



# Market Potential and Case Study of Biomass Heating in China

China National Renewable Energy Centre

Dou Kejun

2018.9.7

# OUTLINE

Heating Status

Market Potential

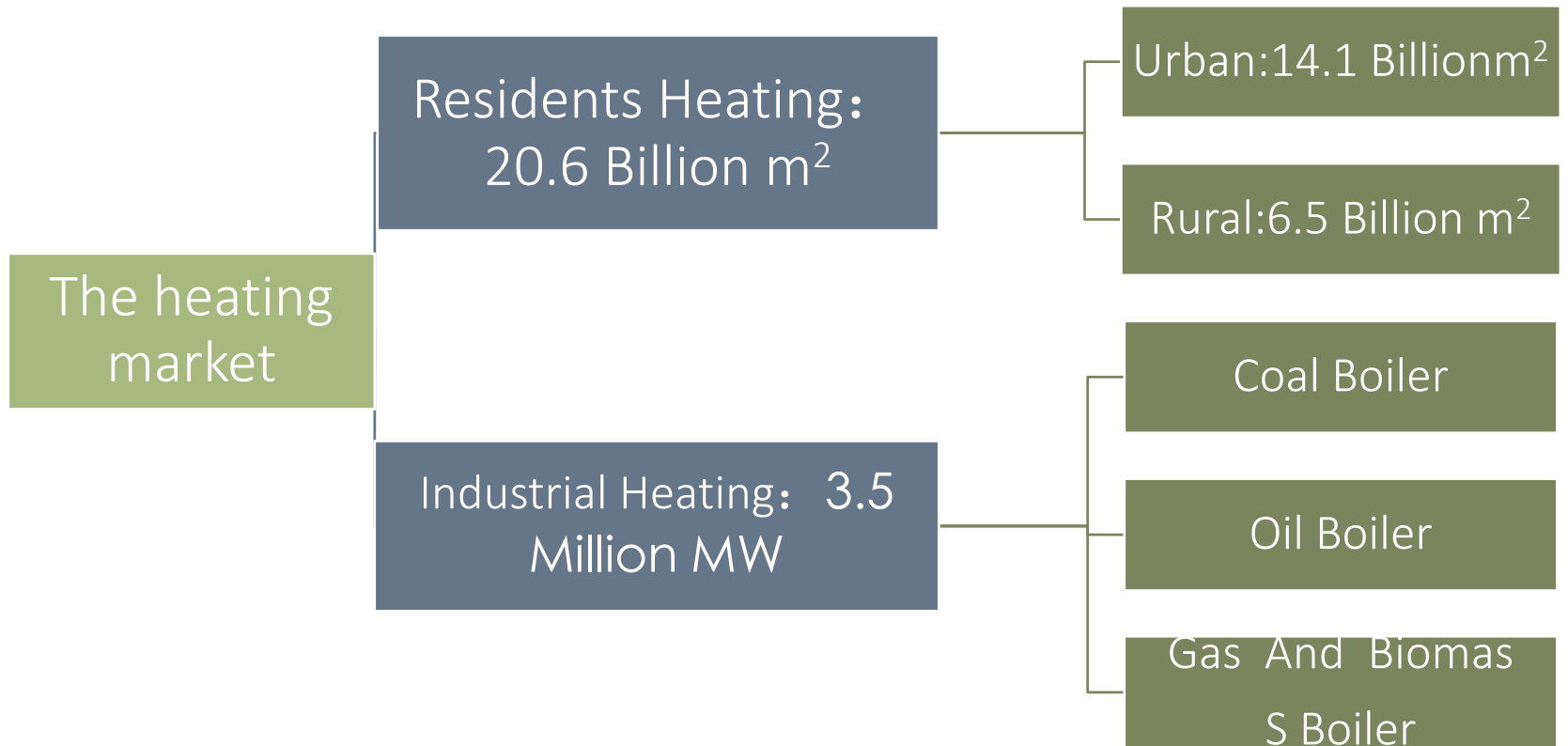
Economical Analysis

Case Study

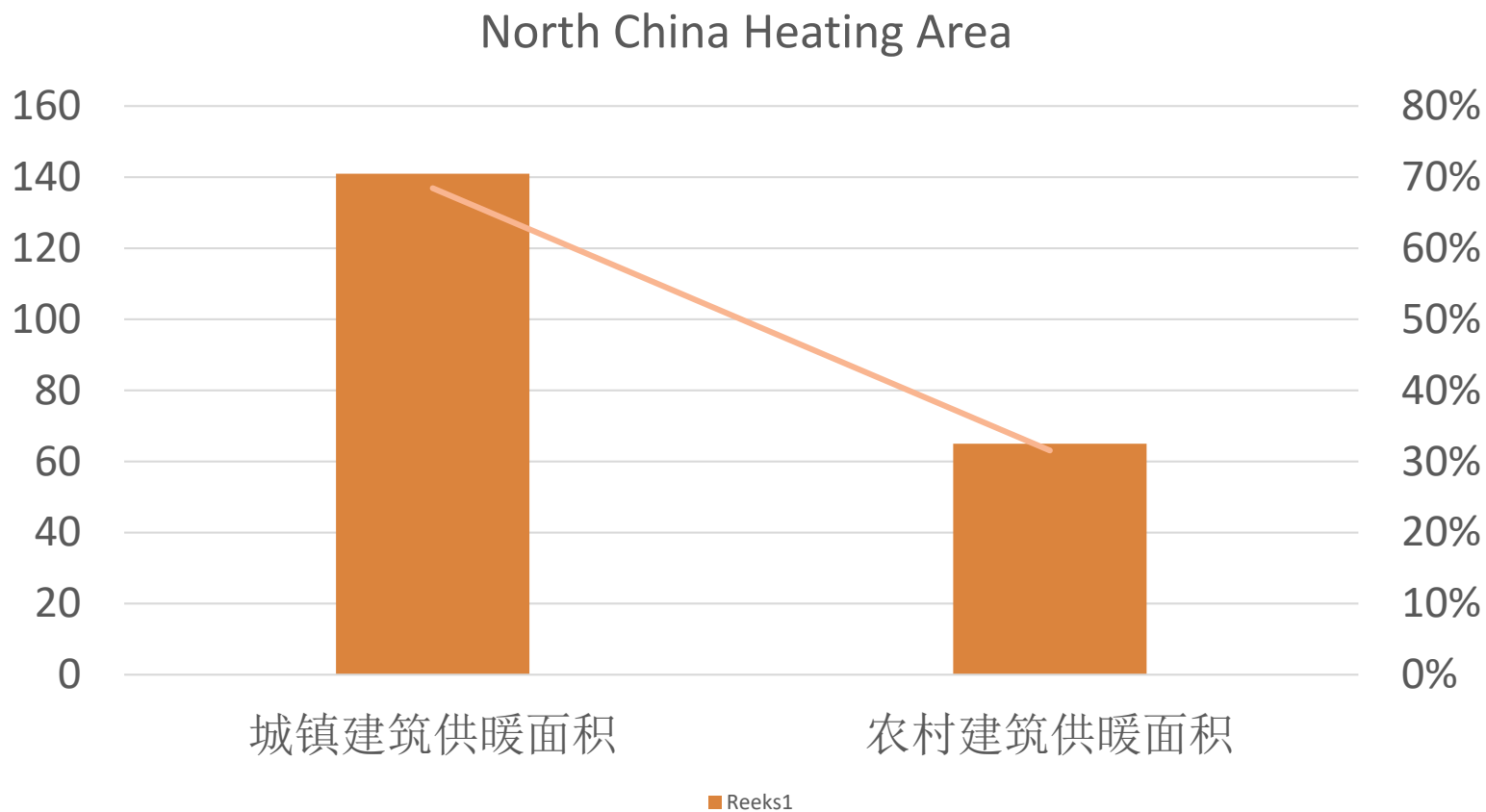
Summary

# I. Heating Status

## 1、Heating Market Overview



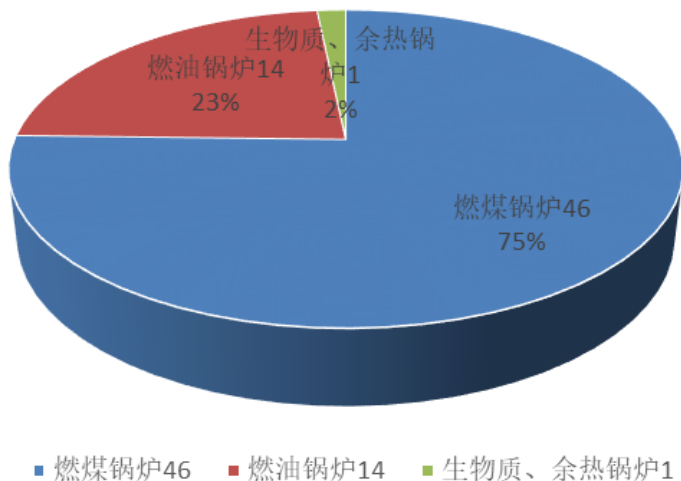
## 2、Residents Heating



- The area heated by coal :83%, gas、Electricity 、geothermal;、bioamass、 solar、 waste heat:17%.
- Coal consumption:4 00 Million TCE/Y, Half of the coal is used in the countryside.
- Biomass for heating :200 Million m<sup>2</sup>.

### 3、 Industrial Heating

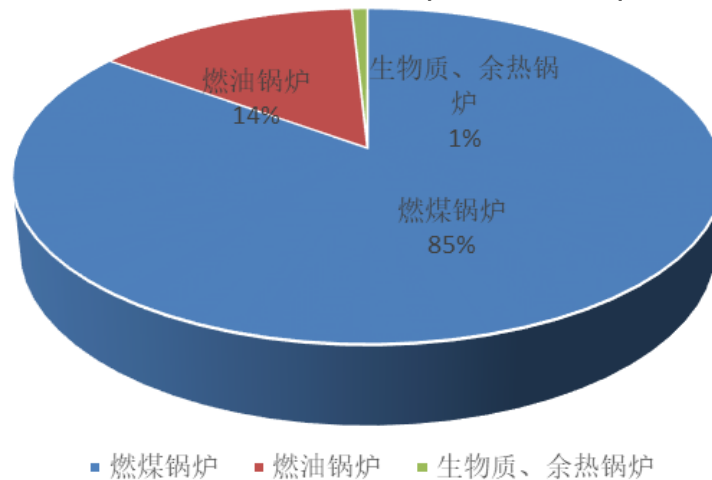
工业锅炉数量占比  
Number of industrial boilers



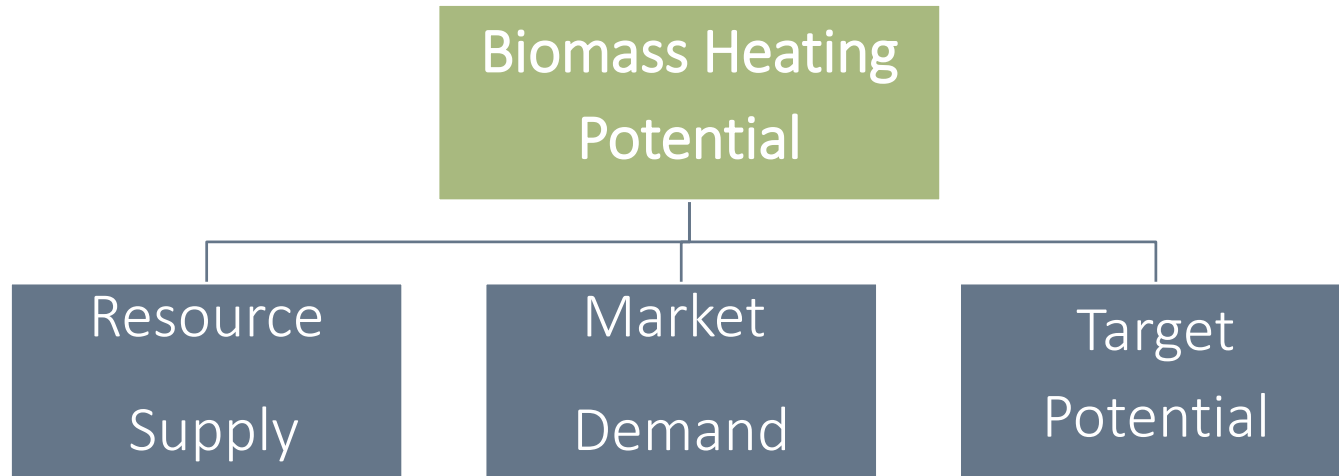
- Total capacity: 3.5 Million MW
- Average capacity: 3.8 ton vapor/h, under 2 ton vapor/h accounted 66.5%

Alternative potential of industrial boiler

工业锅炉规模占比分布  
The share of industry boiler capacity



## II. Biomass Heating Potential



单位: Million TCE

Category and time	2020	2030
Available	264	288
Residue of agriculture and forestry	228	228
Straw	175	175
Residue of agrotechny	35	35
Forestry waste	18	18
MSW	36	60
Biomass heating potential	130	140

### III. Comparison of Heating Economy

Comparison of the economic efficiency of various heating technologies

Type of fuel	Net calorific value	Price of fuel	Efficiency of boiler	Heating cost
Nature gas	36000 (kJ·m <sup>-3</sup> )	3.5 RMB/m <sup>3</sup>	92%	148 (yuan/ GJ)
Oil	41868 (kJ·kg <sup>-1</sup> )	4600 RMB/ton	88%	175 (yuan GJ)
Coal	20900 (kJ·kg <sup>-1</sup> )	580 RMB/ton	65%	59 (yuan / GJ)
Electricity	3600 (kJ·kWh <sup>-1</sup> )	0.7 RMB/kWh	97%	281 (yuan/ GJ)
Pellets	17500 (kJ·kg <sup>-1</sup> )	900 RMB/ton	85%	66.4 (yuan/ GJ)
Biomass CHP	13230 (kJ·kg <sup>-1</sup> )	340 RMB/ton	47%	51.4 (yuan/ GJ)
Biomass gasify	5040 (kJ·kg <sup>-1</sup> )	300 RMB/ton	85%	58 (yuan/ GJ)

# IV. Case Study

## 1、Residents Heating-Biomass CHP

- The project covered a total heating network area of **2.55 million** square meters
- Supplied heating area : 1.85 million** square meters in winter.
- The project has generated a total of **730 GWh** power, fed a total 620 GWh power into the power grid, and supplied a total of **2.7 million GJ** heat since its operation. Annual power generation of 188 GWh.

**Total investment : 420 million RMB**

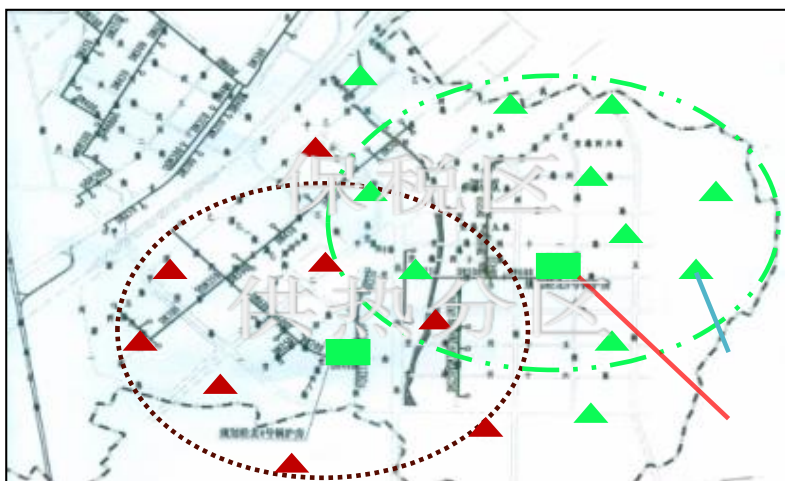
The average system thermal efficiency increases from 24% to 45%, but the rate of return is -9.8%





## 2、 Industrial District Heating

### Demonstration Project in Changchun



#### District Heating in Winter.

Heating area: 6,000,000m<sup>2</sup>

Boiler size: 3 × 56MW + 2 × 42MW

Boiler plant area: 50799m<sup>2</sup>

Pellets demand: 120000~150000t

### District Heating Project in Jilin

Pellet from straw (30,000 t) -Heat supply operation and ash utilization (3,000 t)

#### District Heating

Heating area: 1,000,000m<sup>2</sup>

The total investment: 8500万元 (85 million)

Boiler Capacity: 3 × 29MW+1 × 14MW



## V. Summary

Seize the opportunity

Big Market Potential

Prioritizing Reasonable Development

Improve The Industrial System

# Thank you !

- For further information about the China National Renewable Energy Centre then please visit: [www.cnrec.org.cn](http://www.cnrec.org.cn)
- Email: [doukejun@cnrec.org.cn](mailto:doukejun@cnrec.org.cn) or [dkj81@126.com](mailto:dkj81@126.com)