Rural Energy Policy in China

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Abstract：This paper summarizes the development course of rural energy policy in China, discusses some special factors which influenced the rural energy development, and shows the effect of the main rural energy policies in the rural energy construction development，as well as provides further thinking about rural energy policy research of China in the future.

Key Words：**China; rural energy; policy**

Along with the urbanization, the proportion of rural population in China descended gradually from about 80% in 1980's to 62.34% in 2001, with the total amount of the rural population 795.63 million [1]. However, this quantity is still too huge, and the rural population is dispersed in the large rural area. Along with rural economic development，the rural energy demand has been growing very fast. Total energy consumption in rural area increased to 670 Mtce in 2000，almost half of the total energy consumption in whole China. Therefore，it is necessary to pay more attention to the rural energy problem which concerns about the energy supply and consumption for agricultural production, township enterprises and households.

1. The position of the rural energy in national energy policy and its development process

1.1 The position of the rural energy in China

Since the foundation of the People's Republic of China, its economic development was on the stage of industrialization，the government paid special attention to the commercial energy construction, including large power stations, coal mines and oilfields, which supply the energy for the development of industries and cities, rather than for the rural area. Though the planned economy system was carried out in that era，however, the rural energy construction was not included in the general plan. Most of the commercial energy was consumed out of the plan，only could be bought at high price, or self produced，the rural energy could not be supplied sufficiently.

For a long term, in China the straw, firewood and other biomass were main fuel for the rural residential energy consumption. According to the statistic data in 1979，the total amount of the commercial energy in rural area was consumed 104 Mtce，129kgce per capita，(1/5 of the average value of whole country) [6], more than 50% of

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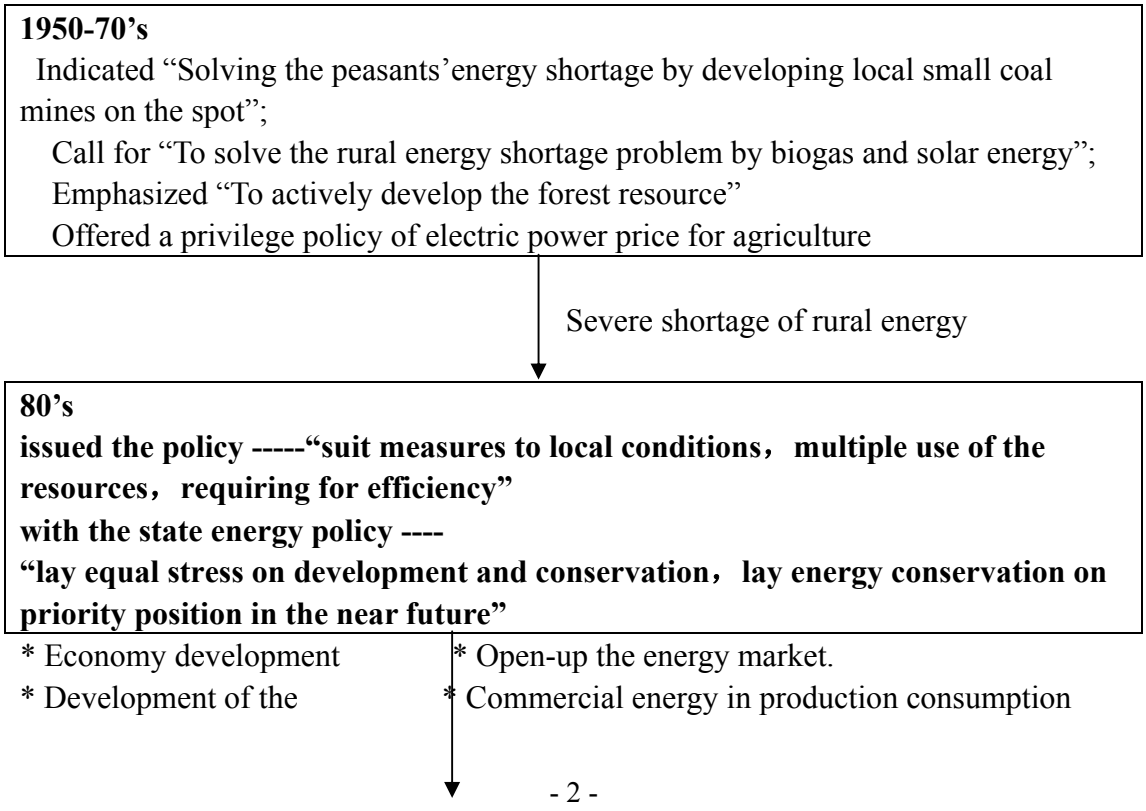
the peasants could not use electricity. Each year, the state provided 1 Mt kerosene for lighting in the countryside. More than 68% of the rural energy consumption is biomass energy，that caused a lot of the straw overburnt and unable back to the field，the forest resources destroyed. The rural economy and living standard are restricted by the shortage of the energy supply. These situation revoked the attentions of the decision makers，and led the policies of the rural energy to be come on.

Along with the economic reform and open-up, as well as the economic development in China，the situation of rural energy supply is improved gradually too. During the agricultural modernization and the township industry development, the energy demand for productive use has been increased year by year. Due to the strong desire of the peasants for rising their living standard, the energy demand for households has been increased too. Not only the quantity of rural energy consumption increased, but also the quality of the energy consumption conversed from the traditional biomass energy to the commercial energy. The rural economic and social development has promoted the development of rural energy market，at the same time, the environmental problems caused by rural energy has been mentioned to the schedule. Solving the rural energy problem became a part of much comprehensive economic policy. Therefore，the rural energy construction and development problems in the entire energy planning must be paid more and more attentions.

1.2 The development process of rural energy policy

Figure.1. The History of development process of rural energy policy



Township enterprises drived that in residential consumption

In 1996, the rural energy construction was arranged as an important part for the realization of agricultural modernization and rural sustainable economic development. In the Ninth Five Year Plan， the government pointed out:“quicken the process of the rural energy commercialization， and spread the firewood and coal saving stoves and briquetting, to form the industry and service system， suit meaures to local conditions to develop the mini hydropower stations, wind power ,solar energy, geothermal and biomass energy”

* Riding Wind Plan
* Bright Engineering
* Straw gasification and other demonstrated engineering projects
* Reform the rural electric grid

In 2000,
The special term for the energy development in the Tenth Five Year Plan pointed out: “considering the natural resource conditions， go all out to develop the small hydropower stations, wind and solar energy generation， for basically solving the problem of power supply to the remote and poverty no-power countryside”

* to build the synthetic rural energy construction, combining the rural energy with the economic development and ecological environment construction in every county
* “Good Ecological Environment and Rich Homeland Plan”

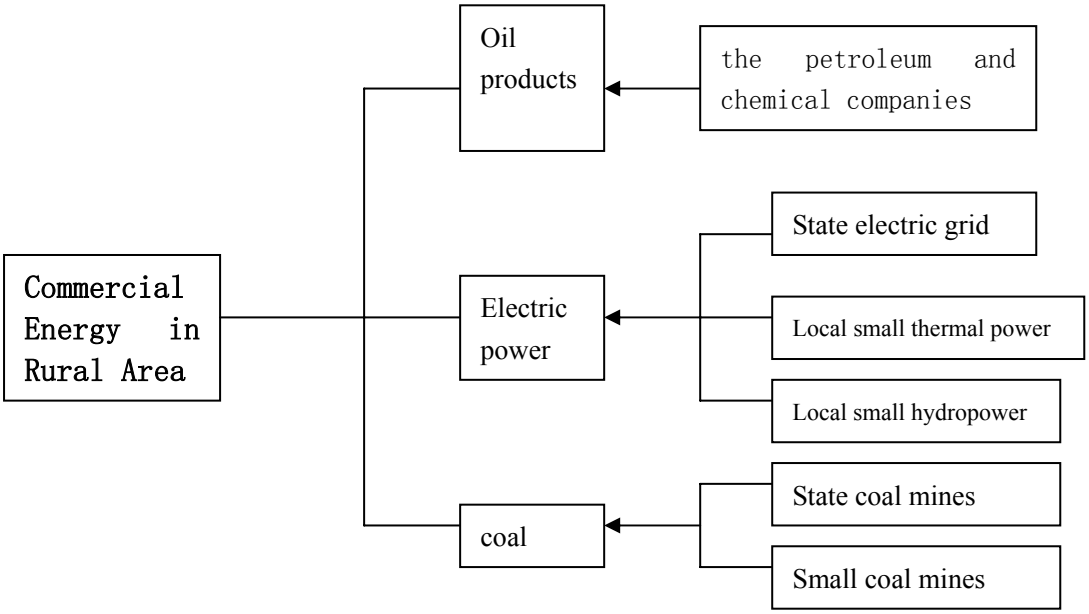
now

During the period of 1950--1974， China’s rural energy construction was only to develop small coal mines to provide the fuel supply on the spot, and to provide firewood for the peasants.The government offered a privilege policy of power price for agriculture,and requested the peasants to solve the energy supply problems by themselves, therefore, the rural energy shortage was in a slowly worsening condition with the increasion of rural population day by day. During the Big Leap Forward (1958—1960) and agriculture learned from Dazhai(1970-1976)， Chinese government called to go in “Five Small Industries”, tried to solve the rural energy shortage problem by biogas and solar energy in a while, however, more haste, less speed, the effect was very little. In 1975,the government raised clearly that the local coal mines should be developed to meet the needs of coal in the countryside, the output of the collective coal mines increased quickly, from 9.73 Mt in 1965 to 95 Mt in 1978.

At the end of 70s, China carried out the economic structure reform in the countryside，then, the township enterprises developed very fast，this brought more and more pressure on the rural energy， 40% of the total energy consumption in China was consumed in rural aera，of which 70% rural energy was biomass energy. The peasants living in the countryside need 600 Mt straw as fuel every year, but annual reaped straw was only about 460 Mt，the residential energy was insufficient seriously，70% of rural families were short of fuels, energy for rural production was in tension too，diesel fuel was short of more than 1/3， the number of electricity users in the countryside was only 50% in the whole country [11], the energy shortage became the important factor restricted the rural economic and social development. The energy supply problem in rural area aroused the attentions to the related departments of the state government.In 1979, Chinese government began to research rural energy problem in large scale for first time. The specialists and scholars of China Agricultural Engineering Society and China Energy Research Society discussed and raised the guidance :"suit measures to local conditions，multiple use of the resources，requiring for actual benefit"，and took it as the guideline of China rural energy construction in the 《Report on the Sixth Five Year Plan》which was passed by the 5th People's Congress，Dec.1982. In 1983, the the Central Committee of CCP document《On Present Rural Economic Policy》pointed out: "The development of small hydropower stations, wind power, biogas, solar energy and fuel forest is urgent, and must be held firmly." The rural energy problem must be as a part of the state strategy, and included it in the Seventh Five Year Plan and the State Science and Technology Development Planning in 90's，6 counties were chosen as the pilot project of the rural energy composite construction. In March 1986, in the meeting of the rural energy and 100 counties rural electrification pilot projects, The leaders in China began to emphasized the market economy，changed the old guideline "requiring for actual benefit" to "requiring for efficiency". After that, **"suit measures to local conditions，multiple use of the resources，requiring for efficiency", and with the state energy policy "lay equal stress on development and conservation，lay energy conservation on priority position in the near future" became the guideline of rural energy construction in China.**

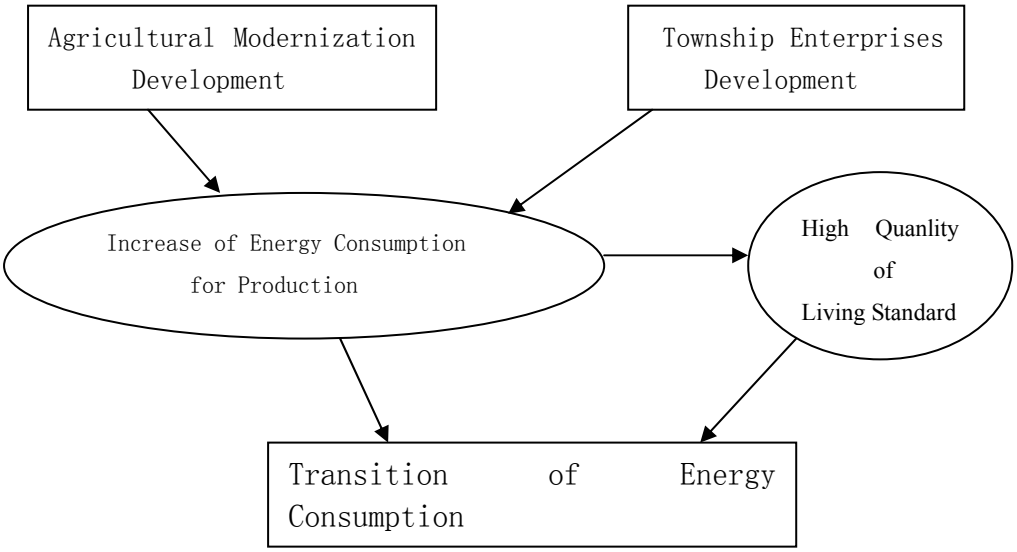
Since 80s，China turned into market economy the economy increase shifted from the extensive mode to intensive mode，the economic development in rural area entered into a new stage. Directed by the guidance of developing economy and encouraging multiplicity of economic sectors，the activity of developing small hydropower stations and small coal mines was aroused，the energy supply increased fast. The electricity came from the state large power grid , and local small thermal and small hydropower stations；the coal supply depended on small coal mines in some areas, or on the state-owned main coal mines in other areas；oil products were provided by the petroleum and chemical companies，more quantity and many kinds of the commercial energy were supplied in larger scope，the strained situation of rural energy use for a long time was relaxed.

Figure.2. The sources of the commercial energy in rural areas



In the period of the Eighth Five Year Plan（**1991——1995**），the annual increase rate of commercial energy consumption was 6.6%.The total rural energy consumption reached to 647 Mtce in 1995，of which, the commercial energy consumption reached to 381 Mtce，accounted 58.9%, more than a half of total rural energy consumption. The increase of energy consumption for production was higher than that for the resident，the energy consumption for the rural production was almost the commercial energy. There were two main reasons: firstly, the modernized agricultural development needed a great quantity of energy，the total power capacity of the agricultural machines reached to 361 MW，as 3.45 times of the level in 1980.The agriculture entered into the era of high energy consumption, the demands for oil and power increased too；secondly, the township enterprises developed fast，and became big energy users，their energy consumption reached to 282 Mtce，up to 43.6% of the total rural energy consumption in that year. The commercial energy consumed by the township enterprises was increased sharply，accounted 25% of total energy consumption in China. But due to lack of the commercial energy in rural area, the people living in backward countryside still consumed the traditional biomass energy mainly，up to 65.8% of their total residential energy consumption[3].The structure of rural energy consumption has been changed mainly by the rural production development.

Figure.3. The Direct Reasons of Rural Energy Transition



The State Development Planning Commission,the State Economic and Trade Commission,and the State Ministry of Science and Technology issued《Perspective Targets of new energy and rural energy in the period of the Ninth Five Year Plan and the prospect target in 2010》, it was the guiding document for the new energy and rural energy construction in the period of the Ninth Five Year Plan（**1996——2000**）. In the Ninth Five Year Plan，the rural energy construction was arranged as an important part for the realization of agricultural modernization and rural sustainable economic development，it pointed out "quicken the process of the rural energy commercialization，and spread the firewood and coal saving stoves and briquetting，to form the industry and service system，suit meaures to local conditions to develop the mini hydropower stations, wind power ,solar energy, geothermal and biomass energy". The government of all levels formulated and practiced a series of feasible policies，and did a lot of work in building the mechanism of rural energy for sustainable development，accelerated the macroscopic management system reform of rural energy, made the construction of policy and legislation. In January 1996， the state government raised a new energy development program which pointed out clearly to accelerate the development of new and renewable energy, and decided it as the direction of rural energy construction. The funds invested in rural renewable energy construction was up to RMB 3620 million in 2000，of which , 12.24% the allocated funds from every level governments，11.80% from every kinds of loan，75.96% from users' self-financing investment.

The main factors that accelerated rural energy commercialization , as following:
Firstly, the environment impact began to become an important factor in both China energy and rural energy policy in 90's, this embodied：some projects were raised to push on the exploitation of rural cleaning energy, combining with the state renewable energy development planning ,as follows:

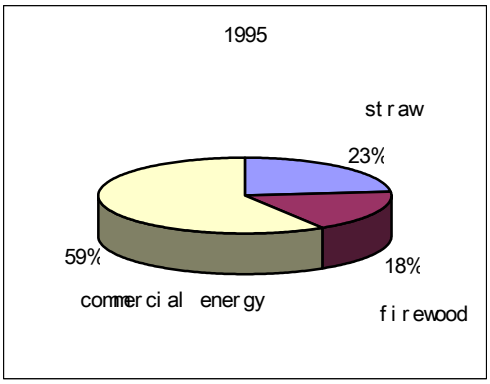
（1）Riding Wind Plan, led by the State Development Planning Commission，practiced by the Ministries and Commissions of the State Council, it adopted the form of combining technology and trade to introduce and absorb the foreign advanced technology，to realize the national production of 300kW and 600kW wind generation sets，to speed up the wind power construction.（2）Bright Engineering, led by the State Development Planning Commission, it needed to solve thoroughly no-power problem in some rural areas to supply power for 23 million rural population by use of small wind, solar and other new energy generation systems，to reach the level of 100W generating capacity per capita.（3）Straw gasification and other demonstrated engineering projects.（4）Synthetic rural energy construction for 100 counties，to push forward the rural energy construction.

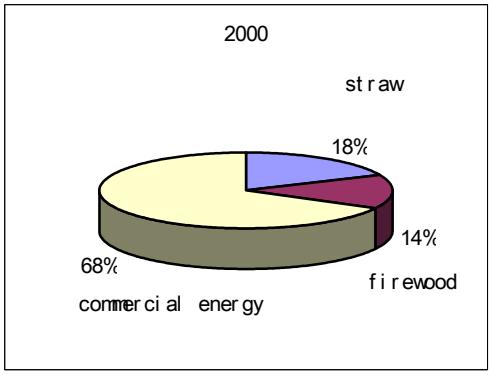
Secondly, the adjustment in related state energy policy , (1)as to rectify and shut down small coal mines，China accelerated the development process of high-quality and commercial rural energy, raised the dependent level of rural coal on the state supply；(2) the government paid attention to natural gas and new energy development，urged high-quality energy consumption , as biogas, electricity, liquefied gas, natural gas, etc. In rural areas, solar energy users has been increased too；

Thirdly, the state paid attention to the natural forest protection and ecological environment construction decreased firewood supply in some rural areas，increased the demand of commercial energy；furthermore, strengthened the reform of rural power grid and rural power administration system. Because electricity price in rural area descended a lot,the power consumption has been promoted in countryside.

Now, the residential power consumption in rural area stayed at the level of 0.44tce per capita, and the degree of dependence on the local energy, natural forest and crops resources was lowered down. The energy consumption in rural industry was the commercial energy basically，and its total amount increased very fast. Comparing the energy consumption structure in rural area between 1995 and 2000, it can be shown: the proportion of straw descended from 23.3% to 18.44%；the proportion of firewood descended from 17.87% to 14.24% the proportion of commercial energy(coal, oil, power) raised from 58.83% to 67.32%[5]

Figure.4. The structure of rural energy in 1995 and 2000





In the period of the Tenth Five year Plan（2001——2005），China rural energy development emphasizes to suit measures to local conditions，to go step by step，to complement by many kinds of energy，to multiple use of the resources，to optimize the fuel structure, the principle of industrial development should be --lay equal stress on energy production and energy conservation, focus on the development of new and renewable energy，to use ordinary energy effectively，to perfect the rural energy conservation system，to strengthen the capability of the sustainable development of rural energy system. The special term for the energy development in the Tenth Five Year Plan pointed out: "considering the natural resource conditions，go all out to develop the small hydropower stations, wind and solar energy generation，for basically solving the problem of power supply to the remote and poverty no-power countryside".

1.3 The measures for carrying out the rural energy policy

Chinese government started to build the synthetic rural energy construction, combining the rural energy with the economic development and ecological environment construction in every county, after the development guideline was published. During 1986—1990, 18 counties in different areas and types were chosen as experimental samples of tackling key problems in science and technology by the state, so as to summarize a complete set of the approaches and experiences for the rural energy construction. In 1991, 138 counties developed their general rural energy construction, this work was brought into the Eighth Five Year Plan, and advanced the experiences from the pilot projects in large scale. During the period of the Ninth Five Year Plan, 191 counties in the different types, for example "the poverty relief", "moderate" and "rich", continued to practice the synthetic rural energy construction projects. The rural energy construction had got great progress. Since 2000，the Ministry of Agriculture practiced "Good Ecological Environment and Rich Homeland Plan" in western rural area ,desired to introduce in, organize and push forward some effective rural renewable energy technology and modes，to increase energy supply，to contain the ecological destroy， to promote the peasants ' income. Meanwhile, the rural energy industry which aimed to product, sell and provide service of rural energy,

will develop step by step. Up to 2000 there were 3297 rural energy service companies in China，1880 renewable energy production enterprises，total assets were RMB 593 Million and 1478 Million, sales income 916 Million and 1407 Million，profit-tax 74Million and 150Million separately.[5]

For a long time, the rural energy construction practiced a policy as--- jointly financed by the local people and government. The principle of rural energy construction was "the builder can manage, own and get benefit"，including the constructions of small hydropower stations, biogas, fuel forest，etc. The funds raised mainly from the rural residents and collectives, the state government would give some support if necessary. The state support were mainly: to allocate special funds and long-term interest-free loan for the rural energy constructions, which in the long-term planning or the directive plan ,for example, 100 counties of the rural energy composite construction engineering , in the near future.

Figure.5. *The funds for the rural energy construction*

The principle ——"the builder can manage, own and get benefit"

The sources —— mainly from the rural residents and collectives
Partly from the state government

Rural energy development in China has gained great achievement, due to the government regarded importance and raised clear policies for it. However, it is still a long-term and hard task to supply enough energy for 800 million residents in rural area.

2. Rural energy policy in China and its effect to the rural energy development

2.1 Comment on the practiced rural energy policy

The rural energy policies practiced in China can be classified according to their species as follows:

2.1.1 Applications of biomass energy and biogas engineering

The biomass energy is the most important rural energy resource in China. Available biomass energy includes the straw、firewood and dung, etc. China rural energy construction started from the building of biogas digesters.

Straw is the by-product of crops，it can be burnt directly as living use fuel. In recent years，the technology of the straw pyrolysis gasification which can produce low

thermal value gas, and convergence supply to the peasant families, was paid attentions. In 2000,388 sets of the straw gasification systems were built, those consumed 87 Mt straw, to supply 150,000,000 m^3[12] every year.

Dung is the main raw material for the biogas. Ox dung can be used as fuel in some pasture areas and other fuel lack areas. In 80's，biogas construction began to enter a steady development stage. Up to 2000, there were 7.6million biogas digesters in use, produced 2,590M m^3 biogas every year.[12] In the practice of biogas multiple use，it appeared different ecological energy usage modes focusing on the biogas in the different areas. Now, China became the first producer of biogas in the world. The normal temperature biogas engineering which matched with the ecological farms is developing fast，the biogas engineering is not only a pure energy engineering，but also an energy-environment engineering, closely combining with the environment and natural resources.

2.1.2 Development of small hydropower stations

Mini hydropower stations and electrification played an important role in the power supply of rural area，China became the leading position in the world for the exploitation of small hydropower resouces，it fully expressed that the support of the state policy was the guarantee in the development. The development of the small hydropower stations in China experienced the three stages, as follows：

The first stage started at the time of new China just founded. There was no power supply in the wide countryside，so that the development of mini hydropower aimed to provide electricity for production and living, especially for lighting in rural area；

The second stage had the starting point of the economic reform and open-up. The construction of primary electrification counties combined with the development of rural hydropower and the local economic development. It hoped to solve the poverty problems in the remote, mountainous, minority ethnic group areas .The central government issued a series of documents to raise the policies: "Self building, self managing and self using"（i.e. rely on rural residents themselves）,"the builders can manage, own and get their benefit"（to protect the investors' legal interests，raise the activity from all aspects for the development of small hydropower stations）、"Self funded by the power sector"（i.e. to carry out the share system to construct power stations; to get bonus according to the shares， the bonus which got by the government and local state-owned share can be used as new funds for the small hydropower stations and rural electrification construction; to set up a virtuous circle of the input-output, to realize the rolling development）" The small hydropower stations should have their supply areas"（to insist on the synchronized construction of small hydropower stations and the power grids，the coordinate development of power and load construction ）,and "carry out the VAT 6% for small hydropower stations", etc. These policies and measures caused hydropower installations increased quickly，

up to the end of 2001，653 primary electrification counties had been built, the total hydropower installed capacity reached to 31100 MW, annual power output 94500000 MWh，of which, rural hydropower installed capacity 27000 MW，annual power output 8000 MWh（the meaning of small hydropower stations is their installed capacity less than 50 MW）. The rural hydropower has become the important infrastructure and industry in the mountainous areas, and advanced the agricultural economic development. Now, about 1/2 territory ,1/3 counties and cities, 1/4 population mainly rely on the power supply from the rural hydropower stations and their grid，and about 800 counties mainly rely on the power supply from the small hydropower stations and their grid，the power consumption problem of the rural population was basically solved；

The third stage started from the new century，along with the direction of serving for the agriculture,countryside and peasants，combined with the economic construction, river management, ecological construction and poverty-alleviating , to develop rural hydropower and electrification continuously. It has been clearly pointed out: Firstly, the development of rural small hydropower stations should solve the problems of peasants' fuel and rural energy consumption，to promote "the convert land for forestry" and natural forests protection，to protect and improve the ecological environment，to serve for the sustainable development；Secondly, to develop the rural hydropower resources and construct countryside electrification，to promote the economic development and social progress of central and western areas；Thirdly, to bring into full play of the resource superiority of small hydropower stations，to accelerate the poverty relief of the poor and mountainous residents. During the period of "the Tenth Five Year Plan", the state government will invest RMB70000 million，to construct 400 counties of electrification with hydropower. The state will support the development of small hydropower stations in recent five years，especially those installed capacity lower than 25000 KW. This planning will be listed in the state renewable energy projects. Now, the Ministry of Water Resources is drawing up a general planning: small hydropower stations replace the fuel, for protecting the ecological environment.

In China, the small hydropower stations provide the commercial energy and water for the countryside，and promote the rural economic development. The specialists of the energy organizations evaluated: from 1983 to 1995，the small hydropower stations supplied electricity for 93 million residents, increased 470,000 km^2 irrigation area，supplied the drinking water for 17 million residents; the total economic output from the electrified counties increased 5.6 times，their peasants' pure income per capita increased 5.3 times，the rate of forest coverage raised 8 percents[12]，the small hydropower policy obtained satisfactory social, economic and environmental efficiency.

Table 1. The Development of the small hydropower stations in China

	1985	1990	1995	2000	2001
Irrigation and Drainage Area by electric Power (%)	55.9	57.3	65.3	66.7	66.8
The number of small hydropower stations	55754	52387	40699	28558	29183
Capacity of small hydropower stations (MW)	3802	4288	5195	6928	10607
Electricity Power consumption In Rural Area (billion KWh)	50.89	84.45	165.57	242.13	260.98

Source: National Bureau of Statistics: China Statistics Abstract, 2002 China Statistics Press 2002.5, p103，p106

2.1.3. Developing small coal mines

In China, there are plentiful coal resources in 1200 counties in almost every provinces and autonomous regions(except Tianjin, Shanghai and Tibet)，especially in Shanxi, Shandong, Henan, Guizhou and Inner Mongolia. The wide spread distributed coal resources and the encouraging policy of the government provided the foundation for the peasants to develop the small coal mines and to get rid of the poverty. The rural energy consumption depended on the small coal mines mainly.

The rural small coal mines started to develop in the beginning of 50's. The first high tide of mining appeared in "the Big Leap Forward"，the output of collective coal mines increased from 6.49 Mt in 1957 to 21.95 Mt in 1960，but the coal production sharply descended in the Three Year Difficult Times，to 19.73 Mt in 1965. After the "Cultural Revolution"，the output of the state-owned coal mines descended, could not meet the productive and residential demand，the situation urged greater development of local small coal mines. Since 1972, the collective coal mines increased year by year, occupied more and more proportion in the total coal output in China. The reform and open-up policies promoted economic development，coal supply was unable to meet the demand in the speedy development, during the beginning period of "the Sixth Five Year Plan". Therefore，the government accelerated the construction of state-owned big coal mines, at the same time, publicized a series of policies to urge the masses to raise fund for mining，for solving the difficulty of state investment. In March 1983，the State Council issued a document:《Eight measures to accelerate the development of small coal mines》, 30000 new coal mines were built in that year. The government

raised “develop as fast as possible” in April 1984；“State, collectives and individuals work together to build the large, medium and small coal mines” in January 1985 ; “To support, reform, reorganize, unite and rise” in 1994;for strengthening the township coal mines management. Since 1993，the coal price liberalization inspirited small coal mines development faster. Under the guidance of “the central and local governments work together to build large, medium and small coal mines simultaneously” ， the number and productive output from the township coal mines increased sharply. The proportion of the township coal mine output in that of whole country increased from 8.2% in 1971 to 23.8% in 1983, and 41.9% in 1998. There were 73000 township coal mines in whole country in 1995，their output reached 659 Mt，48.42% of total output of China，i.e., the highest proportion in the history. The increased coal output in China came from the township coal mines totally, during the period of the Eighth Five Year Plan. The 60% coal output of the township coal mines supplied for local consumption，therefore，the development of small coal mines formed an important part of the rural energy construction.

The increased value of the township coal mines output exceeded that of the state-owned coal mines，turned round the coal demand-supply situation completely. Because the coal supply was unable to meet the demand in the past, the development of the township coal mines was considered as a successful measure: use less input, obtain great achievement of the coal industry. However, the management of small coal mines went out of control，the small coal mines grew a lot of evils. According to the statistics in 1997，more than 50% of the small coal mines (about 40000) were illegal ones， their total output was about 400 Mt. The output of small coal mines increased so sharply that aroused some problems: (1)the surplus of coal production in whole country. (2) among 7000 workers died in coal mines accidents, 5200 died in small coal mines, accounted 73.5% . (3) the extraction rate of small coal mines was about 10—15% on average，but in the state-owned mines it was more than 70%. Because the illegal small coal mines had low cost, low efficiency, exploiting beyond the boundaries, destructive mining, disturbing the market, serious injuries and death accidents, destroyed and wasted the resources, etc. they impacted the production of state-owned important coal mines, confined their productive capacity and pushed them into deficit. The high speed development of the township coal mines in the initial stage had paid upon high social cost. Now, the small coal mines became the main contradiction restricting in China’s coal industry development. In December 1998，the State Council issued a notice to shut down illegal and unreasonable coal mines，to get rid of the straits of coal industry. It requested to ban and shut down illegal and unreasonable arranged coal mines. After the reorganization, 31000 illegal and unreasonable arranged coal mines were shut down, the production output decreased 268 Mt in 1999.[4] After that,18900 township coal mines were pointed to be shut down in 2000. To contain the coalmine accidents, in June 2001, the State Council decided all township coal mines stop their production to set in order, the legal township coal mines should be rectified and qualified, then, able to recover their production.[9]

The small coal mines were distributed extensively in China, their production related with the interests of the local government, towns and peasants directly, therefore, to shut down small coal mines existed a great extent difficulty. In the future, the state government are still faced with numerous small coal mines, it is a real problem to manage and develop these small coal mines.[10]

2.1.4 Development of wind ,solar and other new energy

China has rich renewable energy resources as solar, geothermal, wind and ocean energy, distributed in wide areas. The new energy technology showed up enormous effect in China, even it still stayed at the stage of research and experiment. In the period of the Eighth Five Year Plan，new energy, including the biomass energy, developed fast，could provide 300 Mtce every year，eased the stressed situation of the rural commercial energy，and promoted the social and economic development in the countryside greatly.

Since 1996，the State Development Planning Commission raised some new and renewable energy state plannings, such as “Riding Wind Plan”and “Lighting engineering”. In 1997,《Temporary provisions on the new energy infrastructure construction project management》 raised by the State Development Planning Commission ,which pointed out clearly that the new energy projects should be developed in definite scale.

China has plentiful wind power resources，the theoretical gross potential energy is 3,226,000 MW，of which, primarily estimated exploitable installed capacity is 253,000 MW. It is at the first place in the world，as same as the exploitable hydropower installed capacity 378,000 MW, and can be developed in commercialization and in large scale. Since the middle of 90’s , the wind generation in China began to develop along the direction of commercialization. In 2000, there were 26 wind power fields in China, their total installed capacity was 344 MW, and increased to 400 MW at the end of 2001[12]。However, due to the high input and high cost of the wind generation, its invested cost per KW installed capacity is up to RMB10000, the generating cost is RMB0.6--0.9 per kWh，that made the wind generation unable to compete with ordinary power generation，so, it developed slowly.

In March 2002, the State Economic and Trade Commission, Ministry of Finance, and State Administration of Taxation coordinated to raise, and approved by the State Council, a privilege policy on wind generation will be carried out : the VAT for wind generation projects will be reduced to a half amount of old value. This new policy will lower wind power price RMB0.05—0.06 on the average，the power price of new wind power fields will descend to less than RMB0.5 /kWh，that will produce active influence on the wind generation industrialization.

2.1.5 To extend the energy conservation technology

In the most parts of rural areas,the heat efficiency of Chinese rural traditional kitchen ranges was about 10%，so, the main measure of rural residential energy conservation is to reform the traditional low-efficiency kitchen ranges at first. Because new type firewood and coal saving stoves with heat efficiency more than 25%. the government promoted some projects to drive the peasents to restructure their kitchen stoves and beds.These new technology saving the energy were welomed by the peasants.At the end of 2000，189 million firewood and coal saving stoves were extended in rural areas，among them, 45 million were commercial products, 35 million were briquetting stoves，and 19 million energy conservation beds[5]，it relaxed the stressed rural energy usage and make contributions for the protection of the ecological environment.

Most of the energy consumption in rural production was used by the township enterprises of high energy consumed industries as the cement, bricks and tiles, tobacco and tea. The township enterprises had very low starting points of the technology， most of them adopted the old equipment those eliminated by the large enterprises，their energy consumption per production output was much higher than that of the state-owned enterprises. The township enterprises knew the importance of the energy conservation, and did a lot of work for lower consumption.Their energy consumption per RMB10000 descended from 7.46tce in 1990 to 4.48tce in 1995,the annual average descend 9.7%，[3]however, is still 12% higher than the energy consumption level of the whole society. The real problems as the fund and technology of the township enterprises can not be solved in recent years，therefore, how to lower the energy consumption level of the township enterprises is still a hard problem in the state energy conservation work.

In recent years, the development of China rural energy technology produced many achievements with good prospect，such as the energy-ecological mode in northern China countryside；energy-environment engineering technology；biomass gasification technology; gasification generation technology；solar energy green house, biomass solidification technology, etc. [3]。

2.2 One of the present rural energy policies: rural grid reform and rural power price adjustment

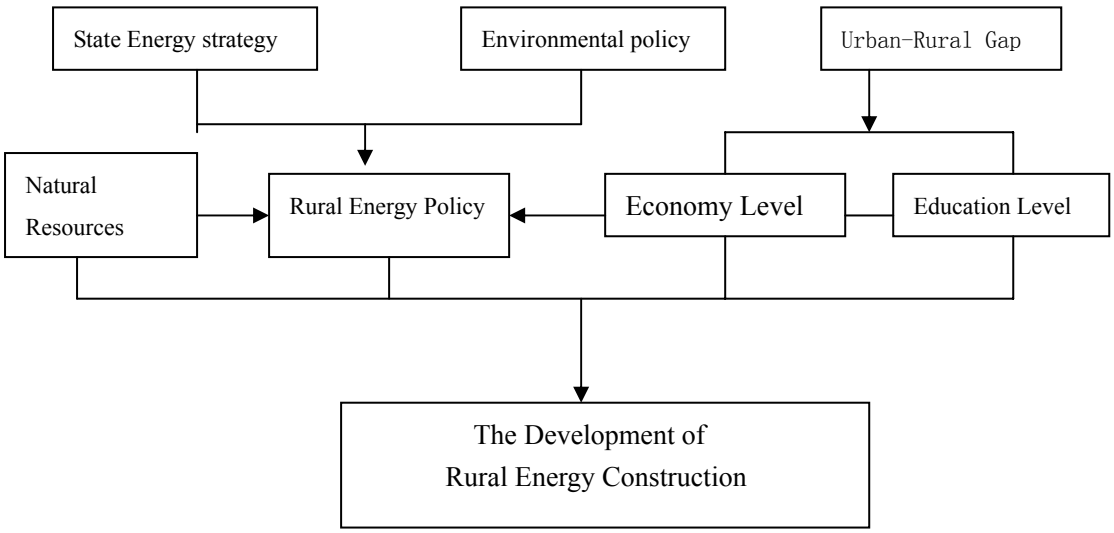
Since 1996, the government brought forward“quicken the process of the rural energy commercialization”,as the first step of this process,the government decided to reduce the heavy burden of the electricity price for the peasants. Because the laggard electric power equipment and management,the electric price in rural areas much higher than that in urban areas in China for many years.Even the electric power grid connected to the villages,the peasants refused to use it,lighting by the candles.
In 1998，the State Development Planning Commission provided the loan RMB 180 billion for the rural power grid construction and reform，this was the largest input to rural energy construction since the foundation of PR China. The water resource system and rural power grid reform, as well as the rural power price reform were

carried out, to cut down the rural power price，break the monopoly, usher in competition, go along the direction of power industry reform ， to practice the policy "Two reforms, one equal price", i.e., water resource system reform and rural power system reform, one equal price of power for both urban and rural users, to lighten the burden of peasants.

Sichuan, Chongqing, Guangxi, Jilin, Yunnan, Qinghai, Hubei, Hunan, Guangdong, Shanxi provinces reformed the rural grid，built the independent power distribution companies, publicized the policy of using power charge gain right as the mortgage guarantee for the loan in rural grid restructure；this loan will be postponed to return in 20 years；the capital assets for rural grid restructure in western poor areas will be changed from national debt to allocated funds. All these policies greatly promoted the reform work in these areas. At the end of 2000，1000 counties finished the reform work，the rural grid loss rate descended to lower than 12%，all those counties finished the reform of water system, rural power grid and township power management system, realized "to open the power quantity and power price" and " service of sale, record power meter, charge to every user's home", and " to unify the power price, invoice, meter record, business accounting and check"，the rural power price lowered down largely，rural power consumption increased obviously，the rural residents can lessen the power charge RMB35 billion every year.[7]

3. Some special factors impacting the formulation of China rural energy policy

Figure.6. Factors Impacting the Formulation of China Rural Energy Policy



Although controlled by the family planning policies, China has a huge number of rural population ，up to 800 million, in 2001.The rural residents have low income and

live in countryside separately, that brought forth a heavy pressure on the energy supply and improvement in rural areas of China. Besides the factors of the population and natural resources，there are other important factors :

3.1 Impact of rural economic development

At the end of 1996，the agricultural economic situation in China began to change greatly，the prices of agricultural products descended in genera,l from that autumn，and this tendency kept four and half years，up to April 2001， the general index of agricultural products purchasing prices just raised slowly. Based on the statistics，pure income(in cash) per capita of the peasants was RMB1063 in first half of 2001, only RMB50 higher than RMB1013, the income level in 1999， and only RMB10 came from sale of peasants' agricultural products. The prices of agricultural products kept at low level and the income of peasants increased very slowly，illustrated deeply that China's agricultural economic development entered into a new stage.

The statistical data expressed: the pure income per capita of the rural residents of whole China raised from RMB1926.07 in 1996, to RMB2366.40 in 2001，however, the corresponding controllable income of urban residents were RMB 4838.9 and RMB6859.6 separately[1]。The data analysis showed:

（1） The peasants' income increased too slowly in the period of the Ninth Five Year Plan；

（2） The income gap between rural and urban residents grew larger;

（3） The income differences among different areas grew larger, the incomes of the peasants living nearby big cities or sea coast were much higher than those living in inner and western areas.

The regional residents' income differences would lead to different energy demands in different regions and living levels，that would speed up the split of rural energy demand in quantity and species, the level of rural energy construction would appear greater differences too.

The income of peasants increased so slowly that resulted in reduction of expensive commercial energy demand， impeded the optimizing process of rural energy structure，at the same time, the low income of peasants would impact directly raising funds for rural energy industrialization.

3.2 the economic and social impact of the urban-rural gap

Under the strategy of accelerating the industrialization, China carried out different management modes in urban and rural areas，the flows of all resources between them were controlled strictly，all resources were offered to cities in priority. The important sign of the system was the domicile control system. Though the foundation of Chinese modern industrial system was benefited by the industry-agriculture price scissors policy，but this policy confined the rural economic development. Now, the

market economy reform has been carried out in China for many years， the urbanization process speeded up, the domicile control system would be changed too， but the old system and gap will still determine the rural energy structure in China for a long time.

3.3 Demands of the Ecological Environment

In the past, the rural energy consumption depended on local resources, so, “expanding the plant area of fuel forest” was the scheme of solving rural residential energy. Therefore， China energy technology policy emphasized “actively develop forest resource”， looked the forest resource as the primary energy source. Although the sufficient straw, firewood and other residential fuel can be obtained in rural areas, but excessive cutting firewood still existed in some counties.[2] The rural energy consumption overdepended on the forest and wood resources, that is one of the reasons of the ecological environment worsening. In 1998， the state publicized important policies about the protection of natural forests, and converting land for forestry and pasture. Therefore， under the action of the state policies on protecting ecological environment， related rural energy supply program has to be adjusted. Meanwhile, it is needed to raise regional rural energy policies , considering the big differences of economic development and natural resource conditions in different regions.

To substitute the firewood， China rural energy policy takes the measure to accelerate the development of the new technology for the biomass energy application，to develop the solar energy,wind power and other renewable energy technology， to open the energy supply market.

4.Conclusions and further thinking

Through the summary of China rural energy policy as above mentioned, it can be seen that：

（1） China rural energy policies have rather strong influences；
（2） The structure of China rural energy is in a changing era obviously， the policy should fit with the change of situation;
（3） Further research is needed to do a deeper comment on every important policy, we think：

Firstly， a complete China rural energy policy describing system is necessary. It should include：

（1） the background of every policy；
（2） the content of the policy；
（3） the funding information of every policy;
（4） the executing organizations for every policy, and the relations among them；

（5） Local policies and their specific practice conditions,etc.

Secondly, considering the characteristic of the vast territory of China, China rural energy development problems should be classified according to regional or economic types , to research the result of executed policies.

Along with the development of market economy，market-oriented energy supply and rural energy demand/supply commercialization is certain to have an increase trend，and would influence the energy development in China. Recently, related departments and research units have studied and induced the rural energy policies, to consider together that the starting point of the **policy should be —— the rural energy construction must adapt with the development of market economy，to be adjusted, following the principle of sustainable development，to promote the sustainable use of natural resources，to guarantee the sustainable development of rural economy.**

The present problems must be studied, for that the rural energy construction can develop smoothly in the future. The effects of the rural energy policies at present stage should be estimated earnestly，the framework for analysis should be set up，for example, the "rural energy commercialized supply-demand analysis framework",etc；it has to do the analysis about"indirect policy"，i.e. the macroeconomic policy, agricultural economic policy, urbanization policy, environment policy ;and their related influence analysis affected by the policy changes in all aspects after entering WTO.

References：

1.National Bureau of Statistics: China Statistics Abstract, 2002 China Statistics Press 2002.5

2.Yan Changle ed., Report on China Energy Development, Economic Management Press 1994.6

3. Yan Changle ed., Report on China Energy Development, Economic Management Press（1997 version） Economic Management Press 1997.6

4.Pan Weier, Comments on the coal economic performance 1999, Energy Policy Communication 2000.2

5.《Report on China Energy Development》editor commission, Report on China Energy Development 2001, China Statistics Press 2001.12

6.China Energy Research Society, Present and Prospects of China Energy 1986

7. China Rural Hydropower and Electrification News Net: New Stage of Rural

Electrification.

8. Chen Lei《Actively develop rural hydropower，realize the electrification of countryside by small hydropower》Nov.21, 2001.

9. Pan Weier, Analysis on the coal industry structure adjustment of China, <China energy〉2002.1

10. Yang Minying, It's necessary to shut down some small coal mines, but the reform of administration is more important, 《Coal Economy Research》2001.12

11.China energy research society, Chronicle of China rural energy, 1994.7

12.Wang Qingyi, Present Situation, obstacles and countermeasures of China renewable energy, 《China energy》2002.7