Current State of Goyang Smart City and Future Plan

Chief of Smart City Team at Goyang City

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Contents

01 Overview and characteristics of Goyang

General information and geological features of Goyang

1 General information on Goyang

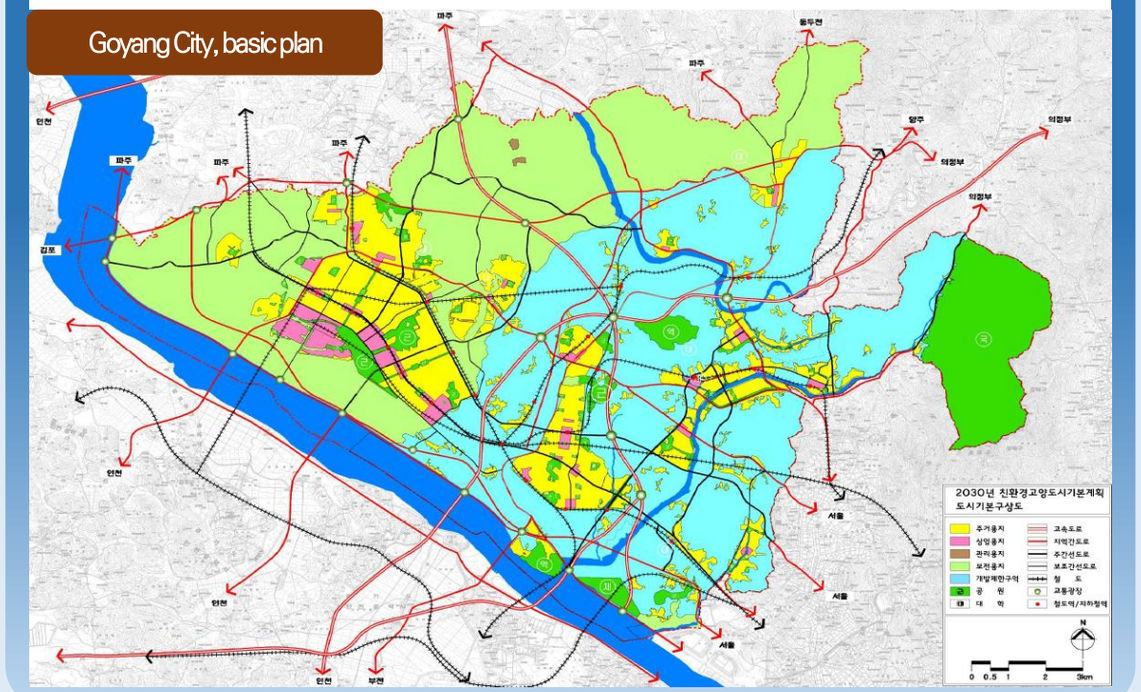
Administrative district Goyang city is composed of 3 districts and 39 neighborhoods (977 towns 6,094 villages (as of Dec. 201ᵒ)

Population 417,607 households / 1,044,189 people

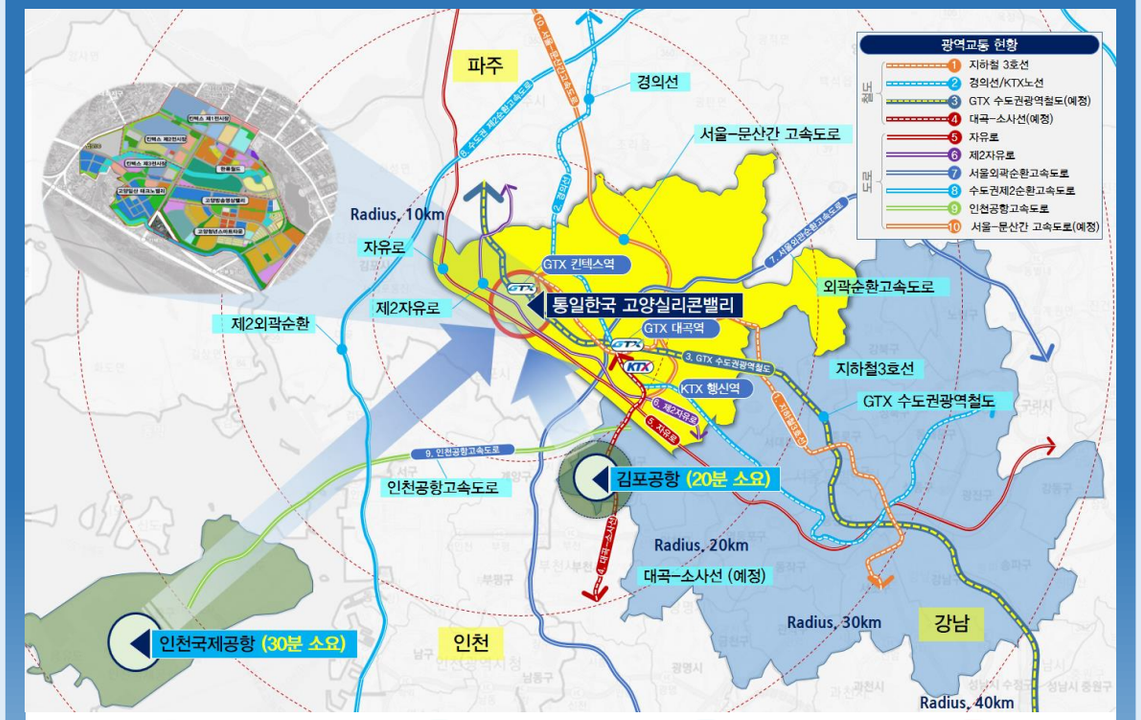
Area 268.05 m²

평화의 시작 미래의 중심 고양

Goyang City, basic plan



2 Geological location and accessibility of Goyang



KINTEX — Gimpo/ Incheon Airport — Border area (Gyeongeui line) — International Accessibility

Goyang City, heart of Iron Silk Road이that will connect Eurasia as it is located in border area, which will play a central role in inter-Korean exchanges!!

02 Current state of Goyang smart city

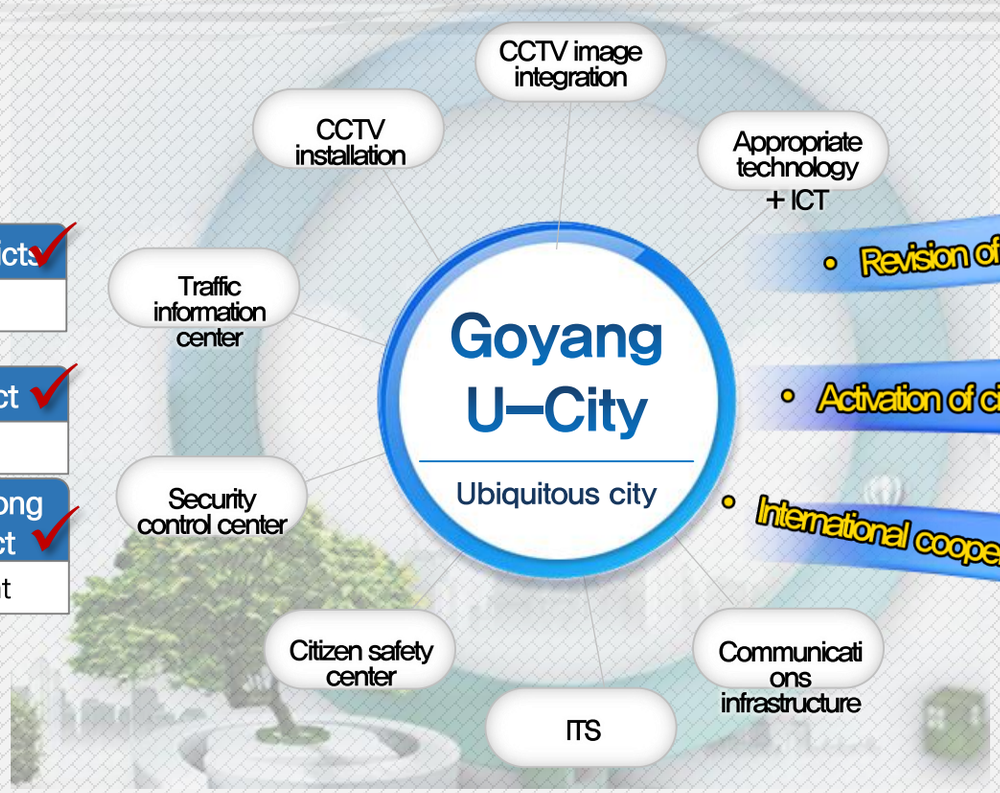
Major progress of Goyang smart city

From Goyang U-City to Goyang Smart City !!

Siksa, Deoki districts ✓
2008 ~ 2012

Samsong district ✓
2009 ~ 2015

Jichook, Hyangdong Deokeun district ✓
2016년 ~ present

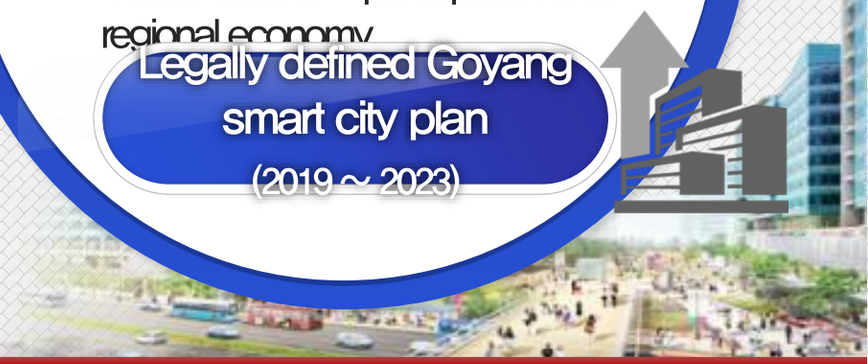


- Revision of smart city act
- Activation of citizen's participation
- International cooperation and globalization

U-City outcome links to "Smart City"

- Create sustainable smart city ecosystem
- Achieve technological innovation and create creative jobs
- Vitalize citizens' participation and regional economy

Legally defined Goyang smart city plan
(2019 ~ 2023)



Goyang Ubiquitous City

Establish U-City in Siksa district and Deoki district	Establish U-City in Samsong district	Establish Goyang Ubiquitous urban plan	Join World Smart Sustainable Cities Organization (WeGo)	Establish U-City in Jichook, Hyangdong, Deokeun districts	Establish IoT convergence pilot complex
2008 ~ present	2008 ~ present	2013	2016	2016 ~present	2016 ~ 2017

Revision of smart city act

Goyang Smart City

Establish youth smart town in Janghang district	Implement smart city Living Lab project	Establish Goyang smart city plan	Obtain smart city pilot certification
2017년 ~ present	2018 ~ 2019	2019	2019

03 Introduction of Goyang smart city service

Goyang smart city Living Lab project

Goyang citizens' capabilities with great participation level and understanding of smart city

▶ In resolving regional issues, Goyang City already accumulated on knowhow as it experienced what to do, how to do for what reason through living lab project

→ To be self sufficient, every project needs to "treat citizens as partners for project implementation"!!

1 Goyang with abundant experience of resolving urban problems based on ICT

Exiting business
- IoT convergence pilot complex (ex: parking with relief, smart waste collection)
- Establish smart city in Siksa, Deoki, Samsong districts and conduct Goyang Living Lab project

Future business
- Run smart city Living Lab project continuously
- Run smart city promotion center continuously (ex : corporate networking, citizen education)

Capability of Goyang to realize smart city

2 oyang where the culture of citizens' participation takes root

Diversification of communication channel
- Diversity citizen participation program (ex : participatory budget system, etc.)
- Diversify claim handling window

Vitalize citizens' participation
- Receive more than 100, 000 claims from citizens a month
- Won Korea internet communication award for 5 consecutive years (2013~2017)

《 Direction of Goyang smart city Living Lab 》

1 Select residents' demand-based item (Empathy of stakeholders)

- Select service items that can be felt by citizens considering request by residents and complaints, motivating people to participate in the project.

2 Living Lab (Innovative structure based on bottom – Up approach_

- Focus on request for improvement by residents in the initial stage of the project, coordinate project direction based on discussion with stake holders, making residents feel about their influence and operation efficient

03 Introduction of Goyang smart city service

Goyang smart city Living Lab project

"Smart IoT walkway" demonstration project" the safety of elementary school students

Background

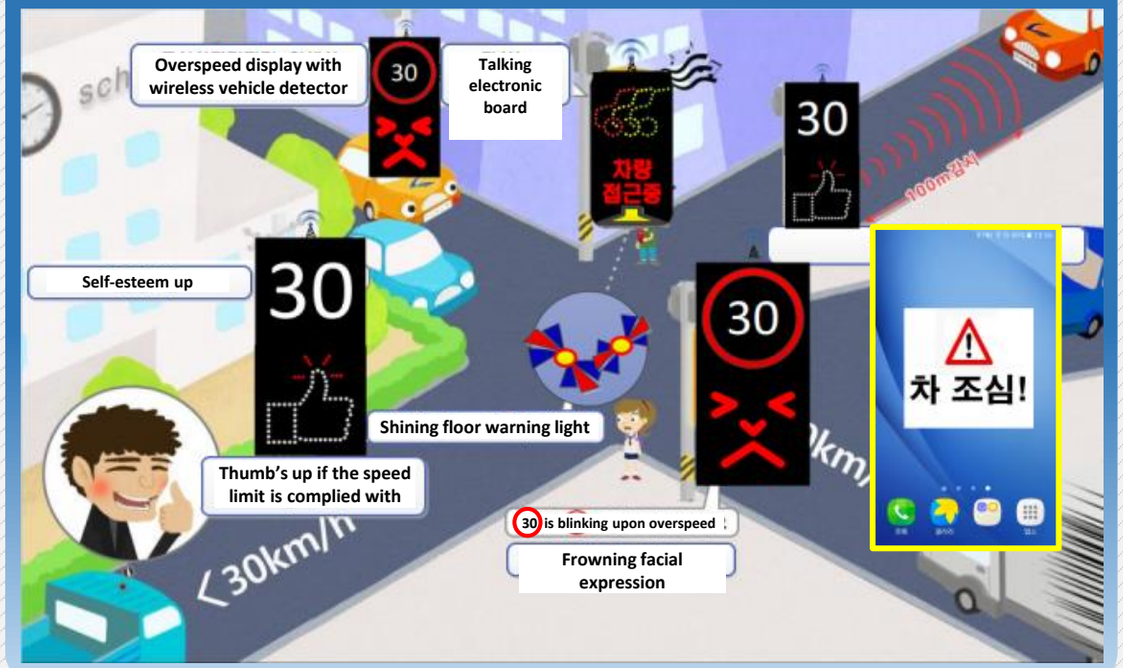
- There is a growing consensus on the safety of children's walking safety, but practical solutions has not been enough.
  → Growing demand for improvement by parents, students, and residents for children's walking safety
- Goyang city is implementing Smart IoT Walkway project by applying smart city technology targeting elementary schools with poor children's walking environment.

Project overview

1. Install smart safety barriers for walkways near Goyang Elementary School
2. Induce vehicle speed reduction by speed alarm and voice notice
3. Inform students by displaying vehicle movement information on the smart application

Participating organization	✓ Goyang smart city team, Goyang Knowledge Information Industry Promotion Agency, ITS Bank, Goyang Municipal Council, Goyang Resident Committee, Goyang Elementary School, etc.
Project budget	✓ 90,000,000 won in total
Project period	✓ 2018. 6. ~ 2018. 12
Location	✓ Near Goyang Elementary School, Deokyang-gu, Goyang-si, Gyeonggido province

Project Concept



Establishment of "mutually cooperative children's walking safety" under which risks can be recognized by all drivers and pedestrians (children and students, etc.)

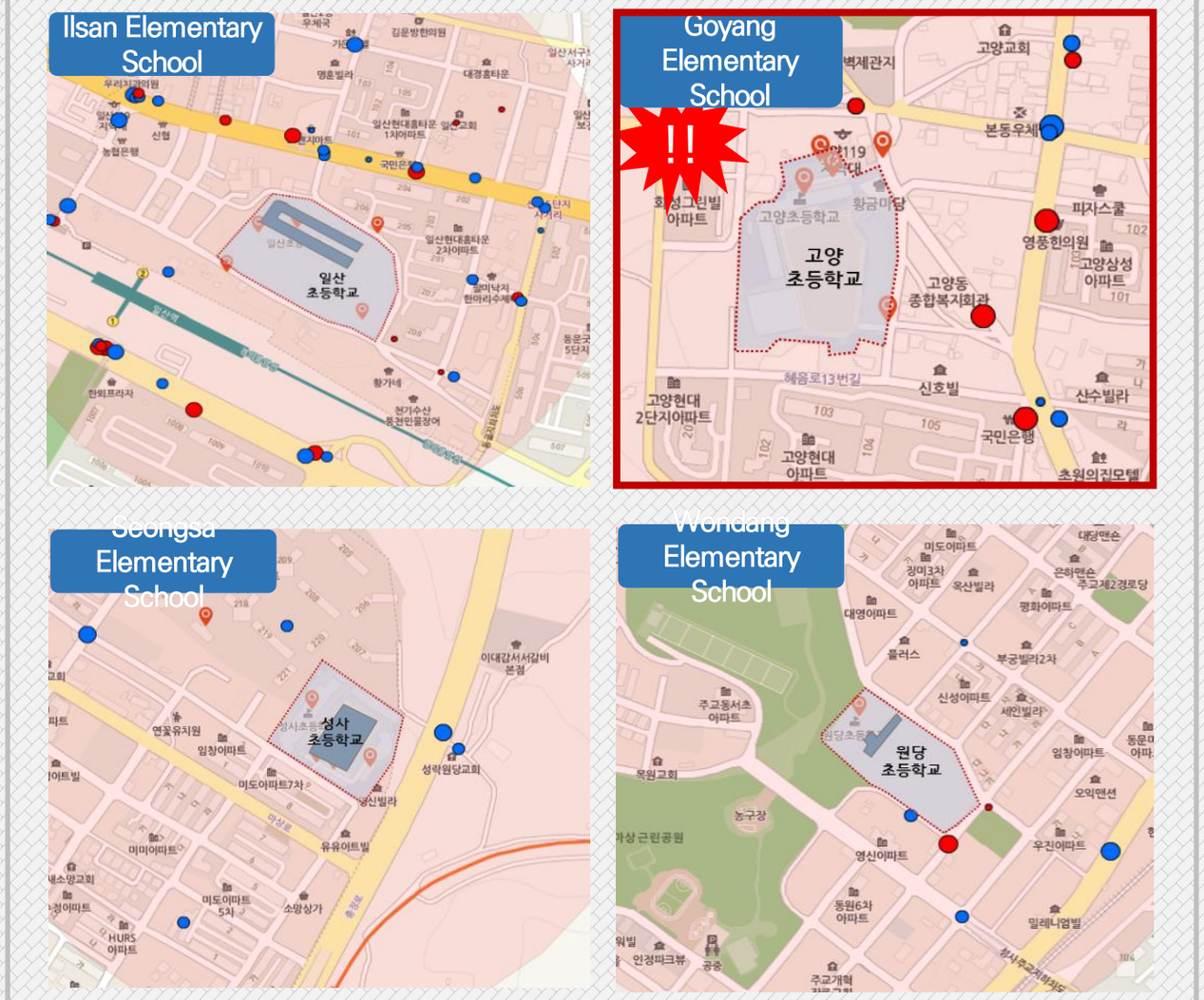
03 Introduction of Goyang smart city service

Goyang smart city Living Lab project

"Smart IoT walkway" demonstration project" the safety of elementary school students

Select project area

▶ Select area near Goyang Elementary School was selected after reviewing accident near elementary school, walkway condition, and willingness of schools and residents to select final project location.



Background of selecting Goyang Elementary School;

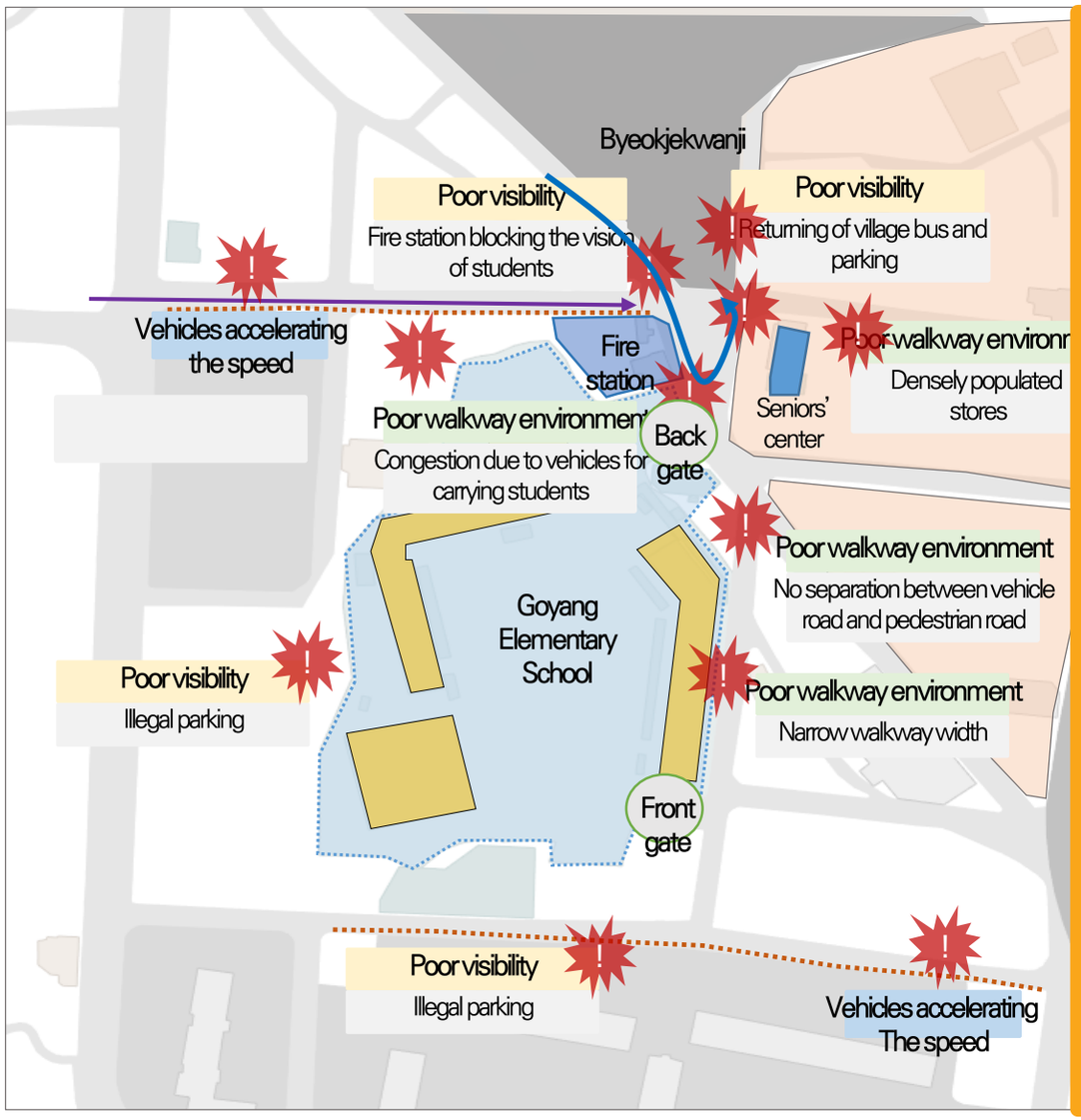
- Among elementary schools surveyed, Goyang Elementary School showed the highest traffic accident rate.
- Unlike other traffic accidents which occur mainly on the wide street, the most accidents near Goyang Elementary school occur near walkways.
- Narrow and complex walkways where students go to and come from school
- Strong willingness to participate by parents, teachers and students

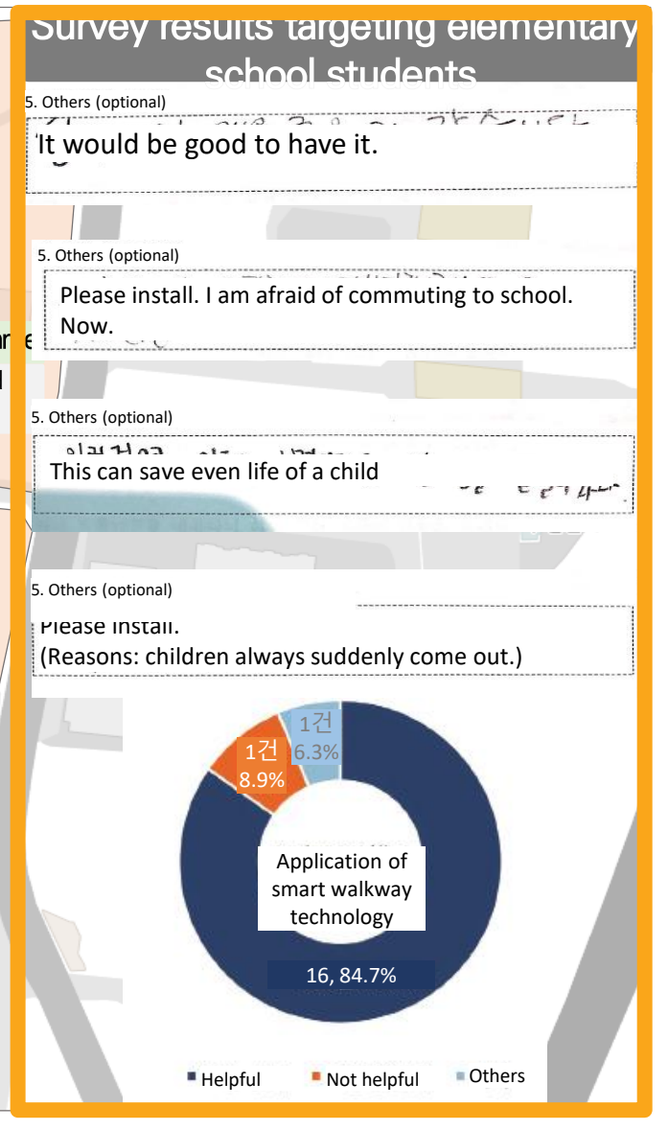
03 Introduction of Goyang smart city service

Goyang smart city Living Lab project

"Smart IoT walkway" demonstration project" the safety of elementary school students

Environment analysis of Goyang Elementary School and survey results targeting elementary school students





03 Introduction of Goyang smart city service

Goyang smart city Living Lab project

"Smart IoT walkway" demonstration project" the safety of elementary school students

Application of Living Lab

▶ Goyang City identified finding specific problems, continued participation of citizens and application of existing business process are the main success factors → incorporating citizens' opinion in project implementation process → improving residents' satisfaction

Participation by residents

Collect creative ideas with participation of various stakeholders such as general citizens, parents and teachers.

Progress of implementing Living Lab

Incorporate various factors for the success of Living Lab in the operation of Living Lab council such as finding specific problems, continued participation and application in the business

Survey in advance	▪ '18.5.23~29 ▪ Survey on the demand for Smart IoT walkway targeting students and parents ▪ More than 87% of respondents agreed on the adoption
1st Living Lab Council	▪ '18.6.25 ▪ Conduct presentation and collect opinion from parents, teachers and residents
2nd Living Lab Council	▪ '18.7.27 ▪ Present project direction to municipal council members, residents, parents, teachers and resident committee
3rd Living Lab Council	▪ '18.8.17 ▪ Coordinate project detailed design direction and connect requirements from municipal council members, resident committee, parents and teachers
4th Living Lab Council	▪ '18.8.27 ▪ Review project progress and discuss ways for future management and operation
Incorporating residents' opinion	▪ Incorporate residents' opinion regarding location of smart installations, installation angle and operating hours → maximizing the satisfaction level

03 Introduction of Goyang smart city service

Goyang smart city Living Lab project

"Smart IoT walkway" demonstration project for the safety of walking elementary school students

Final outcome

▶ Demonstration completed by reflecting residents' requests such as talking smart board, floor warning light, smart crossroad, notice for pedestrians, notice for speed limit and awakening smombie.

Smart intersection

Talking smart notice board (Byeokjekwanji intersection)

Talking smart notice board (Byeokjekwanji intersection))

Talking smart notice board (Hyundai Apt. back gate intersection)

Floor warning light

Smart crosswalk

Talking smart notice board **(back gate of Goyang Elementary School)**

Assistive device for smart notice board

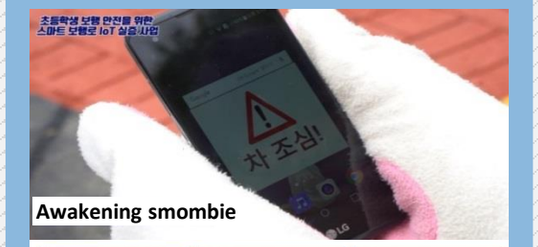
Crosswalk warning light

Notice for pedestrians

Speed limit notice

Downhill near fire station

Awakening smombie



Awakening smombie

Detailed technologies applied

1 Walking smart intersection notice

- With floor warning light and safety signal at the intersection, vehicle access is notified to pedestrians and drivers

2 Nudge-type speed limit notice

- Device that shows the vehicle speed to drivers at the school zone

3 Walking smart crosswalk notice

- With floor warning light and safety signal at the crosswalk, vehicle access is notified to pedestrians.

4 Smart notice to pedestrians

- Notice to derivers on the movement of pedestrians on the road without walkway

03 Introduction of Goyang smart city service

Goyang smart city Living Lab project

With smart city technology + environmental improvement, “create pleasant Goyang smart city”

Before smart IoT walkway project (As-Is)

Various factors that threatens the safety of walking children such as congested and narrow roads

Smart IoT walkway project + formation of unique street (To-Be)

Established [safe + pleasant] environment for pedestrians by linking Smart IoT walkway project with urban regeneration project

03 Introduction of Goyang smart city service

Goyang smart city Living Lab project

What are the responses from citizens regarding "Smart IoT Walkway"?

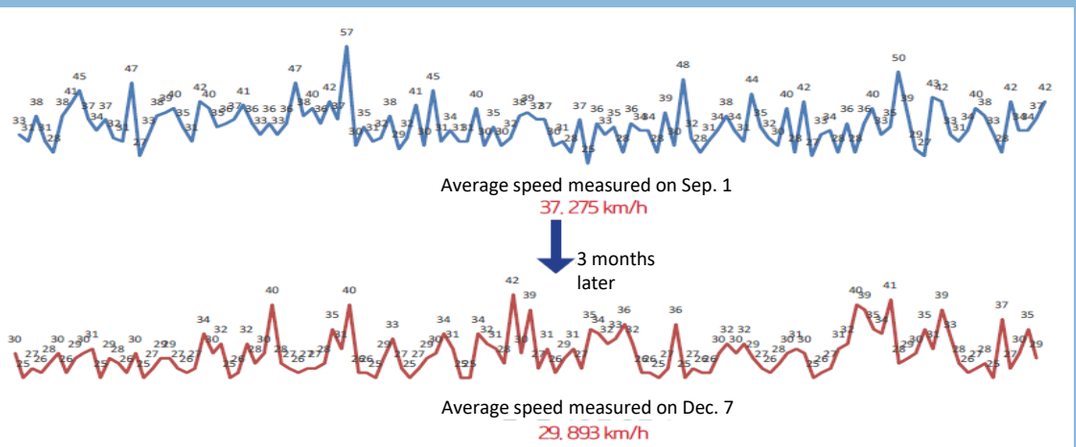
Survey results on the satisfaction level regarding Smart IoT Walkway

Awareness on the walking safety

Preference of installed smart devices

According to the survey results on satisfaction with smart IoT walkway, 90% of respondents showed positive reaction

Outcome of Smart IoT walkway project



Reduced speed of vehicles near smart IoT walkway by more than 20%

(Before: 37.275km/h → After: 29.893km/h)

Received plaque of appreciation from Goyang-dong citizens

(Goyang-dong resident committee → Goyang smart city team)

03 Introduction of Goyang smart city service

Smart city service project that can be felt by citizens

"Smart waste collection management system" to create clean and pleasant urban environment

Overview and process

- Install solar power compression waste bin with waste amount detection sensor → waste amount can be checked by waste collectors → optimization of waste collection vehicle movement → increase in efficiency of cleaning work

Sensor for waste collection amount

Solar power compression waste bin

Smart waste collection and management solution

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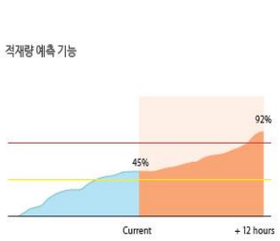
Smart city service project that can be felt by citizens

"Smart waste collection management system" to create clean and pleasant urban environment

Overview and process

- Install solar power compression waste bin with waste amount detection sensor → waste amount can be checked by waste collectors → optimization of waste collection vehicle movement → increase in efficiency of cleaning work

Optimizes the route of garbage collection vehicles by monitoring the amount of waste generated by hour and day



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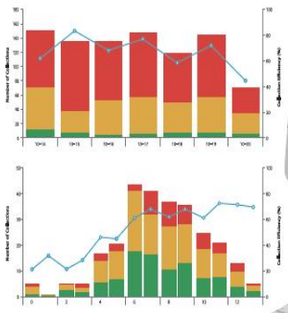
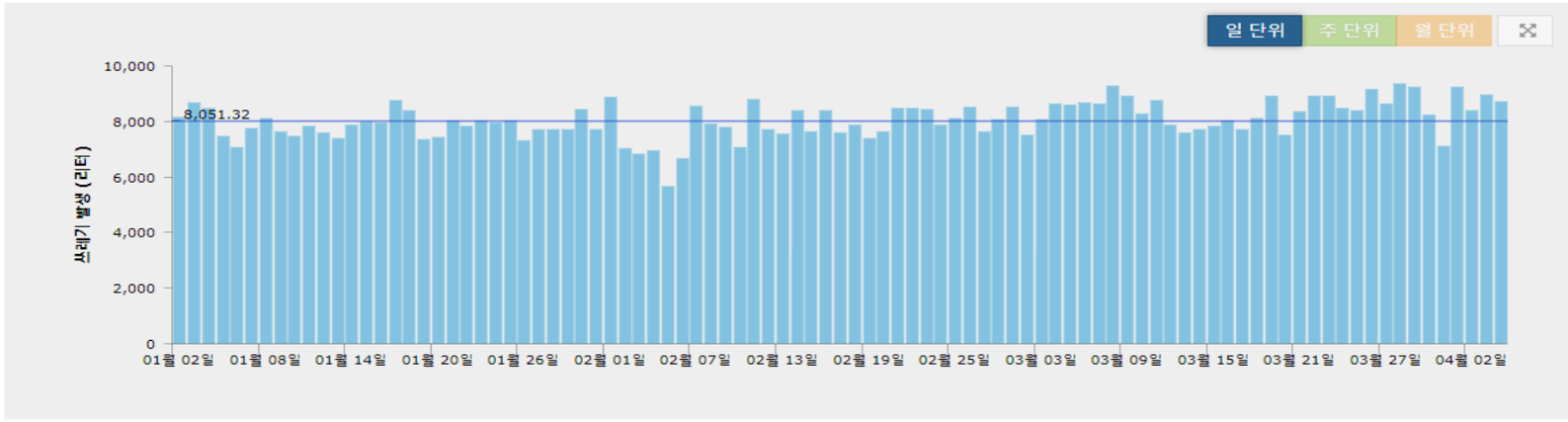
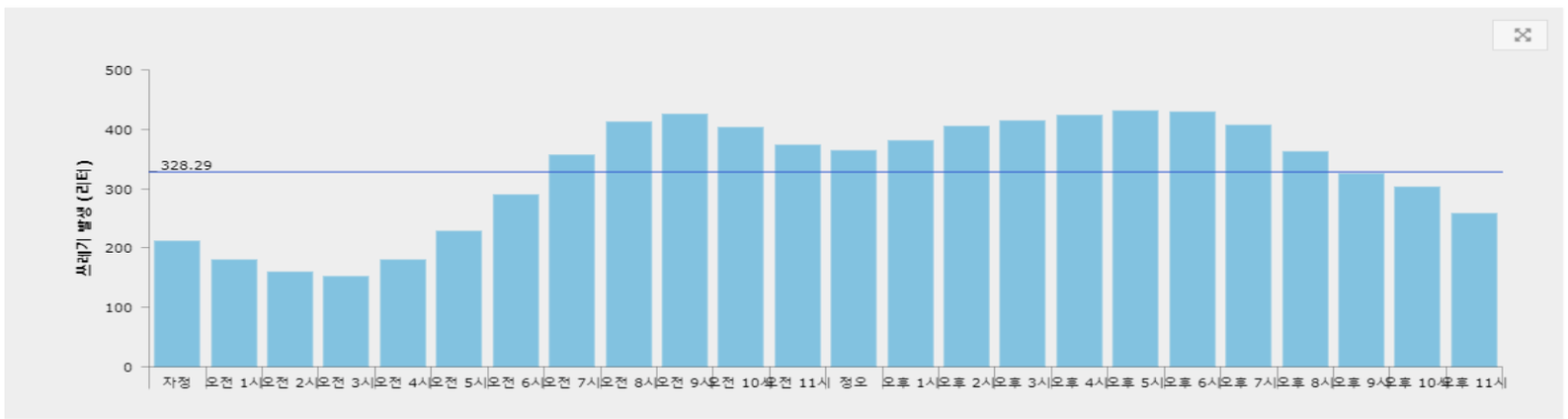






03 Introduction of Goyang smart city service

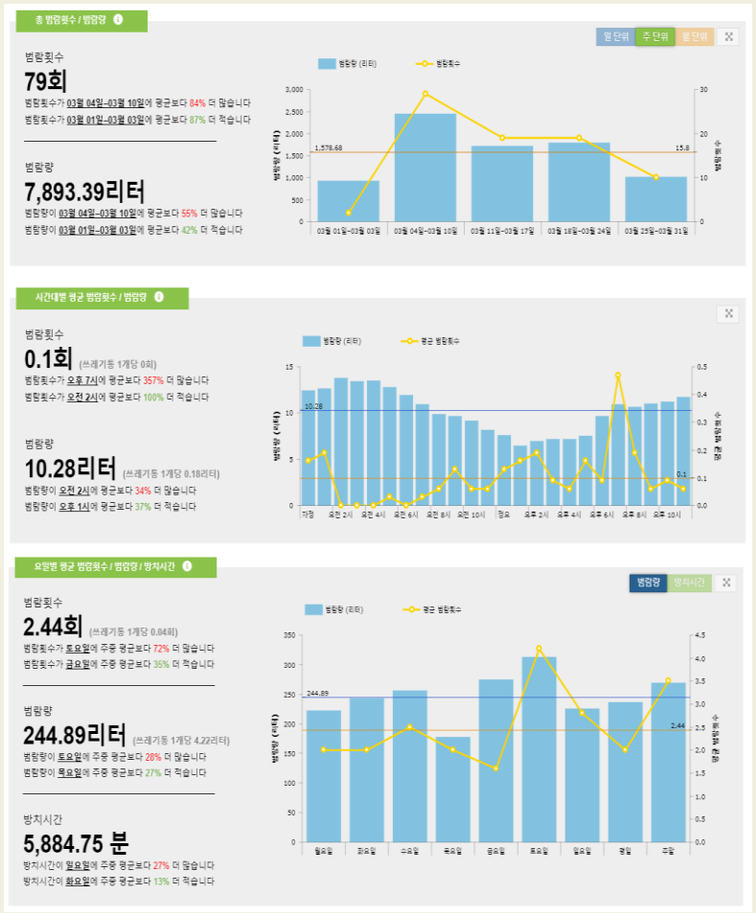
Smart city service project that can be felt by citizens

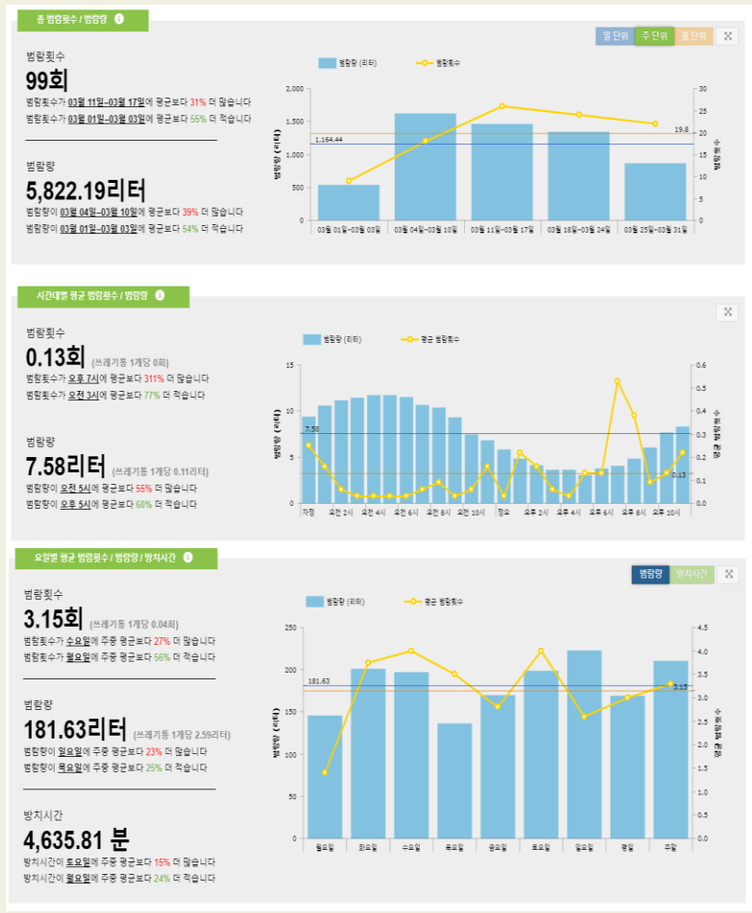
"Smart waste collection management system" to create clean and pleasant urban environment

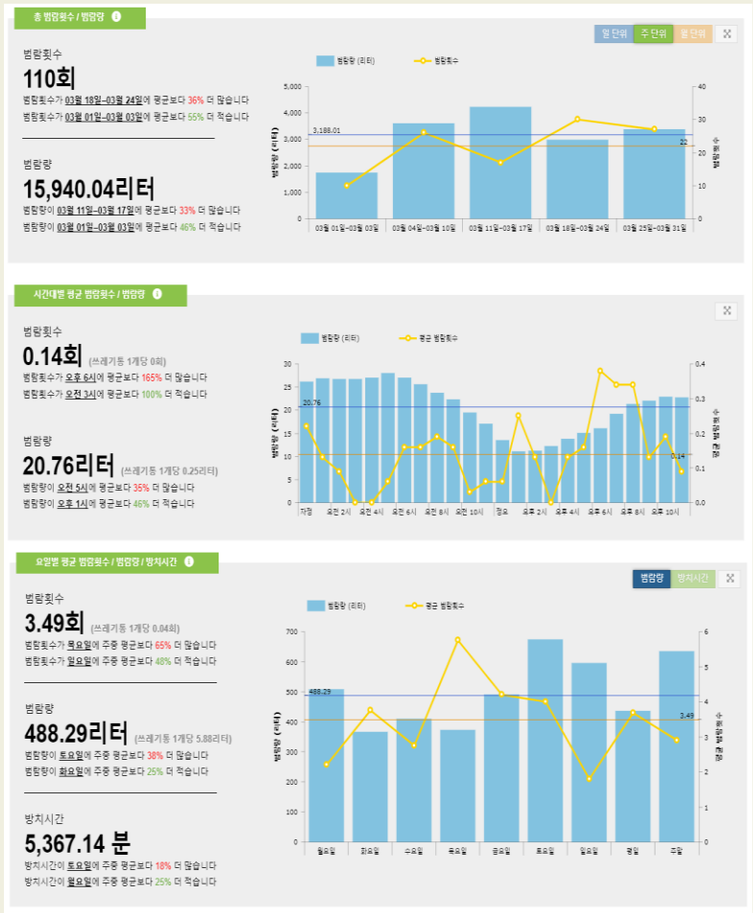
Overview and process

- Install solar power compression waste bin with waste amount detection sensor → waste amount can be checked by waste collectors → optimization of waste collection vehicle movement → increase in efficiency of cleaning work

EX) As of March 2019, the results of the analysis of the garbage in each region of Goyang City







03 Introduction of Goyang smart city service

IoT convergence demonstration complex

"IoT convergence demonstration complex" project to provide various IoT service by establishing sensors across Goyang

- Goyang smart city promotion center has accumulated data for 12 kinds of services established after " IoT convergence complex formation project ('2016~)
- Provide accumulated data at the request of citizens and private companies for free

IoT convergence demonstration complex formation project		
Service name	Equipment and sensors	Data to be collected
Escherichia coli monitoring service	Escherichia coli sensor	Escherichia coli
Water drone service	Water quality sensor	Water temperature, electrical conductivity, hydrogen ion concentration, dissolved oxygen concentration, dissolved oxygen saturation, turbidity, battery voltage
Water quality monitoring service	Water quality sensor	Water temperature, electrical conductivity, hydrogen ion concentration, dissolved oxygen concentration, dissolved oxygen saturation, turbidity, battery voltage
Smart park environment service	Ultra fine dust sensor (certified by the Ministry of Environment)	Ultra fine dust
Smart ecological environment service	Multiple weather sensor (Ministry of Environment), precipitation sensor	Temperature, humidity, wind direction, wind speed, rainfall, barometric pressure, ozone, ultraviolet rays, insolation
Smart security light service	LED security light, illumination, PIR, dimming sensor	Brightness, UV
	Illumination sensor, UV sensor	Temperature, humidity, UV
Smart ecological environment service	Multiple weather sensor (Ministry of Environment), precipitation sensor	Temperature, humidity, wind direction, wind speed, rainfall, barometric pressure, ozone, ultraviolet rays, solar radiation
	Odor sensor (Ammonia, hydrogen sulfide, VOC)	Ammonia, hydrogen sulfide, volatile organic compounds, odors
Relief daycare service	Ultrafine dust, temperature / humidity, wind direction / speed, presence of rainfall, ultraviolet ray, ozone, insolation sensor	Temperature, humidity, wind direction, wind speed, rainfall detection, ozone, UV, fine dust, solar radiation
Smart waste collection and management service	Accumulated amount detection sensor	Accumulated waste amount information
	Solar compression bins	Information on waste amount in compression bin
	Vehicle tracker	Vehicle location information
Illegal parking detection service	Vehicle detection sensor	Parking or stopping sensor detection
Smart protection service to improve residential environment	Mosquito collection, temperature/humidity, CO2	Highest temperature, lowest temperature, highest humidity, lowest humidity, Mosquito Collection, CO2
Complex environmental streetlight service	Pedestrian traffic, CO2, UV	Pedestrian traffic, CO2, UV, failure

- 43.37 million cases of accumulated data, 97 application for certification key, 97,835 cases of data collection, 1.9 million cases of website visit, 2,463 users of smart city promotion center (as of 2018)

Support stable data management and private utilization by linking it with smart city integration platform which is adopted as of 2019

04 Future plan

Ways for resident participatory project for Goyang Smart City formation

What is the way to make residents actively participate in Goyang smart city formation project ?

Holding an open innovation for resident participatory smart city

- Through various services such as Smart IoT walkway and smart air clean bus shelter and accumulated information, pursue open innovation where citizens participate to identify new services

  - Contest for development of smart service linked with existing project based on citizens' idea
  - Support fund to awardees for business startup and administrative service and apply eased condition for moving into youth smart town to be created in Ilsan
  - Provide special treatment to awardees in partnership with major software companies

- Synergy in line with Goyang Citizens' Idea Contest, which is held every year

- By incorporating ideas presented by citizens, sense of pride for citizens increase

Improve awareness on smart city through continuous education/promotion activities

- As of 2018, 30 programs for 3D printer, laser cutter, drone and 10 programs for experience, 612 citizens completed the program with 90.75 as education satisfaction level in 2018

Incorporating residents' opinion into existing smart city installations continuously

Maximize service operation efficiency by collecting residents' opinion continuously

Thank you