

China Medium and Long Term Energy Conservation Plan

November 25, 2004

National Development and Reform Commission

Preface

The 16th CPC National Congress advanced that China will achieve the objectives of building a society that is well-off in every aspect by 2020. Along with the increase of population and the acceleration of industrialization and urbanization, particularly the rapid development of heavy industry and transportation, the demand for energy will increase significantly. The imbalance between energy constraints and economic development, and the environmental pollution brought about by energy utilization will become even more evident.

Energy conservation is a realistic choice for alleviating the problem of energy constraint, a fundamental measure to resolve energy related environmental problems, an important approach to upgrade the quality and benefit of economic growth, and a necessity to enhance enterprises' competitiveness. To resolve the problem of energy constraint, on the one hand we shall increase resources development through strengthening domestic exploration, speeding up project construction, and making full use of foreign resources. On the other hand, we shall adhere to giving priority to energy conservation, taking a path of step-change energy conservation. Without vigorous energy conservation, the sustainable, rapid, harmonious and healthy development of national economy cannot be well supported; without a step-change in energy conservation, it is hard to realize the new approach of industrialization. We must fully recognize the importance of energy conservation from a strategic point of view, establish the cognition for hardship, and enhance the sense of crisis and responsibility. We must vigorously conserve energy, reduce energy intensity, improve the energy utilization efficiency, and accelerate building an energy conserving society

In order to follow the spirit of the 16th CPC National Congress and the 3rd and 4th plenary session of the 16th Party Central Committee, establish and carry out the views of scientific developments, and push the whole society towards energy conservation and energy intensity reduction, improve energy utilization efficiency, speed up building an energy saving society, and alleviate energy constrain and environment pressure, and thus ensure realization of the grand objective of building a society that is well-off in every aspect, the NDRC has therefore formulated "China Medium and Long Term Energy Conservation Plan", while formulating "Energy Development Program Outline for the Medium and Long Term".

Since reform and open-up to the outside world, this is the first Plan for energy conservation for the medium and long term formulated and issued by the Government of China. The Plan analyzes the characteristics of energy consumption in China, energy utilization status, main problems existing in energy conservation work, situation and tasks for energy conservation and then put forward directive idea, principles and objectives for energy conservation, key areas for energy conservation, key projects and implementation measures. During formulating the Plan, we broadly solicit opinions from relevant departments of the State Council, industrial associations, related research institutes and experts. Through approval of the State Council, "China Medium and Long Term Energy Conservation Plan" has already publicized and been distributed to different locals and different departments for implementation.

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Formulating Committee
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Foreword

Energy conservation is a long-term strategic guideline in China's economic and social development, and an extremely urgent matter at present. The NDRC has therefore formulated the Plan of Energy Conservation, which aims to push the whole society towards energy conservation and energy intensity reduction, to remove energy bottlenecks, to build an energy saving society, and to promote a sustainable social and economic development and thus realize the grand objective of building a society that is well-off in every aspect.

The programming period is divided into the Eleventh Five Years Plan period running to 2010 and the period from 2010 to 2020. The energy conservation objectives and the focus of development by 2010 are essentially planned, whereas the objectives stated for 2020 are proposed.

The Plan presented here comprise of the following parts:

1. the current situation in respect of energy utilization in China;
2. tasks for energy conservation;
3. the way forward for energy conservation, principles and objectives;
4. key areas and key energy conservation projects;
5. implementation measures.

This Plan of energy conservation is an important and integral part of China's long term energy development program. It is also a guiding document for China's medium- and long-term energy conservation work, laying the basis for the development of energy conservation projects.

(Note: the program has adopted the adjusted figures of energy production, consumption and per GDP energy consumption etc. in 2000 and 2002, drafted by the National Bureau of Statistics.)

I. Energy utilization in China – the current situation

1. Characteristics of energy consumption

The total primary energy consumption in 2002 in China was 1.514 billion tce, 527 million tce more than in 1990, signifying an increase of 53%, with an annual average growth rate of 3.6%; to which coal contributed 66.3%, petroleum 23.5%, natural gas 2.6%, hydroelectric power and nuclear power 7.6%.

Energy consumption in China is characterized by the following:

(1) Energy consumption is mainly coal based, giving rise to increasingly serious environmental problems. In 2002, coal consumption was 1.42 billion tons, representing an increase of 34% compared with 1990, with an annual average growth rate of 2.5%. Approximately 70% raw coal was directly burnt without washing and dressing. The emissions of sulfur dioxide and particulate matter caused by coal burning amounted to 70-80% of total emissions. The area affected by acid rain due to emission of sulfur dioxide constitutes one third of the national land area. Emissions of carbon dioxide from fossil fuels are the main source of greenhouse gases in China.

(2) Percentage of high quality energy is rising rapidly and the security of oil supply can no longer be ignored. In 2002, the consumption of high quality energy such as petroleum, natural gas and hydropower was 33.7% of total energy consumption, 9.9 percentage points higher than 1990, whereby the total consumption of petroleum rose from 16.6% in 1990 to 23.5%: a 6.9 percentage points increase. Since the "Ninth Five-year Plan" period, oil used in transport has been growing rapidly, and in particular, the average annual growth rate of oil consumption in commercial transport is much higher than the GDP growth rate in the same period. From the moment China became a net petroleum importer in 1993, its dependence on foreign resources has been increasing year after year. Net import volume of petroleum in 2002 rose to 81.3 million tons representing a dependence on foreign resources of 32.8%.

(3) Industrial energy consumption remains high and structural adjustment has a long way to go. In 2002, energy consumption for the primary, secondary and tertiary industries and the residential use were 4.4%, 69.3%, 14.9%

and 11.4% of the total energy consumption respectively. Industrial energy utilization was 68.3% and it has stayed at around 70% since 1990. Although the statistics are not completely comparable, industrial energy utilization in China is apparently higher than those in other countries. In the process of industrialization, the task to adjust economic structure is very arduous.

(4) Residential energy consumption slightly increased but is still at a very low level. In 2002, rural and urban residents consumed 200.1 TWh of electricity, 17.7 billion cubic meters of natural gas and town gas, and 11.69 million tons of LPG. Among the total residential energy consumption, the contribution of above energy increased from 3.7%, 1.66% and 1.72% in 1990 to 14.4%, 6.8% and 11.8% respectively. However the level of energy consumption is still very low. The residential electricity consumption per capita is 156kWh, only 7.7% of that in Japan and 4% in the United States.

2. Status of energy utilization

Since the reform and opening up to the outside world, under the guidance of the policy of “developing the energy supply and energy conservation simultaneously with priority giving to energy conservation” formulated by the Central Committee of the Party and the State Council, local governments, sectors and enterprises have spent great efforts on energy conservation and gained significant results.

(1) Energy utilization efficiency has improved to some extent.

Energy consumption per unit of output value. As calculated in the constant price of 1990, energy consumption per 10,000 Yuan of GDP dropped from 5.32 tce in 1990 to 2.68 tce in 2002, a 50% decrease, representing an average annual rate of 5.6% for energy intensity improvement.

Energy consumption per unit of product. Compared with 1990, in 2000, coal consumption for thermal power supply decreased from 427gce/kWh to 392gce, comparable energy consumption per ton of steel decreased from 997kgce to 784kgce, comprehensive energy consumption per ton of cement decreased from 201kgce to 181kgce, and comprehensive energy consumption for large scaled synthetic ammonia (with oil or gas as raw material) decreased from 1,343kgce per ton to 1,273kgce. The differences of energy consumption per unit of product from advanced world level were reduced by 6.1, 37.1, 18.7 and 3.1 percentage points respectively.

Energy efficiency. Energy efficiency in 2000 was 33%, 5 percentage points higher than that in 1990. The energy efficiency in energy processing, transforming, storage and transport was 67.8% and energy efficiency in end use was 49.2%.

(2) Energy conservation has generated significant economic and social benefits.

As calculated using a year on year comparison, during the twelve years from 1991 to 2002, an accumulated 700 million tce of energy were conserved or saved, whereby an annual growth rate of 3.6% in energy consumption supported the 9.7% national economic growth. The energy conservation and saving resulted in an annual emission reduction of 10.50 million tons of sulfur dioxide. Energy conservation played an important role in mitigation of the imbalance between energy supply and demand; in improvement of quality and effectiveness of economic growth; in reduction of environmental pollution; and in safeguarding of sustainable, rapid and sound development of national economy.

(3) Energy utilization efficiency as compared with advanced foreign countries

Energy consumption per unit of output value. As studied by related agency, energy consumption per 1 million USD of GDP in 2000, calculated using the current exchange rate is 1,274 tce for China, 2.4 times more than that of average world level, 2.5, 4.9, 8.7 and 0.43 times more than that of the United States, EU, Japan and India respectively.

Energy consumption per unit of product. In 2000, energy consumption per unit of eight major products, i.e. electric power, iron & steel, nonferrous metal, petrochemical, building material, chemical, light industry, and textile industries was on average 40% higher than that of the most advanced world level. For example, coal

consumption for thermal power supply was 22.5% higher, comparable energy consumption per ton steel in large- and medium-sized iron and steel mills was 21.4% higher, total specific energy consumption of copper smelting was 65% higher, total specific energy consumption of cement was 45.3% higher, total specific energy consumption of large scaled synthetic ammonia was 31.2% higher, and total specific energy consumption of paper and paper board was 120% higher.

Energy efficiency of major energy consuming equipment. In 2000, average operating efficiency of coal fired industrial boilers was around 65%, 15-20 percentage points lower than that of advanced world level; average energy efficiency of medium and small sized motors was 87%, and the average design efficiency of fans and water pumps was 75%, all being 5 percentage points lower than that of advanced world level, with the system operating efficiency nearly 20 percentage points lower; fuel economy level of motor vehicles was 25% lower than that of Europe, 20% lower than that of Japan, 10% lower than the overall level in the United States; oil consumption per 100t-km of freight vehicle was 7.6L, more than double the amount for foreign advanced levels. Oil consumption level of vessels for inland river transportation was 10-20% higher than that of foreign advanced level vessels. Energy consumption per unit of building area. At present, energy consumption for space heating of per unit building area in China is 2-3 times as much as that in developed countries with similar climatic conditions. As analyzed by experts, it is practical and feasible to fully enforce the energy standards, saving 50% of energy for public and residential buildings in China. Compared with developed countries, there will be further potential to save an additional 50% of energy even if the target of energy conservation by 50% were achieved. Energy efficiency. Energy efficiency is 10 percentage points lower than that of the advanced world level. The average efficiency of thermal power generation, for example, is 33.8%, which is 6-7 percentage points lower than the advanced world level. In the various phases of energy utilization (processing, transform, storage, transport and transmission) the losses and waste are enormous.

The gap in energy utilization efficiency between China and foreign countries indicates the existence of a huge energy saving potential in China. According to relevant studies, the current energy saving potential in China, calculated on the basis of the differences in energy consumption per unit of product and in the energy efficiency level of energy end-use equipment is approximately 300 million tce when compared with advanced world level,. The low efficiency of energy utilization in China results from the expansion mode of economic growth, irrational structure, backward technology and equipment, and poor management. Firstly, the structure is irrational. In the industrial structure, the tertiary industry with low energy intensity, which is only 43% of that of secondary industry, lags significantly behind, especially the service industry. The tertiary industry contributes only 33% to GDP in China, whereas average world level is about 63%. The energy intensive heavy industry occupies a large proportion of the secondary industry and this industrialization is still based on extensive expansion with high consumption, mass waste and heavy pollution. High quality energy use only occupies a small proportion of energy consumption structure. The scale of the enterprises is small, with low degree of industrial integration. Secondly, the process technologies and equipment used are backward. Backward processes still take up a large proportion of the key industries. For example, the gap in terms of total energy consumption per ton steel between large scale and small scale iron and steel complexes is approximately 200kgce. For thermal power plants, the gap in terms of coal consumption per kWh power supply between 300MW units and 5MW units is more than 100gce. The gap in terms of total energy consumption per ton of synthetic ammonia between large and medium scale enterprises on the one hand and small-scale enterprises on the other, is approximately 300kgce. Thirdly, the management is of low level. The systems for statistics, metering and assessment which are essential for energy conservation, are imperfect. The level of information management level is low. All these result in heavy losses and waste.

3. Major problems in energy conservation work

Firstly, knowledge of the importance of energy conservation is insufficient, and the guideline policy to give priority to energy conservation, has not been fully implemented. There is a tendency in the development concept that attaches importance to exploitation and growth rate but despises conservation and benefit. Energy conservation is only regarded as an expedient to ease up the unbalance between energy supply and demand, paying attention to energy conservation only when energy supply is tight, and neglecting energy conservation when energy supply is improved. It is generally believed that energy conservation can be realized by merely relying on market mechanism. There is insufficient knowledge about the important position of energy conservation in transforming economic growth patterns and in realizing the strategy of sustainable development, as well as insufficient recognition of the important function of the government in energy conservation management. The guideline of giving priority to energy conservation has not been fully embodied in the various aspects of macro-policy. Energy conservation management in some locations and industries has been weakened. Energy conservation has not become the natural behavior of most enterprises and all citizens.

Secondly, energy conservation laws and regulations are not complete. The “China Energy Conservation Law” was promulgated and put into effect in 1998. However, the lack of compliance and slack enforcement of the law is rampant; the supporting regulations are incomplete, and the exercisability of the law also remains to be improved. The formulation of energy efficiency standard lags behind. The standards and codes on fuel economy for motor vehicles have now been promulgated, but there are no energy efficiency standards and codes for most of industrial energy consuming equipment (and products). Although the building design codes for various climatic zones, targeting 50% energy saving, have been formulated and promulgated successively, only less than 5% of newly-constructed urban buildings as a whole in the country comply with the design codes of building energy conservation.

Thirdly, there is no effective energy conservation incentive policy. Foreign and domestic practices show that energy conservation has been a market failure in many aspects. Governmental macro-regulation and guidance are needed. At present, financial and taxation policies have not given enough support to energy conservation renovation, research and development of energy saving equipment and their application, nor to rewards for energy conservation. The mechanism of effective energy conservation promoting has not been established.

Fourthly, a new energy conservation mechanism adaptive to market driven economy system has not been established. The energy conservation management system formed under a planned economy system does not fit to the new situation. New energy conservation mechanisms such as integrated resources planning, power demand side management, energy performance contracting, energy efficiency labeling management, and voluntary agreements, are widely accepted in foreign countries. They are, however, not widely applied in China, though some are already being tested and developed. The reform of heating supply system lags behind, this being difficult to implement due to various factors.

Fifthly, the development and dissemination of energy conservation technology is inadequate. Energy conservation must rely on technological progress. Since its reform and opening up, China has developed, demonstrated (introduced) and disseminated a large number of new technologies, new processes and new equipment of energy

conservation. The technology level of energy conservation has been greatly upgraded. However, on the whole, investment is insufficient, and thus the weak ability to make innovation. Advanced and applicable energy conservation technologies are poorly developed, especially some common and key technologies that would have a significant effect. At the same time, due to lack of incentive policies and mechanisms to promote the dissemination of energy saving technology, most enterprises are faced with financing difficulty to disseminate and apply energy conservation technology.

Sixthly, the capacity building in energy conservation regulatory and service institutions lags behind. Presently, there are a total of 145 energy conservation monitoring and testing (and/or technical service) centers in China. Most of which are authorized by the government to supervise and monitor the energy conservation law enforcement. In general, most of these centers lag behind in terms of capacity building, have backward monitoring and testing equipment and have a shortage of information and skilled staff. They are not strong as a whole. The energy statistic system is incomplete, and the energy conservation information has no effective channel for dissemination. Both aspects fail to meet the requirements for energy conservation works.

II. Situation and tasks for energy conservation work

The 16th CPC National Congress advanced that China will achieve the objectives of building a society that is well-off in every aspect by 2020. Along with the increase of population and the acceleration of industrialization and urbanization, particularly the rapid development of heavy industry and transportation, the demand for energy will increase significantly. The imbalance between energy constraints and economic development, and the environmental pollution brought about by energy utilization will become even more evident.

Firstly, The energy constraint is evident. To achieve the target of quadrupling China's GDP from year 2000 to 2020, the energy intensive heavy industries such as iron and steel, non-ferrous metal, petrochemical, chemical and cement industries will have to accelerate their development. Along with the improvement of living standards and the upgrade of consumption structure, more and more families will purchase automobiles and household electric appliances. With the acceleration of urbanization, energy consumed by buildings and residential uses will increase significantly. By 2020, China's energy demand will be more than 4 billion tce, if the growth trend of energy consumption in recent three years is sustained. Such a huge demand will bring serious problems for the supply of coal, petroleum, power and energy. According to the medium- and long term energy development program, the total energy consumption by 2020 will reach 3 billion tce, provided all the measures of energy conservation are put into effect. To meet the demand, we face tremendous pressure to solve the question whether to increase the domestic energy supply or use resources from abroad. The construction of an energy infrastructure is capital intensive and the construction period is long. Moreover it also faces a series of other problems such as limitation of water resources and transportation. Rapid growth of energy demand poses severe challenges on energy resources availability, capacity, and security of national energy supply.

Secondly, environmental problems are aggravated. China is one of few countries which energy structure is dominated by coal. It is also the biggest coal consuming country in the world, leading to serious coal-ash pollution. With the rapid growth of motor vehicles, metropolitan atmosphere pollution has changed its type from pure coal ash into a mixed style of coal ash and motor vehicle's exhausts. Utilizing energy resources in an extensive way has heavily damaged the environment. At present, China's annual sulfur dioxide emission is more than 20 million tons, and the area affected by acid rain has already covers 30% of China's land area, far beyond the tolerance of environment. Although China's energy structure will continue to be improved before 2020 and

the proportion of coal in total consumption will drop to some extent, the total coal consumption will still increase substantially, posing great environment pressure on economic development.

Energy is the strategic resource, and the important material basis for China to build a society that is well-off in every aspect. To resolve the problem of energy constraint, on the one hand we shall increase resource development through strengthening domestic exploration, speeding up project construction, and making full use of foreign resources. On the other hand, we shall adhere to giving priority to energy conservation, taking a path of step change energy conservation. Energy conservation is a realistic choice for alleviating the problem of energy constraint, a fundamental measure to resolve energy related environmental problems, an important approach to improve the quality and benefit of economic growth, and a necessity to enhance enterprises' competitiveness. Without vigorous energy conservation, the sustainable, rapid, harmonious and healthy development of national economy cannot be well supported; without a step-change in energy conservation, it is hard to realize the new approach of industrialization. We must fully recognize the importance of energy conservation from a strategic point of view, establish the cognition for hardship, and enhance the sense of crisis and responsibility. We must vigorously conserve energy, reduce energy intensity, improve the energy utilization efficiency, and accelerate building an energy conserving society, so as to make a contribution to realizing the target of building a society that is well-off in every aspect by 2020.

III. Directive idea, principles and objectives for energy conservation

1. Directive idea

Directive idea for energy conservation can be expressed as: following in earnest the spirit of the 16th CPC National Congress and the 3rd and 4th plenary session of the 16th Party Central Committee; being guided by scientific developments, and adhering to the guideline of giving priority to energy conservation, and focusing on substantially improving the efficiency of energy utilization. It is thereby essential to change growth patterns, to readjust the economic structure and to accelerate technological progress. Take law ruling as security. Attach importance to improving energy end-use efficiency. Improve laws, regulations and policies, deepen reform, innovate mechanisms, strengthen education and dissemination, enhance management, gradually change the production and consumption patterns, and shape a mechanism of conscious energy conservation for enterprises and society. Accelerate the development of an energy conserving society, and facilitate the sustainable economic and social development of economy and society by effective energy utilization.

2. Principles to be followed

(1) Adhere to taking energy conservation as an important component of changing the economic growth pattern. The fundamental reason for high energy intensity and excessive energy waste in China lies in the extensive growth pattern. To greatly improve energy utilization efficiency, we must fundamentally change the extensive development pattern that purely relies on expansion and neglects tapping potential and renovation. We must take a new approach of industrialization featuring in higher science and technology contribution, good economic returns, low resource consumption, little environmental pollution and a full display of advantages in human resources. We must make every effort to realize harmonious integration of economy sustainable development, all-round social progress, resources sustainable utilization, ceaseless environmental improvement, and sound environmental circulation.

(2) Adhere to the integration of energy conservation with structural adjustment, technology progress and management enhancement.

Through adjusting industrial structure, product structure and energy consumption structure, we shall eliminate backward technology and equipment, and accelerate the development of the tertiary industry represented by service industry and the new- and hi-tech industry represented by information technology. We shall transform traditional industry with new and high technology and advanced adaptive technology, promote the optimization and upgrade of industrial structure, and improve technology and equipment level of industry as a whole. We shall develop, disseminate and apply advanced and high efficient technology for energy conservation and substitution, technology for comprehensive utilization, and new and renewable energy technology. We shall intensify management and reduce loss and waste in order to improve energy utilization efficiency.

(3) Adhere to the integration of the function of market mechanism with government macro-regulation. With market regarded as guidance and enterprise as major players, we shall give full play to the essential role of market in the resources allocation, through deepening reform and innovating mechanism. Through enacting and enforcing laws and regulations as well as standards, the government shall strengthen policy and information guidance, create system, policy and market conditions to facilitate energy conservation, and establish the mechanism for enterprises to conserve energy self-consciously according with the market system, so as to promote energy conservation all over the society.

(4) Adhere to the integration of lawful management and policy incentives. Strict market entrance permission will be applied to incremental production capacity, and the enforcement, supervision and inspection of law and regulation will be enhanced, with supplementary policy support. Thus, the development of energy intensive enterprises and buildings, and low efficiency equipment (and products) will be rationalized from headstream. For existing production capacity, we will further tap the potential of energy conservation. Under the precondition of strict law enforcement, we will accelerate structural readjustment and technology progress through incentive policy and information direction. .

(5) Adhere to giving prominence to emphases, providing guidance by categories, and promoting comprehensively. As for key energy consuming enterprise with annual energy consumption exceeding 10,000 tce, it is necessary to apply strict and lawful management, specify targets and measures, publicize their energy consumption status, and intensify supervision and inspection. For small and medium scaled enterprises, more attention should be paid on policy guidance and service provision while applying strict lawful management. For transportation sector, energy conservation is focused on new produced vehicles. The fuel economy standard of motor vehicles, and supporting policies and regulations should be established and put into effect. The focus on building energy conservation is to strictly enforce design standard of energy conservation and strengthen policy guidance. The focus on energy conservation in commercial and residential sectors is to upgrade energy efficiency standard of energy consuming equipment, tighten the market entrance permission, and lead and encourage users and consumers to purchase energy-saving products through market mechanism.

(6) Adhere to public participation by the whole society. Energy conservation relates to all sectors, and every families and households. It demands joint effort and active participation by the whole society. Enterprises and consumers are major players in energy conservation. They shall change irrational production and consumption patterns and fulfill lawful responsibility of energy conservation. The government shall guide and regulate energy utilization behavior through enacting laws, regulations, policies and standards, provide service to enterprises and consumers and take lead in energy conservation. Agencies shall serve as bridge and linkage between the government and enterprise, and between enterprises.

3. Objectives of energy conservation

(1) Macro energy conservation indicators: by 2010, energy consumption per 10,000 Yuan GDP (constant price in 1990, the same below) is expected to drop from 2.68tce in 2002 to 2.25tce, with an annual average energy

conservation rate of 2.2% from 2003 to 2010. The energy conservation capacity is expected to reach 400 million tce

Energy consumption per 10,000 Yuan GDP will drop to 1.54tce in 2020, with an annual average energy conservation rate of 3% from 2003 to 2020. The energy conservation capacity is expected to reach 1.4 billion tce, 111% as much as the total planned newly-increased energy production of 1.26 billion tce during the same period, and correspondingly reduction of 21 million tons sulfur dioxide.

(2) Energy consumption indicators per unit of major products (amount of output): By 2010, China's products as a whole are expected to reach or approach the advanced international level of the early 1990s in terms of the indicators, of which large and medium sized enterprises are expected to reach the advanced international level at the beginning of the 21st century; and by 2020 China is expected to reach or approach the international advanced level (See Table 1).

Table 1. Energy Consumption Index per Unit of Major Products

Items	Unit	2000	2005	2010	2020
Coal consumption of power supply	gce/kWh	392	377	360	320
Comprehensive energy consumption per tone steel	kgce/t	906	760	730	700
Comparable energy consumption per ton steel	kgce /t	784	700	685	640
Comprehensive energy consumption of 10 types of non-ferrous metals	tce/t	4.809	4.665	4.595	4.45
Comprehensive energy consumption of aluminum	tce/t	9.923	9.595	9.471	9.22
Comprehensive energy consumption of copper	tce/t	4.707	4.388	4.256	4
Energy consumption of unit energy factor of oil refining	kgce /t.factor	14	13	12	10
Comprehensive energy consumption of ethylene	kgce/t	848	700	650	600
Comprehensive energy consumption of large scaled synthetic ammonia	kgce/t	1372	1210	1140	1000
Comprehensive energy consumption of caustic soda	kgce /t	1553	1503	1400	1300
Comprehensive energy consumption of cement	kgce /t	181	159	148	129
Comprehensive energy consumption of plate glass	kgce /weighting box	30	26	24	20
Comprehensive energy consumption of architectural ceramics	kgce /m ²	10.04	9.9	9.2	7.2
Comprehensive energy consumption of railway transportation	tce/million t-km	10.41	9.65	9.4	9

(3) Energy efficiency indicators of major energy consuming equipment: by 2010, energy efficiency of newly added major energy consuming equipment is expected to reach or approach international advanced level, and some automobiles, motors and household electric appliances are expected to reach the international leading level (See Table 2).

Table 2. Energy Efficiency Indicators of Major Energy Consuming Equipment

Items	Unit	2000	2010
Coal-fired industrial boiler (under operation)	%	65	70-80
Medium and small sized motor (design)	%	87	90-92
Fan (design)	%	75	80-85
Pump (design)	%	75-80	83-87
Air compressor (design)	%	75	80-84
Average oil consumption of automobiles (for passenger purpose)	L/100km	9.5	8.2-6.7
Room air conditioner (energy efficiency ratio)		2.4	3.2-4
Electric refrigerator (energy efficiency index)	%	80	62-50
Household gas cooker (thermal efficiency)	%	55	60-65
Household gas water heater (thermal efficiency)	%	80	90-95

(4) Objectives of Macro-regulation: It will establish relative perfect laws, regulations and standards system governing energy conservation by 2010, policy support system, supervision and regulation system and technical service system, which are suitable for socialist market economy.

IV. Key fields and key projects of energy conservation

1. Key fields

(1) Key industries

Electric Power Industry. We should try to develop 600MW or above supercritical (ultra-supercritical) units and large combined-cycle units; improve thermal power generating units that under the operation with high efficient and clean power generating technologies, so as to increase the efficiency of these units. Replace small unit with large ones; construct large unit restrict small ones; eliminate small units, so as to increase single-unit capacity. Develop cogeneration, heat-electricity-integrated generation, and combined heat-electricity-coal gas multiple supply. Promote large grid interconnection and practice the power grid economy operation technology. Adopt advanced power transmission, transformation and distribution technologies, and gradually discard old energy intensive equipment, as well as decrease losses of power transmission, transformation and distribution. Adopt natural gas power generating unit to replace small oil-fired units. Optimize power source layout, and properly develop small decentralized power supplied by such fuel as natural gas, coal-bed methane and other industrial waste gases; strengthen electric power safety. Power plants should reduce their self-consumption of power.

Iron and Steel Industry. We should speed up eliminating backward technical processing and equipment, and enhance the energy consumption standards for admission of newly building, retrofitting and expanding projects. We should employ large advanced technical equipment, and production processing characterized by its systematic, continuous, integrated and high efficiency, so as to maximize comprehensively utilization of various energies and resources. Large iron and steel enterprises equipped with coke ovens should install coke dry quenching facilities, and large blast furnace should be equipped with furnace top pressure differential power generating equipment (TRT); apply technologies such as continuous casting and preventing furnace from slag splashing in steel-making system. Further realize continuous casting in steel-rolling system and greatly promote the processing of once reheating to final production of continuous casting billets, and hot charge and hot conveyance technology, and apply heat storage combustion technology. Sufficiently utilize combustible gases such as blast furnace gas, coke oven gas and BOF gas, and various steams, and take self-sustained power station as integrated means to push iron and steel enterprises to save energy and reduce consumption.

Nonferrous Metals Industry. Mines should mainly use large, high efficient and energy saving equipment, so as to

increase efficiency of mining and ore-dressing. In copper smelting process, adopt the advanced oxygen-enriched flash and oxygen-enriched bath smelting processes to replace those traditional technologies such as reverberatory furnace, blast furnace and electric furnace, improving smelting intensity. In alumina smelting process, develop technologies such as ore-dressing Bayer process and gradually disuse the direct heating and melting technology. In electrolytic aluminum smelting process, adopt large pre-baking electrolytic cell; within a specified period, discard self-baking electrolytic cell; step by step phase out small pre-baking electrolytic cell. In lead smelting process, adopt the new lead smelting process by oxygen bottom blowing and other technologies of direct lead smelting by oxygen; renew the sintering blast furnace process and eliminate the traditional primitive lead smelting process. In zinc smelting process, develop the new wet process and disuse traditional primitive zinc smelting process.

Oil and Petrochemical Industry. Oil and natural gas exploiting should apply the optimization technology for oil exploitation system, energy saving supplementary technology for thick oil hot exploitation, optimized operation technology for water filling system, comprehensive energy saving technology for oil and gas enclosed collection and transmission, and recovery and reutilization technology for discharged natural gas. In the process of oil refining, we should improve equipment operation loading and heat exchange efficiency, optimize operation and decrease processing loss. In the process of ethylene production, we should optimize raw material structure, retrofit ethylene cracking furnace with advanced technology, optimize quenching system operation, strengthen facilities management and decrease energy consumption in the process of non-production. We should also replace fuel oil (light oil) with clean coal, natural gas and high-sulfur petroleum coke; promote the circulating fluidized-bed boiler technology and petroleum coke gasifying combustion technology; recovery and reuse residual heat and geothermal by employing technologies of energy system optimization, heavy oil emulsification, high-efficiency burner and absorption heat pump.

Chemical Industry. Large scaled synthetic ammonia plants should employ advanced energy saving technical processes, new catalyst and high-efficiency energy saving equipment, so as to enhance conversion efficiency and recovery and reuse of residual heat. We should promote technology of recovering residual heat from flue gas of one-section furnace for gas-based synthetic ammonia, and renovate steam system. We should accelerate retrofit of replacing fuel oil with clean coal or natural gas for oil-based synthetic ammonia. Apply energy saving equipment and variable pressure adsorption recovery technology to medium and small scaled synthetic ammonia, so as to reduce energy consumption. For coal gas production, we should employ the coal water slurry or advanced pulverized coal gasification technology to replace traditional fixed bed coal gasification technology. In the production of caustic soda, we should gradually eliminate graphite anode diaphragm process, and increase the percentage of ion membrane method. In the production of soda ash, we should disuse energy intensive equipment and use large scale and automatic equipment.

Building Material Industry. In cement industry, we should develop the new dry process kiln with precalcinator technology; increase the percentage of new dry process cement clinker; promote energy efficient grinding equipment and power generating technology by using residual heat recovered from cement kiln; improve the performance of existing large and medium sized rotary kiln, mills and drying machines for the purpose of energy conservation; gradually phase out mechanized vertical kiln, wet process kiln and long dry process kiln and other backward cement production technologies. In glass industry, we should develop the advanced float process; eliminate backward Fourcault and Colburn processes; promote technologies of overall heat insulation for furnace

and kiln and enriched oxygen and full oxygen combustion. In architectural ceramics industry, we should discard backward kilns of down draft kiln, pushed slab kiln and multi-hole kiln, promote the roller kiln technology and improve combustion system. In the processing of sanitary ceramics, we shall change fuel composition and use the clean gas fuel so as to apply sagger-free burning technology. We should also promote application of new wall materials and thermal insulation and sound insulation material, waterproof material and sealing material with characteristics of high quality, environment protection and energy efficient; increase the percentage of high performance concrete application.

Coal Industry. We should gradually eliminate backward technology equipped, inefficient, seriously resource wasted and heavily environment polluted small coal mines, and build large scaled modernized coal mines, so as to realize high efficiency and high yield. We should adopt new high-efficiency ventilator and energy efficient draining pump; carry out energy conservation renovation for equipment and system, perfect coal integrated processing system and improve coal utilization efficiency.

Machinery Building Industry. We should give up backward and energy intensive electro-mechanical products; develop high efficiency and energy saving electro-mechanical products such as variable frequency motor and rare earth permanent magnet motor; promote a increase in energy utilization efficiency of general electro-mechanical products such as fan and water pump; improve design, manufacture and processing capacity for energy efficient electro-mechanical products.

(2) Transportation

Road transport. We should speed up eliminating old energy intensive automobiles and developing diesel automobile, large-tonnage automobile and special vehicle. Popularize van truck, special transport vehicles such as container vehicle, and improve road quality. Accelerate the intensive progress of transport enterprises and optimize structure of transport organization. The phenomenon of single vehicle no-load running shall be tried to avoid, and improving transport efficiency etc..

Newly Added Motor Vehicle. Growth of oil consuming by motor vehicle will rank the first among that of all oil consuming vehicle. According to the experience of the United States, Japan and European countries, the most economic and effective measure to reduce oil consumption of motor-driven vehicles is to formulate and implement fuel oil economy standard of motor vehicle and practice related regulations such as vehicle fuel oil tax. In this way, we may push automotive manufacturing enterprises to improve technology, reduce oil consumption, increase fuel oil economy and guide consumer to purchase low oil consuming automobiles.

Urban Transportation. We should plan a reasonable transportation mode, accelerate development of public transportation such as rail transit and improve efficiency of integrated traffic and transport system. In China's large cities, transportation mode should be developed to take road transport as a priority, rail transit as auxiliary and private motor vehicle transport as supplementary with rational development of bicycle transport. In China's medium and small cities, road public transport and private vehicle transport shall become the main development direction.

Rail Transportation. We should accelerate development of electrified railway and replace oil with electricity for railway transportation; develop AC-DC-AC high efficient electric locomotive; promote pulling power factor compensation technology for electrified railways and other power saving measures, so as to improve electric power utilization efficiency. Internal combustion locomotives should use efficient diesel addition agent and oil-saving technologies and equipment. Strictly carry out computer centralized control for receiving and dispatching

locomotive oil for locomotives; develop the technology of locomotive supplying power to passenger carriage; promote application of passenger carriage power supply; gradually reduce and cancel electric locomotive with diesel engine; strengthen transportation management; optimize locomotive operation; and reduce fuel oil consumption for railway transportation.

Aviation Transportation. We should adopt energy saving of airplane (per unit consumption for different airplanes should be 0.2-1.4 kg/t-km), strengthen management, improve carriage rate, attendance rate and transportation turnover capability, improve fuel oil efficiency and reduce oil consumption.

Water Transportation. By formulating ship technical standard, we can accelerate eliminating old ships ; use new types of ships and advanced power system; develop modern transport organizing means such as specialized bulk transport and multi-model transport; optimize structure of ship transport capability and improve ship average deadweight tonnage, etc.

Agricultural and Fishery Machinery. We should phase out backward agricultural machineries; apply advanced energy-saving diesel engine technology so as to reduce fuel oil consumption by diesel engine; promote advanced mechanized farming technology such as less-farming, free-farming and combination processes; generalize electric motors in fixed production sites; apply renewable energy such as hydro energy, wind energy and solar energy to agricultural machineries. We may improve utilization efficiency and decrease fishery oil consumption, by eliminating backward fishing ship.

(3) Construction, commercial and residential building.

Buildings. During the "Eleventh Five-year Plan" period, new buildings should strictly subject to the design standard of 50% energy conservation. Several major cities such as Beijing and Tianjin shall take a lead in implementing the 65% energy-saving standard. Reform of heat supply system shall be carried out in a full scale. In China's large and medium cities, a charge system based on thermal meter will be widely spread in district heating of residential and public buildings; small cities will be pilot of such practice. Energy saving retrofit for existing residential and public buildings shall be conducted in combination with urban reconstruction. Large cities are expected to improve 25% of building areas, medium cities 15% and small cities 10%. We will promote employing the cold storage air conditioner, heat storage air conditioner and cold-heat-electricity cogeneration technology. Centralized air conditioning system should adopt variable frequency speed adjustable technology for fan and pump. And use such materials as energy-saving doors and windows and new wall materials. In addition, we should speed up application of renewable energy such as solar and geothermal energies in buildings.

Household and Office Electric Appliances. We should promote household and office electric appliances such as high-efficiency energy saving refrigerator, air conditioner, television, washing machine; reduce energy consumption of stand-by; implement energy efficiency standard and labeling; and standardize market of energy-saving products.

Lighting Appliance. We should promote high-efficiency fluorescent lamp products such as phosphorus energy-saving lamp, high intensity gas discharge lamp and electronic ballast, decrease use incandescent lamp, gradually eliminate high pressure mercury vapor lamp, implement lighting product energy efficiency standard, increase the percentage of using high-efficiency energy saving fluorescent lamp.

2. Key projects

Coal-fired industrial boiler (kiln) retrofit projects. Currently, there are about 500,000 medium and small boilers available in China. The average unit capacity is only 2.5 tons/hour. The design efficiency is 72 – 80%. The actual operating efficiency is 65% or so. Among these boilers, 90% are coal-burning boilers. The annual coal consumption of them is 350 – 400 million tons. The potential of coal saving is about 70 million tons. During the “Eleventh Five-year Plan” period, we should transform or replace existing medium and small coal-burning boilers (furnaces and kilns) by burning high quality coal, screened lump coal and sulfur fixed coal, and adopting advanced technologies such as circulating fluidize bed and pulverized coal burning and establishing scientific management and operation mechanisms. As a result, the coal-burning industrial boiler efficiency will increase 5 percentage points with coal savings of 25 million tons; the coal-burning furnace and kiln efficiency will increase 2 percentage points with coal savings of 10 million tons.

District Cogeneration Projects. Compared with separate generation of heat and electric power, heat efficiency of cogeneration can increase 30%. Heat supply efficiency of district heating is 50% more than that of scattered small boilers. During the “Eleventh Five-year Plan” period, we should pay attention to establishing 300 MW cogeneration units with environmental protection features in areas where thermal loads for space heating are heavy and thermal loads are relatively concentrated or there is more development potential; in areas with heavy industrial thermal loads, appropriately establish thermal-based back-pressure units according to local conditions; in areas where there are great demands for space heating and less thermal loads, priority develop district heating, and then develop cogeneration after conditions are mature; in the medium and small cities, establish heat-electricity-coal gas cogeneration with taking circulating fluidized bed as major technology, and distributed cogeneration and heat-electricity-cooling cogeneration with clean energies as fuels, rebuild the current heat supply through scattered small coal-burning boilers into the district heating. In 2010, popularization rate of district heating in urban areas will increase from 27% in 2002 to 40%, the heat supplying by newly increased cogeneration units will be 40 GW and the annual energy savings will amount to 35 million tce.

Residual Heat and Pressure Utilization Projects. During the “Eleventh Five-year Plan” period, iron and steel integrated enterprise should practice coke dry quenching (CDQ), power generation through blast furnace top pressure difference (TRT), improve power generation by using blast furnace coal gas and recovery and reuse of BOF gas, and thus 2.66 million tce will be saved. In the production line with daily output of above 2,000 tons cement, we should every year establish 30 power generating units with using medium and low temperature residual heat, and thus 3 million tce will be saved per year; through exploitation of ground coal-bed gas and gas drawing from ground goaf, waste mine and under mine, annual utilization of methane gas shall reach 1 billion m³ which equals a saving of 1.35 million tce annually.

Petroleum Saving and Substituting Projects. During the “Eleventh Five-year Plan” period, in the electric power, petrochemical, metallurgical, building material, chemical, and transport industries, we should replace fuel oil (light oil) with clean coal, petroleum coke and natural gas, accelerate transmission of electricity from the western to the eastern region of China and substitute small oil burning unit; implement fuel economy standard for motor vehicle and supporting policy and system and adopt various measures to save oil; implement clean automobile action plan and develop hybrid vehicle. Popularize gas vehicle among such fields as city public buses and taxis. Promote methanol and alcohol-powered automobiles and accelerate the progress of the coal liquefaction projects and develop substitute fuels, and thus can save and substitute 38 million tons petroleum.

Motor System Energy Saving Projects. At present, the total capacity of various types of electric motors in China is approximately 420GWh. The actual operating efficiency of these motors is 10-30 percentage points lower than that of foreign countries, and electric power consumption of these accounts for 60% of the total in China. During

the “Eleventh Five-year Plan” period, great efforts should be made to popularize high-efficiency energy saving motor and rare-earth permanent magnet electric motor. In coal, electric power, non-ferrous metal and petrochemical industries, we should optimize the system of high efficiency energy saving fan, pump and compressor and popularize the control technologies of variable frequency speed adjustable and automatic system, so as to raise operating efficiency for 2 percentage points, and save 20 TWh electric power annually.

Energy System Optimization Projects. In the key energy intensive industries, it should optimize energy system. That is, make energy system efficiency to reach the highest level of the same industry or approach the advanced international level by system optimization design, technological transformation and management improvement. During the “Eleventh Five-year Plan” period, above efforts should be particularly made in metallurgy, petrochemical and chemical industries. It is expected to decrease the integrated energy consumption of related enterprises and promote their competitiveness in the market.

Building Energy Conservation Projects. During the “Eleventh Five-year Plan” period, residential buildings and public buildings shall execute strict standard of 50% energy saving. Meanwhile, we should accelerate the reform of heat supply system and promotion of energy-saving construction technologies and products. By making the above efforts, we may save 50 million tce respectively. At the same time, we should carry out energy conservation retrofit for existing buildings in the northern regions where space heating is required, and great efforts should be conducted to comprehensive energy conservation renovation for existing hotels and restaurants.

Green Lighting Projects. Electric power use by lighting accounts for about 13% of China national power use. Ratio of high-efficiency energy saving fluorescent lamp to incandescent lamp is 1:2.6. Substitution of high efficiency fluorescent lamp for incandescent lamp can save 70-80% electric power. Substitution of electronic ballast for traditional inductive ballast can save 20-30% electric power. Traffic signal incandescent lamps are replaced by light emitting diode (LED), which can save 90% electricity. During the “Eleventh Five-year Plan” period, much efforts should be made to spread high-efficient and energy-saving lighting systems, and tri-phosphorus fluorescent lamp in public facilities, hotels, commercial buildings, office buildings, stadiums and gymnasiums and residential buildings. Besides, we should carry out automation retrofit for the production assembly line of high efficiency lighting appliances, and thus we can save 29TWh electricity.

Government Agency Energy Conservation Projects. Energy consumption in government agencies (including public finance supported sectors such as defense, education, and public services) is increasing rapidly, causing large expenditures for energy use. Energy conservation implementing in government agencies not only can decrease their energy consumption and save administrative expenditures, but also with the government leading effect, promote energy conservation in the whole society. During the “Eleventh Five-year Plan” period, we should focus our efforts on making energy conservation retrofits for government buildings and their space heating, air-conditioning and illumination systems. The area of government buildings that is renovated according to the standard of building energy saving will represent 20% of the total areas of government buildings. Popularize application of high-efficient and energy-saving products, and include these products into government procurement lists. Reform public service cars, and take a lead to procure low oil consuming cars. The Central Government should take a lead to make pilot for this. In 2010, the energy consumption per building area of the Central Government Agencies and that per capita will decrease 10% on the base of 2002.

Energy Saving Monitoring and Testing, and Technology Service System Building Projects. During the “Eleventh Five-year Plan” period, we should take measures such as updating monitoring and testing equipment, strengthening personnel training, and adopt new market-oriented mechanisms of energy performance contracting to strengthen capacity building of energy saving monitoring and testing centers at provincial level and in major

energy intensive industries; carry out energy conservation law enforcement by laws and conduct related monitoring and testing (supervision). These centers should be capable of providing a series of services including diagnosis, design, financing, renovation, operation and management for enterprises, administrative agencies and educational institutions. By implementing the above 10 key energy conservation projects, we will realize total saving of 240 million tce (including the increments) in the “Eleventh Five-year Plan” period, and achieve remarkable economic and environmental benefits.

V. Implementation Measures

1. Adhere to and implement the guideline of giving priority to energy conservation

We should set up and carry out a people-oriented, comprehensive, well-coordinative and sustainable scientific development concept according to China’s current conditions; have a strategic and all-round insight into the supporting and restrictive impacts of energy on China’s economic and social development; be fully aware of the significance of energy conservation in the aspects of relieving contradictions of energy restriction, guaranteeing national energy safety, improving economic growth quality and benefits and protecting environment; take energy conservation as an important part of a energy development strategy and implementing the sustainable development strategy; in the fields of production construction and consumption, energy conservation goes ahead of any other issue; persistently practice energy conservation priority policies and promote energy conservation of the whole society.

Priority of energy conservation should be reflected in formulating and practicing development strategies and plans, industrial policies and policies related to investment management, finance, taxation, banking and pricing. Energy conservation should be considered as a key element in formulating the special plans. Governments at different levels should take into account their regions own conditions when formulating middle- and long-term program for energy conservation. Proposals of construction projects and feasibility study reports should underline the part of demonstration and appraisal of the energy conservation. Energy conservation is also prior to any other in structure adjustment and technology progress. China’s policies on finance, taxation, banking and pricing should support energy conservation.

2. Formulate and implement unified and harmonized energy and environment policies to promote energy conservation

To ensure economic growth, energy safety and sustainable development and promote effective utilization of energies, it is necessary to establish overall-planned, harmonized and unified energy and environment policies based on China’s resource characteristics.

(1) Coals should be mainly applied to power generation. Coals should be applied to large coal-burning generating units, at same time flue gas de-sulfurization equipment should be installed on the units. In doing so, coal utilization rate will increase considerably and raw coal consumption will decrease; on the other hand, issues such as sulfur dioxide pollution can be solved in one step and thus coals will be effectively and cleanly utilized. Such doing is the most economical and effective solution to energy and environment issues. China should increase its percentage of coal-based power generation. In this way, energy end-users can use more high -grade electric power. Enterprises and residents should be encouraged to use electric power reasonably, so as to increase the percentage of power taken in energy consumption at end-use.

(2) Petroleum should be mainly applied to the transportation and chemical raw material industry and petroleum consuming fields that cannot be replaced by other fuels currently. Currently, we should make clear different fuel oil fields and promote replacing fuel oil with clean coal, natural gas and petrolatum coke. Oil-burning boilers consuming low sulfur oil should undergo clean coal substitution refit according to local real situation; enterprises who can meet emission standards should properly adjust indices of total volume of pollutant emission. We should plan a unified traffic and transportation development model and formulate an overall traffic and transportation

development plan suitable for China's own conditions. Megalopolis should accelerate the construction of urban track transportation, form three-dimensional urban transportation systems, enhance urban public transportation systems, increase public transportation efficiency and restrict overuse of urban transportation resource by private vehicles.

(3) City air pollution treatment should follow principles of satisfying the emission of standards after renovation and total control for pollutant emission. It is better to select city fuel composition according to the city's conditions. Do not arbitrarily replace coal-burning boilers with oil-burning ones. Otherwise, blind "abandoning coal using oil" will bring about increase of fuel oil demands. In areas where there is rich natural gas, we should encourage using natural gas instead of coal use by medium and small coal-based boilers; in areas where there is no or less natural gas resource, encourage using high quality washed coal or other high quality energies. Besides, better use advanced energy-saving and environment-friendly boilers, so as to reduce coal-burning pollution.

3. Formulate and implement industrial policies to facilitate structure adjustment

Accelerating adjustment of industrial structure, product mix and energy consumption structure is an important approach to establishing energy conservation industries and society. We should study and formulate policy measures of promoting development of the service industry and develop the effect of the service industry on mobilizing fund; adopt powerful measures from such aspects as system, policy, mechanism and input to speed up developing the low consumption and high value-added tertiary industry; especially promote labor-intensive service and modern service; improve the long-term backward status of the service industry and increase its percentage in China's national economy.

We should accelerate formulating the Direction of Industrial Structure Adjustment, promote hi-tech industries, give priority development to the low consumption information industry that may have significantly catalyzing effect on China's economic growth, and increase the percentage of the hi-tech industry in the national economy; promote using high technology and advanced applicable technology to retrofit and upgrade traditional industries, and promote industrial structure optimizing and upgrading. The Government of China will implement the system of eliminating backward and energy intensive products and equipment. Energy conservation management authorities will regularly publicize lists of energy intensive products and equipment that should be eliminated for use and strengthen monitoring and examination. Energy consuming products or buildings that fail to meet the mandatory standards of energy efficiency cannot be allowed to leave factory for sales or start construction. Seriously punish behaviors of producing, selling and using excessively energy intensive products and equipment that have been discarded according to the standards. Formulate plans and policies on developing energy intensive industries such as iron and steel, non-ferrous and cement, and raise standards on industrial access. Formulate policies of limiting energy-consuming fields, and export policy of domestic rare resources and energy intensive products. Prohibit newly constructing and/or expanding conventional oil-burning generating units; if in certain area power supply can keep balance and power demands can be met, restrict use and construction of diesel generators and oil-burning gas turbine.

4. Formulate and implement incentive policies to intensify energy conservation

We should formulate the List on Energy-saving Equipment (Products) which will be especially focused on energy-consuming equipment at end-use, including high-efficient electric motor, fan, pump, transformer, household electric appliances, illuminative products and building energy-saving products; implement incentive policies for producing or using energy-saving products specified in the List; include energy-saving products into government procurement lists.

The Government of China will provide funding and subsidy or deducted loan to support some major energy conservation projects and major energy conservation technology development and demonstrating projects. Expenses necessary for applications such as government energy conservation management and government agencies energy conservative renovation should be included into corresponding fiscal budgets.

We should deepen reform of energy pricing and gradually streamline prices for different energy products, so as to

form a price incentive system that is good to save energies and improve energy efficiency. Establish and improve a compensation system on peak, valley, sufficient and insufficient period power prices and interruptive power prices. Apply differential power prices to eliminated and restricted projects and energy intensive enterprises according to the national industrial policies. Restrict blind development of energy intensive industries and guide user rationally to consume power and conserve power.

We should study financial and taxation policies for advocating development of energy-saving vehicles and accelerating elimination of energy intensive vehicles and choose appropriate time to implement the program on fuel oil taxation reform; cancel all rules that irrational restrict use and operation of low oil consuming, and low emission automobiles with small power engine; study policy of encouraging the production and consumption of hybrid and electric automobiles.

5. Strengthen energy conservation management according to laws

We should speed up establishing an energy conservation law and regulations system that takes the China Energy Conservation Law as the core, and coordinates with supplementary regulations and standards. Besides, we should intensify supervision and regulation according to related laws. First, study and perfect laws related to energy conservation and as soon as possible formulate such laws and regulations as the Power Conservation Management Method, Petroleum Conservation Management Method, Energy Efficient Labeling Management Method and Building Energy Saving Management Method. Second, formulate and implement mandatory and advancing performance energy efficiency standards, mainly including energy efficiency standards of industrial energy-consuming equipment, household electric appliances, illuminative facilities and motor-driven vehicles. Organize amending and perfection of rules on energy conservation design of main energy consuming industries and building energy saving standards. Speed up formulating such standards as on control of building cooling and heating temperature. Currently, much effort should be made to accelerate formulation of motor-driven vehicle fuel economy limited value standard and implement the standard by phase from July 1, 2005. Meanwhile, establish and practice the three rules of reporting, labeling and publishing motor-driven vehicle fuel economy. Third, establish and perfect the energy conservation monitoring mechanism. Supervise and inspect energy consumption and energy conservation management of energy intensive industries such as iron and steel, non-ferrous, building materials, chemical and petrochemical; supervise and inspect implementation of the Energy Efficiency Products Standard, the Building Energy saving Design Standard and the Industrial Design Code; supervise and inspect the regulations of adding provisions (chapter) of energy conservation in feasibility study reports of fixed assets investment projects. Perfect eliminating systems by laws and take compulsory measures to eliminate backward and extremely energy intensive products and equipment according to related laws. Fully develop roles of authorities such as construction, industry and commerce and quality control and energy saving monitoring and testing (inspection) organizations at each level of China and intensify supervision laws enforcement in every possible link.

6. Accelerate development, demonstration and promotion of energy conservation technology

Conduct scientific research on universal, key and leading energy conservation technology, implement major energy conservation demonstration projects and promote industrialization of energy conservation technology. Establish an energy conservation technology innovation system taking enterprise as principal component and accelerate putting scientific and technological achievements into production. Introduce foreign advanced energy conservation technologies and make them a part of our own knowledge. Organize and promote application of advanced and mature new technology, new processing, new equipment and new material of energy conservation. Meanwhile, develop and promote application of energy conservation and substitution technologies of energy carriers such as raw materials and water. Especially promote energy end-use equipment (products) listed in the Energy saving Equipment (Products) List.

China's authorities will formulate plans on developing, demonstrating and promoting energy saving technology, identify stage goals, priority policies supporting energy saving and step by step implement them. The authorities

will also amend and issue the China Energy Conservation Technology Policy Outline, so as to guide enterprises to systematically develop and apply advanced energy conservation technology and provide appropriate investment directions for enterprises and financial organizations. Many efforts to support major energy conservation technology development and industrialization should be particularly included into China's various national scientific and technological plans such as national medium and long-term scientific and technological development plans and national hi-tech industries development project plans as well as local related plans. We should establish a scientific research base (platform) for energy saving universal technology and general equipment. Encourage development of advanced energy conservation technology and high-efficient energy conservation equipment with supports of research organizations, enterprises and individuals. Introduce competition mechanisms and practice market-oriented operation. The Government of China will provide financial support for high-input and high-risk projects.

The local people's governments at different level should take effective measures, increase fund input, intensify development, demonstration and promotion of energy saving technology.

7. Promote new market-based energy conservation mechanism

First, establish an energy conservation information release system; using modern information dissemination technology, on time release energy consumption information at home and abroad, state-of-the-art energy conservation technology, processing and equipment and advanced management experience; guide enterprises to dig out their potentials and increase their energy efficiency. Second, implement integrated resource plans and power demand side management; incorporate energy saved quantity as resources into overall plans; guide appropriate resource allocation. Take effective measures to improve power end-use efficiency, optimize power consumption way and save electric power. Third, greatly promote implementation of energy-saving products certification and energy efficiency labeling management systems; with market mechanism, guide users and consumers to purchase energy-saving products. Fourth, spread energy performance contracting mechanism so as to remove market barriers in promoting new energy conservation technology; facilitate energy conservation industrialization, and provide a series of services including diagnosis, design, financing, renovation, operation and management for enterprises conducting energy conservation renovation activities. Fifth, establish an energy conservation investment guarantee mechanism and promote development of the energy conservation technology service system. Sixth, practice energy conservation voluntary agreements i.e., energy-consuming users or industry associations may sign energy conservation voluntary agreements with governments.

8. Reinforce energy conservation regulation on key energy consuming units

Carry out the Management Rule on Energy Conservation of Key Energy Consuming Units and the Management Rule on Power Conservation; strengthen energy conservation regulation and supervision of key energy-consuming units with annual energy consumption of over 10,000 tce. Supervise and inspect energy utilization status of these units; examine and test main energy-consuming equipment and processing systems; regularly publicize a name list of these units and energy utilization status of these units and comparison among advanced counterparts at home and abroad; do good job in training personals for managing energy conservation of key energy consuming units. These units should set up energy management positions and employ qualified energy management persons to fill the positions; strengthen supervision and inspection of these units' own utilization of energy; establish an energy conservation responsibility system; perfect energy metering management, energy statistic and energy utilization status analysis systems, so as to lift the energy saving level of enterprises and reduce energy use.

9. Intensify promotion, education and training of energy conservation

Carry out energy conservation campaign in a wide, deep and long-term way, so as to inspire Chinese people to be aware of resource value and energy conservation. Incorporate the energy conservation into the system of primary and middle school education, high education, vocational education and technical training. Such sectors as news, publishing, broadcast, television, film and culture as well as related social communities should completely develop their own advantages and dedicate to promoting energy conservation, so as to form a strong energy conservation

atmosphere. They should also expose those enterprises that have seriously wasted resources and polluted environment and related phenomena and promote typical energy conservation models. Noticeably, energy saving activities should start from pupils. Education authorities at different levels should deliver energy conservation knowledge promotion and activities to primary and middle school students. Related sectors of governments at different levels and enterprises should organize frequent energy conservation activities, conduct energy conservation technology and typical communications and deliver training to energy conservation managing personals and technicians. In power demand peak period every summer, we should launch an activity of national energy conservation promotion week. Through various promotion and education activities, mobilize all circles to participate in energy conservation and make it a self-conscious behavior of all citizen of the society.

10. Enhance organization and leadership, and promote program implementation

Energy conservation is a systematic project, which needs coordination and joint efforts from related departments and authorities. China's related departments, enterprises and administrative agencies should strengthen direction on energy conservation, identify related special organizations, persons and expenses, and formulate plans and organize implementation. Industry associations should play positive roles as the bridge and link in energy conservation and strengthen industrial self-discipline of energy conservation.

Government agencies should take a lead to save energy; implement the standard of government agencies energy consumption rated quantity and expenditure; establish and perfect energy conservation regulations and systems; promote and implement government energy conservation procurement, and reform the public service vehicle systems; make effort to decrease energy consumption expenses, and develop governments model for energy conservation.

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