

Great Resources (Jilin) Co., LTD

The Development of Biomass Heating in China

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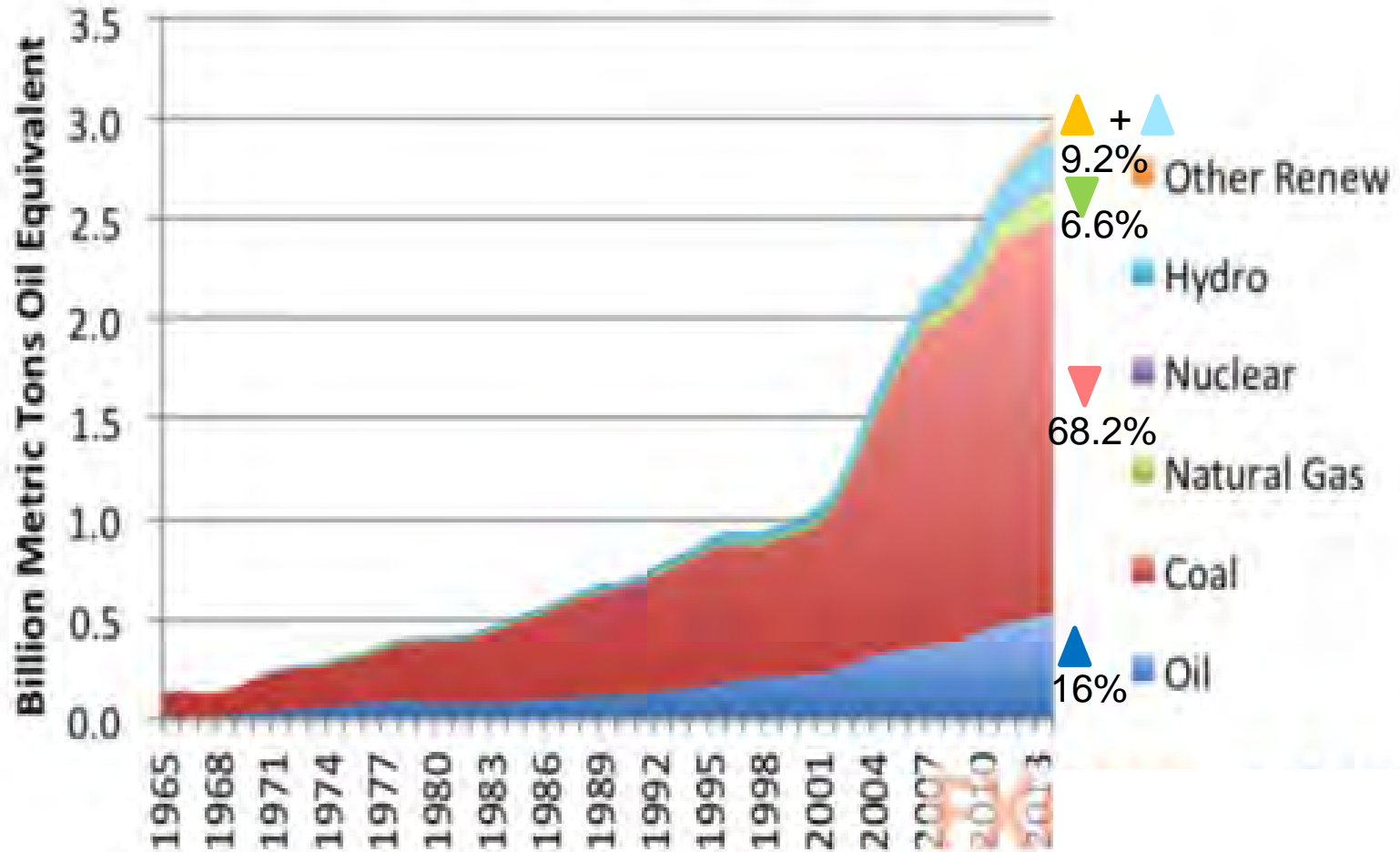
生物质能源供热运营服务商

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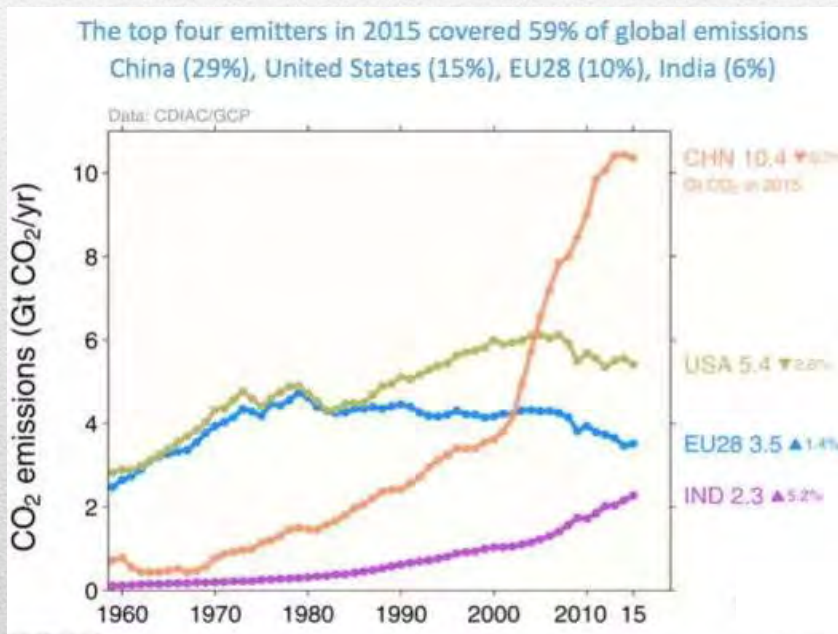
China Energy Consumption by Fuel



China is facing with environment problems

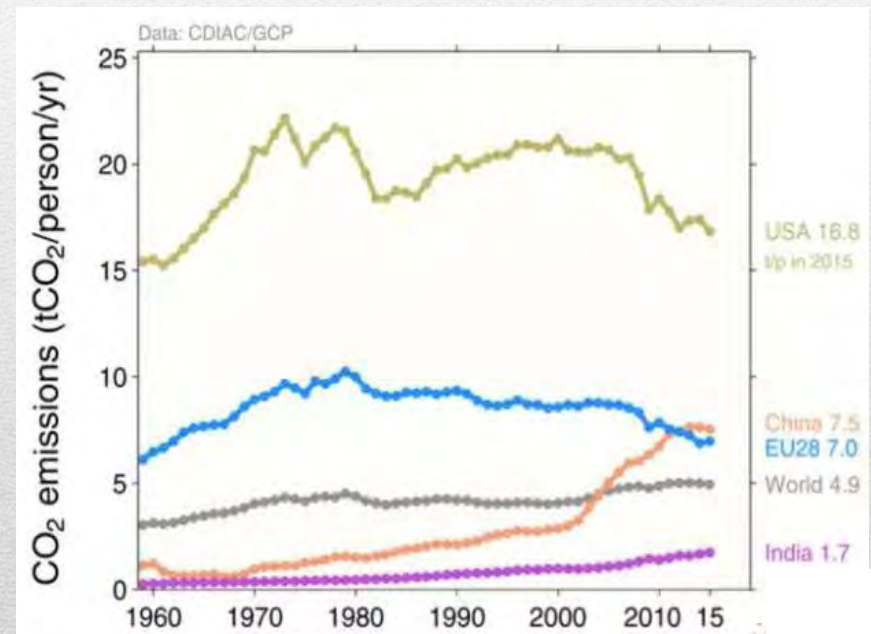
1、Carbon Emissions

Total carbon emissions



The total carbon emissions in China is surpass the US's and EU's combined

Per capita carbon emissions



Per capita carbon emissions in China in 7.5 tons, while it is 4.9 tons in the world.

China is facing with environment problems

2、Pollutant Emissions

Coal and Oil are still as important energy in China, and the consumption share is over 84% in total energy consumption. Therefore its energy structure brings seriously environment problems such as haze and etc.

Pollutant Emissions



Haze



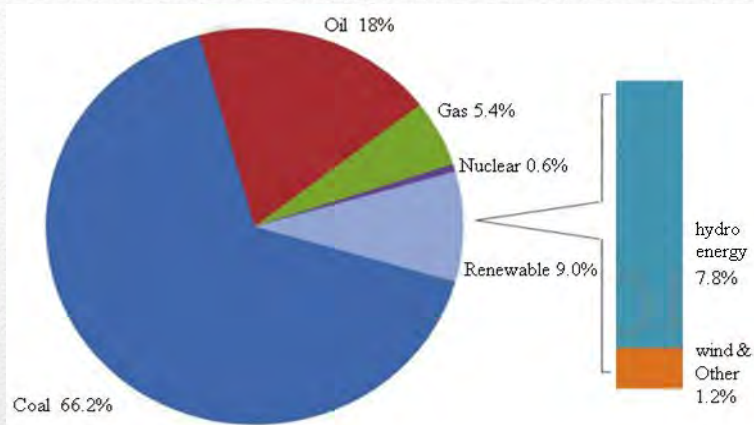
Water pollution



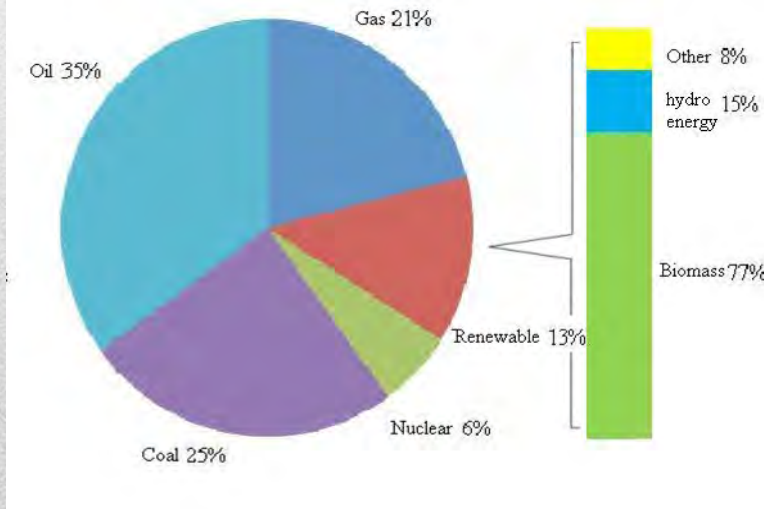
Soil pollution



Market conditions for the bio-energy industry in China



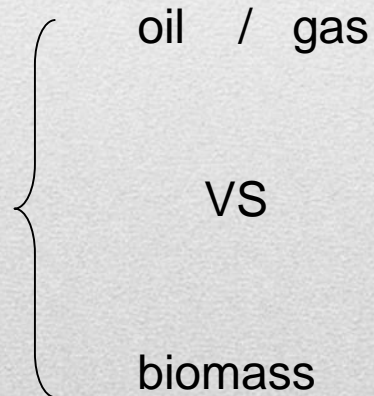
2012 total energy consumption in China



2012 total energy consumption in the world

CHOICE ?

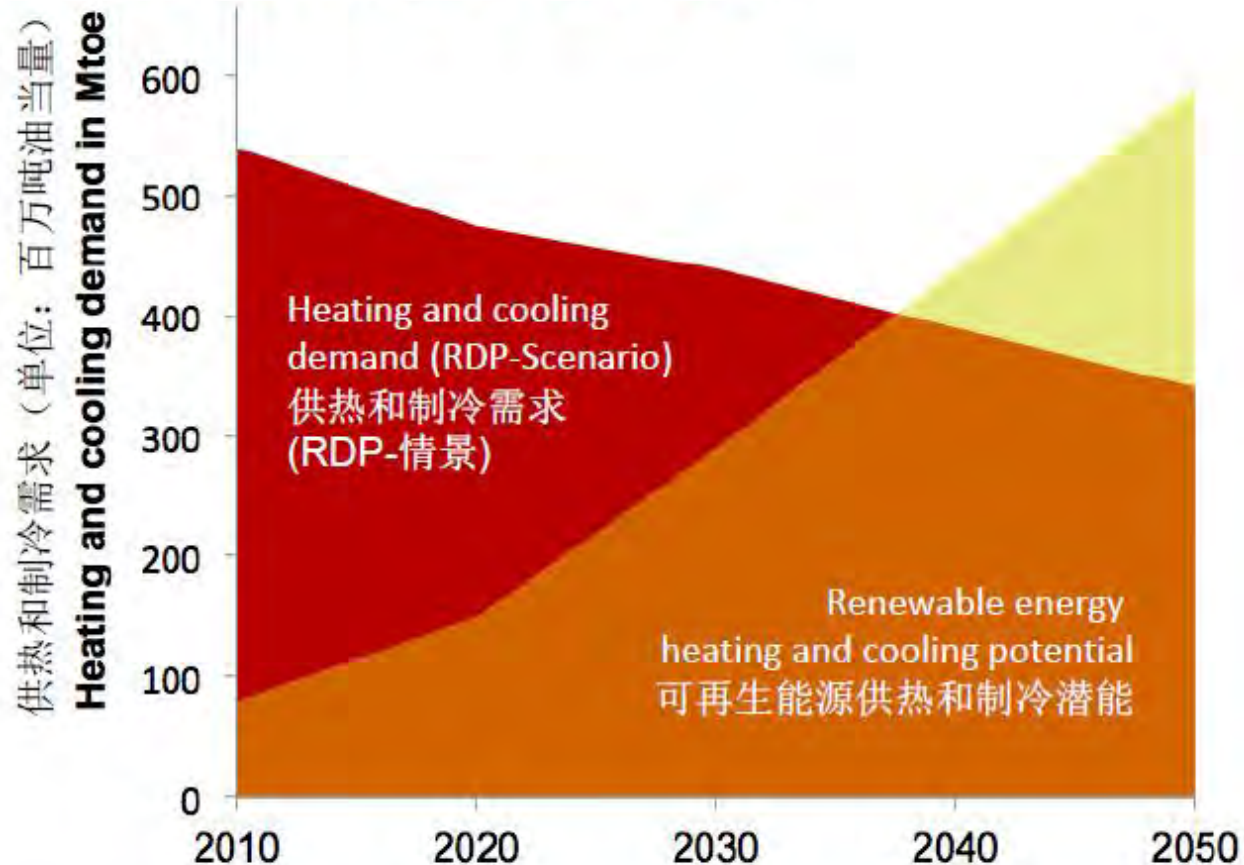
- Instead of coal :



The vision of the RHC-platform: Renewable energy sources (RES) will deliver 100% of the European heating and cooling demand by 2040

Share of RES on heating and cooling demand in Europe in 2014: 17.7%

Source: EHC-platform, Common vision for the RHC-sector, 2011
RDP-Scenario = Full Research, development and policy scenario



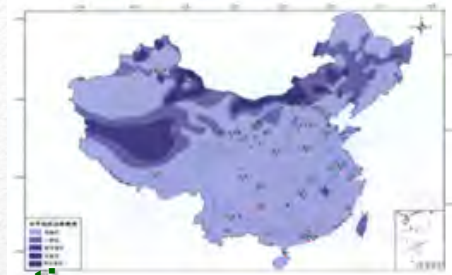
Globe Heating Trend

1. From individual heating to district heating
2. From heat-only to CHP heat production
3. From fossil fuel to biomass

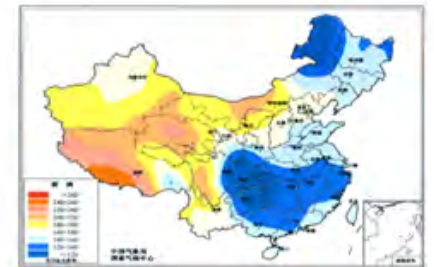


The situation of renewable resources in China

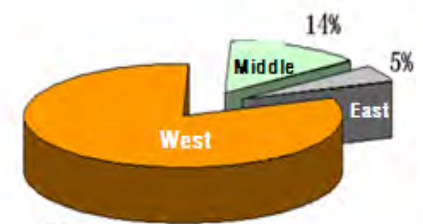
Wind energy and solar energy enrichment region:
 In the northwest china and Qinghai-Tibet Plateau;
Hydroenergy enrichment region: In the southwest china;
Biomass energy enrichment region: In the east and south area,
Regional advantages: raw material place is nearby product marketing



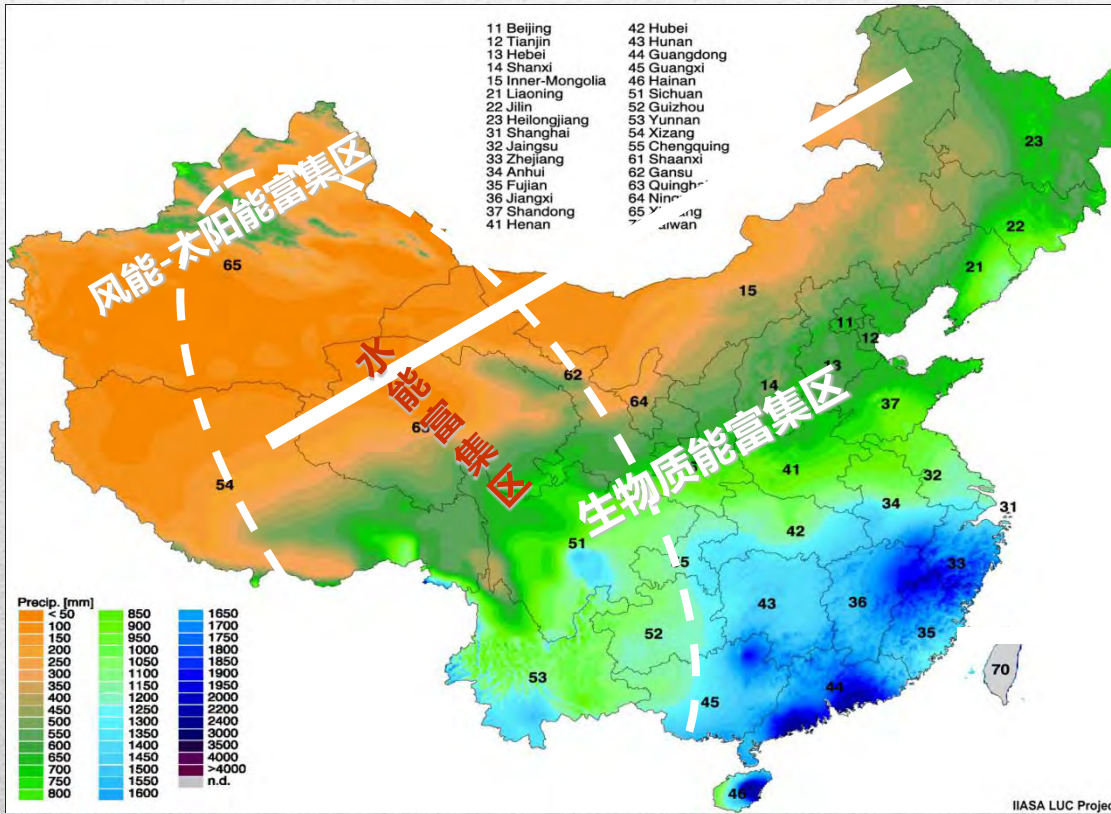
wind energy distribution of 10m in China



solar energy radiation distribution in China



hydroenergy sources distribution in China



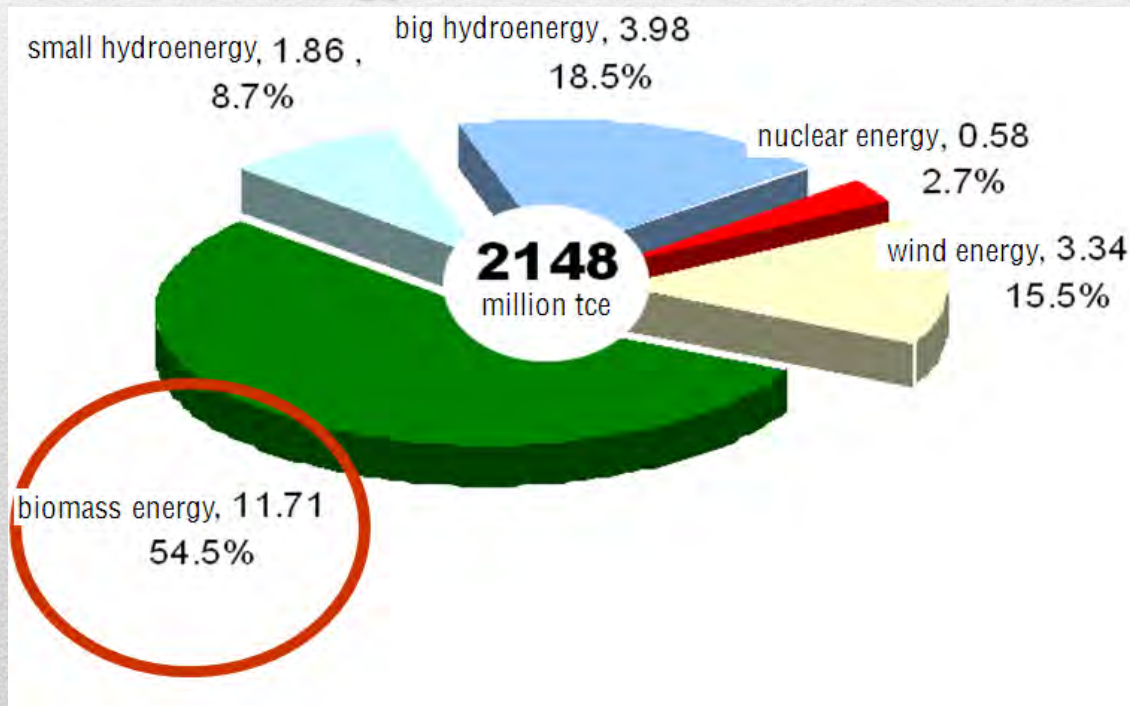
IIASA LUC Project

(Source : the Chinese Academy of Engineering)

The situation of renewable resources in China

Clean energy resources except solar energy in China is 2148 million tce, biomass is accounted for 54.5%.

Biomass resources is 2 times of hydroenergy, or 3.5 times of wind energy.



Biomass resources of agriculture utilize in Jilin

The crops straw

Returing to field 4.03%

Feed 10.5%

Industrial raw materials 1%

Open burning 23.2%

Fuel 61.54%

Energy efficiency is low,
the thermal efficiency is
only 15-20%

13.534 Million tons ,
Amount to 7.16 million
tonnes of coal equivalent

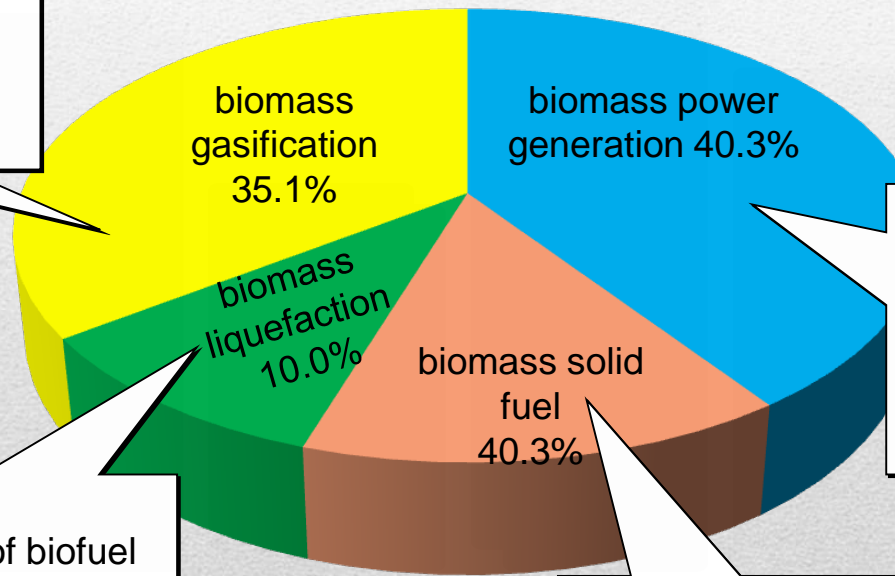
45.266 million tons for
energy utilization
Amount to 23.688 million
tonnes of coal equivalent

31.732 million tons
Amount to 16.528 million
tonnes of coal equivalent



Biomass Energy Development and Utilization by 2015

Annual output:
15.2 billion cubic meters
of biogas. Use 12million
tons (tec) per year .

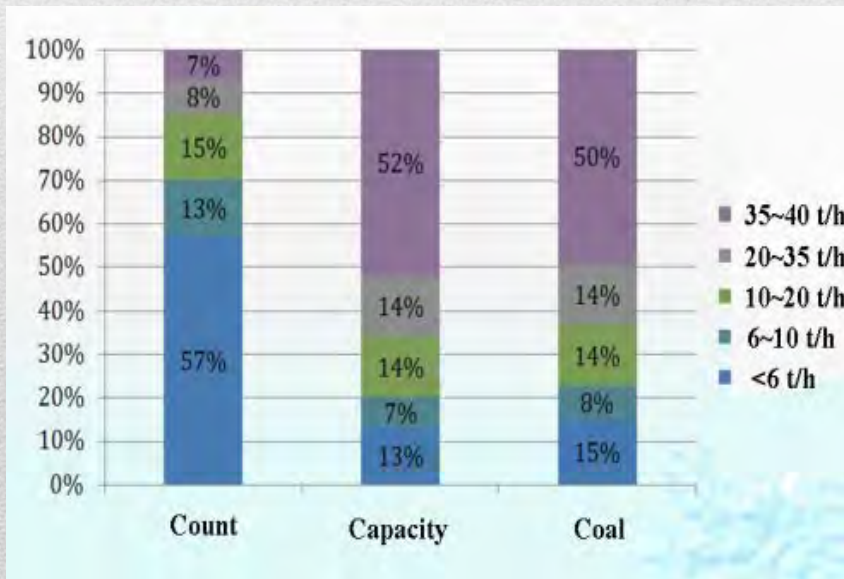
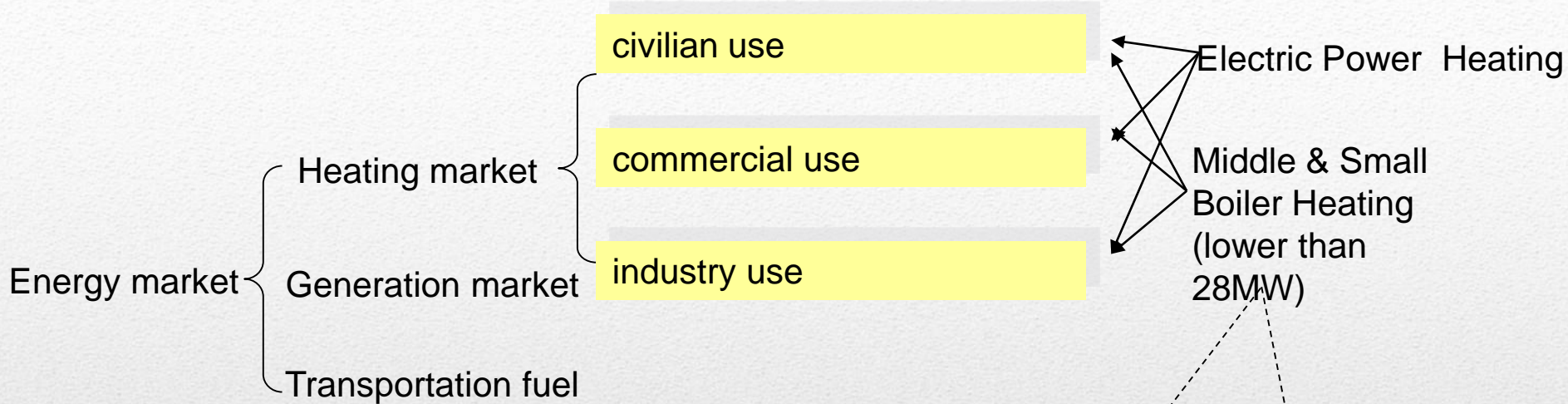


Use 13.76 million tons (tec)
The total installed
capacity :10 million
kilowatts ,
annual power generation 43
billion kilowatts.

Annual output:
2.3 million tons of biofuel
ethanol, 0.9 million tons of
biodiesel. Use 3.42million
tons (tec) per year.

Use 5 million tons (tec)
per year.

Market conditions for the bio-heating industry in China



- Boilers Amount: 600,000
- Fuel Amount: 500 million tce
- account for the total energy consumption:18%
- Account for the total pollutional gases :50%.
- Market Scale:400 billion Yuan.

Heating price of biomass solid fuel compared with conventional fuel

Fuel Band	Lower Calorific Value	Price		Boiler Efficiency	Cost Comparison
	Net Content				
Nature Gas	36 006.48 / (kJ·m ⁻³)	3.5yuan/ m ³	97.21yua n/GJ	0.92	1.48
Fuel Oil M100	41 868.00 / (kJ·kg ⁻¹)	4600yuan /t	109.87yu an/GJ	0.88	1.75
Diesel Fuel 0#	50 241.60 / (kJ·kg ⁻¹)	8600yuan /t	171.17yu an/GJ	0.92	2.61
Coal	20900.00 / (kJ·kg ⁻¹)	700yuan/t	33.5yuan/ GJ	0.65	0.72
Electricity	3 600.65 / (kJ·kWh ⁻¹)	0.7yuan/k Wh	194.41yu an/GJ	0.97	2.81
Wood pellets	17162.6 / (kJ·kg ⁻¹)	1100yuan /t	64.09yua n/GJ	0.9	1

Emission Standards of Boiler before 1 July, 2014 (GB13271-2001)

Boiler Classification		Zone of Application	Dust Emission (mg/m ³)	S02 Emission (mg/m ³)	NOX Emission (mg/m ³)
Coal-fired boiler	air-furnace	A	80	900	-
	others	A	80	900	400
Oil burning boiler	light diesel kerosene	A	80	500	400
	others	A	80	900	400
Gas fired boiler		Whole region	50	100	400

Emission Standards of Boiler after 1 July, 2014 (GB13271-2014)

Boiler Classification		Zone of Application	Dust Emission (mg/m ³)	S02 Emission (mg/m ³)	NOX Emission (mg/m ³)
Coal-fired boiler	air-furnace	A	50	300	300
	others	A	50	300	300
Oil burning boiler	light diesel kerosene	A	30	200	250
	others	A	30	200	250
Gas fired boiler		Whole region	20	50	200

Monitoring Report

综合测试数据表

序号	项目	符号	单位	标准限值	检测结果
1	烟气黑度	q	Nm ³	≤0.01	0.01
2	烟气量	Q	m ³	—	—
3	一氧化碳浓度	CO	mg/m ³	—	—
4	二氧化硫浓度	SO ₂	mg/m ³	≤5	5.0
5	氮氧化物浓度	NO _x	mg/m ³	≤191	191
6	烟尘浓度	PM ₁₀	mg/m ³	≤8.7	8.7
7	颗粒物浓度	PM _{2.5}	mg/m ³	—	—
8	氨气浓度	NH ₃	mg/m ³	—	—
9	硫化氢浓度	H ₂ S	mg/m ³	—	—
10	氟化氢浓度	HF	mg/m ³	—	—
11	氯化氢浓度	HCl	mg/m ³	—	—
12	氯气浓度	Cl ₂	mg/m ³	—	—
13	臭氧浓度	O ₃	mg/m ³	—	—

Dust : 8.7 mg/Nm³
SO₂ : ≤ 5 mg/Nm³
NO_x : 191 mg/Nm³

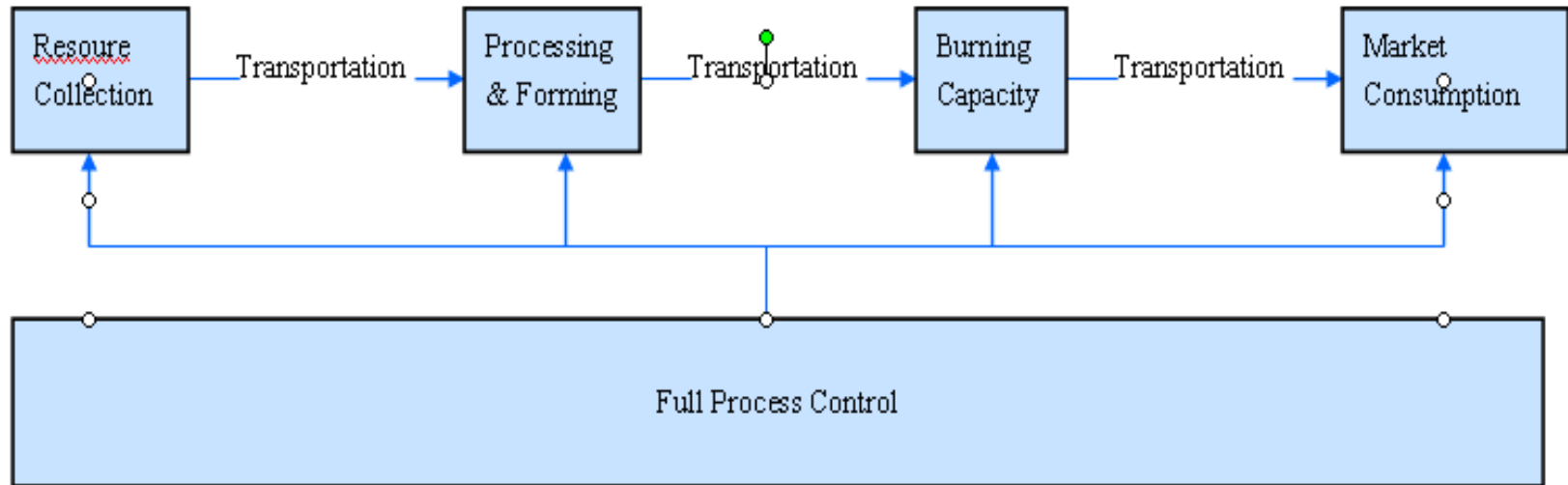
检测人: 郭... 审核人: 刘...
 检测日期: 2014年...月...日
 检测机构: 宏日新能源检测有限公司

The 13th five-year plan for biomass development ——[2016]291

Development goals: using total amount of **58** million tons biomass, and **30 million tons** of biomass pellets .

Development goals of <i>The 13th five-year plan for biomass</i>					
Use pattern	Scale		Annual Output		Replacing fossil fuels
	Amount	Unit	Amount	Unit	Mt /year
Power generation	15	MKW	90	Billion KW	26.60
Biogas			8	Billion KW	9.60
Biomass briquette fuel	30	Mt			15.00
Biology liquid fuel	6	Mt			6.80
Biofuel ethanol	4	Mt			3.80
Biodiesel	2	Mt			3.00
Total					58.00

Bio-heating industry in China



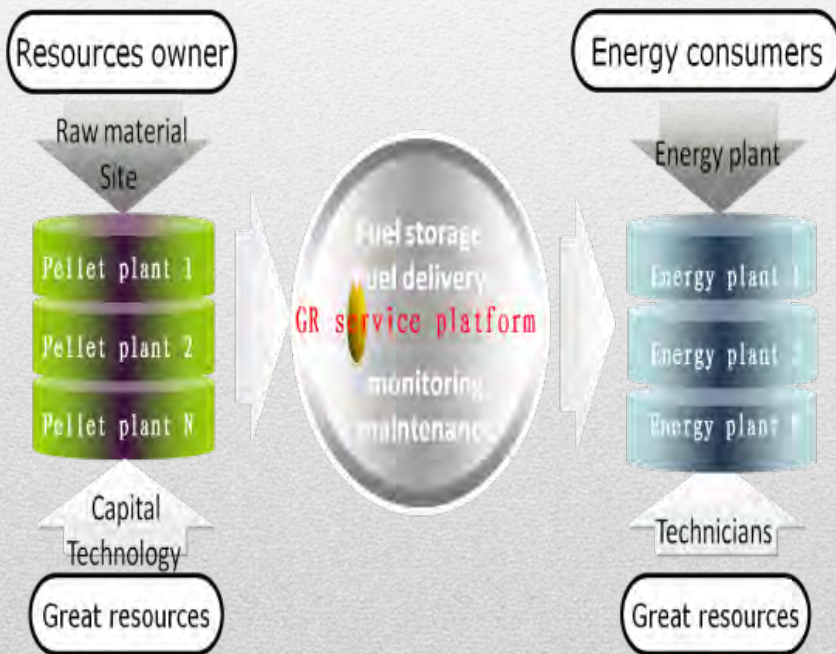
- Total production of pellets and briquettes reached 8 million tons in 2015.
- The companies engaged in this industry nearly 1000.
- The bio-heating industry in China is just in its embryonic stages.

Great Resources Co., Ltd

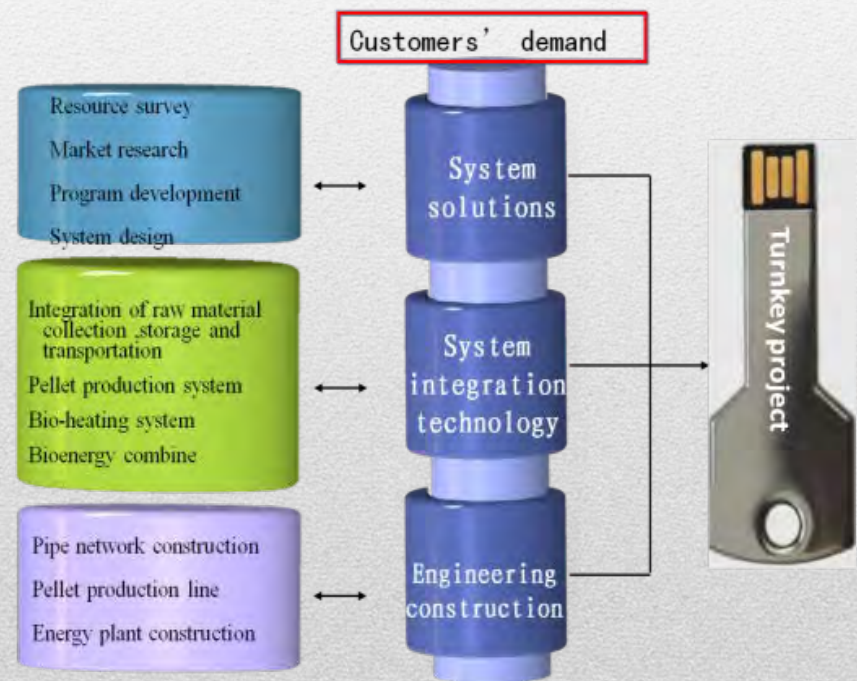
100,000 tons of pellets /year



Business Model 1 : BOO



Business Model 2 : EPC



Undertake the largest biomass heating projects in China:
The FAW reconstruction project for coal-fired boiler
convert to biomass in 2015 (80t, 6 units)





长春吉隆坡大酒店

供热面积: 42000 锅炉配置: $2 \times 1.4\text{MW} + 2 \times 2\text{t}$



长春忆江南利洋大酒店

供热面积: 20000 锅炉配置: $2 \times 1.4\text{MW}$



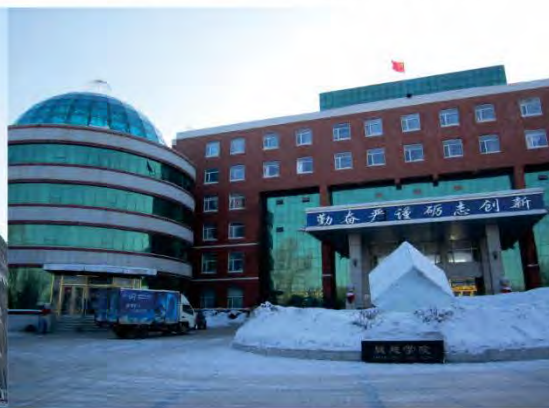
长春环球大酒店

供热面积: 21263 锅炉配置: $2 \times 1.4\text{MW}$



吉林大学第一附属医院

供热面积: 13729 锅炉配置: $1 \times 1.4\text{MW}$



长春城建学院

供热面积: 188000 锅炉配置: $3 \times 4.2\text{MW} + 1 \times 2\text{t}$



长春交通宾馆

供热面积: 15000 锅炉配置: $1 \times 1.4\text{MW}$



天合富奥（长春）有限公司

供热面积：37997 锅炉配置：2×2.8MW+1×1t



山东威海佑成纤维公司

蒸汽供热：10000t/a 锅炉配置：1×4t



山东威海吾星纤维有限公司

蒸汽供热：10000t/a 锅炉配置：1×4t



乳山工业园

15万吨饱和蒸汽 锅炉配置：3×10t



长春兴隆综合保税区

供热面积：400万平方米 锅炉配置：3×80t



北京大东苜蓿园示范基地

供热面积：150000 锅炉配置：2×7MW

Conclusion

- We have a large amount of biomass resources (as much as 7.37×10^8 t) for bio-heating.
- The space of biomass heating market as high as 600 billion yuan, especially special energy demand heating market , district heating market & industry heating market will be the main consumer of biomass heating.
- From heat-only to CHP heat production gradually in China.

Thank you !

Kelvin Hong

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Keep Our Earth More Healthy !

