CityNet Session

IUECAS
Institute of Urban Environment
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Waste Management Practices in Xiamen City, China

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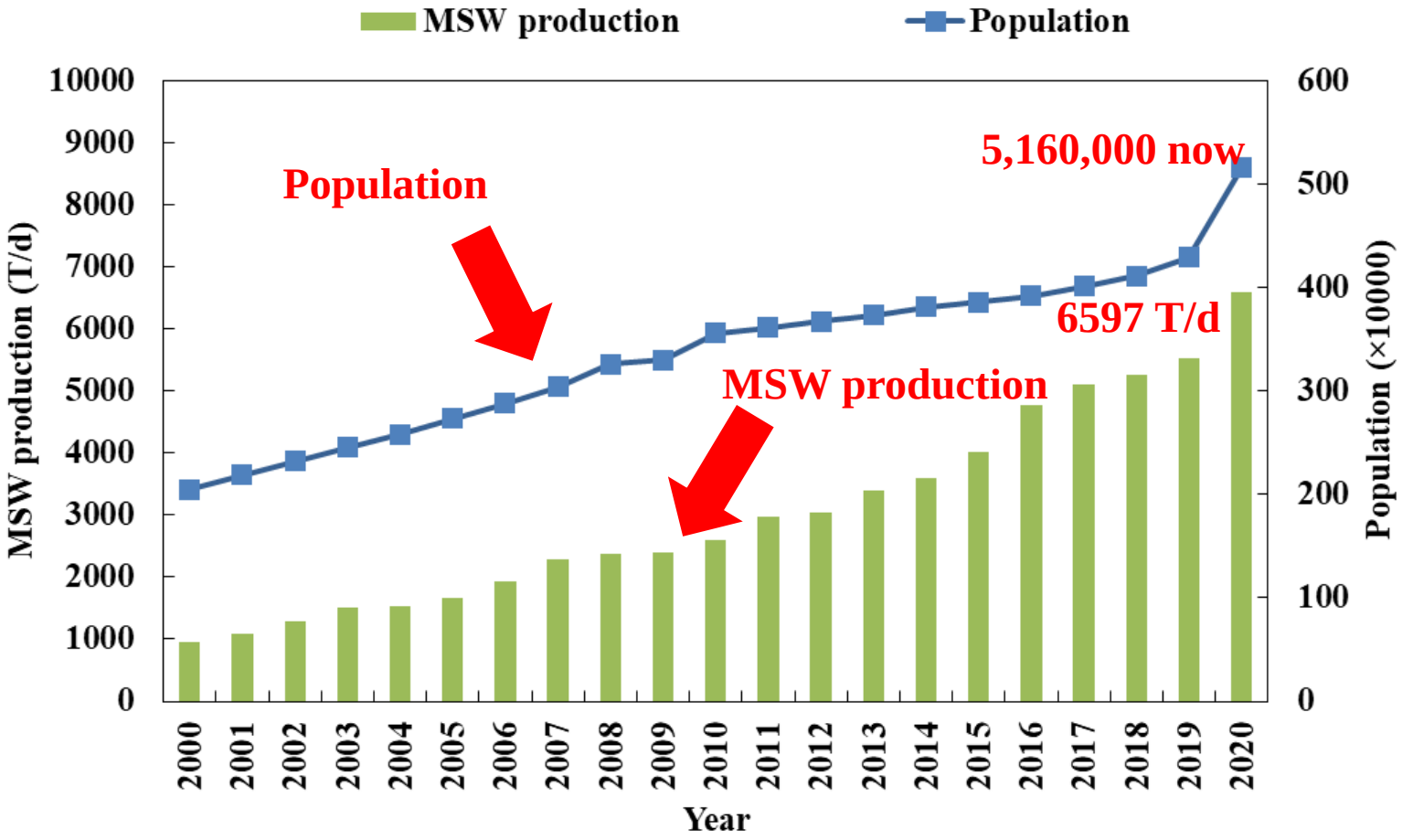
Beautiful Xiamen

Population and MSW growth in Xiamen

Quick urbanization VS Rapid growth of municipal solid wastes (MSW)

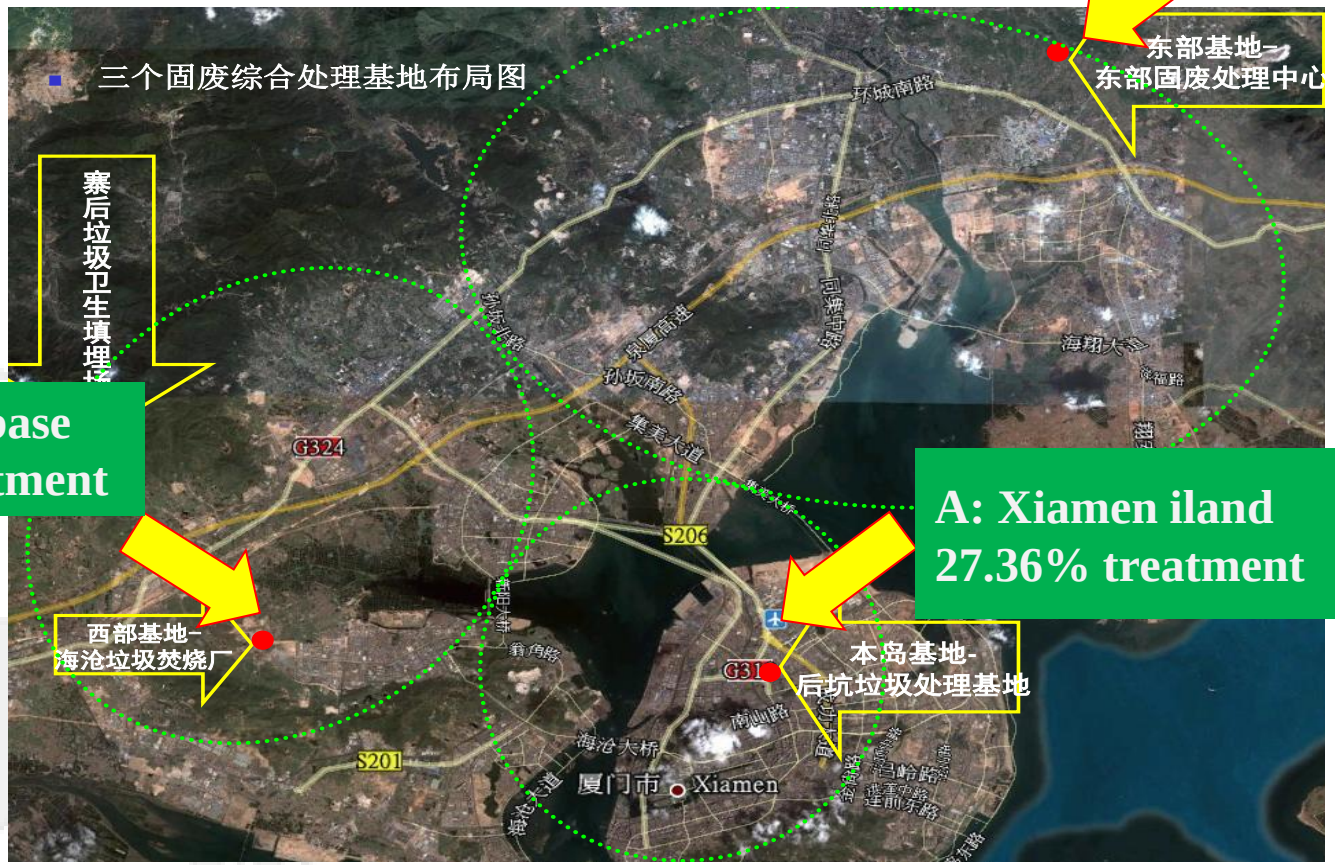
Average MSW growth rate: 10.36% per year



MSW treatment facilities in Xiamen

- ✓ **Extremely difficult to find new places for new construction;**
- ✓ **Effects of "NOT IN MY BACK YARD" are severe.**

C: Estern base 62.09% MSW treatment

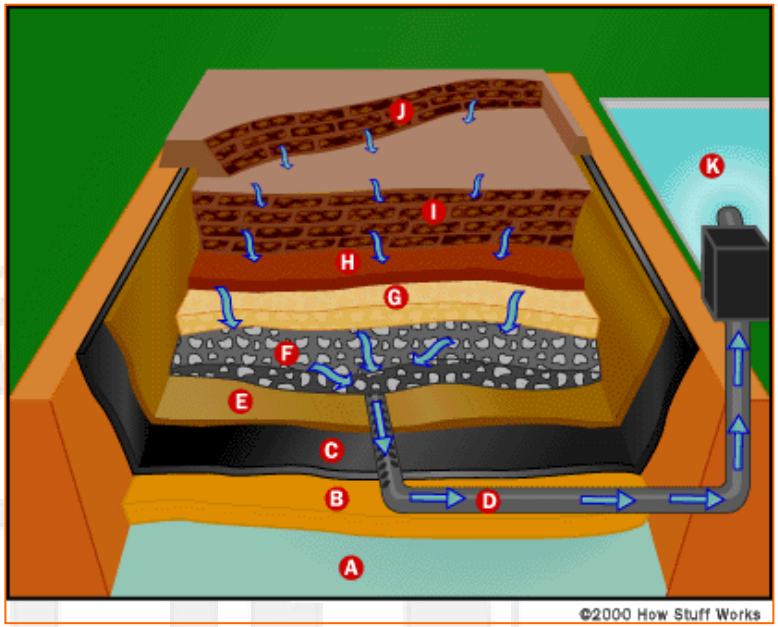


B: Western base 10.55% treatment

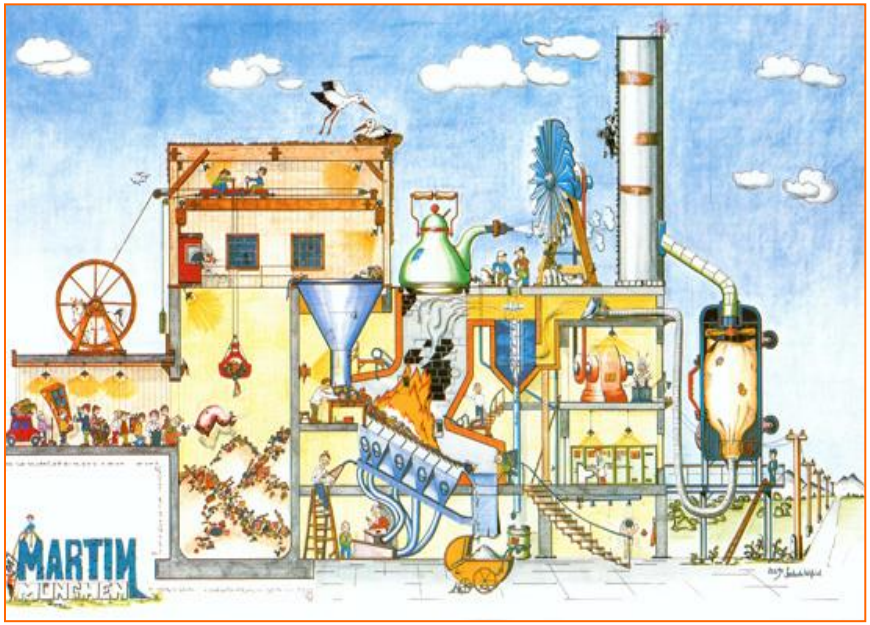
A: Xiamen iland 27.36% treatment

Problems

- The construction of MSW treatment facilities can not satisfy the growth of MSW production.
- To reduce MSW production initially by sorting becomes very urgent.



Landfill



Incineration

Why we need MSW sorting

- **MSW reduction:** to reduce MSW and environmental pollution
- **Recycling:** resources should be recycling
- **Harmless:** to remove hazardous materials with specific methods

Examples

Recycling 1 ton paper

- Produce 800 kg paper
- Wood 3 m^3
- Save 300 kg NaOH
- Save 300 kwh electricity

Reduce a large of wastewater

Recycling 1 ton steel

- Save 2500 pounds iron ore
- Save 1000 pound coal
- Save 2/3 electricity
- Save 40 pounds limestone

Reduce pollution and cost

Launch of MSW sorting

In year 2017, MSW sorting was extensively launched in the city.

MSW sorting refers to the component separation on the basis of their properties, components, values, or the requirement of treatment etc.

Legislation

- 《Measures for the management of household garbage classification in Xiamen special economic zone》 were operated at September 10th, 2017.
- At the same time, 20 supporting documents for MSW sorting were introduced.
- More and more legislations are active.

Design the whole process

Harmless waste Recyclab
Food waste Other waste

Sorted waste throw-in

Sorted waste collection

Sorted waste transportation

Sorted waste treatment

Difficulties of MSW sorting

Throw-in classification

- Citizens lack awareness of classification, difficult to form the habit of garbage classification
- Lack of effective publicity and guidance
- Lack of classified supervision system
- Unreasonable arrangement of small area classification barrel

Classified collection

- The cleaning staff of the community mixed rubbish
- High - rise set bucket, classification collection is difficult
- Scavengers pick up trash at will

Classified transportation

- Difficult to plan transit points and routes
- Classified transport capacity is insufficient
- Unreasonable financial input
- Mixed loading of garbage exists
- Transshipment party coordination problem

Classified treatment

- Low accuracy of garbage classification
- Processing effect of sound classification
- Undeveloped, prescriptive,
- Integrated classification and processing system

Step 1: MSW throw in

Recognize the sorting bins

Government role

(1) Leadership of MSW sorting

- Set up a municipal leading group for the MSW sorting;
- The mayor serves as the group leader;
- The deputy mayor was appointed as the general director.

(2) All functional departments participated

- The 26 municipal government departments are responsible for waste sorting;
- Each department of their own duties, mutual coordination and joint management.

Full public participation

- Distributed more than 500000 MSW Sorting **Promotion Manual**;
- **Media**: TV, broadcast, news paper, internet, wechate, etc., to cover the whole city;
- Provide MSW **sorting assistants**: 5 staff in per street, 3 staff and 1 investigator. For the whole city, 659 managers, 3300 investigators, 3324 volunteers.

电视宣传

楼宇梯视

公交车身

户外显示屏

Students play important roles

Three kinds of MSW Sorting Basic Knowledge were issued in Middle, Primary schools and Kindergartens.

Step 2: collection and transportation

Design transportation routes for different sorting wastes

Harmful wastes — 有害垃圾 Harmful waste

All collected from the city transport to Dongbu center

District	Treatment base
Daonei, Haichang	Houkeng base
Jimei, Tong'an, Xiang'an	Eastern center

Food wastes — 厨余垃圾 Kitchen waste

District	Treatment base
Daonei	Houkeng sanitary base
Jimei, Tong'an, Xiang'an	Eastern center

Other wastes — 其它垃圾 Other waste

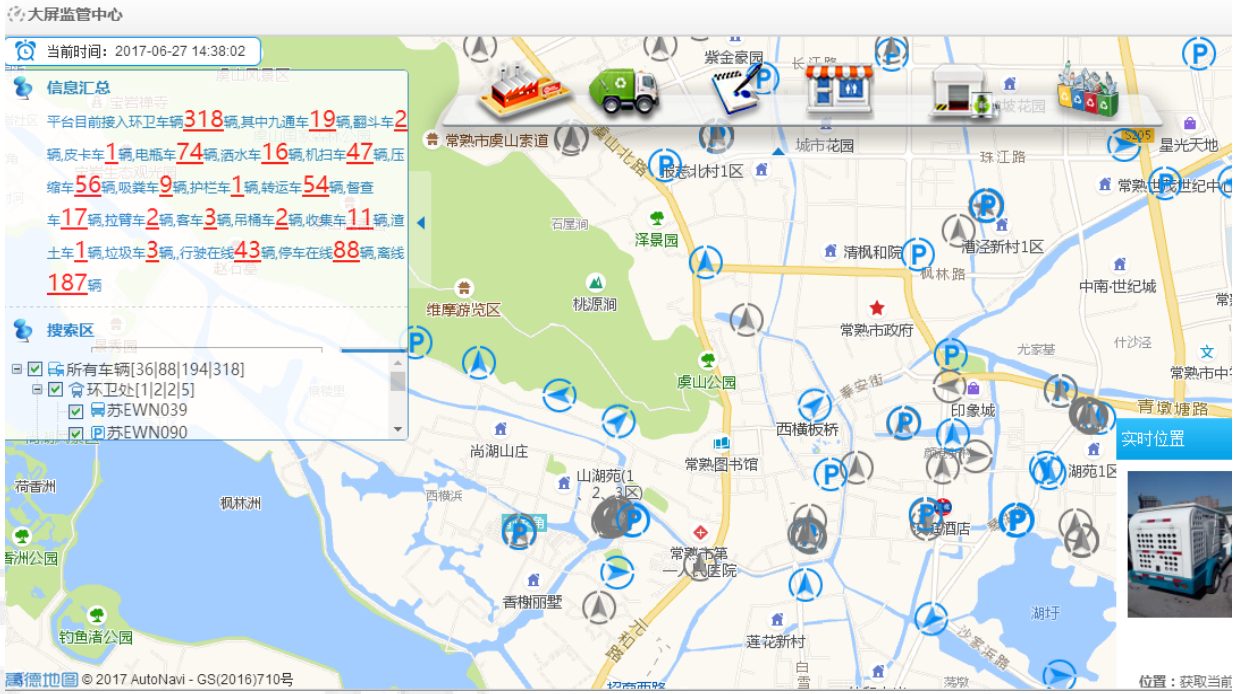
District	Treatment base
Haichang	Western incineration plant

Recycling wastes — 可回收物 Recyclable

All collected from the city go into the net work → Recycling net work

Transportation monitoring

Real-time minitoring



Van and vehicle monitoring

- Vehicle positioning and track supervision
- Vehicle operation status management
- Vehicle fuel consumption management
- Illegal operation of vehicles
- Vehicle video management
- Vehicle statistical analysis

Step 4: MSW treatment bases

- ✓ To improve the treatment capacity, from 5000 t/d to 7500 t/d;
- ✓ To diversify the treatment processes for different wastes.

Western landfill

Food waste recycling plant

Western incineration plant

Eastern incineration plant

Eastern landfill

Houkeng MSW sorting plant, transfer station and incineration plant

Treatment facilities

Incineration plant

New incineration tech.

Food waste digestion

Landfill gas treatment

Landfill site

Leachate treatment

Food waste treatment

厨余垃圾
PANTONE 562C

Collect everyday

Transport by bus station

Sorting

Anaerobic digestion

Biogas power generation

Harmful waste treatment

有害垃圾
PANTONE 703C

Regular collection

Transportation with special vehicle

Transportation

Treatment center for harmless waste

Other waste treatment

其它垃圾
PANTONE 137C

Regular collection

Cleaning bluiding

Condense/trans port station

Clean transport

Incineration

Landfill

Recyclable processing

可回收物
PANTONE 660C

Recycling bin collection

Use of present recycling system

“Smart Sanitation” (Supervision)

Traditional operation

- Experienc
- People
- Quantifie
- Graded

Big data 大数据

Internet of thing

Cloud calculation

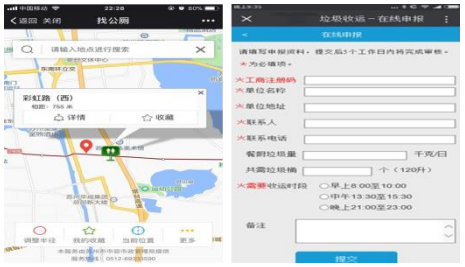
Mobile internet 移动互联网

Modern operation

- Data
- System
- Quanlifie
- Flat

Wechat, Q&R code

AI MSW house



Mobile application

Interface of “Smart Sanitation”

Base comprehensive supervision system

Garbage classification and reduction management system

Environmental operation intelligence evaluation system

Collection management system

The wisdom of eat hutch

Environmental health business supervision system

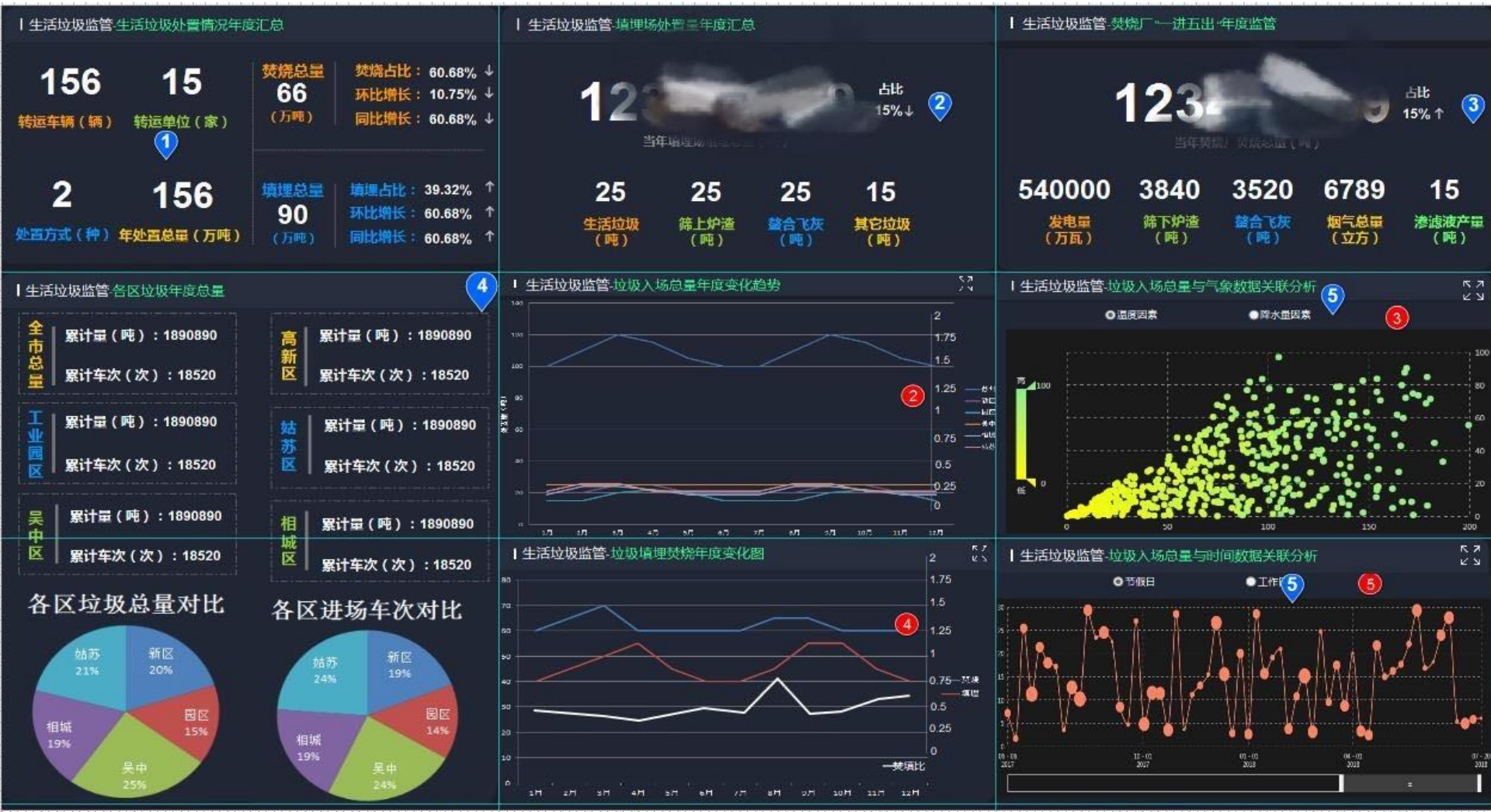
Sanitation vehicle control

Infrastructure regulation

Supervise the cleaning of public toilets

Back-Stage management

Smart monitering

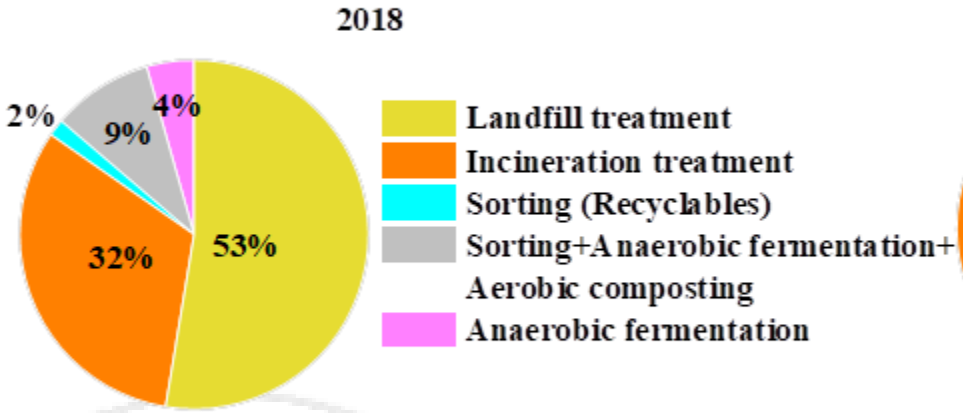


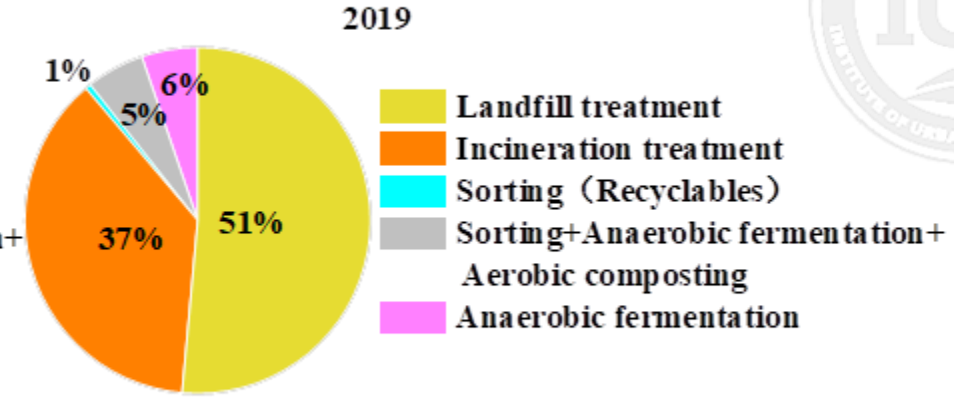
Monitoring platforms for vans and vehicles

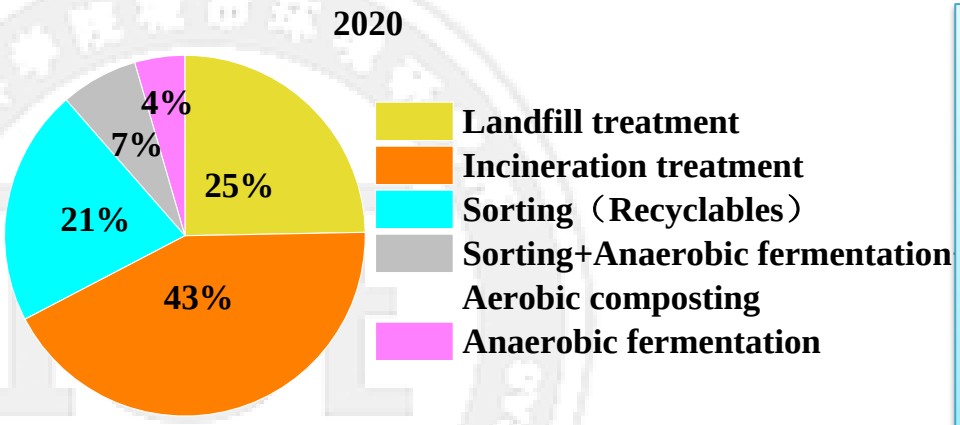
Combining 3 platforms, which monitor 504 vans and vehicles, such as 50 road cleaning vehicles, 39 water carts.

Performance

- ✓ **In 2020, an average of 1530 T/d recyclables was sorted;**
- ✓ **MSW treatment capacity decreased from 5526 T/d in 2019 to 5066 T/d in 2020**







Year 2018-2020：

- ➢ The proportion of **landfill treatment** is significantly reduced to ZERO at 2020.
- ➢ **Incineration treatment** is becoming the main mean. The proportion of **recyclables** is significantly increased.

Outlook: Year 2021-2035

To boost the city targets on “Carbon Peak” (2025) and “Carbon Neutrality”(2055):

- ✓ **To popularize fine MSW sorting;**
- ✓ **To promote wide use of new energy vehicles on MSW transportation;**
- ✓ **To boost biological degradation on organics and reduce incineration;…..**

Thank you for attention