THE CITY OF RESOURCE CIRCULATION, SEOUL
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>Prior to Nanjido Landfill</td>
</tr>
<tr>
<td></td>
<td>- Early 1960s Utilization of housing lots, reservoirs, and other areas as waste landfills</td>
</tr>
<tr>
<td></td>
<td>- Mid-1960s Operation of small landfill sites</td>
</tr>
<tr>
<td></td>
<td>(Gunja-dong, Sangwolgok-dong, Eungam-dong, Yeomchang-dong, Bangbae-dong, Jangan-dong, Apgujeong-dong, Guui-dong, Cheongdam-dong, Songjeong-dong, etc.)</td>
</tr>
<tr>
<td>1978-1993</td>
<td>Creation &amp; Use of Nanjido Landfill</td>
</tr>
<tr>
<td></td>
<td>- Disposal of majority of Seoul waste</td>
</tr>
<tr>
<td></td>
<td>- 1993 Creation of Haneul Park and Noeul Park following closure of landfill</td>
</tr>
<tr>
<td>1992</td>
<td>Creation &amp; Use of Metropolitan Landfill Sites</td>
</tr>
<tr>
<td></td>
<td>- Creation &amp; operation of landfill sites by Seoul and the Ministry of Environment for disposal processing of metropolitan region waste</td>
</tr>
<tr>
<td></td>
<td><strong>Location:</strong> Vicinities of Seo-gu, Incheon &amp; Yangchon-myeon, Gimpo</td>
</tr>
<tr>
<td></td>
<td><strong>Size:</strong> 16,180,000 m²</td>
</tr>
<tr>
<td></td>
<td><strong>Regions:</strong> Used by 64 cities, counties, and districts, including Seoul, Incheon, and Gyeonggi-do Province</td>
</tr>
</tbody>
</table>
INCINERATION
From Landfill to Incinerator

- Alteration of method for residential waste disposal processing from landfill sites to incineration plants
- Establishment of construction plan for 11 regional WtE facilities (process 16,500 t/day)
- Establishment (Change) of installation plan for one incineration plant per district
- Experience of difficulty securing Seoul land site for expansion & convincing residents
- Establishment of regional expansion plan for 13 locations according to government-based principles of regional waste processing (process 7,500 t/day)
- Installation & operation of final four region WtE facilities located in Yangcheon, Nowon, Mapo, Gangnam, and other district areas (process 2,850 t/day)
- Shared use of facilities among 22 districts

CATEGORIZING RECYCLABLES

- Introduction of nationwide Volume-based Waste Fee System
- Implementation of system encourages sharp increase in volume of sorted recyclables
- Implementation of Volume-based Food Waste Fee System (single-family houses, business operation facilities)
- Introduction of Weight-based Waste Fee System (RFID) in shared housing units
WASTE GENERATION

Residential waste: 9,217 tons (19.9%)
Construction waste: 34,846 tons (75.4%)
Medical waste: 146 tons (0.3%)
Waste from commercial waste discharge facilities: 1,831 tons (4.0%)
Designated waste: 180 tons (0.4%)

Amount of waste: 46,220 t/day (as of 2017)
## CURRENT STATUS OF RESIDENTIAL WASTE PROCESSING

<table>
<thead>
<tr>
<th>Year</th>
<th>Landfill (t/day)</th>
<th>Recycling (t/day)</th>
<th>Incineration (t/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>12,103</td>
<td>3,159</td>
<td>135</td>
</tr>
<tr>
<td>1995</td>
<td>9,893</td>
<td>4,137</td>
<td>72</td>
</tr>
<tr>
<td>1996</td>
<td>9,249</td>
<td>4,116</td>
<td>320</td>
</tr>
<tr>
<td>2000</td>
<td>5,664</td>
<td>5,147</td>
<td>627</td>
</tr>
<tr>
<td>2004</td>
<td>6,426</td>
<td>4,498</td>
<td>749</td>
</tr>
<tr>
<td>2008</td>
<td>7,509</td>
<td>2,027</td>
<td>1,910</td>
</tr>
<tr>
<td>2012</td>
<td>6,005</td>
<td>2,465</td>
<td>719</td>
</tr>
<tr>
<td>2014</td>
<td>6,424</td>
<td>2,263</td>
<td>927</td>
</tr>
<tr>
<td>2015</td>
<td>6,501</td>
<td>2,218</td>
<td>719</td>
</tr>
<tr>
<td>2016</td>
<td>6,550</td>
<td>2,292</td>
<td>766</td>
</tr>
<tr>
<td>2017</td>
<td>6,180</td>
<td>2,238</td>
<td>799</td>
</tr>
</tbody>
</table>

The amount of buried waste decreased by 94%.
The amount of recycled resources doubled.
Recyclables
Recyclable items being disposed of by households or commercial buildings must be disposed of in clear plastic bags or categorized according to the type of material. These items must then be thrown away on a designated day, in a designated place, to be collected free of charge.

Bulky Waste (furniture)
Stickers must be purchased and attached to the furniture

Bulky Waste (home electronics)
Advanced pickup arrangement is required to throw away large electronic appliances free of charge

<table>
<thead>
<tr>
<th>Type</th>
<th>Item</th>
<th>Disposal Tips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>Newspapers, flyers, boxes, etc.</td>
<td>Dispose in dry, bulk state</td>
</tr>
<tr>
<td>Paper pack</td>
<td>Paper packs, paper cups</td>
<td>Dispose in compressed state after emptying contents and rinsing with water</td>
</tr>
<tr>
<td>Cans / Scrap Metal</td>
<td>Iron cans, aluminum cans, tools, wires, stainless steel, aluminum, etc.</td>
<td>Dispose after emptying contents / dispose compressed cans after puncturing</td>
</tr>
<tr>
<td>Glass bottles</td>
<td>Beverage bottles, glass bottles</td>
<td>Dispose after emptying contents and removing foreign matter</td>
</tr>
<tr>
<td>Plastic</td>
<td>PET, plastic containers</td>
<td>Dispose after emptying contents and removing foreign matter</td>
</tr>
<tr>
<td>Styrofoam</td>
<td>Containers, Styrofoam waste</td>
<td>Dispose after emptying contents and removing foreign matter</td>
</tr>
<tr>
<td>Vinyl</td>
<td>Snack &amp; noodle bags, plastic bags, etc.</td>
<td>Dispose waste with stained foreign matter in clear plastic bags following a thorough rinse</td>
</tr>
<tr>
<td>Fluorescent lights</td>
<td>Fluorescent lights, three-wavelength lights, etc.</td>
<td>Dispose in designated areas without breaking</td>
</tr>
<tr>
<td>Batteries</td>
<td>Batteries, rechargeable batteries, etc.</td>
<td>Dispose in exclusive disposal containers located in designated areas</td>
</tr>
<tr>
<td>Fabric</td>
<td>Clothes, cotton blankets, throws, etc.</td>
<td>Dispose clothing and blankets without cotton filling in clothing containers</td>
</tr>
<tr>
<td>Electronic waste</td>
<td>Computers, washing machines, refrigerators, etc.</td>
<td>Dispose small household appliances in exclusive containers / dispose large household appliances by requesting free collection</td>
</tr>
</tbody>
</table>
Recyclables
Maintenance

Material Recovery Facility

Function: Separated & categorized processing of disposed recyclables
Public sorting facilities in districts: A total of 16 facilities
Sorting amount: 802 t/day
※ Districts without sorting facilities use those in a neighboring district or outsource the job to a private sorting facility.

Collection of recyclable items
Transportation of recyclable items
Sorting
Sales

Waste from households or commercial buildings
Transportation of recyclable items to public or private sorting facilities
PET, bottles, cans, paper, vinyl
Sale of recyclable items to recycling companies
**Seoul Resource Center**

**Function:** Breaks down disposed household appliances and refurbishes usable parts for retail

**Amount of collected metal:** 3,600 t/year

**Sales profit:** KRW 1.3 billion (as of 2018)

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**Small-sized electronic waste**

Electronic rice cookers, computers, fans, cell phones, etc.

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**Urban Metal Collection Center**

Operated by social enterprises (established in December 2009)

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**Dismantling**

Metals and plastics

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**Sales**

Sold to recycling companies
EXTENDED PRODUCER RESPONSIBILITY (EPR) SYSTEM

- Start of Implementation: January 2003
- EPR-designated goods
  - Packaging: Four kinds, including aluminum cans, glass bottles, cartons, and synthetic resin packaging
  - Products: Eight kinds, including batteries, tires, lubrication oil, fluorescent lights, floating fish cages for fish farming, electronics, wrapping film for silage bales, and laver drying screens
- Obligation Rate of Recycling per Item (2019)

<table>
<thead>
<tr>
<th></th>
<th>Aluminum cans</th>
<th>Glass bottles</th>
<th>Cartons</th>
<th>Synthetic resin packaging</th>
<th>Batteries</th>
<th>Tires</th>
<th>Lubrication oil</th>
<th>Fluorescent lights</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0.811</strong></td>
<td><strong>0.720</strong></td>
<td><strong>0.305</strong></td>
<td><strong>0.300~0.808</strong></td>
<td><strong>0.200~0.715</strong></td>
<td><strong>0.786</strong></td>
<td><strong>0.745</strong></td>
<td><strong>0.571</strong></td>
<td></td>
</tr>
</tbody>
</table>

- EPR Shared Expenses (2017)
  - Packaging: KRW 161.9 billion  /  - Products: KRW 56.5 billion
- Manufacturers Subject to Mandatory Recycling
  - Packaging: Manufacturers earning over KRW 1 billion per annum, Importers earning over KRW 3 billion per annum
  - Products: Manufacturers & importers of goods subject to EPR
RESIDENTIAL WASTE REDUCTION PROGRAMS

Operation of Recycling Stations at Residential Areas

- Commencement of operation from 2013
- Provision of assistance from resource managers to residents sorting and disposing recyclables in proper containers (payment of allowance: KRW 240,000 per month)
- Improvement of recycling rate and sorting efficiency of recyclables disposed in residential and urban housing areas
RESIDENTIAL WASTE REDUCTION PROGRAMS

- Promotion of reduction policy to decrease landfill waste & other various reduction initiatives
- Public Waste Facility Disposal Management System
  - Introduction in 2015
  - Assigns reduction target within each district community
  - Awards waste processing fee equivalent to 10% of WtE facility collection fee upon achievement of target
  - Imposes penalty upon failure to achieve target

Amount of domestic waste treated per day: 9,217 t/day
(Seoul, as of 2017)

Amount of buried waste: 799 t/day

Amount of recycled or incinerated waste: 8,418 t/day
RESIDENTIAL WASTE REDUCTION PROGRAMS

Mixed Recycling Management

- Conducting of regular inspections to confirm implementation of recyclable sorting in each district
- Imposition of fine up to KRW 1 million upon violation

Description of wastes collected at resource recovery facilities in Seoul in 2017.
Reducing the Use of Disposable Plastic Bags

- Consumption of over 500 billion plastic bags a year all over the world
- Imposes serious threat to the environment and ocean climate & requires more than 500 years to decompose
- Requirement of effort among Koreans to reduce bag use per capita by 370 bags
- Prohibited use of disposable plastic bags at large stores and supermarkets of 165 m² or larger / Prohibited free provision of disposable plastic bags at other wholesale/retail businesses
- Imposition of fine upon violation based on the scale of business and frequency of violation (fine ranges from KRW 50,000 - 3 million)

Enhanced Implementation of Civic Governance

- Establishment of a civic group for waste reduction

  Date of establishment: February 2015  
  Number of members: 32 (30 commissioned members, 2 officials)  
  Professions of members: Civic groups, specialists, religious groups, city councils, press, businesses, youth

  Key Roles
  - Provide policy advice for reduction of domestic waste
  - Develop waste reduction projects
  - Carry out and run waste reduction projects and campaigns
MAINTENANCE OF RESIDENTIAL WASTE

Volume-based Residential Waste Fee System

- Implementation of nationwide Volumed-based Waste Fee System imposing disposal fees according to the amount of waste produced (1995)
- Categorization of disposal bags under general disposal, reuse, and public use
- Offering of various sizes from 1-100 liters

Waste Production, Disposal, & Transport

- Disposal of residential waste, packaged in the proper bags following purchase, at the designated time and place
- Incineration or landfill waste processing following waste collection/transportation by private waste haulers under contract

Cleaning Operation System

- Sorting of waste, including general waste, food waste, and recyclables, by private waste haulers under contract
- Management of street cleaning operations by waste haulers directly employed by the district government
## FOOD WASTE MAINTENANCE POLICY

### Food Waste Disposal Guidelines

<table>
<thead>
<tr>
<th>Government-Issued Bags</th>
<th>RFID</th>
<th>Tax Payment Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food waste must be disposed of in government-issued waste bags purchased at a nearby supermarket and left at a designated place.</td>
<td>The volume of food waste must be measured with an RFID device in order to calculate the disposal fee that is based on the volume of the waste.</td>
<td>A tax payment certificate sticker must be purchased at a nearby supermarket. Food waste must be disposed of in an approved container with the certificate sticker attached to the container and it must be left in a designated place.</td>
</tr>
</tbody>
</table>

- Multi-unit dwellings, single-family houses
- Multi-unit dwellings
- Single-house families, small restaurants
Waste-to-energy (WtE) Plants

Facility capacity (tons/day) / Year of initial operation / Operational rate (% 2018)

※ Shared use of four facilities, among 22 of 25 Seoul districts, located in Yangcheon, Nowon, Gangnam, and Mapo

- Residential Support Funding
  - Establishment of community support funding for those residing within a 300 m radius of WtE facilities
  - Provision of support for expenditures related to heating, apartment maintenance, facility improvements, etc.

- Residential Amenities
  - Installation & operation of community amenities, including a gym, swimming pool, and study room, as supplementary add-on to WtE facilities
  - Offering of approximately 30% service discount for those residing within a 300 m radius of WtE facilities
## SPREAD OF REUSE & SHARING CULTURE

**Flea Market**

Operation of flea markets for the exchange and sales of secondhand daily goods, every Saturday or Sunday, in approx. 300 locations throughout Seoul

<table>
<thead>
<tr>
<th>Category</th>
<th>Gwanghwamun Flea Market</th>
<th>Hangang Ttukseom Flea Market</th>
<th>Regional Flea Market of Each District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venue</td>
<td>Gwanghwamun Plaza</td>
<td>Hangang Ttukseom District</td>
<td>Gu-offices, community service centers, empty lots in apartment complexes</td>
</tr>
<tr>
<td>Operation Period</td>
<td>Every Sunday from April to October (Closed in July &amp; August)</td>
<td>Every Saturday &amp; Sunday from April to October (Closed in July &amp; August)</td>
<td>Usually open on Saturdays and Sundays</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Civic market, peddler, youth market, folk flea market, farmers market, foreigners market, events</td>
<td>Household items, children’s items, vacation items, experience programs for families</td>
<td>Sales &amp; exchange of household items</td>
</tr>
<tr>
<td>Year of Establishment</td>
<td>2013</td>
<td>2004</td>
<td>2003</td>
</tr>
</tbody>
</table>

**Secondhand Goods Thriftshop**

Operation of 32 secondhand goods thriftshops, selling goods donated from households and business operation sites cheaply
# MAINTENANCE OF CITY CLEANING

## Street Cleaning Program

### Seoul 365 Cleaning Task Force
- 69 members in 31 areas of 7 districts
  - Jongno-gu, Jung-gu, Yongsan-gu, Seodaemun-gu, Mapo-gu, Yeongdeungpo-gu, Songpa-gu
- Hours of Operation: 4 p.m. - 10 p.m. (weekdays) / 3 p.m. - 10 p.m. (weekends)

### Seoul Clean Day
- Once a month (the fourth Wednesday of each month from March to November)
- About 100,000 government employees and members of civic groups participate in the event every year
- Cars, sidewalks, and street furniture cleaning

### Self-Alley Cleaning
- 61,355 alleys (6,354 km)
- Voluntary cleaning groups and public cleaning sectors participate in the event
- Alley cleaning, prevention of illegal disposal of waste

### Prevention of illegal disposal of waste in alleys
- Installation of CCTV, black boxes, LED warning signs (for warning & monitoring)
- Vegetable gardens, flower gardens, large flower pots
- Mural paintings, paintings, clean floor zones, etc.
MAINTENANCE OF CITY CLEANING

Operation of Cleaning Trucks

Street Cleaning Vehicle Information System

Purpose: To remove dust on the streets
For: All streets in Seoul (total distance: 24,252 km)
Hours: 11 p.m. – 5 p.m. every day
Method: Use of street washing vehicles and street sweepers

• Scientific and systematic maintenance of road dust cleaning
• Establishment & implementation of cleaning vehicle information system that incorporates the technology of cleaning vehicle devices, GPS satellites, and the Internet
• Real-time monitoring of road cleaning status, including road cleaning routes, current cleaning operations, and more