Urban Waste Revolution:

Turning China's Sludge & Garbage Mountains into Low-Carbon Solutions

September 20, 2018

Wilson Center

China Environment Forum

Fighting Climate Change: Story of China's Low-carbon Cities

Meian Chen, Ph.D.
innovative Green Development Program (iGDP)

Wilson Center| Washington, D.C. | September 20, 2018

iGDP

About iGDP

- An independent Chinese think tank working on:
  - Green and Low-Carbon Development Planning
  - Green Economy
  - International Cooperation on Climate Change

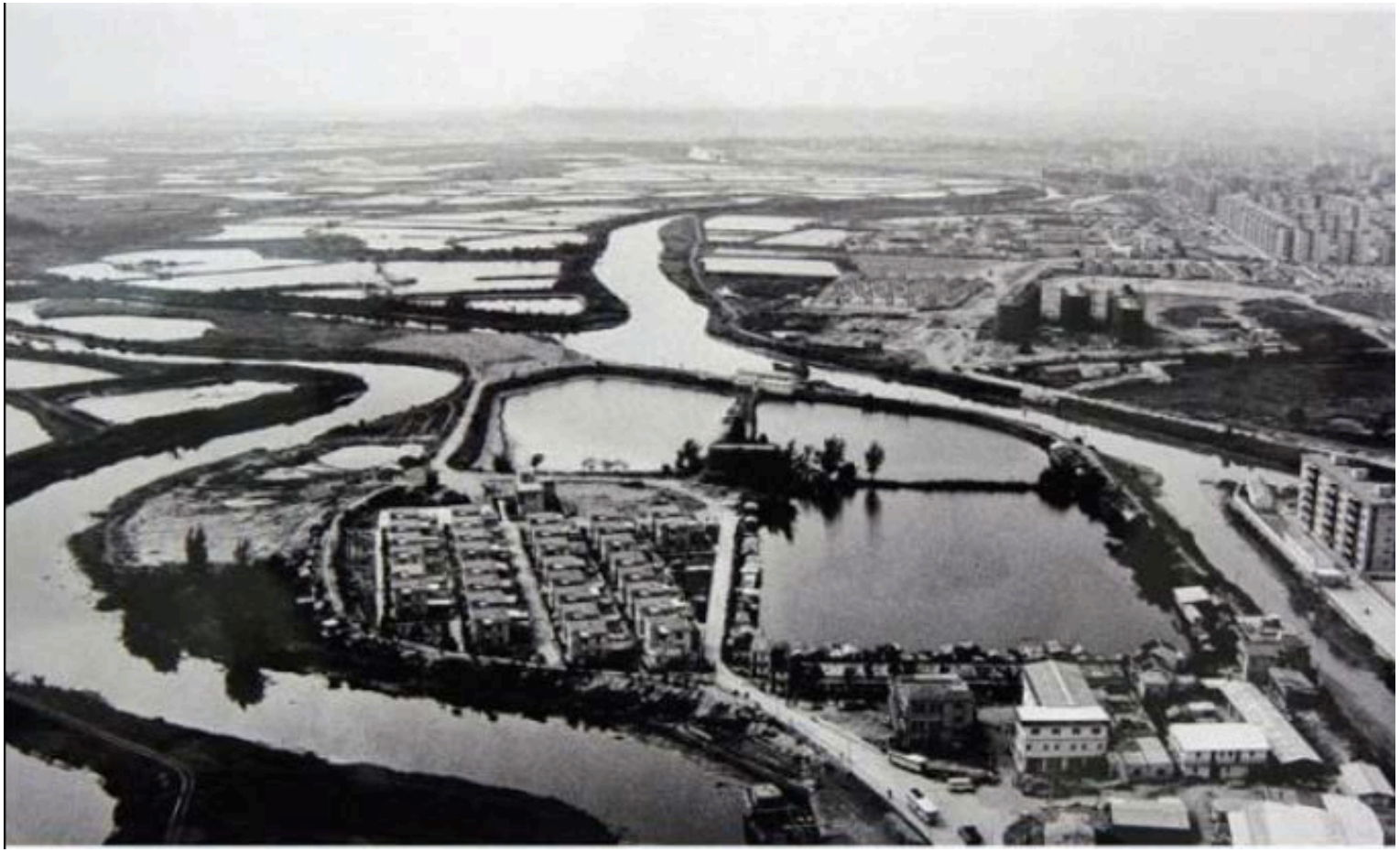
- The implementation organization of the Green Low-Carbon Development Think Tank Partnership (GDTP):
  - A network of 45 local research institutions that have been providing technical support for subnational green low-carbon development

- Please visit us at new.igdp.cn.

iGDP

Story of a low-carbon city: Shenzhen

1980s



Source: china.org.cn

Story of a low-carbon city: Shenzhen

2018

Source: china.org.cn

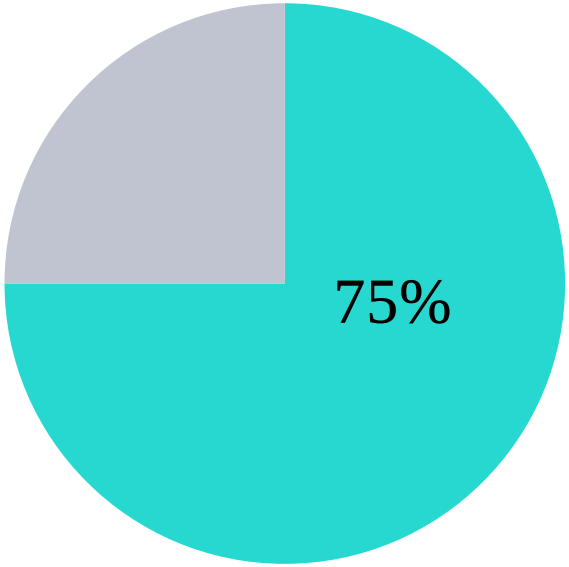
Story of a low-carbon city: Shenzhen

CEEX
CHINA EMISSIONS EXCHANGE
深圳排放权交易所

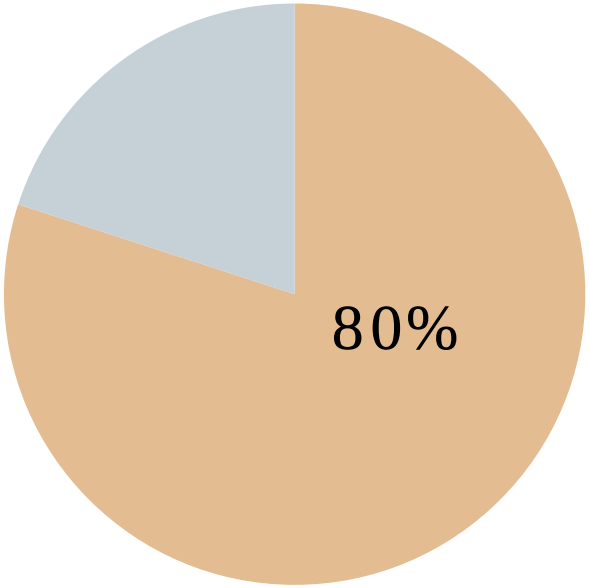
SILCC
Shenzhen International Forum
Low Carbon City

Why Cities?

GDP



Energy Consumption



Source: Belfer Center for Science and International Affairs

Overview of China's Low-carbon Cities

87 low-carbon pilots

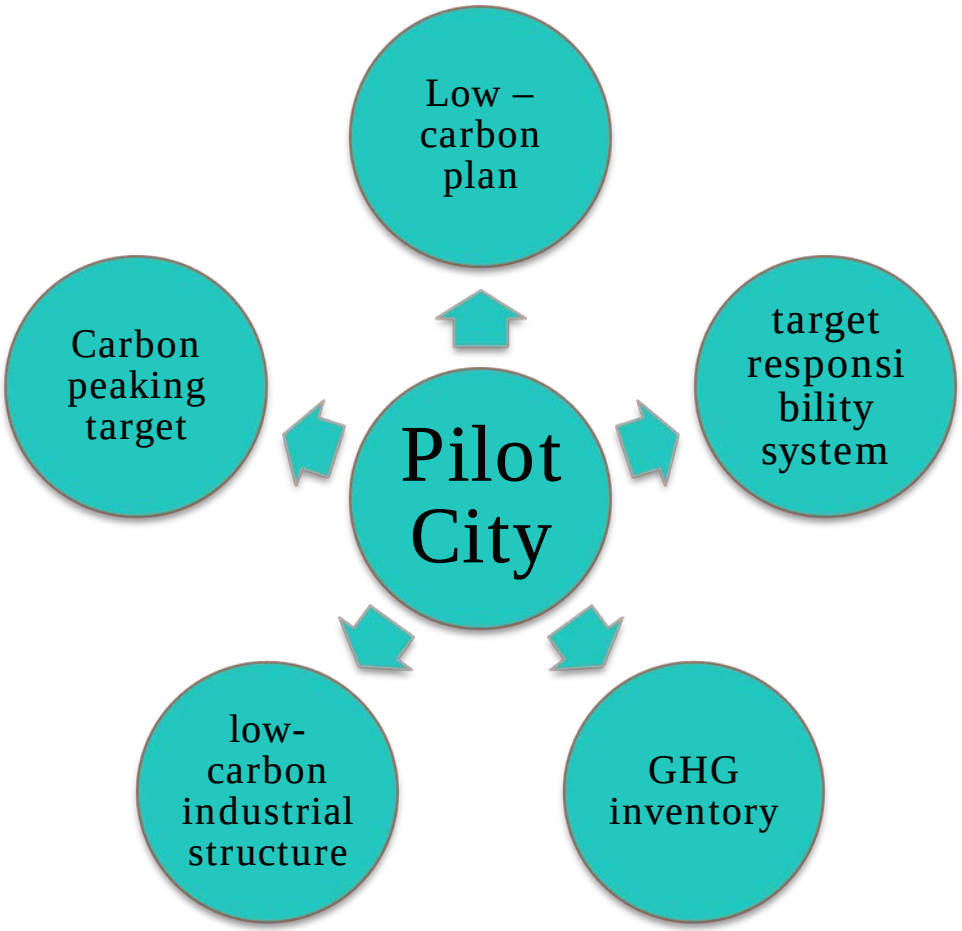
- 6 provinces
- 81 cities

31% population

47% GDP

14.5% Land area

Low-carbon Pilot Cities Requirements



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7 Priority Areas

Shenzhen

Area (10000 hectares)	Resident population (10000)	GDP (hundred million yuan)	Peaking year
19.96	1137.89	17502.99	2022

Transportation

- Shenzhen Implementation Plan on the Construction of Green and Low Carbon Transportation City (2013-2020)
- Shenzhen Five-Year Implementation Plan on World-class Public Transportation City
- Shenzhen Transportation Plan on Walking and Bicycling
- Shenzhen Special Plan on Green Road
- Shenzhen Action Plan on Green Low-carbon Harbor Construction 2016-2020
- Shenzhen 13th Five-Year Plan on Comprehensive Transportation

Buildings | Carbon Sink | Waste Management | Institutional Capacity | City Planning | Industry | Energy

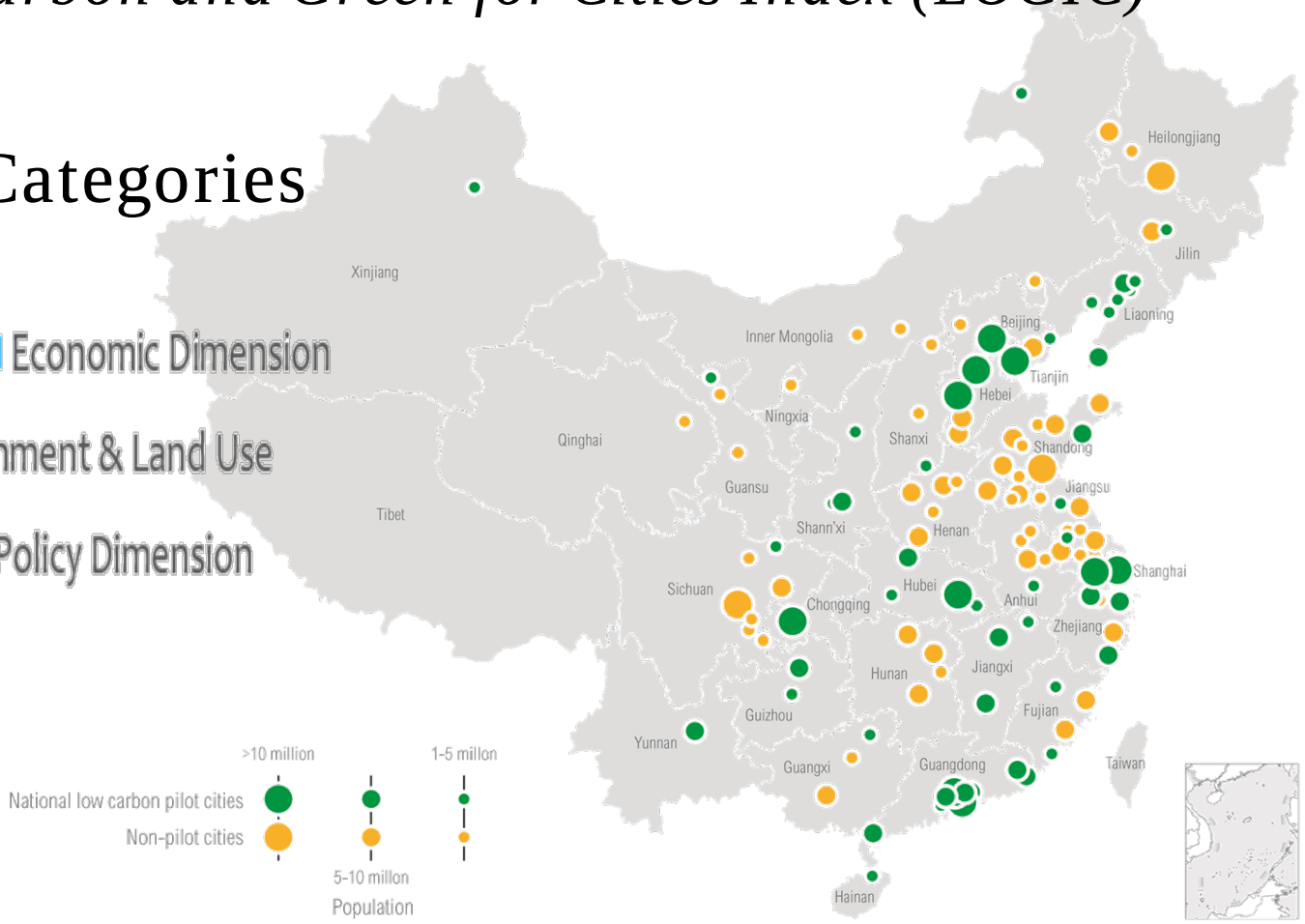
Source: http://www.cepm.igdp.cn/

How to Measure Progress?

China Low-Carbon and Green for Cities Index (LOGIC)

7 Index Categories

- Energy & Power
- Economic Dimension
- Industry
- Environment & Land Use
- Transportation
- Policy Dimension
- Buildings

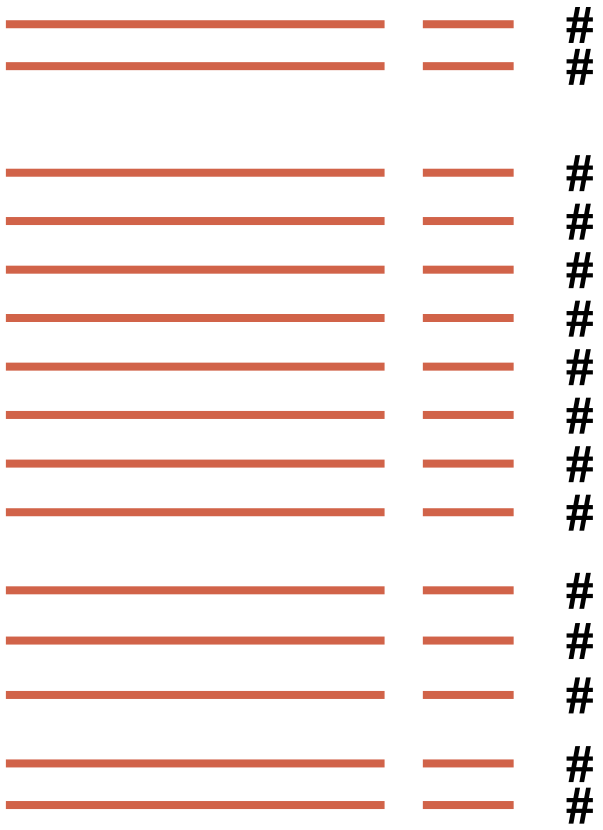


Measuring Progress

7 Categories / Sub-Categories

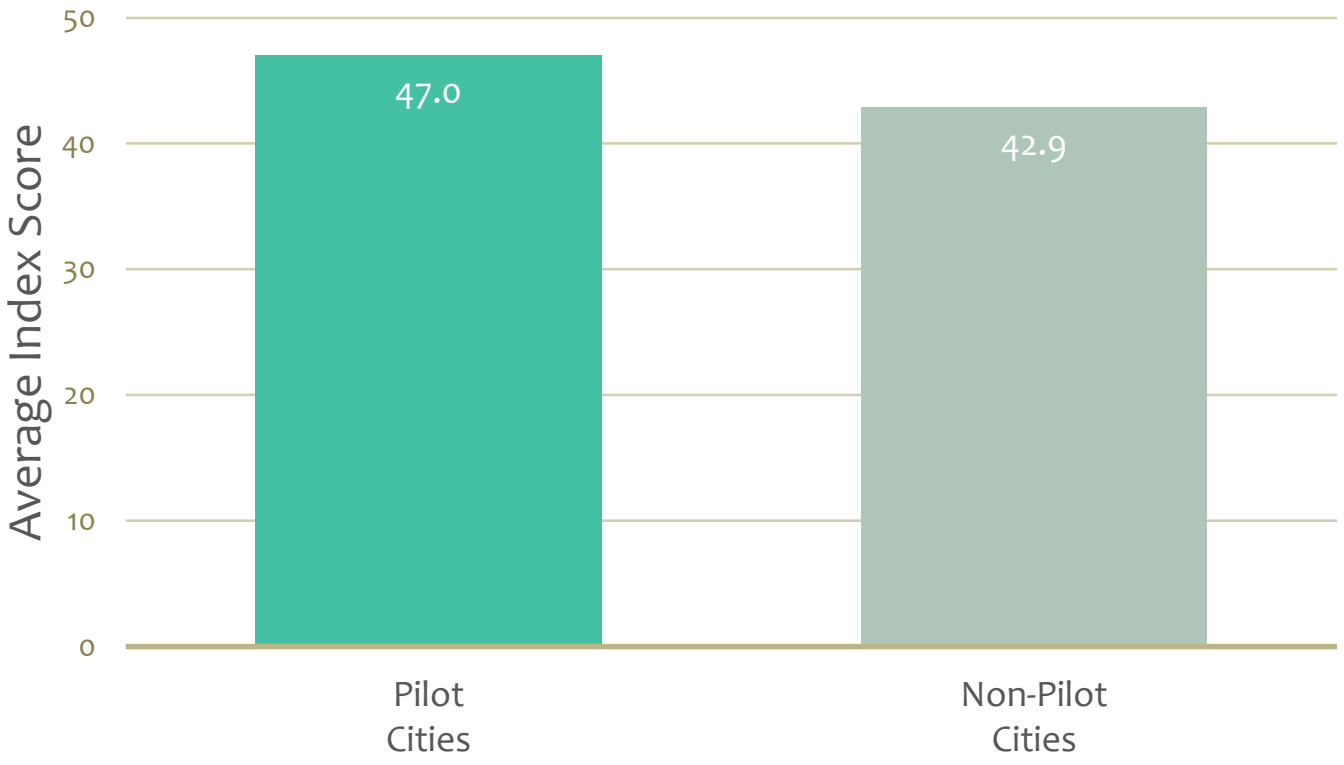
	Weight
Economy	20%
Energy & Carbon • Energy &Power • Industry • Building • Transportation	50%
Environment & Land Use	20%
Policy & Outreach	10%

23 Indicators



$\sum = 100\%$

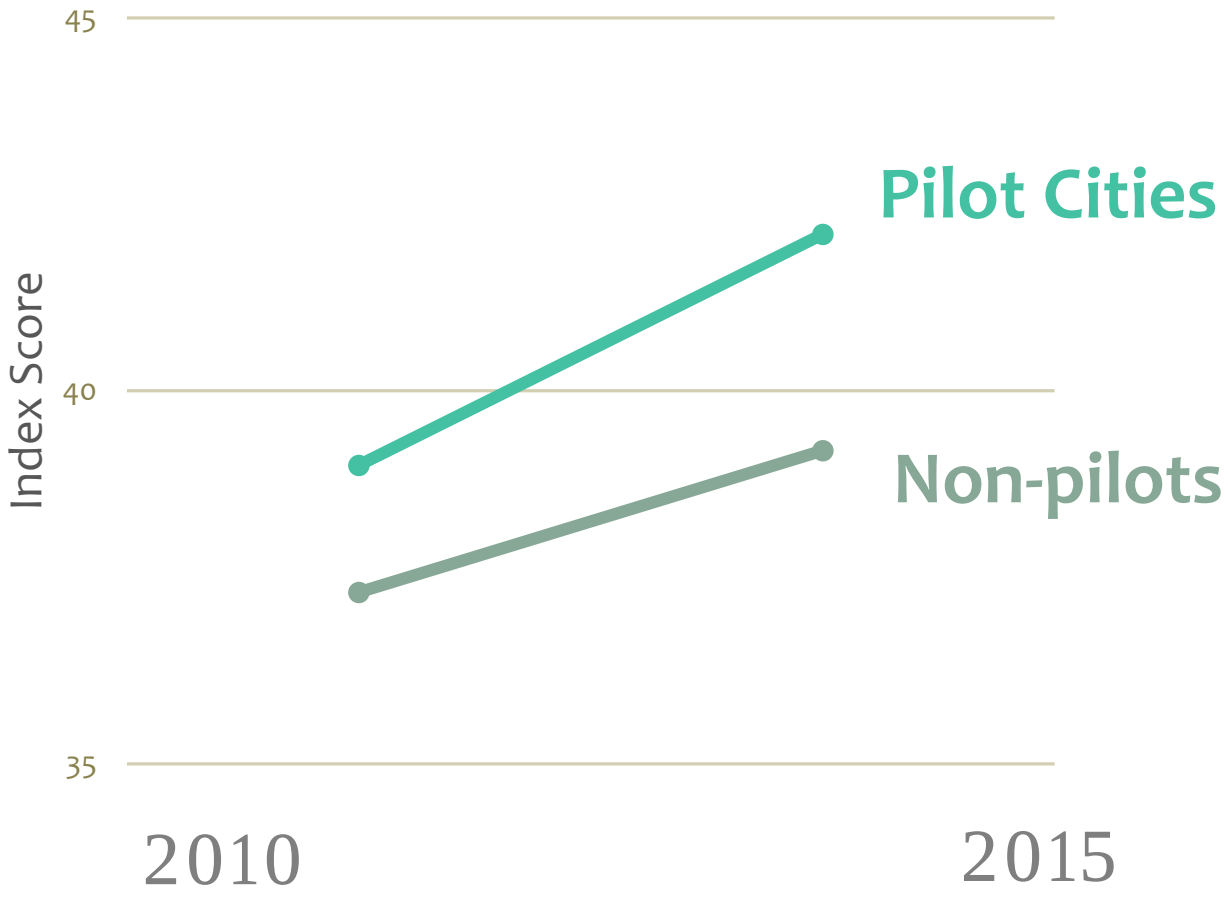
Pilot Cities Have Higher Average Scores.....



2015

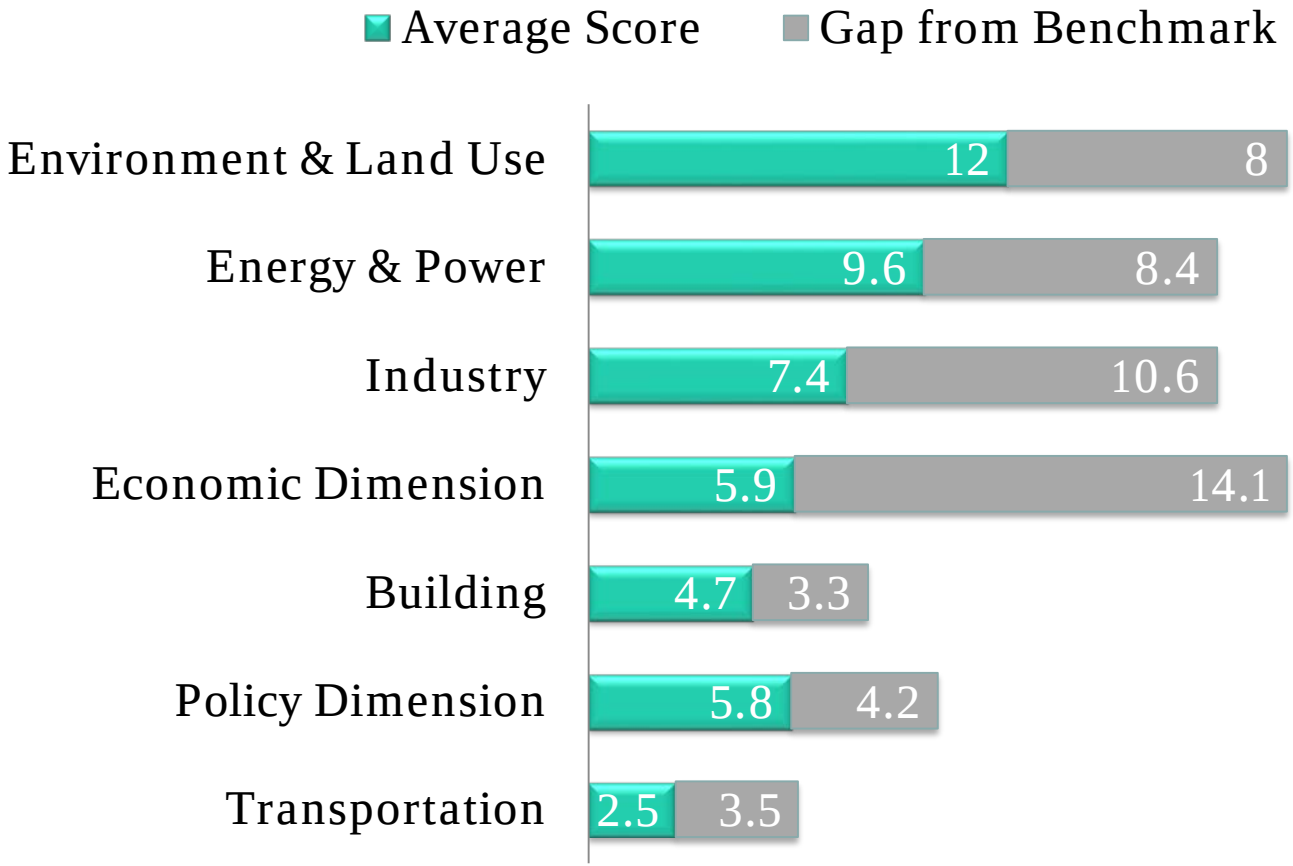
Source: http://logic.igdp.cn/

..... And Are Improving Faster

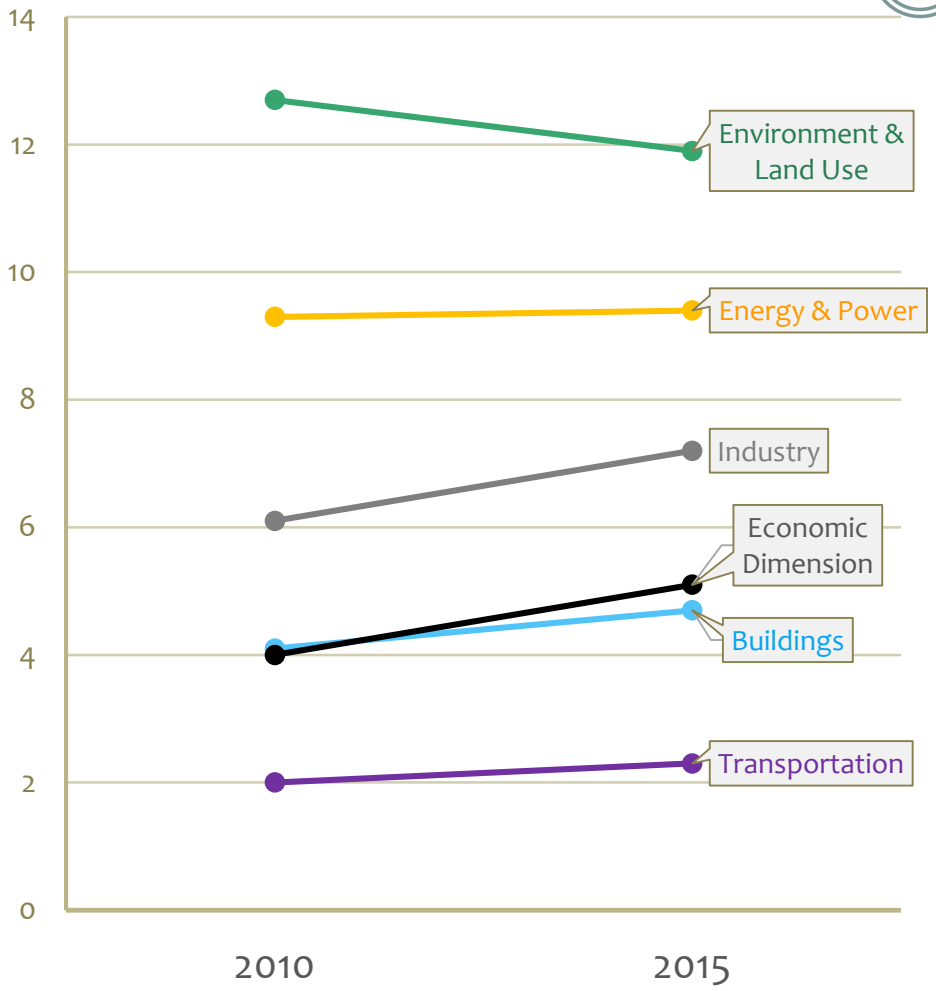


Source: http://logic.igdp.cn/

2015 Pilot City Breakdown



Change by Average Index Scores



- 6 out of 7 rising
- **Environment & Land Use** dropped
- **Economic** category had fastest growth

Challenges and Opportunities

- Gaps remain between current performance and benchmarks

- Non-CO2 emissions overlooked

Challenges and Opportunities

- Chinese Cities have considerable room to improve
  - *Environment and land use*

Challenges and Opportunities

- Less attention has been paid to non-CO2 emissions

Thank You for Your Attention !

We welcome your suggestions and comments.

Please contact us at: igdpoffice@igdp.cn or visit us at http://new.igdp.cn/

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U.S.-China Technical Exchange: Methane Recovery from Wastewater Treatment and Low Carbon Management Strategies

Mitigation Actions in Waste Sector in China
A Case Study of China MSW NAMA Project

Liu Xiao

2018-9-20

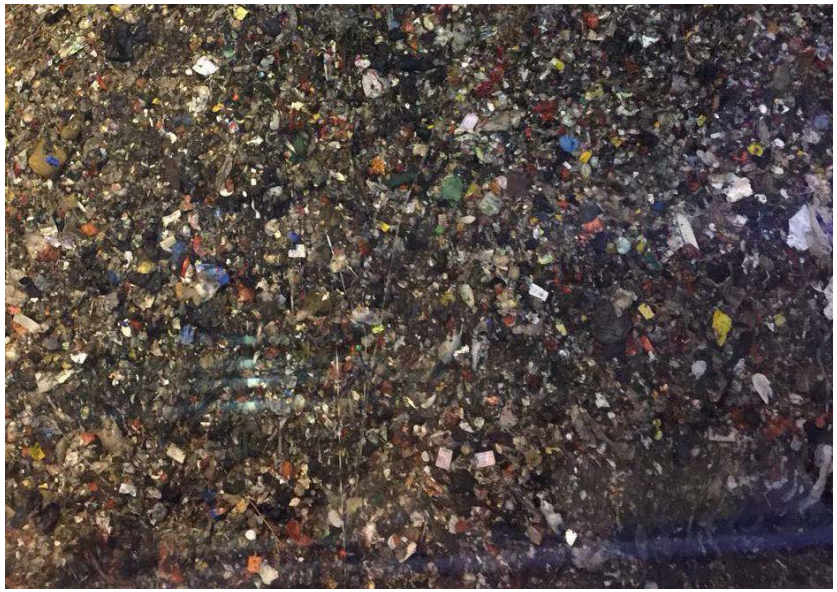
Content

1. Brief summary of MSW management in China
2. Why NAMA in waste sector ?
3. How to achieve NAMA in waste sector
4. About China MSW NAMA project

Brief summary of MSW management in China

Mitigation Actions in Waste Sector in China
--A Case Study of China MSW NAMA Project

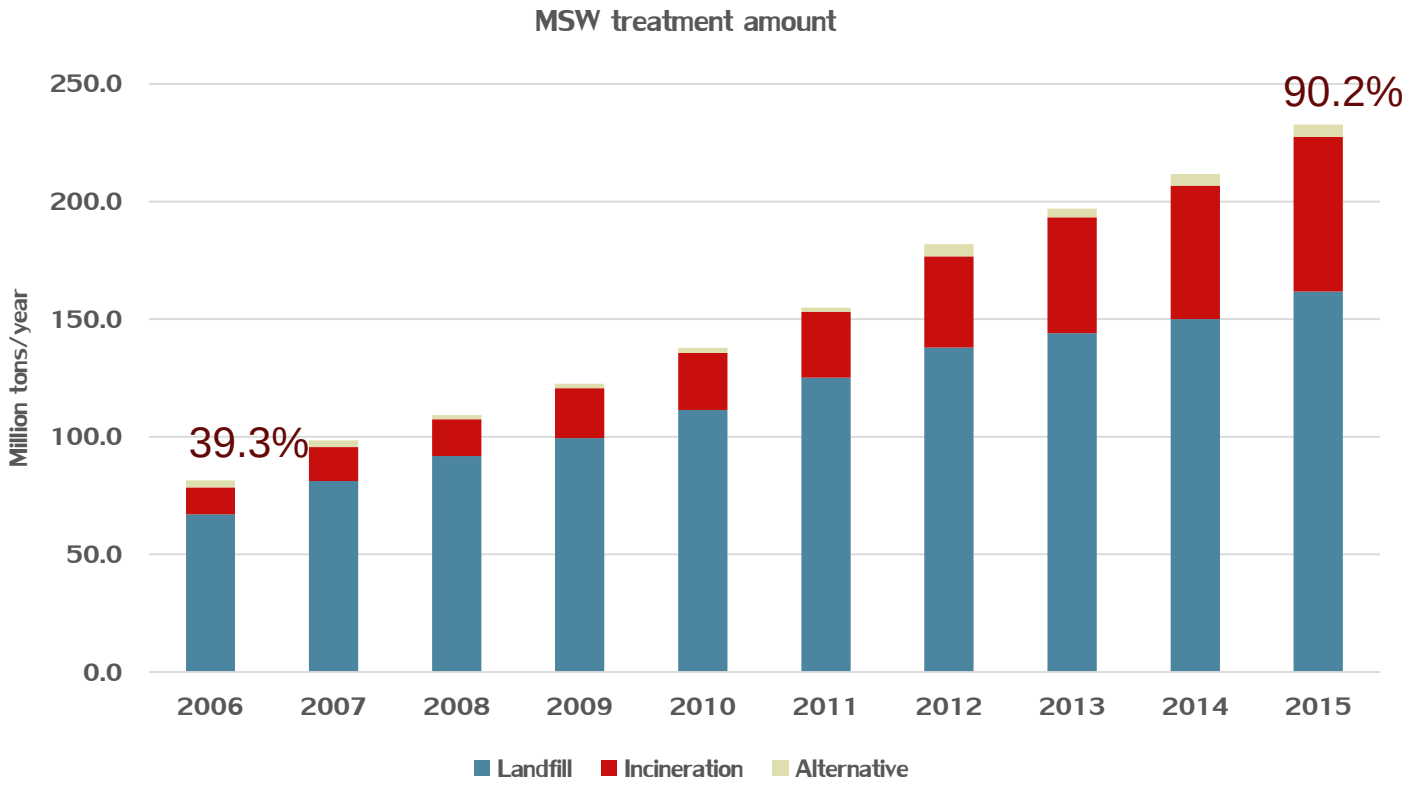
MSW in China



MSW in U.S.

Recyclables have been removed before transported.

MSW Sector Transformation in China



By 2015, MSW environment sound treatment rate is 90.2%, while for city area achieve 94.1%

Mitigation Actions in Waste Sector in China
--A Case Study of China MSW NAMA Project

MSW Transformation in China

MSW Transformation in China

During the 12th FYP (2011-2015)

Built 70 out of 100 planned restaurant waste treatment plants

More than 70% using anaerobic digestion.

MSW Transformation in China

Since the 13th FYP (2016-now)

46 waste segregation demonstration cities

Strong initiatives on integrated management and low carbon development in MSW sector!

Why NAMA in Waste Sector ?

Nationally **A**ppropriate **M**itigation **A**ctions NAMA

- First defined in COP13 in 2007 as “nationally appropriate mitigation actions **by developing country Parties** in the context of sustainable development, **supported and enabled by technology, financing and capacity-building**, in a measurable, reportable and verifiable manner” (1/CP.13:1.b.ii)

China NAMA Goal

2020

CO_2 reduction **40-45%**

non-fossil **15%**

forest **1.3** billion m^3

Peaking around 2030

CO_2 reduction **60-65%**

Non-fossil **20%**

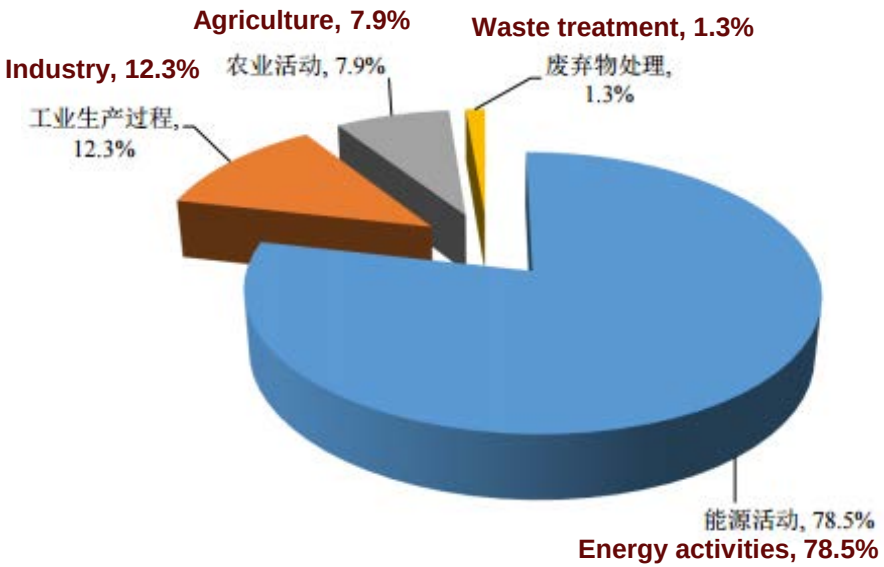
forest **4.5** billion m^3

Climate Change Emissions from the Waste Sector

Source: Intergovernmental Panel on Climate Change
来源：政府间气候变化专门委员会

- Global statistic from IPCC：
- 1.5 billion tons of GHG emission from waste sector 2010，3-5% of total GHG emissions
- **97% from methane emission** (50% solid waste, 50% waste water)

Climate Emissions from Different Sectors in China



158 million CO_2eq

- Waste water 91 million
- Incineration 14 million
- landfill 54 million

Source: The first two year update of climate change in People's Republic of China 2016

GHG Emission Reductions from MSW Sector

GHG emissions from the waste sector
3-5%

GHG emissions reduction from the waste sector
24%
In Germany

High Concentration
Easy management

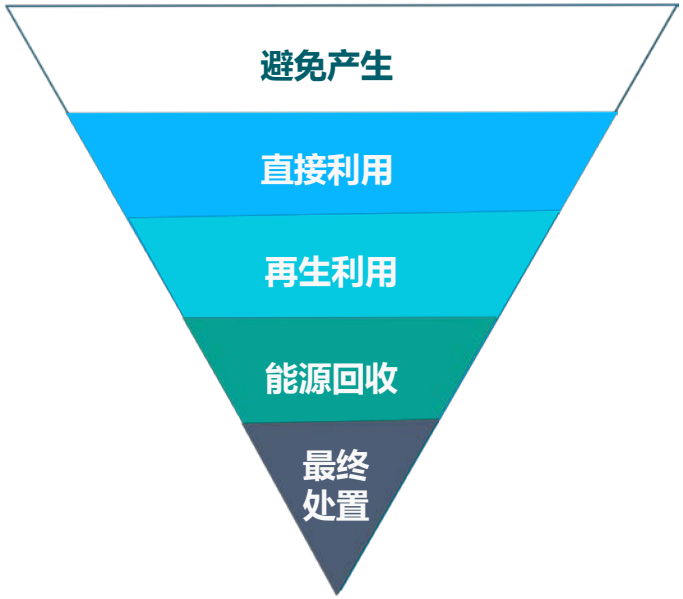
Lower cost for
GHG reduction

Mature mitigation
technology

Significant
Co-benefit

How to achieve NAMA in Waste Sector?

How to Reduce GHG Emissions in the MSW Sector

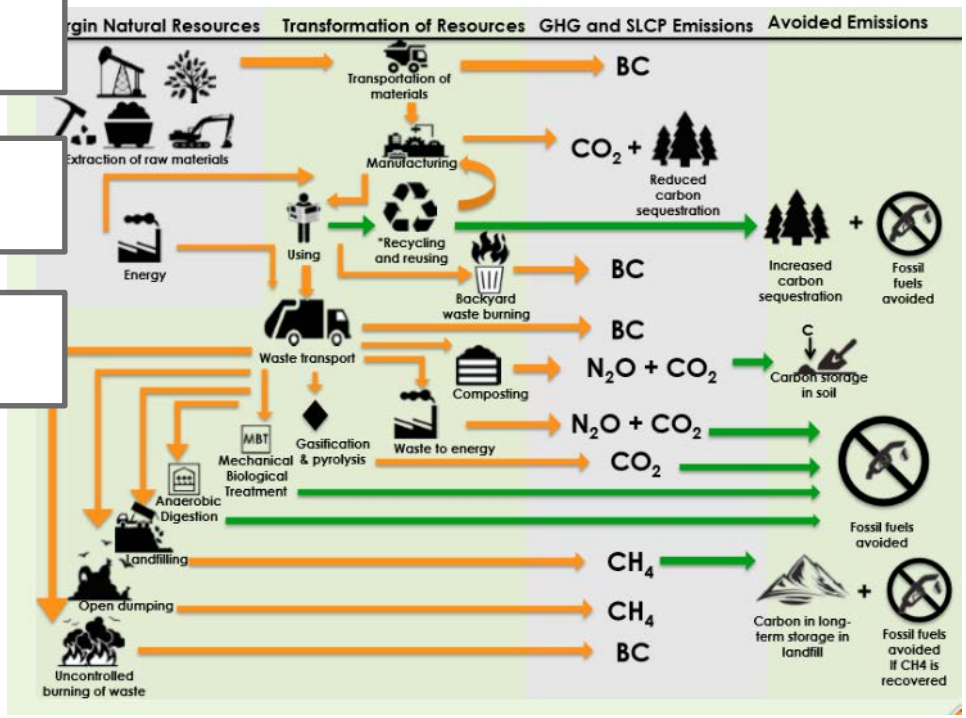


Prevention
>
Reuse
>
Recycling
>
Energy recovery
>
Disposal

How to Reduce GHG Emissions in the MSW Sector

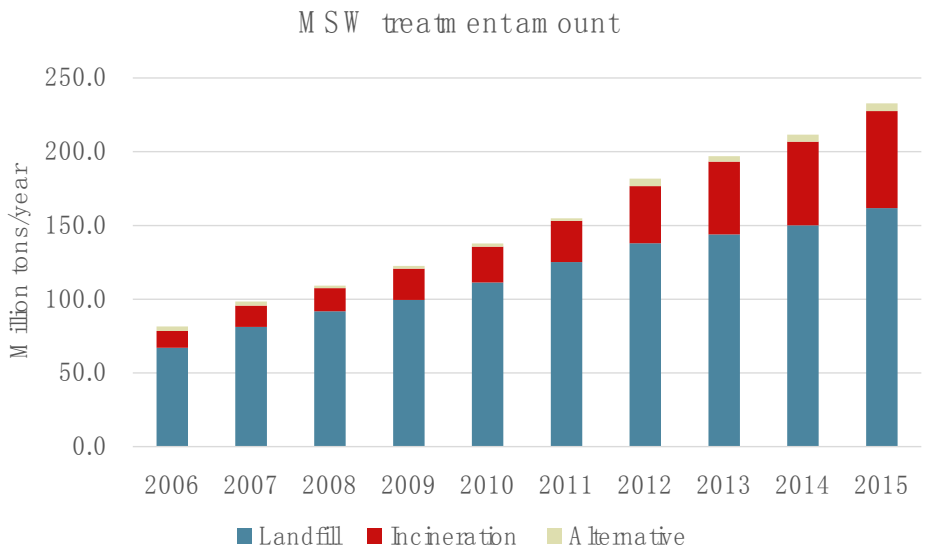
1 Ton MSW

- Sanitation landfill : 1.05 tCO_{2eq}
- Incineration : 0.47 tCO_2eq
- Composting : 0.14 tCO_2eq
- Anaerobic digestion : -0.13 tCO_2eq



Estimation by average MSW treatment situation using UNFCCC methodology

How to Reduce the GHG Emissions in MSW Sector



Organic waste + Methane capture

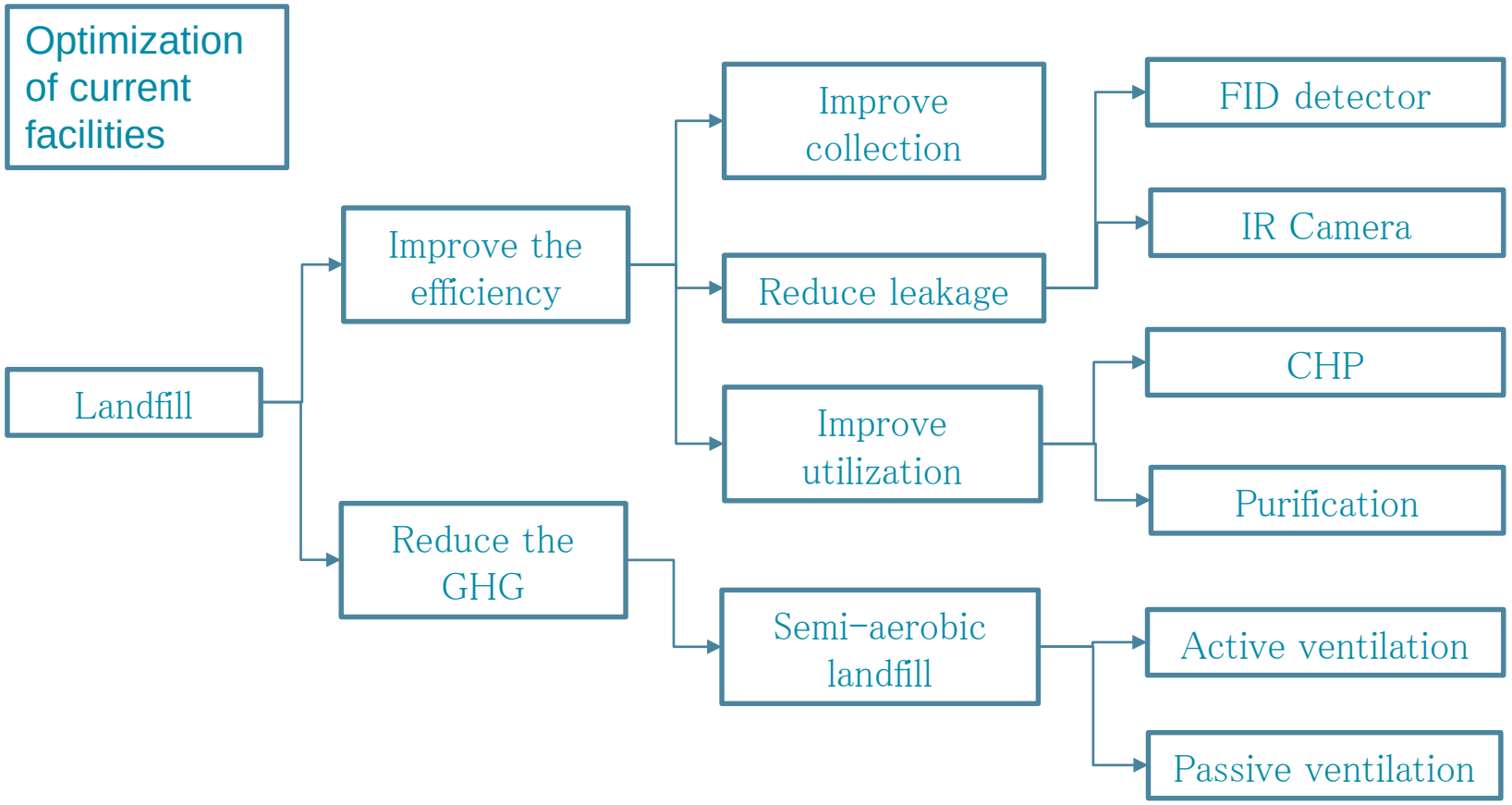
Mix collection and treatment

65% sanitation landfill, 35% incineration

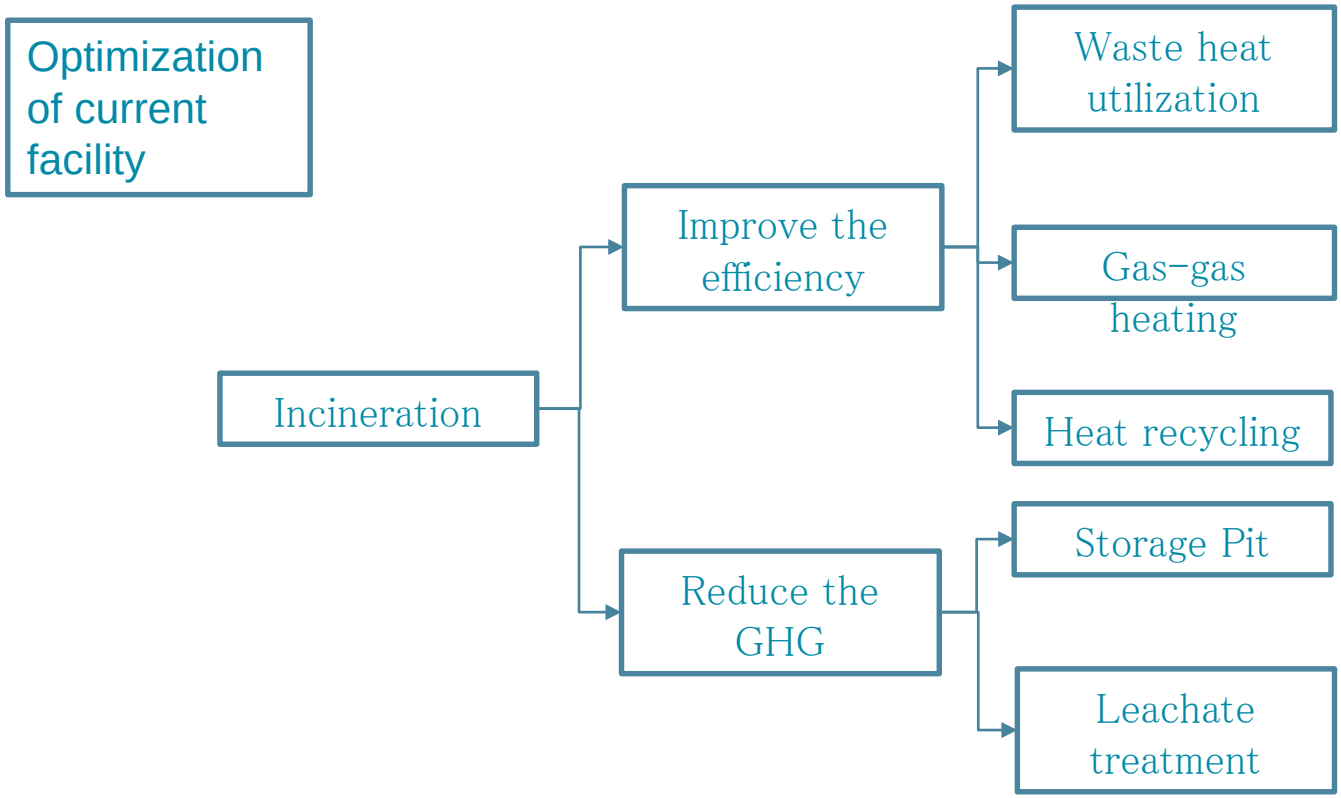
Optimization of current facility

Organic waste treatment

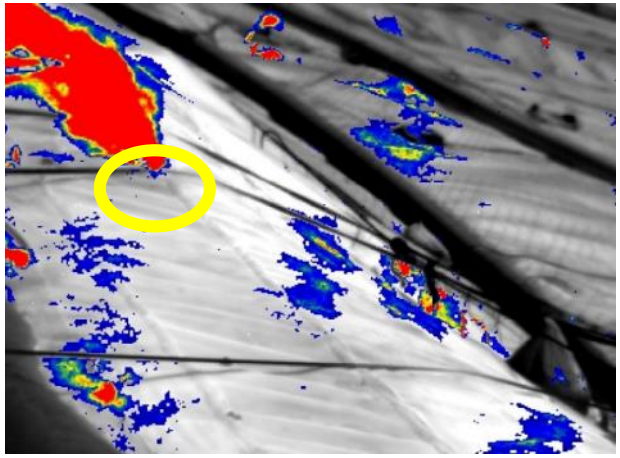
How to Reduce GHG Emissions in the MSW Sector



How to Reduce GHG Emissions in the MSW Sector



Mitigation Actions in Waste Sector in China
A Case Study of China MSW NAMA Project



Sensitive IR camera for methane leakage detection

The picture below, around 100L biogas/h

We tried in 2 landfills, around 10 leakages per 10,000m^2

Source：CERT & Tsing-Tech

How to Reduce GHG Emissions in the MSW Sector

Organic waste treatment

Green waste

Composting facility

Compost product

City park or landscape

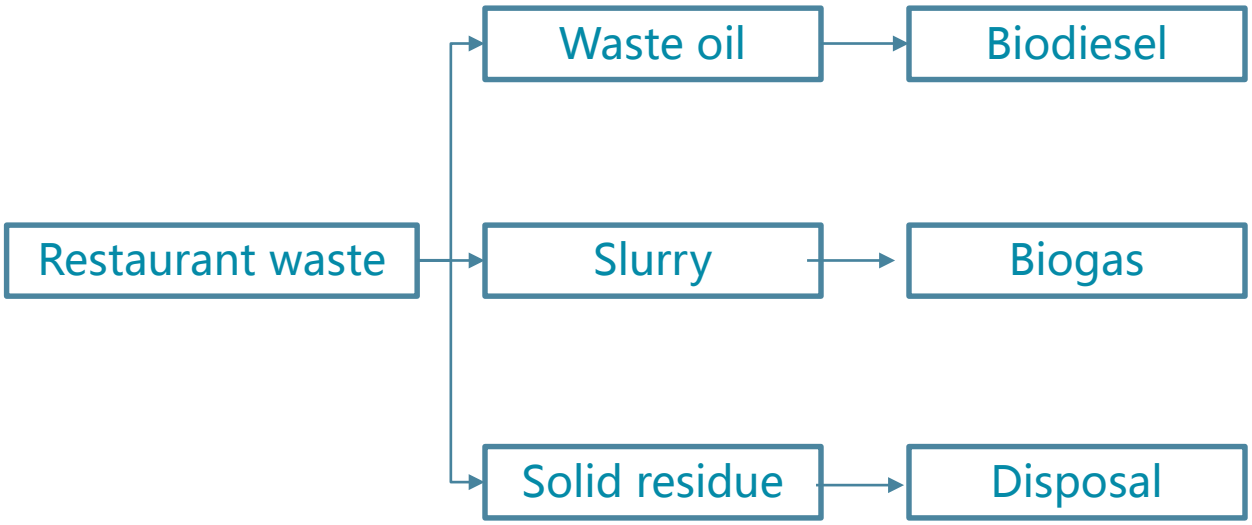
On site treatment and utilization

Recycling & Business Loop

How to Reduce GHG Emissions in the MSW Sector

Organic waste treatment

Recycling & Business Loop



About China MSW NAMA project

China Integrated Waste Management NAMA At a Glance

Duration:
- September 2017 – August 2022

Budget:
- 8,000,000 €

Political Partner:
- Ministry of Housing and Urban-Rural Development (MoHURD)

Implementation Partner:
- China Association of Urban Environmental Sanitation (CAUES)

Client:
- NAMA Facility

执行期:
- 2017年9月 –2022年8月

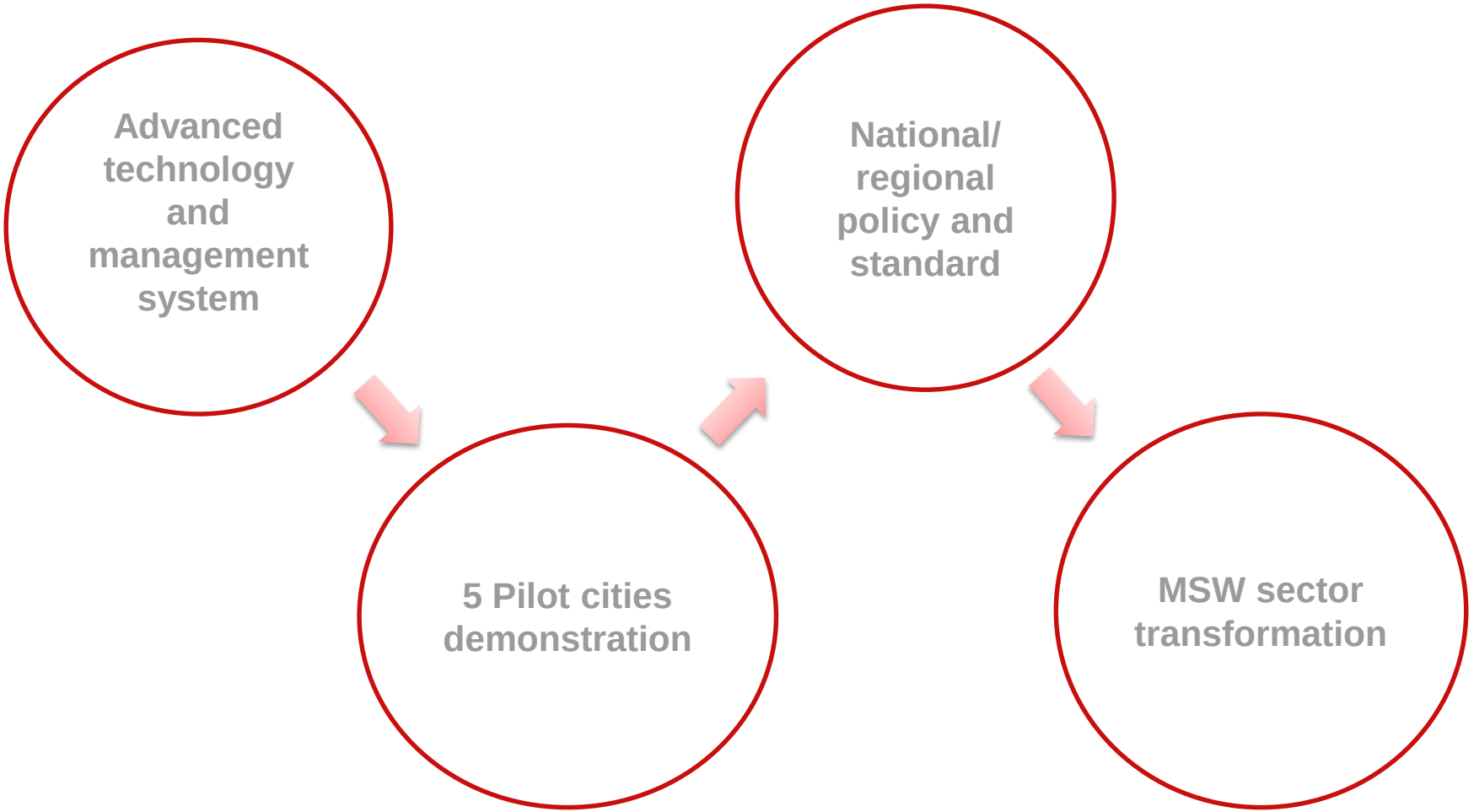
预算:
- 8,000,000 €

政府支持单位:
- 中国住房和城乡建设部

执行合作单位:
- 中国城市环境卫生协会

委托方:
- NAMA基金会

Mitigation Actions in Waste Sector in China
A Case Study of China MSW NAMA Project



Output:

- Baseline and GHG mitigation evaluation for demonstration city
- Best practices on MSW management focused on mitigation effects
- 220,000 t/y GHG reduction for each demonstration
- Suggest sustainable business model for low-carbon development in MSW sector
- 3 national policies or standards
- Training for the stakeholders

Thank you for your attention!

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PhD / Associate Researcher

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MSW management and low carbon development, technology innovation

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U.S.-China Technical Exchange:
Methane Recovery from Wastewater Treatment and Low Carbon Management Strategies
September 16 – 21, 2018

China's wastewater and sludge treatment and low carbon development

Jinghao LIU

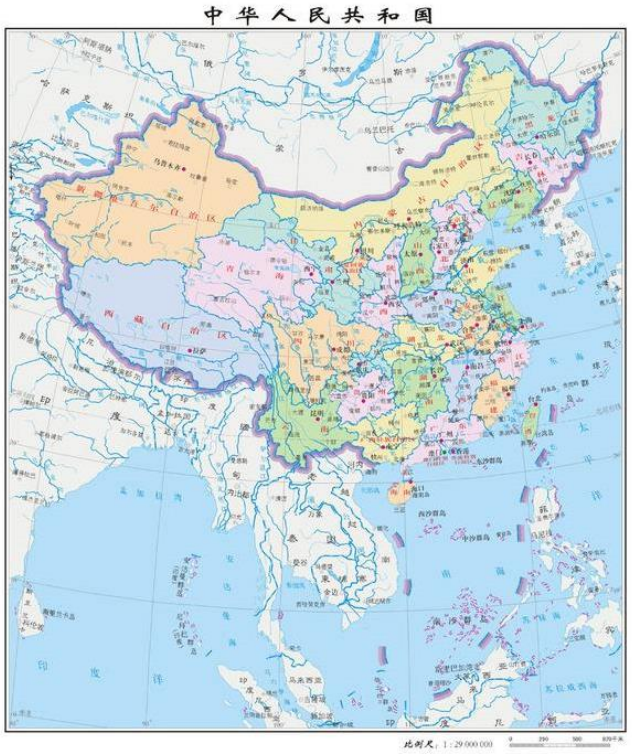
China Urban Construction Design & Research Institute Co., ltd
Environmental Sanitation Engineering Technology Research Center, MoHURD

2018–09–20

1. Facts and Figures
2. Policies, Standards and Plans
3. Technology and Cases
4. Low Carbon Development

1. Facts and Figures

General information



China Urban Construction Statistics is released by MoHURD as two classes.

- 653 cities, include 293 prefecture-level cites and 360 country-level cities;
- 1483 counties.

Urban population of 653 cities

~0.48 billion

+

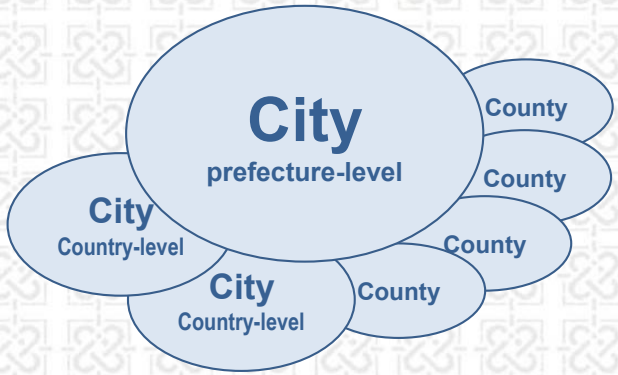
Urban population of 1483 counties

~0.150 billion

½ of Total Population of China Mainland

~0.63 billion

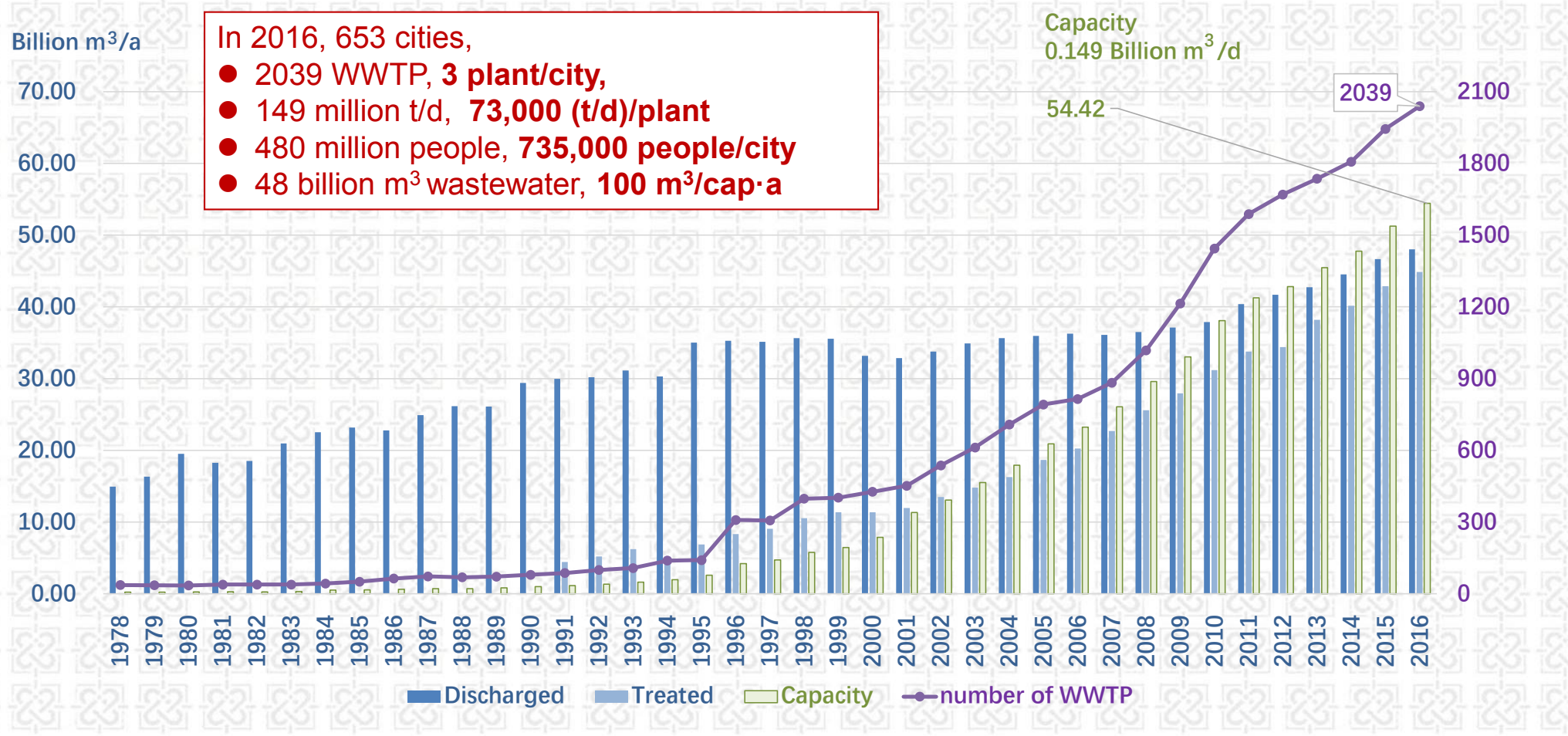
about ½ of 1.38 billion



One prefecture-level city governs some country-level cities and some counties

Note: The data of Hongkong, Macao and Taiwan are not included in this PPT.
Urban population in the slide include Urban Temporary Population.

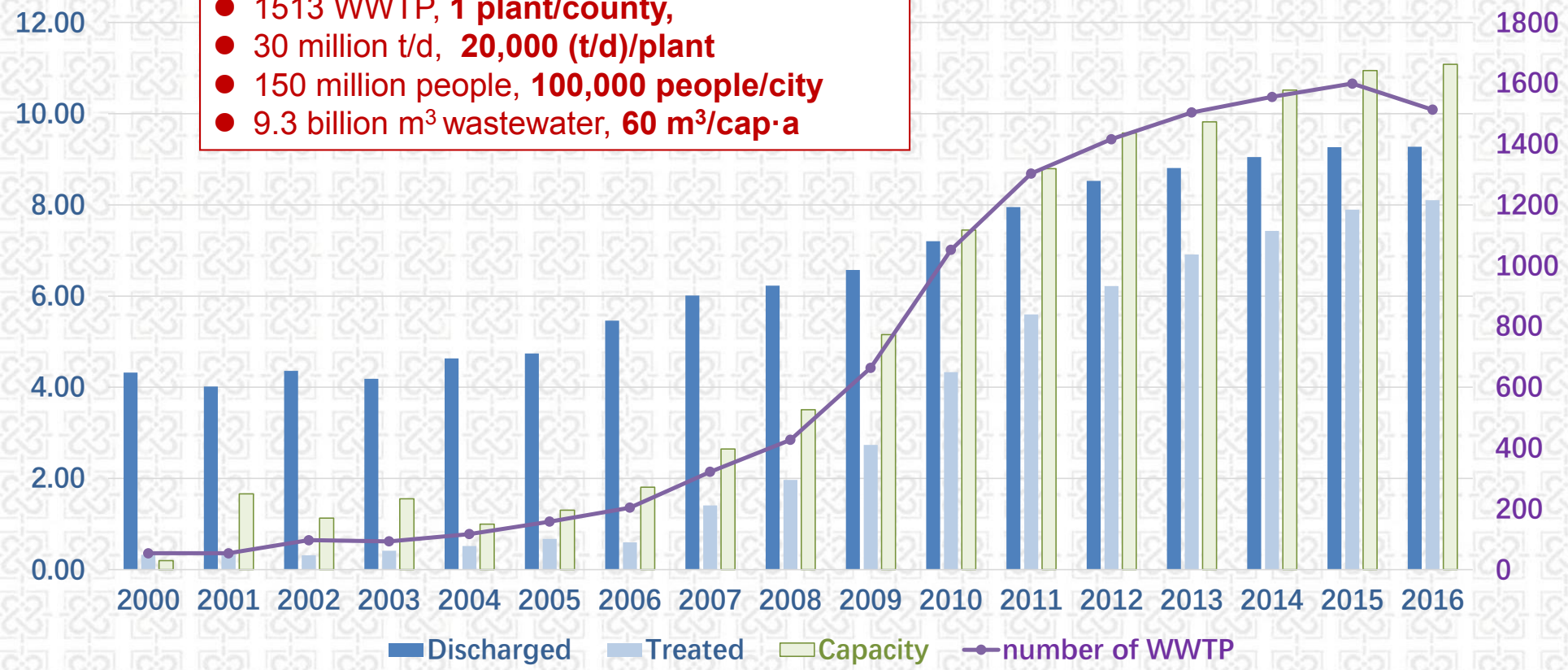
Wastewater Treatment in Cities in mainland China (1978-2016)



Wastewater Treatment in Counties in mainland China (2000-2016)

In 2016, 1483 counties,

- 1513 WWTP, **1 plant/county,**
- 30 million t/d, **20,000 (t/d)/plant**
- 150 million people, **100,000 people/city**
- 9.3 billion m^3 wastewater, **60 m^3/cap·a**



Wastewater and Sludge Facts (2014 – 2016)

年份	地区名称	污水排放量 十亿立方米	排水管道长度（公里）	污水处理厂 Wastewater Treatment Plant								其他污水处理设施 Other Wastewater Treatment Facilities		污水处理总量 十亿立方米
				座数		处理能力		处理量		干污泥产生量（百万吨）	干污泥处置量（百万吨）	处理能力 百万立方米/日	处理量 十亿立方米	
				（座）	二、三级处理	百万立方米/日	二、三级处理	百万立方米	二、三级处理					
Year	Name of Regions	Annual Quantity of Wastewater Discharged ($10^9 m^3/a$)	Length of Drainage Pipelines (km)	Number of Wastewater Treatment Plant (unit)	Secondary and Tertiary Treatment	Treatment Capacity ($10^6 m^3/day$)	Secondary and Tertiary Treatment	Quantity of Wastewater Treated ($10^9 m^3/a$)	Secondary and Tertiary Treated	Quantity of Dry Sludge Produced ($10^6 t/a$)	Quantity of Dry Sludge Treated ($10^6 t/a$)	Treatment Capacity ($10^6 m^3/day$)	Quantity of Wastewater Treated ($10^9 m^3/a$)	Total Quantity of Wastewater Treated ($10^9 m^3/a$)
2014	城市 City	44.53	511,179	1807	1513	130.9	110.1	38.27	32.51	7.12	6.81	20.37	1.89	40.16
2014	县 County	9.05	160,267	1555	1163	28.8	22.0	7.25	5.73	1.02	0.92	1.14	0.17	7.43
2014	合计 Total	53.58	671,445	3362	2676	159.7	132.1	45.53	38.24	8.13	7.73	21.51	2.06	47.59
2015	城市 City	46.66	539,567	1944	1666	140.4	123.7	41.05	36.65	7.46	7.09	20.27	1.84	42.88
2015	县 County	9.27	167,917	1599	1196	30.0	23.7	7.73	6.27	1.15	1.06	1.25	0.16	7.90
2015	合计 Total	55.93	707,484	3543	2862	170.4	147.5	48.78	42.92	8.61	8.15	21.52	2.00	50.78
2016	城市 City	48.03	576,617	2039	1757	149.1	128.1	43.13	37.44	8.00	7.61	18.70	1.75	44.88
2016	县 County	9.27	171,865	1513	1177	30.4	24.9	7.96	6.65	1.34	1.25	1.32	0.15	8.10
2016	合计 Total	57.30	748,482	3552	2934	179.5	153.0	51.09	44.09	9.34	8.86	20.02	1.90	52.98

Key Index Analysis

In 2016, 653 cities

- 2039 WWTP, **3 Plants/City,**
- 149 million t/d, **228,000 (t/d)/city**
- 480 million people, **735,000 people/city**
- 48 billion m^3 wastewater, **100 t/cap·a**
  72 gallon/cap·d

90% wastewater was treated

- 43 billion m^3 wastewater
- 8.0 million ton dry sludge, **0.18 tDS/10^3tWW**

- **Dry Sludge: 40 ton/city**
- **Wet Sludge(W%=80%): 200 ton/city**

In 2016, 1483 counties

- 1513 WWTP, **1 plant/county,**
- 30 million t/d, **20,000 (t/d)/county**
- 150 million people, **100,000 people/county**
- 9.3 billion m^3 wastewater, **60 t/cap·a**
  43 gallon/cap·d

85% wastewater was treated

- 8.0 billion m^3 wastewater
- 1.3 million ton dry sludge, **0.16 tDS/10^3tWW**

- **Dry Sludge: 3 ton/county**
- **Wet Sludge(W%=80%): 15 ton/county**

2. Policies, Standards and Plans

List of key Policies, Standards and Plans

Year	Titles
2009	城镇污水处理厂污泥处理处置及污染防治技术政策（试行） **Technical policy** for sludge disposal and pollution control in municipal wastewater treatment plant (Trial)
2010	城镇污水处理厂污泥处理处置及污染防治最佳可行性技术指南（试行） **Technical guide** for sludge disposal and **BAT pollution control** in municipal WWTP(Trial)
2010	关于加强污水处理厂污泥污染防治工作的通知 **Government Doc.**：Notice on strengthening prevention and control of sludge pollution in WWTP
2011	城市污水处理厂污泥处理处置技术指南（试行） **Technical guide** for sludge treatment and disposal of municipal WWTP(Trial)
2015	水污染防治行动计划 **Water pollution control strategy**
2016	“十三五”全国城镇污水处理及再生利用设施建设规划 (2016-2020) **National Plan** for municipal wastewater treatment and recycling facilities in 13th Five-Year
2017	城市排水工程规划规范(新修订) **Planning specification** for Urban drainage works (Updated 2017)
2018	城镇污水处理厂污染物排放标准(新修订) **Standard** for the discharge of pollutants in municipal wastewater treatment plant (Updated2018)

UDC

中华人民共和国行业标准

CJJ

CJJ 131－2009
备案号 J891－2009

P

城镇污水处理厂污泥处理技术规程

Technical specification for sludge treatment of municipal wastewater treatment plant

2009－07－09 发布　　2009－12－01 实施

中华人民共和国住房和城乡建设部 发布

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MoHURD & NDRC （2011，March）
Technical Guide for sludge treatment and disposal of municipal wastewater treatment plant

城镇污水处理厂污泥处理处置技术指南

（试　行）

Technical Guide for sludge treatment and disposal of municipal wastewater treatment plant

（Trial）

中华人民共和国住房和城乡建设部

中华人民共和国国家发展和改革委员会

二〇一一年三月

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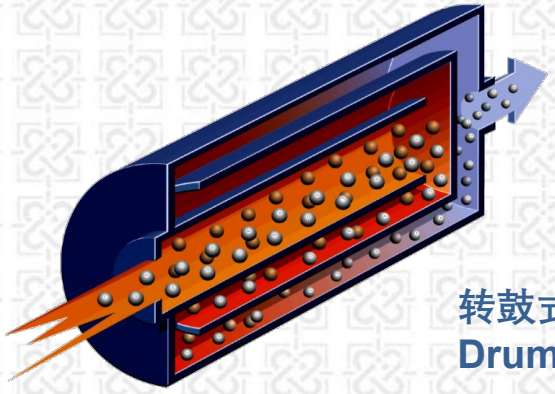
National Plan for municipal wastewater treatment and recycling facilities in 13th Five-Year

Main Objectives and Tasks in 13th Five Year				
Indicators		2015	2020	Add in 13th Five-Year
Wastewater Treatment Rate (%)	City	91.9	95 Urban built-up areas will be 100	3.1
	County	85	≥85 Counties in Eastern regions should be 90	/
	Town	/	70 Towns in Midwest regions should be 50	/
Sludge Harmless disposal rate (%)	City	53	75 Urban built-up areas will be 90	22
	County	24.3	~60	35.7
	Key Town	/	+5%	5
Length of drainage pipelines (10^4km)		29.65*	42.24	12.59
Wastewater treatment capacity (10^4m^3/day)		21744	26766	5022
Innocent treatment capacity of sludge (10^4t/d)		3.74*	9.75	6.01
Regenerated water production capacity (10^4m^3/d)		2653*	4158*	1505*

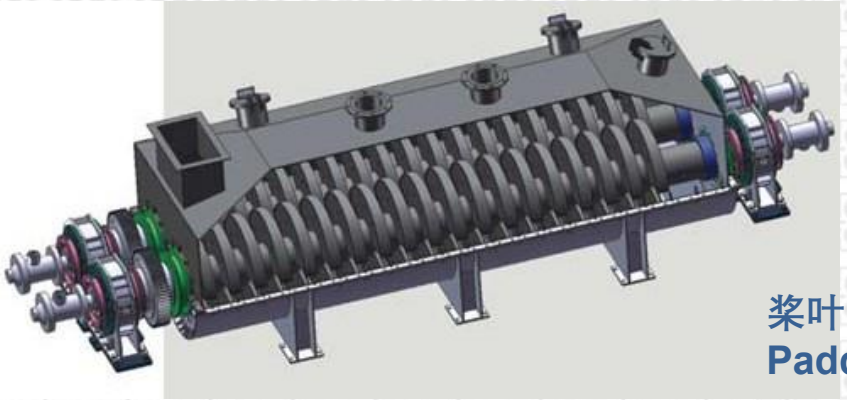
Note: Data with * do not contain township data

3. Technology and Cases

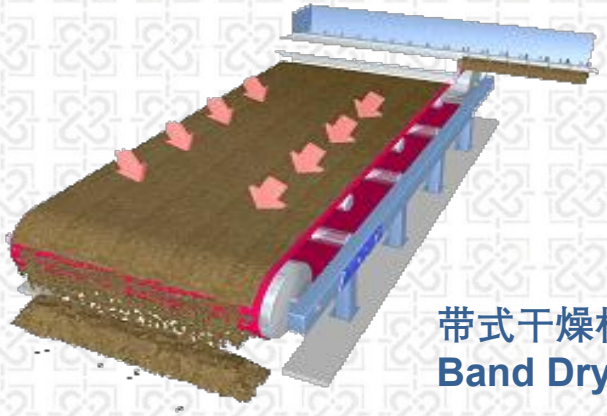
Typical equipment of sludge drying technology



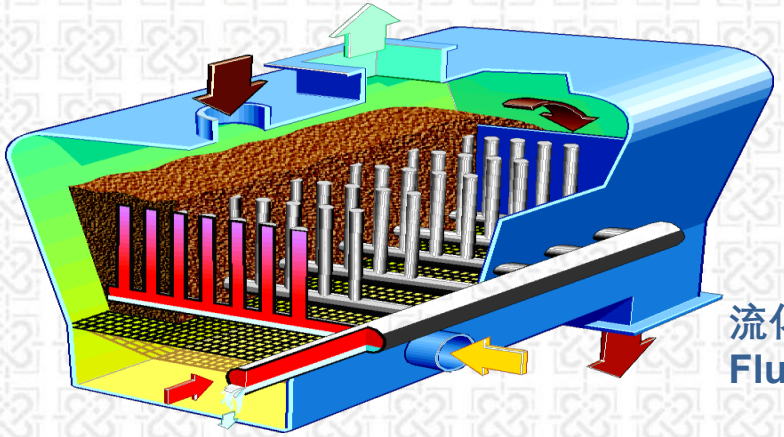
转鼓式干燥机
Drum Dryer



桨叶式干燥机
Paddle Dryer

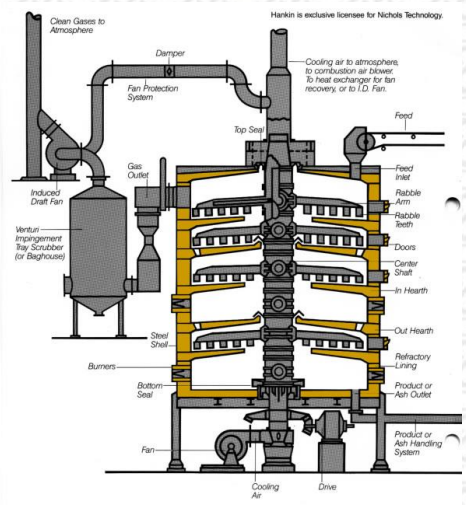


带式干燥机
Band Dryer

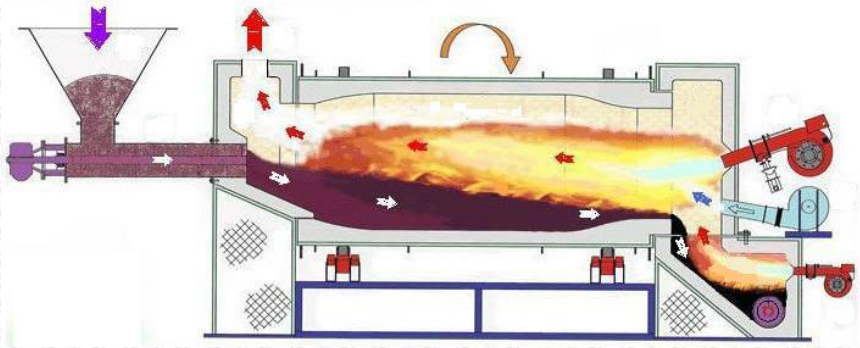


流化床干燥机
Fluidized Bed Dryer

Typical equipment of sludge incineration technology



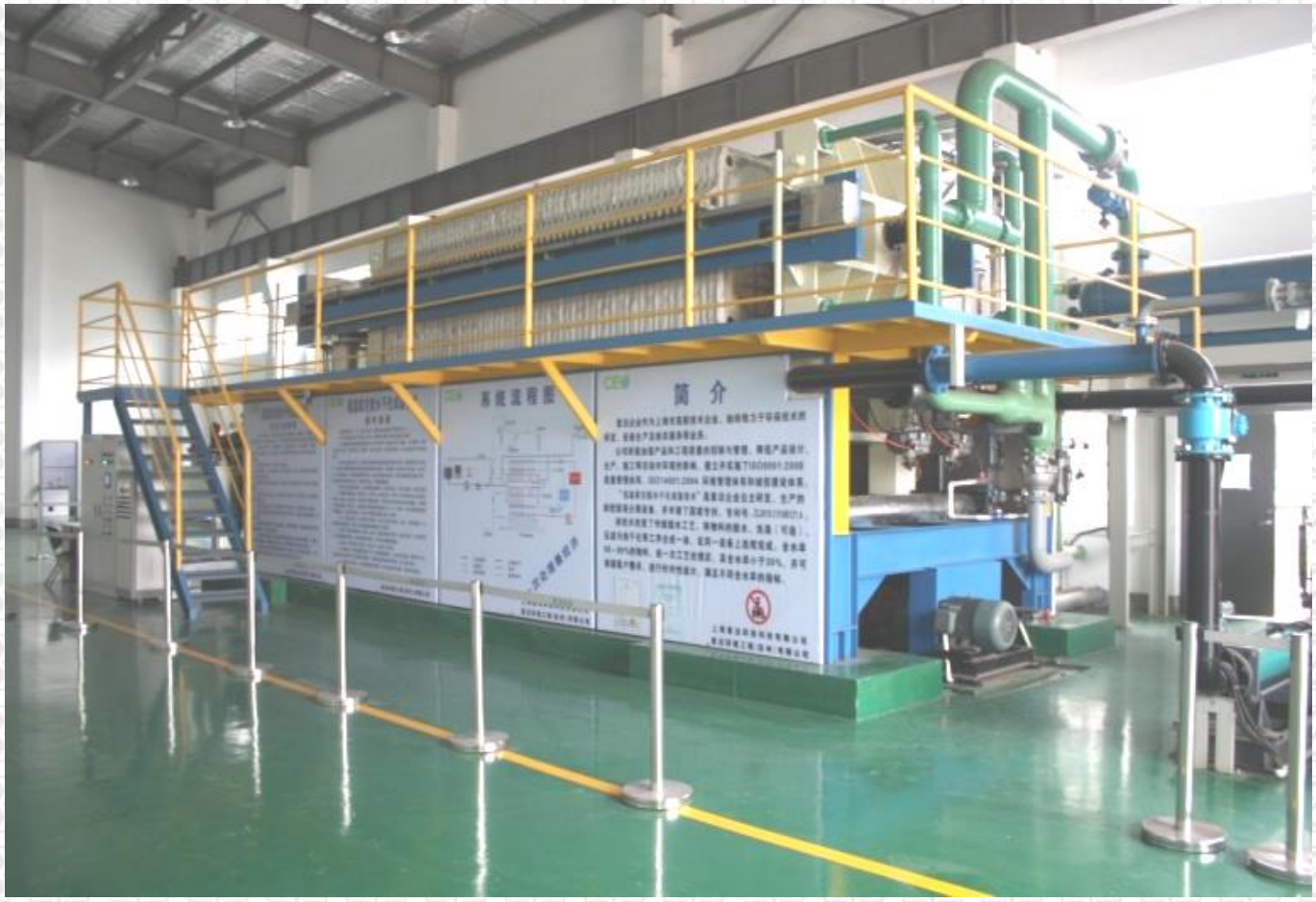
多膛炉
Multiple Hearth Furnace



回转窑
Rotary Kiln

流化床炉
Fluidized Bed Furnace

Sludge Treatment Facility in Nanjing



- **Capacity: 1400 t/d (W%=80%)**
  处理总规模1400t/d （含水率80%）
- **Dehydration drying in low tempture**
  低温真空脱水干化
- **Design capacity of first-phase construction : 400t/d, 2 lines**
  一期规模400t/d，2条生产线
- **Design capacity of second-phase construction: 1000t/d, 2 lines**
  二期规模1000t/d，2条生产线

Sludge Treatment Facility in Tangjiatuo, Chongqing

- **Capacity: 240 t/d（W%=75%）**
  处理能力240吨/日（含水率75%）
- **Reduce moisture content to 10% with two-stage heating drying process and Anaerobic Digestion process**
  采用热干化两段式组合工艺，污泥的含水率降至10%；
- **In operation in 2009**
  2009年投入运营；

Sludge Drying & Incineration Project in Shidongkou, Shanghai

- **Capacity is 150t/d (W%=80%)**
  处理能力150吨/日（含水率80%）
- **The Germany Andritz fluidized bed is used for drying sludge**
  污泥干化采用德国Andritz流化床污泥干化装置
- **Chinese fluidized bed furnace is used for incineration**
  采用国产流化床污泥焚烧炉
- **In operation in 2004**
  2004年投产运行

Sludge Drying and Incineration Project in Jiaxin City

- **Capacity of first-phase project is 1300 t/d （w%=80%)**
  一期处理能力为1300t/d
- **7 Chinese drum dryers**
  7台国产超圆盘污泥干燥机
- **1x260 t/h sludge-fired CFB furnaces**
  1台260t/h循环流化床污泥焚烧炉
- **3x220t/h coal-fired CFB furnaces**
  3台220t/h循环流化床燃煤锅炉
- **In operation in 2011**
  2011年投产

Drying Sludge Project in Beijing Cement Plant

- **Capacity is 500 t/d (W%=80%)**
  处理规模500t/d（含水率80%）
- **Use cement kiln heat to dry sludge**
  采用水泥窑余热干化技术
- **5 turbine thin layer sludge drying device are used for drying process.**
  5套涡轮薄层污泥干化装置用于干燥工艺
- **In operation in 2009**
  2009年建成投产

4. Low Carbon Development

China's GHG Emissions Target by 2020

- To lower carbon dioxide emissions per unit of GDP by **40% to 45%** from the 2005 level

  单位GDP二氧化碳排放量相对2005年降低40-45%

- To increase the share of non-fossil fuels in primary energy consumption to about **15%**

  化石能源占总能源比重提升至15%左右

- To increase the volume of forest stock by approximately **1.3 billion** cubic meters over 2005 levels

  森林蓄积量比2005年增加13亿立方米

China's Nationally Determined Contributions(NDC) Targets (around 2030)

- To lower carbon dioxide emissions per unit of GDP by **60% to 65%** from the 2005 level

  单位国内生产总值二氧化碳排放比2005年下降60%-65%

- Increase the share of non-fossil fuels in the primary energy mix to around **20%**

  非化石能源占一次能源消费比重达到20%左右

- To increase the forest stock volume by around **4.5 billion** cubic meters on the 2005 level.

  森林蓄积量比 2005 年增加45亿立方米左右

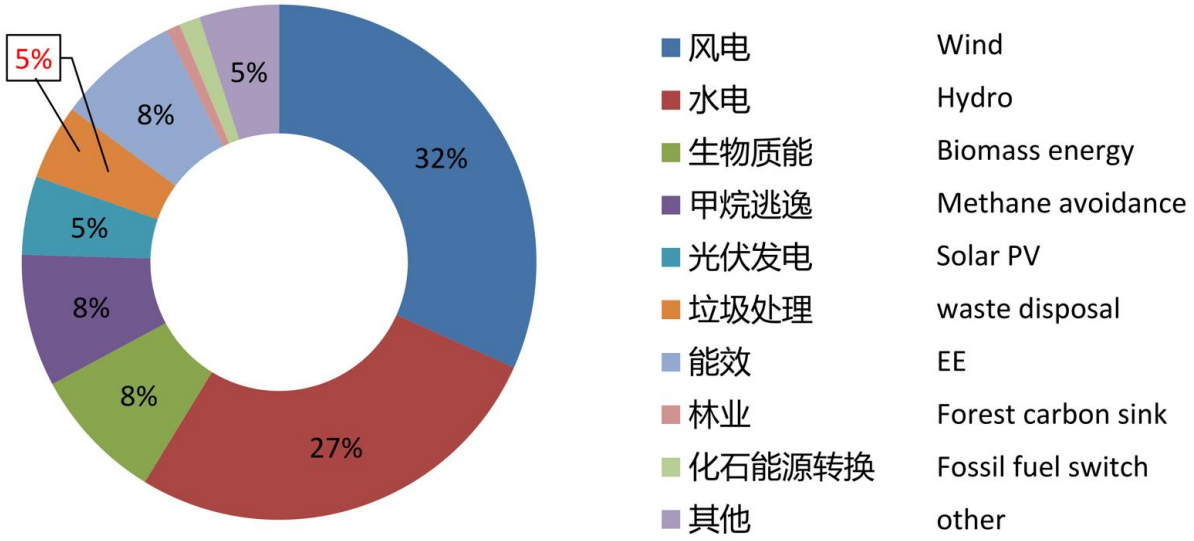
- To achieve the **peaking** of carbon dioxide emissions around 2030 and making best efforts to peak earlier

  二氧化碳排放2030年左右达到峰值并争取尽早达峰

CDM项目注册情况
Registered CDM projects

CDM注册项目: 7715个
垃圾处理CDM项目: 364个（**5%**）

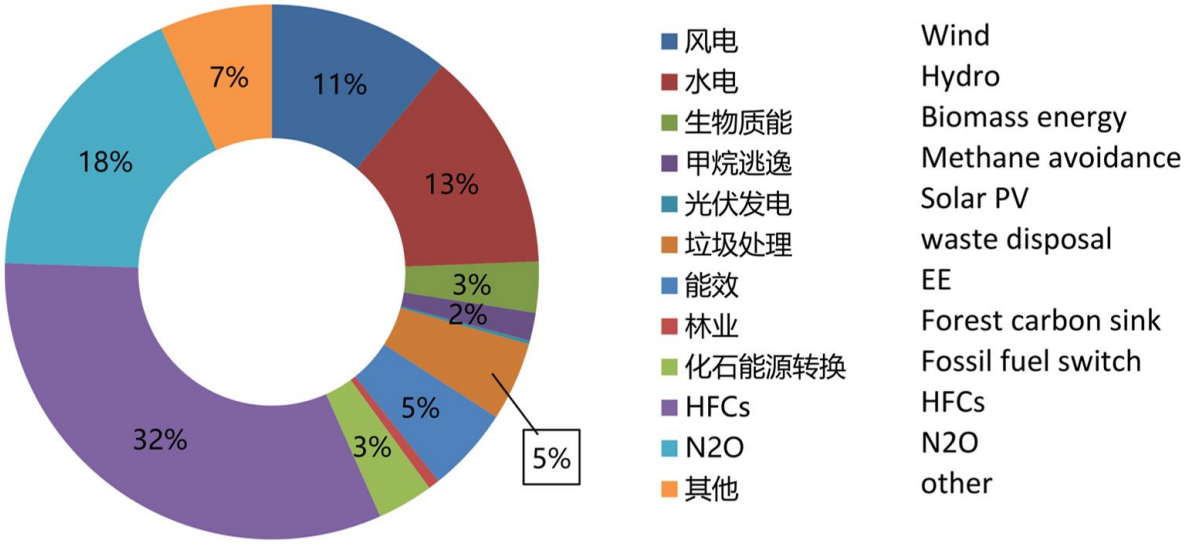
Registered CDM projects: 7715 projects
Registered CDM projects in waste disposal: 364 (**5%**)



CDM项目减排量签发情况
Issuance of CERs

签发项目：2915个
签发减排量：167785万tCO_2e
垃圾处理领域的减排量：8010万tCO_2e （**5%**）

CDM projects with issuance： 2915 projects
Issued CERs: 1677.85 million tCO_2e
Issued CERs in waste disposal: 80.1million tCO_2e (**5%**)



Waste sector climate change in mitigation

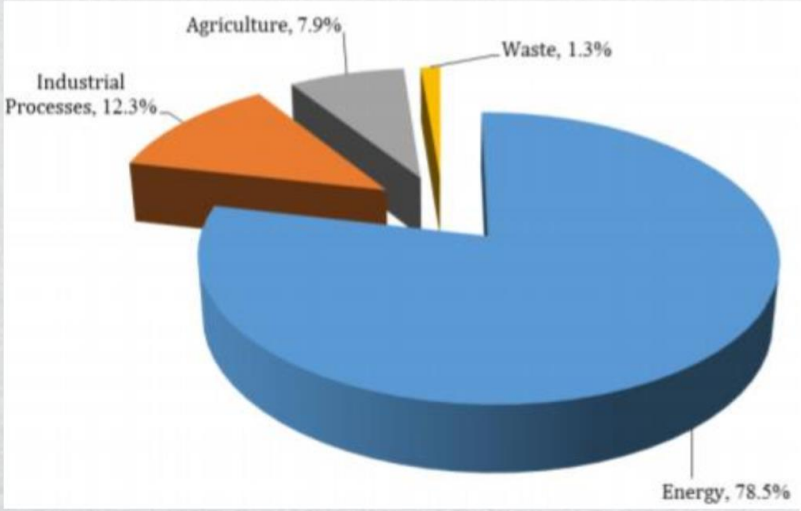


Table 2-6 GHG inventory of China in 2012（100 Mt CO_2 eq）

	CO_2	CH_4	N_2O	HFCs	PFC	SF_6	Total
Energy	86.88	5.79	0.69				93.37
Industrial processes	11.93	0.00	0.79	1.54	0.12	0.24	14.63
Agriculture		4.81	4.57				9.38
Waste	0.12	1.14	0.33				1.58
Land-use change and forestry	-5.76	0.00	0.00				-5.76
Total (excluding LUCF)	98.93	11.74	6.38	1.54	0.12	0.24	118.96
Total (including LUCF)	93.17	11.74	6.38	1.54	0.12	0.24	113.20

Note: 1. Shaded cells do not require entries; 0.00 indicates that the value is less than 0.005; due to rounding, the aggregation of various items may have a slight difference with the total.
2. Global GWP values (Table 2-8) are from IPCC AR II in the 100-year time scale.

- Solid waste treatment（固体废弃物处理）: 33.8%;
- wastewater handling（废水处理）: 57.3%;
- waste incineration (non-energy use)（废弃物焚烧处理（非能源使用））: 8.9%.

Carbon emission accounting results for China's urban wastewater industry (1,000,000 tons)

Carbon Emissons: 47.11 Mton CO_2e

Type of emission	Processing procedure		CO_2	CH_4	N_2O
Direct emission	Wastewater treatment			0.6290	0.0153
	Sludge treatment	Landfills		0.3070	
		Incineration		0.0252	0.0350
		Anaerobic digestion		0.0427	
Indirect emission	Power consumption		10.4358		
Total			10.4358	1.0039	0.0503

Source: Ke WANG, RUC, Progress and Prospects of Climate Negotiation after the Paris Agreement and the Significance of Mitigation Actions of Waste Treatment, 2018/08/29

Analysis results of the emission reduction potential of wastewater Treatment

Measures	Emission reduction potential (10,000 tons CO2/year)	Technology incremental cost for emission reduction (CNY/tCO2)
Improvement of wastewater treatment and system optimization	-312.39	-43.54
Aeration optimization system	-76.73	-390.99
Energy recovery from wastewater treatment plants	-284.98	-387.99

Source: Ke WANG, RUC, Progress and Prospects of Climate Negotiation after the Paris Agreement and the Significance of Mitigation Actions of Waste Treatment, 2018/08/29

Analysis results of sludge treatment and reduction potential

Measures	Emission reduction potential (10,000 tons CO2/year)	Technology incremental cost for emission reduction (CNY/tCO2)
Thermal hydrolysis-anaerobic digestion-biogas utilization heat drying (10% water content)-coal substitutes (e.g. in power plants or cement kilns)	-20.77	0.5
Anaerobic digestion-biogas utilization-landfills (using landfill gas)	-20.43	-0.92
Thermal hydrolysis-anaerobic digestion-biogas utilization land utilization	-20.30	0.25
Anaerobic digestion-biogas utilization-compost-land utilization	-20.13	-0.81
Anaerobic digestion-biogas utilization-land utilization	-19.79	-0.43
Compost-land utilization	-18.80	0.13
Lime stabilization-land utilization	-17.10	-0.28
Anaerobic digestion-biogas utilization-landfills	-16.14	-1.16

Source: Ke WANG, RUC, Progress and Prospects of Climate Negotiation after the Paris Agreement and the Significance of Mitigation Actions of Waste Treatment, 2018/08/29

Thanks for your attention !

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Xiangyang Municipal Sludge and Food Waste Treatment Project

Wenlong Dou
Company: HELEX, China
Email:45887460@QQ.com

Before


before the project was implemented 1


before the project was implemented 3

Beginning

during the project was implemented 1

Our PRIORITIES

- Treat incremental and stocked sewage sludge simultaneously

- Co-digestion with food waste


After

Marketing Methane and Biosolids

Layout of Vein Industry Chain

Methane Capture & Usage

- 1500—4000 M^3 CNG Biogas/Day
- 60—90 Tons Organic Charcoal/Day


Methan
e
Capture
Low
Carbon
Cities