

Smart Urban Solutions



Seoul Urban Solutions Agency



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The Seoul Advantage



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Case: Magok Development



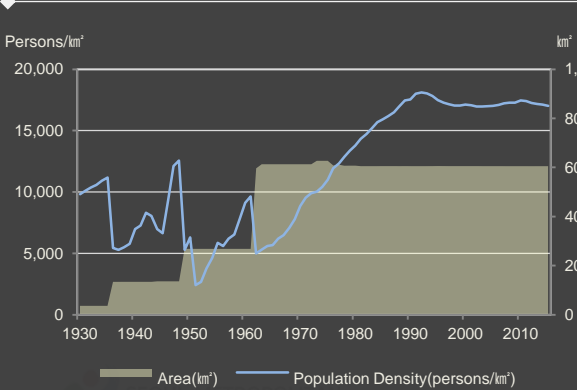
Smart Execution: SUSA

The Seoul Advantage

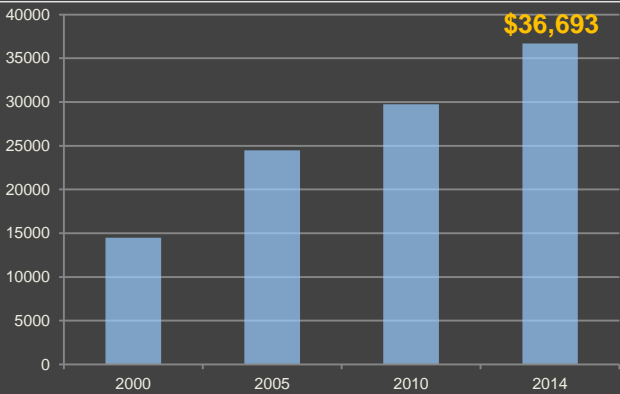
Seoul's journey from ruins in the 1950s to a smart metropolis.



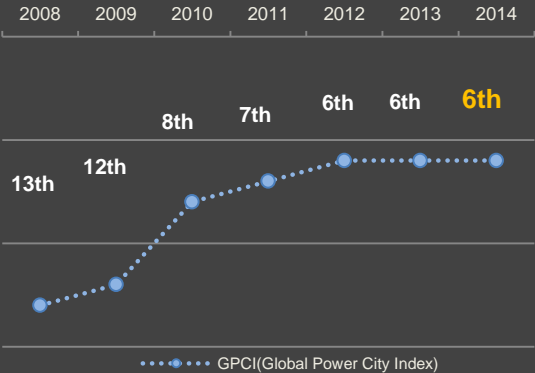
Population and Area Growth



Seoul's Gross Regional Product

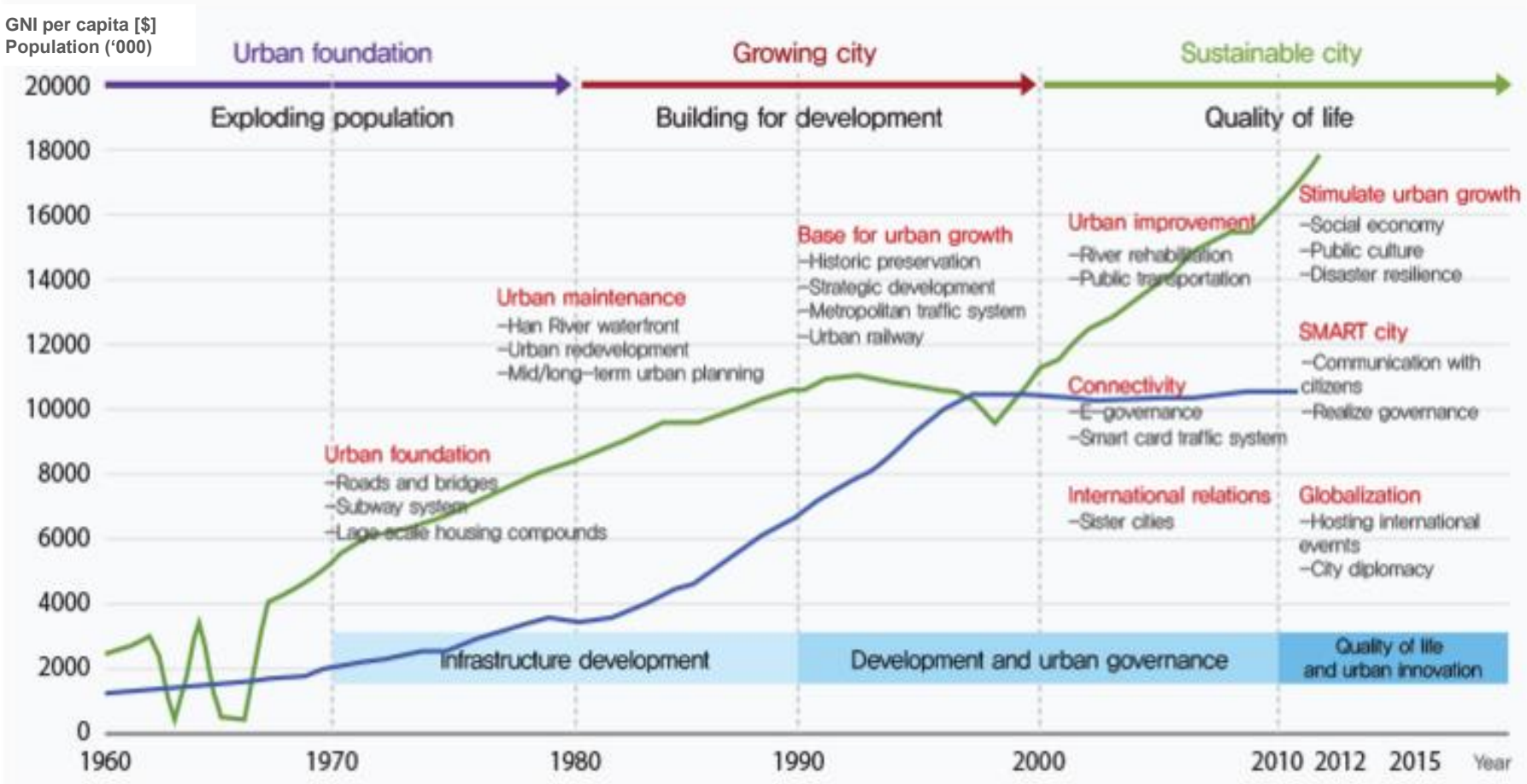


GPCI(Global Power City Index)



Seoul's Growth Trajectory

Transformation of Seoul's urban development



Seoul's Growth Trajectory

Growth of the city

1945 Independence	1950	1960	1970	1980	1988 Seoul Olympic	1990	2000	2010
	Aftermath of the Korean War: Destruction of Seoul's urban foundation and identity	Rapid post-war reconstruction to establish urban foundation	Expansion of city center to accommodate economic and population growth	Han river rejuvenation in preparation for global events – Seoul 1988 Olympics		Large scale urban regeneration project and new town developments	Installations of physical features to facilitate enhanced quality of life for Seoulites	Transforming to a city with a historical heritage, culture and identity



Seoul's Growth Trajectory

Transforming the city



Sangam Digital Media City
New Media Cluster and Park on Landfill



Cheonggyecheon Restoration
Reborn of Water landscape in downtown



Seoul's Growth Trajectory

Key features of Seoul's urban planning



High-density and compact

Transit-oriented development

Segmented planning:
- Regional planning
- Neighborhood area

Citizen participatory planning

Purpose-focused new town developments

Continued urban renewal - Retrofitting

Seoul's Growth Trajectory

The next 100 years

[Challenges]

- Side-effects from rapid growths
- Stagnant economic growth
- Reverse pyramid population growth
- Increase in youth unemployment

[Direction]



**Environment
Friendly**



**Heritage
Conservation**



**Convenient
Everywhere**



**Green
Transport**



Safe City



**Energy
Efficient**



**Balanced
Landscape**



**Spatial
Diversity**



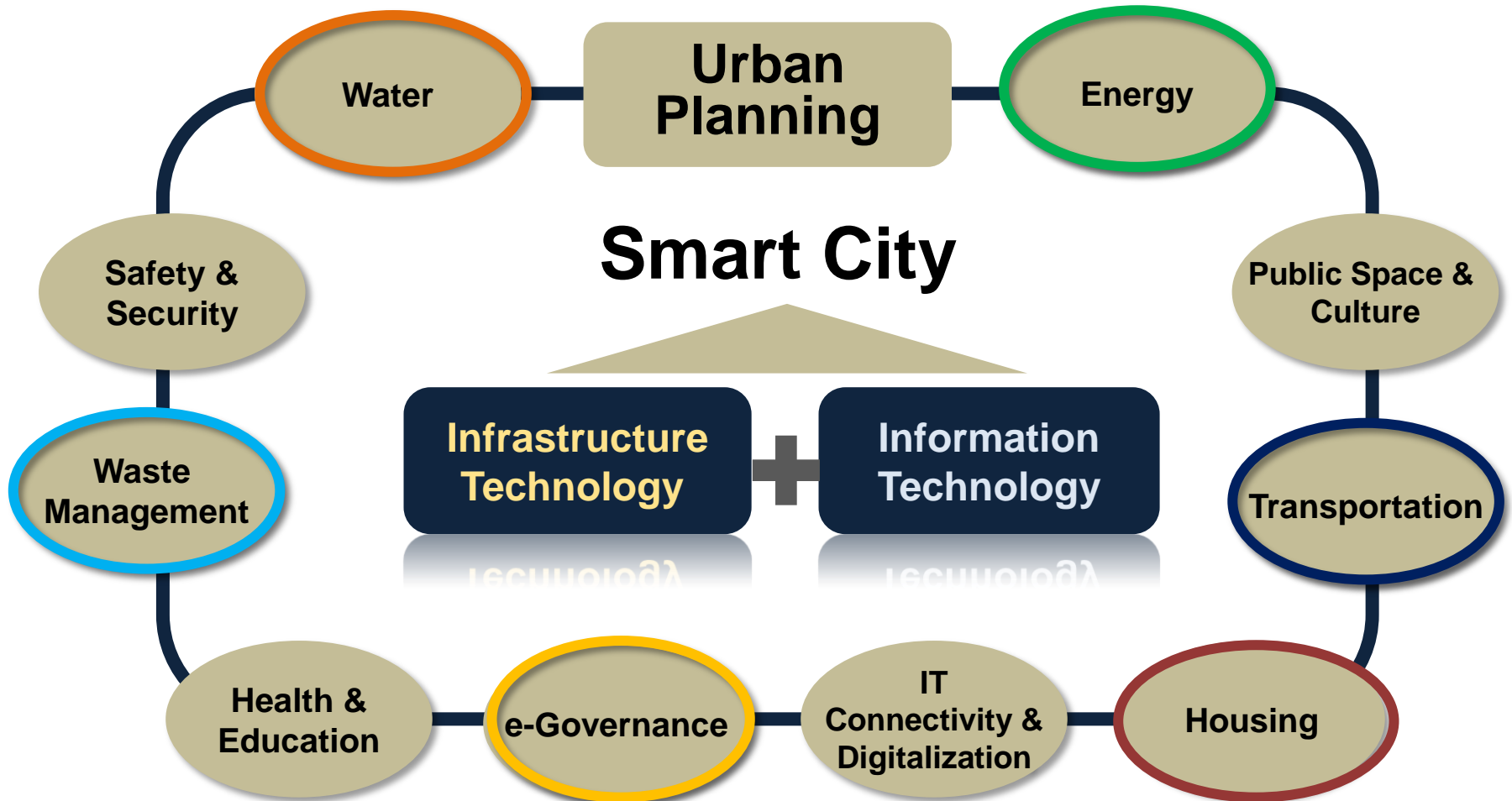
**Participatory
and Aligned**



**Inclusive and
Equitable**

Integrated Smart Solutions

Smart City urban planning – Focus areas



1. Seoul's Housing

Historical development

1950~60

As the result of rural-urban migration

Shanty Towns increased.

1970~80

After an enactment of Urban Redevelopment Act,

Co-operative Redevelopment Program was launched.

1990~2000

Apartment Complex is the majority of housing type.

1. Seoul's Housing

Past housing issues: Meeting housing demands in rapid growth period

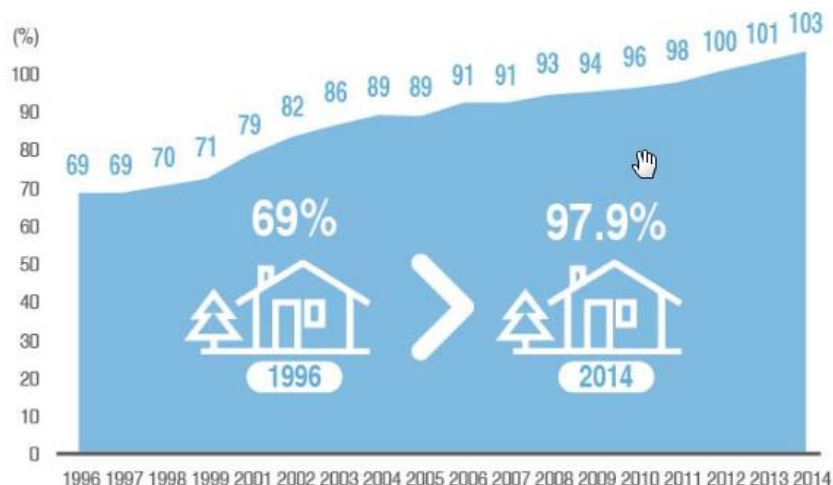
[Problems]

- Housing Shortage
- Shanty Towns (“Moon Villages”)
 - More than 10% in 1980’s

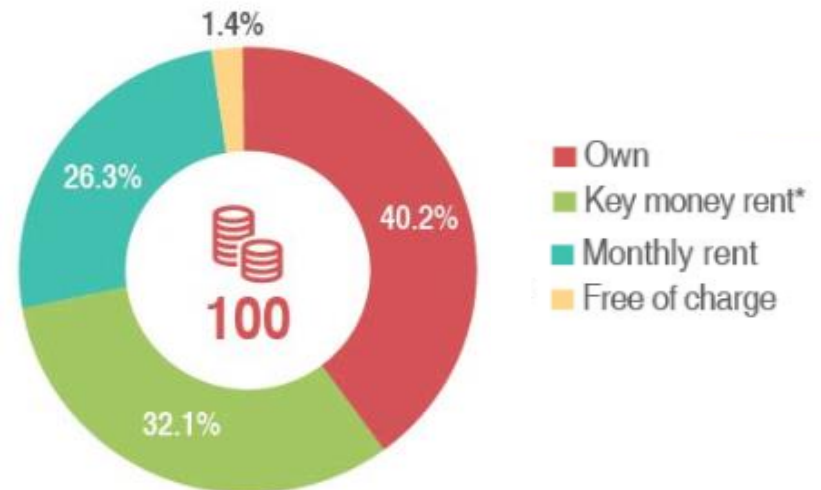
[Solutions]

- Mass supply of housing through public development
- Co-operative Redevelopment Plans
- Large-scale housing construction through low-cost land supply

[Changes in Housing Supply]



[Types of Occupancy]



1. Seoul's Housing

Current housing issues: Housing affordability

[Problems]

- Increase in aging population and single-person households
- Job insecurity and high youth unemployment rate
- Change in rental housing market
- Rising housing cost, falling home ownership

[Demands]

- Increased need for public housing
- Housing subsidy program for the housing poor

- Begin housing subsidy program for the housing poor
- Housing Support Service
 - Security deposit support
 - House improvement consultation
- Operation of housing welfare support center
- Affordable housing plans



2. Smart Waste Management

Waste Management Hierarchy



Seoul's adoption and improvement of national policy on solid waste management.

1. **Waste reduction at source**
2. **Utilization of waste**
(recovery of material and renewable energy)

Seoul currently operates...

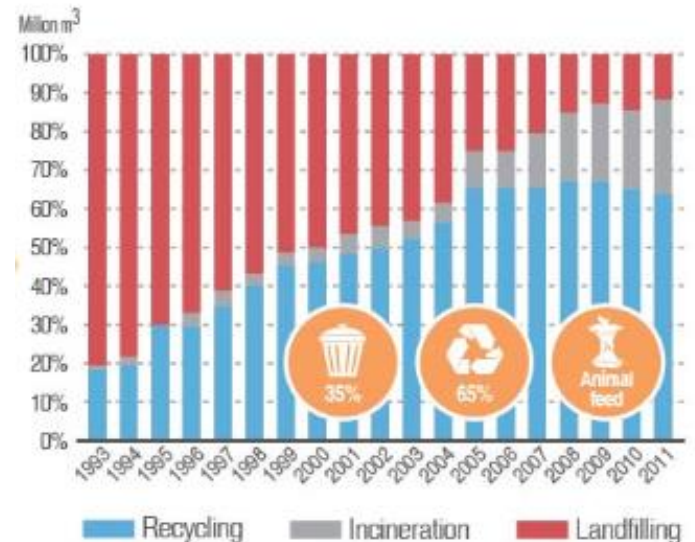
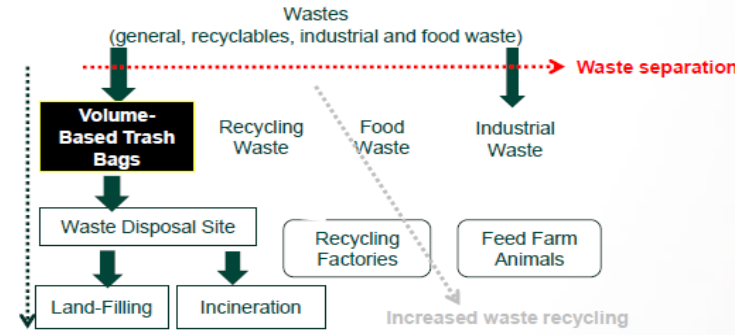
- Four resource recovery centers (incinerators) and
- One landfill shared by the entire Seoul metropolitan area.

2. Smart Waste Management

From maximum treatment to minimum waste



Volume-based Waste Fee System



2. Smart Waste Management

Waste as resource: Yielding *Economic + Environmental* benefits



4+1
Centers

Number of resource recovery centers in Seoul + 1 landfill site for the Metro area

\$30 M
USD

Worth of electricity generated to provide for **43,000 residents** by burning landfill gas

850,000
CO2 tons

Decreased due to CDM technology and generating eco-friendly energy

Landfill Gas Power Plant Overview



Reference : Sudokwon Landfill Site Management Corporation www.slc.or.kr

2. Smart Waste Management

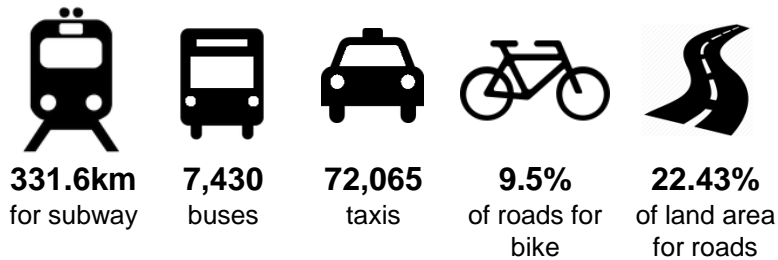
Resource Recovery Centers



3. Smart Integrated Transportation

Transportation infrastructure – convenient mobility

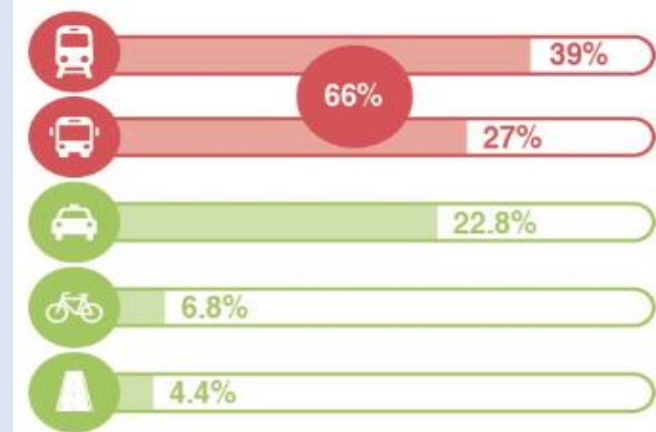
Public transportations and roads in Seoul



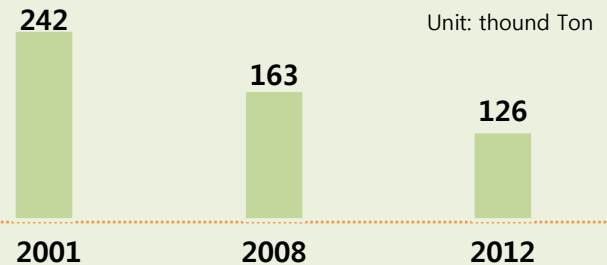
Seamless Integration: Transfer Center connects various transportations in one place



Mode share

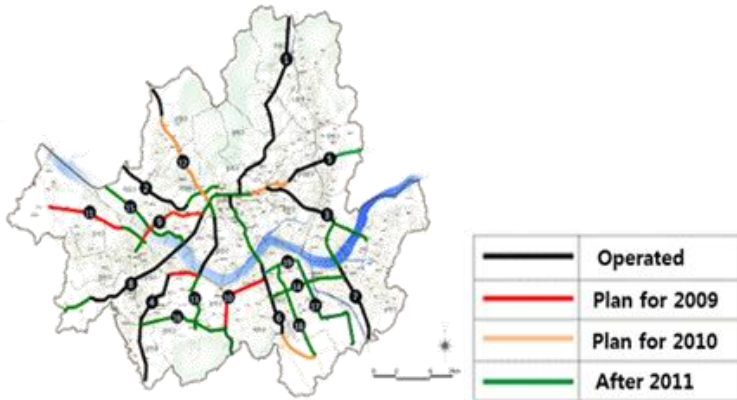


Amount of mobile source emissions



3. Smart Integrated Transportation

Bus Rapid Transit



Inter-regional Lines



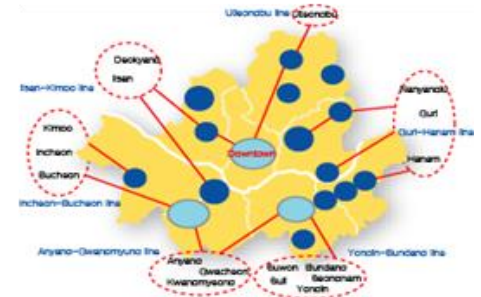
Trunk Lines



Feeder Lines



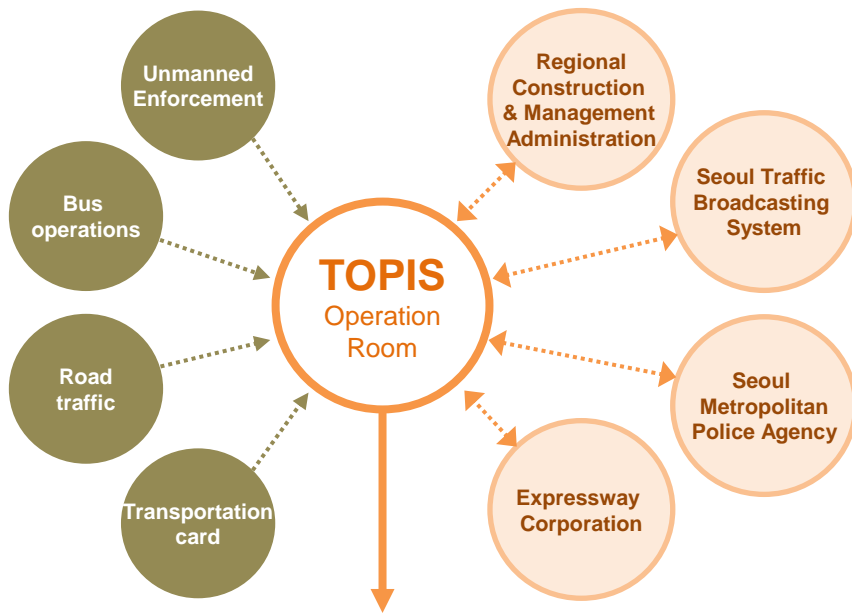
Circular Lines



3. Smart Integrated Transportation

Integrated Transport System – Efficient management

[Transport Operation and Information Service (TOPIS)]



Information Supply for Citizens



Reference: Seoul Public Transportation

[Smart Card]

Integrated distance-based transit fare system

- Free transfer between bus-bus and bus-subway, within 30 min. (max 4 times)
- Introduction of “smart card”



[ITS Units]



Bus Information Terminal



On Board Unit



Traffic Information



Route Terminal

4. Smart Water Management

Arisu – quality tap water

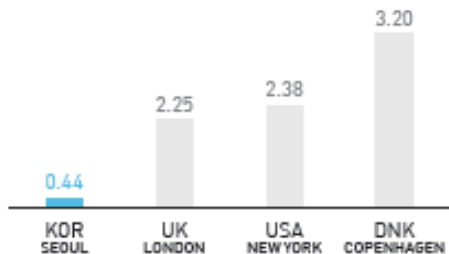
[Overview]



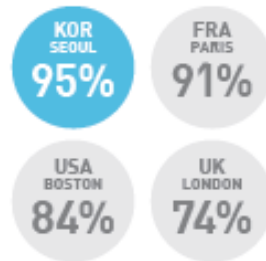
- 10 million : Population served
- 3.2 million m² : Average daily production
- 4.35 million m² : Daily production capacity
- 13,846 km : Tap water piping network
- 94% : Rate of water flow

[Inexpensive & 24/7 Supply]

Water Utilities Bill of the World's Major Cities
(Unit: USD/m²)



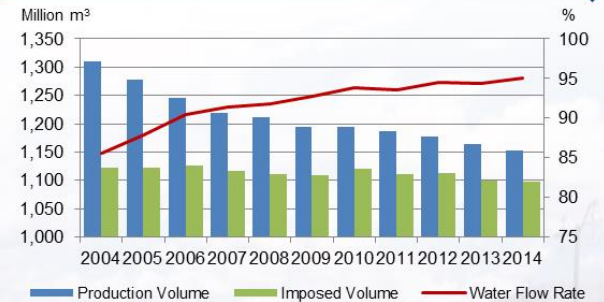
Revenue Water Ratio of the World's Major Cities



100%
water supply

95.1%
water maintained

Production/Impose Volume & Rate of Water Maintained

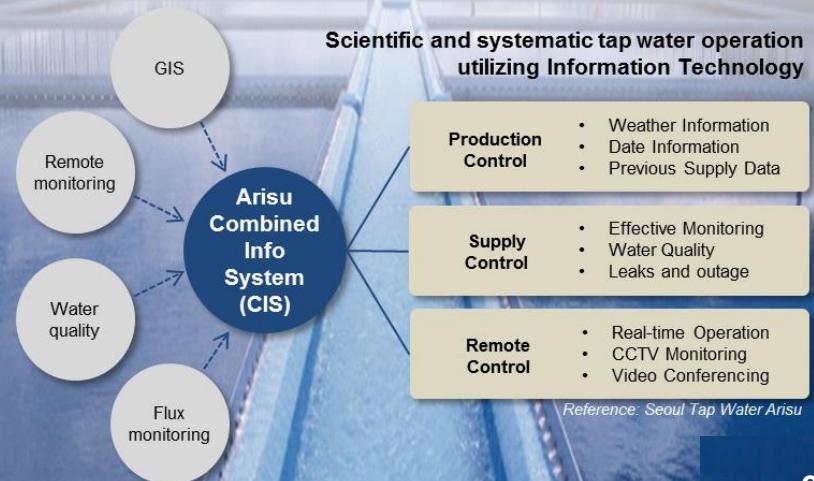


163
items tested

Number of Water Quality Items Tested

Location	WHO	Seoul	USA	Japan	France	Australia
# of Items tested	163	163	102	121	63	199

Scientific and systematic tap water operation
utilizing Information Technology



Reference: Seoul Tap Water Arisu

4. Smart Water Management

Waste water management



Size	Population	Sewer	Sewage Treatment Rate	Treated Sewage Amount	Level of Treatment
605.33km ²	10.38million	10,392km ²	100%	Sewage 4.98 millionm ³ /day Excreta 10,500m ³ /day Food Waste Water 900m ³ /day	Sewage BOD 130~170mg/L → Less than 10mg/L

Before 1960	1960s ~ 1970s	1980s ~ 1990s	2000 ~ Present
<ul style="list-style-type: none"> GNI: USD 80/capita Area: 268km² Pop.: 2.4 mil. 	<ul style="list-style-type: none"> GNI: USD 1,645 Area: 605km² Pop.: 8.3 mil. 	<ul style="list-style-type: none"> GNI: USD 10,841 Area: 605km² Pop.: 10.3 mil. 	<ul style="list-style-type: none"> GNI: USD 20,250 (2010) Area: 605km² Pop.: 10.17 mil.
<ul style="list-style-type: none"> No treatment plants Sewage and night soil discharged into streams and Han River 	Streams in Seoul severely contaminated <ul style="list-style-type: none"> All 36 streams dangerous 24 streams covered up 	Increase in sewage volume → serious pollution	<ul style="list-style-type: none"> Greater demand to improve environment Mandatory onshore treatment of sludge Strengthened sewage treatment standards
Reconstruction and extension of sewers (225km)	<ol style="list-style-type: none"> Institutional arrangements and organization reform Construction of 5,940km sewers Open sewers were covered up Construction of two sewage treatment facilities 	<ol style="list-style-type: none"> Master plan for sewage and drainage in Seoul (1983) Expansion of sewage treatment facilities Introduction of separate pipes to separate rain and waste water Rehabilitation of existing pipes Introduction of Trenchless Pipe Lining in pipe maintenance (1995) 	<ol style="list-style-type: none"> Construct sludge treatment facilities Introduce advanced sewage treatment facilities Transform into a facility that produces new and renewable energy Ensure transparent management of the sewage treatment facilities Eliminate sewer plant odor and build parks for citizens

● Level of Han River (where waste water is released after treatment) contamination

5. Smart Energy

Energy self-sufficiency: Decrease consumption, increase efficiency & renewable energy

Seoul's energy sources



Electricity Consumption

- Annual: 46,555 Gwh
- Daily: 123,340 Mwh
- Seoul generates 4.2% of its energy consumption

Energy savings from LED replacement



- LED: Up to 80% energy efficient
- 2018: Plan to replace all lighting in public organizations with LED
- 2030: Plan to replace 80% of private sector lighting with LED

LED deployment by year & energy savings



Energy Self-Sufficient



Energy Sharing



Energy Public Participation

400

Total Energy Production and Savings
4 Million TOE

20

By 2020
20% Energy Self-Reliance

1,000

Reduction of GHG Emissions
10 Million Tons CO₂/uiv.eq

5. Smart Energy

Systematic distribution

District Energy

Economical and Effective Energy Supply



Adoption of district heating



Waste heat from power plants and incineration as heat source



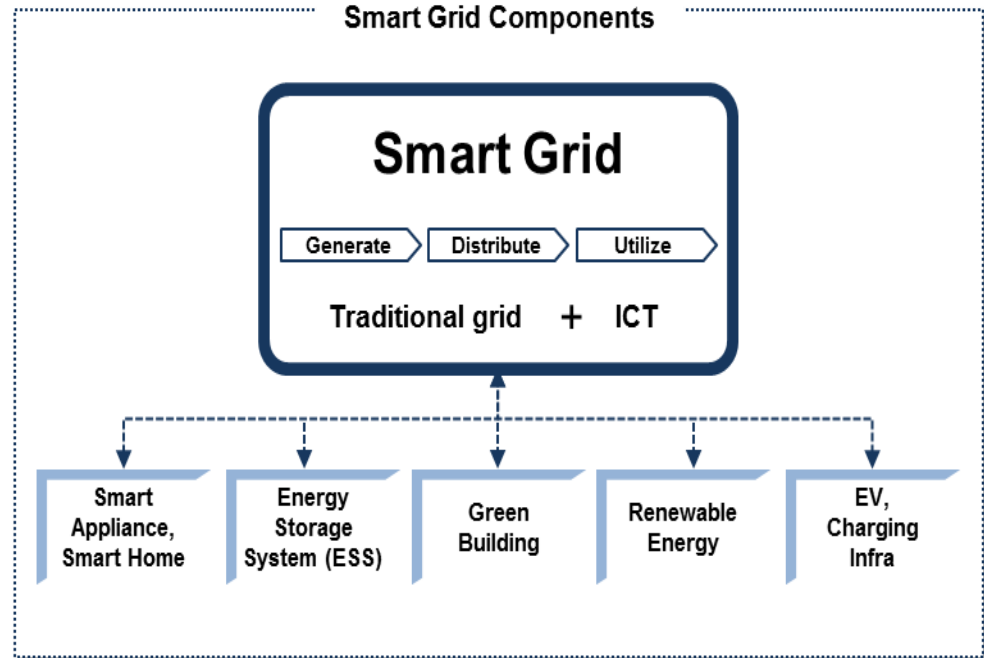
Installing cogeneration plants at sewage treatment facilities



Recovering heat from treated sewage effluent for district heating



Recovering heat from neighboring areas



Suppliers	Consumers	Market
<ul style="list-style-type: none"> Maximized reliability Load balancing Distributed generation system (ESS*) 	<ul style="list-style-type: none"> Efficient power consumption Consume less energy 	<ul style="list-style-type: none"> Commercialization of Smart appliances Growth of Smart home, building-energy industries Enhanced EV infrastructure

* Electricity Storage System

6. Smart e-Governance

Three objectives



[Elements of e-Governance]

IT Infrastructure	Citizen Services	Citizen Participation
<ul style="list-style-type: none">IT Super HighwayPublic WiFi	<ul style="list-style-type: none">Public smartphone charging stationSeoul websiteInformation Communication Plaza	<ul style="list-style-type: none">Oasis of 10 Million Imaginationm-VotingSmart complaint report

6. Smart e-Government

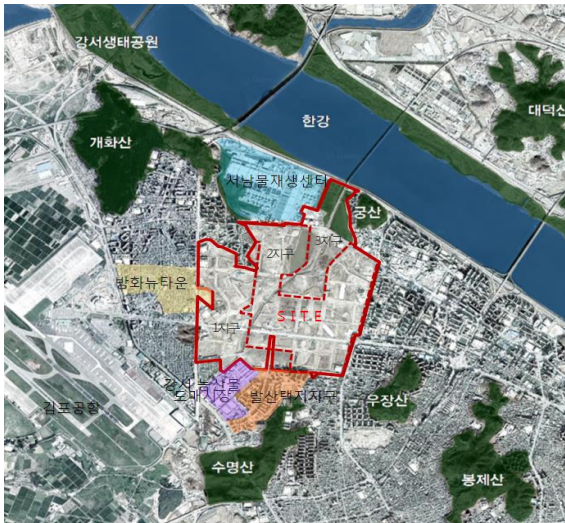
A Day of Seoulites with Smart e-Government



Magok Development Case

A self sufficient city with mix of industrial, business, commercial and living functions

- Area : 3,665,086m²
- Developer : SH Corporation
- Project Period : 2007 ~ 2016
- Housing Units : 12,030 units



History

2005

• Magok District Development Plan announced

2009

• Construction begins

2013

• Housing Sale

Magok Development Case, Cont'd

Mixed land-use plan



The industrial facility site is planned around the **Central Park**



The **Commercial and Business Sites** are located near main roads and public transportation stations



The **Residential Site** is placed adjacent to existing neighborhoods



Magok Development Case, Cont'd

Transportation: Seamless integration



- Connected with Subway lines and Airport Railroad



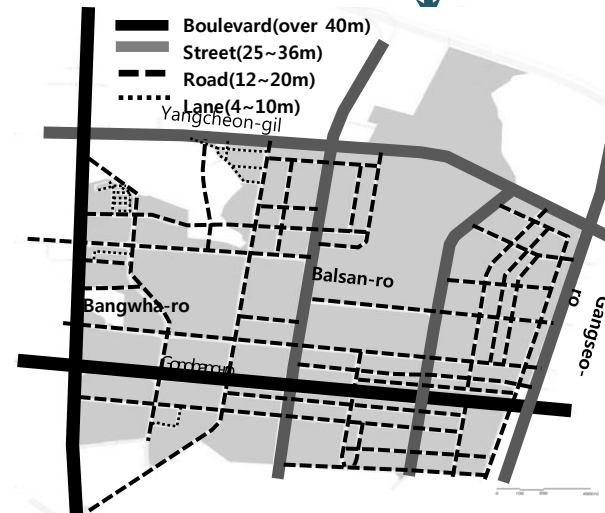
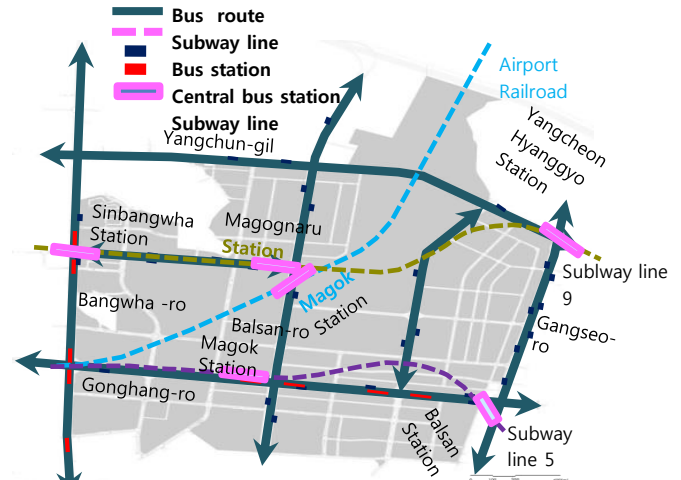
- Bus Rapid Transit



- Pedestrian walks

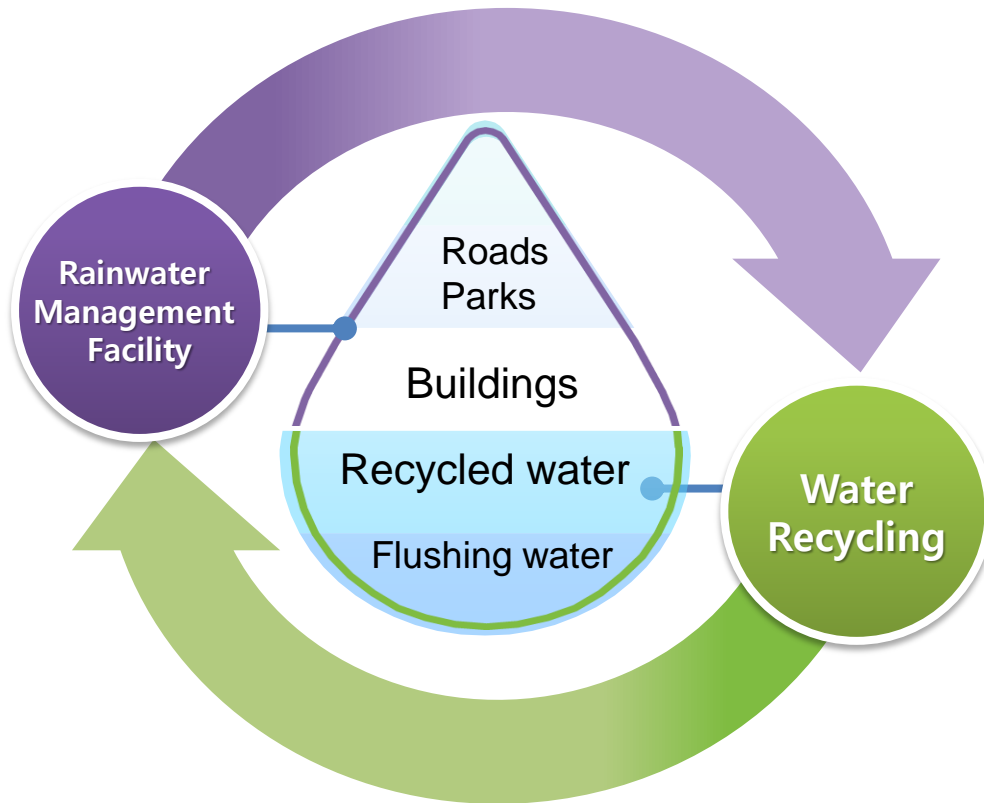


- Bicycle Road circulating the entire Magok District



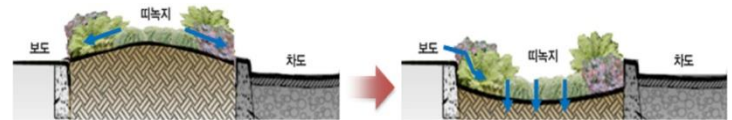
Magok Development Case, Cont'd

Smart water circulation system



Roads and Parks

- Allowing rainwater to penetrate under road surface, by setting up water permeable paving on non-permeable roads



Buildings

- Rainwater system recycling the water collected from rooftops to water gardens on the ground floor



Magok Development Case, Cont'd

Livable open space

Green Area : 761,282 m²

Three different parks form a vast green area and gives an amenity.



Central Park

Central Park includes a botanical garden



Neighborhood Park

Neighborhood parks in each cluster will be specialized to different industries



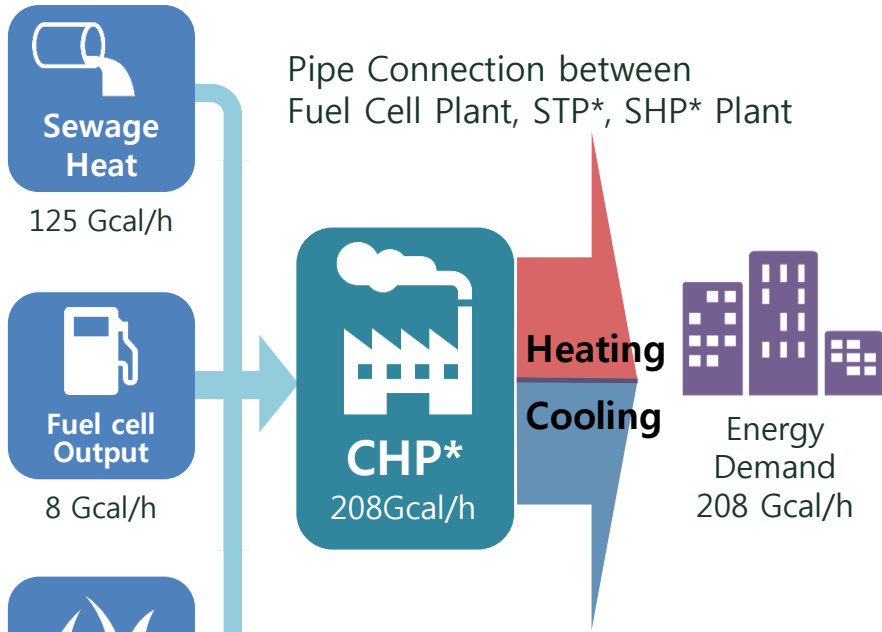
Green Corridor

Pedestrian and bicycle friendly network forms green corridors – seamlessly connecting subway stations and neighborhood parks



Magok Development Case, Cont'd

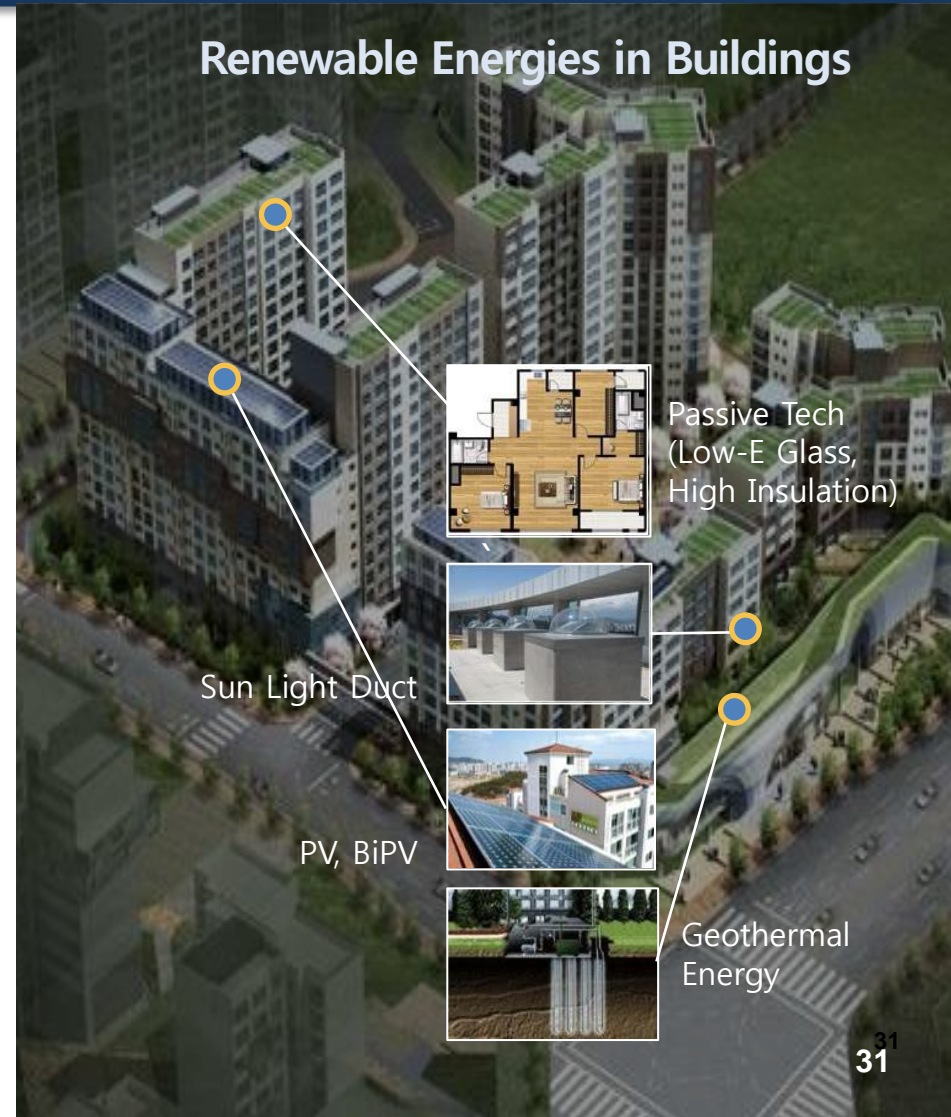
Smart energy



*CHP : Combined Heating Power
 *STP : Sewage Treatment Plant
 *SHP : Small-Hydrant Power

(※ Capacity is changeable)

Renewable Energies in Buildings



Magok Development Case, Cont'd

Smart safety

Integrated Control Center



- **Scale** : 5 floor
- **Total Floor Area** : 982.57 m²
- **Total Operators** : 16 person(Full Time)
- **Function** : Provide integrated security

Services



Crime Prevention

- Full HD IP camera installed
- Intensive protection for women and children

Transportation

- Data transferred to Seoul Transportation Information Center in real-time
- Collect and provide transportation information through CCTVs
- Intelligent parking enforcement

Disaster Management

- Detect disaster situation through sensors and respond immediately
- Automatic water level measurement

Magok Development Case, Cont'd

ICT based management



U-City facilities

Facilities Information
- Spatial data for facilities management



Smart phones
QR codes
Spatial data

Construction of site maintaining and repairing system



Intelligent Transportation

- BIT
- VMS
- VDS
- CCTV
- Illegal parking CCTV



Intelligent Disaster Management
- water level monitoring of reservoirs, etc

- Water level measuring instruments
- Predicting and warning broadcast equipments
- Disaster prevention CCTV

발산1동 수위현황	0.05 M	(1.1)
가양3동 수위현황	0.09 M	(2.5M)
무궁화공원 저류조 수위현황	0.02 M	(5.1M)
월정공원 저류조 수위현황		

Smart Execution: Seoul Urban Solutions Agency

What we do

[Overseas Project Process]



[Areas We Work In]



[Services We Provide]

- Study Visits
- Training Program
- Advisory/Consulting
- Project Implementation
- Public-Private Partnership Projects

Smart Execution: Seoul Urban Solutions Agency

How we work – provide integrated solution

[Policy Solution + Business Solution]



Thank You



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