

The Prospective of the Mission of Carbon Emission Reduction by 2020

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Abstract

In 2009, China government announced that by 2020 it would voluntarily cut its carbon dioxide emissions per unit of gross domestic product (GDP) by 40% to 45% from the level of 2005. And this cuts would be “a binding goal” to be incorporated into China's medium and long-term national social and economic development plans. However, suspicion starts to emerge whether it is an over ambitious target for China government to achieve. The study has analyzed the current situation and problems of applying the target of cutting carbon dioxide emissions with aspects of polices, investment and industries, and then the positive and negative effects are analyzed further. This target helps China to adjust economic structure, enlarge the project approval supervision, and improve investment and clean energy development. At meanwhile, there are some difficulties such as dualistic economy, fast economic development as well as a shortage of funds and other issues. Achievement of emission reduction goals plays a very important role to promote circular economy vigorously, achieve sustainable development and build a harmonious society for China.

Keywords: Mission of carbon emission reduction, Prospect, Working direction

1. Basis for China to achieve carbon dioxide emission reduction by 2020

China is the second largest energy producer and consumer. So it's the second biggest carbon polluter. China realizes the necessity for environment protection against climate changing. And it takes the responsibility to make a sustainable strategy to build an energy saving, ecologically friendly society, supporting by technological and fiscal policies. In December of 2009, Chinese Premier Wen Jiabao claimed that China would reduce carbon dioxide emissions per unit of GDP in 2020 by 40% to 45% compared with 2005 levels. And this cuts would be “a binding goal” to be incorporated into China's medium and long-term national social and economic development plans. New measures would be formulated to audit, monitor and assess its implementation during the negotiations at Copenhagen. However, suspicion starts to emerge whether it is an over ambitious target for China government to achieve. In history of economy development all over the world, fossil energy was relied on most and environment was damaged most in industrialization. In this phase, the per-capita GDP is between 1000 to 4000 USD. In 2004, the per-capita GDP of China reached 1000 USD, and is assumed to be 4000 USD in 2020. It will take a lot to cut the carbon dioxide emissions for China in this phase. So whether China can finish the goal, and how it will be done are concerned most over the world.

1.1 Sign the International Convention to charge with common but different responsibilities

In 1992, China signed United Nations Framework Convention on Climate Change (UNFCCC or FCCC), ratifying it in 1993. In 1998, China signed Kyoto protocol and implementing it in 2002. The Kyoto Protocol is generally seen as an important first step towards a truly global emission reduction regime that will stabilize greenhouse gas emissions,

and provides the essential architecture for any future international agreement on climate change. China will stick to FCCC and Kyoto Protocol. China has finished the People's Republic of China Initial National Communications on Climate Change. And make strategy to deal with climate change, with the following principles: thoroughly apply the Scientific Outlook on Development; stick to energy-saving and environment-protection as a basic state policy for China; set goals of controlling greenhouse gas emission and speeding up sustainable development; take economic development as the central task, speeding up transforming of economic development mode; take energy-saving, energy structural optimization and ecology-protection as major goals, supporting by science and technology; improve the communication and cooperation with international, contribute to the climate change problem as much as possible. China is the member of Carbon Collect Forum, Methane to Markets Partnership and Asia-Pacific Partnership on Clean Development and Climate. China participated the dialogue between G8 and five major developing countries about climate. China proposed the management net of forest recovery and sustainability in Asia and held the climate change and technology innovation international forum in APEC. China has been making efforts to dealing with climate change.

There is mechanism for China to dialogue and cooperate with European Union, India, South Africa, Brazil, Japan, America, Canada, Britain, Australia and so on. All of these countries are making efforts to deal with the climate change. China has been devoting itself to helping developing countries in Africa and small-island to adapt to climate change. China claimed that it would cooperate with Central Africa in China's African Policy. Chinese government has held Clean and Development Mechanism study twice, which is for officers from Africa and Asia to participate.

1.2 The government makes policies to promote the energy saving and emission reduction

After the United Nations Conference on Environment and Development in 1992, China has made laws, policy and plan to guarantee the energy-saving and emission-reduction, such as China's Population and Development in the 21st Century. So far, there are 9 laws on environment protection, 14 laws on natural resource management and 34 regulations on environment enacted by National People's Congress or the State Council. Also the environment department enacted more than 90 national regulations 1020 local rules to protect environment. In 2003, China has sped up to build up resource-effective and environment-friendly society. Energy saving and emission-reduction is included in China's 9th five-year plan, 10th five-year plan and 11th five-year plan. In the meanwhile, low-carbon economy is guaranteed by series of law. China claimed that China pledges to cut energy consumption per unit of GDP by 20 percent, and reduces the main pollution by 10% in total in the Outline of the 11th five-year Plan for National Economic and Social Development of the People's Republic of China. The National Development and Reform Commission enacted Implementation Scheme of Checking System of Energy Consumption per Unit GDP, which says officials are in the accountability and rejection system for province to save energy and reduce emission.

1.3 Enhance the science research and international cooperation to improve technology of energy saving and emission reduction

China is working on climate change based on research and study, along with international cooperation. In last 20 years, there has been a team of experts on climate change research from different fields, who have got landmark achievement. National scientific research bases are built, with the net of monitor system on climate. Speed up the research and demonstration of high technology about climate change, to progress the combination between productivity and technology. It needs stable investment from government and other channel for the research of climate change. During 11th five-year plan, it has financed more than 2.5 billion Yuan by National key scientific and technological project, 863 projects and 973 projects. By 2007, Chinese government had supported 7 billion Yuan for energy-effective and emission-reduction, besides the investment from other channel. China has thrown itself to the international cooperation about the climate change, China has participated World Climate Research Program sponsored by Earth System Science Partnership (ESSP), International Geosphere-Biosphere Program (IGBP), International Human Dimensions Program (IHDP), Group on Earth Observation (GEO), Global Ocean Observing System (GOOS), International Polar Year (IPY) and so on.

1.4 Enhance the economy structure adjustment to transform the economic growth mode

Since later in the 1980s, China has paid attention on economic growth mode. Energy-saving, cleaning, pollution avoiding are important parts of China's industry policy. The proportion of the primary industry is growing smaller and smaller. The tertiary industry has made great progress, especially telecom, tourism, finance and so on. Though the proportion of secondary industry is growing up, it is very obvious that the inner-structure has changed. Mechanism, electron, communication industry have developed fast. The proportion of high additional value products is getting bigger. The diversity of secondary industry is blowing. The structure is getting more and more complicated. Both light industry and heavy industry are developing in the same time. Capital-intensive and technical-intensive are taking place of labor-intensive. These changes bring good to the energy saving.

In 2004, the State Council laid out the Outline of Energy Mid-Long term Development Blue Print (2004-2020). National Development and Reform Commission laid out Blue Print of Mid-Long Term Energy-saving. In Feb of 2005, the National People's Congress laid out the Renewable Energy Act of the PRC, showing the obligation and right of Government, Corporation and Individual in exploring renewable resource, including price management, fee distribution, investment, preference price and tax, network combination electricity generation. In 2007, China laid out Guiding Catalogue for Structural Adjustment. There are three types of industry in the catalogue, encourage ones, confined ones and eliminated ones. By 2007, large productivity has proposed to be shut down.

China has devoted to the development of low-carbon energy and renewable energy, along with the progress of the structure of energy usage. Thanks to direction of national policy and investment, hydropower, nuclear energy, oil, gas and gas above coalmine are explored and used. And new type of renewable energy is welcomed in the countryside and area proper for them, such as biomass energy, solar energy, terrestrial heat and wind power. The proportion of this energy is growing bigger and bigger. In the primary energy consumption structure, the proportion of coal is reduced from 76.2% in 1990 to 69% in 2008, and oil grew up from 16.6% to 20%, gas from 2.1% to 3.4%, and hydropower from 5.1% to 7%. There is progress on ecology structure, by planting trees and protection. Along with the implementation of key projects of national forest ecological construction, it got great achievement on planting with the number of 195 million hectare forest. And forest coverage rate grew up from 13.92% in 1990s to 20.36% in 2008, according to the 7th forest resource inventory, with the planted forest 62 million hectare in conservation, which is keeping the world record.

1.5 The achievement of energy-effective and emission-reduction

In 2005, under a five-year plan to 2010, China pledged to cut energy consumption per unit of GDP by 20%, major polluter by 10%. According to China National Climate Change Program issued by the State Council of China, China has set goal, principles, and policy of climate change, as the first developing country to issue a climate change national program. And in 2009, this program is confirmed as the national mid-long term economic and social developing plan.

Service industry will be supported to progress and turn the poor link to develop, according to Several Viewpoints on Speeding Development for Service Industry. Service industry will also be helped to increase the proportion in the GDP by 3% by 2010, compared with 2005. Tourism, finance and logistics are the symbol of the developed service industry. High-tech industry is concentrating on digital TV, software, integrated circuit and biology, and supposed to increase the proportion in GDP by 5%, during the 11th five-year plan. Communication, aerospace, new energy, new material and sea industry are the key points of establishment manufacturing. The entry of high consuming industries will become much harder than before, with 13 industries will be washed out. The production of high-energy consumption, large emission and made of resource will restrained to export. High energy consuming industry is shrinking. And many documents are issued for the responsibility system to establish, such as Implementation Scheme of Checking System of Energy Consumption per Unit GDP, Implementation Scheme of Statistical Index System of Energy Consumption per Unit GDP, and Implementation Scheme of Monitoring System of Energy Consumption per Unit GDP. These documents set accountability system for officials in province to finish the energy-effective and reduction mission. In 2008, 580 billion Yuan was invested in environment protection out of 4000 billion Yuan in total of government investment, of which 210 billion Yuan was used directly for energy saving and emission-reduction, 370 billion in industry structure adjustment and invention. China has been making efforts to turn his industry-developing mode to low-emission, low-consumption and low-input way, encouraging green industry to develop.

Energy-consumption is getting down every year, for the last 4 year, with drop by 1.79% in 2006, 4.04% in 2007 and 4.59% in 2008. It has dropped by 10.1% in total, saving 29 billion Ton of energy in standard coal. China has reduced the energy consumption per GDP by 13.77% by the second season of 2009, 6.23% away from the promise of 20%, compared with 2005. For the next a year and a half, China should reduce it by 4.15% annually to finish the goal. Reviewing the last two years, it reduced by 5.1% on average. It's very possible for China to achieve by 2010. The sulfur dioxide and COD are reduced by 8.95% and 6.61% for the last 3 year. And the sulfur dioxide emission reduction has reached the goal that is set in the 11th five-year plan. The increase of the capacity of the fuel coal sulfur removal instrument is 411 million KW from 2006 to 2008. And 60.06 million KW washes out the installed capacity of thermal power during 11th five-year plan. Many washed out productivity is been shut down.

2. Challenge of energy-effective and emission-reduction in China

2.1 Coal is major part of the energy-consumption in China

In China, Coal takes 94% of the energy-storage that can be explored, compared with oil's 5.4% and gas's 0.6%. It's easy for coal to be dominating in the energy-production and energy-consumption for a long time. Though China has

been working on the diversity of the energy-use for the last 20 years, coal is dominating in the primary energy-consumption, which takes 69%. The carbon dioxide emission of coal-usage is much higher than other fossil energy, which is twice as much as gas dose. Coal-usage is contributing to 85% of the carbon dioxide emission, 90% of the sulfur dioxide emission and 73% of the soot all over China. The carbon dioxide costs 2.2% of GDP every year. The more China's economy is developing, the more use coal will be taken. The coal-dominant energy pattern is the prior problem to be solved for the sake of climate change.

2.2 Industrialization and urbanization make energy-effective and emission-reduction harder

As economy developing, population growing, consumption-structure upgrading, the need for energy is stronger and stronger, and the carbon dioxide emission is of course more and more. According to World Energy Outlook 2007 by International Energy Agency, the need of primary energy will grow by 3.2% from 2005 to 2030, with reference, and 2.5% without reference. And carbon dioxide emission will grow in the same speed. As this comes along, China will become the largest carbon dioxide emission producer in the world, exceeding America. The economic developing mode hasn't been changed, China's energy-consumption is still much higher than other developed countries. All of these are holding back of 2020 mission.

2.3 Globalization has great impact on China's mission

As globalization going, China still keeps in the end of the industry chain. There is large lag between China and other developed countries, about technology, additional value and other aspects. China has long been in labor-intensive and capital-intensive economic developing mode, along with energy-intensive and pollution-intensive. China takes deep part in the international trade. The energy-consumption and energy-export will grow larger and larger.

2.4 Invention and creativity is poor, and become the bottleneck of the mission

China is in imbalance of the technology development, which is the biggest challenge of transition from high-carbon economy to low-carbon economy. According to Kyoto Protocol, developed countries are required to support the developing to reduce carbon dioxide by money and technology. China is in a subtle situation and is not ready to take all of these supports. China has been in the situation of trading market with technology, importing high-tech. But China does not have his intellectual property rights about energy-effective and emission-reduction. These have been the bottleneck of the mission. Recent days, low-carbon technology and carbon dioxide storage have been included in the "973" plan and "863" plan. But the real progress has not been made, and need more working on.

3. Working direction of 2020 mission

3.1 Figure out the way to make energy effective

As the second largest carbon dioxide emission country, China's effective utilization rate of energy is just 33%, less than the developed by 10%. There is room for China to make progress.

Effective utilization rate of energy means the economic growth and impact on environment and ecology that caused by using energy. There needs cooperate among energy, environment and economy to make energy utilization effective. We should pay attention to impact on environment from energy consumption, as well as economic development. There are several way of energy-effective: first is economy grows, in condition that energy consumption and environment impact are the same; the second is environment is better, in condition that energy consumption and economy growth are the same; the third is that energy is consumed less, in condition that environment impact economy growth are the same; the fourth is that energy is consumed less and environment is better in condition that economy growth is the same; the fifth is that energy is consumed a little bit more in order to make big progress in economy development and environment improvement. Local area and companies in a short time above can achieve all of these. However it is inevitable that economy is growing and environment is getting better, so the fourth and fifth pattern are the most possible way for China to make energy utilization effective.

3.2 Make energy consumption structure adjustment deeper

For years, Coal is dominating in the primary energy, about 70%-75%, much higher than the average level of the world. And more than half of the electricity is generated by coal; about 78% is made from coal. That is the reason why China consumes more, pollutes more and emits more. China is rich of hydropower, wind power and solar power, which are not been explored. It's very clear how to make the adjustment. First, develop nuclear power. Second, wind power is the prospective one for China to explore, as is the fifth top countries all over the world. Solar power and other new power accounting for less than 1% in total are developing the core technology. Thirdly, China has the richest hydropower in the world, about 540 billion KW of capacity, which is used less than 30%. Fourthly, work on new energy and substitutes for old ones, such as hydrogen power, gases, fuel cell, hydrate and oceanic power. Finally, coal is used more effective and clean. It is long way to change the energy consumption pattern

completely. It is reasonable to making break through in the coal use to make energy effective and emission reduced.

3.3 Work on the industry structure adjustment

China should adjust industry structure, considering the environment and energy. Rebuild the traditional industry, developing the high-tech, high additional, and knowledge-intensive industry. Make tertiary industry develop in a high level.

3.4 Forest carbon sinks

Forest carbon sinks means carbon dioxide is absorbed by forest, and settled in soil. Forest is the largest carbon dioxide storage, slowing down the climate change. For the next 30-50 years, it's very economical and possible to enlarge the forest coverage. According to the 7th National Forest Inventory (2004-2008), the forest coverage is 195 million He, coverage rate 20.36%, and forest storage 13.721 billion cubic meters. China has 7.811 billion Ton forest carbon sinks. It's very much effective to enlarge the carbon sinks, in order to slow down the climate change.

3.5 Invest more in the technology and innovation

China's technology and science is much behind the developed. And technology and science is the key for low-carbon economy. China has issued Energy Mid-Long term Development by 2020: First, technology about energy-saving and energy-effective; second, explore technology about fossil energy; third, technology about electricity net safety and energy storage; fourth, technology about renewable energy use in large scale; fifth, nuclear technology and dealing with nuclear disposals; finally, new energy theory.

3.6 Enhance the awareness of the people about low-carbon lifestyle

With the population of 1.3 billion, energy consumption by family cannot be neglected. The people should change the lifestyle of waste, using less one-off, saving every drop of water, electricity. Build up leading community, city and family to show the model. Encourage buying environmental product, reusing material, and doing rubbish classification.

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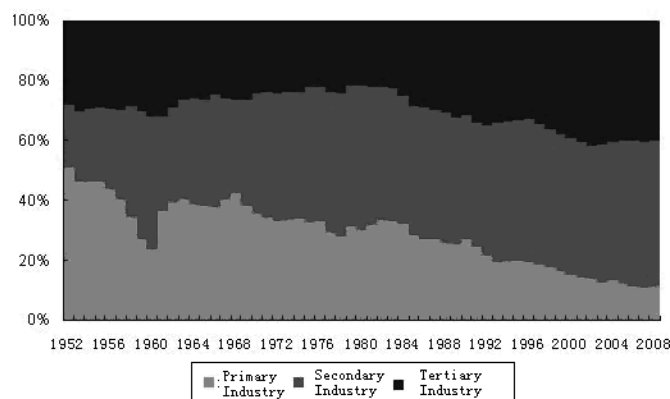


Figure 1. Proportion of the Three Industries in China from 1952 to 2008 (Resources from China Report)

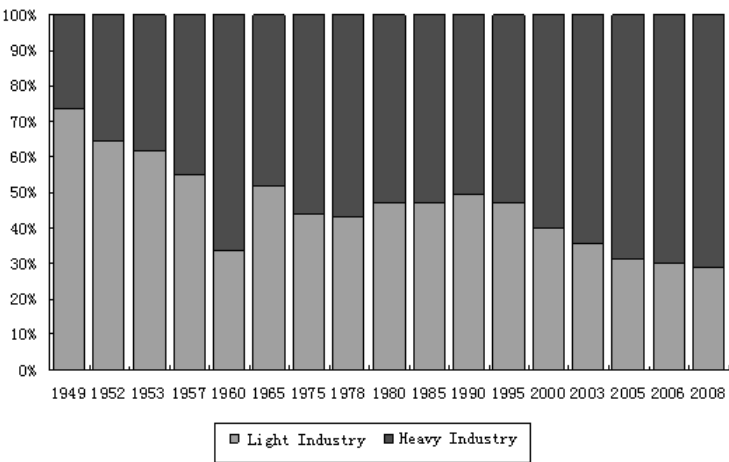


Figure 2. The Proportion of Light and Heavy Industries in China 1949-2008 (Resources from China Report)