The Research for China Electric Power Energy Multivariate Structure Status Quo

ETUDES SUR L'ÉTAT ACTUEL DE LA STUCTURE MULTIPLE DE L'ÉNERGIE ÉLECTRIQUE CHINOISE

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Abstract: Energy problem is one of the three global problems in new century. Being national base industry, the development of our electric power energy has played the great role in China economy developing. Now China electric power energy 's structure composition presents as following "the coal resources being main force, followed by pluralistic developments in which the clean energy becoming more and more important. since greatly developing the new electric energy must be the inevitable solution along our electric power sustainable development path.
Utilizing the different developing mechanisms such as sustainable development, recycling economics, clean energy , the article starts from researching for the current situation of China electric energy requirements, and analyzes the structure composition of our electric power energy .at last it presents the point that greatly developing the new electric energy will play key roles and have the strategy meaning during the course of China energy sustainable development.
Key words: electric power new energy, CDM, energy structure, status quo

Résumé: Le problème de l'énergie est l'un des trois plus grands problèmes globaux de la nouvelle ère. L'énergie électrique, considérée comme l'énergie fondamentale d'un pays, a une grande importance pour l'économie nationale. La structure actuelle de l'énergie électrique chinoise représente plusieurs caractéristique-" le charbon comme la matière première principale, un développement multiple, et la force à paraître des énergies propres ". La promotion des nouvelles énergies électriques est un choix logique pour poursuivre le chemin d'un développement durable. A partir du besoin actuel de l'énergie électrique de la Chine et du point du vue du développement durable, de l'économie de recyclage et du système de la promotion des éngergies propres, cet article analyse la disposition des nouvelles énergies électriques et nous propose de chercher et explorer ces nouvelles énergies électriques tout en améliorant le taux d'utilisation des énergies actuelles. Il est d'une grande importance stratégique pour le développement durable des énergies en Chine.

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Mots-Clés: énergie électrique, CDM, structure des énergies, état actuel

INTRODUCTION

Being regarded as the national economic base industry and pillar industry, the electric power industry has played the great role in China economy developing. The pluralistic status structure of electric power energy is not only the result of resource constraints, but also the influenced product by restrict factors from political and economic development. To change the current low efficiency, energy consumption, serious pollution in the status quo, is the imperative requirement of electric energy development. Therefore, while enhancing the existing energy efficiency, to explore and make full use of new alternative energy resources, just as the new electric power energy, will take great strategic important place in sustainable energy development of China.

1. NEW ENERGY AND ENERGY DEMAND STATUS QUO

1.1 What's the new energy

According to the United Nations energy statistical analysis, the current mainly form for global human access to electricity is coal-fired thermal power, the rest followed by hydropower, nuclear power, gas, electricity, oil, and new energy. The new energy sources usually refers to wind, solar, geothermal, ocean (tidal energy, Polang energy, flows to the sea, ocean thermal energy, marine bio-energy), and biomass energy and other renewable resources which is converted or processed into electricity or clean Fuel.

1.2 Energy shortage supply, an urgent need to develop new energy

Since reform and opening up, China's power industry has continuously got substantial development. Since 1996 the installed capacity of power generation of China has been the second in the world. The installed capacity of power generation has been added in 2005 as 517 million kilowatts to 2006 as 622 million kilowatts, while in 2007 to 713 million kilowatts. According to China's power sector forecasts, the next 15 years China must add more than 500 million kilowatts of generation capacity to meet demand.

With the sustained, rapid socio-economic development, the dramatic increase in the total energy consumption, and the pressure of growing environmental pollution, clean new energy and renewable energy development and use has become increasingly urgent.

According to statistics, China's oil, gas, coal and other energy resources per capita volume account for 11%, 4% and 54% of the world's average, respectively, which is relative lack of traditional energy sources. On the other hand, the huge coal production and coal consumption has made China's economy different from the similar level as the country's economic characteristics. At the same time, China's dependence on foreign oil is over 40%, meanwhile, 90% of energy transport rely on the ocean, leading to the existence of circuit interruption by many insecure factors. Moreover, the soaring oil prices, environmental pollution and a series of problems have forced China's energy development model for an absolute change, to accelerate the development and utilization of new energy power.

2. The status quo of China electric power energy multivariate constitution

China's power industry has entered a rapid development era. It is for three consecutive years in each of 100 million kilowatts of electricity construction, of which the speed in the history of China is unprecedented, and even in the world it is rare. In three consecutive years, 2006,2007,2008, China ushered in the power industry's rapid growth era with so large-scale construction of power,which basically meets the demand for electricity, and China's power industry has laid a good foundation for the future. However, the development of the excellent situation runs, some issues also will be exposed.

2.1 The primary productivity of coal

Being impacted by resources, China has been “coal-based" structure of energy over the years, where coal proportion of the energy supply is far higher than other countries, and there is the significantly different from the situations of Europe and the United States as "mainly oil, coal, natural gas, supplemented by water Electricity, nuclear energy is added". According to "Issued by the 2007 national economic and social development of statistical bulletin," issued by the National Bureau of Statistics in February 2008 ,the Chinese energy production and consumption in 2007 remains the same:

2.1.1 From the view of energy production to read the coal output

From the point of energy production to see the preliminary estimation, the year 2007 the total primary energy production is 2.37 billion tons of standard coal, an increase of 7.0% than last year; raw coal 2.536 billion tons, up 6.9 percent; crude oil 187 million tons, an increase of 1.1 percent and natural gas 693.1 100 million cubic meters, up 18.4 percent; generating capacity of 3.27772 trillion kilowatt hours, up 14.4 percent, of which: thermal power 2721.83 billion kilowatt hours, up 14.9 percent; hydropower 482.88 billion kilowatt hours, up 10.8 percent.

Based on the above data, coal production accounted for a total energy production of 76.4 percent, down 0.3 percentage points of; crude oil accounted for 11.3 percent, down 0.6 percent and natural gas accounted for 3.9 percent, up 0.4 percentage points; hydropower, nuclear power and other Accounting for 8.4 percent of primary energy, rose 0.5 percentage points.

2.1.2 From the view of energy consumption to read the coal output

Through preliminary calculations, the year 2007 total energy consumption reaches 2.65 billion tons of standard coal, an increase of 7.8 percent to last year. It is coal consumption of 2.58 billion tons up 7.9 percent; crude oil consumption of 340 million tons, an increase of 6.3 percent and natural gas consumption of 67.3 billion cubic meters, up 19.9 percent; electricity consumption of 3.2632 trillion kilowatt hours, up 14.1 percent.

Based on the above data, the coal consumption accounts for a total energy consumption of 69.5 percent; oil consumption is for 18.3 percent; natural gas consumption accounts for 3.4 percent; hydropower, nuclear power and other energy consumption accounts for 7.5 percent.

2.2 Electric power energy lead the multi-pattern by "based on thermal power"

2.2.1 China's power energy use ratio

Currently, China's total installed power generation capacity has reached 713 million kilowatts, ranking second in the world. But in the power generation capacity, 77 percent is the thermal power of energy consumption relatively high and the emissions a little more. In the end of 2007, thermal power, stand-alone 100,000 kilowatt small generating units are still 104 million kilowatts, accounting for thermal power installed capacity of 18.6 percent. Total installed hydropower capacity reached 145 million kilowatts, the power generation amounted to more than 4,800 billion kilowatt-hours, accounting for all the generating capacity of 16%. 2007 new wind power installed capacity of about 3.4 million

kilowatts, wind power installed capacity reached 600 million kilowatts of wind power technology rapidly improved, industrial capacity increased significantly. Annual production capacity of solar water heaters had reached 23 million square meters, the use of solar water heaters total more than 120 million square meters, the use of the world total of 60 percent. Development and utilization of biomass energy has a greater development, which households use methane-generating pit reached more than 27 millions families, while facilitation gas consumption reached about 11 billion cubic meters. 2007 renewable energy use about 220 million tons of standard coal, accounting for a total energy consumption of 8.5 percent.[4,5]

2.2.2 Proportion of the power new energy of the world's developed countries

There is great gap between China's power using structure from the clean energy development ,which is compared with other countries especially the developed ones. In the U.S. electricity production, coal-fired electricity accounts for only 50 percent, nuclear power accounted for 20 percent, natural gas in power generation accounted for 17 percent, hydropower and other renewable energy power generation accounted for 10 percent. Japan's nuclear power accounted for 26 percent, hydropower accounted for 10 percent, oil and natural gas in power generation accounted for 35%, coal accounted for 27 percent. French nuclear power accounts for about 80 percent, coal-fired electricity accounts for only about 5%. Germany, Spain, Denmark and other countries in recent years wind power development at a fairly rapid pace. From the world's average level, accounting for about 40 percent of coal-generated power, nuclear power accounted for 15 percent, hydropower and renewable energy power generation accounted for 20 percent.

Although the proportion of China's oil consumption is still low, but the reliance on imported crude oil becomes high. From 2003, China has become the world's second largest oil importer and consumer countries, in the degree of dependence on crude oil imports about 40 percent, also the future will continue to improve. Hydropower, nuclear power, wind power and other new and renewable sources of energy are only used as a supplement from the scope and methods of use. Under such circumstances, China's future energy supply of coal can not change the pattern of mainly using the clean, but add an efficient way to optimize the use of coal that is used as the main channel to solve the energy issue, to protect the national energy security.

2.2.3 China main primary energy use current situation and prospects

Table 1. China main primary energy use current situation and prospects

energy type	situation and prospects	result
coal	About 70 percent of energy supply, China's major energy longest in the reserve-production ratio of primary energy	China's coal-based energy supply can not change the pattern of using the clean, efficient way to optimize the use of coal which is to solve the energy issue, the protection of national energy security as the main channel.
oil	Occupy 21%, import reliance is about 40%, and the situation in future will do the same trend.	
water energy	Occupy 6%, and 2020 scale is 370 million KW, which is three times than it now.	
nuclear energy	Occupy 4%, and 2020 scale is 40 million KW, which is four times than it now.	
wind energy	Accounting for the total energy supply of little; 2020 reach 300 millions.	

Data origin: National Development and Planning Commission energy police station

[4] Chinese Academy of Engineering. Our country renewable energy source developmental strategy studies [R].2008.

[5] WANG Changgui, CUI Rongqiang, *New energy power technology*[M]. Beijing: Chinese Electric power Publishing house, 2003[3].

Coal as the important position decides the Chinese power industry's future. China's coal by more than half of secondary energy into electricity for use after the (2005 coal consumption accounts for the power industry of the total consumption of coal for 54.5 per cent), with the gradual upgrading for the energy efficiency and environmental standards requirement, the coal power conversion ratio will continue to grow. Therefore, clean, efficient coal-fired power generation will become China's power industry development orientation, and all kinds of new energy, renewable energy generation will become a useful supplement coal-fired power generation.

3. TO IMPROVE THE ELECTRIC POWER ENERGY LAYOUT, THE NECESSITY TO DEVELOP THE RENEWABLE ENERGY SOURCE

3.1 the deprivation of our electric power energy resources need urgently to develop new energy

The traditional ideas of “bounteous” has covered the fact that the Chinese energy total reserves are insufficient. Today comparing with international, the majority resources reserves reduce suddenly, simultaneously along with the economical swift development and population quantity's unceasing increase, the resources demand further increases, the resources safeguard reduces. On the other hand, which also fades the protection and the reasonable use to the resources ,the massive resources are developed unreasonable, the resources waste has been created.

In China existing fossil energy reserves, the coal accounts for the world total quantity 16%, the petroleum accounts for 1.8%, the natural gas accounts for 0.7%.if the sum of three converts into the standard oil equivalent ,which accounts for the world fossil energy ultimate reserves less than 11%, comparing with the population proportion 21% which accounts for the world population, the Chinese discovered primary energy's reserves is quite deficient.

Meanwhile, China's availability of resources is low, the following chart shows: the primary energy intensity converts the ppp(purchasing power parities vs exchange rates) based on the exchange rate purchasing is 5 times of the world average level, surpasses Commonwealth of Independent States merely. But China is also impossible to compare with the fruitful resources’s degree of the Commonwealth in Independent States.

3.2 Developing the new energy is the requirement for realizing the electric power sustainable development

3.2.1 To develop electric power new energy is one of main ways for the developing circulation economy

The circulation economy is one brand-new economical movement pattern for humanity to realize the sustainable development. It advocates the accord development for economical and the environment，which is based on the principle of reducing the quantification, recycling, refreshing the resources, the fundamental principle emphasizes “the clean production”, which is one closed loop feedback type cyclic process of “the resources - product - renewable resource”, in order to realize “the most superior production, the most suitable expense, most little abandons” finally.

Developing the electric power new energy and realizing the traditional energies substitution, so as to the substitution between the traditional energy and the new energy, all of which is one efficient path to solve the bottleneck for the Chinese energy supply and demand, for the constitutive contradiction of

supply and demand ,so as to reduce the environment pressure .which is also the basic guarantee to realize the circulation economy. China will positively develop the water electricity, the nuclear power, and china will encourage to develop the wind energy, the solar energy, the biomass energy and so on renewable energy source, develops the use geothermal energy and the sea energy positively. It is reported that the Chinese renewable energy source proportion may be enhanced from present 7% to 16% up to 2020; this proportion will occupy above total energy quantity 25% at 2035~2040 years.

3.2.2 To develop the alternative energy will be the premise to insure realizing the Chinese electric power sustainable development

China will certainly march into the new times of multiplication, cleanly, the highly effective energy use. In the existing boundary's restraint of energy and the resources. Being a helpful industry, the energy substitution will solve the bottleneck question existing in economy sustainable development, which will also bring us the significant opportunities for investment, and bring us the relatively rich investment repayment.

3.3 Developing the new energy is the global need for the energy conservation and carbon emission reduction under the clean development mechanism (CDM)

3.3.1 The clean development mechanism (CDM)

The clean development mechanism (Clean Development Mechanism) is a market nimble mechanism, signed at12th protocol in "the Kyoto Protocol", the main contents of which refers to the cooperation between the developed country and the developing country, via the way of which the developed country provides the fund and the technical way to the developing ones through the projects, and to realize the certified reduction delivery capacity, which is used in the developed country contracting party to complete the pledge in the protocol third of reducing its own country greenhouse gas emissions.

The CDM is one kind of transnational trade investment mechanism, which can urge the developing country to obtain the developed country partial funding invested and the technical transfer, simultaneously promotes the developing country technology advancement, to develop the renewable energy source, to raise the resources comprehensive utilization level.

3.3.2 CDM has brought the turning point for our country

CDM is considered as one “win-win” the mechanism: which brings the turning point to our renewable energy, which also has the positive sense to the electricity generation enterprise. it can raise the project benefit, improve the project efficiency, promote the electricity generation way to turn to the direction, which can benefit he environment and the sustainable development, but the risk and the opportunity with exist together.

In fact, from 1990 to 2006, because china used the coal massively as the main foundation energy in our electric power production, which caused the national energy production emissions CO2 is the add-quickest in the global, just as shown in Figure 2, Figure 3. All these caused Chinese present electric power production emissions CO2 to occupy the whole world 18%, which is only inferior to North America, therefore it is difficult task for us to accomplish the energy conservation and carbon emission reduction .[6]

[6] National Development and Planning Commission Energy Bureau data statistical data.

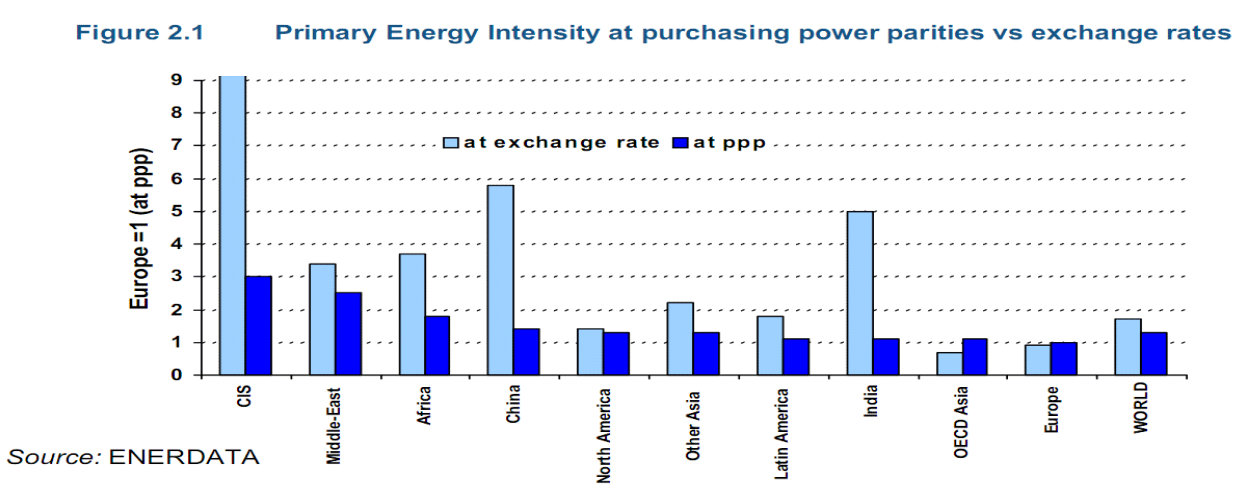

Chart1: A global energy denseness exchange rate conversion purchasing contrast[4]

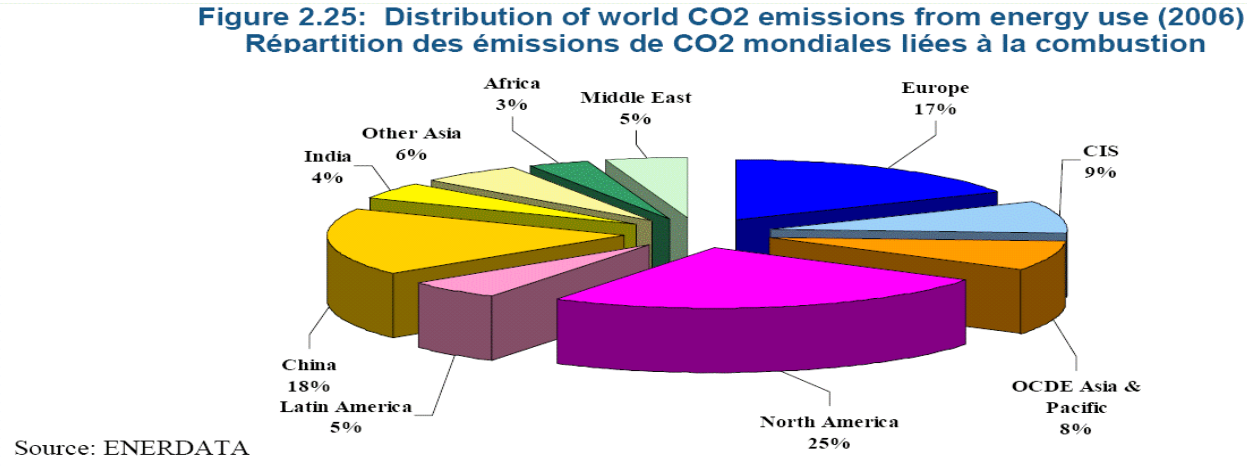

Figure 2. Emissions contrast in the CO2 produced by consumes energy in the whole world [7]

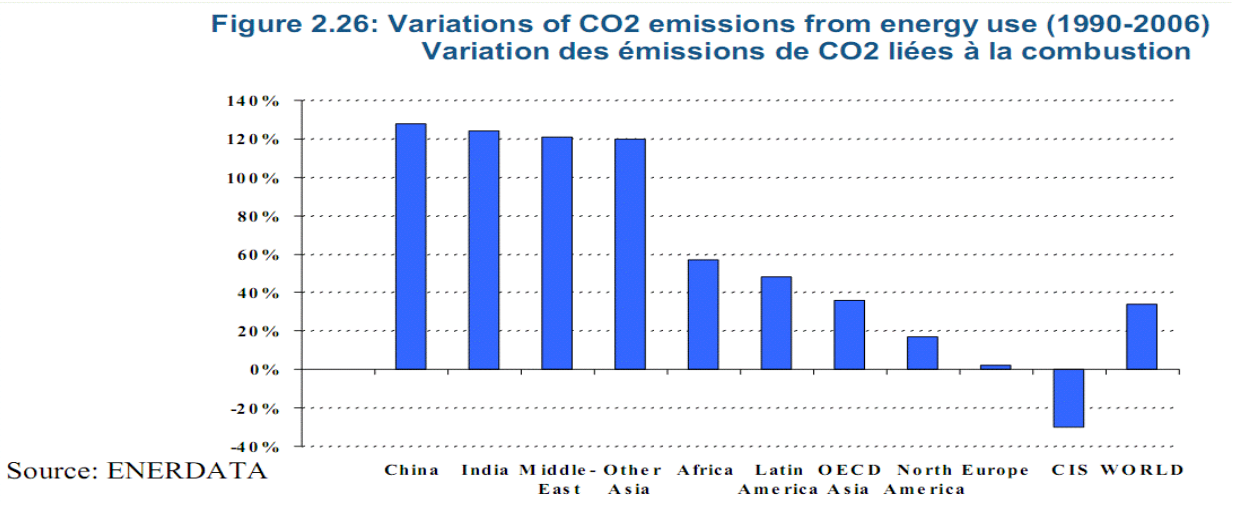

Figure 3. The CO2 change degree contrast in the whole world from1990 to 2006 by consume

energy

4. RESULT

The “Kyoto Protocol” agreement which was signed in May,1998 and approved in August,2002 by the Chinese government came into effect in 2005. In accordance with Principle of Common and Separate Responsibilities, the developing countries have not got the emission index, however, as a responsible big country, in June,2007,the Chinese Central Government promulgated “China's National Programmer to Address Climate Change”，stating that developing renewable energy, such as wind energy, biomass energy etc, which will be taken as a major answering back measure to address climate change as greenhouse gas emission reduction and an important measure, 2010 will be committed to improving energy efficiency 20 percent.

Only by conserving energy, controlling total demand, developing clean energy technology, and speeding up the development of the renewable energy source, we can optimize the energy structure, to fill out the conventional energy source gap, to protect the environment and to reduce the greenhouse gas emissions, thus realizes the sustainable development.

In December, 2007, Chinese government had also issued the white paper "China's Energy Condition And Policy", which proposed explicitly that to realize the energy multiplication developmental strategy, and regard developing the renewable energy source as the important component of the national energy developmental strategy. All these in view of climatic change endeavor would be impossible to achieve, if we only depend upon the coal by the technology promotion without the widespread renewable energy source development. But the electric power energy's multi-dimensional pattern improvement has the indispensable essential significance, and developing the renewable energy source will have the important meanings to the Chinese electrical energy development.

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