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Research on the current situations and countermeasures for the energy security in China

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Abstract

Concretely, main problems in that security are analyzed, which are considered to affect China and mostly embody in such five big areas as the great pressure in energy supply, the scarcity of relative energy resources, the shortage of green energy, the relative backwardness of energy technology and the drastic change of the international energy market; furthermore the counter-measures concerned are proposed, including perfecting the laws in energy, carrying out the diplomacy in energy actively and initiatively, saving energy and increasing the energy utilization rate, developing the new technology of energy resources forcefully and expanding green energy and new types of energy.

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1. Introduction

Energy is an important resource on which modern human survival and development depend. As China's economy booms, its demand for energy is growing. Whether there is adequate and stable energy has become an important factor affecting and constraining China's economic develop entering the 21st century, energy prices climb up quickly, repeatedly rewriting historical records. The ent. Since ups and downs of international oil prices affect the world's nerves. According to the estimation of authoritative international institutions, the proven recoverable oil in the world, can only supply around 41 years of human needs (natural gas for 60 -70 years, the coal about 200 years), man is confronting the energy crisis which threatens energy security[1-2]. Energy problem has become a global problem. The thorough

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settlement of the energy issues is related to resources, technology, environmental protection, finance, law, regional security, counter-terrorism, and many other areas. No country can tackle it alone. Therefore, for the common interests of sustainable human development, all countries in the world are required to carry out close cooperation; in particular, the major energy producers and major energy consuming countries need to cooperate closely.

In order to effectively deal with the world's energy crisis, our country has made tremendous efforts in environmental protection and energy security and achieved remarkable results. But because of various reasons, there are still a lot of problems we need to solve in the area of energy security in our country.

2. The main problems and the current status analysis on China's energy security

China's energy security problems are mainly embodied in the following five areas:

2.1. The big energy supply pressure and the relative shortage

At present, our country is in the acceleration period of industrialization and urbanization, the energy consumption is of higher intensity. As the economy further expands its scale, energy demand will continue to increase rapidly, which will create a great pressure on energy supply. The contradiction between supply and demand will exist for long; oil and natural gas will further depend on imports. Although the total amount of China's energy resources is considerable, the per capita is very low. Resources exploration has lagged behind, which has impacts the improvement of energy production capacity. At the same time, our country has very uneven distribution of energy resources; large-scale and long-distance energy transport result in unsatisfying transporting capacity with increased cost. The latest data shows that China's dependence on oil imports reached 42 percent, and is expected to grow to 60% by 2020. In fact, the most important issue about energy security is whether energy supply can support China's rapid economic growth or not. In recent years, the development in this regard is not in a normal situation: high energy-consuming industry is growing rapidly, driving the energy industry's rapid development. This results in the mutual promotion between the high energy-consuming industry and energy industry and their ultra-high-speed development, leading to imbalance in the entire national economy. The research report released by NPC Financial and Economic Committee shows that in recent years, the speed of rapid growth of high energy-consuming products is basically doubled in a few years. Coal is not only the fuel for thermal power but also an important chemical raw material. Driven by the double forces, from 2000 to 2004 China's coal output was nearly doubled in four years, from 1 billion tons to 1.98 billion tons. Even so, coal is still in shortage. 26 provinces limited the electricity supply, and the coal used to generate electricity was in great need. From 1980 to 2000, in these 20 years, China's GDP average annual growth rate was 9.7 percent, achieving the first goal of quadrupling ahead of schedule. During this period, the average annual energy consumption growth was 4.1 percent, achieving the goal of doubling energy consumption to ensure quadrupling the GDP.

If that were allowed to develop this way, not to say doubling energy consumption to quadruple the GDP, even if we quadruple energy consumption, we cannot ensure quadrupling GDP growth. Relevant departments make assumptions, in accordance with the existing mode of growth, to achieve the goal of quadrupling 2000 GDP ratio by 2020, at least 5.2 billion tons of coal will be required. In fact It is the situation that leads to frequent mining accidents. High-energy consuming industries has driven the demand for electricity, and thermal electricity has driven the coal demand. Insufficient coal supply cannot satisfy the market, thus coal prices soaring which makes a number of small coal mines' profits doubled and redoubled. Ultra-high profits encourage some people to take risks. This is the deep-seated reason for the continuous mine accidents. Production safety inspection results show that 1 / 3 of two billion tons of

coal in our country, that is, there is around 700 million tons of coal are produced by the mines unavailable of the safety conditions of coal production.

Most people think that China is very rich in coal resources, and it is not true. Experts who conducted inspections in Xinjiang and Inner Mongolia found that the coal long-term reserves there are about one trillion tons, but the extractable reserves are far less than the figure. Now the reserves available for exploitation are only 110 billion tons. To achieve the goal in 2020, we need to find 120 billion tons of reserves available for exploitation. Therefore, our resources are not very rich, but not enough. In addition, on the one hand, resources are in shortage, while on the other hand, waste is very serious. Jia Zhijie pointed out that the national average recovery rate of coal is only 30%, and many small mines' recovery rate is only 10% to 15%, while in developed countries this data is much as 70-80%.

2.2. The lack of green energy

Coal is China's basic energy, and it is difficult to change the energy structure that China is rich in coal, lack of gas, and short of oil. China's coal cleaning using level is low, and the pollution caused by coal combustion is serious. If this situation continues, it will bring greater pressure on the ecological environment. At present, pollution caused by the use of coal and damage to the ecological environment in China are also very serious. Data shows that China's emission of sulfur dioxide ranks first in the world and carbon dioxide emissions ranks second in the world after the United States. Once our country is constrained by the "Kyoto Protocol", the situation will be very serious. Take Shanxi Province as an example, one ton of coal mining leads to loss of 250 million tons of water and loss of eight tons of reserves and associated ores. The indiscriminate digging at the moment has also brought the ecology and vegetation damage. These are realities that we have to face.

3. Countermeasures

3.1. Perfect the relevant energy laws

Practice shows that one of the main problems is the lack of a corresponding law. Therefore, it is an urgent need to develop our country's energy security leading law. According to the latest reports, top leaders of our country have paid great attention to questions of energy, not only increasing more than 20 organizations for the Bureau of Energy under National Development and Reform Commission in 2005, more importantly, they have made instructions to enact China's "energy law" as soon as possible [3-5]. At present, our country already has "Coal Law", "Electricity Act" and other relevant law. "Energy Law" will be the top law of these laws. In the past, our management of coal resources was only concerned about their physical property, that is, only managed these resources as fuels.

On August 8, 2005, U.S. President George W. Bush signed a new energy bill, "National Energy Policy Act of 2005." Some experts consider it as the most extensive energy of the world in the last 40 years. According to the briefing, this US new energy law mainly include the following contents: provide consuming tax preference, promote home energy efficiency; set a new minimum energy efficiency standard, improve the efficiency of commercial and household appliances; through tax incentives, repeal outdated provisions not conducive to infrastructure investment, to strengthen and upgrade the national power grid and other energy infrastructure; through tax cuts and other measures to promote renewable energy development and utilization; support energy-efficient automobile production; reduce dependence on foreign energy sources etc.

Experts have long suggested that although the Chinese have "Coal Law", "Electricity Law", "Energy Conservation Law", "Renewable Energy Law", we still lack of a "leading" Basic Energy Law. And the

legal status and the principle for adjusting "Oil law", "Natural Gas Law" and "Atomic Energy Act," need further study. In addition, some of the existing energy laws and regulations cannot adapt to the needs of the reform and development, or even become obstacles to reform, and new things arising from reform or organizations lack legal basis and legal protection. In addition to the new birth of the "Renewable Energy Law", other laws are necessary to be revised. National departments did have the plan to revise these laws, but the progress is slow, and some even come to a halt. Because there is not a basic energy law at the top, the amendments to the laws lack of a guiding principle for co-ordination.

3.2. Positive and proactive in carrying out energy diplomacy

According to International Finance News reports, China's current dependence on foreign energy is a big constraint on China's development. It is predicted that China's future energy supply and demand gap will be bigger and bigger. According to international practice, when a country's oil imports reach more than 100 million tons, it often needs to use diplomatic and economic means to ensure oil security. In fact, energy diplomacy has become the third aspect in China's diplomatic strategy, second only to big power diplomacy, and surrounding diplomacy.

At present, China has been carrying out a "going out" strategy to encourage energy enterprises "going out", to participate in the global energy openness, by increasing the supply of energy all over the world to protect China's energy needs. We need oil, so we should set up a good relationship with those oil-producing countries, as well as those potential oil-exporting countries. In fact, especially entering 2006, China's energy diplomacy has been very active. The series of diplomatic actions in the New Year serve only as a prelude to the future Chinese energy diplomacy. Over the past, in the energy issue, China always let a large-scale domestic energy companies fight on their own and did not want to cooperate with other countries. China, therefore, got the final price often higher than the actual price, resulting in a certain degree of "disadvantage." At present, China has good relations with almost all oil-producing countries. Ideological differences will not lead to the breakdown of energy cooperation. This is resulted from China's moderate foreign policy pursued in international politics and adherence to the principle of equality and mutual benefits in international economic and trade exchanges. The kind of view to regard energy diplomacy as a self-sufficient energy supply policy precisely lacks of strategic vision. Although in the past few years, the international community has criticized and alerted on the efforts of China to obtain overseas energy supply sources, China's sustained economic development is essential to the stable development of world economy. Therefore, China's foreign policy in energy on the one hand should not be undermined by criticism and pressure; on the other hand, it is necessary for China to acquire a stable source of overseas energy supplies and use it as a means to promote the benefits and dispel misgivings with all stakeholders and relative countries.

3.3. Save energy and improve energy efficiency

On the one hand, compared with developed countries, China's energy utilization efficiency is low. GDP produced by per unit energy consumption, is equivalent to only 1 / 4 of developed countries. For example, China's total energy consumption is as much as 1.7 times of Japan's, but its total GDP is only about 28 percent of Japan's. The key to China's low energy efficiency lies in the high proportion of low-grade industrial structure and high-energy-consuming industries such as steel, electrolytic aluminum and cement etc. The proportion of those low-energy-consuming, high value-added industries such as electronic information, precision manufacturing and third industries is too low. Because of the sole pursuit of economic growth and product quantity, so as to ignore product quality and economic benefits for a long time, China has formed an extensive growth mode with the characteristics of high-consumption,

high input, and low-efficiency. Even though we have been aware of the problem, because of the lack of effective mechanisms and policies, therefore, this long-term prominent contradiction restricting China's healthy economic development has not been fundamentally resolved, despite that we have indeed achieved certain results in this respect. From 1997 to 2000, under the condition that total energy consumption was at zero growth or declined, GDP growth rate reached over 7.1 percent. But for the last three years, energy consumption elasticity coefficient rose markedly. From 2000 to 2003, they were respectively 0.02, 0.47, 1.21 and 1.45. In 2004, energy consumption grew 4.1 percentage points more than total GDP growing rate, but it still failed to satisfy the demand. On the other hand, China's energy-saving potential is huge. At present, the main energy-consuming equipment and technologies are outdated. High energy-consuming products' per unit energy consumption is about 40% more than the developed countries on average, and China's energy consumption of per unit output value is 2.3 times of the world average level. Since the "Ninth Five-Year Plan", the energy conservation work has achieved remarkable results, the energy consumption of 10,000 yuan gross domestic product value dropped by 25% and the energy efficiency reached 5.6%, energy-saving rate ranking top in the world. However, energy conservation work can only be counted as a start, and a lot of things are still required to do. China's energy-saving should first start from the conservation of energy resources. It is necessary to close the small coal mines which undermine the bigger ones. Meantime, the state should be determined to rectify the high-energy-consuming industries, close in accordance with the law the industrial enterprises leading to the destruction of resources, waste of energy, damage to the ecology, and serious pollution. For those enterprises with high energy, material and water consumption, the state should be determined to technologically transform them.

4. Summary

- 1) China's energy security situation is very serious, which we need to seriously deal with;
- 2) China's energy security problems are mainly reflected in the energy supply pressure, the relative shortage of energy resources, lack of green energy, relatively backward energy technology and the changing international energy ;
- 3) put forward corresponding measures such as set up a sound energy law, actively carry out energy diplomacy, energy saving and improve energy efficiency, vigorously develop new energy resources technologies, green energy and new energy etc.

References

- [1] Kong Lingbiao, Feng Shu-hu. Regarding questions of energy security Chinese Coal. 2004
- [2] Zeng Peiyan. Five problems facing China's energy and the complex situation [Http://www.gov.cn](http://www.gov.cn), 2005, 12-27
- [3] Huadian News Network. National People's Congress Standing Committee concerned about energy security .2005-12-29
- [4] China's energy security and sustainable development (1) <http://www.stock888.net>, 2004
- [5] Zhang Wenmu. China's energy security and policy options <http://www.cngdsz.net>, 2004