



Municipal Organic Waste - Methane and Resource Recovery in China

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Content

I. Municipal Solid Waste in China

II. Methane Capture and Use in China

III. Organic Waste Management in China: Policy Development

SOLID WASTE IN CHINA: Production and Characters

- Total municipal solid waste increases to **180 million tons in 2015**
 - High water content: **60-70%**
 - High share of kitchen waste: **60-70%**
 - Mostly **Combined** collection
 - Many **plastic bags** use
- MSW disposal in China: mainly by landfill and about **1/3** incinerated



SOLID WASTE IN CHINA: Collection and Sorting Challenges



Waste sorting is significant, but difficult:

- Promoting household sorting – low efficient and needs improvement
- Machine sorting failed to working in previous practices in China

SOLID WASTE IN CHINA: New Innovation for Waste Sorting



Super high pressure sorting system piloted in Shenzhen: **5 ton/hour**



METHANE CAPTURE FROM LANDFILL: Shenzhen Xiaping



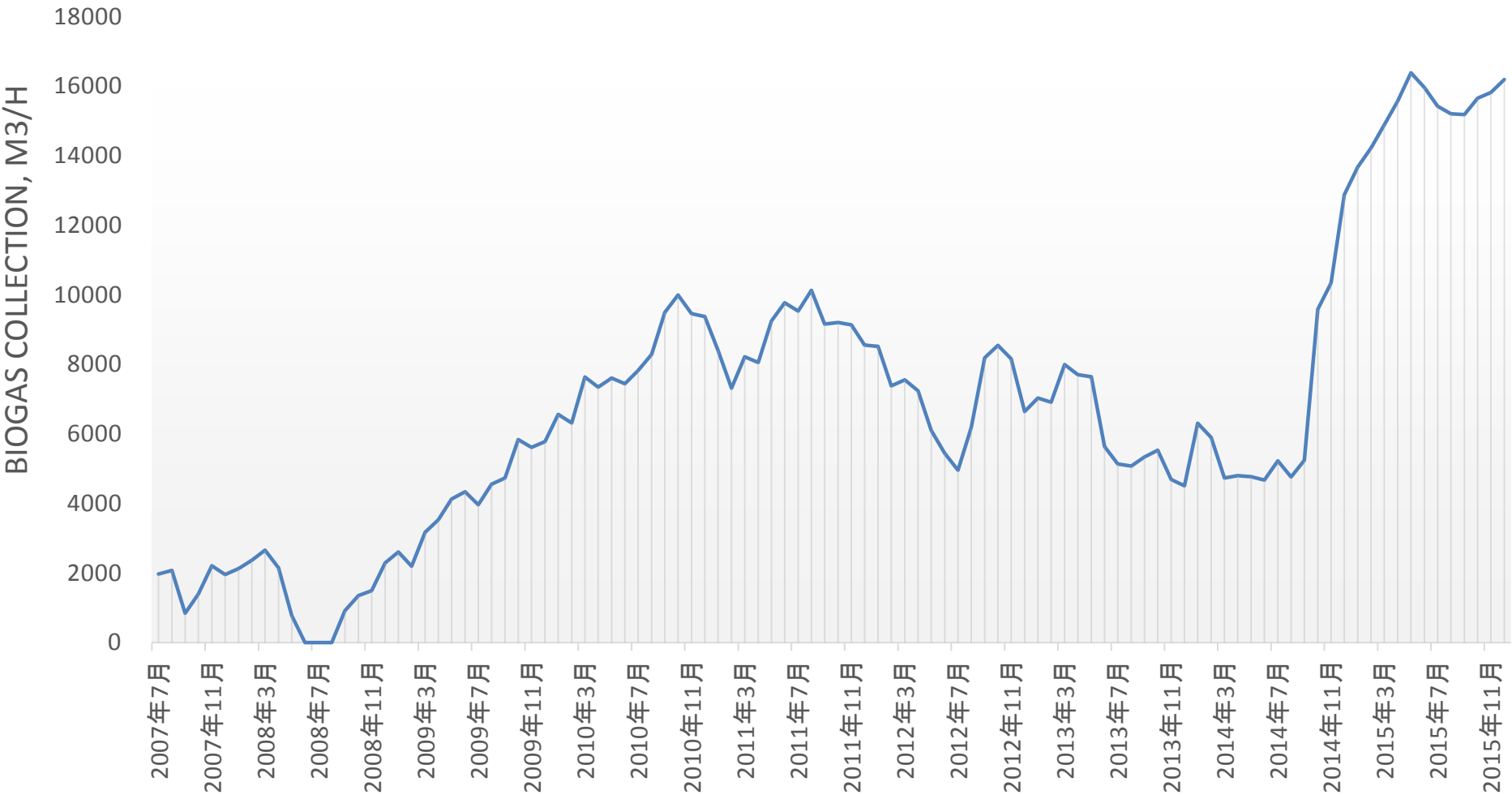
China has made big progress in capturing methane from landfill
Shenzhen Xiaping – the first large scale landfill project in China:

- Built in 1992
- Total capacity at **46.93 million ton** and disposing **4000 ton MSW per day**

METHANE CAPTURE FROM LANDFILL: Shenzhen Xiaping



METHANE CAPTURE FROM LANDFILL: Shenzhen Xiaping



KITCHEN WASTE FROM RESTAURANT: 100 Pilot Projects

Kitchen waste – illegal collection (waste oil) has public health problem

- Production: over 30 million tons per year
- National piloting projects: 100 projects in 100 cities – seeking the best solutions, focused on anaerobic digestion and methane use

No. of Piloting	Aerobic	Anaerobic Digestion	Feeding
First round (33)	6	23	4
Second round (16)	1	12	3
Third round (17)	1	16	—
Fourth round (17)	1	16	—
Fifth round (17)	1	16	—
Total	10	83	7

SLUDGE DIGESTION AND METHANE CAPTURE:

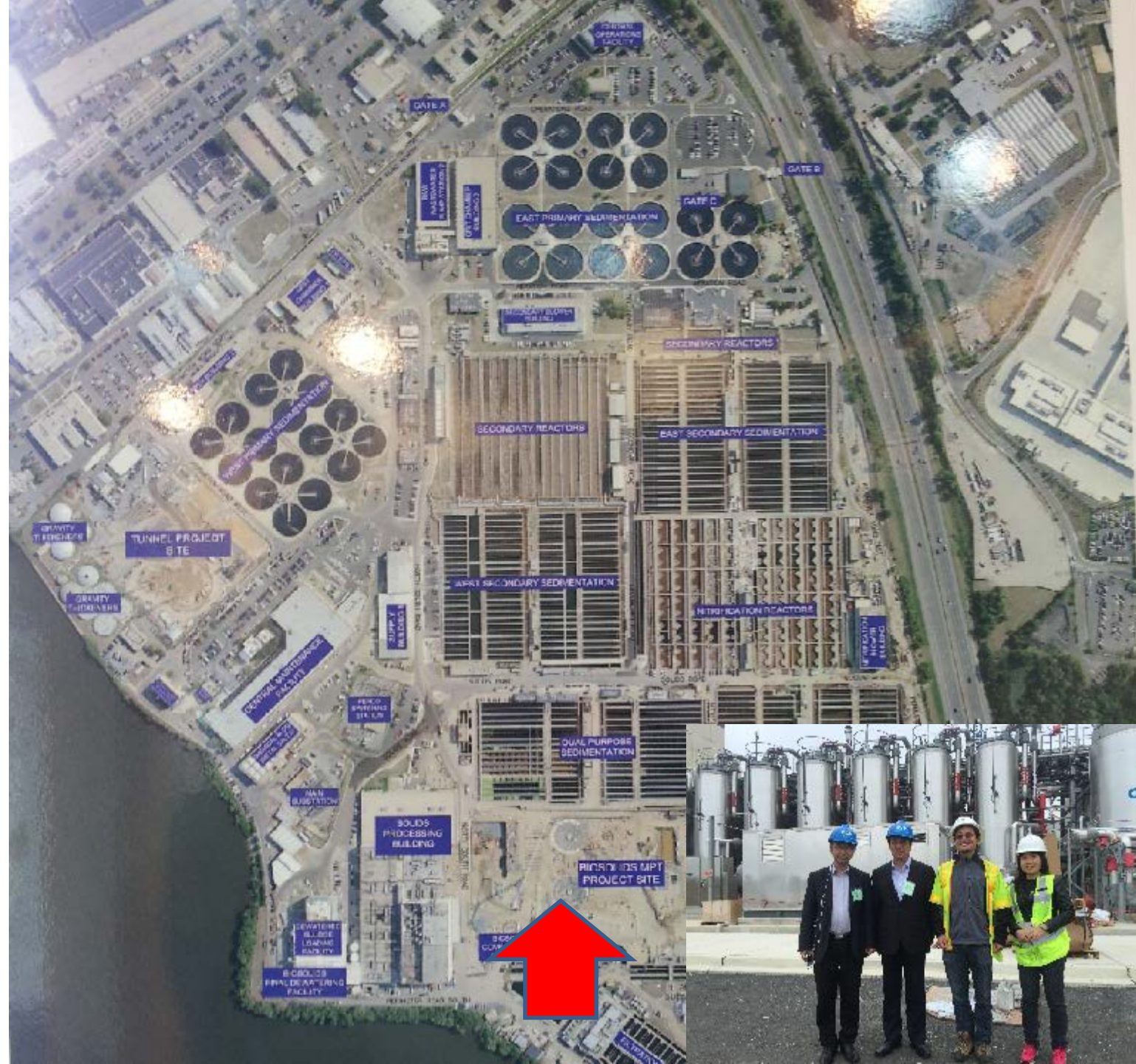
Changsha Case



- Method: thermal hydrolysis + anaerobic digestion + dewatering & drying
- Capacity: 500 tons per day (dry solid 100 tons per day)
- Products:
 - Biogas 30,000 m³/d (68% CH₄)
 - Biochar 120 t/d (<40% water content);

Blue plain in Washington DC

Change three sludge disposal system in 2014
dry solid: 400 tons per day



SLUDGE DIGESTION: Beijing Case

- Sludge production and capacity : 6128 ton per day in total (80% water content) – 5 sludge disposal centers
- Method: thermal hydrolysis + anaerobic digestion + plate-frame dewatering + land application for greening
- Products:
 - Biogas production capacity: 300,000 m³ per day
 - Electricity production capacity by biogas: 396,000 kWh per day

SLUDGE DIGESTION: Beijing Case



Beijing Xiaohongmen
Project under
Construction
(180t ds/d)



CO-DIGESTED SLUDGE AND KITCHEN WASTE:

Xiangyang Case



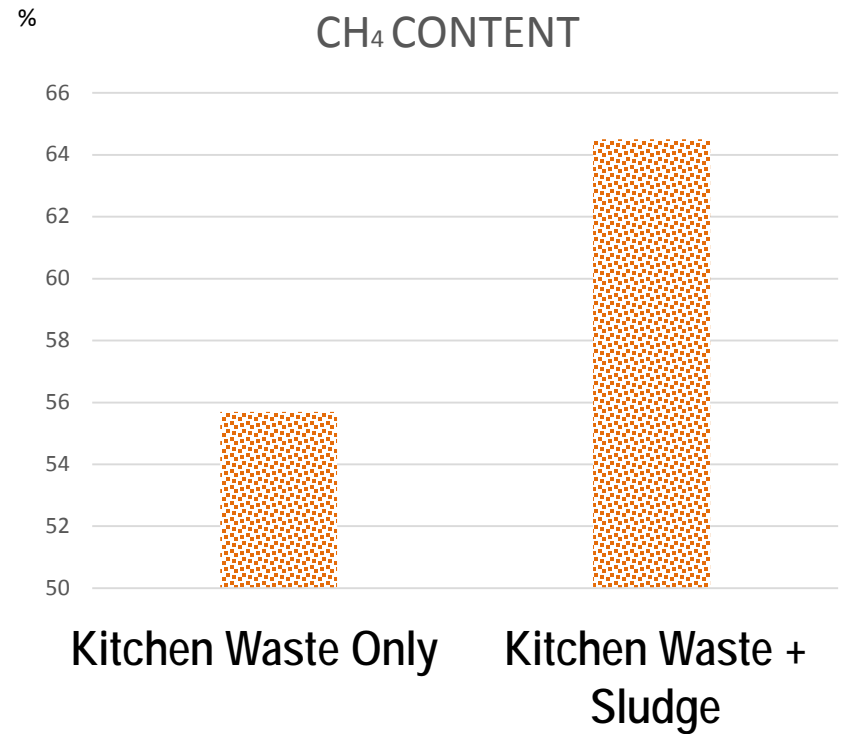
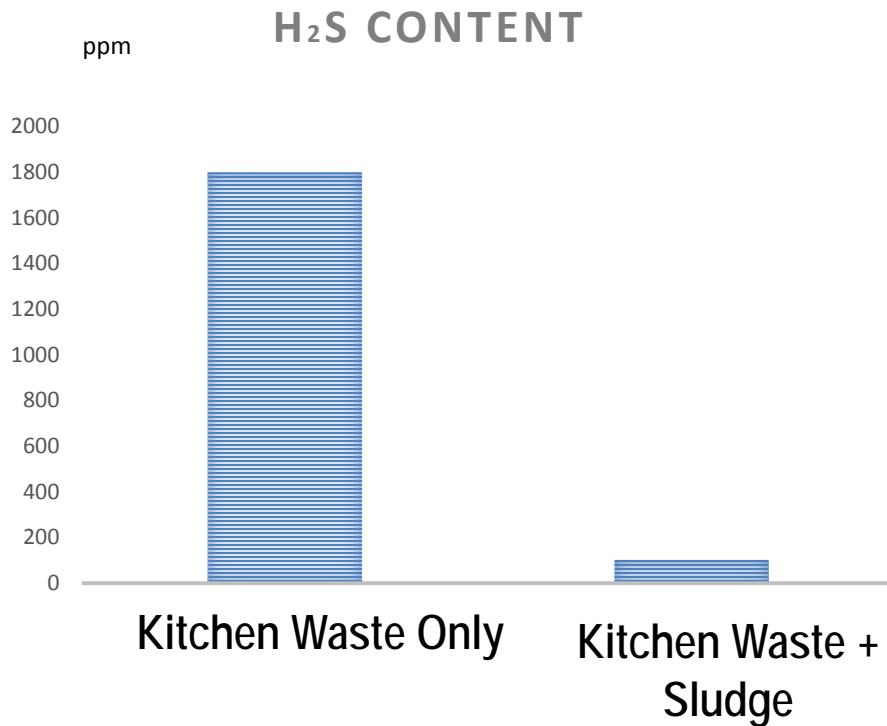
- Method: thermal hydrolysis + anaerobic digestion + greening
- Capacity: 300 ton per day (mainly for sludge, 30% for kitchen waste)
- Products:
 - Biogas production: 6,000 m³/d
 - Biochar 60 ton per day (<40% water content);

CO-DIGESTED KITCHEN WASTE AND SLUDGE: Chongqing Case



- Capacity: 1700 ton per day (primary for kitchen waste, about 20% for sludge)
- Products:
 - Biodiesel
 - Electricity
 - CNG

CO-DIGESTED KITCHEN WASTE AND SLUDGE: Chongqing Case



Co-digestion has good results:

- H₂S content decreased from about 1800ppm to 100ppm
- CH₄ increased by 15%

POLICY FOR ORGANIC WASTE: Green, Recycle, Low Carbon



TREES by Digested organic waste



POLICY FOR ORGANIC WASTE: Policy Development

2016 Government Report

- Highlight the importance of developing bio-energy

Climate Change Policies

- Gov. pays attention to non-CO2 carbon reduction
- Law for carbon trading in process

Financial and Economic Policies

- Central government invests more \$
- Encourage PPP

International cooperation

- Non-CO2 carbon trading
- Methods for calculating non-CO2 emission
- Best practices

人人都是排放源

Everyone is the pollution source



个个奉献新能源

Everyone can contribute to new energy

化污染为资源

Transferring pollutants to resources



从黑色到绿色

From black to **GREEN**

谢谢！

Thank You!