

2022 Korea Government Innovation Contents

# Building Better Governance

Local Government



Ministry of  
the Interior and Safety

Republic of Korea



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Local Government





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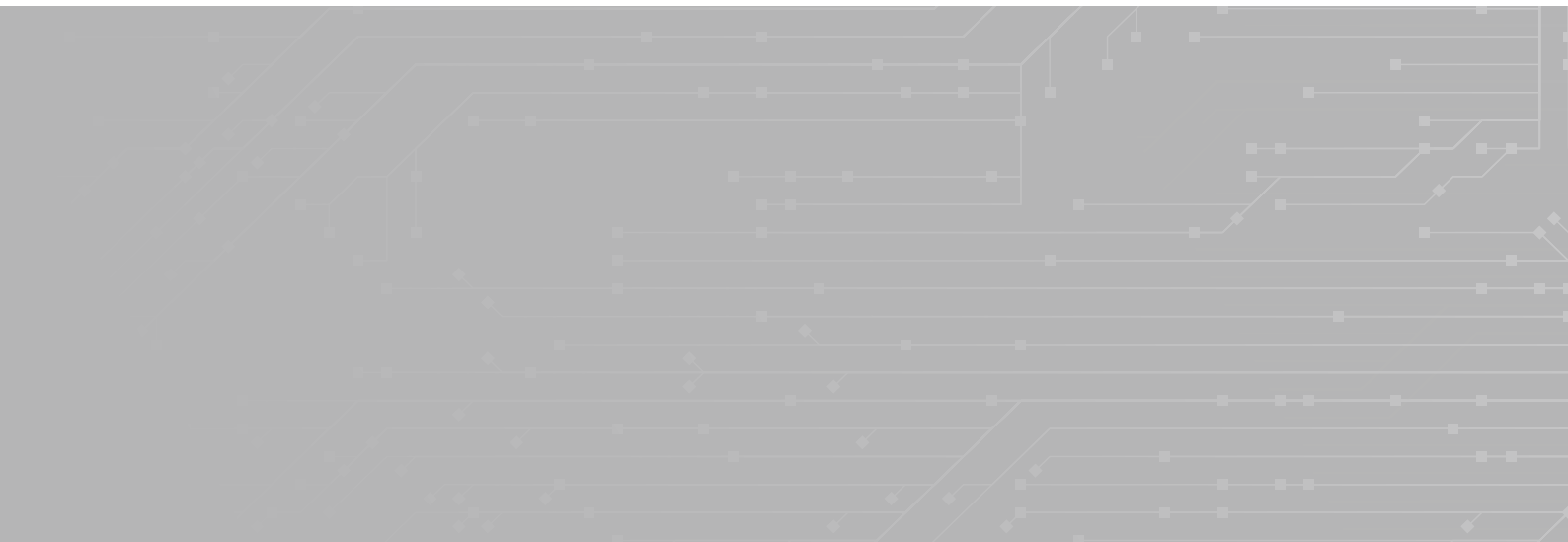
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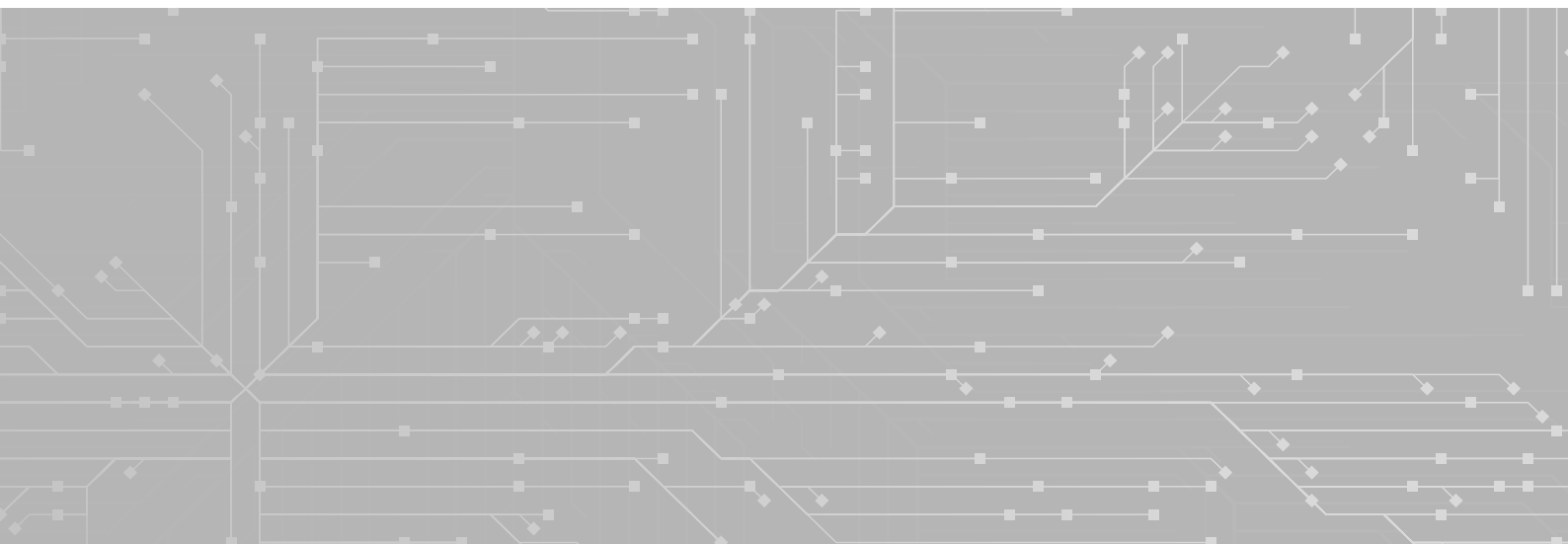
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# Changing Transportation Map through Big Data for Greater Convenience and Enhanced Safety

Big data, often dubbed “the new oil” in this era of the 4th industrial revolution, has emerged as a means of enhancing policy efficiency particularly in the public sector. The transportation sector is also actively harnessing big data to propel new changes. The “Seoul TOPIS” of the Seoul Metropolitan Government (SMG), and the “AI Taking Charge of Emergency Vehicle Dispatch, as Leading Contributor to Saving Lives!” program of Daejeon Metropolitan City are prime examples of local government transportation policies built on big data. Here are two cities that have tapped into big data to alleviate deep-seated issues of traffic congestion, and revamped their transportation maps to make them more convenient and safer in line with their cities’ unique characteristics.

## PART 1

- Transport Operation & Information Service [Seoul TOPIS] - Seoul Metropolitan Government
- AI Taking Charge of Emergency Vehicle Dispatch, as Leading Contributor to Saving Lives! - Daejeon Metropolitan City



# **Big Data for Transportation**

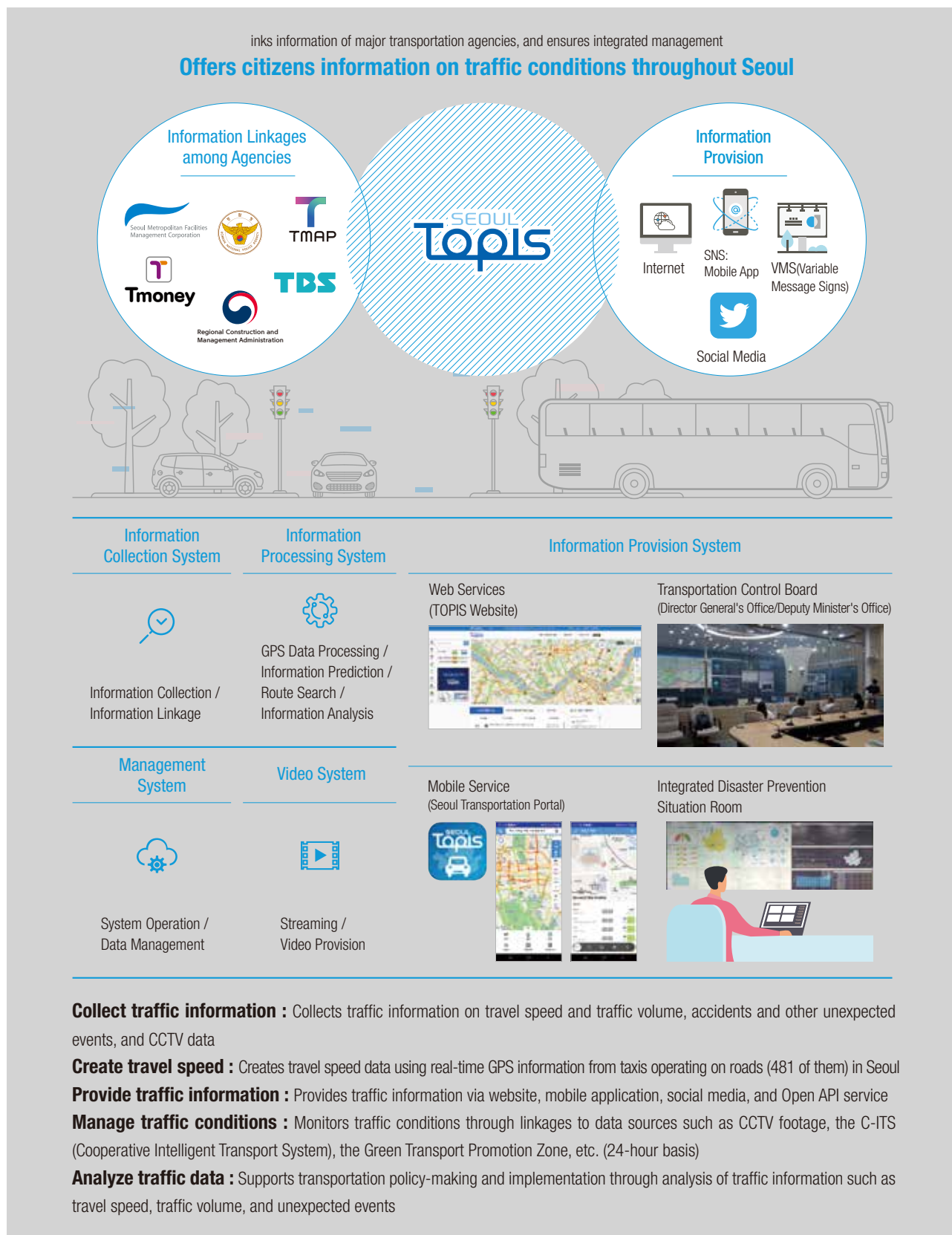
# Intelligent Transportation System for Predicting and Managing Traffic Conditions Using Big Data

Transportation in Seoul has been a long-standing problem, owing to an accumulation of factors such as the increase in private vehicles, the decline in service quality on buses due to the financial difficulties of their operators, and the relative subway congestion caused by the rising proportion of commuters using the subway. The multi-faceted efforts made to relieve the over-saturated traffic conditions in the city center, such as the creation of new subway lines and the expansion of road networks, have not been sufficient. Under these circumstances there was an urgent need for adoption of a state-of-the-art transportation information system, to offer quality services to public transportation users. It was also necessary to ensure integrated management of the diverse, disorganized transportation data produced by various agencies such as the Seoul Metropolitan Government, the Traffic Broadcasting Network, the Seoul Metropolitan Police Agency, the Korea Expressway Corporation, and private enterprises.

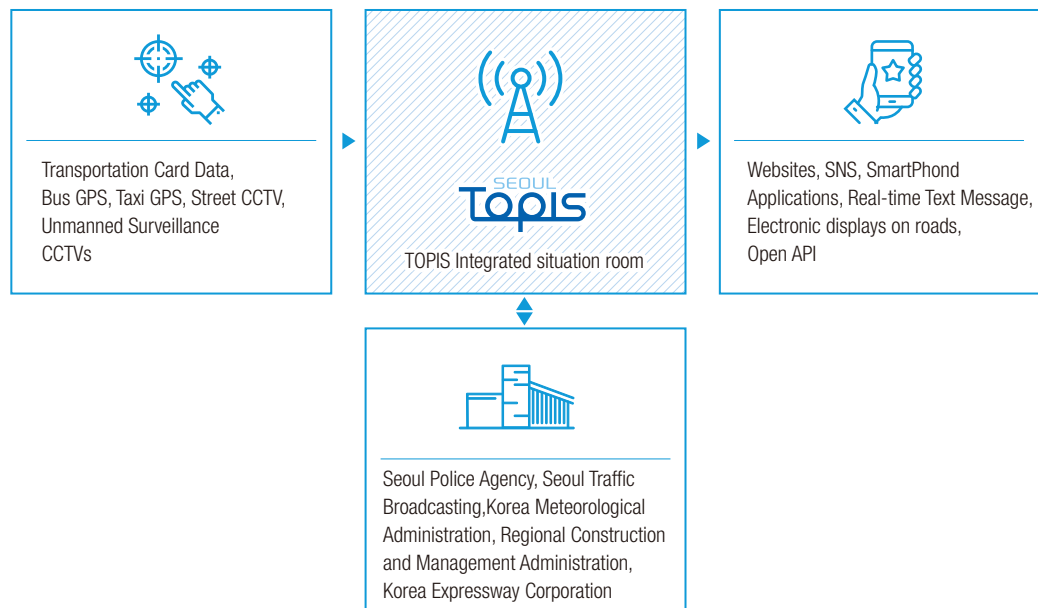


The Transport Operation and Information Service (TOPIS) is a comprehensive transportation information system established by the Seoul Metropolitan Government to enhance citizens' transport convenience and support policy-related decisions. To these ends, TOPIS collects and manages data on Seoul's traffic conditions, integrates and processes this transportation information, and finally makes available and also analyzes diverse sets of traffic information. The Seoul Metropolitan Government launched "TOPIS 1.0" in 2004, as a next-generation transportation system for predicting and managing traffic conditions to facilitate the prompt assessment of and proper responses to situations as well as the analysis of big data statistics. Subsequently, after the system evolved from the era of "Openness (TOPIS 2.0)" in 2008 through that of "Collaboration (TOPIS 3.0)" in 2013, the city government is now seeking to export the intelligent Seoul transportation system overseas, in collaboration with private companies, and is sparing no effort in developing transportation policies for the city using big data in diverse fields.

## TOPIS: Overview



TOPIS:  
Information Flow Chart



## Progress

- 2000** ● Implemented ITS (Intelligent Transportation System) for urban highways
- 2004** ● Officially launched Seoul TOPIS  
Revamped public transportation system, and introduced real-time bus operation management and transportation card systems
- 2005** ● Carried out 1st through 5th stages of TOPIS construction  
(linking and integration of individual systems, expansion of transportation information services for citizens, integration of traffic information websites, etc.)  
Introduced Unmanned Enforcement System
- 2008** ● Implemented pilot installation and expansion of bus information terminals (BITs)
- 2009** ● Launched mobile traffic information service
- 2010** ● Opened traffic data to private sector
- 2011** ● Introduced standard designs (VMS, VDS) for ITS facilities
- 2013** ● Established and began operation of Seoul Integrated Safety Center, with integrated transportation, disaster management and control functions
- 2014** ● Set up and implemented plan to commercialize TOPIS solutions and establish TOPIS business model
- 2015** ● Launched Seoul TOPIS platform (ITS Solution)
- 2019** ● Relocated computer equipment to Sangam Cloud Center, and revamped TOPIS website
- 2020** ● Improved service for providing information on unexpected situations, and carried out upgrading of transportation policy system
- 2021** ● Consolidated comprehensive transportation conditions announcement system for cases of disasters, and renewed TOPIS English and mobile pages

## Key Services

### 24/7 Integrated Transportation, Disaster and Security Management System

Minimizes secondary damage through 24/7 monitoring of any anomalies related to traffic, disasters and safety in Seoul, using cutting-edge equipment to ensure swift responses

TOPIS Disaster Situation Room Monitoring Boards	Information on Unexpected Traffic Situations	Information on Controlled Routes
		

### Real-time Bus Operation Management

Building on GPS data collected from buses and transportation card data, it manages bus operation information and intervals, and plans any needed detour operations.

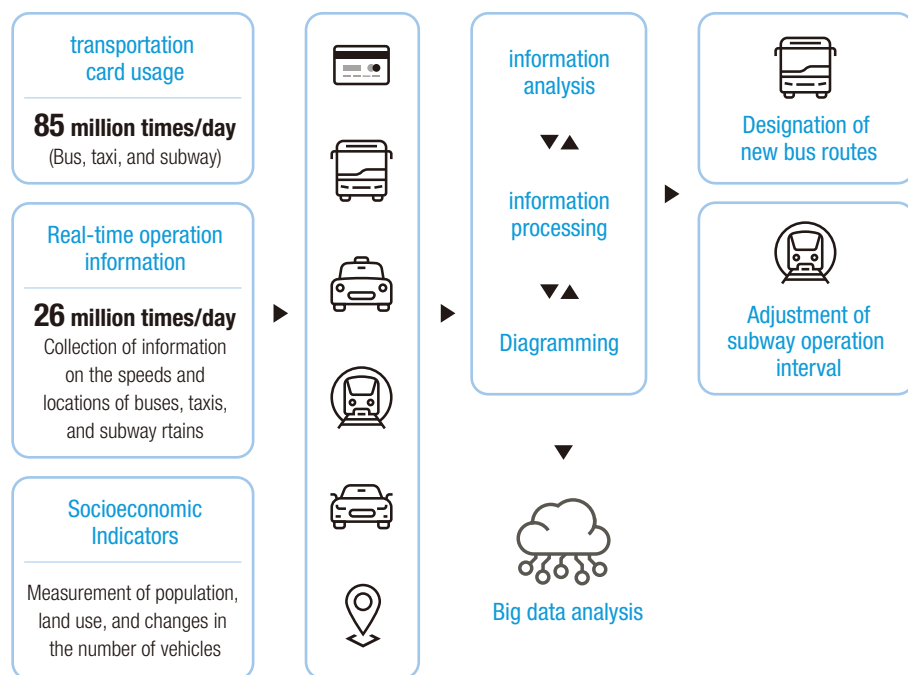




## Establishment of Transportation Policy Based on Big Data Analysis

Based on the analysis of converged data rooted in the SMG's variety of big data (transportation card usage data, bus and taxi operation data, socioeconomic indices, etc.), TOPIS supports transportation policies such as those establishing plans to minimize persistent traffic congestion and creating and adjusting public transportation routes

### Establishment and assessment of transportation plans use of big data



Big data



Collaboration on preparing for the future of transportation



Transportation

### Preparing for future transportation using big data

Introduction of traffic forecasting system



TAIMS Main Page



Analysis of Data on Intra-city Buses



Analysis of Ddareungi (Seoul Bike) Route Data



## Key Outcomes

### Seoul ITS Extends Its Presence Abroad

Exports of Seoul's Transportation Card System and ITS to 10 Countries:

Malaysia (2010), Colombia (2011), Philippines (2015, 2018), Egypt (2016), Thailand (2017), Mongolia (2017), Ukraine (2018), El Salvador (2020), Ecuador (2021)

### Site Visits to TOPIS Situation Room

Since the first site visit in 2005, a total of 40,360 people, among them 24,923 foreigners (61.8%), had visited the facility as of June 2022.

### Diverse Channels, Including TOPIS Website (Korean and English), Mobile Application, and Social Media

Provide the citizens with transportation information through diverse channels, such as the TOPIS website (supports both Korean and English), mobile application (Seoul Transportation Portal - available on both iOS and Android), and Twitter page

Website  
(<http://topis.seoul.go.kr>)



English Website  
(<https://topis.seoul.go.kr/eng/english.jsp>)



Mobile App  
(Seoul Transportation Portal)



Twitter  
(@seultopis)



### Release of Reports on Transportation

Provide basic materials required in the processes of building, maintaining and operating roads, as well as fundamental materials for various research projects, through publication of monthly and annual reports

## AI Taking Charge of Emergency Vehicle Dispatch, as Leading Contributor to Saving Lives! - Daejeon Metropolitan City

# Securing of Golden Time for Emergency Vehicles, by Identifying and Mitigating Obstacles and Causes of Delay through Big Data Analysis

The initial response, specifically the prompt dispatch of fire trucks and ambulances, is crucial to dealing with large-scale disasters involving considerable losses of lives and property. In Daejeon, however, it is a challenge to ensure emergency vehicle arrival during the Golden Time for optimal emergency response, due to the increasing traffic volume as well as the numerous vehicles left illegally unattended in alleyways and narrow streets. According to an analysis by the Daejeon Fire Headquarters in 2017, the average emergency vehicle dispatch coverage rates (the proportions of areas where fire fighters or emergency service teams can arrive within 5 minutes) were quite low, at 20% for fire engines and 31% for ambulances.



In response, recognizing the urgent need to resolve the issues involved in delayed dispatches of emergency vehicles and to establish plans to bolster safety measures for areas prone to fires and other disasters, Daejeon Metropolitan City began to implement improvements and strengthen safety measures using cutting-edge technologies including big data and AI. Since then the city has achieved meaningful outcomes in dramatically shortening the arrival times of emergency vehicles, and protecting more lives and property thereby, through identifying areas where delays are persistent, and working to resolve their causes, via big data analysis of the GPS data of emergency vehicles such as fire engines and ambulances.



## Progress

- July 2017** ● Began big data analysis using GPS location data of emergency vehicles
- April 2018** ● Analyzed traffic flows for optimization of emergency vehicle dispatch systems
- May 2018** ● Identified vulnerable areas through time frame-based dispatch coverage rate analysis

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## Major Programs

### **Analysis of Factors Affecting Emergency Vehicle Dispatches**

From August 2016 to January 2017, in collaboration with other agencies, Daejeon Metropolitan City employed diverse algorithms to thoroughly analyze the various factors that could affect the dispatches of fire engines and ambulances

- It analyzed 30 million cases of GPS data of ambulances to generate location coordinates at 10-second intervals, and analyzed the pager numbers of 210 vehicles dispatched to various disasters, the administrative jurisdictions of fire stations, the 119 Safety Centers under the fire stations, and the vehicle type data
- It also analyzed the intelligent transportation system (ITS, [nodelink.its.go.kr](http://nodelink.its.go.kr)), in order to arrive at more accurate and reliable results
- The analysis was carried out based on 110,000 cases of road location data as well as 9,000 cases of road characteristics data, categorized in terms of roadway names, road IDs, road numbers, lane information, etc.

### **Analysis of Vehicle Routing for Optimization of Emergency Dispatches**

Machine learning-based analysis of routing data identified seven vulnerable areas and 800 chronically congested spots which emergency vehicles could not reach within 5 minutes

- The analysis identified the optimal routes for avoiding congested sections and dispatching emergency vehicles to promptly arrive at the vulnerable areas
- The results of analysis showed that using the most expeditious routes between the centers and the destinations is more efficient than focusing on the shortest direct distances between them (Even if its total distance between the two points is longer than the shortest direct distance, the more efficient route, which avoids obstacles such as traffic lights or left-turn signals, should be used)
- Drawing on the data, an emergency service team can be more promptly dispatched from a center from which it can arrive at the site most rapidly

### Shortest Routes for Emergency Dispatch

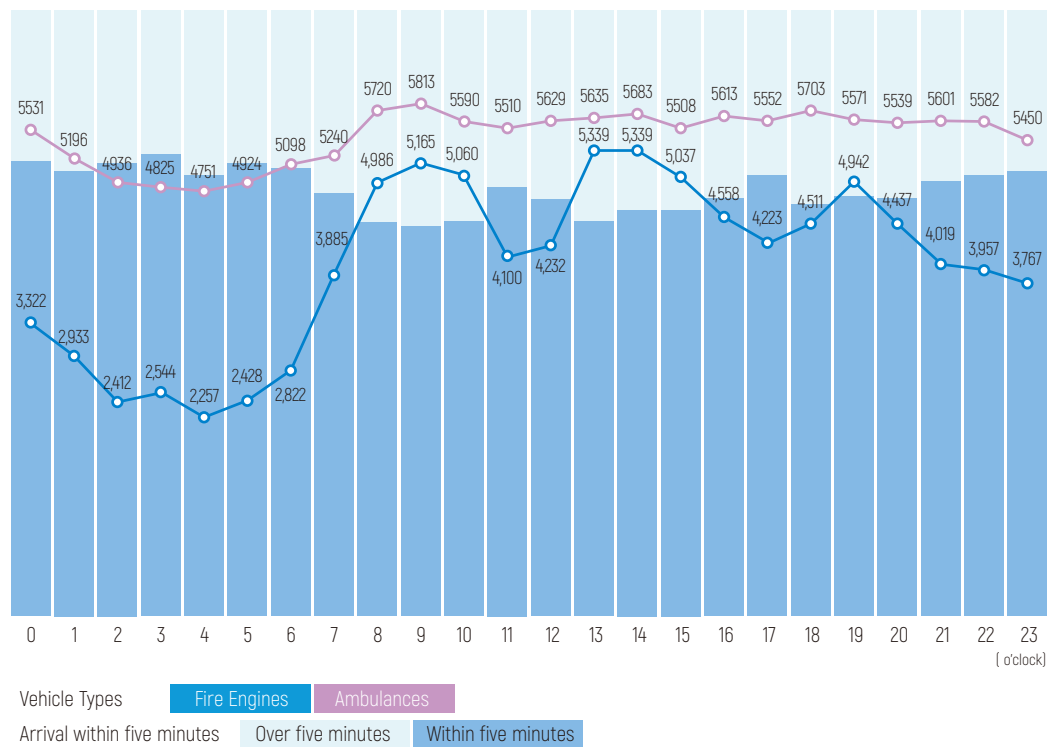


#### Identified Vulnerable Times and Areas through Time Frame-based Coverage Analysis

Through a multifaceted analysis and approach, the dispatch coverage rate differences by time frame of fire engines and ambulances were identified, as well as their vulnerable areas and times, leading to the achievement of enhanced dispatch coverage rates

- While the dispatch coverage rate for fire engines amounts to 60% in the time frame from midnight to 7 am, when traffic is light, it is only 10% between 1 and 2 pm when the volume of traffic is relatively high. The vulnerable hours for ambulances are from 8 to 10 am, when the coverage rate is only 25%
- Additional analysis was undertaken to come up with a more accurate approach to reinforce safety measures for the region
- A shortest route algorithm was adopted, based on the average speed of ambulances, and simulations were carried out on designating centers to dispatch rescue teams in cases of emergencies and avoiding routes subject to delays. This resulted in a twofold increase in the overall dispatch coverage rate, from 31% to 60%

Numbers of arrivals  
within five minutes and  
dispatch coverage rates,  
by time frame



## Major Achievements

### Established Transportation Policies for Emergency Vehicles and Enhanced Fire Fighting Response System, Using Big Data Modeling

Installed left-turn signals on roads near emergency centers; Implemented traffic signal control system giving priority to fire trucks; Installed hose-reel fire hydrants in areas difficult for fire trucks to access

#### Before modeling

- Sections causing chronic delays for emergency vehicles.
- Low dispatch coverage rates
- Vulnerable areas

#### After modeling

- Shortened arrival times of emergency vehicles
- Vulnerable areas and times identified
- Proactive responses to congested areas (causes of delays eliminated, and safety measures reinforced)

### Significant Reductions in Response Times of Emergency Vehicles, Thanks to Decision-making based on Machine Learning Algorithms or AI Data

Proportion of dispatches to fires recording response times less than 7 minutes: Increase of 9.9%, from 72.2% in 2017 to 80.0% in 2021

\*Comparisons with rates in Gwangju, which has traffic conditions similar to Daejeon, and nationwide: Gwangju (77.4%), National Average (65.9%)

\*While the analysis was based on the 5-minute dispatch coverage rate widely used in academic research, a response time of seven minutes was used here for a more realistic reflection of fire suppression practices





# Inconvenience Mitigated and Safety Enhanced, through Implementation of New Technology

Technological advances, which open up new possibilities, have been widely adopted in our society and have expanded cities' capabilities. That, in turn, has a positive impact in improving people's quality of life. This explains why local governments, whose fundamental goal is to improve their citizens' quality of life while also guaranteeing their safety, have been actively embracing new technologies. Local governments provide public facilities and resources to serve as testbeds, thus supporting innovative companies. We look here at two examples in this regard. In Seoul, the Seoul Metropolitan Government (SMG) has come up with ways to improve the quality of its administrative services for citizens and enhance its technological capabilities in tackling urban issues. In Jeollanam-do, meanwhile, the Provincial Office has adopted digital twin technology to promote the convenience and ensure the safety of public and multi-purpose facilities.

## PART 2

- Public Testbeds for Innovative Technologies (Testbed Seoul) - Seoul Metropolitan Government
- Demonstration Project on Safety Management of Facilities Using 5G-based Digital Twins at Jeollanam-do Suncheon Medical Center - Jeollanam-do Province





# **Making Use of New Technology**

## Public Testbeds for Innovative Technologies (Testbed Seoul) - Seoul Metropolitan Government

# Offering All Available Public Facilities and Resources as Testbeds to Support Companies and Promote Urban Growth

As of the first quarter of 2019, there were a total of 59,000 newly established domestic technology companies in operation in Korea, a historical record-high number. In reality, however, during this boom in technology-based startups many small and medium-sized startups have been forced out to a so-called “Death Valley,” in that they face threats to their very survival despite technological breakthroughs they have made that could lead to massive economic ripple effects. This is because of the difficulties that such startups face in forming their initial markets and finding markets, so that they fail to advance to the commercialization of their technologies. Even if some startups succeed in commercialization, without having any actual sales or supply contracts they face difficulties in penetrating existing markets.



The “Testbed Seoul” project makes available all public facilities and resources of the Seoul Metropolitan Government for use as demonstration sites (testbeds) for innovative products and services, allowing innovative companies to commercialize their products and services and explore new markets for their development. The Seoul Metropolitan Government has made available its public facilities and resources, ranging from public infrastructure including subways, roads, Han River bridges, municipal hospitals and underground-shopping complexes, to administrative systems, to serve as testbeds for evaluating the performances and effectiveness of prototype products and services created based on innovative technologies such as blockchain, FinTech and AI, as well as verifying their business values. In so doing, the Seoul Metropolitan Government has supported the development of companies that have innovative technologies, while at the same time enhancing the quality of its administrative services for citizens and strengthening its technological capabilities in addressing urban issues.



<b>Eligibility</b>	Products and services of Seoul's SMEs and startups, which can be placed in public facilities as they are equipped with the innovative technologies of the fourth industry (Technology Readiness Level (TRL) 6 or above)
<b>Project Details</b>	Support for demonstration (maximum one year) + Issuance of the Field Test Confirmation certificate + Follow-up support (finding new markets and others)
<b>Project Types</b>	<ul style="list-style-type: none"> <li>- Budget-oriented: Provide demonstration sites, Subsidize demonstration expenses (Up to KRW 400 million per project)</li> <li>- Opportunity-oriented: Provide demonstration sites (Large and middle-standing enterprises are eligible; Budget not supported)</li> </ul>

## Progress

- 2018** ● Launched public testbed pilot project
- 2019** ● Promoted “Testbed Seoul” project at full-scale
- 2020** ● Adopted demand-oriented tasks (identified necessary tasks for project demonstration agencies)
- 2021** ● Consolidated cooperation among organizations involved, including demonstration agencies, and presented awards from - Board of Audit and Inspection of Korea for best practices
- 2022** ● Expanded project scope to autonomous districts, and introduced hub-based testbed projects

## Key Services

### Seoul Metropolitan Government Provision of Public Facilities and Resources for Testbeds

The Seoul Metropolitan Government provides public spaces such as Seoul municipal hospitals, construction sites, and roads to serve as testbeds for trying out the performances and effectiveness of new technologies, detecting any technical issues that might arise during actual use and improving any shortcomings in advance, while supporting market development by providing empirical results



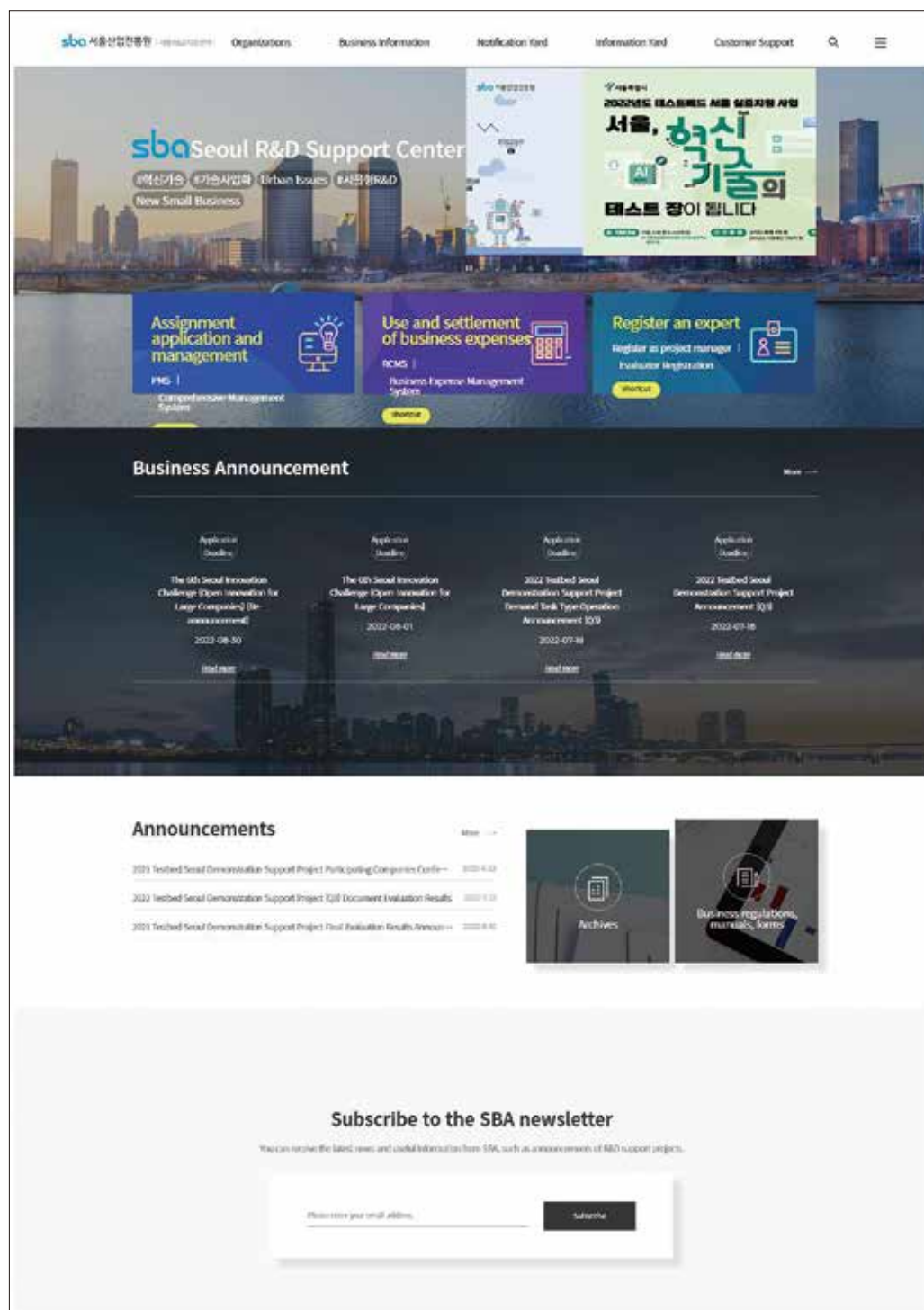
Demonstration of AI-powered food waste reduction solution  
(Seoul City Hall Main Building Cafeteria)



Demonstration of autonomous delivery robots  
(Sangam Autonomous Vehicle Pilot Zone)

## Seoul R&D Support Center

The Seoul Metropolitan Government operates an online platform to receive applications for and manage demonstrations of products and services developed by companies, and to provide follow-up support for companies completing the demonstration processes





### Issuance of Field Test Confirmation, a Seoul Mayoral Certification

After the demonstration results have been evaluated, Field Test Confirmation certificates in the name of the mayor of Seoul are issued to outstanding companies, in Korean and English, which the companies can utilize to pursue their products' public purchases and exports and to explore markets



## Key Services

### Provided Opportunities for Demonstration of Innovative Technologies

Provided opportunities for demonstration of a total of 104 innovative technologies during four years (2018-2021)

Year	Total	IoT	Cognitive Intelligence	Big Data	Autonomous Vehicles	VR/AR	Drones, others
Total	104	30	29	6	6	10	23
2021	32	10	11	3	-	1	7
2020	33	10	8	1	1	6	7
2019	27	7	7	1	5	3	4
2018	12	3	3	1	-	-	5

### “Testbed Seoul” exhibition

The “Testbed Seoul” exhibition (2019) was held to help companies find domestic and foreign markets: An exhibition of 50 innovative companies' products was held, together with forums for discussing them. Ten companies participated in a competition to pitch innovative technologies, with companies making outstanding pitches obtaining support for public purchases of their products



### Robust International Cooperation

Through their participation in “Testbed Seoul,” 28 companies have penetrated foreign markets and achieved an estimated KRW 35,167 million in exports. A total of 44 MOUs have been signed

Year	Companies	Countries	Exports (unit: KRW 1 million)	To be exported (unit: KRW 1 million)	MOUs
Total	28	48	4,774	30,393	44
2021	5	8	550		1
2020	6	13	83	27,621	7
2019	10	16		2,000	4
2018	7	11	4,141	772	32

\*Based on the year in which the demonstration project was selected, it is the cumulative amount from the time of selection to the present

## Demonstration Project on Facility Safety Management Using 5G-based Digital Twins at Jeollanam-do Suncheon Medical Center - Jeollanam-do Province

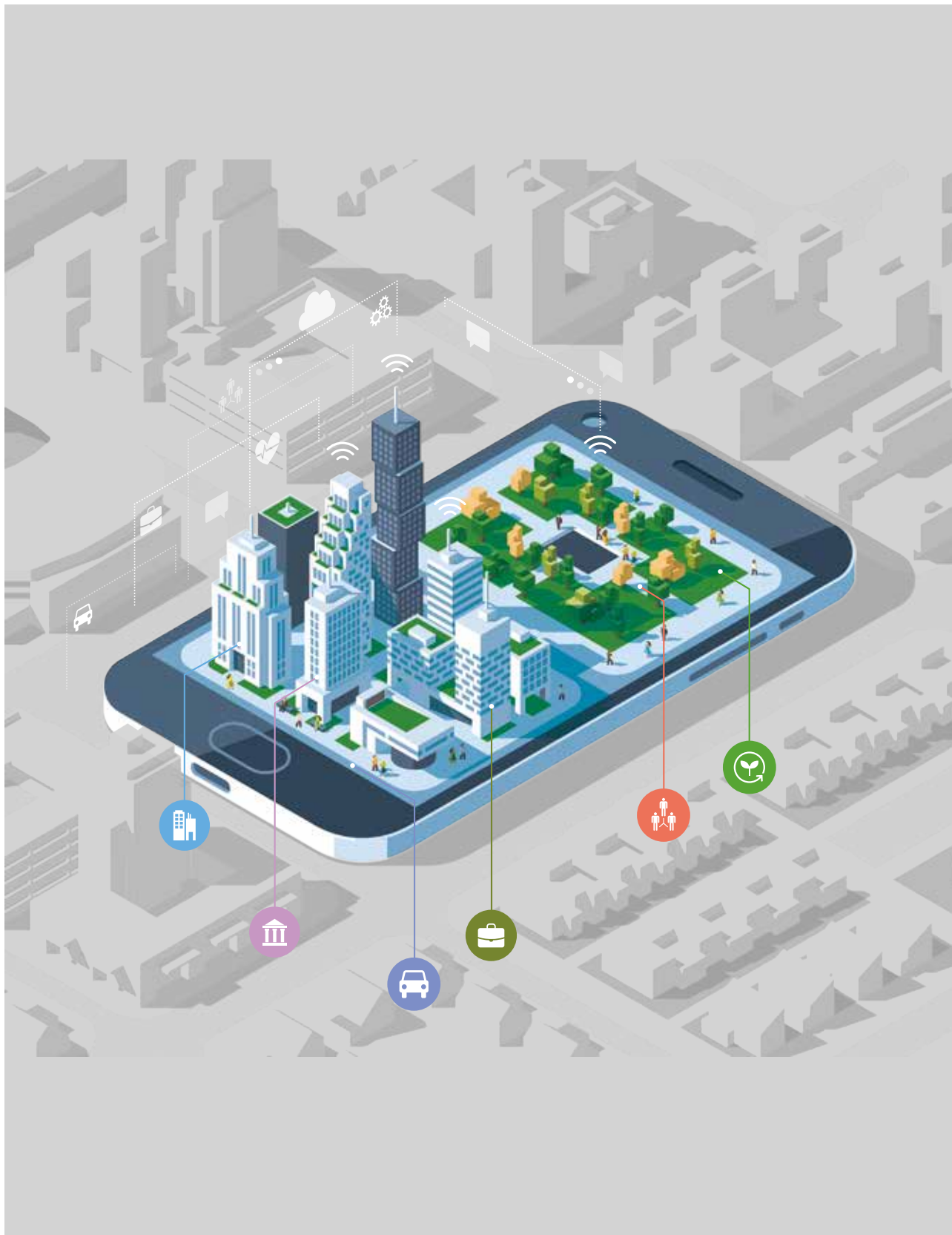
# Securing Safety of Public and Multi-purpose Facilities through Application of Digital Twin Technology

Ensuring the safety of public and multi-purpose facilities such as medical, cultural and sports facilities is a fundamental determinant of people's quality of life and a core task for job creation and economic development. Moreover, through its enhancing of social convenience and achieving upgrading of the relevant industrial ecosystems, it will boost the national economy.



To these ends, a project on “Public-led Facility Safety Management Using Digital Twins” was launched. This project utilized digital twins for the safety management of aging local government-run public and multi-purpose facilities such as hospitals and performance halls, to thus accelerate transitions toward a digital society. The Jeollanam-do Province designated Suncheon Medical Center as a service model, and has pushed ahead with digitization applying new technologies such as AI and 5G, as well as the digital twin technology that recreates physical objects in the virtual world so as to control them in real-time or prevent accidents. Based on these efforts, a transition has been made from a system based on follow-up measures and emergency responses to safety incidents, to a system centering on prediction and prevention, thereby enabling authorities to prepare countermeasures for recurring disasters and facility safety issues, while also promoting an expansion of the foundation for innovative digital technologies.





## Progress

- March 2021** Registered candidates and selected participants for public contest on facility safety management using 5G-based digital twins
- April 2021** Conducted on-site inspection of project site and signed agreement
- May to December 2021** Carried out project

## Key Services

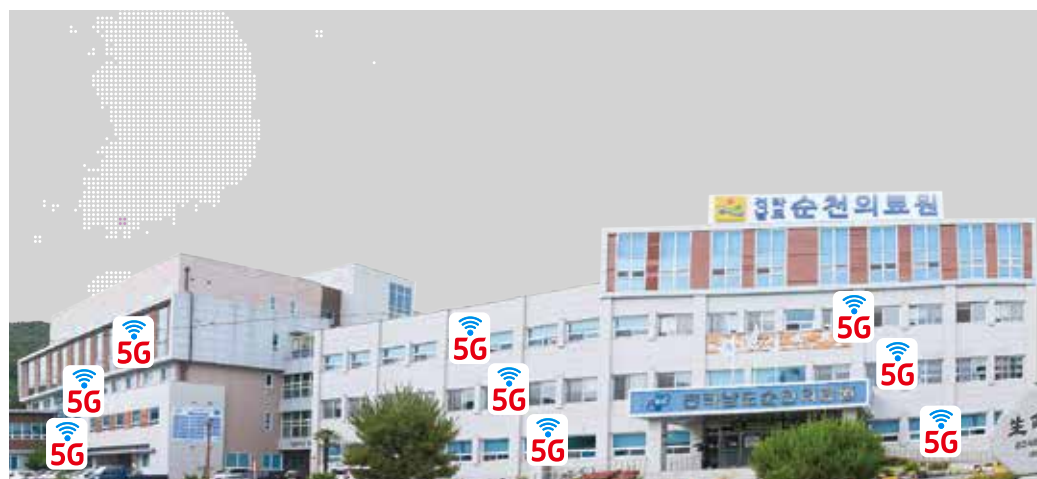
### Visualization of Digital Twin-based Integrated Facility Management Data



### Demonstration of 5G Communication Networks

The quality of 5G signals received inside buildings of Suncheon Medical Center was measured, and 5G Routers were then installed in places with better-received signal quality for using 5G communication networks. Data collected from the Routers was transferred to cloud-based platforms

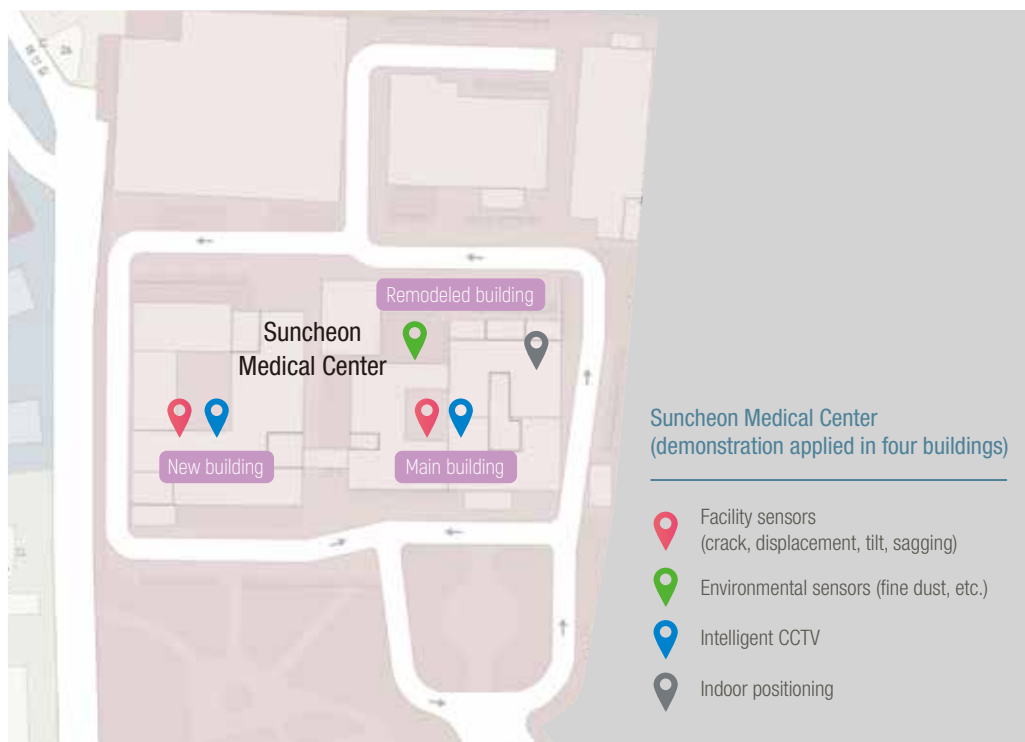
5G Router installation in  
Suncheon Medical Center



### IoT-based Demonstration

After taking into account safety in facility use and structural safety, IoT-based sensors for safety management were built and linked to an integrated management system. By identifying the access to specific areas and the locations of facility users, basic location information was provided for simulations on tracking the movements of infected persons and the spread of infectious diseases based on an infectious disease management system

IoT-based sensor  
infrastructure in  
Suncheon Medical Center

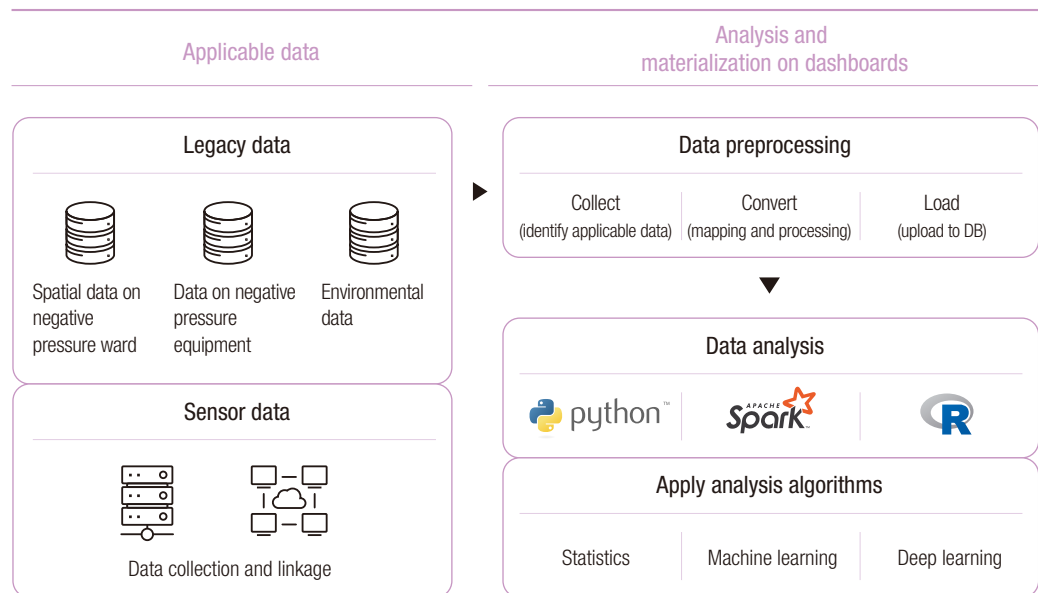


### Predictions Based on AI and Big Data, Simulations of Spread of Infectious Diseases Based on Changes in Negative Pressure

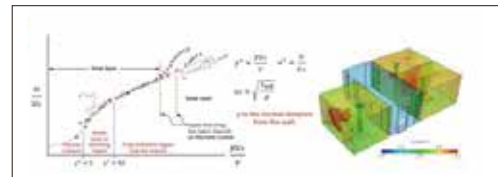
The negative pressure isolation ward of Suncheon Medical Center had been used to isolate and treat tuberculosis patients. As the demand for negative pressure rooms has increased rapidly due to COVID-19, the spreading of infectious diseases is simulated, based on digital twin, in accordance with changes in negative pressure

- A model was established for predicting the spread of infectious diseases in accord with the degree of difference in pressure and the operations of the airflow and leakage systems, based on the preprocessing of collected data (including legacy data, for example on conditions of negative pressure equipment, negative pressure settings and operating information, as well as environmental information concerning temperatures, humidity, air quality, etc. and other usage data)

Data analysis process  
related to spread of  
infectious diseases  
in accordance with  
changes in negative  
pressure



□ Algorithms for analyzing negative pressure environment and predicting spread of infectious diseases



Modification of simulations of infectious disease spread based on changes in negative pressure facilities, by linking to and analyzing information on negative pressure ward operation and environmental data

### Example of simulation



## Key Outcomes

### **Operational efficiency expected to increase by 86% thanks to digital twin-based platform services**

- Time required for regular inspection of facility: 1 hour per day → 15 min per day
- Smoke alarm response time: 3 min per case → 10 sec per case
- Time spent for checking frequent alerts: 30 min per day → 3 min per day

### **Manager's response time expected to decline by 86% thanks to use of digital twin-based platform services**

- Time required for notification of malfunctions in quarantine facilities: 30 sec per case → 10 sec per case
- Response time during quarantine facilities alerts: 8 min per case → 1 min per case

## Expected Effects

- Strengthening of platform operation capabilities through securing of demonstration information and internalization of advanced technologies
- Increase in facility values through implementation of services specialized for facilities concerned (simulations on spread of infectious diseases in medical facilities, detection of wastewater and sewage leakage in commercial facilities, ensuring of child safety based on locations of cultural and sports facilities, etc.)
- Improved management of safety issues closely related to lives of citizens, concerning for example safety accidents in facilities and the spread of infectious diseases, through sharing of real-time information on potential risk factors

# Enhanced Administrative Efficiency and Public Satisfaction through Bespoke Information Services Suitable to Specific Local Government Policies

The realm of web portal services, encompassing diverse services scattered across the Internet attending to the needs of users surfing the Web, is expanding more and more. Lately, as data-driven administration in public institutions and local governments has flourished, a growing number of organizations are developing their own portal services meeting their own specific policy demands. We look here at several best practice cases: the Location & Map-based Portal Service for Smart Urban Living ("Sejong N") of Sejong Special Self-Governing City; the Resident-oriented Gangwon-style Integrated Service Platform of the Gangwon-do Province; the Ulsan Purchase Counseling Platform (Ulsan e-NEGO) of Ulsan Metropolitan City; the Comprehensive Mobile Incentive Application for Garbage Cleaning ("Time to Bin") of the Cheongju City

## PART 3

- Location & Map-based Portal Service for Smart Urban Living, "Sejong N" - Sejong Special Self-Governing City
- Resident-oriented Gangwon-style Integrated Service Platform - Gangwon-do Province
- Ulsan Purchase Counseling Platform (Ulsan e-NEGO) - Ulsan Metropolitan City
- Comprehensive Mobile Incentive Application for Garbage Cleaning ("Time to Bin") - Cheongju City



## **Web Portal Services**



## Location & Map-based Portal Service for Smart Urban Living, “Sejong N” - Sejong Special Self-Governing City

# Citizen-tailored Smart Living Information Service Delivered via One Simple Login

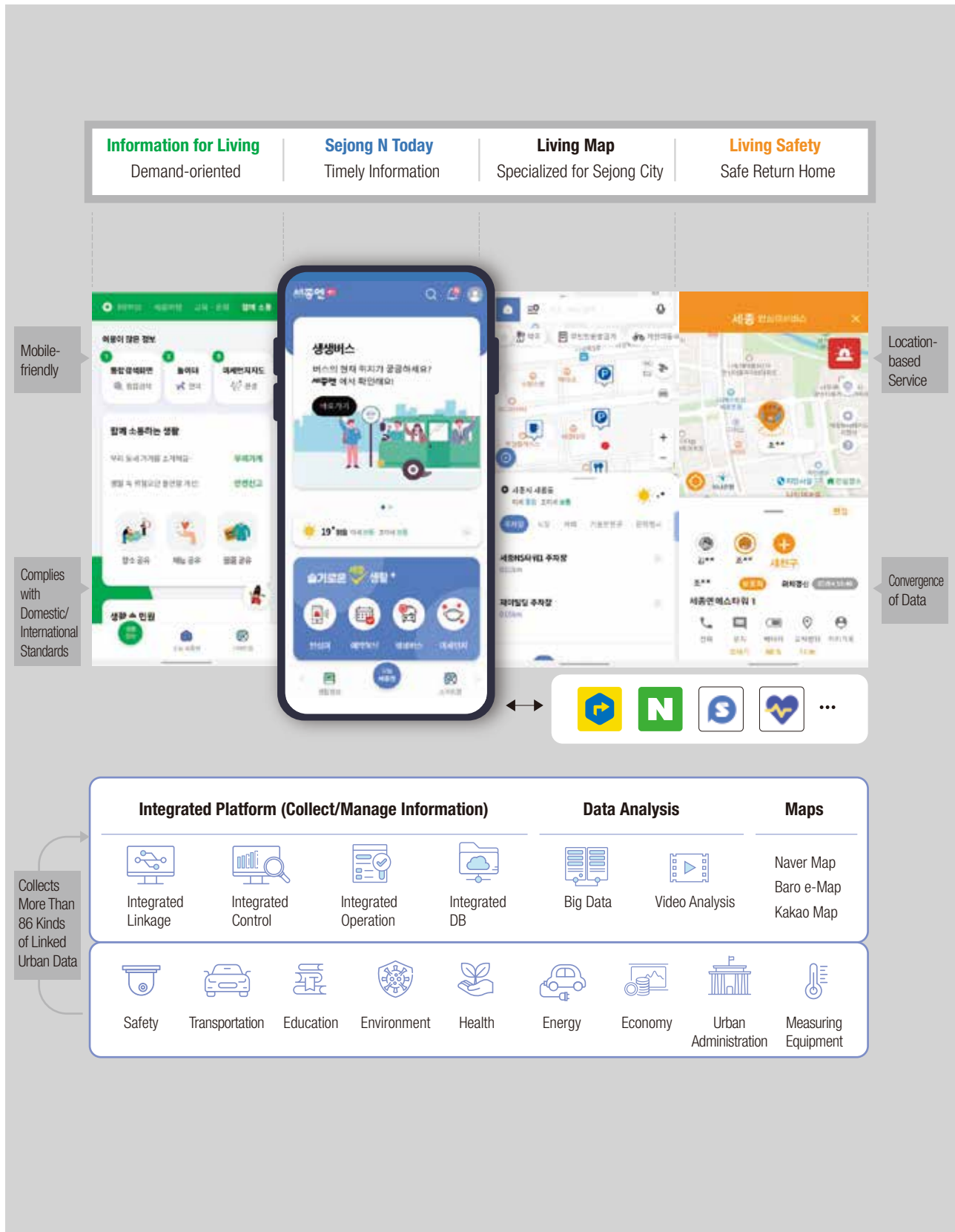
Many cities around the globe are transitioning rapidly into smart cities, by building on the information and communication technologies of the 4th industrial revolution to address various issues caused by urbanization such as limited resources and infrastructures, traffic congestion, energy shortages, and environmental deterioration. Under leadership of the central government, Sejong Special Self-Governing City also plans to build a smart city during the period from 2007 to 2030, to improve the quality of life of its citizens, enhance its urban competitiveness, and complete the nation's administrative capital. However, when the smart city infrastructure and facilities were first established, public services involving matters such as crime prevention, transportation, the environment and culture were set up to be provided on individual bases, and citizens had until recently suffered inconvenience in being forced to access each related website individually to utilize any of these services.



In light of this problem, the Sejong Special Self-Governing City has now established “Sejong N”, a location- and map-based smart portal system that not only allows users to enjoy Sejong City's information services concerning day-to-day life issues including crime prevention, transportation, the environment and culture, all via a single login, but also makes possible related citizen participation and two-way communication. “Sejong N” currently offers urban living information in 86 different categories highly relevant to the everyday lives of citizens in Sejong City, such as traffic, safety, the environment and tourism. It also provides 24/7 safety services through its mobile SOS security application, “Sejong Ansimi”.



## Sejong N Information Service Structure



## Progress

- 2019** ● Launched smart portal web service, "Sejong N"
- 2020 to 2021** ● Prepared plans for enhancing "Sejong N" services
- 2021 to 2022** ● Developed advanced functions of "Sejong N," and established app services

## Key Services

### Improved Mobile App Performance

Increased convenience and accessibility for citizens, through redesign of existing web-based user interface (UI) into application optimized for mobile devices

### Integrated Functions

Offers convergence services incorporating both "Sejong N" and "Sejong Ansimi," which are operated individually

### Smart Services



◀ Bus boarding and deboarding reminder service and "Safe Return Home" service, using real-time bus location data updated every second



◀ Provides air quality information using particulate matter sensors installed throughout the city

## Communication Services



◀ A platform enabling small business owners to share promotional information for example on their stores, openings of business, special events, additional discounts for payments made in the community currency, etc.



▶ Citizen-generated service for sharing information on local community issues such as safety and transportation, and for community mapping

## Education Services



◀ Happiness Education Experience Centers operated by both public and private sectors. Shows whether centers accept voucher card (Ggoom-Kki Card) designed to promote cultural activities for students



▶ Education resources map helping people to know about and introduce to others the neighborhoods they live in

## Multilingual Services



◀ Map service offered in English, Chinese and Japanese using the "Baro e-Map (national Internet map)" of the National Geographic Information Institute (NGII). Provides multilingual map content (place names, addresses, etc.) using external translation services

## Reservation Hub Services



◀ Offers integrated service for making reservations at all public facilities operated by Sejong City



▶ Shows the types, locations and hours of operation of available facilities at a glance

## Mobile SOS Security Application, "Sejong Ansimi"



◀ Supports family safety services for women and children, via features to help locating friends, provide departure and arrival information, etc.



▶ Linked with police and 119 safety call services, offers safety service enabling citizens to press emergency bell button in cases of emergency

## Citizen-oriented Services



◀ Shows real-time data on crowdedness of polling stations within and outside city jurisdiction



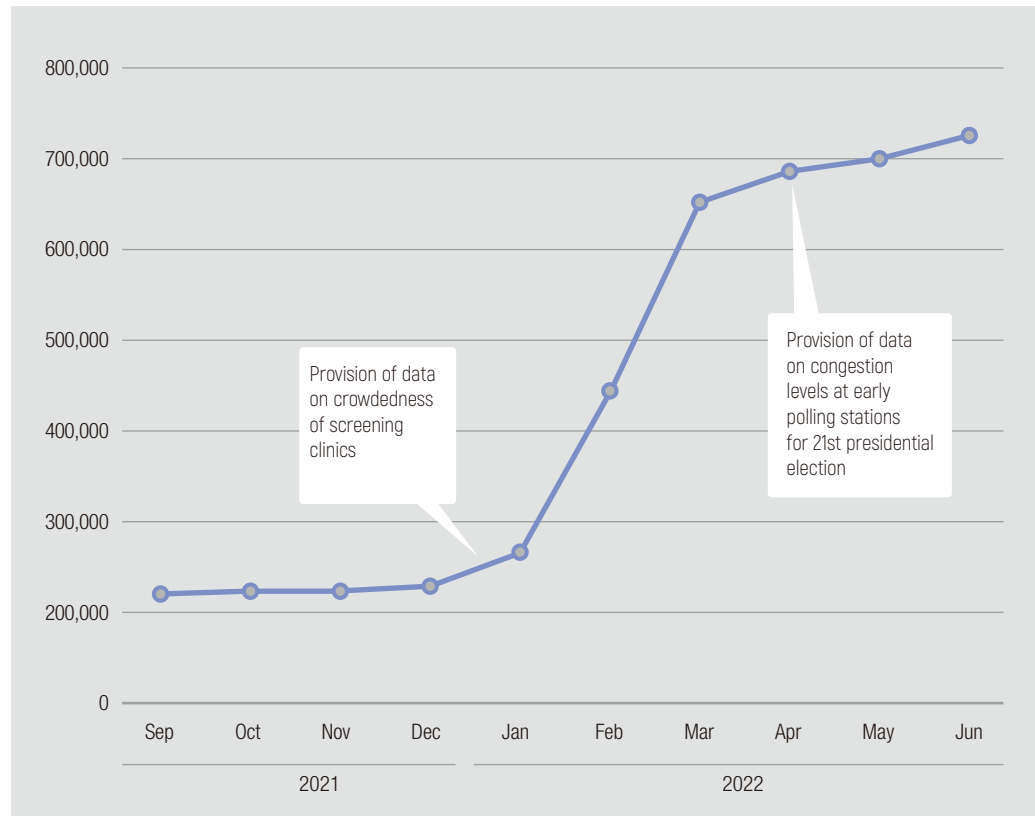
▶ Offers screening clinic data, on numbers of people waiting, expected waiting times, etc., using AI

## Key Outcomes

### Record-high Number of Visits

Accumulated 700,000 hits – Nine-fold increase in comparison with previous year (as of June 2022)

Accumulated Number  
of Sejong N Hits



### Government Awards and Selections for Best Practices

- Participated in 2020 Regional Informatization Research Tasks Conference hosted by MOIS, and received Presidential Award
- Selected as best practice in field of smart services in Combined Evaluation of Local Government (CELG), and presented Minister of the Interior and Safety Award

### Achievements in International Cooperation

- Has received certification renewal every year since platform was first certified under the ISO 22301 business continuity management systems (BCMS) standard in 2016
- Contributed to acquisition of ISO 37106 smart city standard certification, as “leading smart city (level 4)”

## Resident-oriented Gangwon-style Integrated Service Platform - Gangwon-do Province

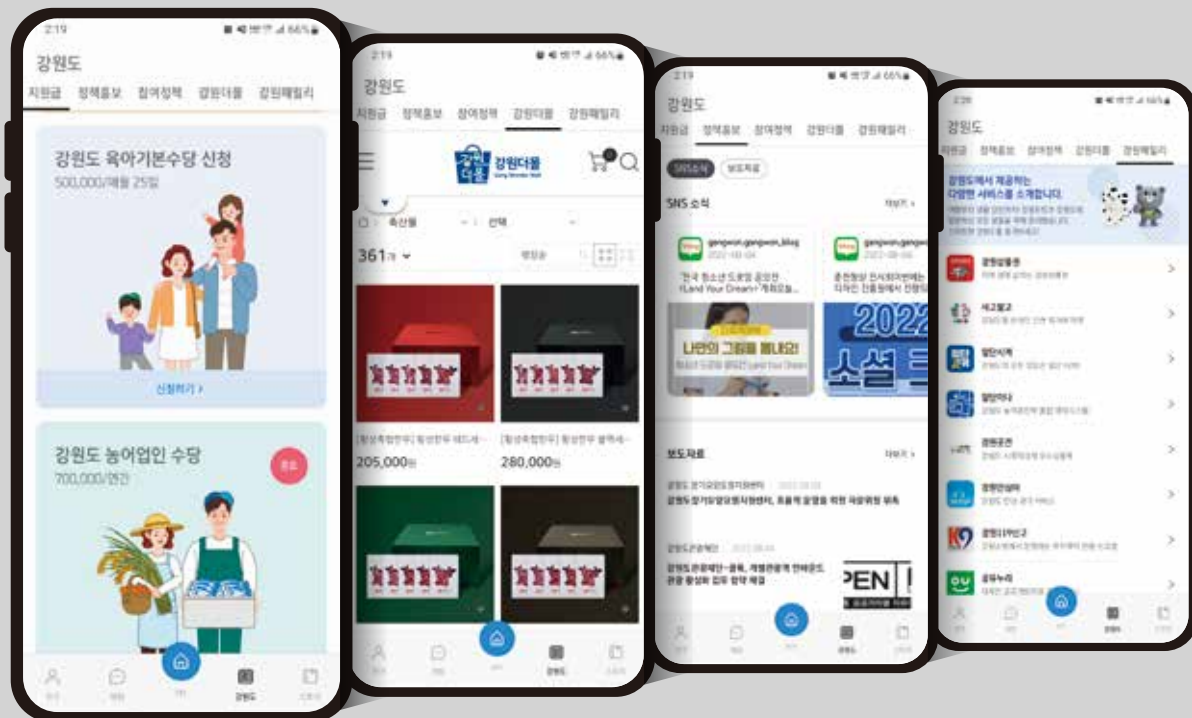
# New-concept Integrated Service Platform Combining Next-generation Identity Authentication and Public MyData



With a view to addressing the overall changes in social and economic structure brought about by the COVID-19 outbreak since 2019, as well as overcoming the subsequent risks and reinforcing its future competitiveness, the Gangwon-do Province has implemented a comprehensive adjustment of projects carried out by its various departments, based on a strategic roadmap to promote the digital transformation of its entire provincial population, its whole economy, and its provincial governance. In addition, believing that the speed of digital transformation of its administration will determine its future competitiveness in the post-COVID-19 era, the Provincial Office has chosen to avoid an administration- and enterprise-oriented digital transformation in favor of developing a Gangwon-style integrated service platform to which its residents can truly relate, to thus facilitate a digital transformation highly interwoven with each individual resident's everyday life.

The integrated service platform is a novel one that allows users, after giving their consents, to verify their identities at anytime and anywhere using MyData, and enjoy personalized services related to areas such as administration, the economy and welfare, through a single integrated application. Its main functions include the provision of resident-centered services involving matters such as digital provincial IDs, digital administration services, a Gang Wonder Mall, public identification, and resident participation in policy-making. The platform integrates blockchain-based next-generation identity authentication (DID: Decentralized Identity) with public MyData. The data and services are separated, so that diverse services can be offered in a secure way using only necessary information without any collection of private information.

## Gangwon-do Province Integrated Service Platform



## Decentralized Identity-enabled Digital Provincial ID



## Any Gangwon-do citizen can easily issue a digital ID card

- ✓ Integrated identification using DID ID (code)
- ✓ Secure security management with password and biometric information authentication
- ✓ Applying for subsidies using digital ID cards, recommending customized administration, Provision of access services to public institutions



## Progress

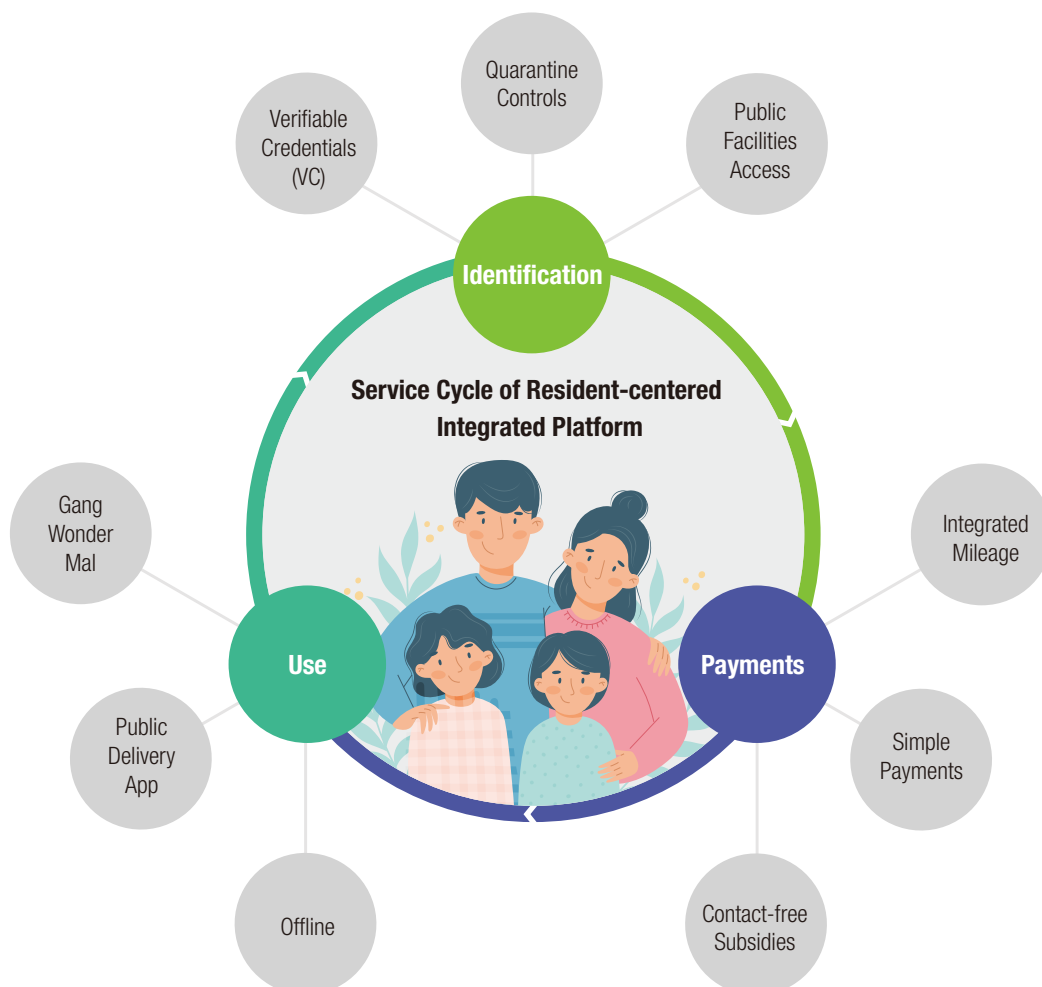
- December 2020** Selected as operator of project by Ministry of Science and ICT, to establish foundation for next-generation identity authentication
- July 2021** Selected as implementer of contact-free civil service provision project by Ministry of the Interior and Safety, and signed joint promotional agreement
- September to November 2021** Pilot operation of platform
- April 2022** Official launch of integrated service platform

## Key Services

### Issuance of Digital Provincial IDs and Provision of Contact-free Administrative Services

Implemented provision of administrative services such as provincial welfare support and subsidies, which do not require direct physical contact, building on issuance of digital provincial IDs powered by blockchain-based DID (Decentralized Identifier) technologies

Service Cycle of  
Resident-centered  
Integrated Platform of  
Gangwon-do Province



### Major Features of Gangwon-do Province Resident-oriented Integrated Service Platform

Digital Provincial IDs	Identification and Verification through interface with MyData
Health Check-Up Dates	<p>Contact-free applications for and receipts of subsidies, which do not entail document submission processes or visits to government offices</p> <p>*1st Development</p> <ul style="list-style-type: none"> <li>- (Gangwon-do Province) Basic childcare allowances; Allowances for farmers and fishermen; Job seeker allowances for youth; Job seeker allowances for women whose careers have been interrupted; Interview allowances for job seekers</li> <li>- (Chuncheon City) Subsidies for returning to normal; Welfare programs for young workers</li> </ul>
Gang Wonder Mall	Purchases of local products with subsidies provided on platform
Easy Access to Public Facilities	Holders of digital provincial ID cards able to use public libraries and enjoy discounted resident fees for visiting tourist attractions
Resident Participation in Policy-making	Facilitated engagement of residents in provincial governance, through electronic voting for policy-making and two-way policy promotional channels

### Established Channels for Communication with Residents

Encouraged greater participation of residents in provincial governance, through channels such as policy promotion activities (via social media, chat rooms and storyboards) and an e-voting system (for surveys and voting)

### Promoted Efficient Integration of Provincial Administrative Services

Integrated existing provincial services including Gang Wonder Mall, Let's Order First (a public food delivery app), and the Gangwon Storehouse (a social enterprise for local product storage), into a single platform

### Developed Applications

#### Mobile Application

Features diverse elements including a chat service, storyboards and social media, to promote user convenience and motivate more active use of app, which is available via both Android and iOS

#### Admin Application

Developed a common template for supporting administrative tasks such as visualizing provincial ID issuance and subsidy application statuses, receiving applications, and carrying out evaluations and expenditures, while also providing a statistical function for monitoring, a service for paying of subsidies, etc.

## Key Outcomes

### Number of Mobile App Downloads

90,174 (through Google: 64,009; through Apple: 26,165)

### Issuances of Digital Provincial IDs

88,647 Residents (daily average: 1,249)

### Uses of Administrative Services

101,394 cases involving four kinds of contact-free administrative services (Gangwon Basic Childcare Allowances, Gangwon Allowances for Farmers and Fishermen, Chuncheon Subsidies for Returning to Normal, and Job Seeker Allowances for Youth)

\* More administrative services to be continually added

### Promotional Marketing

512,396 push notifications sent to target users identified using big data (from April 18 to April 30, 2022)

### Press Coverage

230 instances via diverse channels such as TV programs, print media, and the Internet

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## Future Plans

- Identify more services and implement any necessary related measures, to ultimately integrate all services provided by the Gangwon-do Province
- Plan to expand and enhance the platform by 2023

## [ Residents Enjoy A Digital Life Together With Gangwon-do Province ]



# Expanded Sales Channels for Local Businesses through Online Product Exhibitions and Purchase Counseling Arrangements



Ulsan, the industrial powerhouse of Korea, is one of the cities with a very high concentration of businesses. Given this situation, talk of the growth engines and factors behind Ulsan Metropolitan City's development cannot overlook the strong presence of local businesses. This is also the reason why the Ulsan Metropolitan City's key administrative goals always include policies to mitigate the challenges faced by local businesses. The "Ulsan Purchase Counseling Platform (Ulsan e-NEGO)" program aims to help local businesses to expand their markets, and has been implemented as a part of the city's "Revitalization of Public Procurement from Local Businesses" project.

With contact-free practices becoming commonplace in consequence of the COVID-19 pandemic, the Ulsan e-NEGO platform has been introduced to enable local businesses to provide online purchase consultations to buyer organizations. Using this contact-free purchase counseling platform, the city offers increased opportunities for regional companies to promote information related to their products and services, supports product exhibitions and promotional activities, and arranges purchase counseling sessions between local businesses and buyers. Local businesses that join the online business promotion center on this platform can host contact-free purchase counseling sessions upon requests from potential customers such as public institutions and large corporations.



## Progress

- April to August 2021** ● Developed contact-free purchase counseling platform through service agreement
- July 2021** ● Hosted 2021 contact-free purchase counseling session
- June 2022** ● Hosted 2022 contact-free purchase counseling session

\*Plan to host session five times in 2022

## Key Services

### Operation of Online Business Promotion Center

Web page set up for online business promotion center where participating local businesses can exhibit and promote their products

- Platform enables users to easily collect product information through the introductions of businesses and products (catalogs), and enhances customer access through hyperlinks to the companies' websites

### Hosting of Contact-free Purchase Counseling Sessions

Contact-free purchase counseling sessions started from 2021, via video consultation, as means of matching sellers with buyers and ensuring the eventual conclusion of contracts

Purchase Counseling  
Platform Webpage





Online Business  
Promotion Center  
Webpage



## Key Outcomes

### Cases of Counseling Provided through Platform

115 cases (Products 92, Services 14, Construction 9); KRW 3,135,651,000

### Number of Contracts Concluded through Platform

29 contracts (Products 24, Services 4, Construction 1); KRW 359,586,000

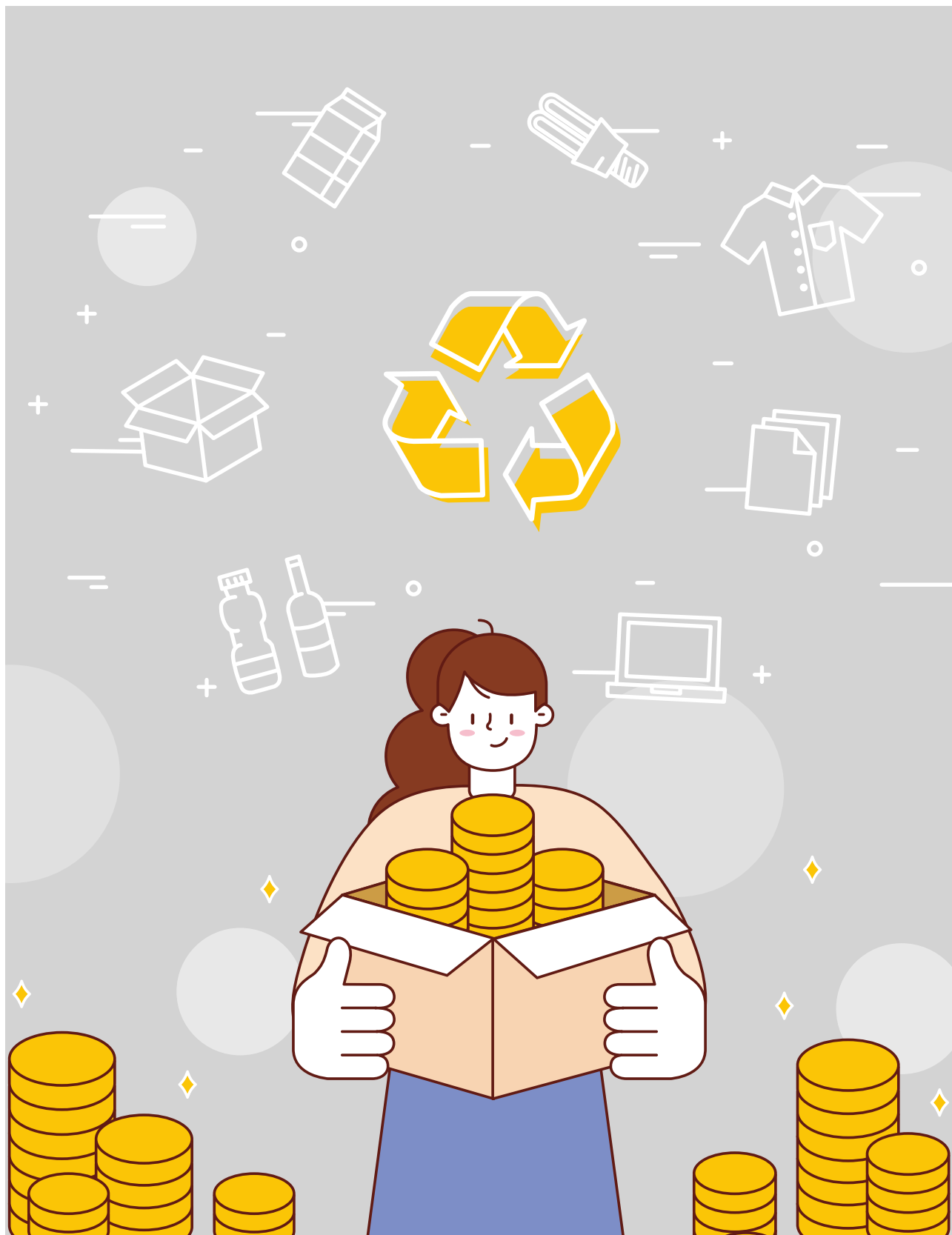
## Comprehensive Mobile Application for Incentive-based Garbage Cleaning (“Time to Bin”) - Cheongju City

# No More Regulations! Encouraging Voluntary Citizen Participation through Fun and Rewards

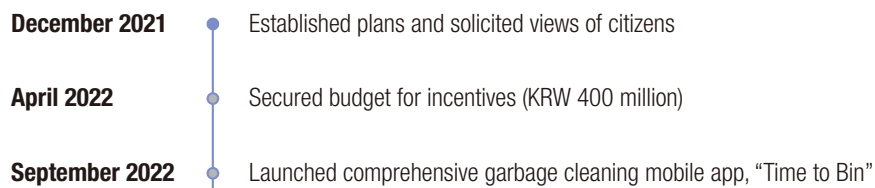


Most people are aware of the seriousness of environmental degradation. In a recent survey of citizens in Cheongju, 95.1% of respondents answered that environmental pollution posed grave concerns. The problem, however, is that this level of awareness does not necessarily lead to meaningful actions for environmental protection. Moreover, the volume of waste such as disposable food containers, plastic, foam resin and PVC products, has increased markedly due to the surge in use of online food delivery services since the COVID-19 outbreak. In line with this, the Cheongju City, recognizing the distinct limitations of its existing regulation-oriented environmental policies such as crackdowns on illegal waste dumping and impositions of fines, has begun seeking new policies designed to attract voluntary citizen participation.

The development of its comprehensive reward-based waste cleaning application (“Time to Bin”) is one outcome of Cheongju City’s efforts to attract such citizen participation. This app is a public version of “Cashslide,” the most popular commercial reward app with 25 million subscribers. In detail, the app provides necessary cleaning-related information, on garbage collection hours and guidelines for waste disposal for example, in a fun and easy to understand way, and offers diverse incentives to encourage citizens to take more voluntary actions, including community currency payments and giveaways, as a reward for engaging in environment-friendly behaviors designated in the app such as using tumblers and reusable containers or learning of facts related to the environment. The Cheongju City has adopted a vision of reducing its annual volume of domestic waste by 3%, through encouraging 400,000 residents (almost half of its total population of 860,000) to subscribe to this app.



## Progress



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## Key Services

### Easy Participation

Developed as an additional service feature of the existing community currency app ("Cheongju Pay"), and made available to users immediately, without any additional sign-up process

- The city was able to immediately secure the existing 300,000 Cheongju Pay members as new users of the app

### Correct Cleaning Information

Offers features related to waste disposal, such as guidelines on waste collection hours and routes, notifications of the arrivals of garbage trucks nearby, information on correct disposal procedures, and an encyclopedia of waste disposal methods

### Incentives

Provides "Cheongjucon," a virtual currency that can be used in the app, to reward environment-friendly behaviours specified in the app

- Cheongjucon → Can be exchanged for diverse incentives, such as community currency and sweepstakes coupons
- Local businesses engage in the offering of incentives (sponsoring provision of money for the region and promoting their business activities in the app)

### Search for Neighboring Recycling Stores

Provides information on the locations of recycling stores where people can receive monetary rewards for recycled materials, as well as details concerning collectible items and collection prices

### Effort-based Rewards

Offers rewards for disposals of less domestic waste than in the same month of the previous year; Gives online commendations of users reporting carbon emission efforts made through environment-friendly behaviours on their personal pages of the app, and those achieving specified goals

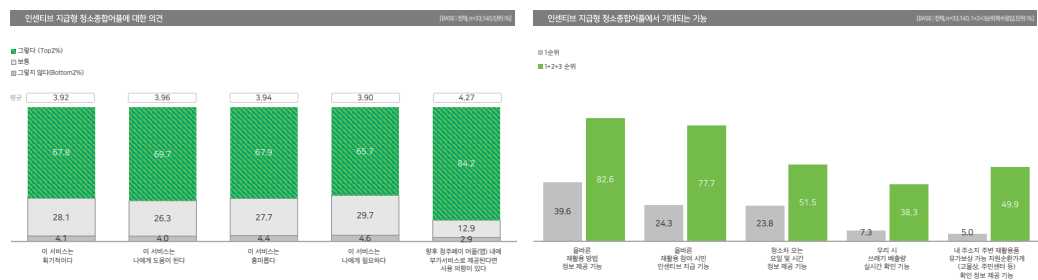
Easy Participation, and  
Accurate Cleaning  
Information



## Key Outcomes

### High Level of Citizen Receptiveness

First notable case of conduct of large-scale survey before implementation of administrative policies – 33,140 citizens participated in survey

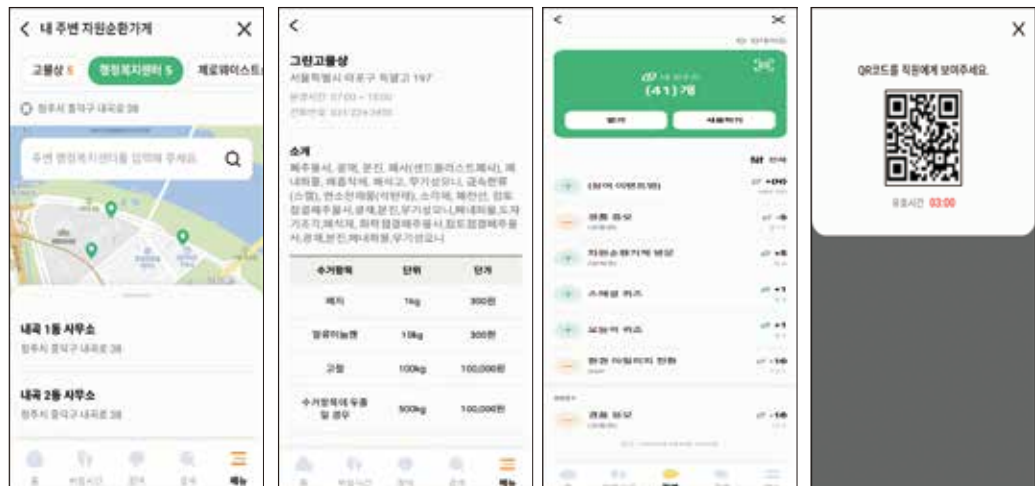


Intention to use integrated cleaning app (84.2%)

Most highly-anticipated features  
(1st: Recycling Information; 2nd: Incentives)

## Securing of Sustainable, Quality Recycling Stores

Private junk shops (25), Zero waste stores (25), Community Service Centers (43)



Citizens ⇒ Easily search for nearby recycling stores and check reward information on app

Junk Shops ⇒ Conveniently enter details on sales items and collection hours, and provide monetary compensation to visitors

## Attracting Sponsor Companies and Establishing Partnerships

- Four organizations, including major local businesses, have joined to offer incentives (contribution scale: KRW 20,000,000)
- Concluded partnership with Korea's largest environmental foundation: To carry out collaborative projects and manage donations
- Resource Circulation Society Economic Research Institute (Dr. Waste): Implements collaborative projects and offers educational contents

## Selected for Best Practices in Diverse Areas

- 2021 H2 Cheongju City Public Proposals Evaluation: Won bronze prize
- Selected as Most Excellent Group in "2021 Spreading of Correct Recycling Practices" pilot program of Ministry of the Interior and Safety: Secured KRW 220 million government funding
- 2022 H1 Cheongju City Government Active Administration Best Practices: Won prize for excellence
- Selected as best practice example for "2022 Supporting Propagation of Innovative Cases for Residents' Lives" project of Ministry of the Interior and Safety

가을철 산촌도심(소중함) 산촌을 지켜요.

**청 주 시**

수신 수신자 참조  
(경유)  
제목 2021년 하반기 공무원·시민 제안 심사결과 알림

1. 청탁기회과-17698(2021. 12. 20.)호에 따라 『2021년 하반기 공무원·시민 제안』 심사결과를 붙임과 같이 알려드리오니, 관련부서에서는 채택된 제안이 실행될 수 있도록 적극 검토·시행하여 주시기 바랍니다.

2. 아울러, 행정지원과에서는 『청주시 우수공무원 인사후대 운영규정』에 의한 **인사가원** 부여에 참고하시기 바랍니다.

☐ 상생발전제한 심사결과

등급	제안명	제안자	관련부서
농성 (22)	① 카르보안등 위험 정보 활용으로 시민 안전환경 조성		도로시설과
	② 교통상의 하역한 편상 유류에서 자원순환가게 운영		자원정책과
	③ 동·백리 지역 활성화		자치행정과

2021 H2 Cheongju City Public Proposals Evaluation  
(Bronze Prize)

**올바른 재활용 실천확산 시범사업 최종 선정 결과**

\* 특별교부세 교부예정액 포함

지자체	특교부세 (백만원)	사업명(사업기간)
연천 미추홀구	200	<b>미추홀 재활용·양명상점으로 재활용 생태계 구축</b> * (시민 교육·캠페인 활성화) 연천 읍사이글에코센터 일부를 리모델링하여 재활용·양명상점 설치 및 상설 베타장터, 아이스팩 재활용사업과 공공원불러다이어음 형태 캠페인 및 교육으로 시민 참여 유도
경주 동구	220	<b>경주 동구 '자원순환가게' 운영</b> * 자원순환마을에 자원순환가게를 설치하고 자원순환해설사를 배치하여 올바른 재활용 실천자에게 인센티브 지급(민·관·기업 협업) * 차량을 이용하여 이동식 자원순환가게 운영 및 홍보
강원 평창군	200	<b>투명페트병 거점 수집소 설치</b> * 관내 소공업 10개소에 투명페트병 거점수집소를 설치하여 주민들이 투명페트병을 가져오면 수량에 따라 인센티브 제공 * 페트병은 분쇄하여 부피를 줄여 보관하고 재활용업체인 '두산이엔티'와 협업하여 난방(민·관·기업 협업) * 거점수집소는 재활용품 제공 전시 및 시민 체험의 장으로 운영
충북 청주시	220	<b>전국 최초 인센티브 지급형 환경통합어울 가게, 주민 참여재활용 혁신</b> * 시민들에게 꼭 필요한 재활용 정보(수거시간·배출방법)를 어울을 통해 알기 쉽게 제공하고 재활용 가능자율 분리 배출에 참여하는 시민들에게 다양한 인센티브 지급 * 관내 고물상 100여개소와 연계하여 재활용품 수거 및 올바른 재활용 실천자에게 인센티브 지급
충남	200	<b>재활용 종대마을 플린허우스 설치 및 자원관리사 운영</b> * 재활용 종대마을 플린허우스 설치 및 자원관리사를 배치하여

Most Excellent Group in "2021 Spreading of Correct Recycling Practices" Pilot Program  
(Secured KRW 220 million Government Funding)

나. 「2022년 상반기 적극행정 우수공무원 선발」 최종 심의 결과

○ 선정근거 : 지방공무원법 제75조의2, 지방공무원 적극행정 운영 규정 제13조, 제14조 및 청주시 적극행정 운영조례 제4조

○ 개제일시 : 2022. 4. 15.(금) 14:00 ~ 15:40 / 임시청사 대회의실

○ 위원회명 : 청주시 적극행정위원회

○ 선발인원 : 10명 (실적가산점 5, 최장부서 점수 1, 특별휴가 4)

구분	시례명	소속 및 대상지	인정대상
최우수	청주시 미래를 바꾸는 혁신사례 도전의 구조		실적가산점
우수	전국 최초 인센티브 지급형 환경통합어울 가게	자원정책과	실적가산점
우수	「청정 공공청사 환경친화적 노력이 이끌어 낸 혁신적인 우수공무원의 역할」		실적가산점
우수	30년간 가족과 함께한 현대판 청정마을 적극행정으로 찾아온 새 삶		실적가산점
최저점	주민의 품을노련의 일 투쟁 민·관 협업으로 된 팀		실적가산점

2022 H1 Cheongju City Active Administration  
Best Practices: Excellence Prize

**충 청 북 도**

수신 수신자 참조  
(경유)  
제목 「22년 주민생활 혁신사례 확산 지원사업」 공모 신청

1. 관 련  
가. 행정안전부 지역사회혁신정책과-1354(2022.05.04.)호  
나. 도 법무혁신담당관-4778(2022.05.10.)호

2. 행정안전부에서 주민생활 편의를 증진시킨 지역의 혁신 성과를 전국 지방자치단체로 확산하는 「주민생활 혁신사례 확산 지원사업」을 추진하고 있습니다.

3. 이와 관련하여 「주민생활 혁신사례 확산 지원사업」의 공모계획을 다음과 같이 알려드리니 우수사례를 추천하고자 하는 시·군에서는 붙임 서식에 따라 사업계획서 등을 22.05.25.(수)까지 제출해주시기 바랍니다.

< 공모 개요 >

□ 공 모 명 : 22년 주민생활 혁신사례 확산 지원사업 「혁신정책장터」

□ 환경분야 공모대상(혁신사례)

- 인센티브 지급형 환경통합어울 구축(충북 청주시)
- 자원순환가게 운영(광주 동구)
- 탄소중립 실현을 위한 탄소다이어터 양성(대전 대덕구)

□ 지원규모 : 사업비 3.220백만원, 약 60여개 지방자치단체

□ 선정심사 : 사업계획서 등에 대하여 행안부 별도 심사기준에 따른 서면심사

□ 사업내용 : 사업추진에 소요되는 사업비 및 컨설팅 지원

Selected as Best Practice Example for "2022 Supporting Propagation of Innovative Cases for Residents' Lives" Project



# Local Governments' Executive Abilities to Balance Environmental Protection and Economic Growth

"Sustainable development" is a principle coined in discussions of whether environmental protection and economic growth are compatible. Applications of this principle have been increasing in various fields as it has emerged as a solution to ensuring future generations' quality of life in the 21st century. The "Incheon-Type Hydrogen Ecosystem Construction Project (Incheon Metropolitan City)," the "2045 Initiative for a Carbon-Neutral and Independent Energy City (Gwangju Metropolitan City)," "Carbon-Free Island Jeju by 2030 (Jeju Special Self-Governing Province)," and "Taehwa River Reborn as a River of Life, from a River of Death! (Ulsan Metropolitan City)" are exemplary projects showing local governments' executive abilities to stride towards a sustainable future.

## PART 4

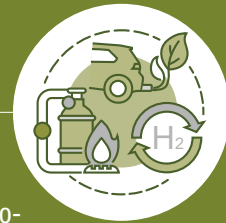
- Incheon-Type Hydrogen Ecosystem Construction Project – Incheon Metropolitan City
- 2045 Initiative for a Carbon-Neutral and Independent Energy City – Gwangju Metropolitan City
- Carbon-Free Island Jeju by 2030 [CFI 2030] – Jeju Special Self-Governing Province
- Taehwa River Reborn as a River of Life, from a River of Death! – Ulsan Metropolitan City



**Sustainable  
Future**

## Incheon-Type Hydrogen Ecosystem Construction Project - Incheon Metropolitan City

# Creating a Sustainable Future City Where a Clean Environment and New Growth Industries Are In Harmony



With hydrogen energy at the center of the paradigm shift to eco-friendly and carbon-neutral energy, major countries are scrambling to formulate hydrogen economy-promotion strategies. The Korean government has announced a "Hydrogen Economy Roadmap" to create a hydrogen automobile- and fuel cell-centered industry ecosystem, with the vision of "positioning Korea as a world leading hydrogen economy."

Of particular note, Incheon Metropolitan City boasts large-scale hydrogen production facilities, in addition to its international port and airport. Given its ideal location adjacent to the metropolitan capital area of Seoul and Gyeonggi Province, Incheon has the optimal foundation for meeting the heavy hydrogen demands of the capital area and leading growth of the hydrogen industry going forward. The city has recently implemented its "Incheon-type Hydrogen Ecosystem Construction Project," aimed at promoting creation of a sustainable future city in which a clean environment and new growth industries are in harmony. To this end, it will build a hydrogen production cluster, hydrogen fuel power plants and hydrogen stations, and expand hydrogen-powered mobility solutions to create industrial demand.



<b>Vision</b>	Promote a Sustainable Future City of Happy Citizens, with a Clean Environment and New Growth Industries in Harmony
<b>Policy Directions</b>	<p>Coal-Free &amp; Carbon-Neutral Incheon, Living with Eco-Friendly Hydrogen Energy</p> <div> <div>Create virtuous cycle of value chains in hydrogen industry</div> <div>►</div> <div>Build future growth engines based on hydrogen energy</div> <div>◀</div> <div>Citizen-centered hydrogen ecosystem in daily lives</div> </div>
<b>Major Initiatives</b>	<ol style="list-style-type: none"> <li>Lead hydrogen economy development in metropolitan area, through building of hydrogen production cluster <ul style="list-style-type: none"> <li>- Generate clean hydrogen and by-products (31,400 tons/year)</li> <li>- Promote hydrogen industries through test beds and a hydrogen industry-supporting ecosystem</li> </ul> </li> <li>Accelerate transition to a hydrogen economy in transportation, through expansion in eco-friendly hydrogen mobility <ul style="list-style-type: none"> <li>- Supply about 60,000 hydrogen cars</li> <li>- Use hydrogen in transportation and logistics, including for buses and cleaning, freight and specialty vehicles</li> </ul> </li> <li>Facilitate early shutdowns of coal-powered plants through distribution of power generation using blue hydrogen <ul style="list-style-type: none"> <li>- Build hydrogen fuel cell plants in capable industrial complexes</li> <li>- Grant incentives for blue hydrogen use, and give discount on blue hydrogen costs</li> </ul> </li> <li>Construct hydrogen refueling infrastructure to improve citizens' convenience and access <ul style="list-style-type: none"> <li>- Develop infrastructure accessible within 20 minutes from anywhere in the city</li> <li>- Implement phased transition to hydrogen refueling stations, by building complex refueling stations and converting to CNG</li> </ul> </li> </ol>

## Progress

- May 2020** ● Launched Incheon Hydrogen Industry Council
- April 2021** ○ Established Incheon-type Hydrogen Ecosystem Construction Strategy

## Major Programs **Leading Hydrogen Economy Development in Metropolitan Area**

Generate 31,400 tons of clean hydrogen and by-products annually, and build hydrogen production cluster including test beds and Hydrogen Industry Support Center

### Hydrogen Production Plan

	2021	2023	2025	2030
Total Output (tons)		30,000	31,400	31,400
By-Product Hydrogen (tons)		30,000	30,000	30,000
Clean Hydrogen (tons)			1,400	1,400

## **Expanding Eco-friendly Hydrogen Mobility, and Accelerating Transition to Hydrogen Economy in Transportation**

Supply total of 60,000 hydrogen buses and cleaning, freight and specialty vehicles

### Hydrogen Vehicle Supply Plan

Category	~2020	2023	2025	2027	2030
Total (accum.)	495	2,855	9,810	22,019	60,000
Cars (accum.)	488	2,671	8,171	20,171	57,920
Buses (accum.)	7	184	1,628	1,828	2,035
Industrial (accum.)	-	-	11	20	45

## **Improving Citizens' Convenience and Access**

Build hydrogen refueling stations accessible within 20 minutes from anywhere in Incheon

### Hydrogen Refueling Station Building Plan

Category	~2022	2023	2025	2027	2030
Total (accum.)	10	16	20	31	52
General Refueling Stations	7	11	13	21	36
Industrial Refueling Stations	3	5	7	10	16

## **Facilitating Early Shutdowns of Coal-Powered Plants**

Provide discounts on blue hydrogen fuel costs, establish distributed power generation systems using blue hydrogen in industrial complexes, supply fuel cells for use in daily life, and build hydrogen village enterprises

### Fuel Cell Supply Plan

Category	2019	2023	2025	2027	2030
Cumulative Capacity (MW)	95	239	299	579	739
Industrial Complex (MW)	-	10	70	250	410
Power Plants (MW)	95	229	229	329	329
Capacity (MWh)	563,046	1,690,900	2,163,940	4,371,460	5,632,900

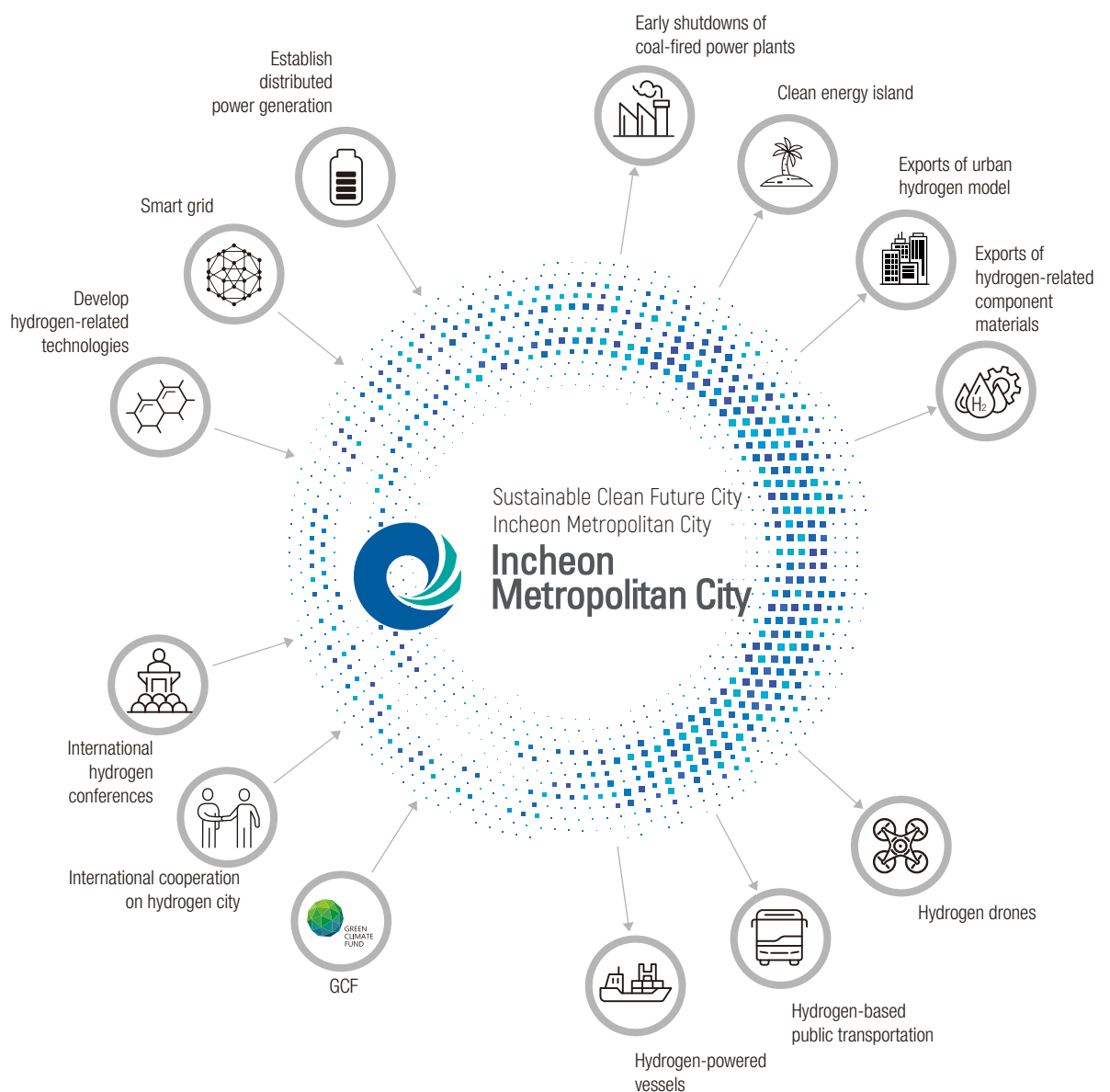


## Establishing Industry-Academia-Institution Collaboration Network, and Ensuring Capacity to Gain Foothold in Hydrogen Economy

Signed MOU with Ministry of Trade, Industry and Energy; Ministry of Environment; Incheon Technopark; Inha University, etc.

## Fostering “Incheon Cheongna Hydrogen Economy Hub”

Attract global leading hydrogen enterprises such as Hyundai Mobis and Plug Power, and build hydrogen production cluster of hydrogen industry complexes, testbeds, etc.





## Key Outcomes

### **Selected from Preliminary Feasibility Study on Hydrogen Production Cluster Construction Projects**

Supplied 1,157 hydrogen vehicles (Passenger cars 1,139, Buses 15, Trucks 3) (as of May 2022)

Installed 5 hydrogen refueling stations (as of May 2022)

Built 211MW of hydrogen fuel cell plants (as of December 2021)

### **Enacted Municipal Ordinances on Developing and Supporting Hydrogen Industry, and Held Hydrogen Industry Council Meeting**

### **Established Hydrogen Energy Cooperation Network**

Signed MOU with Hyundai Motors, SK E&S, Plug Power, Ministry of Trade, Industry and Energy, Ministry of Environment, etc., to establish hydrogen energy cooperation network in Incheon, with aim of attracting investment from global hydrogen enterprises and propelling hydrogen industry development

### **Achievements in International Cooperation**

- Fostered "Incheon Cheongna Hydrogen Economy Hub," by inviting investment from SK Plug Hyverse (a joint corporation of U.S. global hydrogen enterprise Plug Power and SK E&S) – in Cheongna (Seo-gu, Incheon)
- Emerged as a leading hydrogen energy city in the Asia-Pacific region while participating in EU-launched ICP-AGIR\* program, by sharing new renewable energy policies and developing collaborative projects in cooperation with Almeria, Spain

\* International City Partnerships: Acting for Green and Inclusive Recovery (total of 28 cities, from January 2022 to March 2023)

## 2045 Initiative for a Carbon-Neutral and Energy-Independent City of Gwangju - Gwangju Metropolitan City

# Achieving an Energy-Independent City through the Generation and Supply of Power from Renewable Energy



Gwangju Metropolitan City maintains first place among Korean metropolitan cities in its cumulative provision of photovoltaic power generators (243MW, end-2020). It is also a leader in the energy field, with its Energy Valley centered on the Gwangju-Jeonnam Common Innovative City. Furthermore, placing value on the city's playing a leading role in responding to the global climate crisis and achieving carbon neutrality (Net-Zero), Gwangju entered into full-scale discussions with its citizens, experts and civic groups to devise measures to this end.

The fruition of these discussions was its "2045 Carbon-Neutral and Energy-Independent City of Gwangju" announcement of July 21, 2020. The vision behind this announcement depicts a three-phase process for achieving 100% renewable energy power generation and supply, to thus move into the status of a carbon-neutral, energy-independent city by 2045 — five years ahead of the target year specified in the Korean Government's Carbon Neutrality Strategy:

**(Phase 1)** Replacing all electrical power for enterprises with renewable energy by 2030

**(Phase 2)** Replacing all electrical power for Gwangju City with renewable energy by 2035

**(Phase 3)** Achieving a carbon-neutral, energy-independent city of Gwangju, capable of autonomous generation and supply of power from new renewable energy, by 2045

2030 Enterprise RE100



2035 Gwangju RE100



2045 Carbon-Neutral Energy Independence

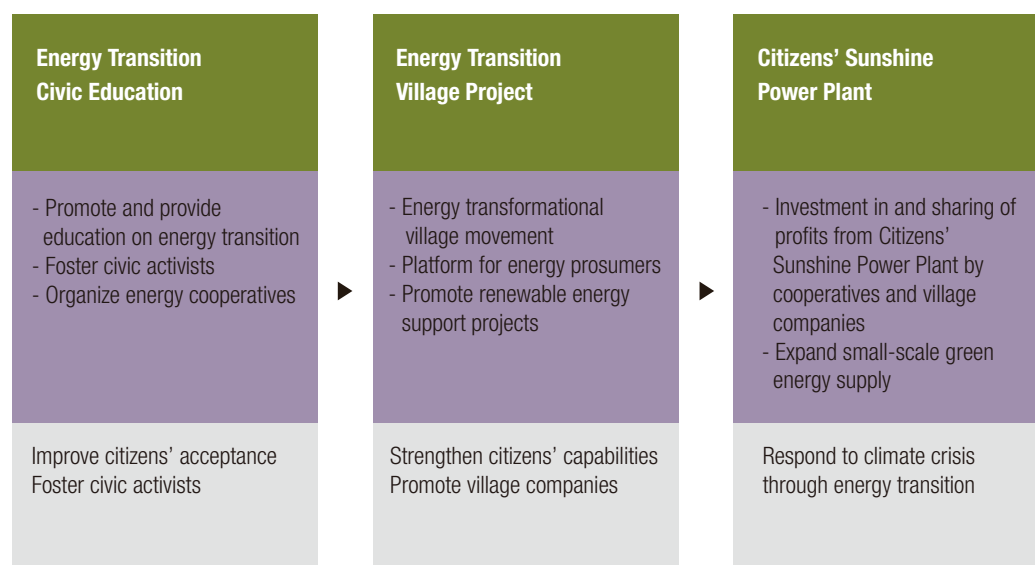


## Progress

- January 2020** Organized and operated “Energy Policy Committee” and “Citizens and Civic Groups Energy Council,” to push ahead with energy-independence policies
- April 2021** Completely revised “Framework Ordinance on Energy,” and enacted “Ordinance on Supporting Citizen Participation-Type Energy Transition”

## Major Programs Creating Citizen-Led Energy Transition Ecosystem

Citizen-Led Virtuous Cycle  
Ecosystem Model for  
Energy Transition



### Supply of Renewable Energy Centered on Photovoltaic Power

Expanded photovoltaic power generation by utilizing idle public sites such as public institution parking lots; supported PV panel installations on balconies of public housing, solar power and fuel cell facilities at 1,905 locations in 31 villages to organize network of energy-independent villages; and promoted establishment of “Microgrid Demonstration Villages”



Building Integrated Photovoltaic (BIPV) Installation



Energy-Independent Village Project

### Creating New Energy Industry Ecosystem Centered on Renewables

Promoted photovoltaic module development project; completed Redox Flow Batteries Testing and Certification Center; conducted future smart grid demonstration study; developed Energy Industry Convergence Complex; pushed ahead with construction of Knowledge Industry Center for Energy Industry, etc.

## Key Outcomes

### Nine Industrial Complexes in Gwangju City Designated as Nation's First Energy Industry Convergence Complex

- Energy Industry Convergence Complex: Urban High-tech Industrial Complex, Energy Valley, Pyeongdong (1st to 3rd), Cheomdan (1st to 3rd), and Bitgreen National Industrial Complexes
- Broke Ground for Comprehensive Support Center to Support R&D and Growth of Companies in Convergence Complex (March 2022)

\* Comprehensive Support Center: Project cost KRW 22.7 billion; GFA 5,221 m<sup>2</sup>; Certified as 1st grade Zero Energy Building

- Established Knowledge Industry Center, to Create Business Space for Energy SMEs

\* Knowledge Industry Center: Project cost KRW 36.4 billion; GFA 11,777 m<sup>2</sup> (one basement, and six above-ground floors); Business incubation and support

### Designated Gwangju Regulation-Free Special Zone for Green Energy ESS Power Generation, and Developed New Energy Industry Technology

Strengthened industry-academia-institution cooperation to foster new energy industries and support corporations launching projects

\* Five projects (cost: KRW 105.7 billion, 2018-2025)

### Construction of "Hydrogen Fuel Cell Power Plant," Adopting World's First LPG-LNG Dual System

First private investment project of Gwangju-Type AI-Green New Deal, to begin commercial operation from September 2022

## Expected Effects

- Contribution to improving city's sustainability and pulling forward time of carbon neutrality achievement, through innovations in production and supply systems of energy industries with heavy carbon emissions
- Stable supplies of renewable energy, including photovoltaic power, through improving energy consumption efficiency and fostering future energy industries

## Carbon-Free Island Jeju by 2030 (CFI 2030) - Jeju Special Self-Governing Province

# Carbon-Free Island Initiative to Achieve Energy Independence and Carbon Neutrality



Jeju Island is a clean ecotourism destination that holds the famous triple crown of UNESCO natural sciences: a Biosphere Reserve (2002), a World Natural Heritage site (2007), and a Global Geopark (2010). To live up to its reputation for a clean environment, efficient energy management and an expanded utilization of renewable energy are essential. A massive power blackout across the island in 2006 caused Jeju to confront the limitations of its existing land-dependent power supply system, and led it to set the goal of achieving energy self-reliance. This gave birth to the CFI 2030 initiative in 2012, to promote energy self-reliance and carbon neutrality in line with Jeju's optimal position for hosting low-carbon green industries, including its exceptional wind resources (annual wind speed of 6m/s and above).

The “CFI 2030” initiative aims to transform Jeju into a carbon-free island by 2030, as the first carbon-free project in the world to target an area with a population greater than 500,000. The project is focused on meeting the entire island's electricity demand through renewable energy, and replacing all internal combustion engines there with eco-friendly electric vehicles. It has also set goals of upgrading energy demand management to realize lower final energy intensity (high efficiency and low consumption), and creating new jobs by leading the new energy convergence industry.



Carbon-Free Island Jeju by 2030 (CFI 2030)



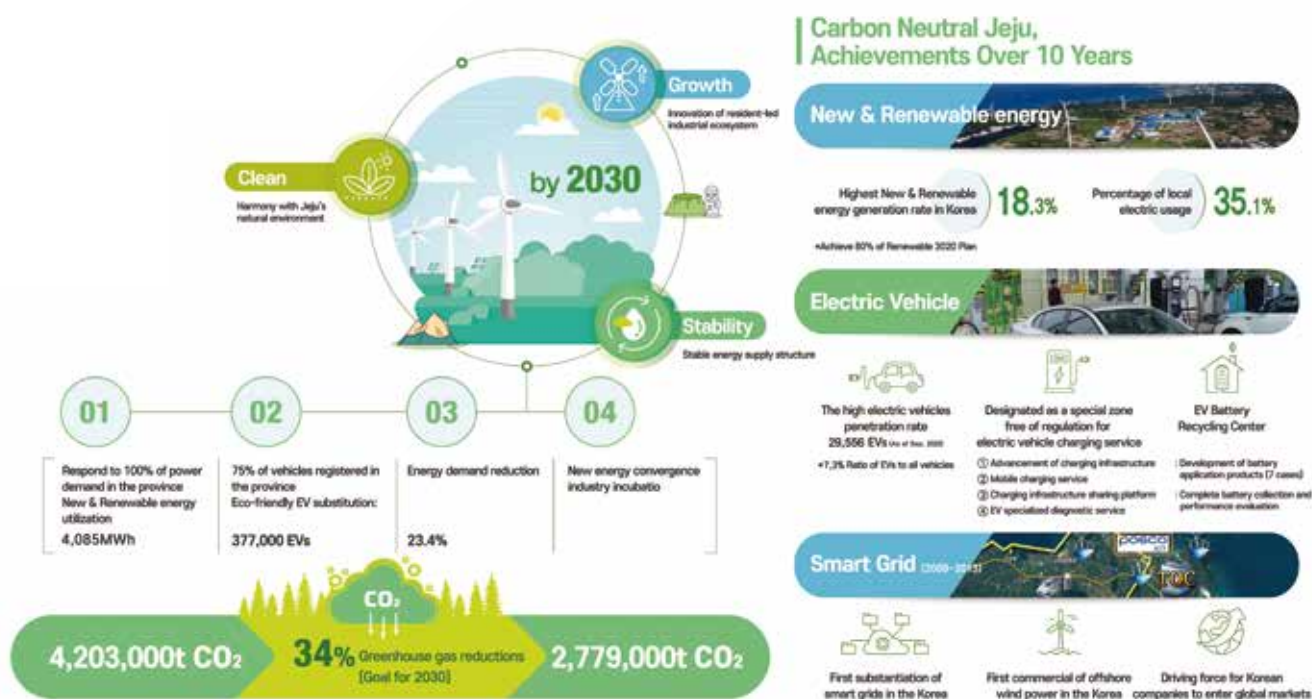


## Core Slogan and Vision

Vision	Carbon-Free Island
<b>Core Values</b>	<ul style="list-style-type: none"> <li>· Cleanliness – Establish clean energy system harmonious with Jeju and its natural environment</li> <li>· Stability – Build stable energy supply system</li> <li>· Growth – Create indigenous ecosystem for energy industries</li> </ul>
<b>Policy Objectives</b>	<ul style="list-style-type: none"> <li>· Fully meet Jeju Island power demand through renewable energy (4,085MW)</li> <li>· Convert IC engine vehicles into environment-friendly electric vehicles (377,000 vehicles)</li> <li>· Realize reduced final energy intensity (high efficiency and low consumption) through enhanced energy demand management</li> <li>· Lead new energy convergence industry (to create 74,000 direct and indirect jobs)</li> </ul>

## Progress

## Carbon Free Island 2030



## Progress

<b>May 2012</b>	●	Announced “Carbon-Free Island Jeju by 2030” plan
<b>February 2013</b>	●	Released detailed implementation roadmap to “Carbon-Free Island Jeju by 2030”
<b>April 2016</b>	●	Established basic plan for completing “Carbon-Free Island Jeju” vision
<b>March 2017</b>	●	Established detailed action plan for completing “Carbon-Free Island 2030” vision
<b>June 2019</b>	●	Announced revised “Carbon-Free Island Jeju by 2030” plan
<b>May 2022</b>	●	Announced ‘CFI 10th Anniversary – Milestones & the Road Ahead’

## Major Programs

### Selecting Three Key Indicators for Each of Four Policy Objectives

		2017	2022	2030
Introduction of Renewable Energy Facilities	Installed Capacity (MW)	605	1,821	4,085
	Capacity (GWh)	1,488	3,720	9,268
	Capacity to Electrical Demand (%)	30	59	106
Electric Vehicle Supply	No. of EVs (unit: Vehicles)	9,206	92,726	377,217
	EV Share (%)	2.5	23	75
	No. of Chargers (unit: Chargers)	8,284	34,603	75,513
Final Energy Intensity	Final Energy Consumption (1,000 TOE)	1,510	1,621	1,581
	Electricity Demand (GWh)	5,014	62,900	8,723
	Energy Intensity (TOE/KRW 1 million)	0.096	0.085	0.071
Leading New Energy Convergence Industry	Production Inducement (KRW 100 million)	-	8,688	10,341
	Employment Inducement (Person)	-	7,369	8,951
	Profitable Business Models for Citizens (unit: Models)	8	18	21

### Developing and Promoting Policy Instruments for Each of Five Policy Tasks

- Realizing a clean and stable energy system based on renewable energy
  - Expand renewable energy supply, and increase its capacity limits and flexibility
- Converting to a clean transportation system by expansion in numbers of electric vehicles and chargers
  - Heighten incentives, build infrastructure, and restrict operation and introduction of internal combustion engines
- Realizing a High-efficiency, Low-consumption Society by Upgrading Energy Demand Management
  - Introduce energy-efficient equipment and smart energy systems, and operate energy management programs for buildings
- Securing Innovative Growth Engines in New Energy Industries, in Connection with 4th Industrial Revolution
  - Nurture downstream industries, and lay foundations for win-win growth in convergence industries
- Creating Energy Governance with Citizens' Participation
  - Create citizen-participating energy governance, and extend and lay foundations for business models to promote citizens' participation

## Key Outcomes

### Electric Vehicle Powerhouse in Korea

Exceeded 20,000 in cumulative number of registered EVs, for first time anywhere in Korea (as of July 2020)

Boasts largest number of EVs in operation in the country at 27,000 — 6.4% of all vehicles on Jeju (as of June 2022)

Greenhouse gas reduction of 60,833 tons/year due to EV conversion (as of 2021)

\* Greenhouse gas reductions: 77.5 tons/year (2011) ⇒ 60,833 tons/year (2021)

### Expansions in Upstream/Downstream Industries of Electric Vehicles

Completed EV Battery Industrialization Center (September 2019), while Being Selected as Regulation-Free Special Zone for EV charging service (December 2019)

### Highest Proportion of Renewable Energy Power Generation (18.2%) in Korea (as of 2020)

Greenhouse gas emission decline of 449,383 tons/year owing to renewable energy supply (as of 2021)

\* Greenhouse gas reductions: 88,920 tons/year (2011) ⇒ 449,383 tons/year (2021)

### Achievements in International Cooperation

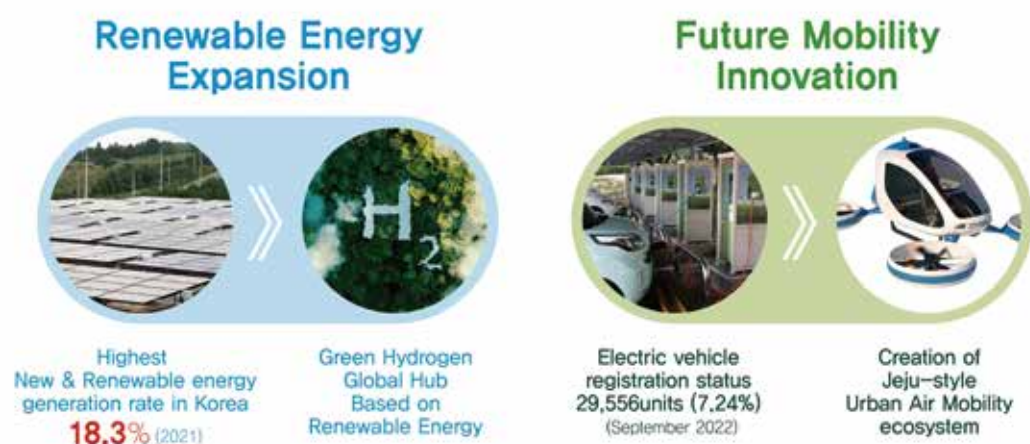
Won “Best Partnership in the Energy Sector Award” of P4G\* State-of-the-Art Partnership Awards at COP26 (Glasgow) (November 2021)

\*P4G (Partnering for Green Growth and the Global Goals 2030): A multilateral consultative body in which 12 governments, as well as private sector institutes, businesses and civil society, participate as partners with the goal of solidarity for promoting green growth and the Global Goals 2030.

Promoted Jeju CFI 2030 Policies through activities in international organizations and consultative bodies

· Publicized CFI model at United Cities and Local Governments Asia-Pacific (UCLG ASPAC) Congress, as president city (2014 to 2018)

Jeju Special Self-Governing Province, Jeju Energy Corporation, Nampower (Namibian national electric power company), etc. searching for methods of international cooperation in energy (since 2020)



## Future Plans

- Efforts for sustaining carbon neutrality to invigorate uses of new energy and EVs
- Extension of initiative to all areas of Jeju Island
- Successful implementation of carbon-neutral initiatives through gaining empathy of citizens
- Promoting the Green Hydrogen Global Hub Project

**Jeju and the Republic of Korea will lead the way to global achievements.**



## Green Hydrogen Global Hub, Jeju

### Process description



### Vision



## Taehwa River Reborn as a River of Life, from a River of Death! - Ulsan Metropolitan City

# Designated as 2nd National Garden, for Creating an Ecological River Where Nature and Humans Coexist



Ever since its designation as the “Ulsan Specific Industrial Zone” in 1962, Ulsan has consolidated its footing as the industrial powerhouse of Korea, in driving the nation’s economic growth through its automobile, shipbuilding and petrochemical industries.

These achievements have however come at enormous cost. As the wastewater from factories was discharged into the downtown streams, causing considerable ecological damage including deterioration in water quality (to level 6), nasty smells, and mass deaths of fish, Ulsan was branded as the city of pollution and the Taehwa River stigmatized as the River of Death.

In response Ulsan Metropolitan City, in collaboration with citizens and environmental groups, embarked on a project to restore the Taehwa River as an ecological stream where nature and humans coexist. Starting out with a project aimed at preventing domestic sewage from flowing into the Taehwa River in 1995, the city has successfully implemented a series of policies, including the “2004 Eco-polis Ulsan Plan” and the “2005 Taehwa River Master Plan,” for restoring the river’s water quality and ecology, and eventually transformed it into an urban stream boasting Grade 1 water quality. Subsequently, thanks to the city’s constant efforts to improve its water quality and restore nature, the Taehwa River was designated as Korea’s second national garden in 2019. The river has also become one of the most beloved landmarks in the environmentally-friendly eco city of Ulsan.





## Progress

<b>1995 to 2010</b>	●	Implemented Phases 1 & 2 of project to prevent domestic sewage from flowing into Taehwa River (including installation of separated sewer pipes)
<b>1995 to 2012</b>	●	Established and operated Yongyeon Water Quality Improvement Office (1995), Eonyang Water Quality Improvement Office (2004), Bangeojin Water Quality Improvement Office (2005), and Gulhwa Water Quality Improvement Office (2012)
<b>1999 to 2007</b>	●	Implemented projects for purifying polluted streams of Taehwa River, and for river dredging and channel maintenance
<b>2004</b>	●	Established Eco-polis Ulsan Plan
<b>2004 to 2010</b>	●	Carried out project to redevelop Mugeo and Yecheon Streams into close-to-nature streams
<b>2004 to 2009</b>	●	Implemented Phases 1 & 2 of "Taehwa River Master Plan"
<b>2004 to 2009</b>	●	Conducted ecological stream restoration projects for Cheokgwa Stream (2004 to 2009), Yaksa Stream (2005 to 2007), and Myeongchon and Yeonam Streams (2008 to 2009)
<b>2008 to 2014</b>	●	Implemented project for redevelopment of Eonyang sewage culvert

## Major Programs

### Eco-polis Ulsan Plan

Plan declared by Ulsan for a paradigm shift to become an eco-city where both the environment and economy thrive and where humans and nature coexist

### Establishment of Taehwa River Master Plan

(Phase 1) To promote a safe and clean Taehwa River, restore the ecosystem's health, create water-friendly waterfront space, restore and reestablish historicity, host cultural festivals, etc.

(Phase 2) To secure a clean water flow path, build a salmon run path, create a green road to health, and establish a 40-km riverside trail

### Project for Bringing Taehwa River Back to Life

#### Improve water quality

Projects to build and maintain sewage culverts, construct sewage treatment plants, dredge sediment, improve stream environments secure maintenance water, and improve conditions in Samsan drainage stations

#### Create water-friendly space

Projects to establish a Taehwa River Park, renovate the Taehwa River riverside, create ecological space, and build resting areas for citizens

#### Restore culture and historicity

Restore the Taehwaru Pavilion, build a 40-km trail along the Taehwa River, and host cultural festivals

#### Establish local governance

Administrative organizations, participation of civic groups, efforts of regional experts, business contributions to local communities, local governance support activities, etc.

## Before Transition into Ecological River



Taehwa River and Simnidaebat Bamboo Forest (1960s)

## After Transition into Ecological River



Nest of white herons (2018)



Pigeons at Taehwa River riverside, dying from oil spill (1985)



Panoramic view of Taehwa River (2018)



Domestic sewage discharged under Taehwa Bridge (early 1990s)



Rooks (2018)



Mass fish deaths (1995); Eutrophication in midstream of Taehwa River (1996)

Taehwa River regenerated as ecological river (2019)  
(photo of children with carp)



## Key Outcomes

### **Korea's Finest Ecological River that Has Secured Biodiversity**

Natural habitat for Eurasian otters (one of Korea's Natural Monuments), 700 kinds of animals and plants, 7,000 summer migratory birds (white herons), and 100,000 winter migratory birds (rooks)

### **Selected as Best Practice and Awarded Various Prizes**

Announced as case of best practice in 4th and 5th Environment-friendly River Management Workshops (Ministry of Land, Transport and Maritime Affairs / Korea River Association) (2008, 2009)

Won Prize for Excellence in Eco-friendly River Maintenance Contest (Ministry of Construction and Transportation / Korea River Association) (2007)

Selected as one of "100 Most Beautiful Rivers of Korea," and won First Prize for Excellence in Restoration Section (Ministry of Land, Transport and Infrastructure / Korea River Association) (2009)

Won Prize for Excellence in Korea Green Awards, in Green Growth Management Section (Hankook Ilbo) (2009)

Taehwa River Grand Park and its Simnidaebat Bamboo Forest selected as GD (Good Design) Product in Environmental Design Section (Ministry of Knowledge Economy / Korea Institute of Design Promotion) (2009)

Won Grand Prize in Environmental Management Section of Chosun Ilbo's Environment Awards (Ministry of Environment / Chosun Ilbo) (2010)

Taehwa River Grand Park won Grand Prize in Infrastructure Section of Korea Land & City Competition (The Financial News / Korea Planning Association) (2010)

Selected as most excellent organization for green competitiveness (Ministry of the Interior and Safety) (2010)

Selected as most excellent organization in Contest for the Natural Environment Awards (Ministry of Environment / Korea Association of Ecological Restoration) (2011)

Won Coexistence Award in "13th National Beautiful Forest Contest" (hosted jointly by Korea Forest Service / Forest for Life / Yuhan Kimberly, Ltd.) (2012)

Global Green Management Excellence Awards – Presidential Citation (Maeil Business Newspaper / Ministry of Trade, Industry and Energy / Ministry of Environment) (2013)

Designated as one of Korea's Top 12 Ecotourism Sites (Ministry of Environment) (2013 to Present)

Designated as Regional Garden (Ulsan Metropolitan City) (2018)

Designated as National Garden (Korea Forest Service) (2019)

### **Achievements in International Cooperation**

K2H (Korea Heart-to-Heart) Program for inviting and training local government officials of other countries (2007 to 2008)

Hosted Asia-Pacific Mayors' Forum (2008)

2020 Asian Townscape Awards (ATA)

Won Outstanding Award in 2021 IFLA (International Federation of Landscape Architects)

Listed as East Asian-Australasian Flyway Partnership (EAAFP) Flyway Network Site (FNS) (EAAF150/2021)









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the Interior and Safety**

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