

I • SEOUL • U

# SEOUL

## Municipal Waste Collection & Treatment



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RECYCLABLE

# 1.INTRODUCTION

# I About Seoul

- Land Area : **605.25 km<sup>2</sup>**  
(0.6% of total national area)
- Population (2015) : **10 million**  
(20% of Korea's total population)
- Population Density : **17,070/ km<sup>2</sup>**

## Madrid

- Land Area: 605.7km<sup>2</sup>
- Population : 3.2 million
- Density : 5,283/km<sup>2</sup>

- Type of Residence : **1,578,361** multifamily housing  
(43.4% of the total 3,637,605 houses)

사람, 문화, 자연이 하나로 소통하는  
건강과 휴식, 편리함이 있는 주거 중심 단지로 설계됩니다



- Administrative Zones : **25 Districts(Gus)**  
(423Dongs)

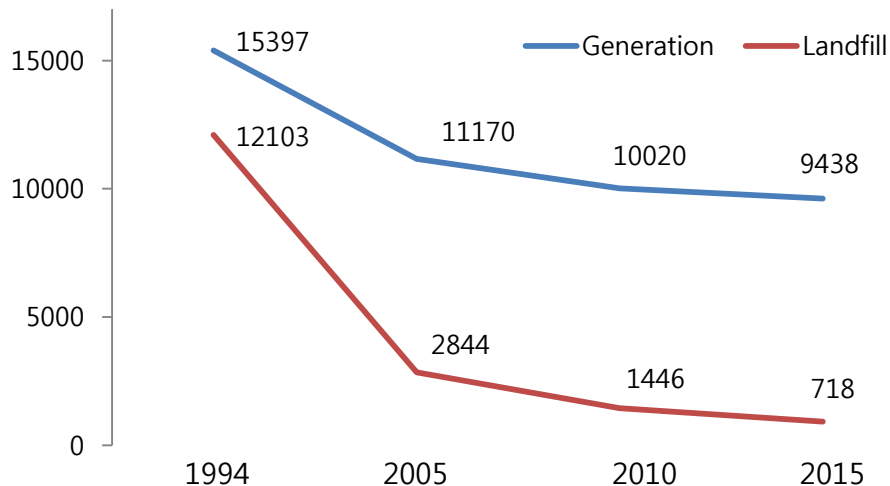
# Current Status on Waste Generation

- Waste Generation : 42,065 tons/day(2015)

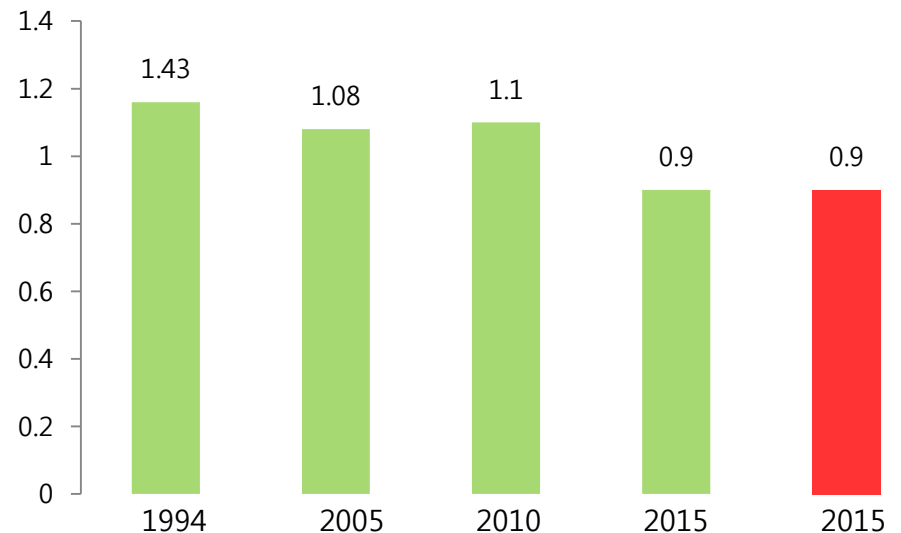
(unit : tons/day)

Type	Total	Municipal	Industrial	Construction
Generation(%)	42,065	9,438(22%)	2,237(5%)	30,035(71%)

**Municipal Waste Generation**



**Per capita daily municipal waste generation**



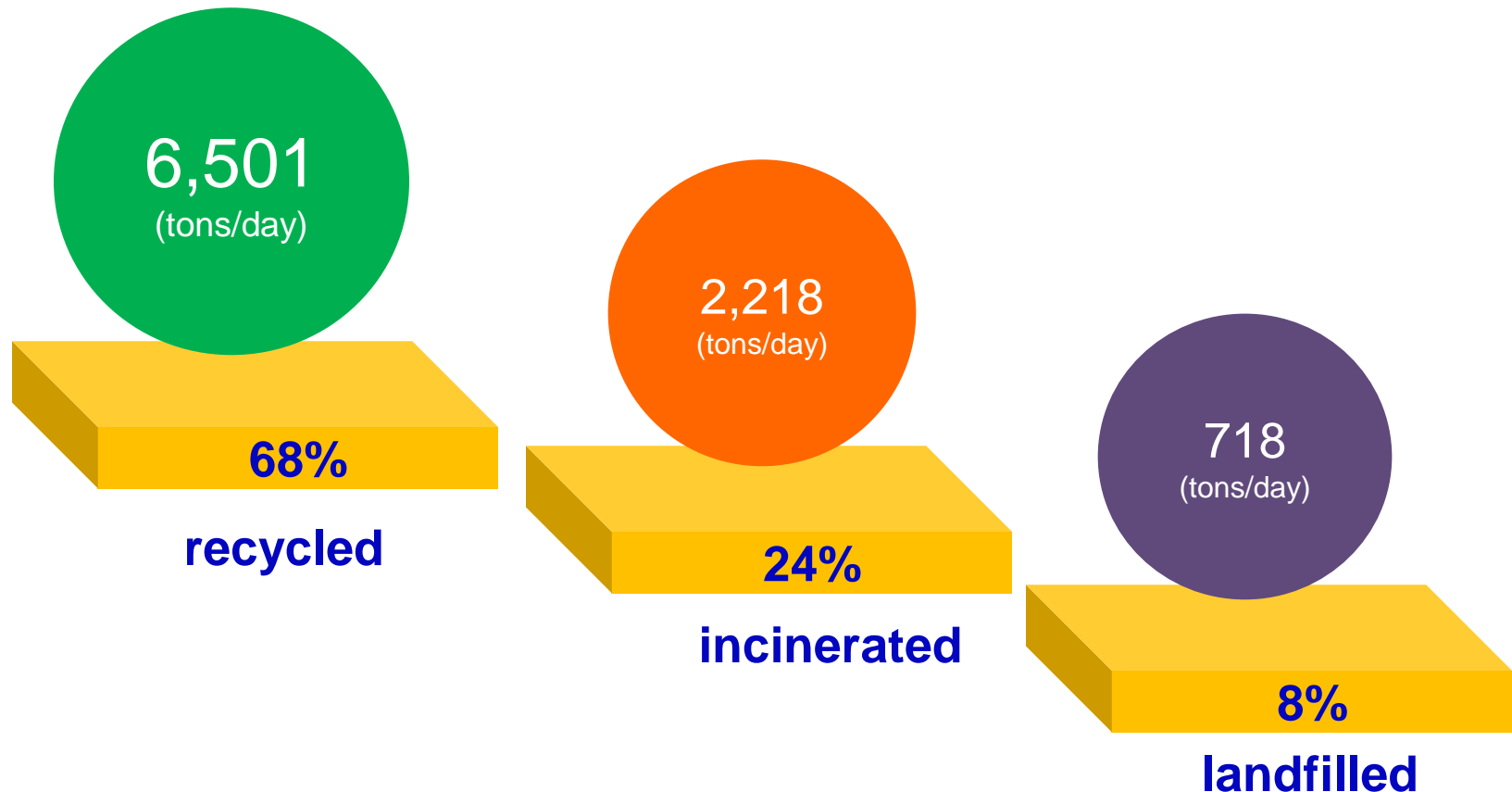
- Waste generation has fallen by 40% since 1995 ( Pay-As-You-Throw was introduced in 1995)
- Waste sent to landfill fell by 94%
- Per capita waste generation in 2015: 0.9 kg



# Statistics on Municipal Waste Generation

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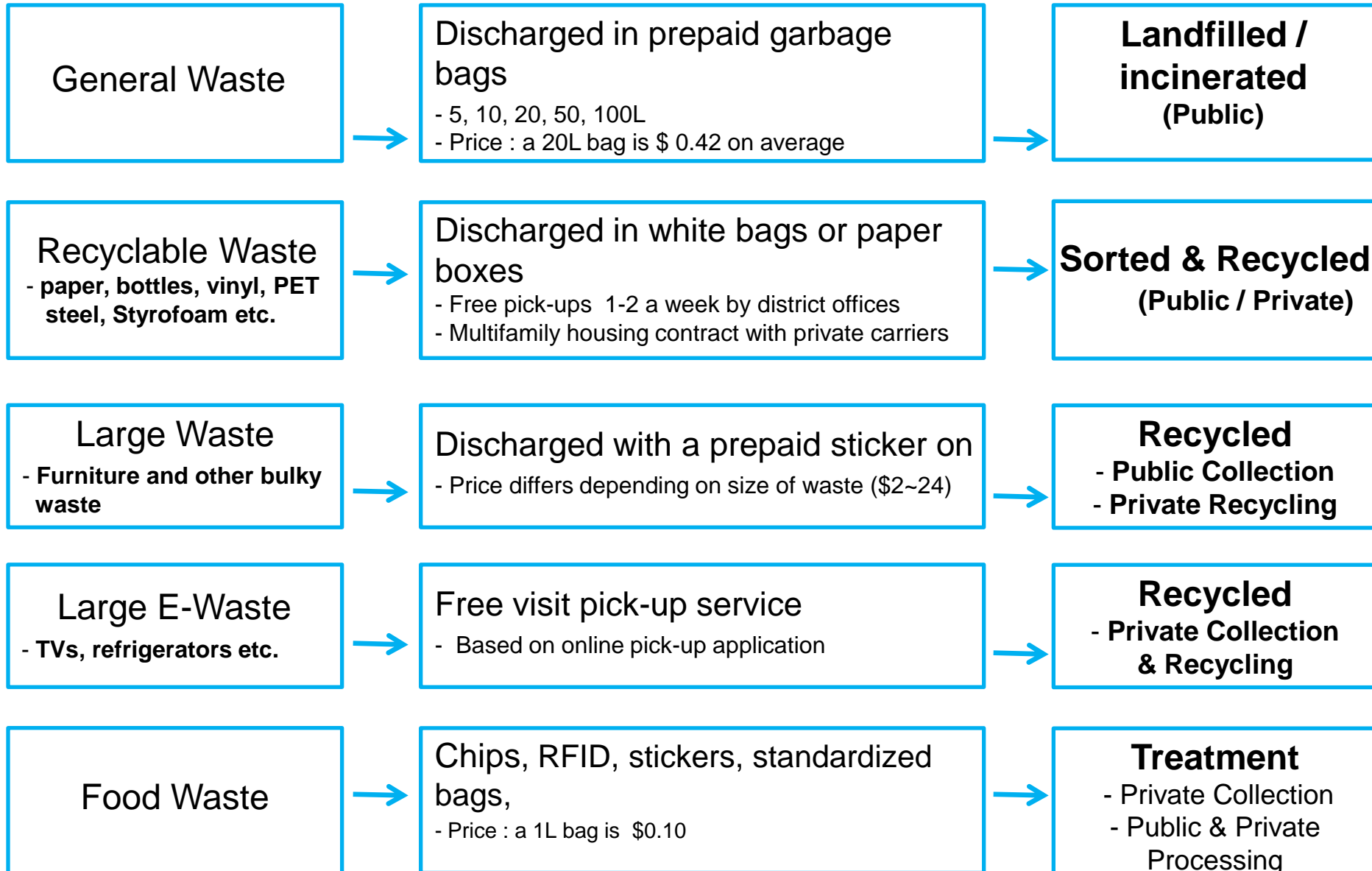
**68% of the 9,438tons of daily municipal waste generation is recycled**



A red car is being lifted by a crane inside a large white structure. The car has Korean text on its side. The structure is made of white panels and has a large opening. The background shows a blue sky with clouds and a grassy field.

## 2. Municipal Waste Collection

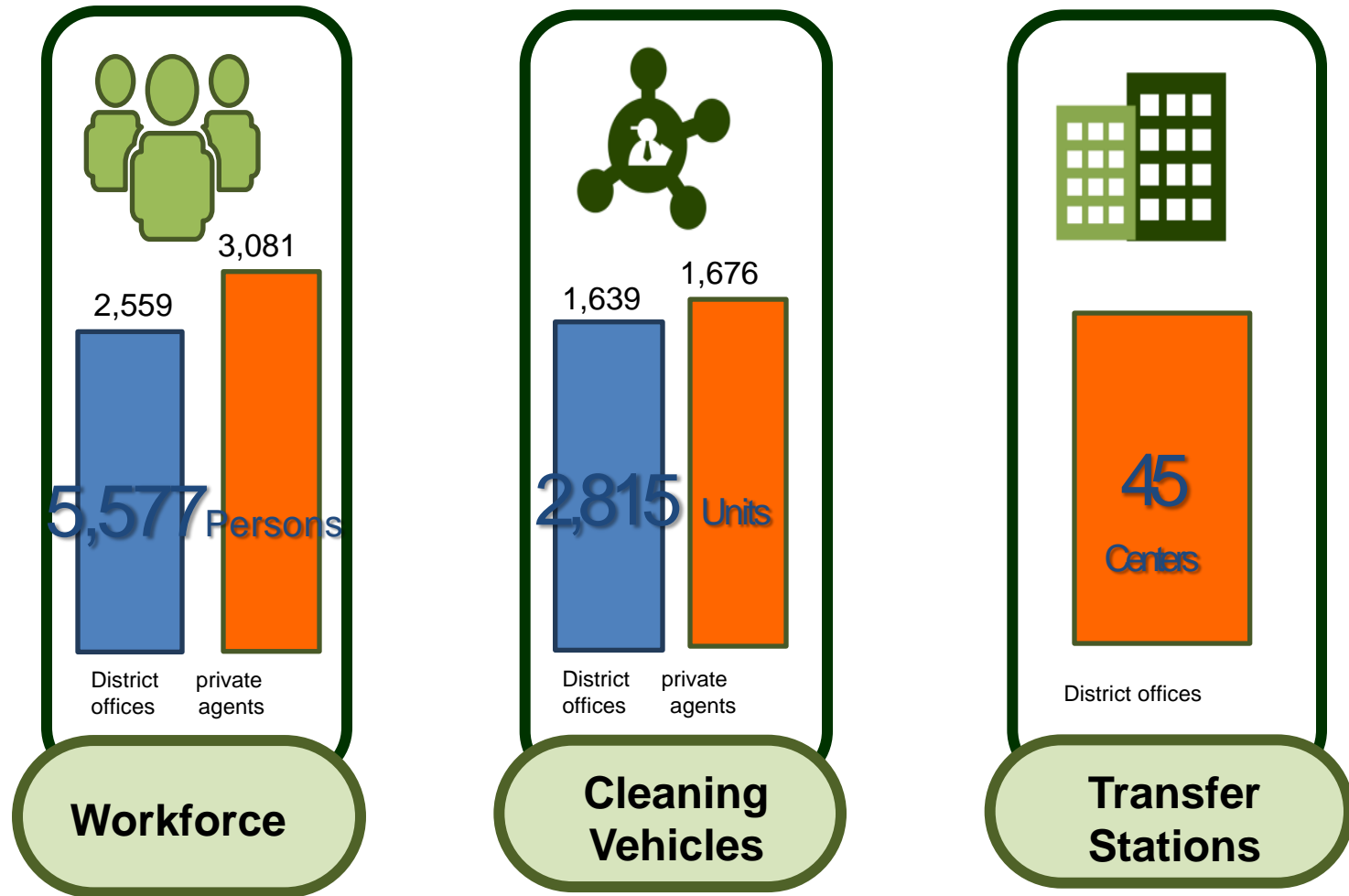
# Municipal Waste Management





# Municipal Waste Collection & Transportation

- **Street Cleaning** : Street cleaners directly hired by district offices
- **General Waste Collection & Transportation** : Private agents



# Pay-As-You-Throw for Municipal Waste

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● **Launched** : January 1995

● **Purpose** : To reduce waste and ensure fairness  
by attributing the cost to waste generators

- Waste must be thrown out in standardized bags at the designated places

## ● **Type of Prepaid Garbage Bags**

- Volume of General Bags: 3ℓ, 5ℓ, 10ℓ, 20ℓ, 30ℓ, 50ℓ, 75ℓ, 100ℓ
- Volume of Bags for Reuse : 3ℓ, 5ℓ, 10ℓ, 20ℓ
- Volume of Public Bags : 30ℓ, 50ℓ, 100ℓ
- **Volume of Disposable Plastic bag : 3ℓ, 5ℓ**
- ※ Separate Production : Bags for Landfill(nonflammable) and  
Bags for Incineration(flammable)

# Pay-As-You-Throw for Municipal Waste



Prepaid bags for reuse



Prepaid bags for reuse



# Pay-As-You-Throw for Municipal Waste

## ● Revenue and Processing Cost of Standardized Garbage Bags

- Revenue from Prepaid Garbage Bags(2015) : \$96.1 million  
※ 31% of Processing Cost
- Processing Cost (2015) : \$309 million

## ● Price of 20-liter Standardized Garbage Bags

2015 (Before price increase)	2015 (After price increase)	2017
<ul style="list-style-type: none"><li>● Lowest price : \$0.30</li><li>● Highest price : \$0.35</li></ul>	<ul style="list-style-type: none"><li>● Standard Price : \$0.35</li></ul>	<ul style="list-style-type: none"><li>● Standard Price : \$0.42</li></ul>



# Pay-As-You-Throw for Food Waste

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## ● **Launched** : January 2005

- Flat Rate for food waste collection at multifamily houses and free collection of waste were banned in July. 1. 2013

## ● **Purpose** : To reduce waste and ensure fairness by attributing the cost to waste generators

## ● **Type of Prepaid Food Waste Bags**

- Volume of Standardized Containers : 2ℓ, 3ℓ, 5ℓ, 10ℓ, 20ℓ, 60ℓ, 120ℓ
- Volume of Standard Bags : 1ℓ, 2ℓ, 3ℓ, 5ℓ, 10ℓ

## ● **Food Waste Generation** : 3,181tons/day( as of 2014)

- Animal Feed(2,020 tons, 64%) , Compost(789 tons, 25%),  
Energy(91tons, 3%), Prototype(281ton, 8% )

# Pay-As-You-Throw for Food Waste

## Food Waste Discharging Methods



Gradual ban of use



Single households,  
Small restaurants



Multifamily housing /  
Large restaurants



Resident card  
needed  
(1.75million won  
per unit)



Food waste  
collection  
by vehicles  
(Dobong, Mapo,  
yangchen)

# Pay-As-You-Throw for Food Waste



# Pay-As-You-Throw for Food Waste

## ● Revenue and Processing Cost of Standardized Garbage Bags

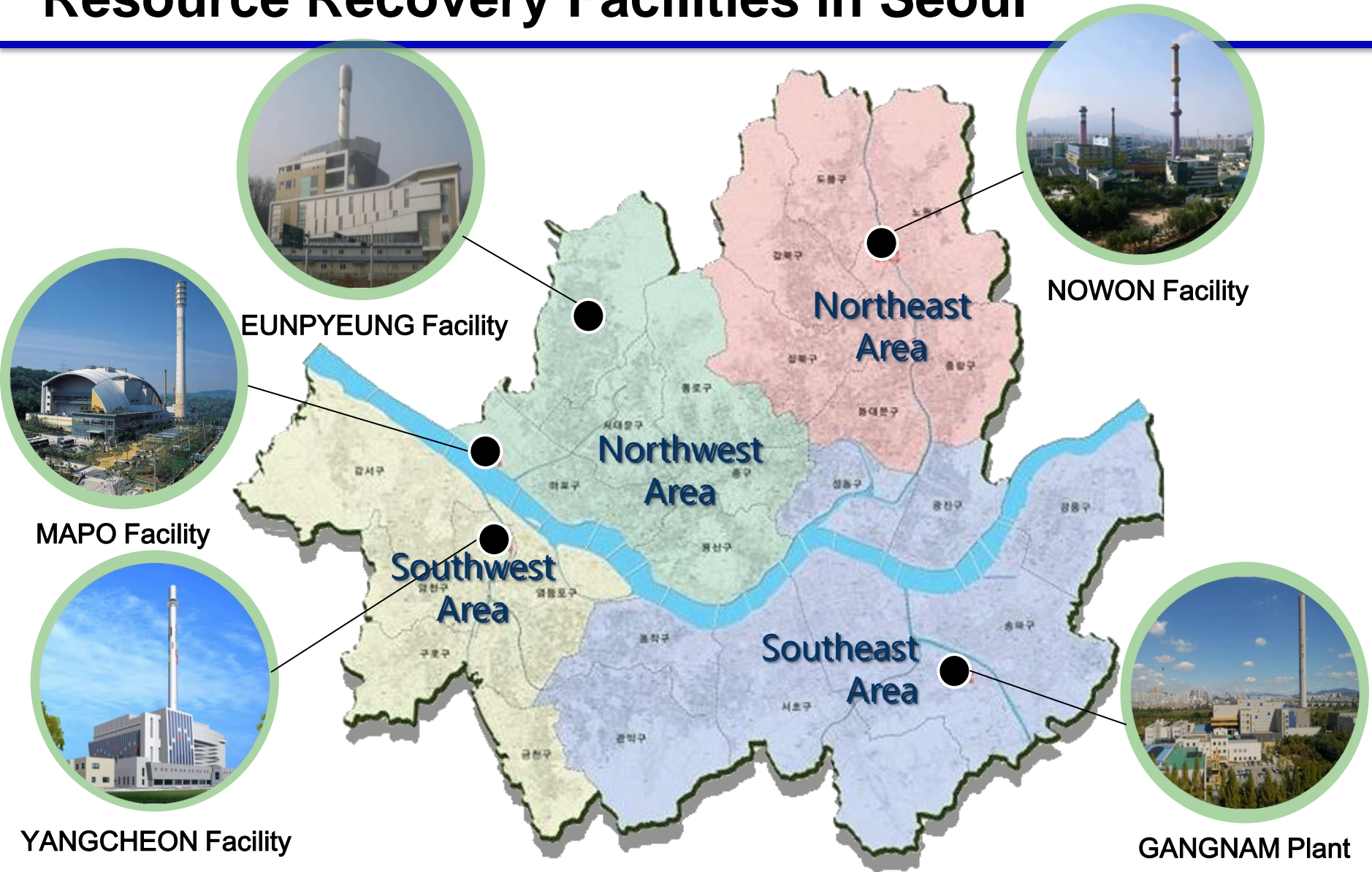
- Revenue from Prepaid Garbage Bags(2015) : \$5.19 million  
× 41% of Processing Cost
- Processing Cost (2015) : \$1.26 million

## ● Price of 2-liter Standardized Garbage Bags

2015 (Before price increase)	2015 (After price increase)	2017
<ul style="list-style-type: none"><li>● Lowest price : 40won</li><li>● Highest price : 160won</li></ul>	<ul style="list-style-type: none"><li>● Lowest Price : 140won</li><li>● Highest Price : 190won</li></ul>	<ul style="list-style-type: none"><li>● 190won</li></ul>



# Resource Recovery Facilities in Seoul



# Resource Recovery Facilities in Seoul

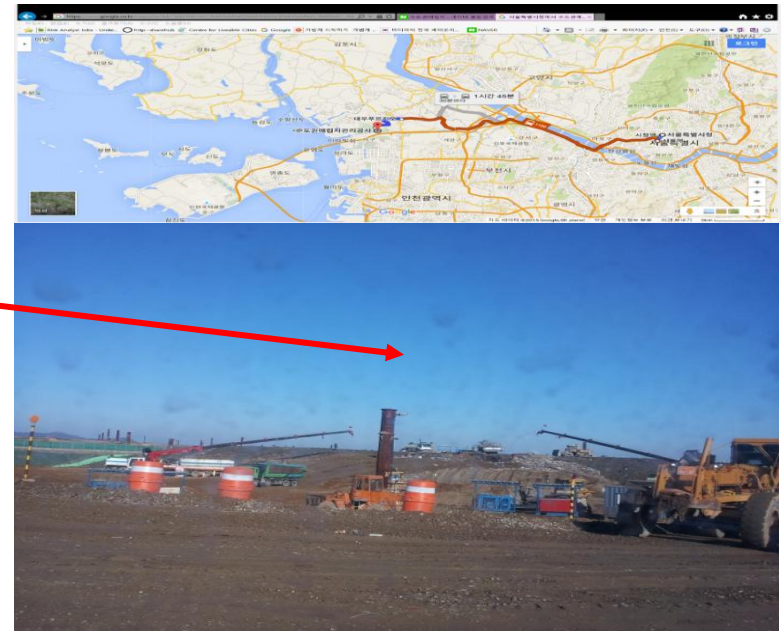
Name of Facilities by area	Volume (Tons/Day)	Districts Using the Resource Recovery Facilities	Waste Take-in Started	Date of co-using agreement
Total	2,850	23(Districts)		
Southwest (Yangcheon)	400	Yangcheon, Yeongdeungpo Gangseo,Guro (Kwangmyung Plant)	Dec 26 2006	May 10 2010
Northeast (Nowon)	800	Junngang, Sungbuk, Gangbuk, Dobong, Nowon, Dongdaemun	Jan 26 2008, Feb 2 2012 (Dongdaemun)	June 30 2007
Southeast (Gangnam)	900	Gangnam, Gangdong, Gwanak (Section), Seocho, Gwangjin, Dongjak, Sungdong, Songpa	May 10 2007	May 7 2007
Northwest (Mapo)	750	Jongno, Junggu, Yongsan, Seodaemun, Mapo	May 2005 (Yongsan, Junggu), Feb 2009 (Seodaemun, Jongno)	Feb 10 2009

※ Districts that do not use the facilities : Geumcheon and Eunpyeong

In Eunpyeong a separate small-size facility(48 tons/day), which was built during development of a new town is in operation

## : Sudokwon(首都圈) Landfill Sites

- **Located near the coast of Incheon City** (40km west Seoul City Hall)
  - First landfill site(3.08 km<sup>2</sup>) : expired (1992~2000)
  - Second landfill site(3.56 km<sup>2</sup>) : 90% landfilled (2000~current)
  - Third landfill site(1.03 km<sup>2</sup>) : Under construction(2015~2018)







### **3. Recyclable Waste Collection**





**Given changes in national waste management policies,  
And local conditions surrounding Seoul,**

## **Seoul Focuses on Waste Reduction & Recycling**

- **Curb direct landfilling(producing odor), increase incineration and introduce incineration and landfilling charges according to Resource Circulation Act**
- **Difficulties in securing sites for additional waste processing facilities due to public resistance and lack of space etc.**

# WASTE REDUCTION AND RECYCLING TARGETS

## REDUCTION

2014  
3,088ton/day



2015  
2,921ton/day



2016  
2,931ton/day

## RECYCLING

2014  
67%



2018  
71%



2020  
73%

# Recyclable Waste Separation and Discharge

## Multifamily Housing such as apartment buildings

● Recyclable items : Paper, Paper Pack, Plastic, Styrofoam, Bottle, Metal, Vinyl etc.



Discharge at any time

OR



Weekly discharge  
(once or twice a week)

# Recyclable Waste Separation and Discharge

## Single Houses

- All recyclables are put in one transparent bag and discharged outside houses
- Stationary Collection Bins : Recyclables are separated before getting discharged
- Recycling Station(portable) : Paper, plastic, styrofoam, bottles, metals, vinyls



Discharged in bags outside houses



Stationary Collection bins



Portable Collection Bins  
(Once or Twice a week)



# Recyclable Waste Separation and Discharge

## Commercial districts

- All recyclables are put in one transparent bag and discharged outside stores on the streets



On the street



In front of stores

# 「Recycling Stations」 at residential areas

## Shift in Discharging Spot : **Outside doors** → **Designated spots**

- Operating hours : pick-up at designated time by district offices  
( more than twice a week)
- Installed spots : public parking lots, unused spaces, playgrounds etc.
- Stations are built within 50~100m radius of single houses  
(One station per 100 to 150 households)
- Stations are managed by the elderly residents designated by district offices as resource managers

### Effects

- Cleaner neighborhoods
- Job creation for the elderly
- More recyclable collection
- Raised awareness of recyclable separation



- Seoul aims to increase the number of recycling stations to 3,000 by 2020

2014

611

2015

1,786

2018

2,100

2020

3,000

# Free Door-to-Door Pick-up for Large E-waste



Free door-to-door pick-up service for large e-waste started in Sept 2012

## Before

- **Fee charged**  
(Prepaid Stickers required)
- **Drop off** at designated spots
- **Pick up** on designated dates



## After

- **Phone call for reserving a pickup date**
- **Free pick-up and processing**  
by  
**Korea Association of Electronics Environment**

Boost citizens' convenience and environmentally friendly treatment of e-waste

# Clothing Collection Bins

## Design Improvements



<Standardized design adopted in 2012>

Number of clothing collection bins installed  
: 17,100 units in 2016

## Clothing Recycling Management

- Overview
  - Sign business agreements with prospective recyclers
  - Develop guidelines for clothing recycling management
- Agreements & Guidelines
  - Designate location of clothing collection bins
  - Require compliance with standardized design
  - Ensure financial(profits) transparency
- Recycling Managers
  - Disability Association, Group of People with National Merit, Recycling Association
- Management Criteria
  - Required equipment(over one vehicle) according to the Waste Control Act must be secured by managers
  - Managers must report their recycling progress

# Seoul Metal Recovery Center

- **Seoul Metal Recovery Center was built as a social enterprise** within Jungnang Sewage Treatment Center in December 2012
- **Recover metal** from small sized e-waste and discarded mobile phones
- **Job creation for the underserved**





# Recycling Centers

- Number of Recycling Centers : 35 (1~2 centers operated by the district offices)
- Function : sell used/recycled products such as furniture, appliances etc.
- Website : <http://fleamarket.seoul.go.kr>
- Prices are 70% lower than new products.



Gangdong Recycling Center



Furniture



Appliances, sofa

# Recycling Sorting Centers

- Number of centers: 15 (1 directly managed by Seoul, 14 operated by private agents)
- Function : sort both manually and automatically collected recyclables into item by item



Collected recyclables take-in



automatic sorting



manual sorting



Compressing

경청해 주셔서  
**감사합니다**

**Thank you !!**