



Medium - and Long- Term Prospect for Electric Power Development of China

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Medium- and Long- Term Prospect for Electric Power Development of China

- **Status of National Economy and Demand for Energy**
- **Distribution of Energy Resources and Loads**
- **Prospect of Electric Power Grid Development**
- **Progress on Urbanization and Application of Cable**



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1. Status of National Economy and Demand for Energy



1.1 Status of China's National Economy

By the end of 2010

1. China's gross domestic product (GDP) reached 39.8 trillion Yuan (RMB), about 6 trillion U.S. dollars

2. Average annual growth of GDP was 11.2% during 2006-2010

3. Foreign trade volume reached 2.97 trillion U.S. dollars

(Note: 1. Hong Kong , Macao and Taiwan Province are not included in this report.

2. Sources: The government work report of China in 2010

3. \$: ¥ = 1:6.62 __Exchange rate on December 31, 2010)



1.2.1 China's Energy Consumption

1. 3.25 billion tons of standard coal equivalent(TSCE) in 2010

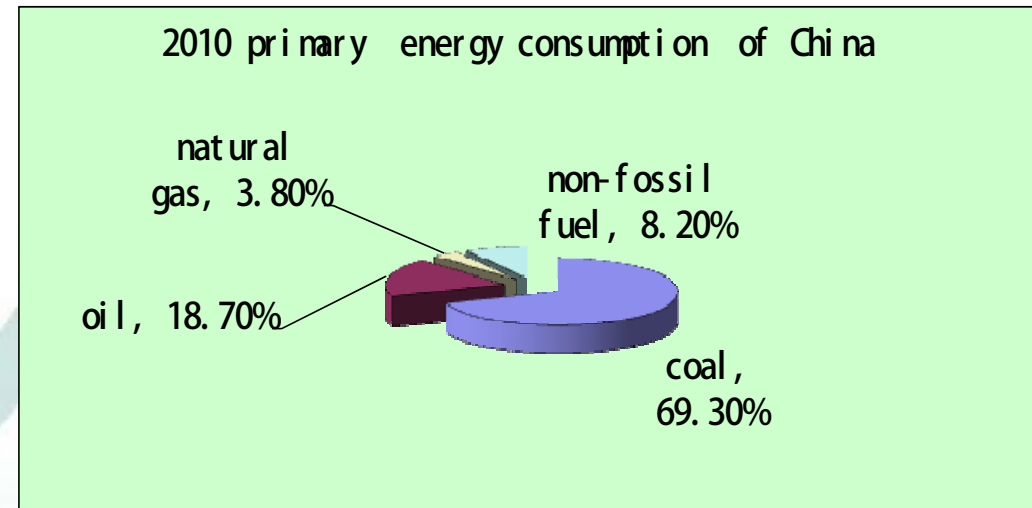
of which:

coal 69.3%

oil 18.7%

natural gas 3.8%

non-fossil fuel 8.2%



2. 2.43 TSCE /person

(By the end of Oct. 2010, China's population was 1.34 billion

Source: National Bureau of Statistics of China)



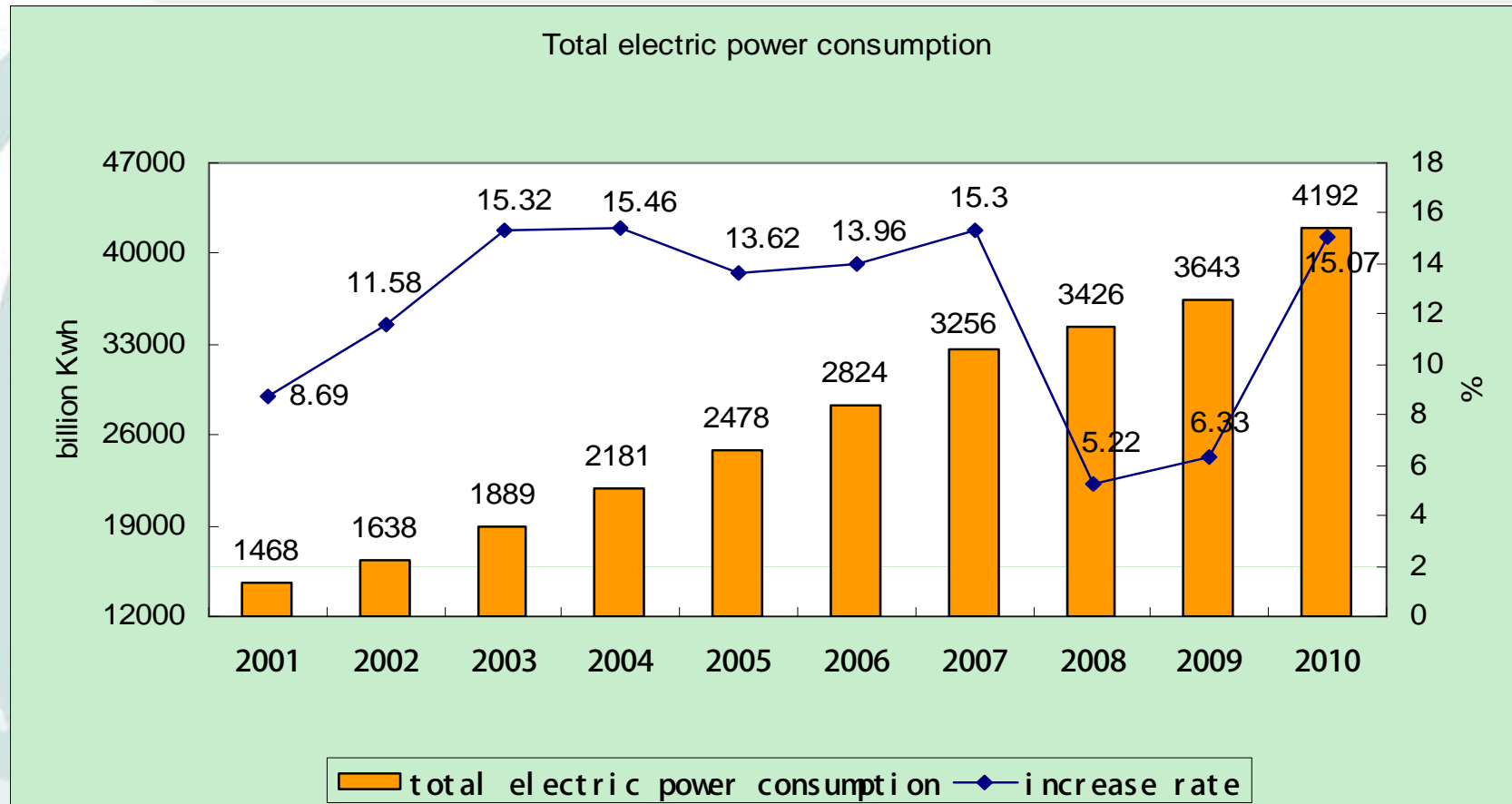
1.2.2 China's Energy Consumption

- 1. Total electricity consumption reached 4.19 trillion kWh**
- 2. 3100 kWh/ person**
- 3. 43% of the total energy consumption is in the form of electricity**

Source: National Bureau of Statistics of China



1.2.3 Electricity Consumption



In 2010, Electricity consumption reached 4.19 trillion kWh, and annual increase rate was 15.1%.

Source: China Electricity Council



1.3.1 Electric Power Construction

Total investment was 3.1 trillion yuan, during the last 5 years

a. 1.7 trillion yuan for power source construction

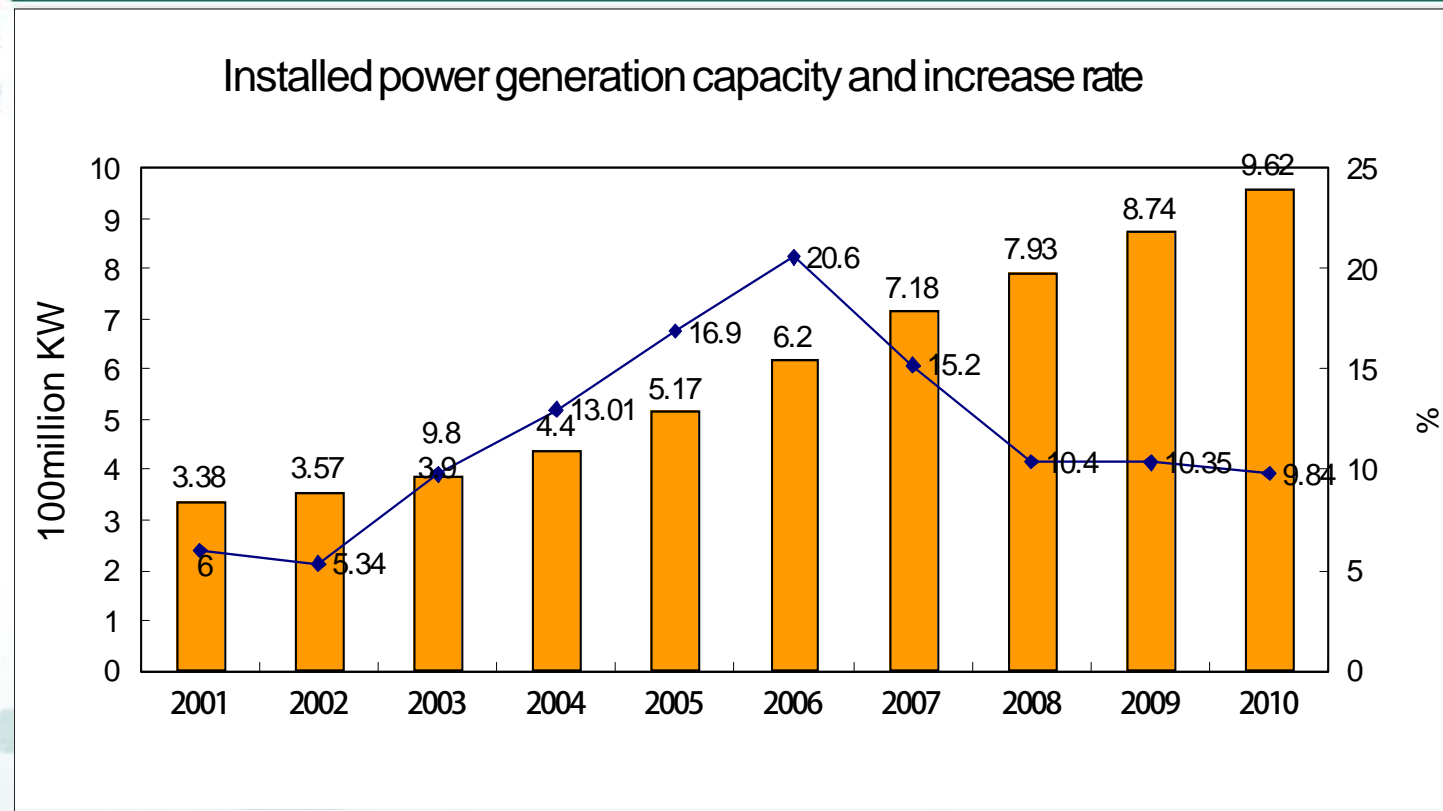


b. 1.4 trillion yuan for power grid construction





1.3.2 Installed Power Generation Capacity



Power generation capacity reached 962 million kW

The average annual growth rate was around 11.6% in the last decade

Source: China Electricity Council



1.3.3 Installed Power Generation Capacity

**Installed capacity of 962.19 million kW
of which:**

Wind power(on grid):31.07 million kW

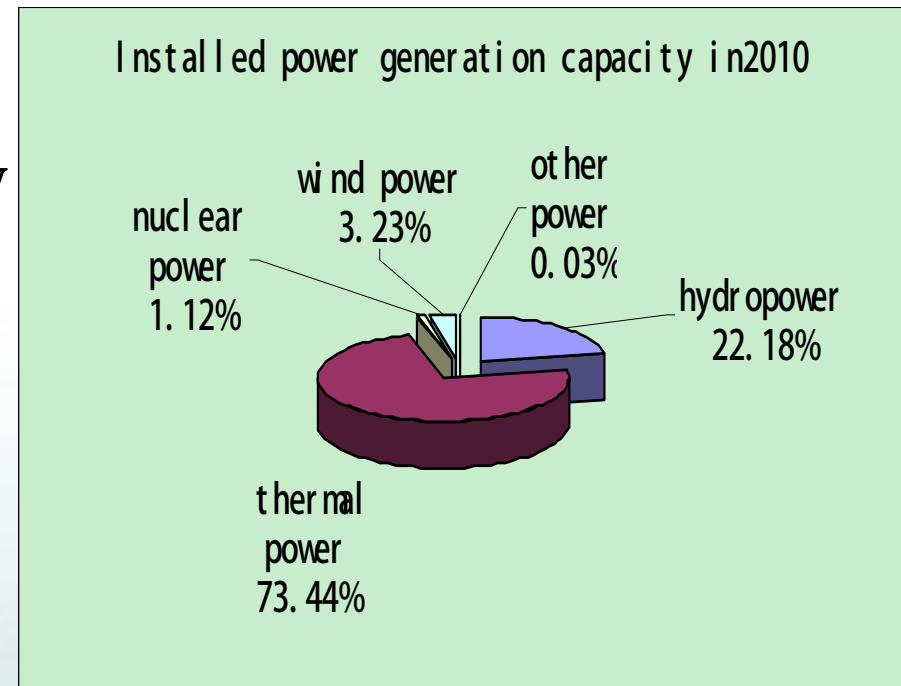
Hydropower: 213.4 million kW

Nuclear power: 10.82 million kW

Thermal power: 706.63 million kW

Other: 0.27 million kW

*** More than 26.6% came from
non-fossil energy sources**



Source: China Electricity Council



1.3.4 Status of Power Grid in 2010

1. **The length of transmission line (220 kV and above) was 442,700 km;**
2. **Transformer capacity (220 kV and above) was 1.974 billion kVA;**
3. **149.2 billion kWh power was transmitted across different regions;**
4. **The first AC 1000kV transmission line of China was put into operation on Jan. 6, 2009;**
5. **The first ± 800 kV transmission line of the world was put into operation on June. 18, 2010;**





1.3.5 Status of Power Grid in 2010

6. The second longest 500 kV submarine cables of the world were put into operation in 2009.

**The length: 32 km/per phase
96 km/three phases**

**Type: oil-filled paper-insulated
OKZA 525 kV 1x800 mm² Cu**

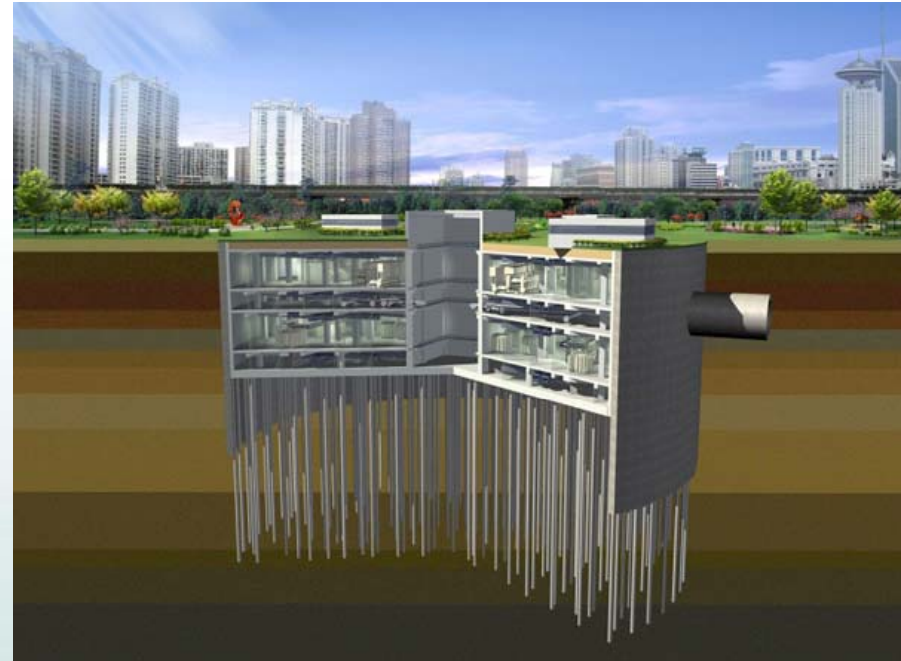




1.3.6 Status of Power Grid in 2010

7. The first 500 kV underground substation of China was put into operation in Shanghai, on April 16, 2010.

The cable inlets of this substation adopt double circuits of 500kV and 2500 mm² XLPE cable. The total length of cable is 93.4 km.





1.4.1 Status of China's Regional Power Grid



There are 6 regional power grids, of which 5 regional power grids are operated by SGCC and one is operated by CSG.



1.4.2.1 State Grid Corporation of China

- **SGCC, as a key state-owned electric enterprise, is the largest utility in the world.**
- **It invests, constructs and operates 5 regional power grids, which cover 26 provinces, autonomous regions and municipalities.**
- **The service area represents 88% of the national territory with a population of over one billion, supported by more than 1.5 million employees.**



1.4.2.2 State Grid Corporation of China

- **Its electricity sale reached 2.7 trillion kWh in 2010.**
- **The length of transmission lines (110 kV and above) reached 618,834 km in 2010.**
- **Transformer capacity (110 kV and above) reached 2.13 billion kVA in 2010.**



1.4.3.1 China Southern Power Grid Co., Ltd.

- **China Southern Power Grid Co., Ltd (CSG), is the other key state-owned electric enterprise.**
- **It invests, constructs and operates one regional power grid, which covers 5 provinces.**
- **The service area represents 17.8% of the national territory , about 1 million km², with a population of 230 million, supported by 300 thousand employees.**



1.4.3.2 China Southern Power Grid Co., Ltd

- **Its electricity sale reached 602.7 billion kWh in 2010.**
- **The length of transmission lines (220 kV and above) reached 84,000 km in 2010.**
- **Transformer capacity (220 kV and above) reached 360 million kVA in 2010.**

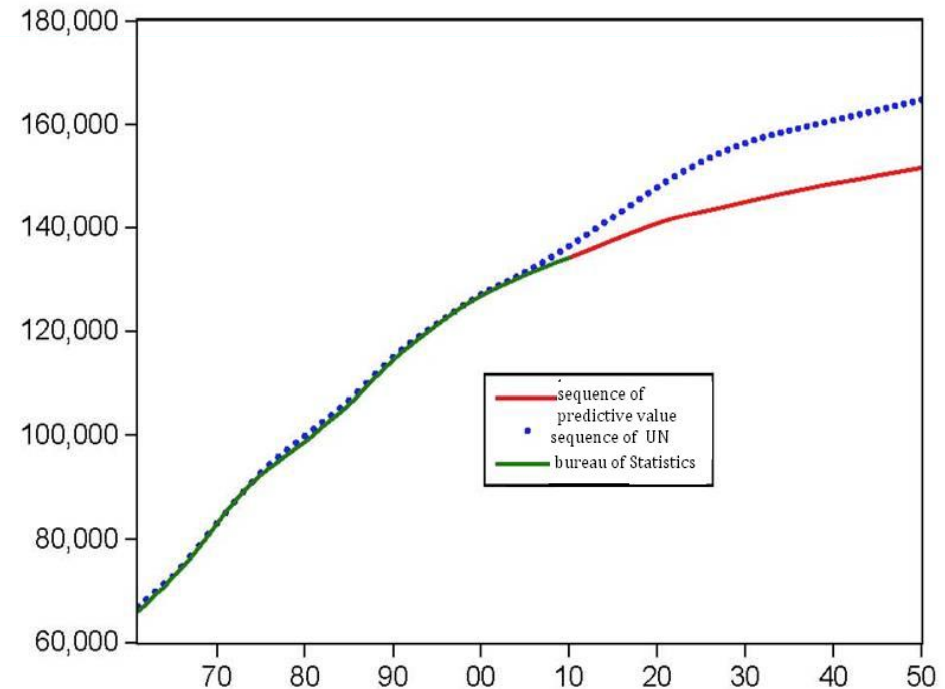


1.5.1 Prospect of China's Economy Development

By the year of 2050 :

1. China's population will grow from the current 1.34 billion to 1.51 billion.

2. About 10 to 14 million people will migrate from rural area to town every year .



Note: Auto regressive integrated moving average model was applied in this report.

The data involved in the calculation source:

1961-2009 : China Statistical yearbook

2010: People's Republic of China Economic and Social Development statistical bullet in 2010



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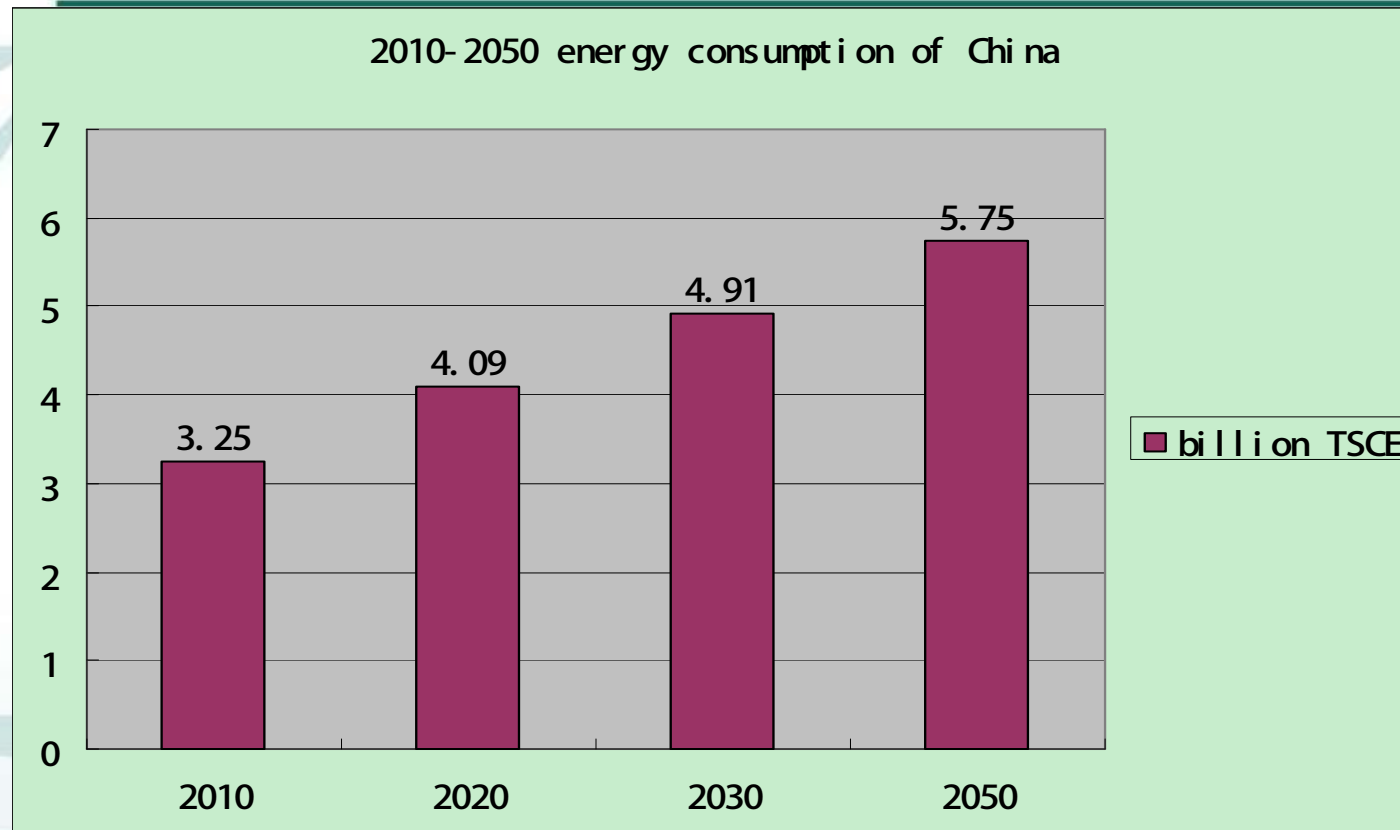
1.5.2 Prospect of China's Economy Development

3. **The level of urbanization (47.5% in 2010) will increase to 78%.**
4. **In the next 40 years, China's economy will experience a rapid growth period (8%) , moderate growth period (6%), and growth will come to a normal or low level (more or less 4%).**
5. **The per capita GDP will grow from the current \$4,500 dollars to about \$20,000, based on the prices in 2010.**

Source: Medium- and Long- Term(2030,2050) Strategy Research for Energy Development of China; Feb. 2011
---Chinese Academy of Engineering



1.6 Prospect of China's Demand for Energy



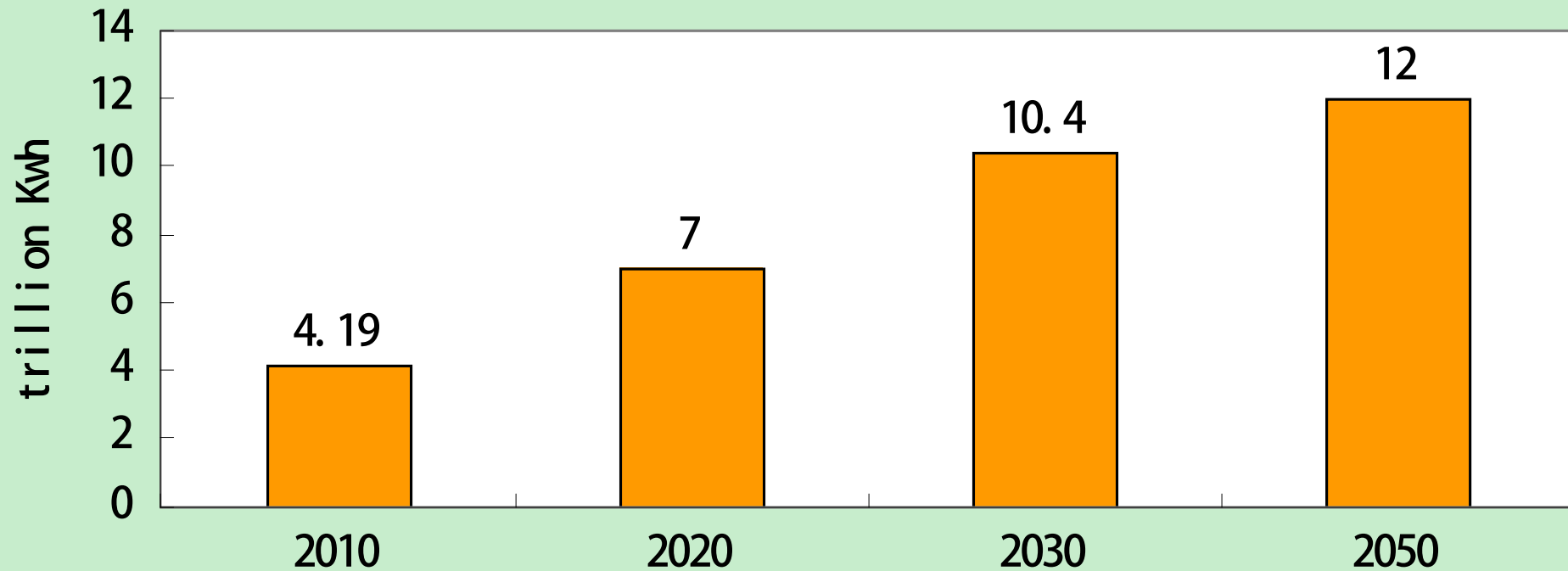
Total energy consumption will reach 5.75 billion (TSCE) in 2050

Source: Medium- and Long- Term(2030,2050) Strategy Research for Energy Development of China---- Chinese Academy of Engineering



1.7.1 Prospect of China's Demand for Electricity

The national electricity demand



Total electricity consumption will reach 7, 10.4 and 12 trillion kWh in 2020, 2030 and 2050 respectively.

Source: Medium- and Long- Term(2030,2050) Strategy Research for Energy Development of China---- ---Chinese Academy of Engineering



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1.7.2 Prospect of China's Demand for Electricity

By the end of 2020

Northeast: 0.53

Northwest: 0.49

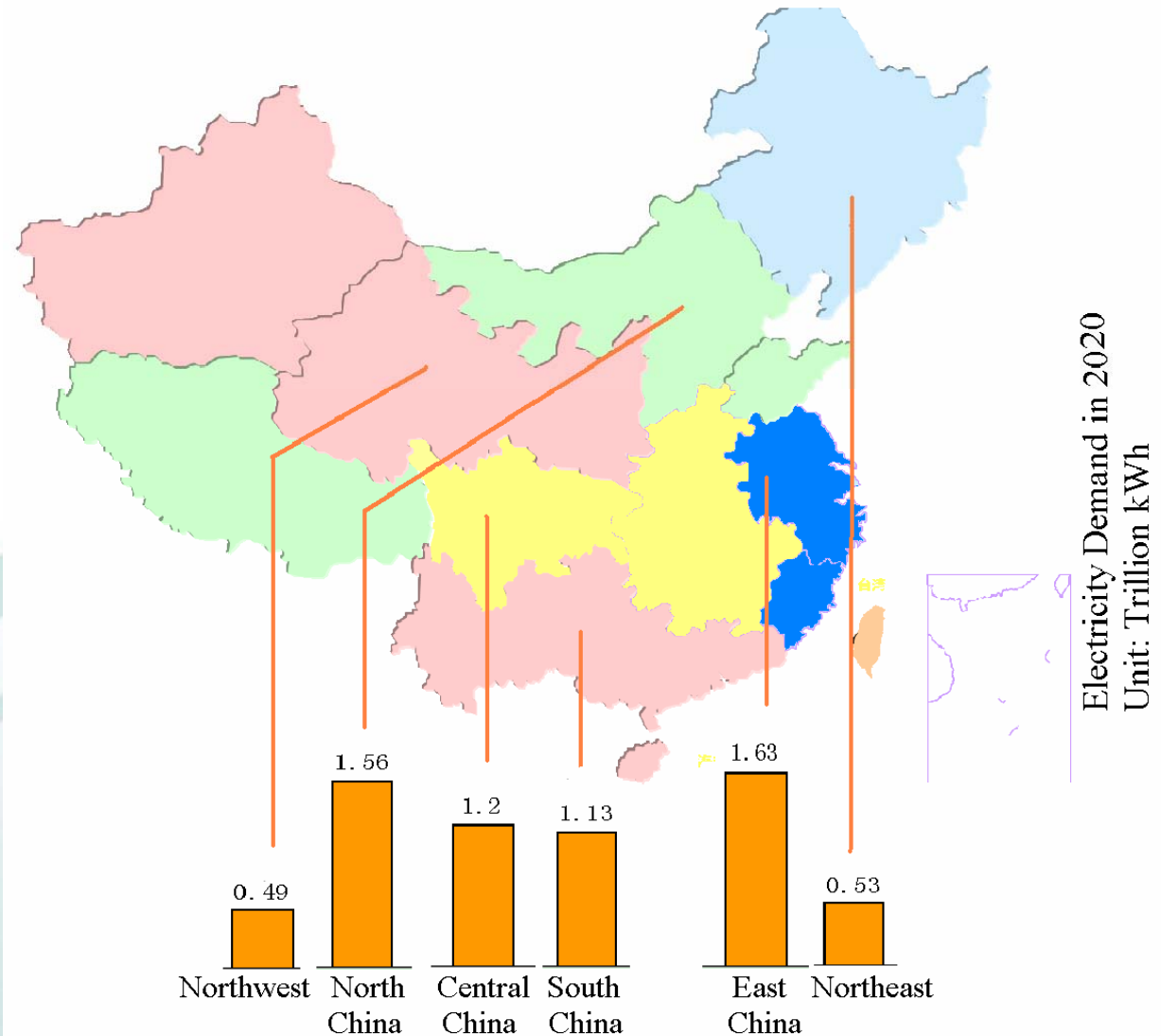
North China: 1.56

Central China: 1.2

East China: 1.63

South China: 1.13

Source: Medium- and Long- Term(2030,2050) Strategy Research for Energy Development of China---- Chinese Academy of Engineering





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1.7.3 Prospect of China's Demand for Electricity

By the end of 2030

Northeast: 0.81

Northwest: 0.68

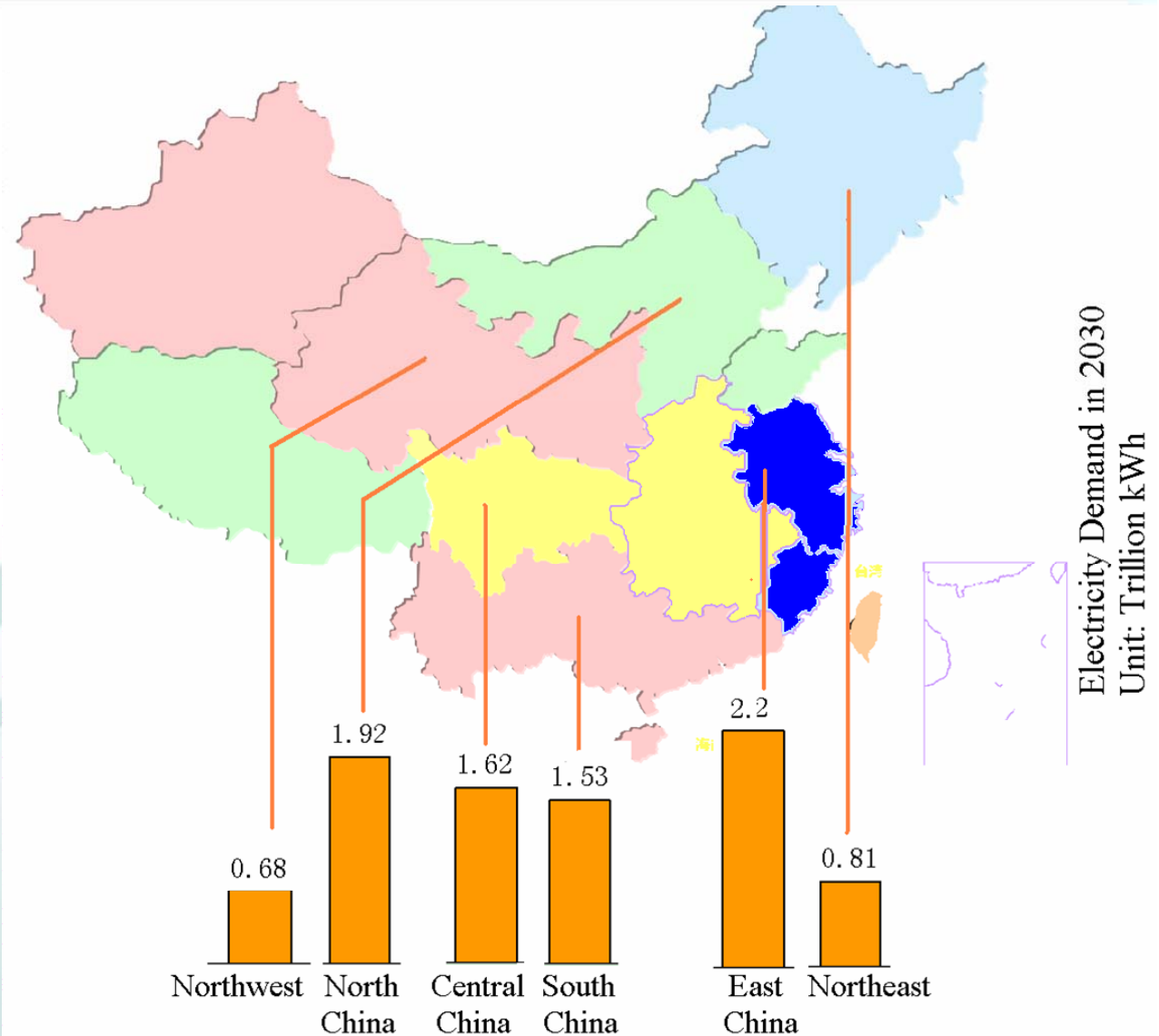
North China: 1.92

Central China: 1.62

East China: 2.2

South China: 1.53

Source: Medium- and Long- Term(2030,2050) Strategy Research for Energy Development of China----- Chinese Academy of Engineering





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1.7.4 Prospect of China's Demand for Electricity

By the end of 2050

Northeast: 0.92

Northwest: 0.98

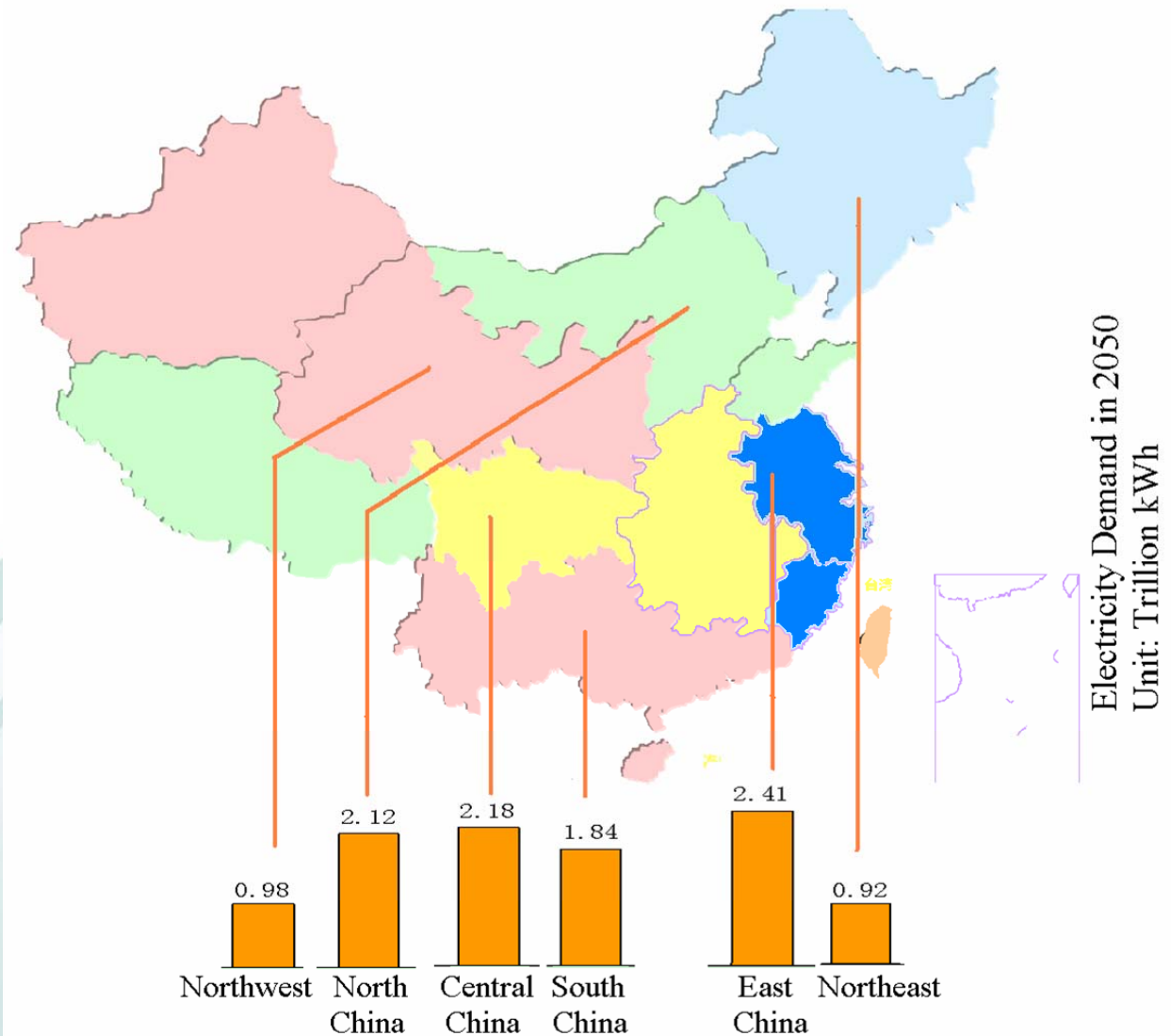
North China: 2.12

Central China: 2.18

East China: 2.41

South China: 1.84

Sources: Medium- and Long- Term(2030,2050) Strategy Research for Energy Development of China---- Chinese Academy of Engineering





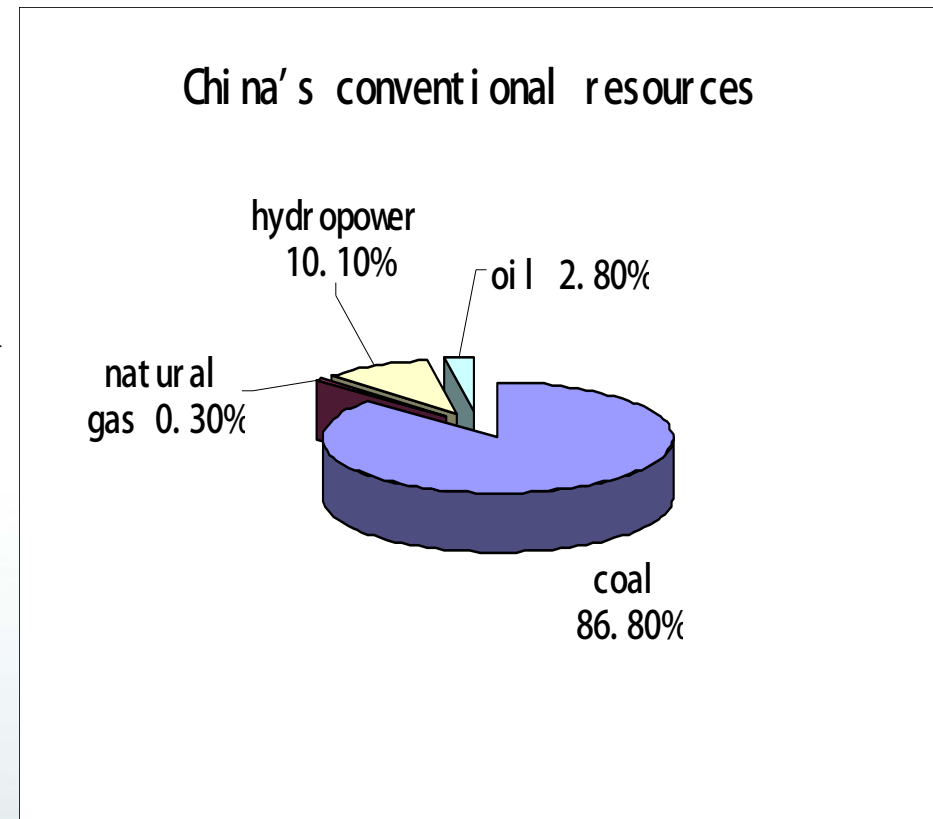
1.8 China's Conventional Energy Resources

China's conventional energy resources:

1. Coal accounts for about 87% in the total proven reserves of conventional resources.
2. The per capita possession of energy resources is only 40% of the world average level.
3. The per capita possession of natural gas and oil reserves is only 11% and 4.5% respectively of the world average level.

Energy consumption structure:

1. Coal accounts for 70%, and the use of coal won't reduce to a quite low level in the next period of time;
2. Oil and natural gas account for 20%;
3. Non-fossil fuel account for 10%;



Source: "Under the pattern of energy supply and the development of smart grid requirements" State Grid Energy Research Institute__ Jiang Liping



1.9 Energy Conservation and Emissions Reduction

The Chinese government declared:

- 1. The proportion of non-fossil fuel in primary energy consumption should reach 15% in 2020.**

_____ Chinese President Hu Jintao, Sep. 22, 2009

- 2. Carbon dioxide emissions per unit of GDP should be reduced by 40% -45% based on the level of the year 2005.**

_____ Chinese Premier Wen Jiabao Nov. 26, 2009



1.10 Current energy strategy of China

The current energy strategy of China is known as a combination of energy conservation, domestic development, environmental protection, international cooperation, which aims at adjusting and optimizing the energy structure, building secure, stable, less spending, clean and modern energy industry system.

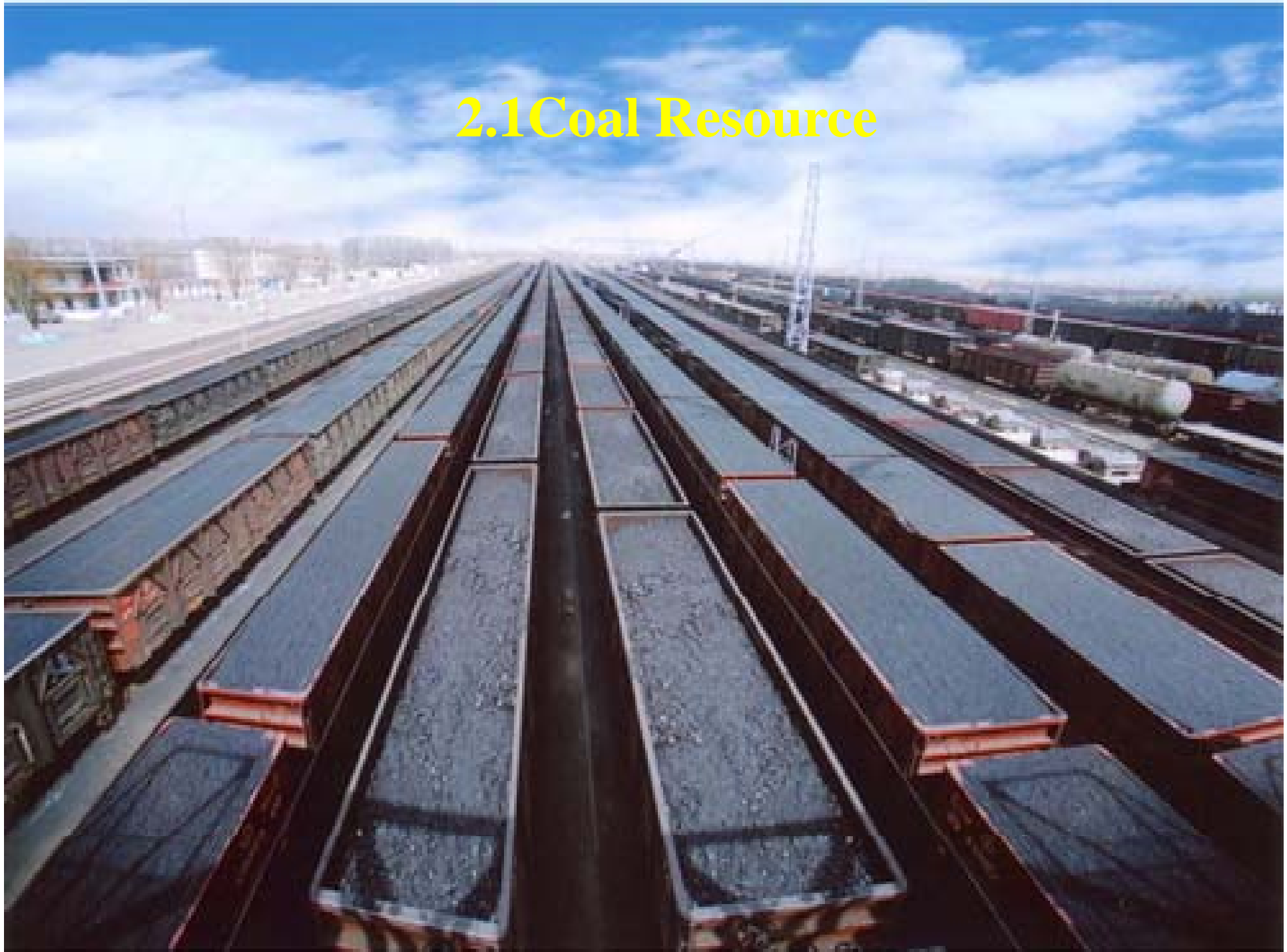
And the strategy of “controlling total amount, meeting reasonable requirements” may be another key point of strategy in the future .



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2. Distribution of Energy Resources and Loads

2.1 Coal Resource





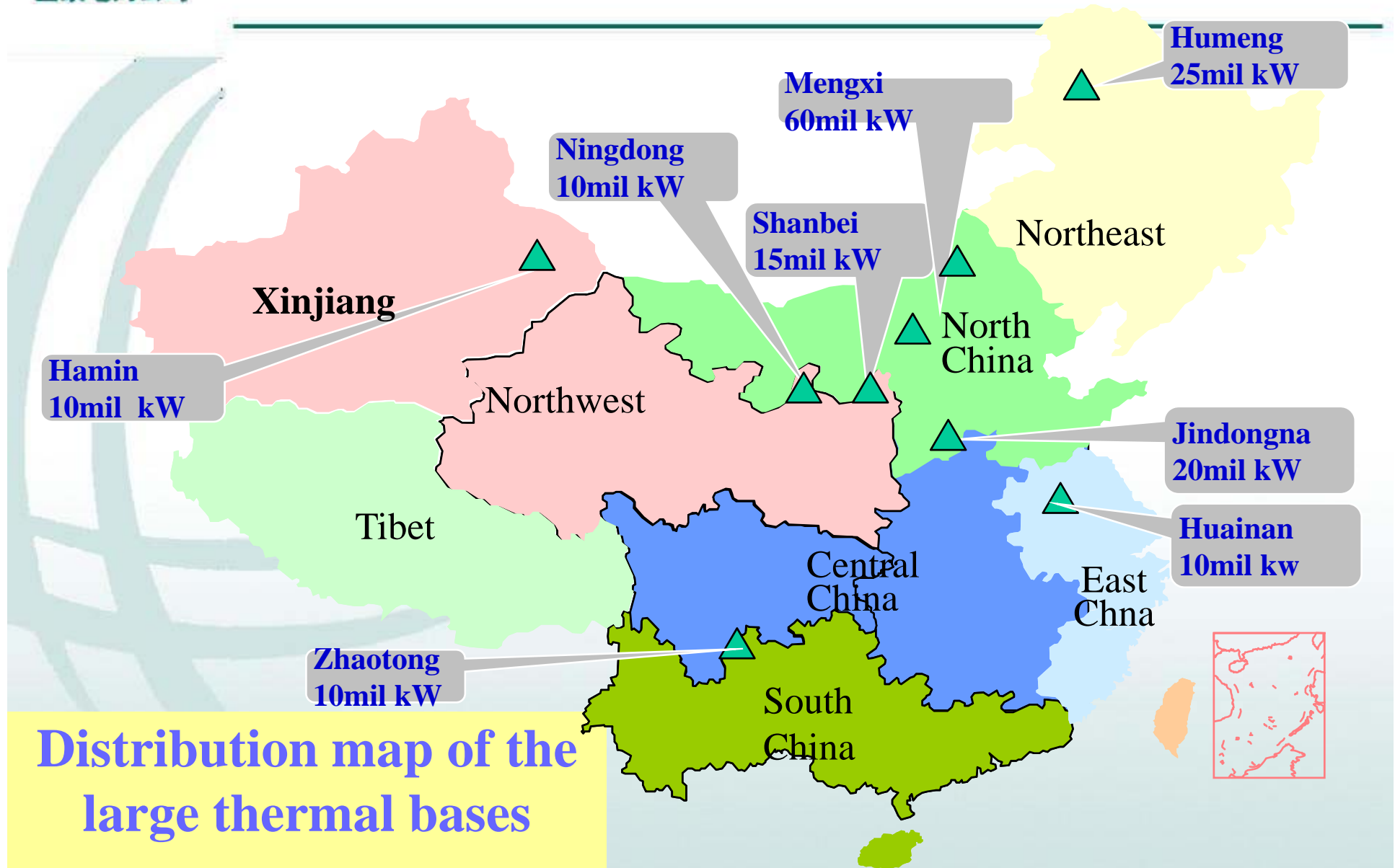
2.1.1 Distribution of Thermal Bases

- **The proven reserves of coal in China is 1 trillion tons, which takes the second place in the world.**
- **2/3 of the coal resources are found in the West of China and Inner Mongolia.**
- **A concentration of thermal generation will be in the northwest of China in the future.**



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2.1.2 Distribution of Large Thermal Bases



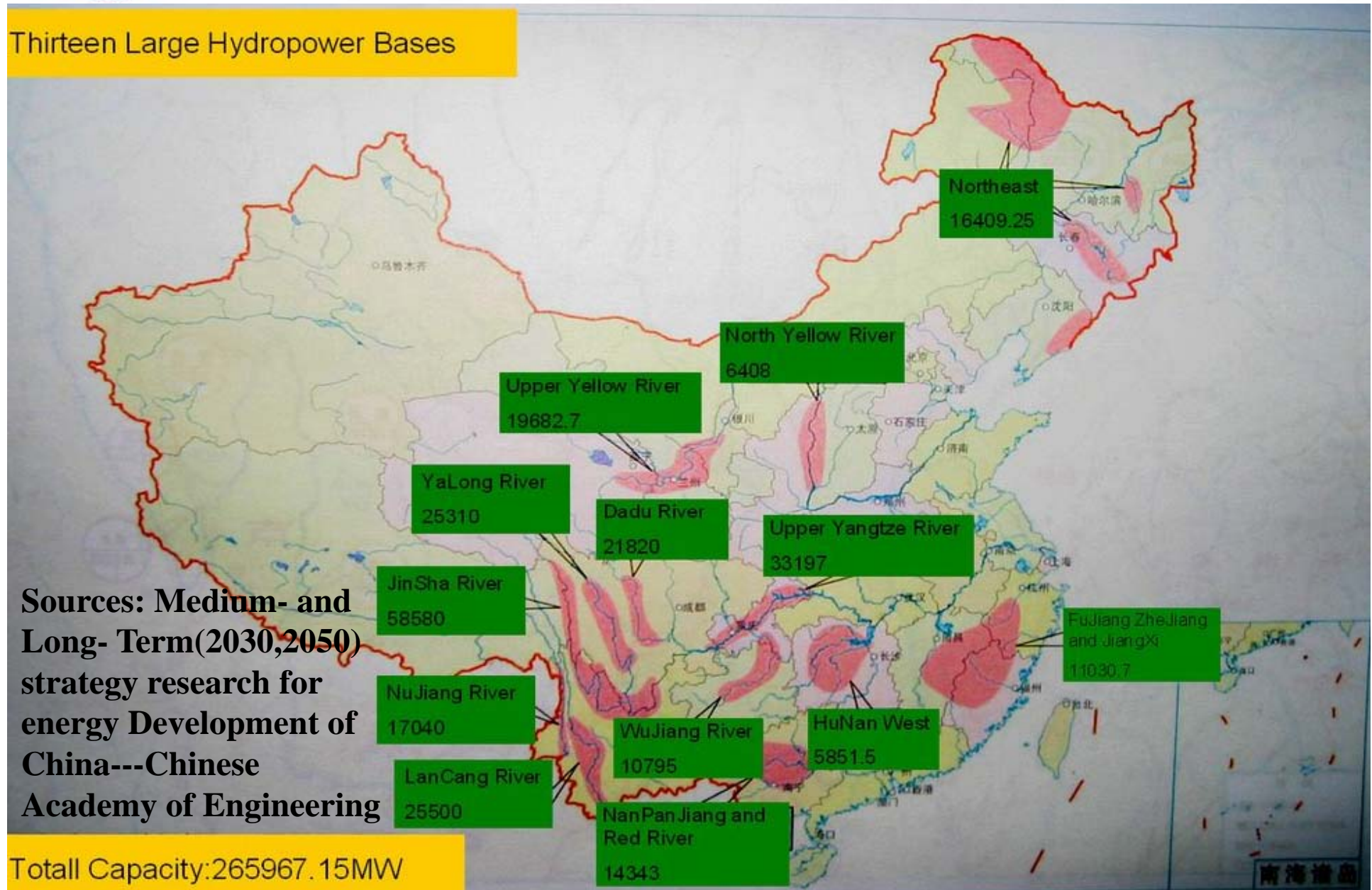
2.2 Hydropower Resource





2.2.1 Distribution of Thirteen Large Hydropower Bases

Thirteen Large Hydropower Bases



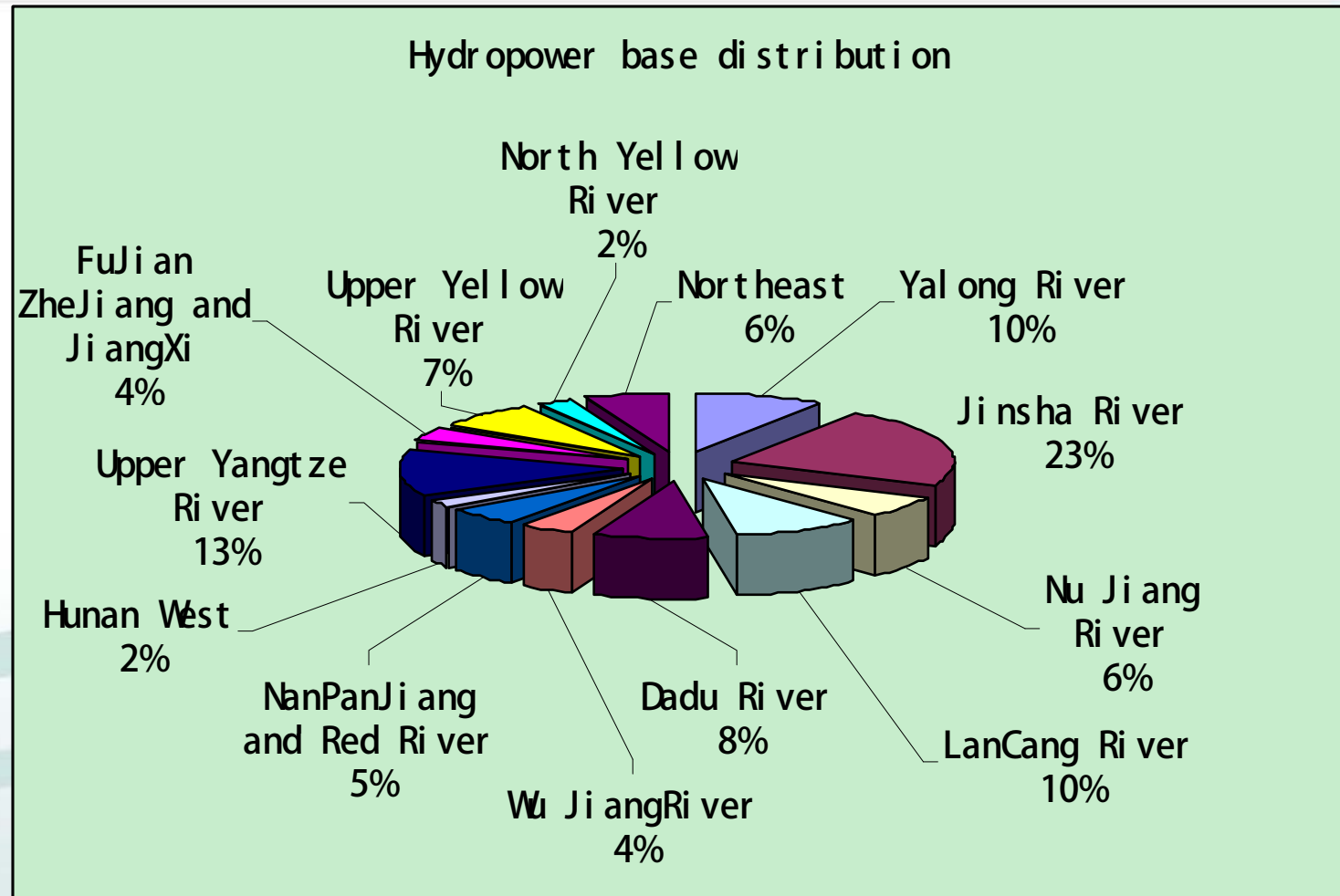
Sources: Medium- and Long- Term(2030,2050) strategy research for energy Development of China---Chinese Academy of Engineering

Total Capacity: 265967.15MW



2.2.2 Distribution of Thirteen Hydropower Bases

Jinsha , Yalong and Lanchang River have rich hydraulic resources.



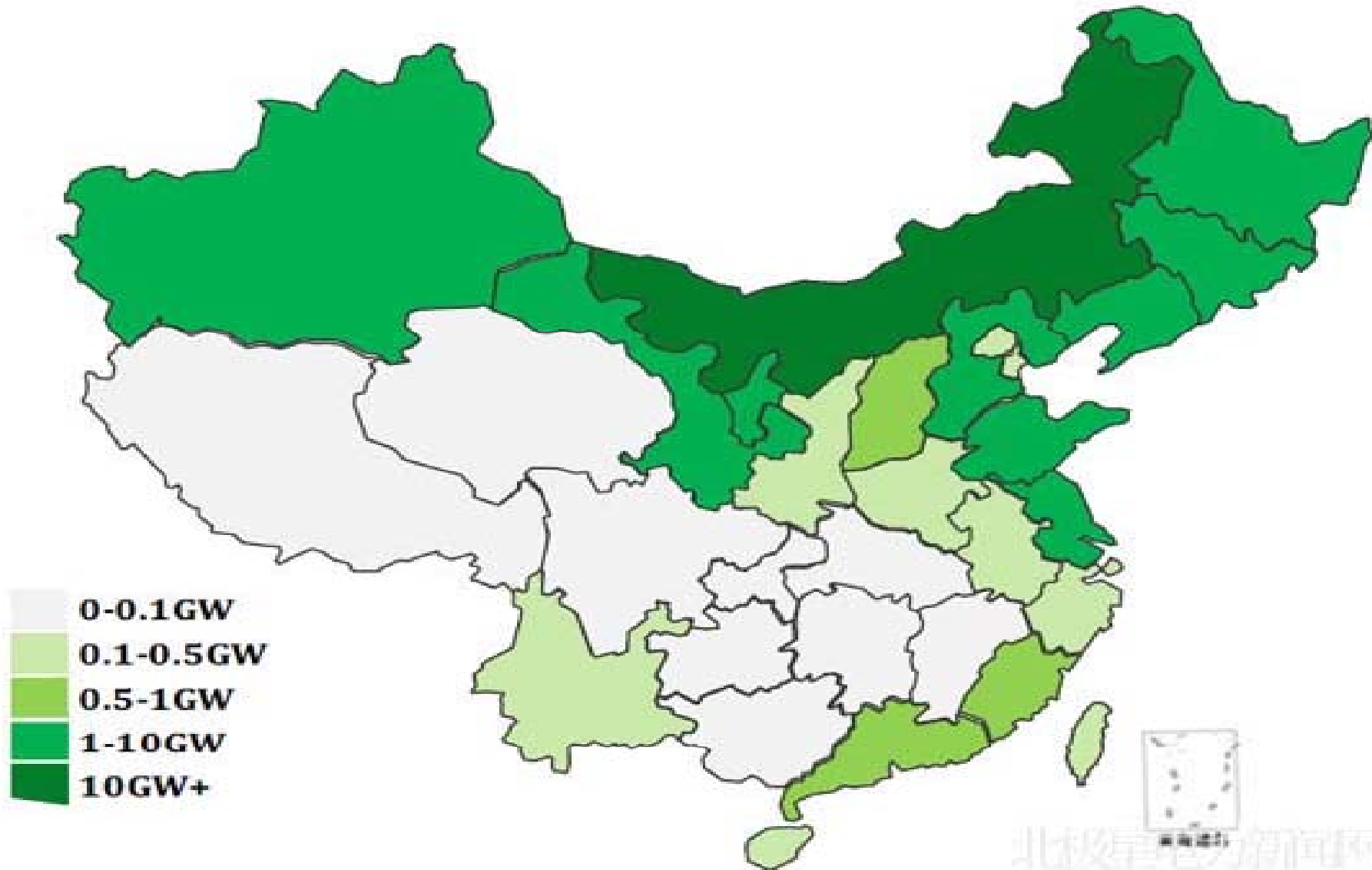
Source: Medium- and Long- Term(2030,2050) strategy research for energy Development of China----- Chinese Academy of Engineering

2.3 Wind Power Resource





2.3.1 Distribution of Wind Power

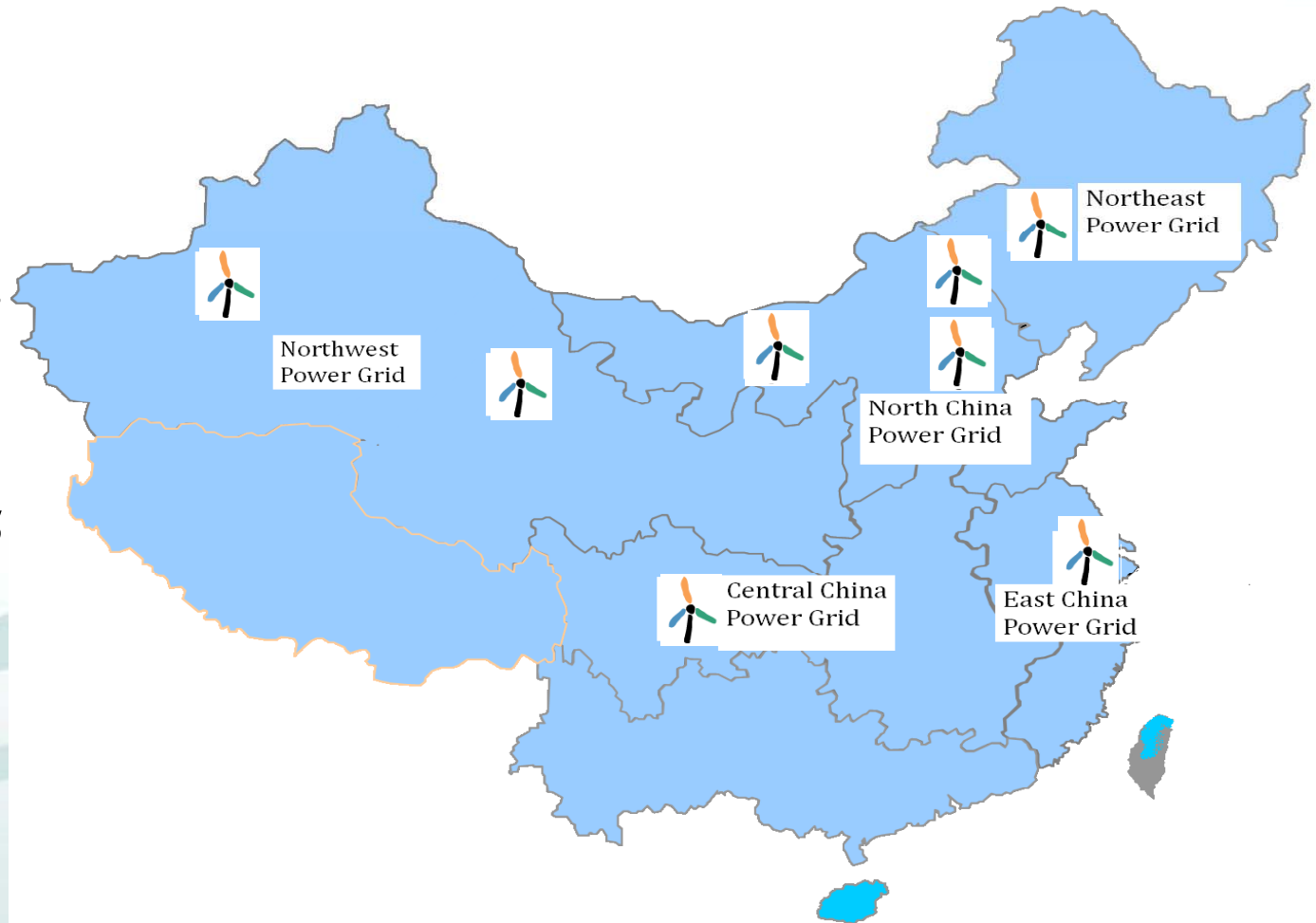




2.3 .2 The Development of Wind Power

China plans to build eight wind power bases, each of 10 million kW capacity before 2020, and then the wind power installed capacity of China will reach 0.15 billion kW.

(Locations of wind power bases: Jiuquan of Gansu, Hmi of Xinjiang, Hebei, Jilin, eastern of Inner Mongolia, western of Inner Mongolia, Jiangsu, Shandong)

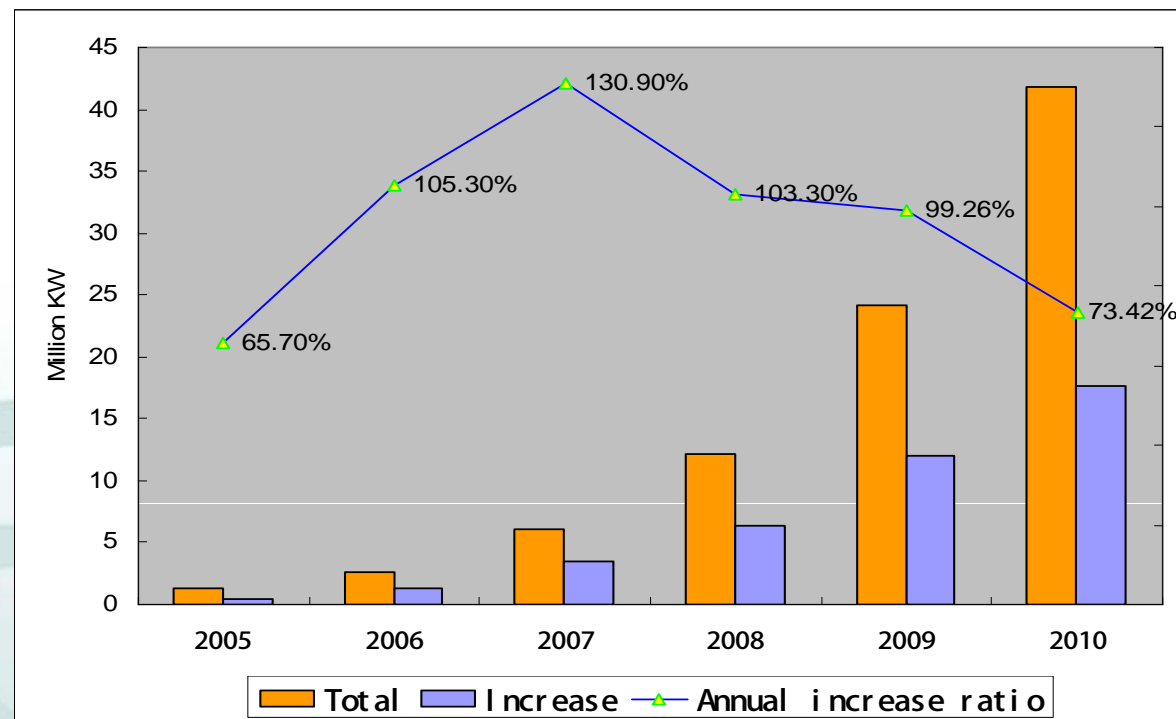


10 million kW of wind power base



2.3 .3 The Development of Wind Power

In 2010 the wind power installed capacity of China reached 41.8 million kW, ranking the first place around the world.



Installed capacity of wind power in China 2005-2010

2.4 Nuclear Energy

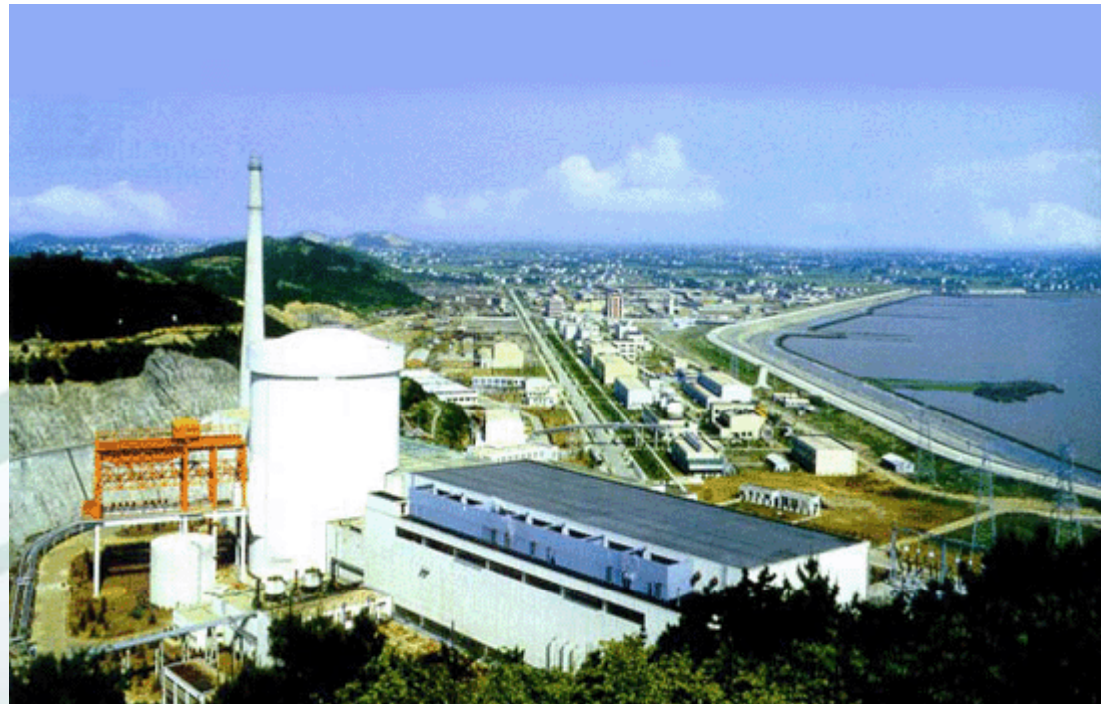




2.4 .1 The Development of Nuclear Energy

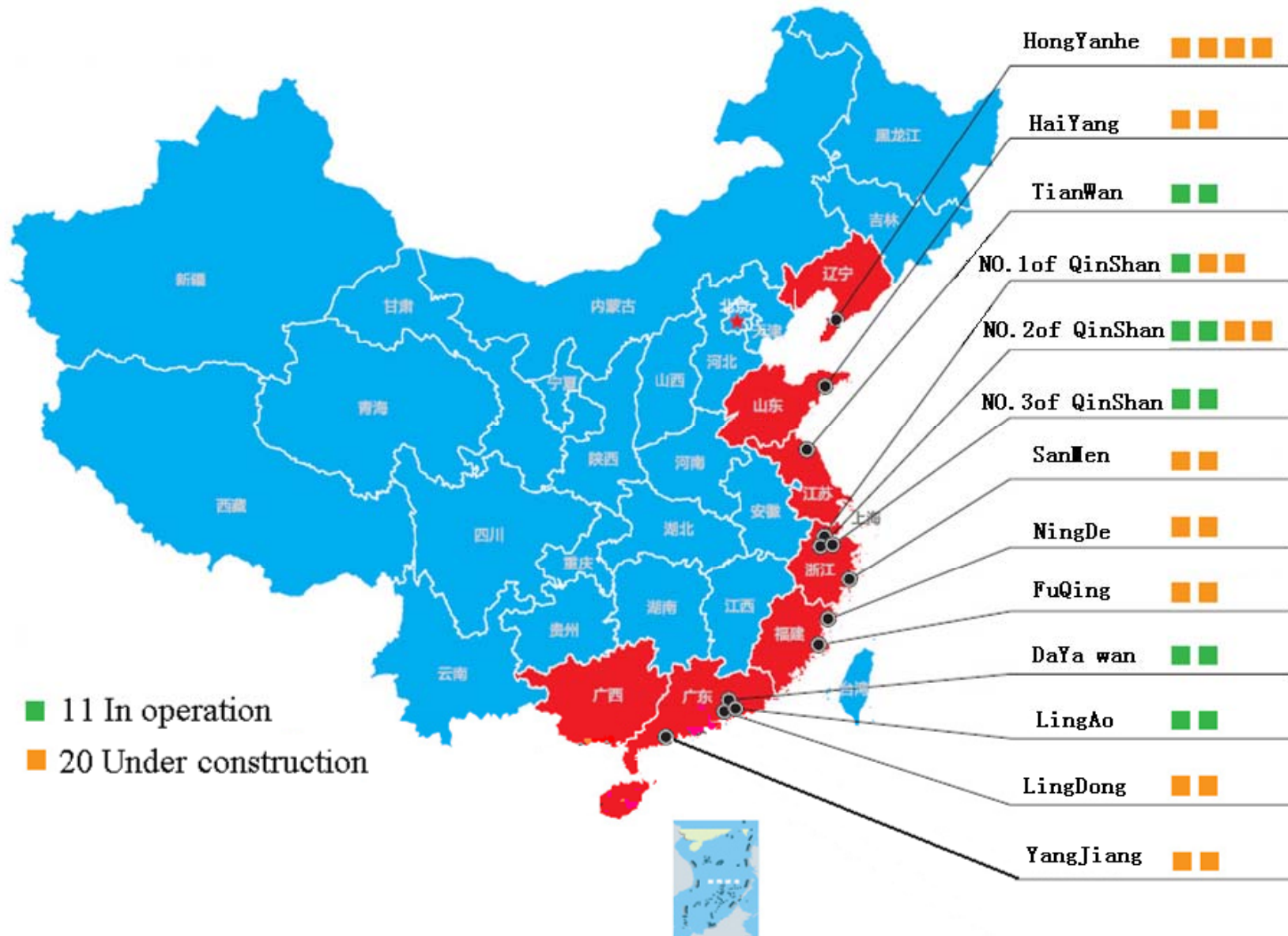
In China ,the first nuclear station -- Qinshan nuclear station , was put into operation in December, 1991 in Zhejiang province.

The installed capacity of the first unit was 300 MW, using CNP300 press water pile technique.





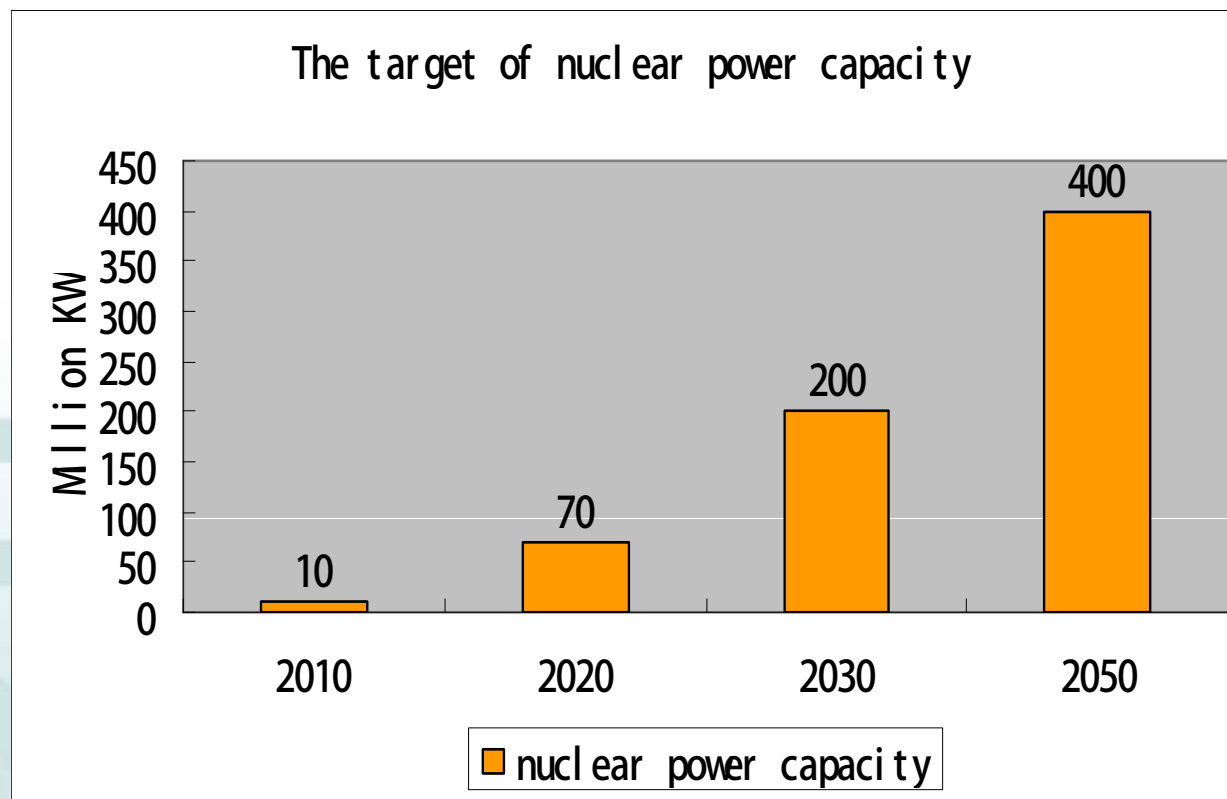
2.4 .2 Distribution of Nuclear Stations





2.4 .3 The Development Plan of Nuclear Energy

The nuclear power installed capacity of China will reach 400 million kW in 2050, which is 40 times that of 2010.



2.5 Solar Power





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2.5.1 Distribution of Solar Resources

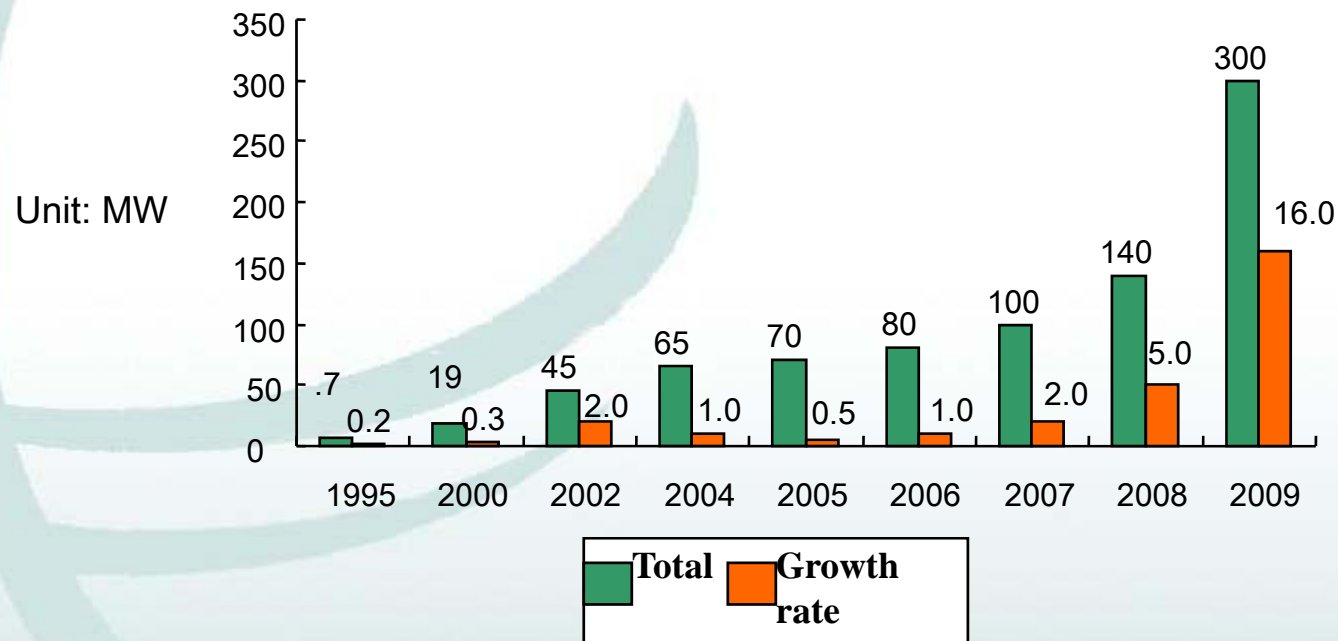


The sunlight hours per year in the rich regions reach 3200~3300h.



2.5.2 Installed Capacity of Solar Power

The nationwide solar power installed capacity reached 0.3 million kW by the end of 2009.

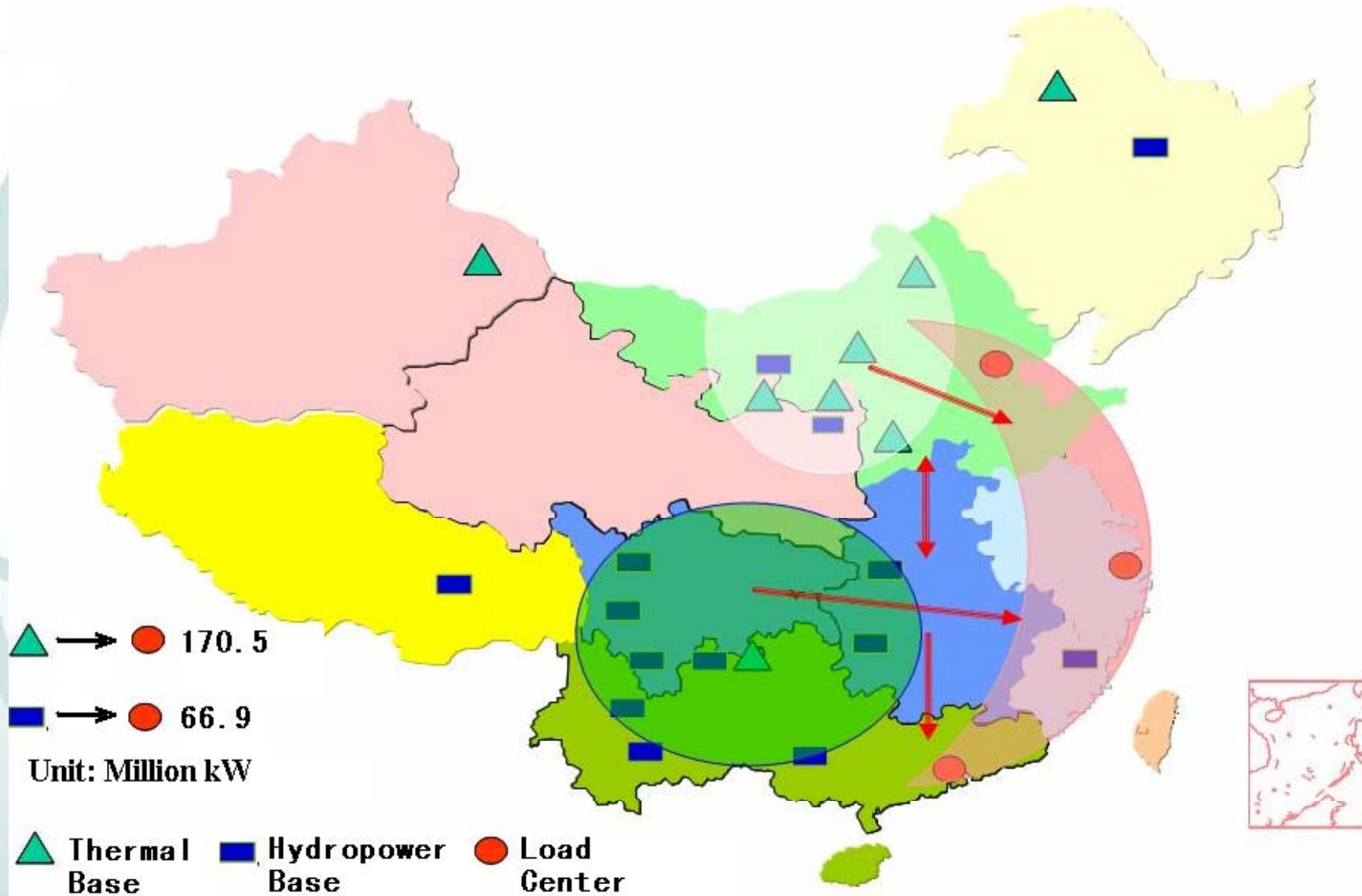


China's solar power installed capacity



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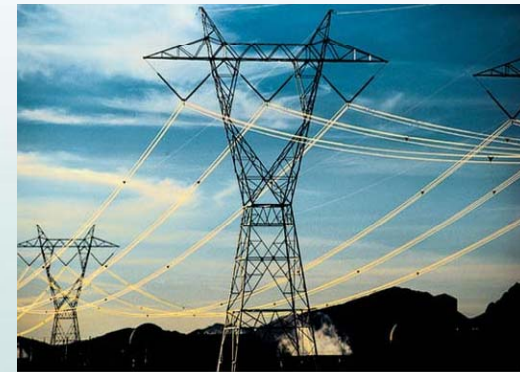
2.6 Distribution of Main Energy Resources and Load Centers





2.7 Requirement of Power Grid Construction

- **Energy resource regions and load centers present reverse distribution:**
 - 2/3 of energy resources are located in the west and north regions;**
 - 2/3 of load centers are located in the middle and east regions.**
- **The farthest distance between energy resources and load centers are more than 3000 km.**
- **The power grid should have the ability to transmit electric power from different kinds of power sources.**





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3. Prospect of Electric Power Grid Development



3.1 The Function and Role of the Grid

- 1. Be a flexible, efficient, reliable, environmental and friendly energy distributing system;**
- 2. Adapt to large energy to consumption needs,;**
- 3. Meet the national energy structure adjustment and optimization of the layout;**
- 4. Improve the whole efficiency and economic benefits of energy**
- 5. Have the ability to admit variety of power source and accession of distributed generation;**
- 6. Actualize the efficient consumption and optimal allocation of the diversified energy resources...**



3.2 General goal:

Developing clean energy, reducing emission and constructing strong smart grid

- Improve the ability of grid access security and the ability of optimize the allocation of clean energy,
- Develop the utilization of clean energy widely, reduce fossil fuel consumption ratio.
- Promote the application of large-capacity thermal power generator with low energy consumption and low emission.
- Construct UHV power grid as the main network to form the strong smart grid, and develop the grids at all levels coordinately





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3.3.1 Energy Consumption will Reach 4 Billion Tsce in 2015

In this period (2010-2015) ,

GDP will grow at an average annual rate of 7%, to reach 55 trillion yuan in 2015 (based on price calculation in 2010);

Energy consumption will reach 4 billion Tsce in 2015.

Urbanization rate will raise from 47.5% to 51.5%.



3.3.2 Construction of Power Industry during 2011-2015

- **By the end of 2015, the total installed capacity will reach 1.44 billion kW, of which 284 million kW is from hydropower;**
- **The length of transmission lines (110 kV and above) will increase to 1.33 million km;**
- **Transformer capacity (110 kV and above) will be 5.6 billion kVA;**
- **The electricity consumption will reach 6.27 billion kWh;**
- **During 2011-2015, the Total investment will reach 5.3 trillion yuan , of which:**
 - 2.75 trillion yuan for power sources;**
 - 2.55 trillion yuan for power grid.**



3.4.1 Grid plan

4 synchronous regional grids will be set up:

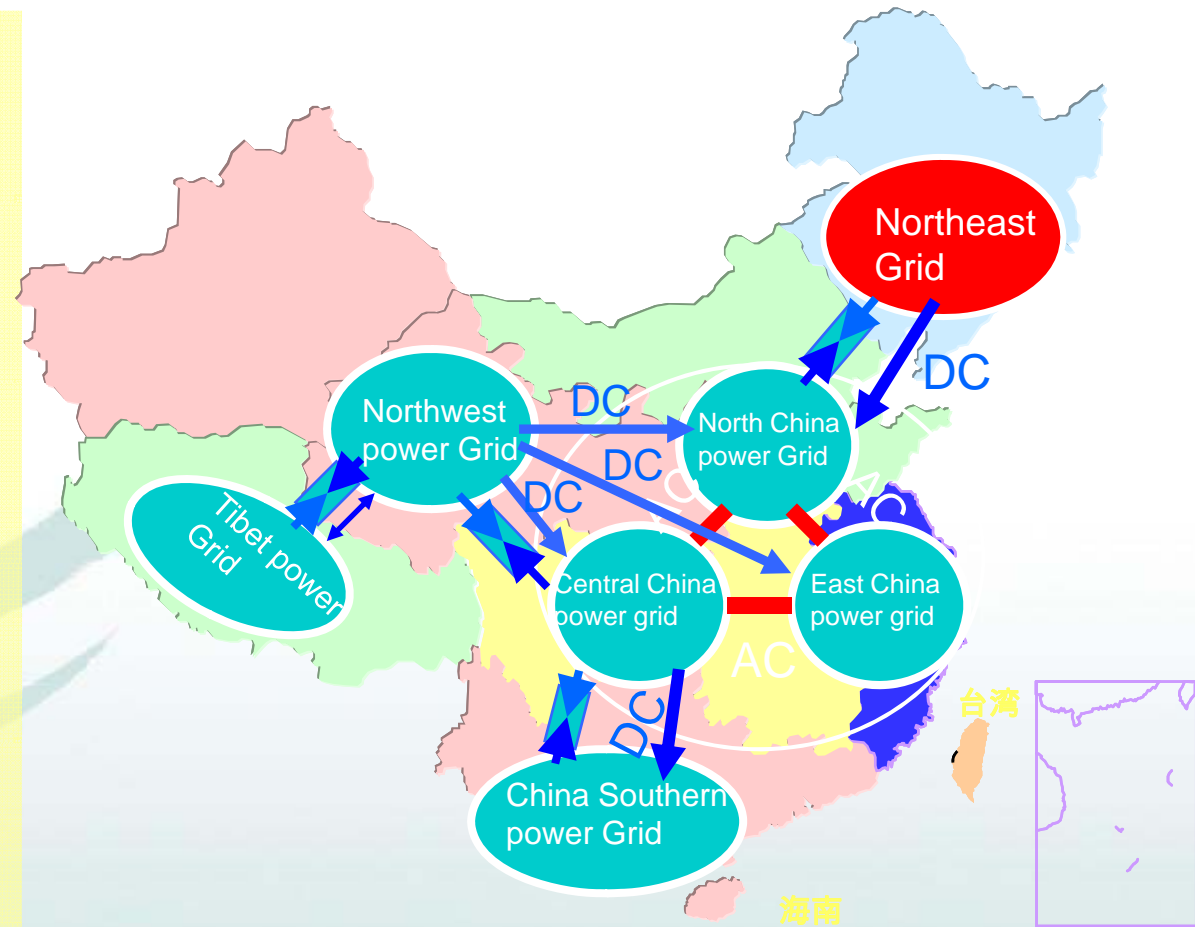
1. North, Central and East China grids will come into being a synchronous grid (called Sanhua Grid) at 1000 kV;
2. Northwest grid operates at 750 kV synchronously;
3. Northeast grid operates at 500 kV synchronously;
4. Southern grid operates at 500 kV synchronously;
5. DC back to back link technique is applied to set the interconnections between different synchronous grids.





3.4.2 Northeast grid

Northeast grid operated at 500 kV has rich coal resources in Inner-Mongolia region and renewable energy sources;
Surplus electricity can be sent to other grids.

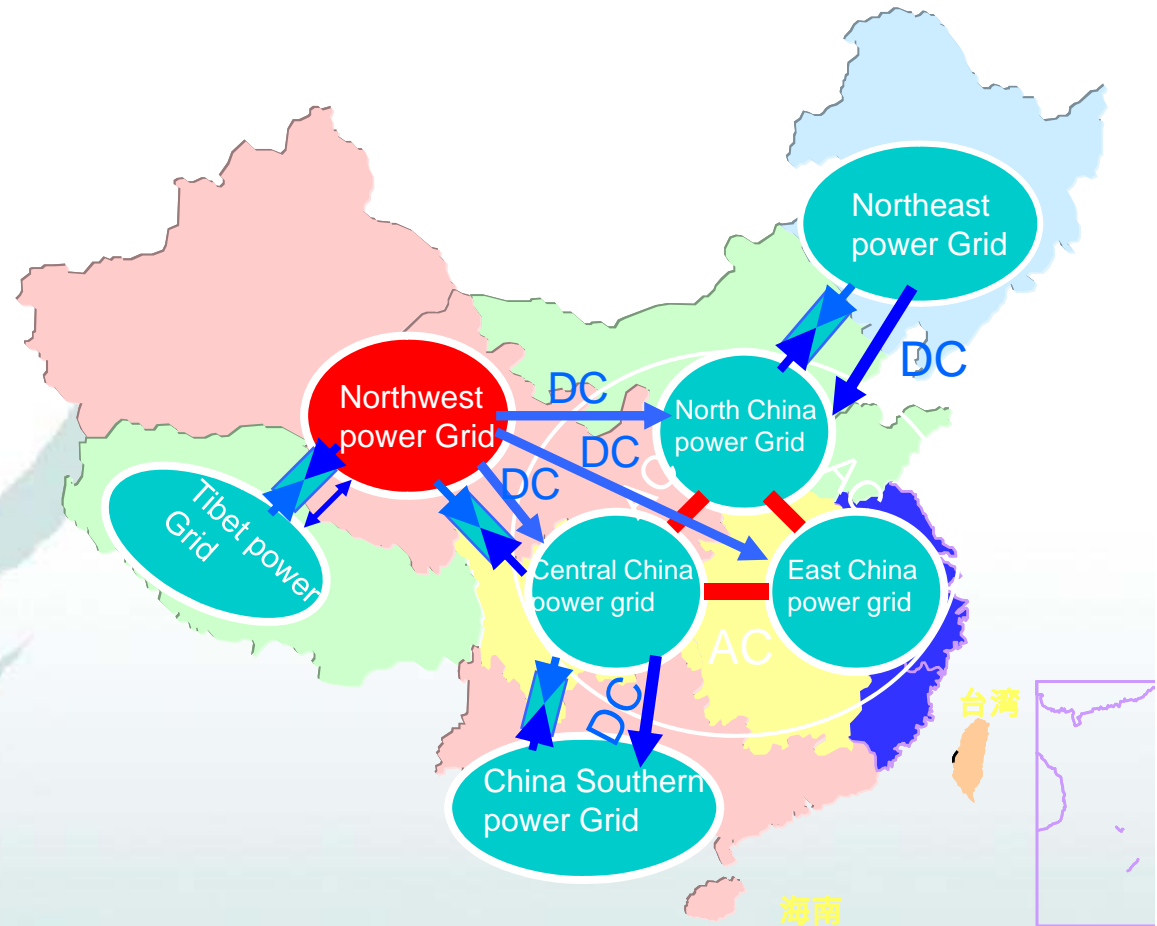




3.4.3 Northwest grid

The grid of 750 kV will be constructed quickly, and the grids of 330/220/66 kV will be reinforced.

The large amount of electricity power, which converted from regional abundant coal and wind resource, can be transmitted from local grid to others.





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3.4.4 North China Grid

The electric power converted from the regional coal and wind resource can meet the local consumption normally.

If necessary, additional power requirements can also be met from adjacent northeast or northwest grid.





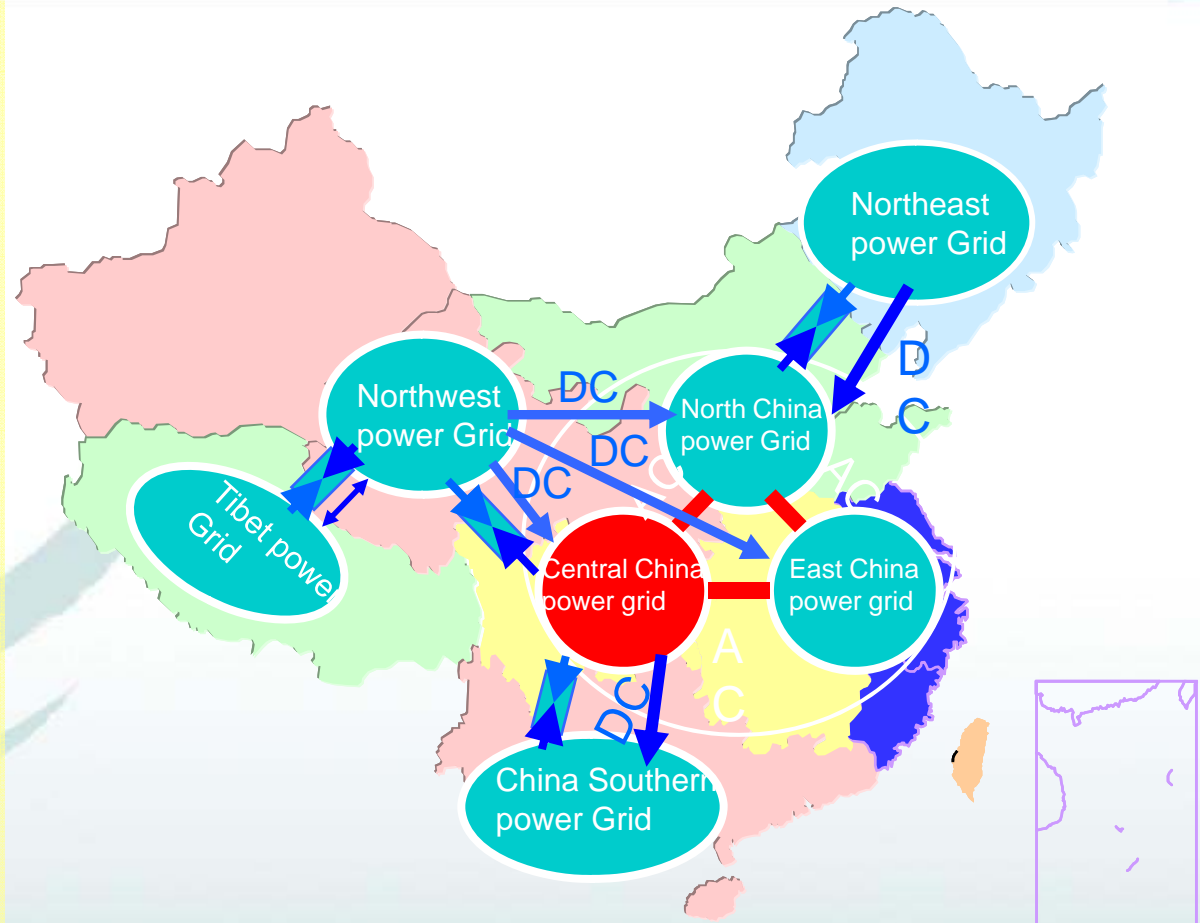
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3.4 5 Central China Grid

Hydropower resources in the east part of the central region has been well developed.

But there are much more hydropower resources in the west part of the central region (especially Sichuan province) which are under development, so the shortage of coal resources and poor transport condition can be compensated for.

Surplus hydro-electricity can be transmitted to East China Grid.





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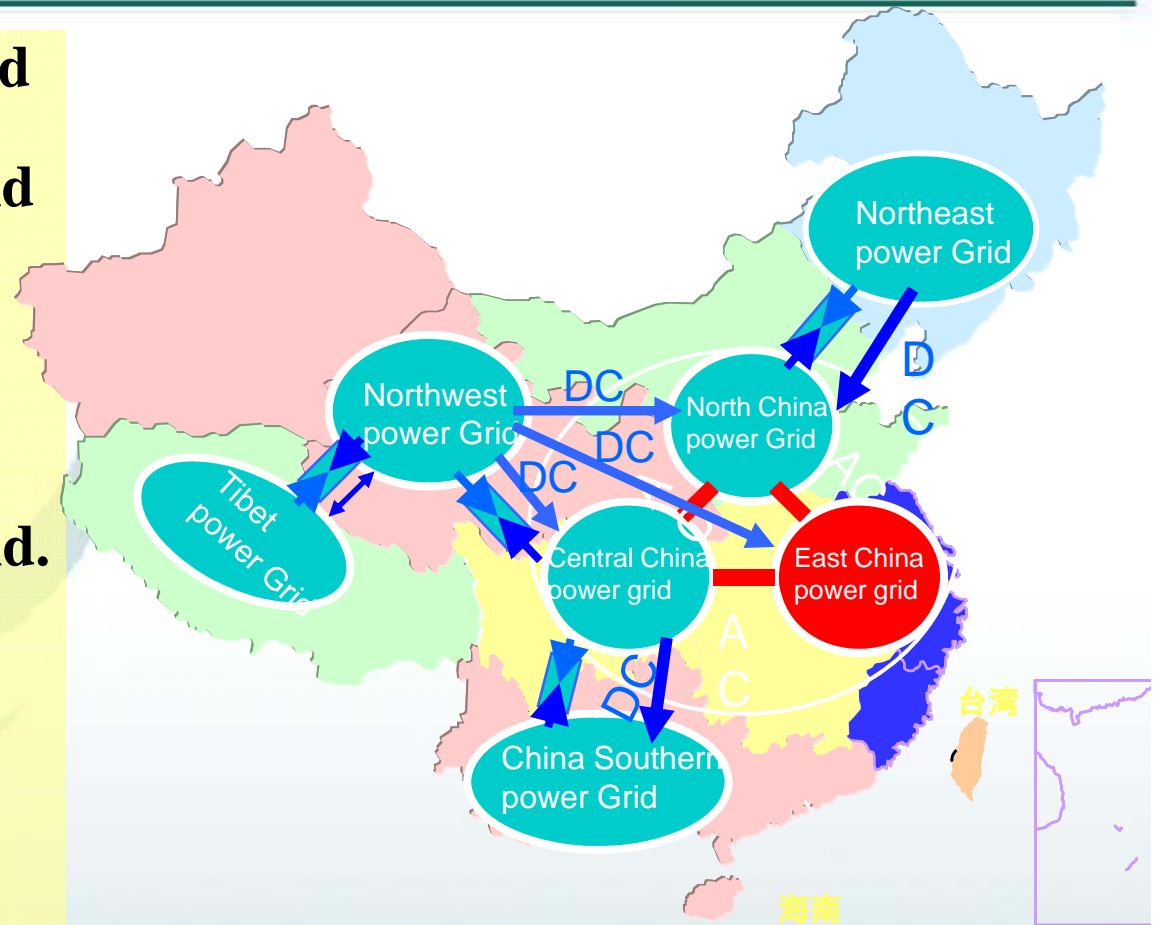
3.4.6 East China Grid

At present, the East China grid also get electric power from thermal bases in northwest and Mengdong thermal bases.

The hydropower from the Three Gorges Project and the Jinsha River are mainly transmitted to East China Grid.

There are a large number of nuclear plants in the grid.

With the benefit of good transport condition, more large-scale thermal stations can be built.





3.4.7 Sanhua Synchronous Grid

North China, Central China and East China grids will be connected to a synchronous grid (called Sanhua Grid) at 1000 kV AC during 2011-2015.

The shortage of power in the grid can be solved by power transmission from Northwest and Northeast grids.





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3.4.8 Southern Grid

By the end of 2010,
Installed capacity:
170 million kW
Transformer capacity (220
kV and above):
360 million kVA
Length of transmission
lines (220 kV and above):
84 thousand km
8 AC and 5 DC (500 kV
and above) long-distance
(more than 1000 km each)
transmission lines.
Max transmission
capability: 24.2 million kW





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3.4.8 Southern Grid

By the end of 2015, the Southern grid will keep balance between supply and consumption with an additional 3 million kW electric power from Yangtse gorges.

Hydroelectric power from Yunnan and Tibet may be used in the future

4 DC long-distance lines (500 kV and above) will be constructed





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3.4.9 Build Strong Smart Grid during 2011-2015

2011-2015, a number of 1000kV transmission lines will be built to link North, Central and East China Grid, thus forming the “three vertical ,three horizontal and a ring linking”.

In the same period, 13 DC ($\pm 500 \sim \pm 1100$ kV) long-distance transmission lines will be constructed to allow power transmission from thermal, hydro, nuclear and wind bases.





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3.5 Plan of Energy Supply in 2020

- **Installed capacity will reach 1.714 billion kW;**
- **The length of transmission lines (110 kV and above) will increase by 0.43 million km;**
- **Transformer capacity (110 kV and above) will increase by 2.3 billion kVA;**
- **Electricity consumption will reach 7 billion kWh;**
- **Total investment will reach 5.8 trillion yuan, of which:**
 - 2.95 trillion yuan for power sources;**
 - 2.85 trillion yuan for power grids.**



3.5.1 Energy Consumption will Reach 4 Billion Tsce in 2020

Non-fossil fuel will account for at least 15% of the total primary energy consumption in 2020.

Energy consumption :

The total energy consumption will reach 4.09 billion TSCE.

The ratio of Primary energy used for power generation will reach 48%.

More than 90% of the non-fossil fuel will be turned into electricity.

Non-fossil fuel generation will account for about 25% of the total power generation.



3.5.2 Installed Capacity in 2020

Installed capacity will reach 1.714 billion kW.

The proportion of non-fossil fuel generation in total installed capacity will reach 35%.

Of which:

Nuclear power : 80 million kW

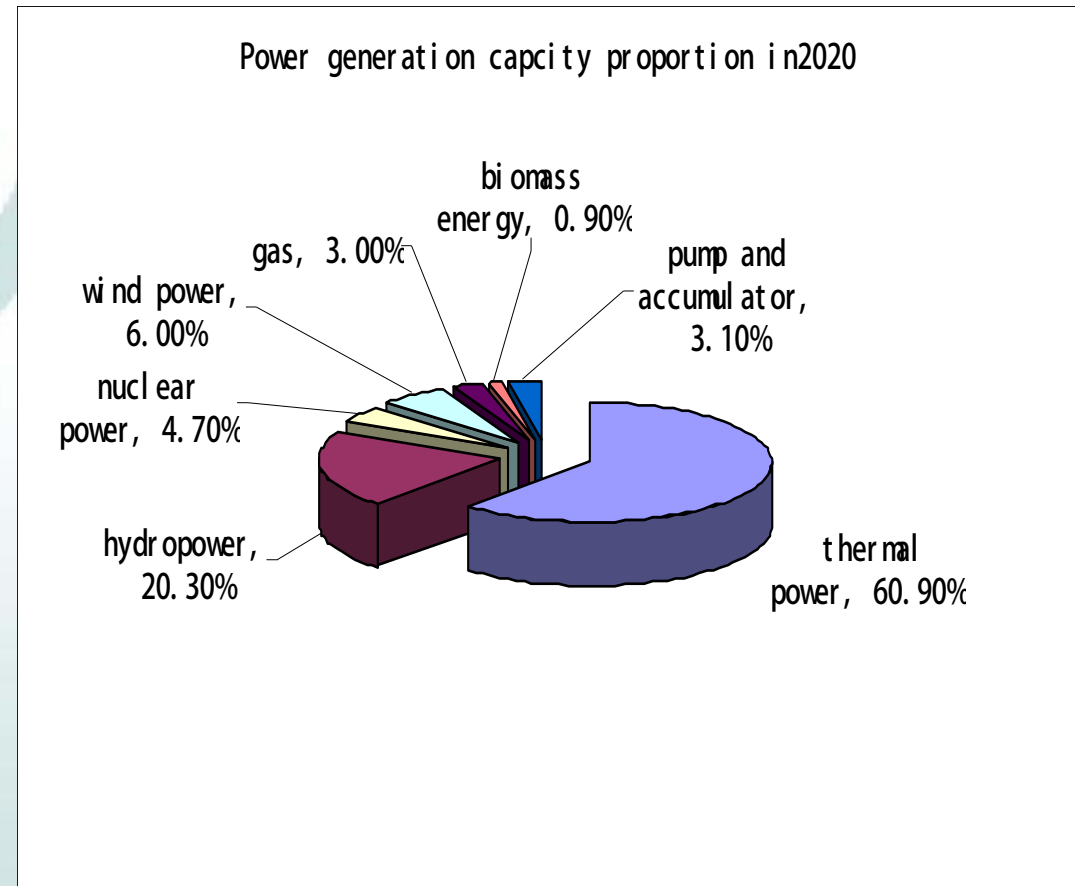
Hydropower : 347.8 million kW

Wind power : 100 million kW

Solar power : 20 million kW

Biomass power : 15million kW

Thermal power: 1004 million kW



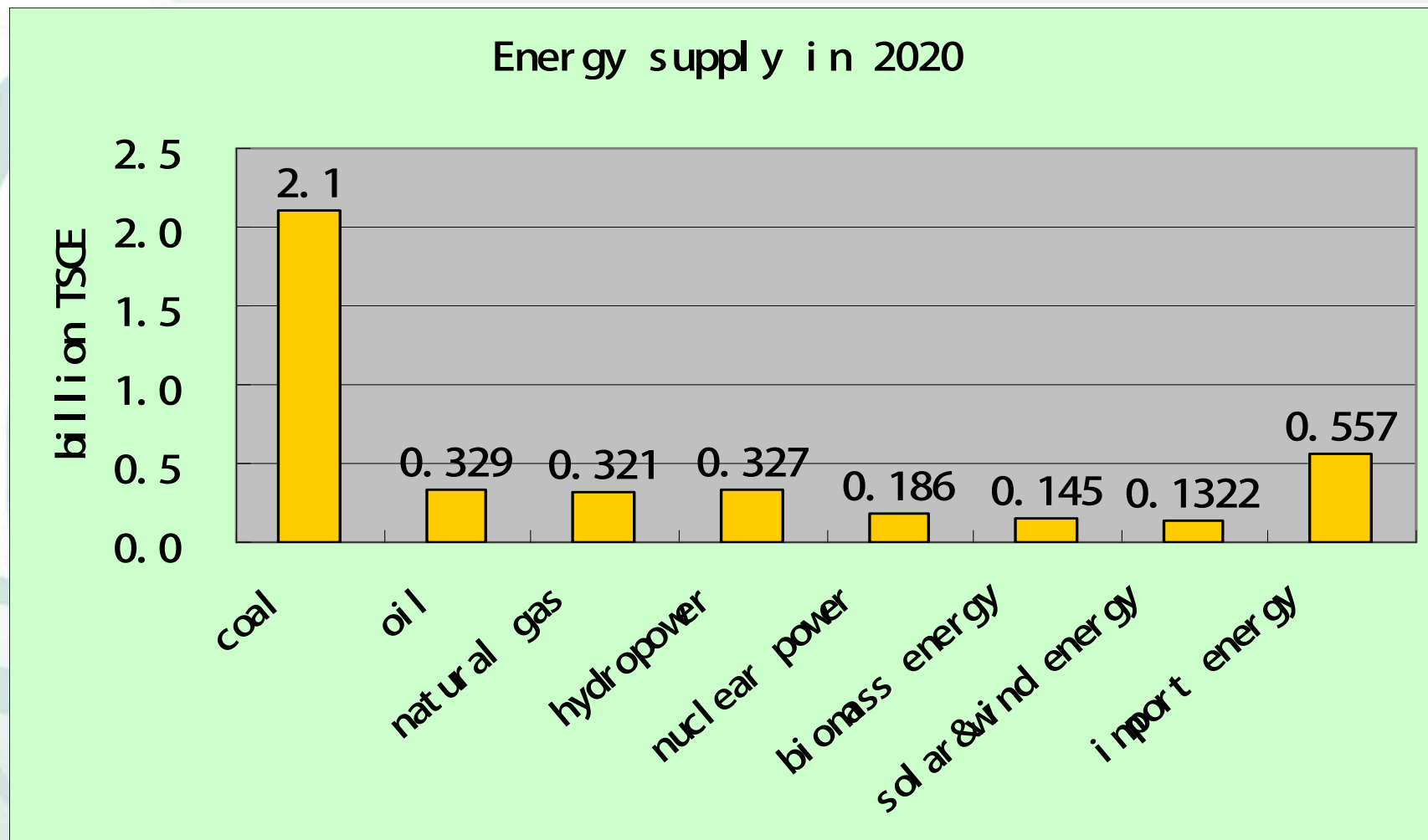


3.5.3 Build Strong Smart Grid during 2016-2020

- 1. By 2020, the power grids will get the capability to transmit a huge amount of electricity generated from “thermal, hydropower, nuclear and large scale renewable energy” power bases.**
- 2. 300 million kW power needs to be transmitted across different regions or even from some other countries.**
- 3. The main strong grid at 1000kV AC will be constructed completely, and “six vertical, five horizontal and a central ring linking ” structure will be formed by 2020.**



3.5.4 Plan of Energy Supply in 2020



Energy supply will reach 4.09 billion TSCE in 2020



3.6.1 Installed Capacity in 2030

Installed capacity will reach 2.35 billion kW.

The installed capacity of hydropower may reach its maximum level.

Nuclear power : 161 million kW

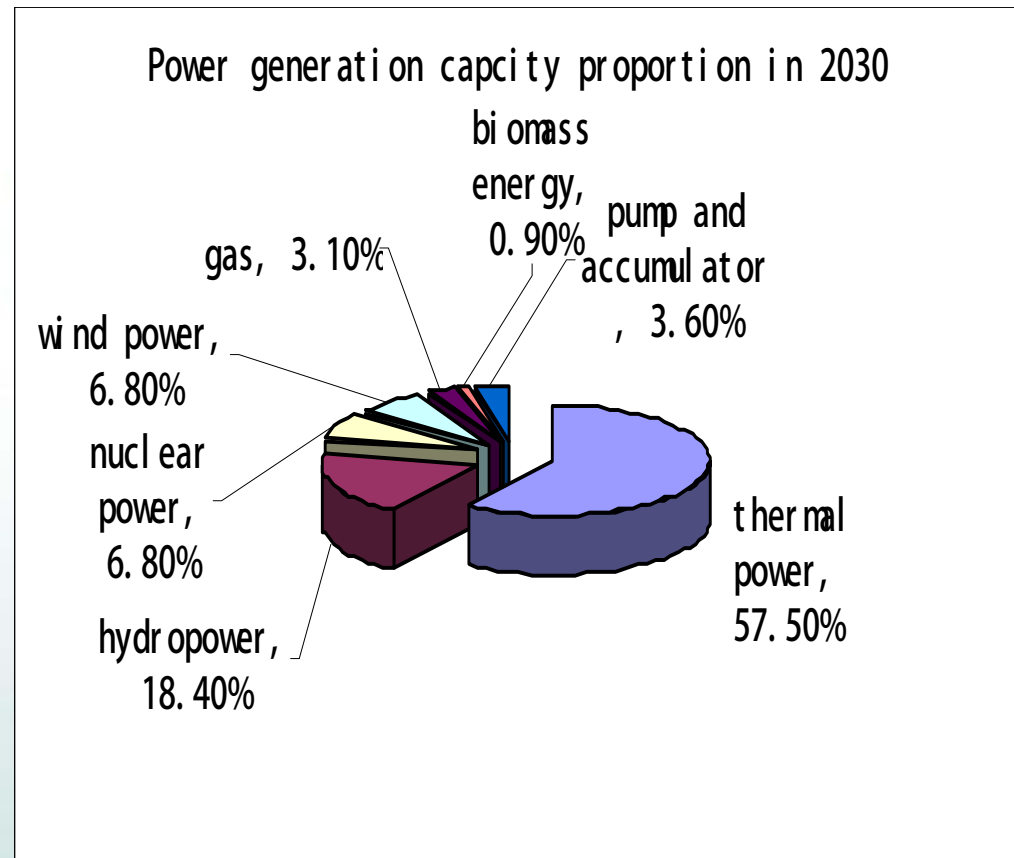
Hydropower : 431 million kW

Wind power : 160 million kW

Solar power : 70 million kW

Biomass power : 20 million kW

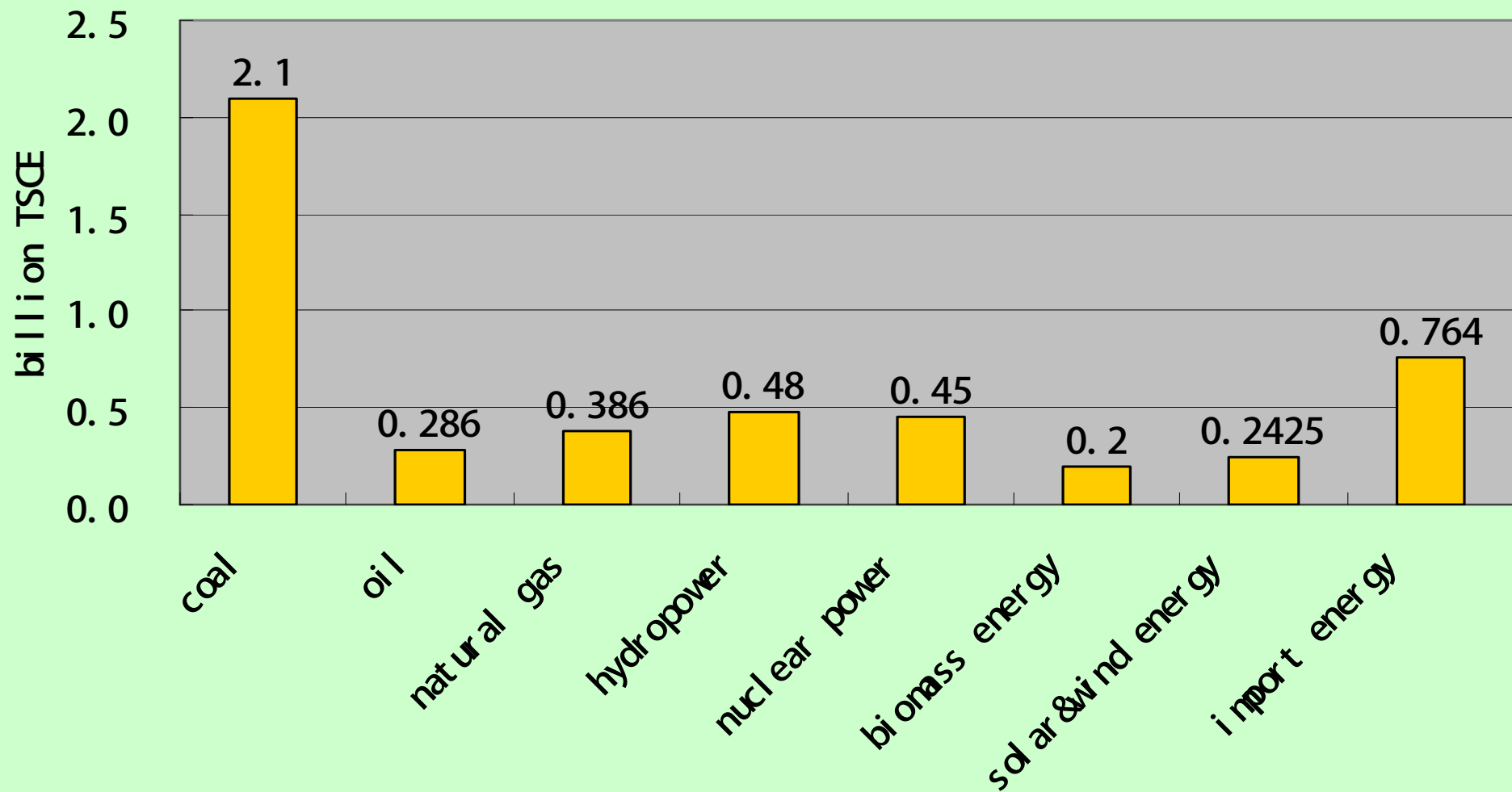
Thermal power: 1345 million kW





3.6.2 Plan of Energy Supply in 2030

Energy supply in 2030

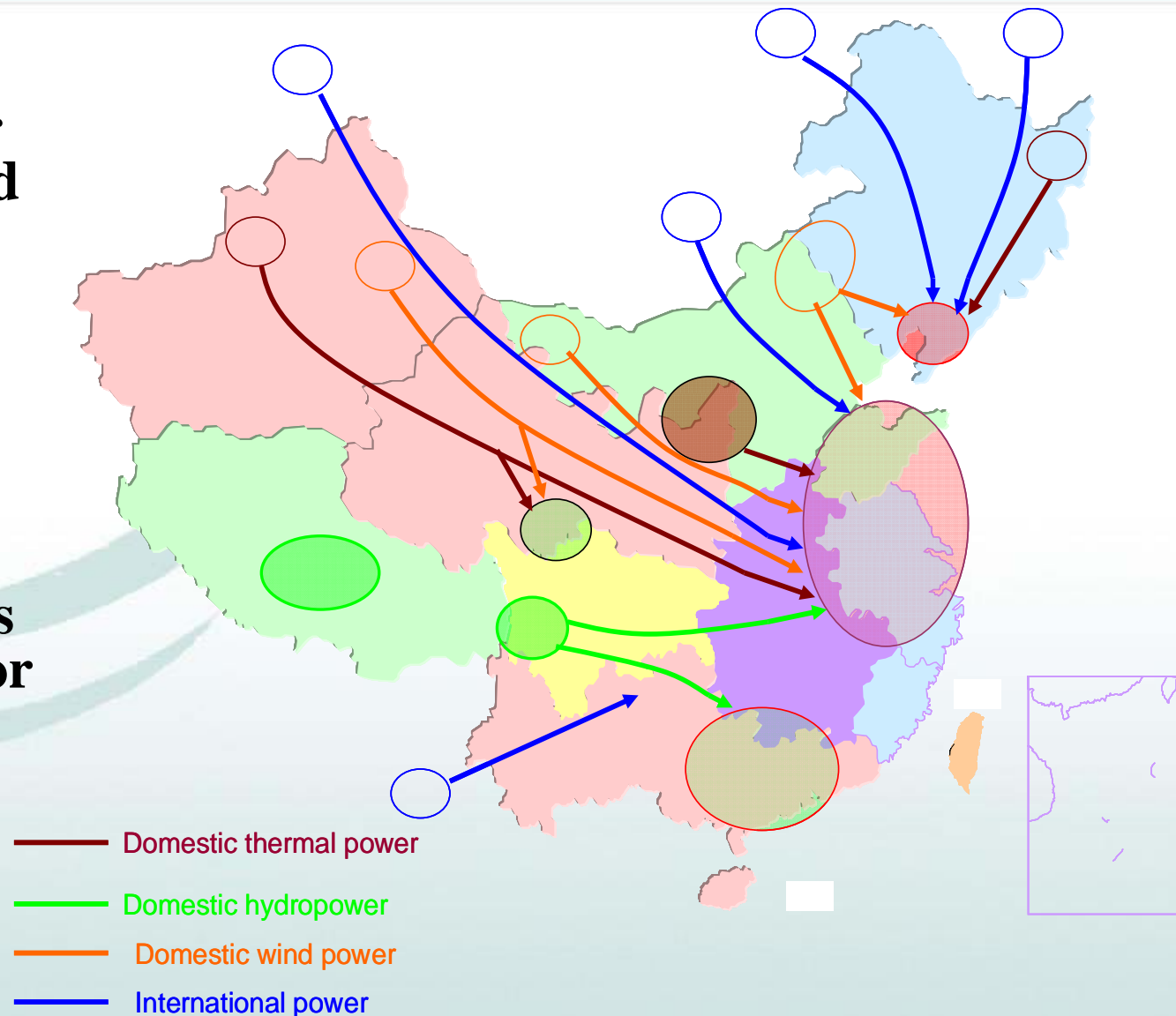




3.6.3 Power Transmission Capability of the Grid

1. By 2030, 420 million kW power can be transmitted across different regions or even from some other countries ;

2. After 2030, the amount of Power transmitted across different regions or countries will hardly increase.



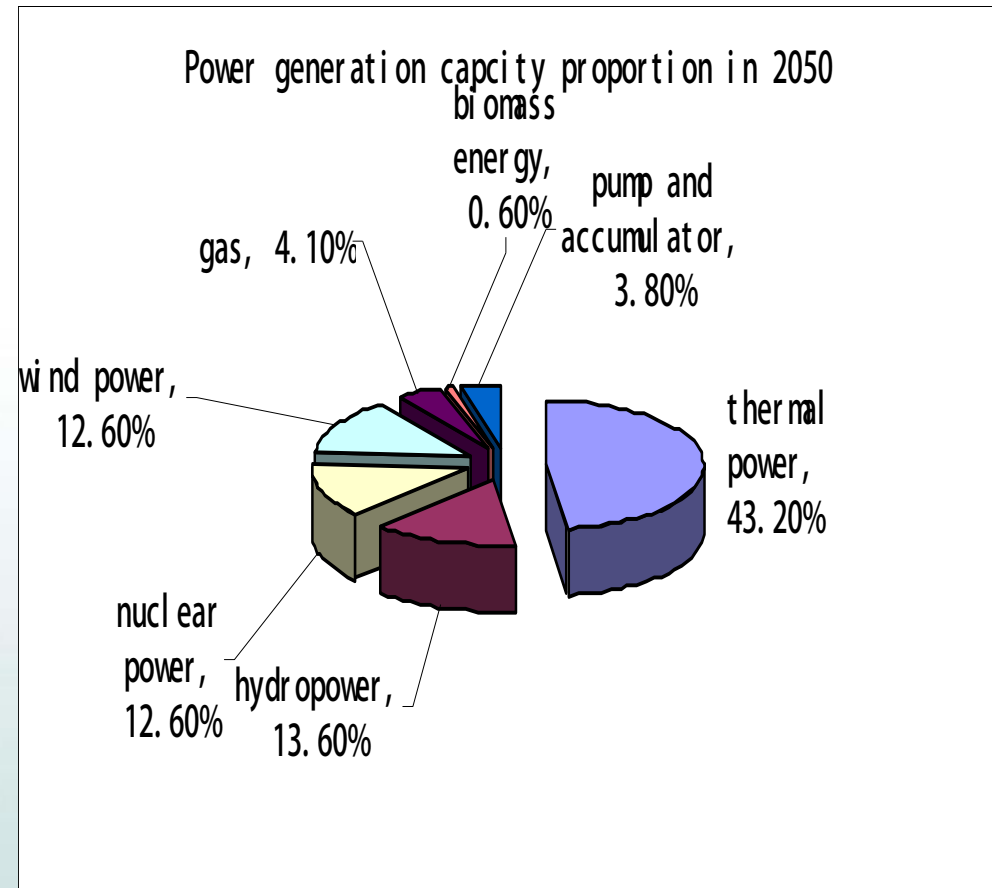


3.7.1 Installed Capacity in 2050

Installed capacity will reach 3.2 billion kW.

The installed capacity of thermal power and hydropower will not increase by a significant amount.

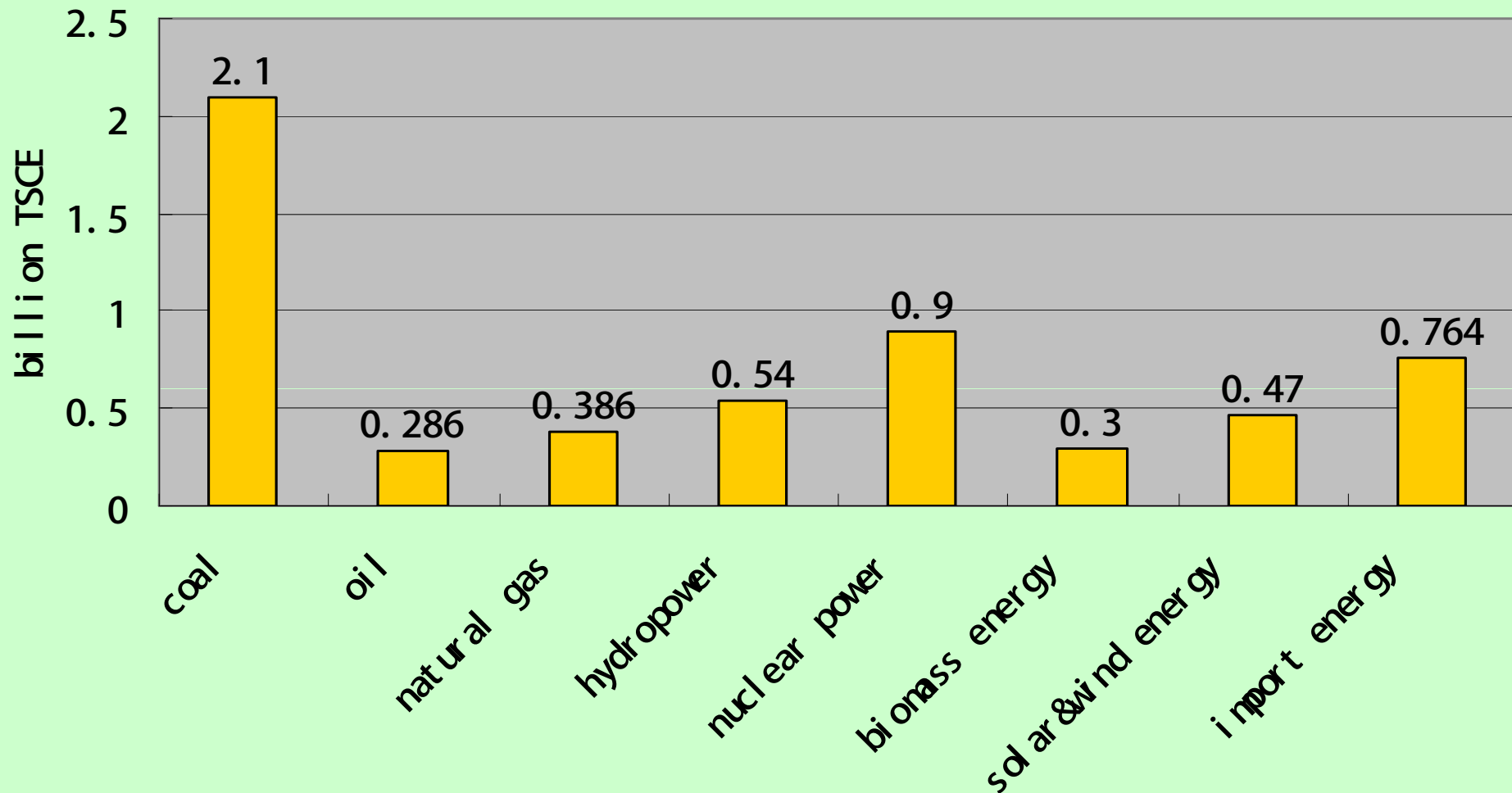
Nuclear power : 400 million kW
 Hydropower : 430 million kW
 Wind power : 400 million kW
 Solar power : 300 million kW
 Biomass power : 20 million kW
 Thermal power: 1369 million kW





3.7.2 Plan of Energy Supply in 2050

Energy supply in 2050





3.7.3 Plan of Energy Supply in 2050

Geothermal and tidal power generation may play more important roles in the energy supply of China after 2030.

The proportion of coal use in the total energy consumption may decline year by year, perhaps reducing to 35% by the end of 2050.



Yangbajing geothermal power station in Tibet, 25.18 MW



Jiangxia tidal power station in Zhejiang province, 6 MW



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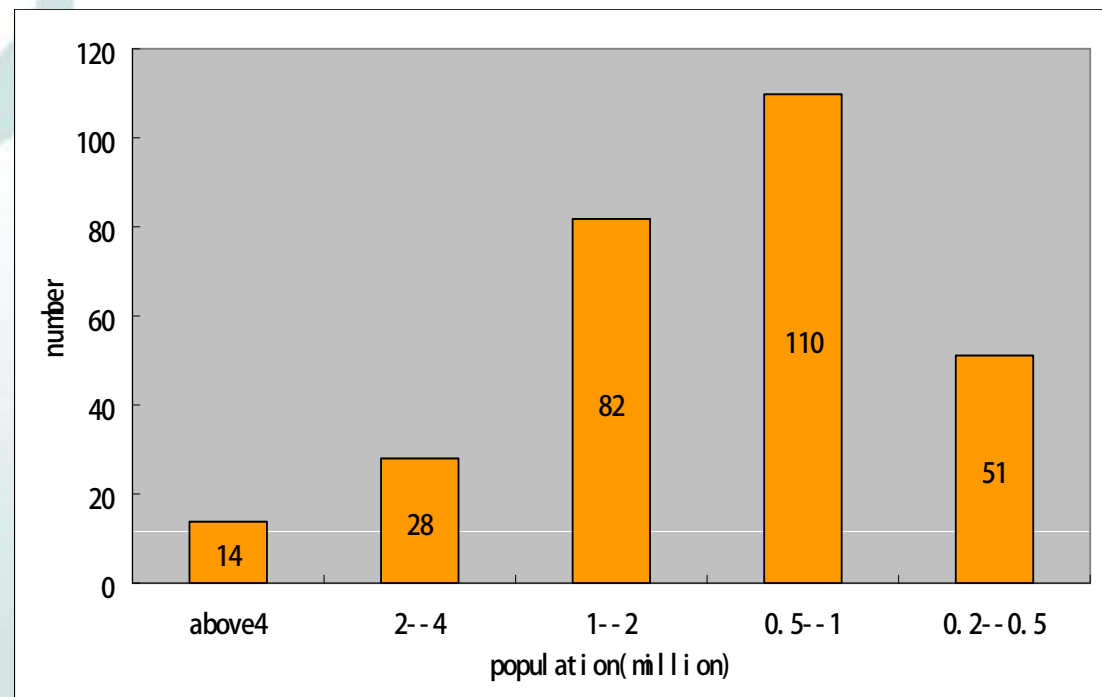
4. Progress on Urbanization and Application of Cable



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4.1 Urbanization and Cable Application

1. During the last decade(2000-2010), the level of urbanization increased from 36.2% to 47.5% , with an average annual growth rate of more than 1%.
2. 124 large and medium cities (population above 1 million), and more than 500 small towns experienced rapid development. The total number of citizens reached 665.57 million in 2010.



Source:

China Statistical
Yearbook 2010



4.2 Principles of Cable application

- 1. Cables are generally used in the transmission and distribution networks in downtown area of large and medium cities.**
- 2. Cables are optional in the transmission and distribution networks in the suburbs of large and medium cities or central parts of small towns.**
- 3. Overhead lines are used in suburban and rural districts.**



4.3.1 Shanghai---the Largest City of China

- Shanghai is the largest and most modernized city of China.
- Its population reached 22.2 million by the end of 2010.
- The total electricity consumption was 129.6 billion.
- The peak load was 26.21 million kW.
- Shanghai's GDP rose from 0.92 trillion yuan in 2005 to 1.69 trillion yuan in 2010.





4.3.2 Shanghai Municipal Electric Power Company

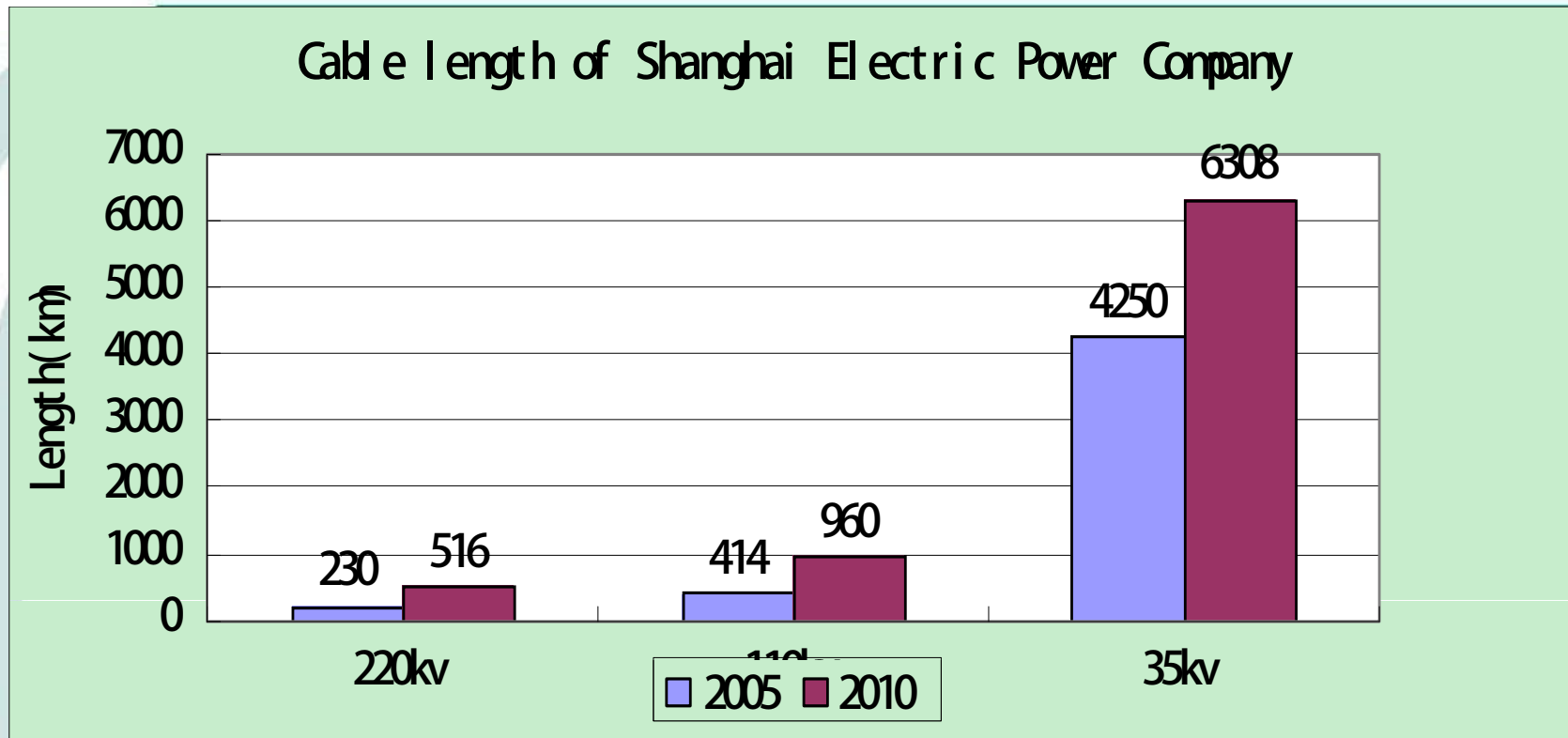
Shanghai Municipal Electric Power Company is responsible for 80% of the urban electricity consumption.

During the last five years:

- 1. The total investment of 55.6 billion yuan was invested for power grid construction and improvement.**
- 2. The electricity sale increased from the 70.5 billion kWh in 2005 to 102.8 billion kWh in 2010.**
- 3. Transformer capacity of 35kV and above increased from the 68.5 million kVA to 115 million kVA.**
- 4. The total investment in the next 5 years will increase significantly**



4.3.3 Shanghai Electric Power Company



The cable length of 500kV is 93.8 km.

The cable length of 220kV increased from 230 km to 516 km.

The cable length of 110kV increased from 414 km to 960 km.

The cable length of 35kV increased from 4250 km to 6308 km



4.4.1 The Third Largest City of China -- Tianjin

Tianjin is the third largest city of China, The area is 11.76 thousand km². It's population reached 13 million by the end of 2010.

Urbanization rate in 2010 was 79.55%, and increased by 7.15% compared with the urbanization rate in 2000. In 2010, the city's GDP exceeded 900 billion yuan.

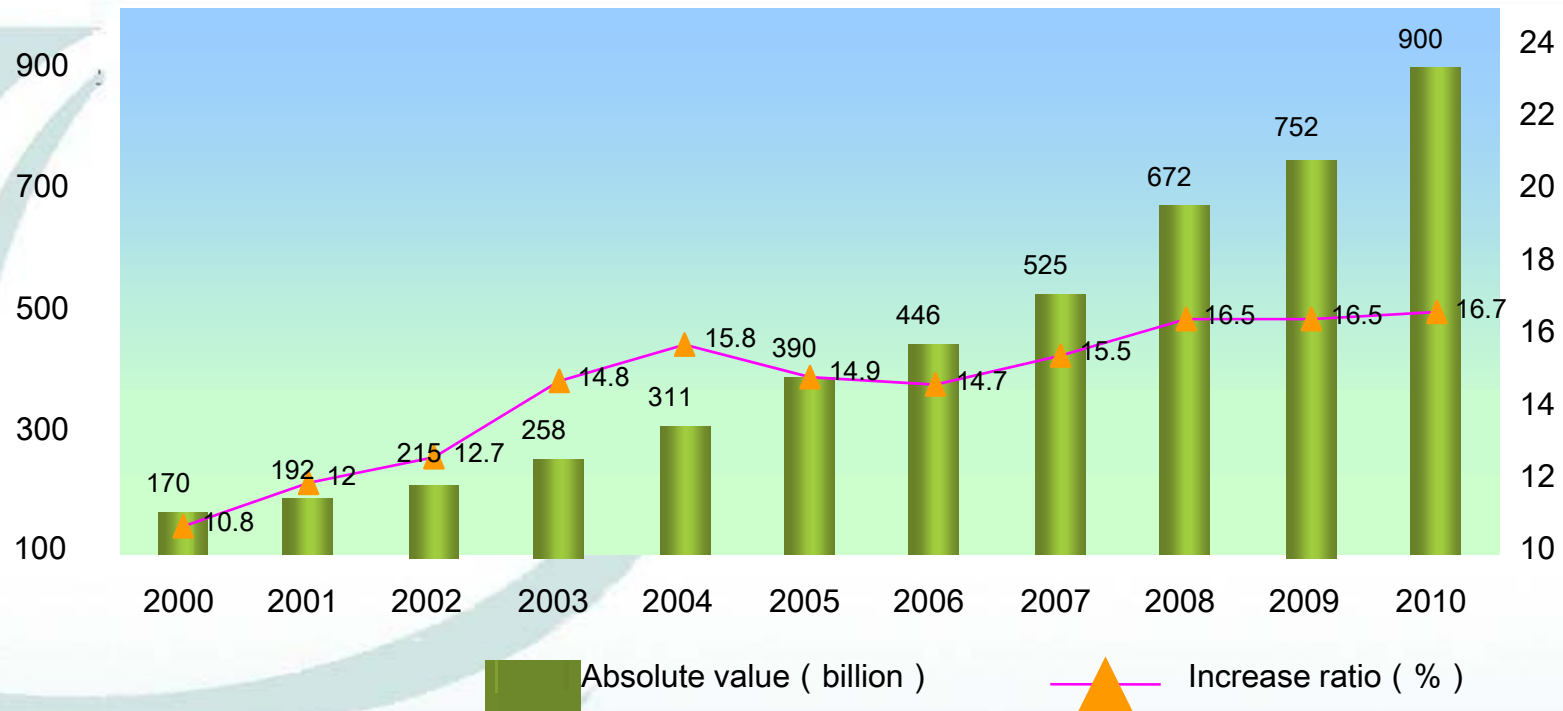
The per capita was more than 10,000 U.S. dollars.

The total electricity consumption was 62.7 billion kWh in 2010.





4.4.2 Electric Power Demand Forecast of Tianjin



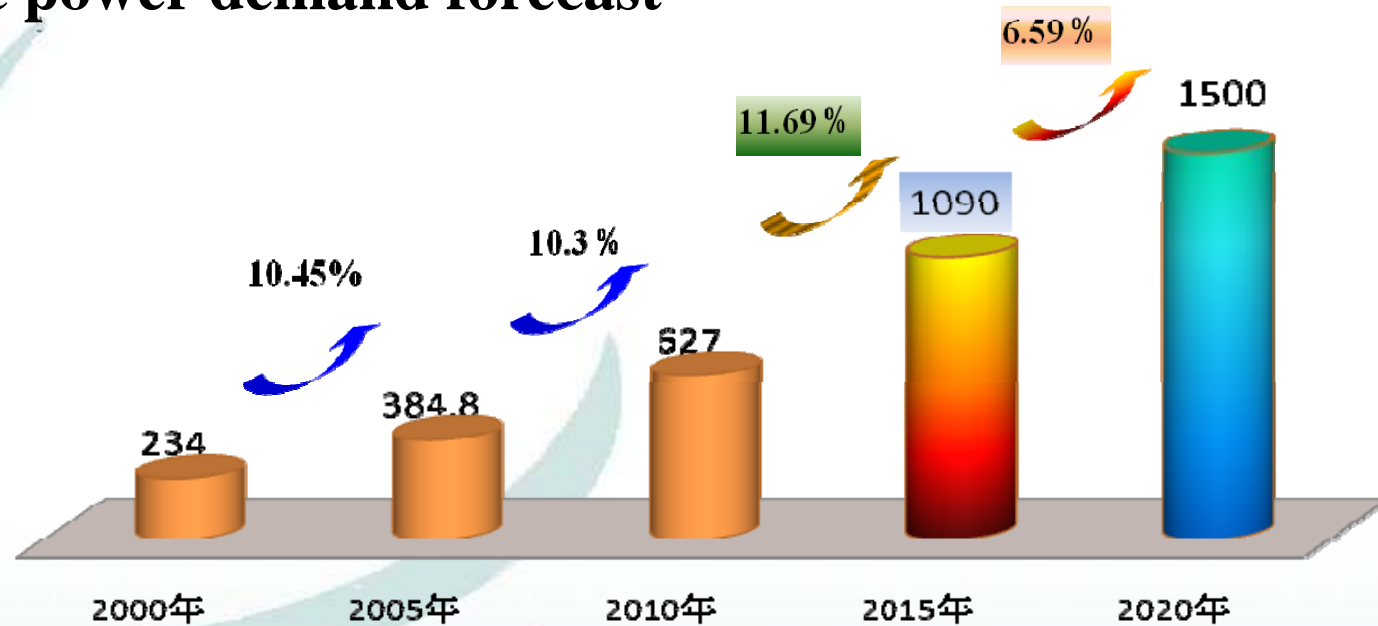
The average annual GDP growth rate of Tianjin was more than 15% during the last 5 years.

In the next 5 years we assume the growth rate will be 14% to 18%. The amount will reach 1.6-2 trillion yuan by the end of 2015.



4.4.3 Electric Power Demand Forecast of Tianjin

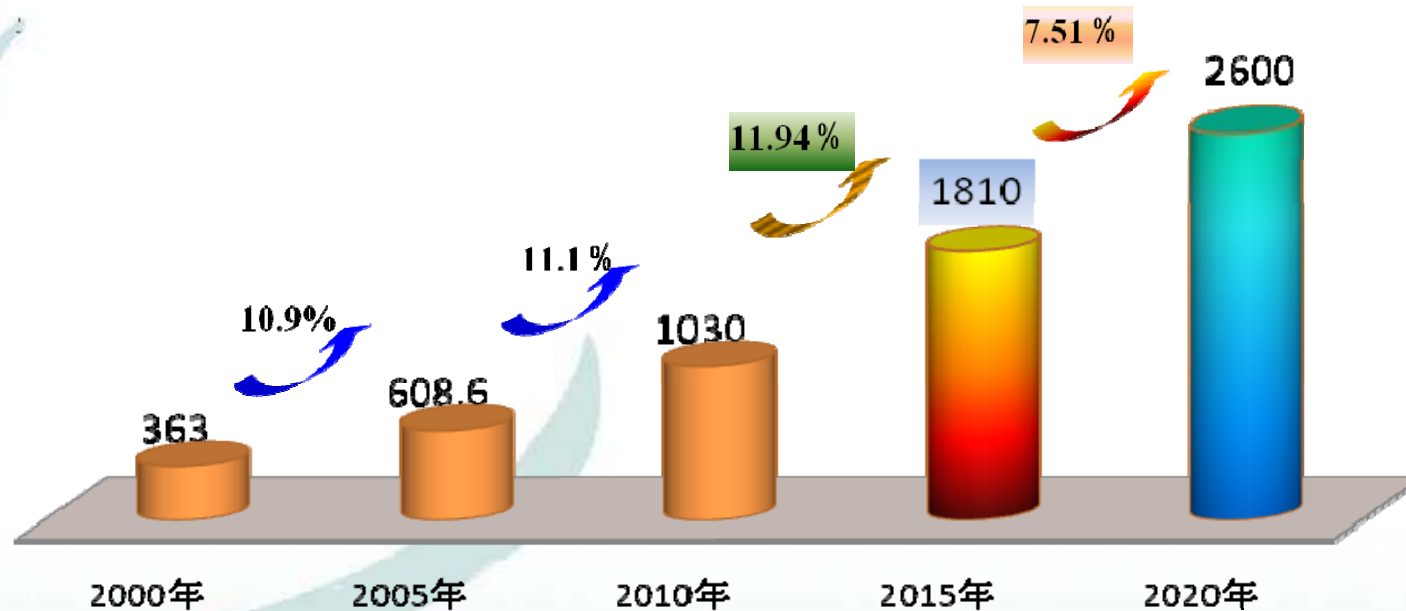
Electric power demand forecast



The total electricity consumption reached 62.7 billion kWh in 2010, increased by 13.86%. It's expected that the total electricity consumption will reach 109 billion kWh in 2015. Setting 2010 as the base, the average annual growth rate will reach 11.69% in the next 5 years.



4.4.4 Electric Power Demand Forecast of Tianjin



The peak load reached 10 million kW in 2010, yearly increased by 13.9% during the last half decade. It's expected that the peak load will reach 18.1 million kW in 2015.

The average annual growth rate will be 11.94% during the next 5 year.



4.4.5 Construction of Tianjin Grid

Over the past 5 years, about 41 billion yuan was invested for Tianjin power network construction by Tianjin Electric Power Company, which supported 97% of the city's electrical customers.

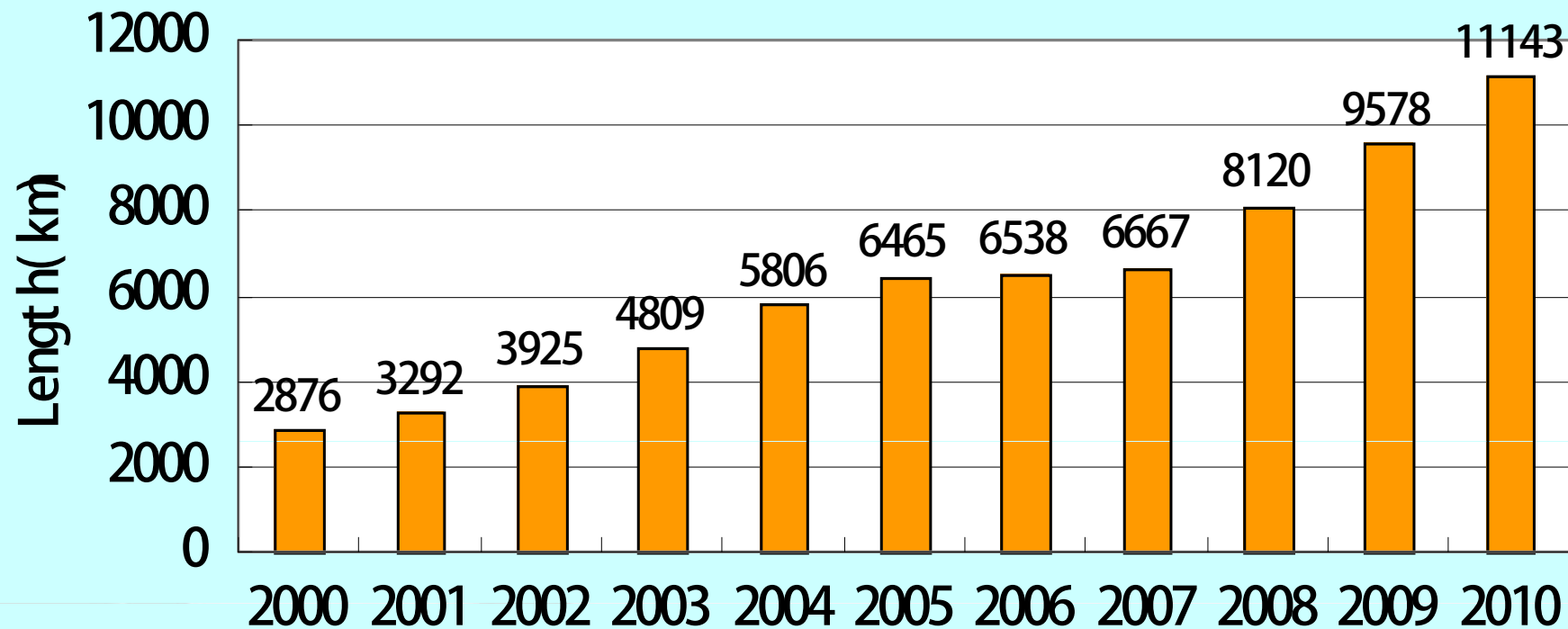
The electricity sale increased from 38 billion kWh in 2005 to 55 billion kWh in 2010, and the transformer capacity of 35kV and above increased from 26 million kVA to 54 million kVA.

In the next 5 years, the amount of investment capital in construction and improvement of Tianjin power grid will be more than the amount in the last 5 years.



4.4.7 Construction of Tianjin Grid

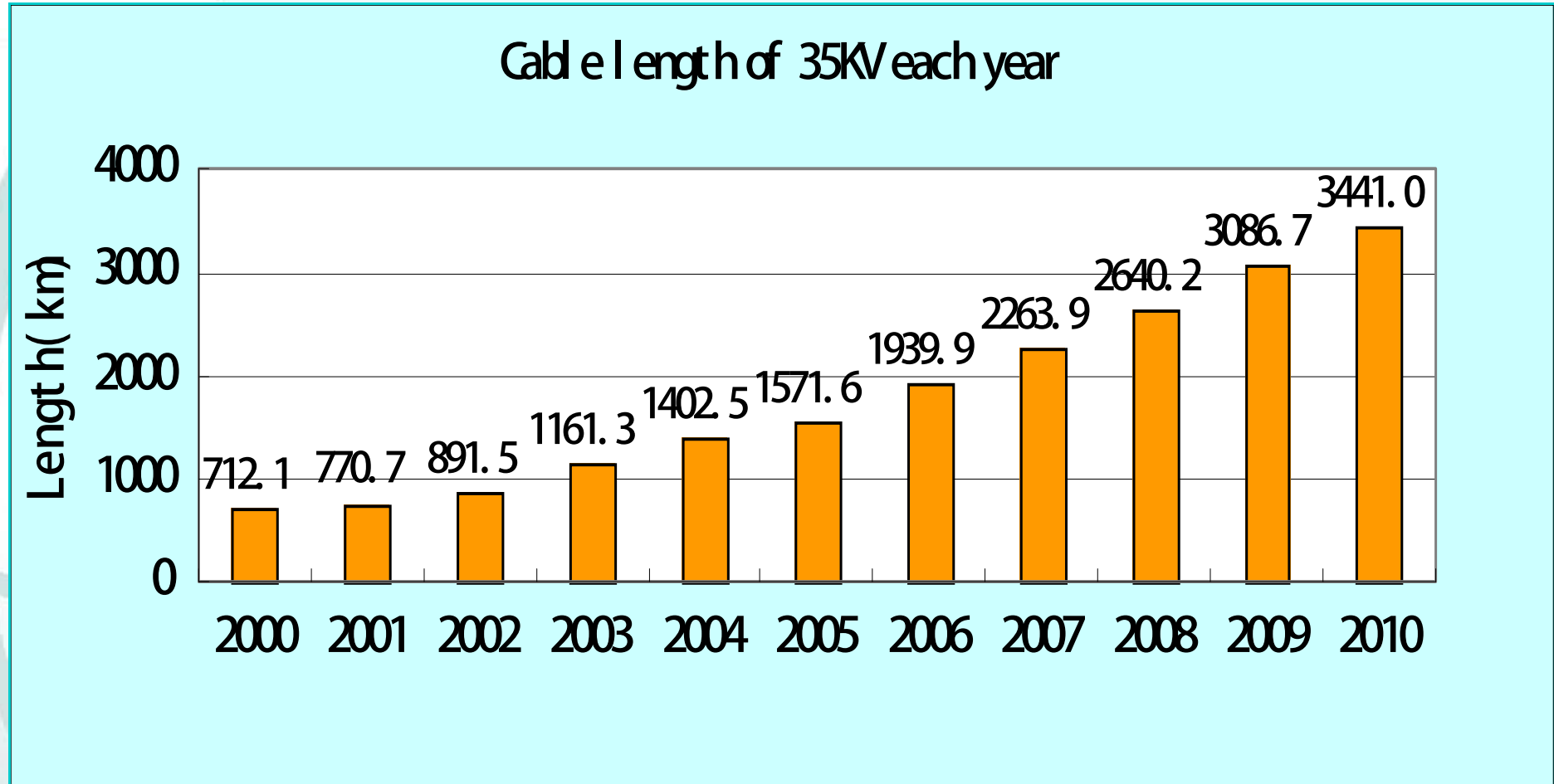
Cable length of 10kv each year



Average annual growth rate of cable length (10 kV) reached more than 11.1% in the past decade.



4.4.8 Construction of Tianjin Grid

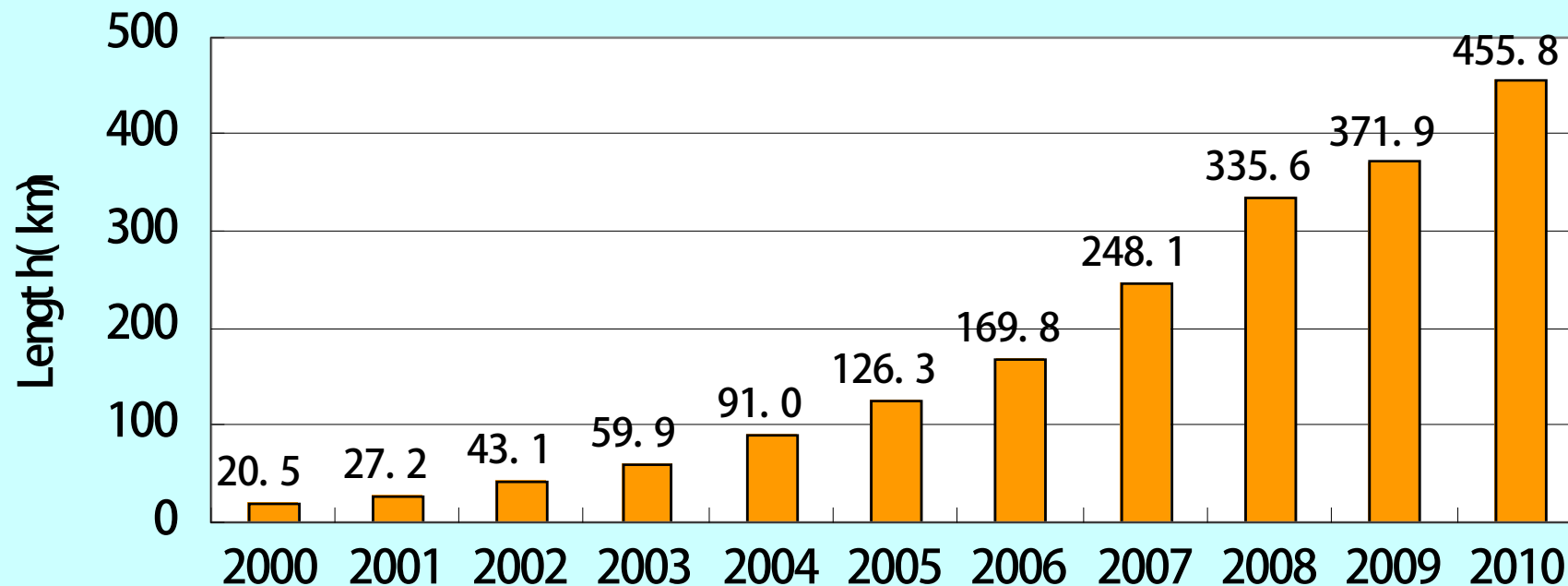


Average annual growth rate of cable length (35 kV) reached more than 14.5% in the last decade.



4.4.8 Construction of Tianjin Grid

Cable Length of 110kv and 220kv



Average annual growth rate of cable length (110 kV and above) reached more than 35.8% in the last decade.



4.5 Demand of cable during 2011-2015

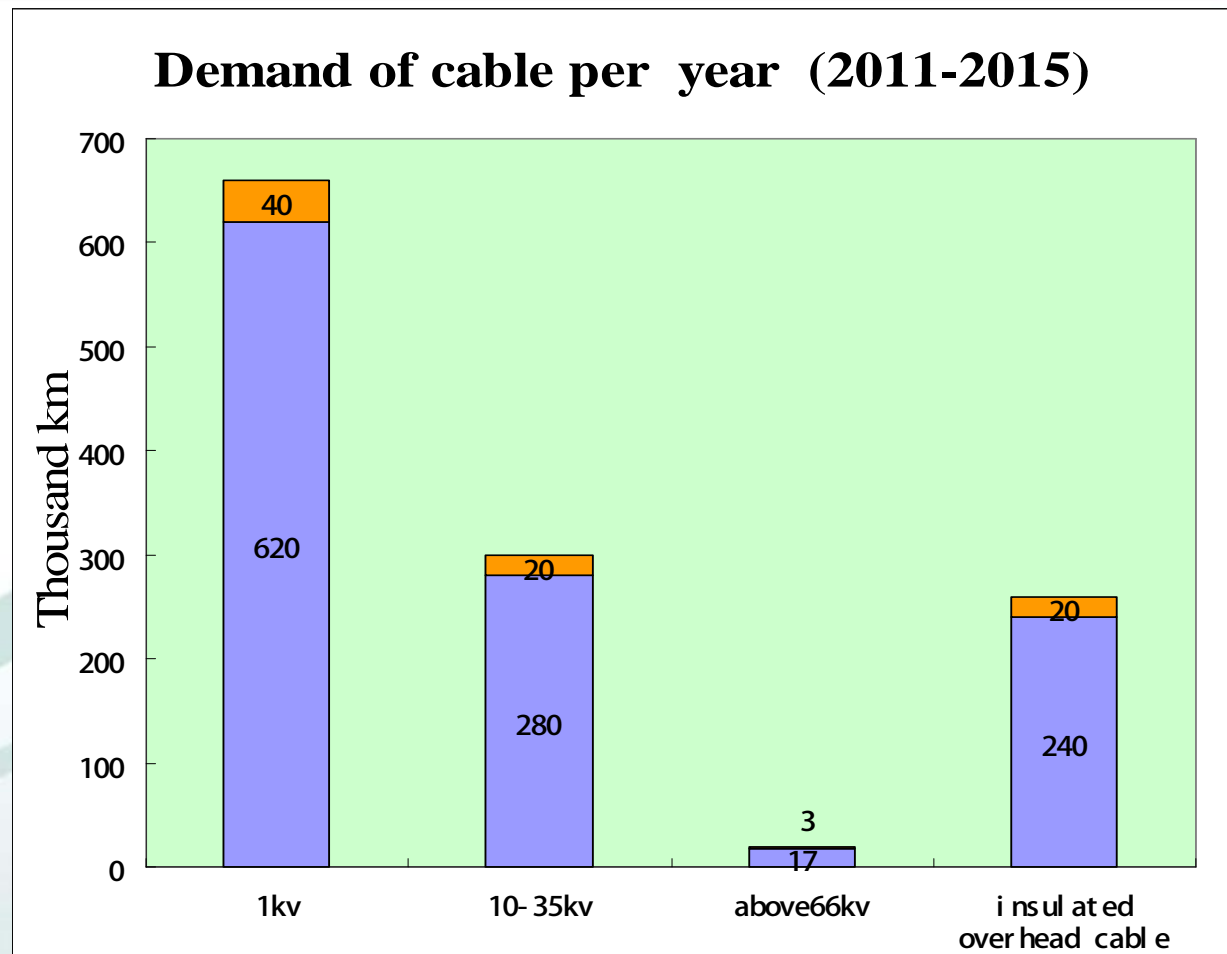
Unit: Thousand km

1 kV :
620~660

10-35 kV :
280~300

66 kV and above:
17~20

Insulated overhead line:
240 ~ 260





5 Conclusions

- 1. The sustainable economic development of China strongly depends upon the development of energy industry, especially the electric power industry.**
- 2. The electric power industry of China will focus on non-fossil fuel utilization and long-distance, large-scale power transmission.**
- 3. The rapid development of power source and urban grid construction results in a tremendous requirement of cables.**
- 4. The international cooperation has played and will continue to play an important role in the power grid construction of China.**



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Thanks !