorous yet steady way, gradually established a pricing mechanism that is able to reflect resource scarcities, changes in market supply and demand, and environmental costs. It has deepened coal price reform to realize all-round marketization. It has propelled electricity tariff reform to ensure that electricity generation and selling prices are eventually formed by market competition, with the electricity transmission and distribution prices being supervised and controlled by the state. It has improved step by step the oil and natural gas pricing mechanism to timely reflect changes in international market prices and domestic market supply and demand.

VIII. Strengthening International Cooperation in the Field of Energy

China's development cannot be achieved without cooperation with the rest of the world, and the prosperity of the world needs China as well. With accelerating economic globalization, China has forged increasingly closer ties with the outside world in the field of energy. China's development of energy has not only satisfied its own needs for economic and social progress, but also brought opportunities and tremendous space for development to the rest of the world.

China is an active participant in international energy cooperation. In multilateral cooperation, China is a member of the energy working group of the Asia-Pacific Economic Cooperation (APEC), Association of Southeast Asian Nations (ASEAN) plus China, Japan and ROK (10+3) Energy Cooperation, International Energy Forum, World Energy Conference, and Asia-Pacific Partnership for Clean Development and Climate. It is an observer of the Energy Charter, and maintains close relations with such international organizations as the World Energy Agency and the Organization of Petroleum Exporting Countries (OPEC). Regarding bilateral cooperation, China has established a mechanism for dialogue and cooperation in the field of energy with a number of energy consuming and producing countries, such as the US, Japan and Russia, and the European Union. It has intensified dialogue and cooperation regarding energy exploration, utilization, technology and environmental protection, as well as renewable energy and new energy resources, and has had extensive dialogues and exchanges with them in such aspects as energy policy and information data. In international cooperation in the

field of energy, China has not only shouldered a wide range of international obligations, but also played an active and constructive role.

China has made active efforts to improve laws and policies related to its opening-up, promulgating in succession the Law on Sino-foreign Equity Joint Ventures, Law on Sino-foreign Cooperative Joint Ventures and Law on Foreign Capital Enterprises to create a fair and open environment for foreign investment. In 2002, China formulated the Regulations for the Guidance of Foreign Investment Orientation, and revised the Catalogue of Industrial Guidance for Foreign Investment and the Catalogue of Advantageous Industries for Foreign Investment in the Central and Western Regions in 2004, in order to encourage foreign investment in the energy sector, including energy and energy-related exploitation, production, supply, transportation and energy equipment production, as well as in the energy sector of the central and western regions.

— *Improving external cooperation in the exploration and development of oil and gas resources.* China has implemented a cooperative mode based on product-sharing contracts with other countries in the field of oil and gas resources. In 2001, China promulgated the revised Rules on External Cooperation for Ocean Oil Exploitation as well as Rules on External Cooperation for Onshore Oil Exploitation. China protects the legitimate rights and interests of foreign business people participating in collaborative oil exploitation. It encourages foreign business people to participate in cooperation in oil exploration and development, such as risk exploration for oil and natural gas, low-permeability oil and gas reservoirs (fields), and the improvement of the recovery rate of old oilfields. It encourages foreign investment in the construction and operation of oil and gas pipelines, as well as special oil and gas storages and port berths.

— *Encouraging foreign investment in exploration and development of unconventional energy resources.* In 2000, China promulgated the Opinions on Further Encouraging Foreign Investment in Exploring and

Exploiting Non-oil-and-gas Mineral Resources, further opening up its market in this regard. China allows foreign investors, either by themselves or in collaboration with Chinese counterparts, to conduct risk exploration on its territory. Foreign investors who invest in exploring and recovering paragenetic and associated minerals and utilizing tailing or exploring mineral resources in China's western regions are entitled to enjoy the preferential policy of reduction of or exemption from mineral resources compensation fees. Further efforts are being made to improve management of and services to foreign investment in the exploration and exploitation of non-oil-and-gas mineral resources.

— *Encouraging foreign investors to invest in and operate energy facilities such as power plants*. China encourages foreign investment in the production and supply of electric power and gas, as well as in the construction and operation of thermal power plants with a single-generator capacity of 600,000-kw and above, power stations burning clean coal, power stations featuring heat and power cogeneration, hydropower stations mainly for electricity production, nuclear power stations in which the Chinese side holds the dominant share, as well as power stations with renewable energy or new energy resources. It encourages foreign investors to invest in technology and equipment production for thermal, hydro and nuclear power stations with a considerably large generating capacity as well as for thermal power desulphurization. It also encourages them to invest in the construction and operation of coal pipeline transportation facilities.

— *Further improving the environment for foreign investment.* The Chinese government has kept its commitments to the WTO made when it joined the organization and has sorted out and rectified administrative regulations and departmental rules concerning energy management that are inconsistent with the WTO rules. In light of the demand of transparency of the WTO, China has relaxed control over the scope of geological data of a public welfare nature, strengthened the work of releasing energy policies, improved the energy data and

statistics system and promptly released energy statistics, so as to ensure the openness and transparency of energy policies, statistics and information.

— *Further expanding the scope of foreign investment*. In bringing in foreign investment for the development and utilization of energy resources, China pays primary attention to introducing foreign advanced technology, management experience and people of high caliber to further shifting the focus from investing in fossil energy resources to renewable resources, from emphasizing exploration and development to the development of service trade, and from relying mainly on foreign loans and direct foreign investment to directly pooling of funds at international capital market.

For a fairly long time to come, international energy trade will remain a major way by which China utilizes foreign energy resources. China will actively expand international energy trade, promote the complementary advantages of the international energy market and maintain the stability of this market. China will pursue energy imports and exports, and improve policies for fair trade in accordance with its commitments to the WTO and the WTO rules. It will, step by step, change the current situation of relying too heavily on spot trading of crude oil, encourage the signing of long-term supply contracts with foreign companies, and promote the diversification of trading channels. China supports direct overseas investment by domestic qualified enterprises to engage in transnational operation, and encourage such enterprises to participate in international energy cooperation and in the construction of overseas energy infrastructure, and steadily expand cooperation in energy engineering technology and services in accordance with international practice and the rules of the market economy.

Energy security is a global issue. Every country has the right to rationally utilize energy resources for its own development, and the overwhelming majority of countries could not enjoy energy security

without international cooperation. To realize a steady and orderly development of the world economy, it is necessary to promote economic globalization to develop in a direction featuring balance, universal benefit and win-win, and it is necessary for the international community to foster a new concept of energy security characterized by mutual benefit and cooperation, diversified development and coordinated guarantee. In recent years, sharp fluctuations of oil prices on the international market have affected the development of the world economy. The causes are multiple and complex, which demands that the international community strengthen dialogue and cooperation to work out a solution together from various aspects. To safeguard world energy security, China holds that the international community should make efforts mainly in the following three aspects:

— *Intensifying mutually beneficial cooperation in energy exploration and utilization*. To ensure world energy security, it is imperative to strengthen dialogue and cooperation between energy exporting countries and energy consuming countries, as well as between energy consuming countries. The international community should strengthen consultation and coordination as regards energy policies, improve the international energy market monitoring and emergency response mechanisms, promote oil and natural gas development to increase energy supply, realize globalization and diversification of energy supply, ensure stable and sustainable energy supply internationally, maintain reasonable energy prices on the international market, and ensure that each country's energy demands are well met.

— *Setting up a system to develop and popularize advanced technology.* Energy conservation and diversification is a long-range plan for global energy security. The international community should strive to develop and popularize energy conservation technology, promote the comprehensive utilization of energy, and encourage each country to improve energy efficiency. It is necessary to actively advocate cooperation in highly efficient utilization of fossil fuels, such as clean coal

technology, encourage cooperation of the international community in major energy technologies, such as renewable energy, hydrogen energy and nuclear energy, and explore for the establishment of a future world energy supply system using resources that are clean, economical, safe and reliable. Aiming at the sustainable development of humanity, the international community should handle well the problems concerning capital input, intellectual property rights protection and popularization of advanced technology, so as to benefit all countries and allow them to share humanity's achievements.

— *Maintaining a safe, stable and wholesome political environment*. Safeguarding world peace and regional stability is the prerequisite for global energy security. The international community should work collaboratively to maintain stability in oil producing and exporting countries, especially those in the Middle East, to ensure the security of international energy transport routes and avoid geopolitical conflicts that affect the world's energy supply. The various countries should settle disputes and resolve contradictions through dialogue and consultation. Energy issues should not be politicized, and triggering antagonism as well as the use of force should be avoided.

Conclusion

In the course of building a moderately prosperous society in all respects that benefits 1.3 billion people of China, energy has a significant bearing on China's economic and social development. It is a long and arduous task to use sustainable energy development to support the sustainable economic and social advancement. The Chinese government will strive to address the energy problem properly to realize sustainable energy development.

Though China's energy consumption is growing rapidly, its per-capita energy consumption level is still fairly low — only about three-fourths of the world's average. The figures for China's per-capita oil consumption and imports account for only one half and one quarter of the world's average, respectively, far below the level of the developed countries. China did not, does not and will not pose any threat to the world's energy security. China will continue to maintain its sustainable energy development and make it promote the sustainable development of the world's energy resources, thus making positive contributions to the world's energy security.

Peace and development remain the themes of our era. Pursuing peace, seeking development and promoting cooperation have become an irresistible trend of the times. With the continuous economic globalization, rapid advances in science and technology, quickened flow of the factors of production as well as the accelerated changes of industries, all countries and regions in the world have intensified their interactions. The world needs to strengthen cooperation to safeguard global energy security. China will, together with all other countries, make unremitting efforts to safeguard the stability and security of energy supplies in the world, strive to achieve mutual benefit, win-win and common development, and protect this home human beings share.