

## CITIES FOR US

engaging communities and  
citizens for sustainable  
development

# Developing a framework to model resource recycling residential complexes

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KICT

12<sup>th</sup> International Symposium on Urban Planning and Environment  
1<sup>th</sup> UPE Lusophone Symposium



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2016



UNIVERSIDADE  
DE LISBOA



Instituto de Geografia  
e Ordenamento do Território  
UNIVERSIDADE DE LISBOA



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Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR



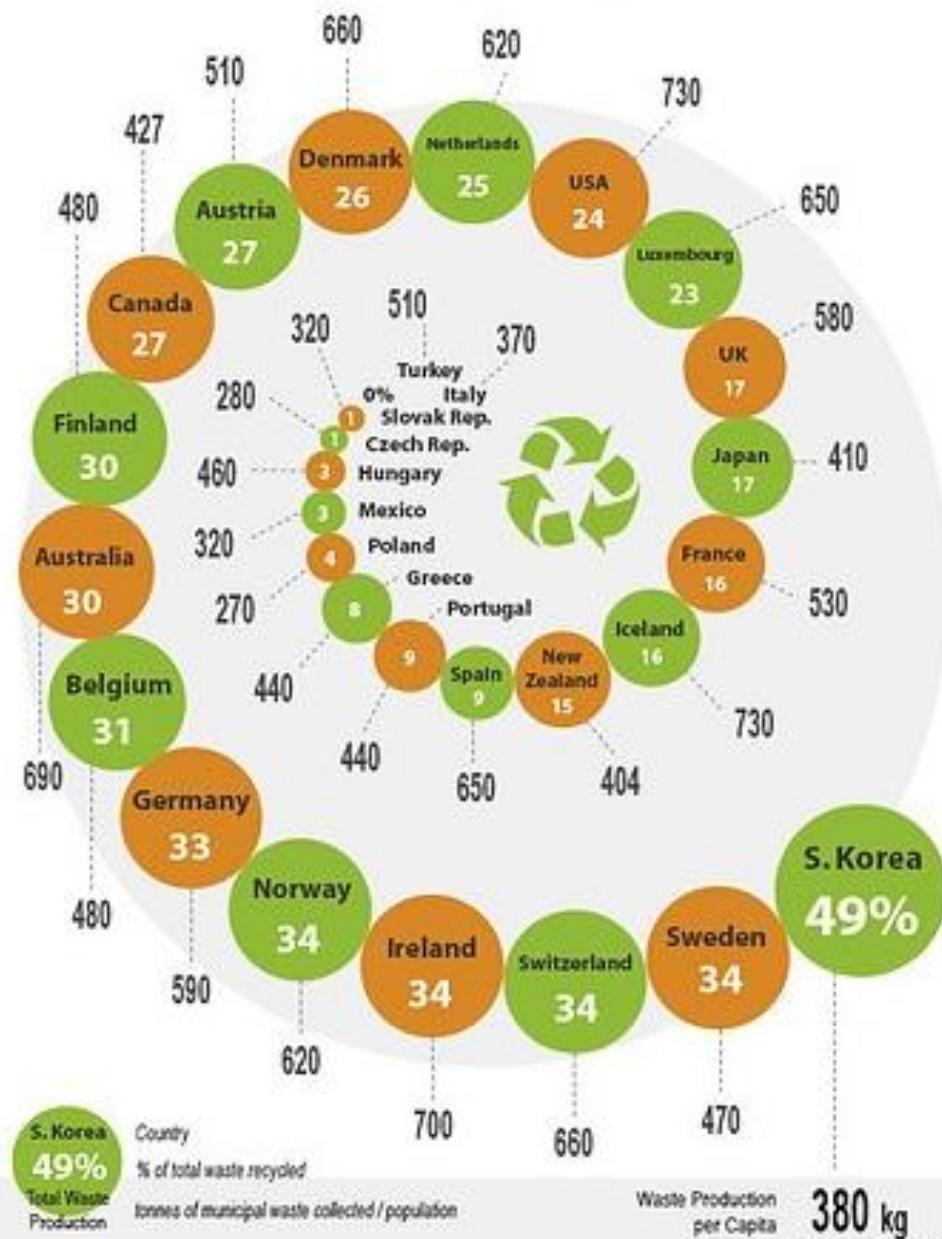
Caixa Geral  
de Depósitos



# Recycling Rates of OECD Countries

SOURCE: OECD Environment Statistics

Years of data are variable, between 2003 and 2006, except for New Zealand, which is from 1999.



쓰레기 분리수거를 생활화 합시다



캔류

PET병

종이팩

비닐류

유리병

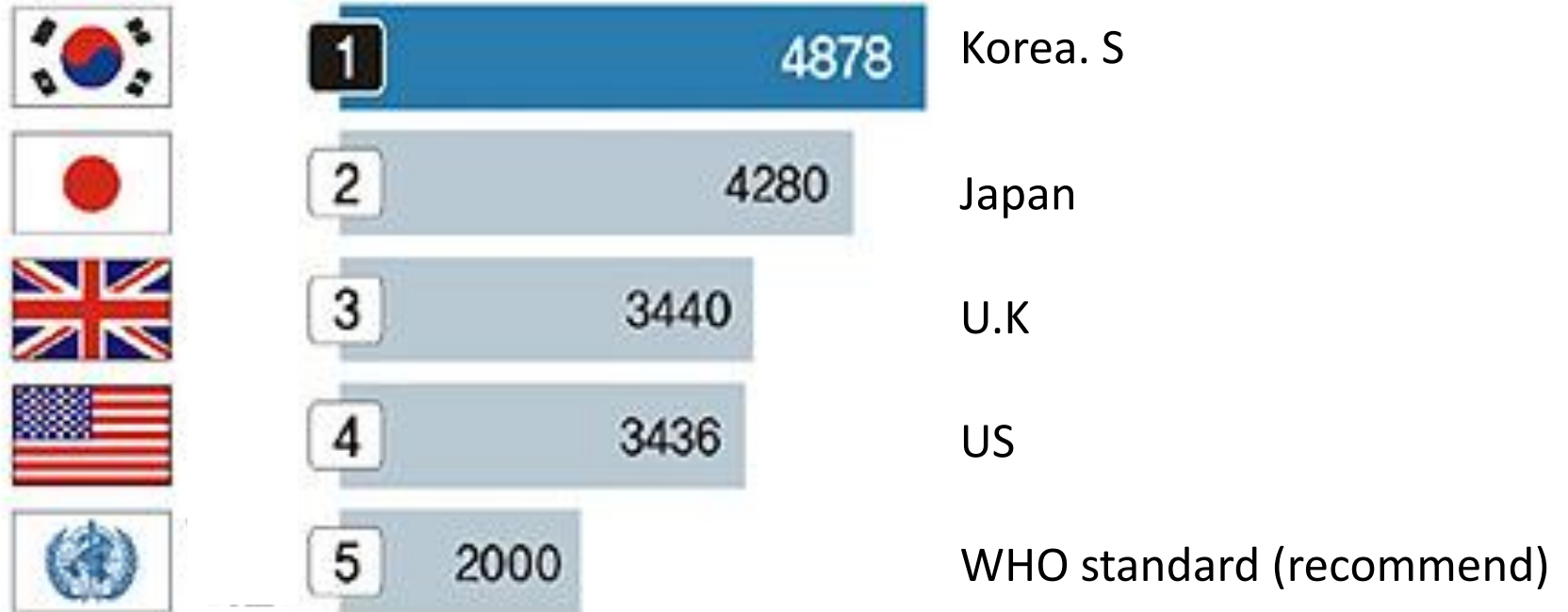
일반쓰레기



For 2 person...



## Daily sodium intake volume (mg)



© Ministry of Health and Welfare, Korean Government







# Ban on the dumping of raw sewage at sea

폐기물 어디에 버리나?

군산앞바다



포항앞바다



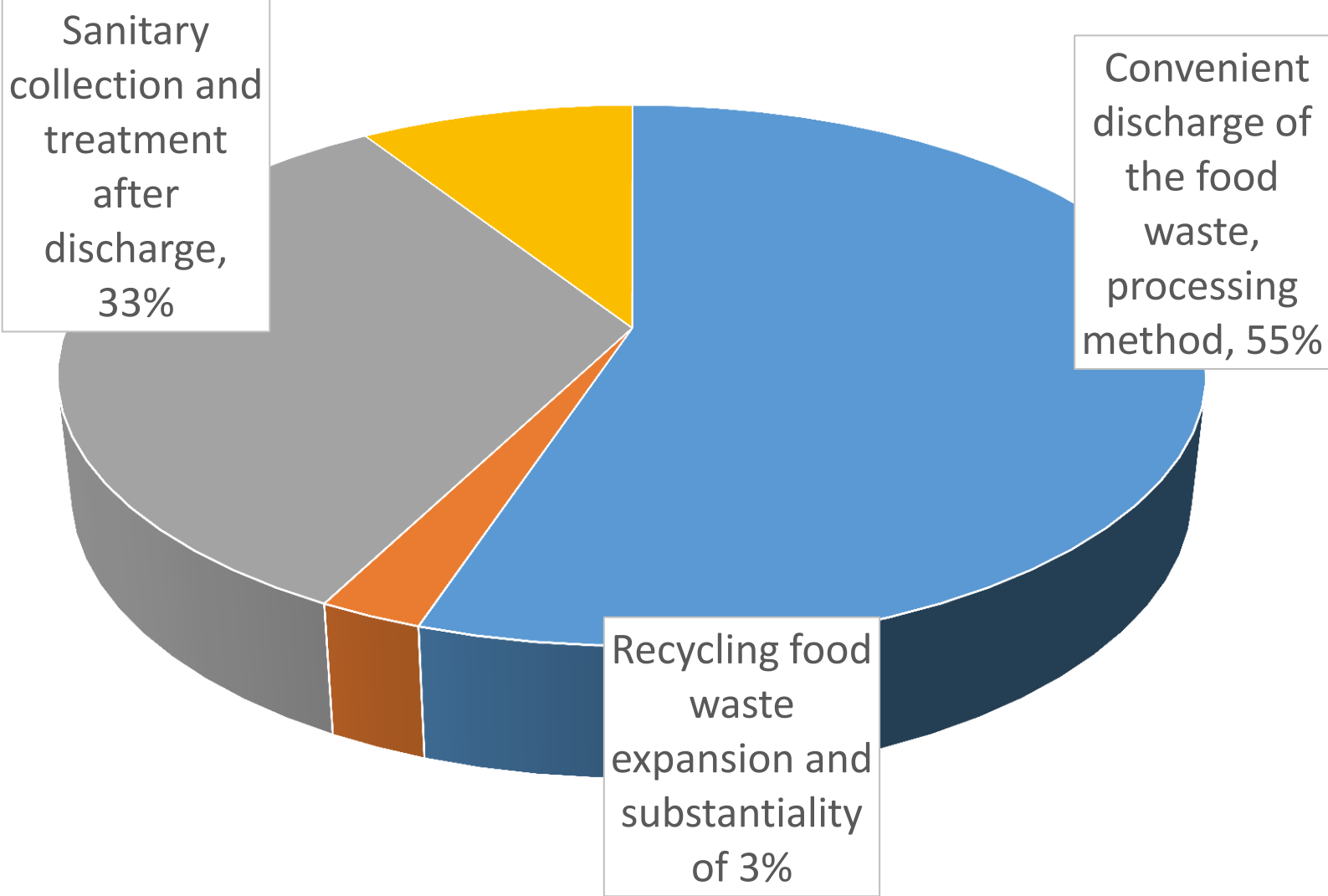
88년부터

누계 1억 이상

울산앞바다

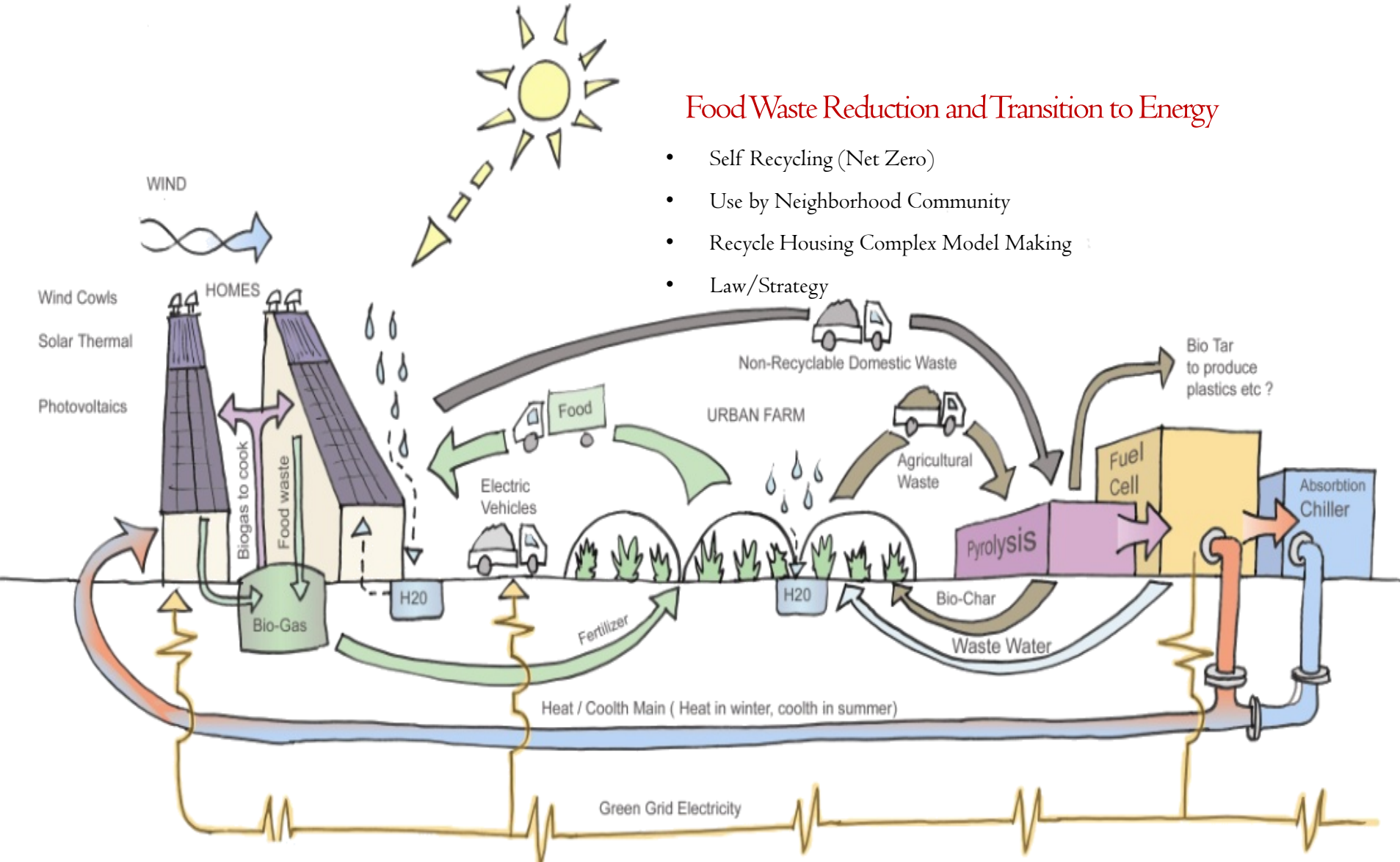


2008 Research of the City of Seoul  
**Inconvenient in food waste disposal**

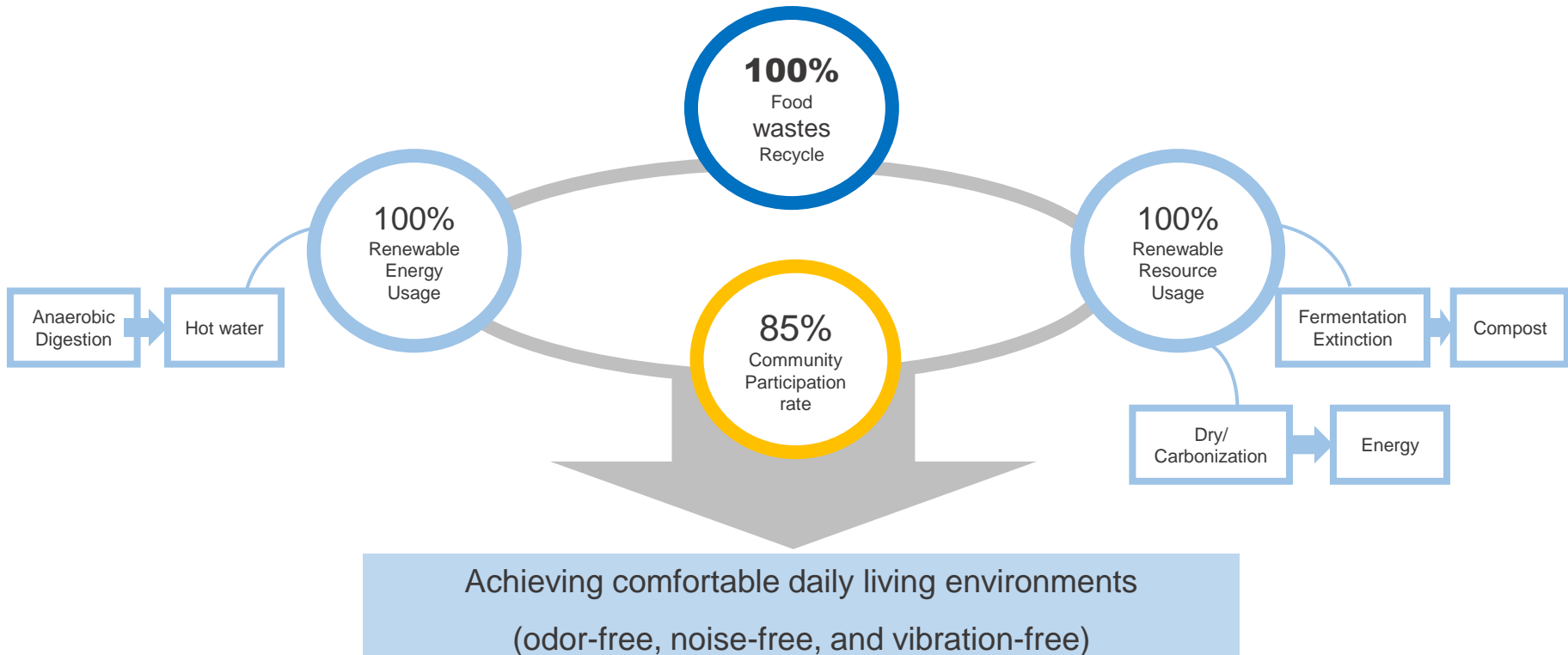


# Food Waste Reduction and Transition to Energy

- Self Recycling (Net Zero)
- Use by Neighborhood Community
- Recycle Housing Complex Model Making
- Law/Strategy



# Objectives



# Objectives

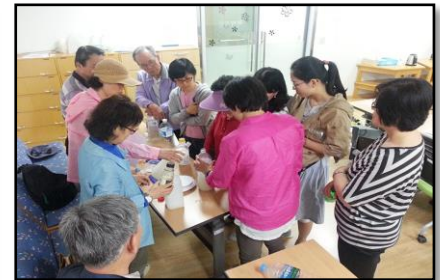
Big plant



Distributed facilities



Community Activation



# Research Strategies

## Core Strategies of the Research

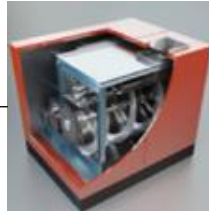
	3 × Tech. Type			3 × Housing Type			3 × Application Scale			3 × Installation Place			3 × Utilization Types			Site name	Current stage
	Technological type			Housing type			Application scale (households)			Installation place			Utilization type				
	Composting	Anaerobic Digestion	Dry carbonization	Detached House	APT house	Multiple District	Less than 500	500-1,500	1,500 or more	underground	ground	Collection place	Com post	Fuel	Electricity		
TB1	●				●		●						●	●		Ansan Bonheur Village	Under progress
TB2	●				●				●		●			●	●	Gangnam Suseo / Daejoen Songrim	Expected to be complete / Completed
TB3				●			●				●			●	●	Yongin Dongcheon	Completed
TB4		○							○			○			○	Somang Prison	Under progress
TB5			○			○			○				○	○		TBD	Planned

○ : Scale is reduced and operated as a test bed

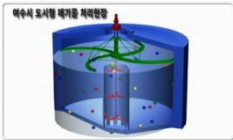
# Research contents

## Food waste processing technology

Composting



Anaerobic digestion



Drying technology



## Proven technology for housing complex

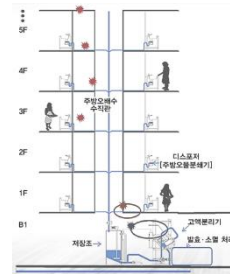
Existing complex

- Equipment installation at the outdoor space
- Easy to apply to existing housing complex
- Can apply various technologies



New complexes

- Considered from the design phase
- Technology is needed to integrate with housing buildings



## Community-activated program



Eco-friendly leisure type

Community welfare type

Experience park type

Urban leisure compact type

## Resource Recycling Housing Complex Model

(Technologies/Plan/Design/Construction/Operation/Management)



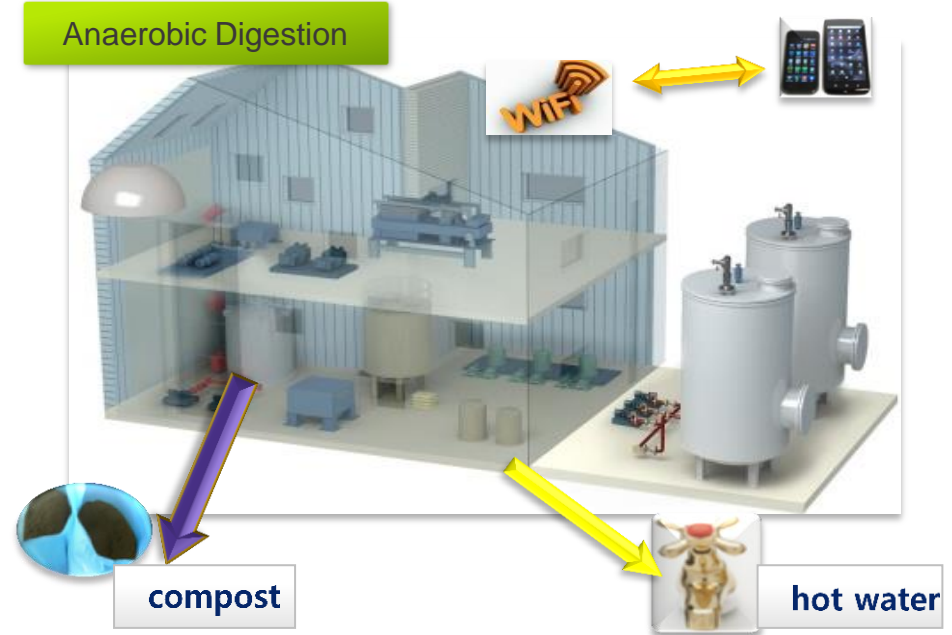


# Major Technologies

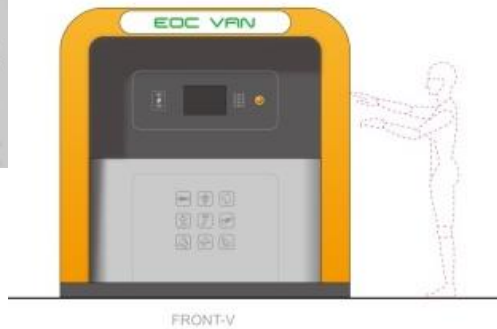
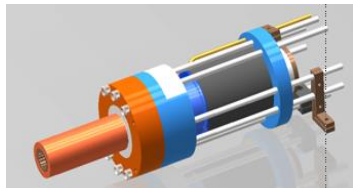
Composting



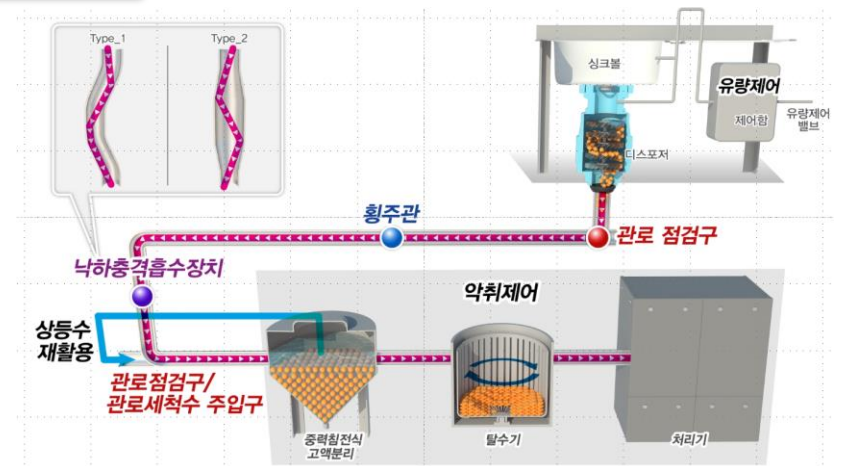
Anaerobic Digestion



Carbonization



Plumbing



# Composting

Input

Food waste

100



Output

Fertilizer

10

Output

Low water

90

# Empirical Researches

## Smart Town in Dongcheon, Yongin



Composting

## Songlim in Yooseong, Daejeon



Composting



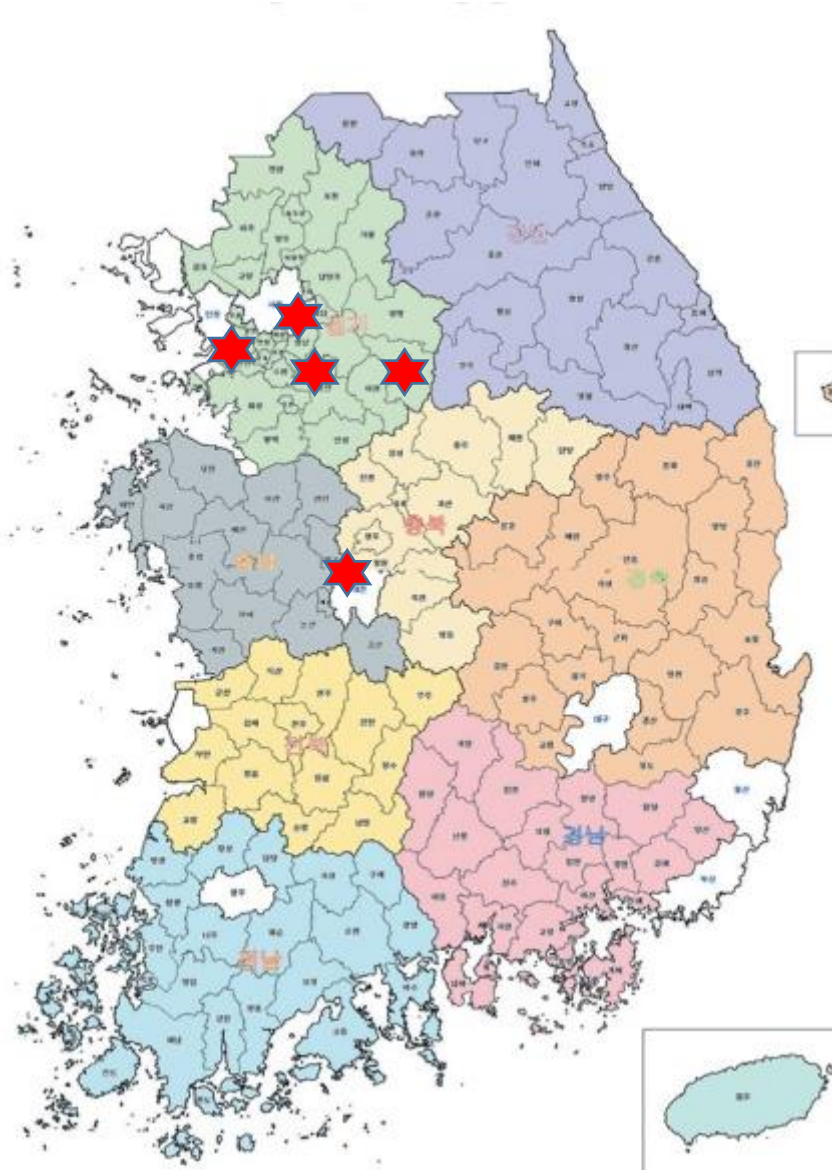
## Ansan Boner Village, Ansan



Composting

## Somang prison, Yeojoo

Smart box



# 1 Detached houses complex(neighborhood)

Smart Town in Dongcheon, Yongin



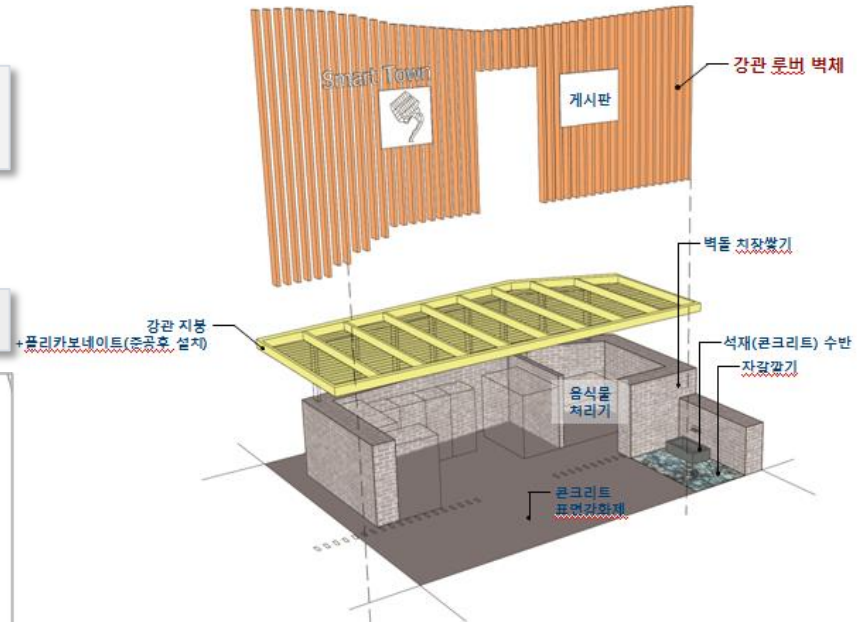
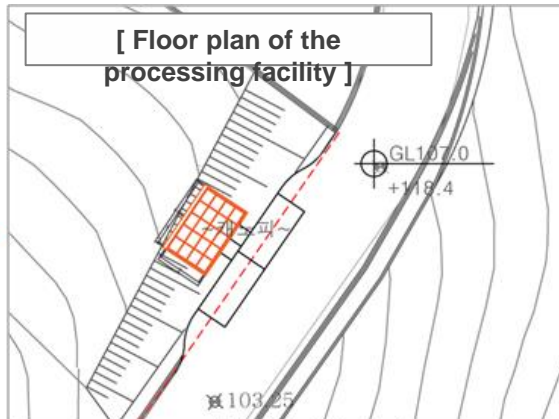
# Outdoor facility was designed by community

## Smart Town in Dongcheon, Yongin

Household size  
32households

Applied technology  
Composting

### <Facility layout and plan>



# Community seminar

## Smart Town in Dongcheon, Yongin



Information Session for Residents in Smart Town in Dongcheon, Yongin



Description of the Research Project



Announcement of prizes for idea competition by residents



Site inspection



Information on community planning



Greeting from Officer in the MOLIT



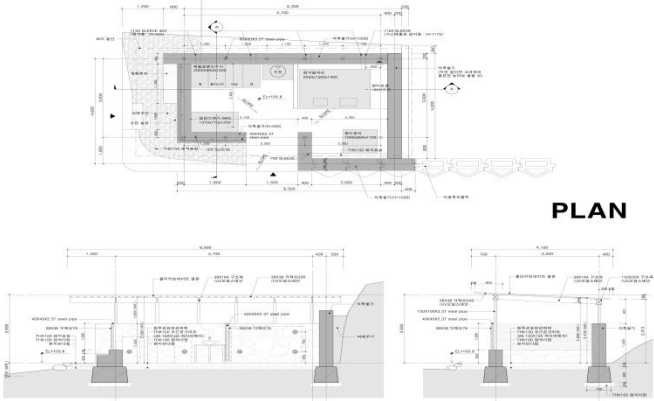
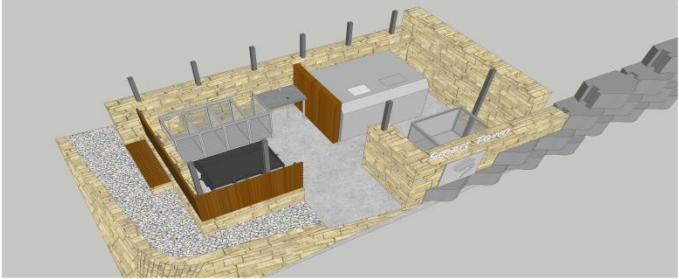
Question and Answer

# ground breaking ceremony



Groundbreaking ceremony of Smart Town Recycling Center in Dongcheon Yongin (March 2015)

## Design draft of the Recycling Center

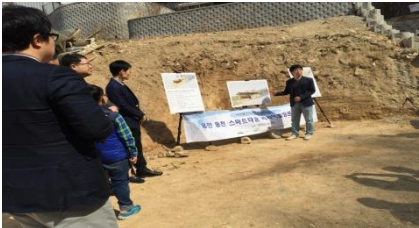


PLAN

SECTION



Tape cutting ceremony



Explanation of the design draft



Description of the Research Project Panel exhibition



# Opening ceremony



용인 동천 스마트타운 리사이클링센터 설치현황



맞춤형 발효소멸 장치



분리수거장



개소식 인사말



제막식



장치 시연



개소식 단체사진



# Community seminar for urban farming

## Smart Town in Dongcheon, Yongin



Information Session for Residents in Smart Town in Dongcheon, Yongin



Discharge and sharing of byproducts from food waste fermentation and extinction devices in Smart Town in Dongcheon Yongin.

# Effects



Carrying out



Collection box



Transport



Food Waste Treatment Site



Transport of Food Waste Water



Food Waste Water Treatment Plant

100,000PPM



Sink



Vegetable Garden

Sewage Treatment plant



Recycle

150PPM



Carrying out



Food wastes disposal system

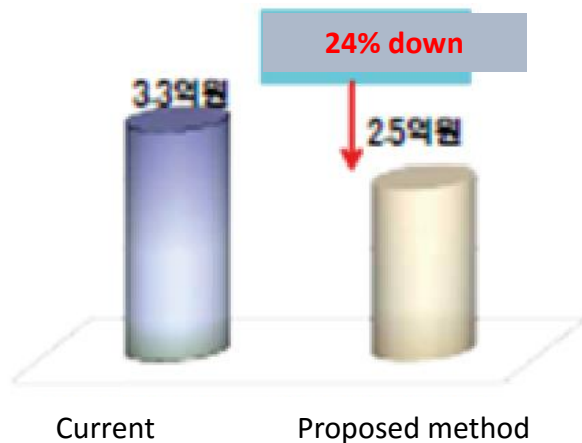
Waste water

# Effects

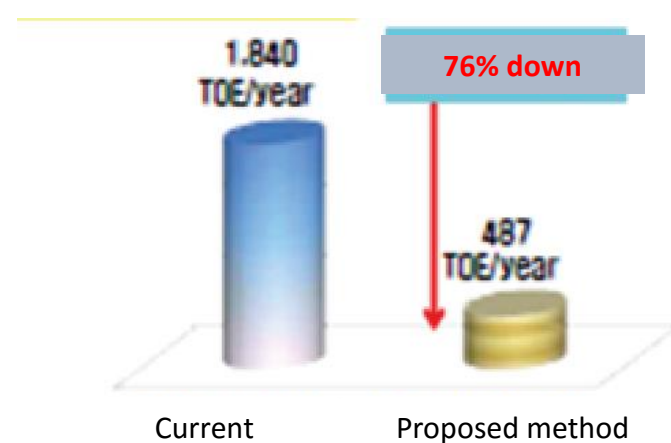


▶ Comparison of the effect when one bottle of food waste is dumped

## Construction cost of processing facility



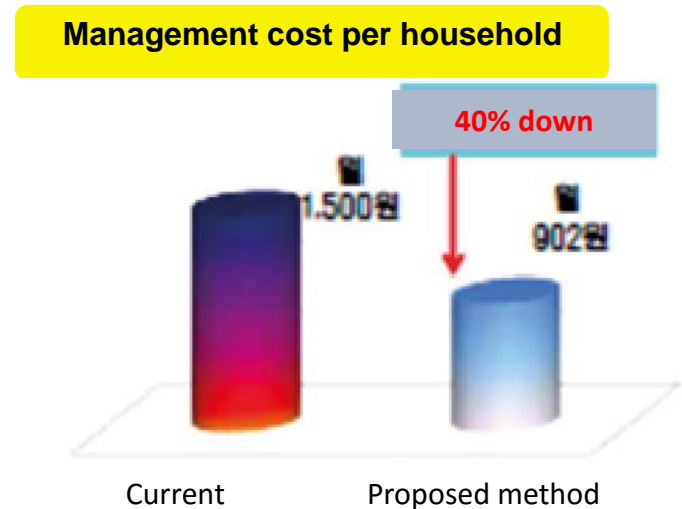
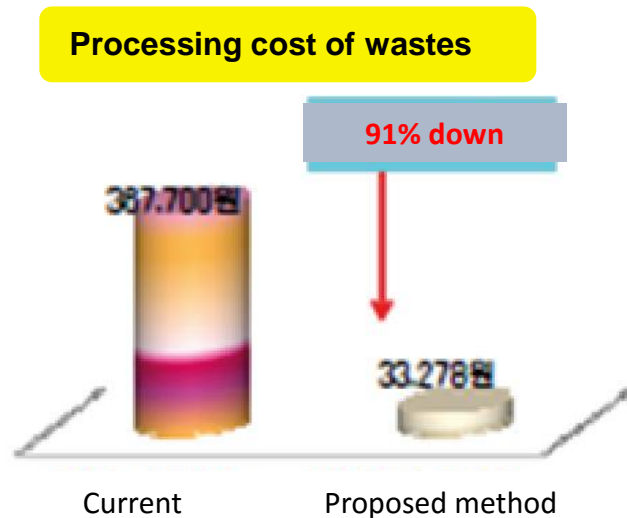
## Annual oil usage



# Effects



► Comparison of the effect when one bottle of food waste is dumped



# Conclusions

- Reduced public treatment cost of food waste by residents activation.
- Neighborhood Community Activation and restoration
- Open Spaces (urban farms) expansion in housing complexes
- Resource Recycling community

Thank you

(Gamsa hapnida!)