

Big Data, SMART CITY

# Data Driven Smart City Services

시원한 전주

깨끗한 전주

안전한 전주

건강한 전주

**UX** 한국국토정보공사

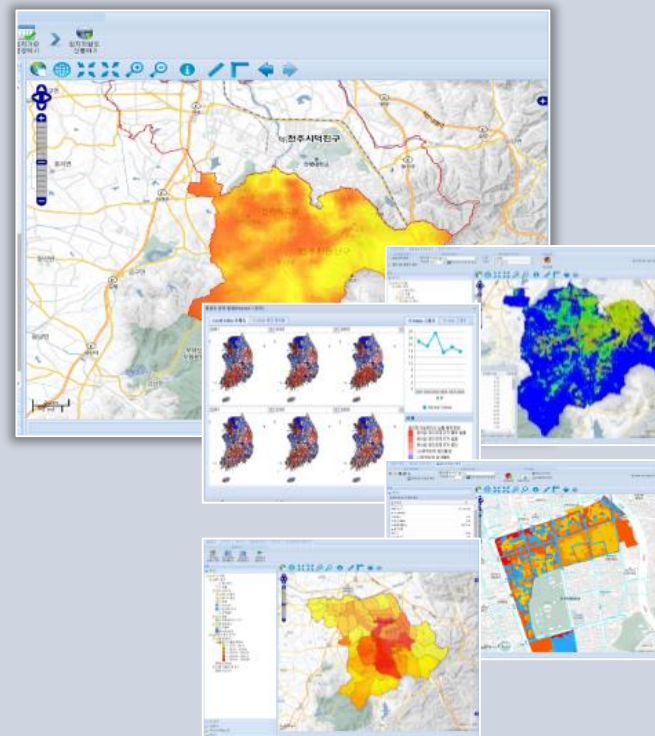
# LX Smart City Digital Twin Project



## Cyber Jeon-ju

### Service

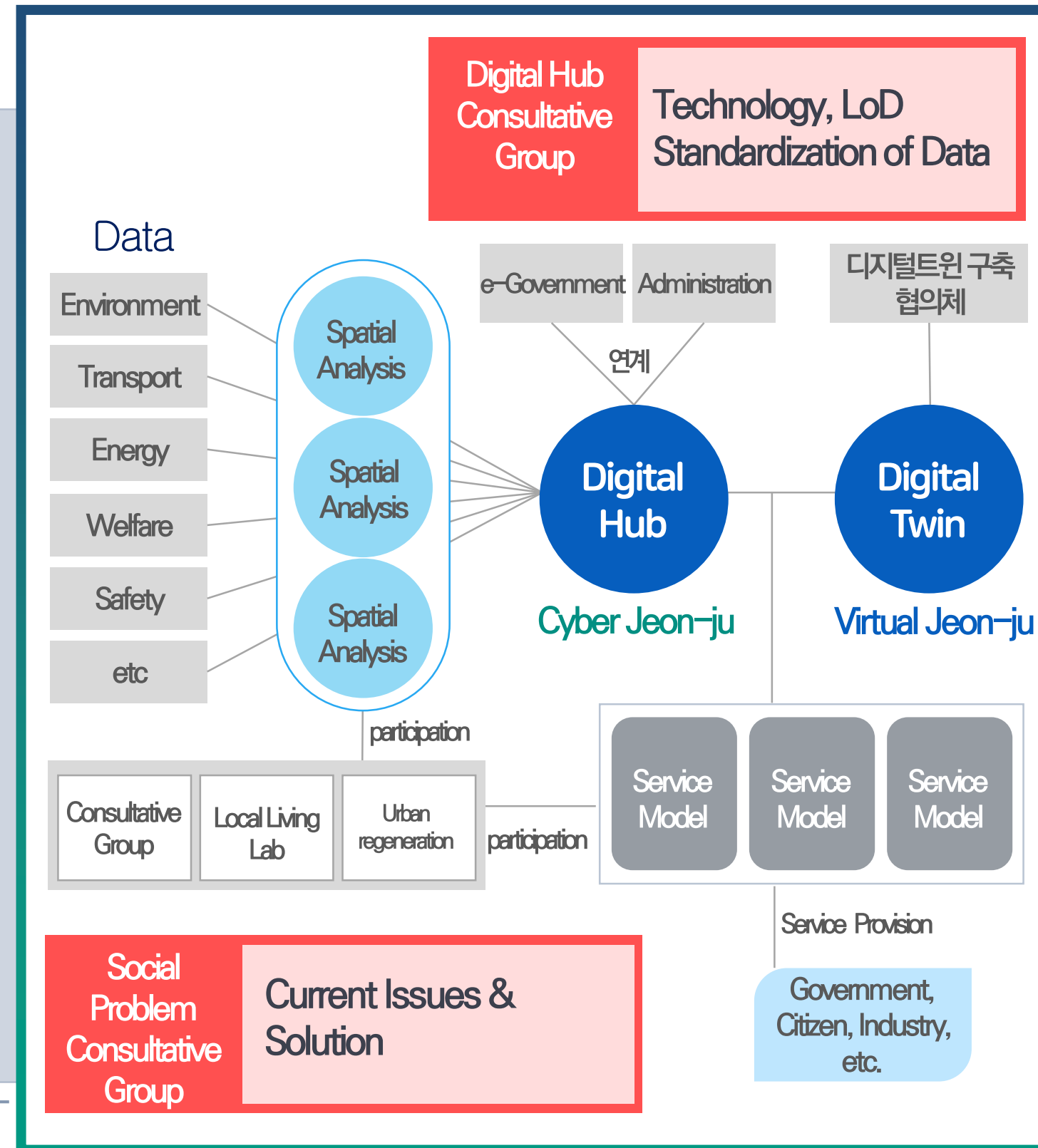
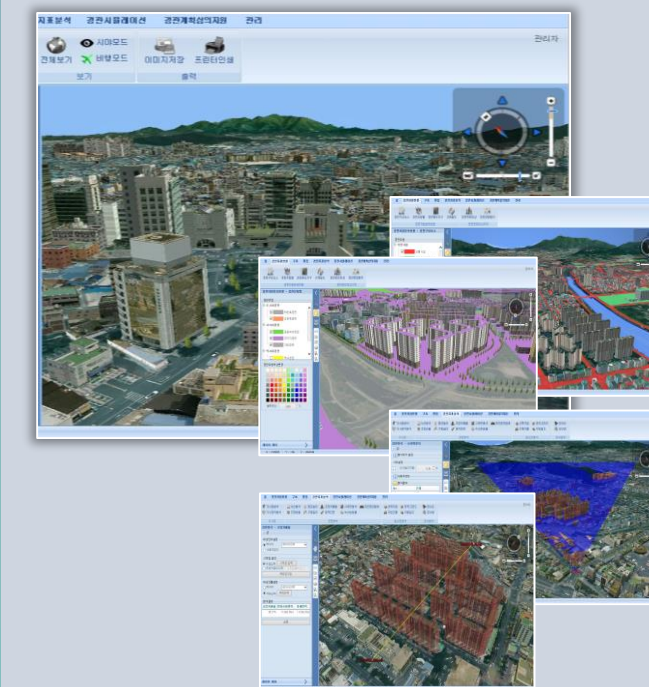
- Problem Identification
- Education
- Spatial data Sharing
- Living Lab



## Virtual Jeon-ju

### Service

- Digital Twin
- 3D Simulation
- Operating Consultative Group



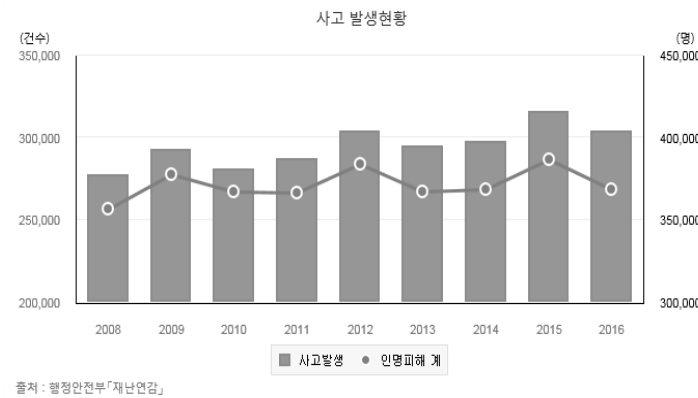
# LX Smart City Digital Twin Project

Digital Twin Team(19. 3. 4)

Consultative Group Formation

Analysis Model Development

Service & Modularization



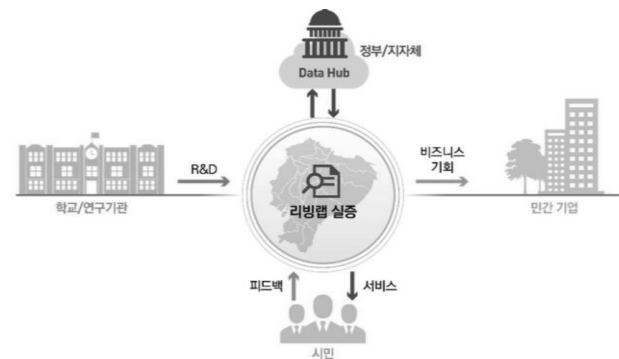
## 전주시 현안 분석

전주시-전주시유기농업협업체  
2018 전주시 지속가능지표 평가보고서 (2017 기준)

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- 1. 현안 분석
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  - 1.2 현안 분석의 범위
  - 1.3 현안 분석의 방법
  - 1.4 현안 분석의 결과
- 2. 지속가능지표 현황
  - 2.1 지속가능지표의 개요
  - 2.2 지속가능지표의 측정
  - 2.3 지속가능지표의 평가
  - 2.4 지속가능지표의 개선
- 3. 결론

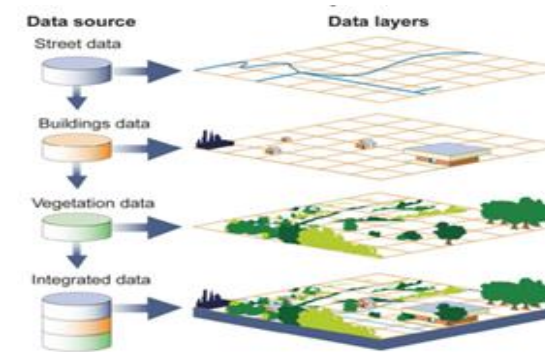
## 지속발전가능 협의 보고서



## 관산학연 연계 방안



## 도시문제 해결 협의체



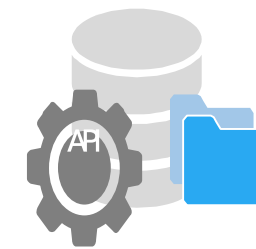
## 행정데이터 기반 도시, 사회문제해결 분석모형



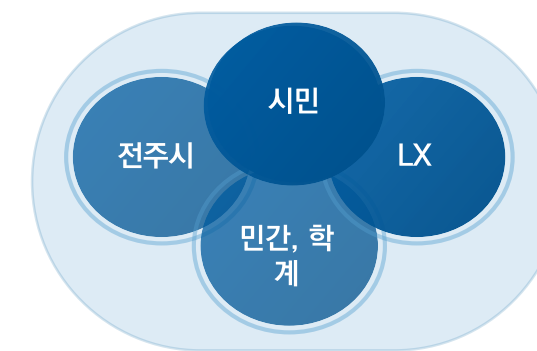
## 스마트시티 서비스화



BM특허



플랫폼 설계



## 거버넌스 운영

# LX Smart City Digital Twin Project

LX & Jeon-ju city has founded the team of experts on spatial data analysis.



'19. 3. 21. MoU between LX-Jeonju city-H&C

'19. 3. 4. starting ceremony for the team



# LX Smart City Digital Twin Project

Issue Identification

Education on Spatial data

## Identifying Current Issues



analysis on civil complaints & report on SDGs  
meeting with Group for SDGs (19. 3. 18.) etc

## Education Course on Spatial Data Analysis



classes on spatial data utilization for public  
practice over 13 times

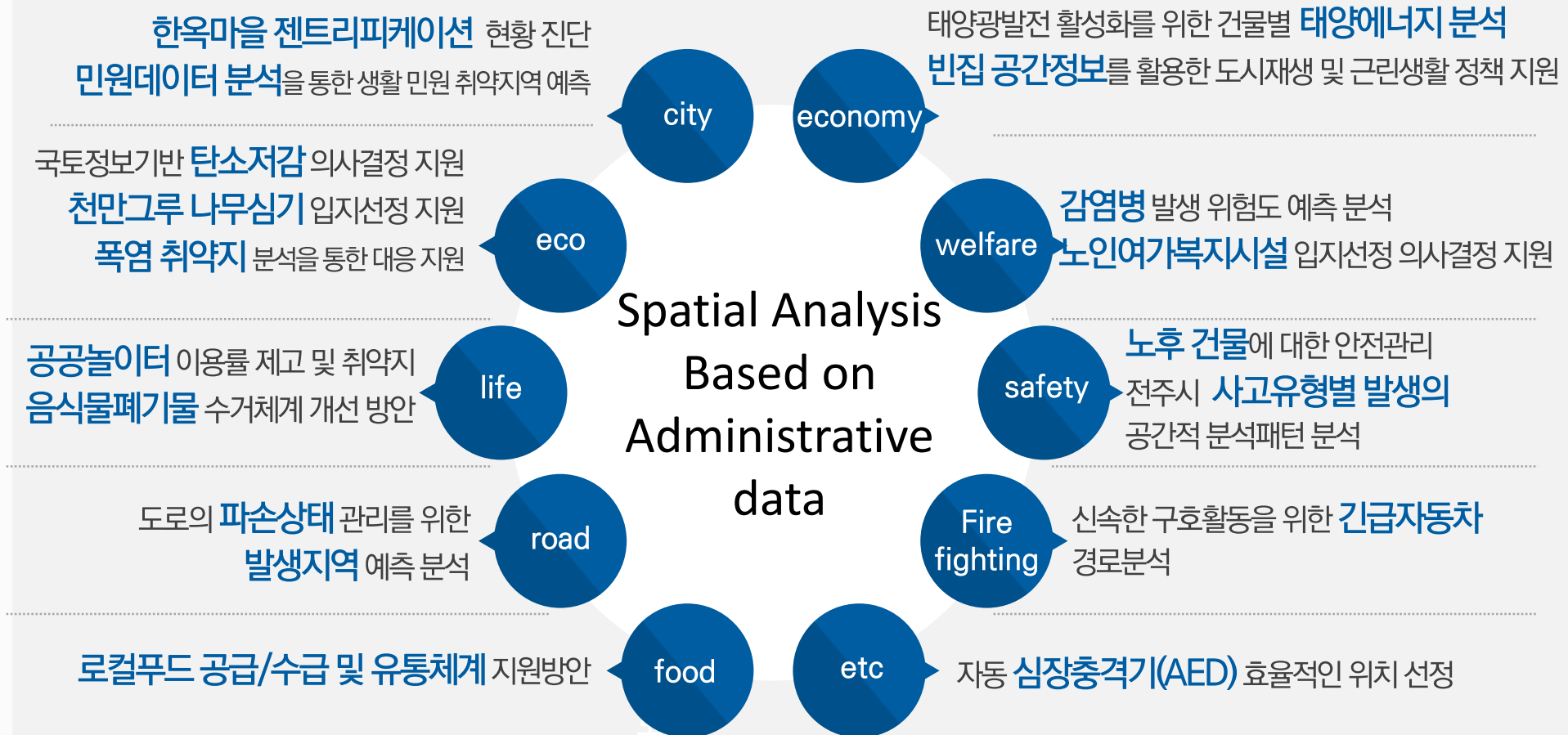
# LX Smart City Digital Twin Project

Issue Identification

Education on Spatial data

Topic Selection

## Models for Spatial Data Analysis



## Topic Selection

01 Topic Suggestion(12)

02 Current Models(68)

03 Setting Up Priority(16)

# LX Smart City Digital Twin Project

Issue Identification

Education on Spatial data

Topic Selection

Team Formation

Discussion & Data Sharing

## Group Formation & Data Sharing

- ✓ meeting with the local officers in needs
- ✓ issue Identification
- ✓ discussion on smart city services
- ✓ Acquisition of data for analysis
- ✓ frequent meeting with the officers

\* related departments on  
department on energy, landscape&planting, urban waste, welfare, female&household,  
housing&welfare, urban regeneration, etc.

\* Jeon-ju IT&CT Industry Promotion Agency, Civic Organization meeting



# LX Smart City Digital Twin Project

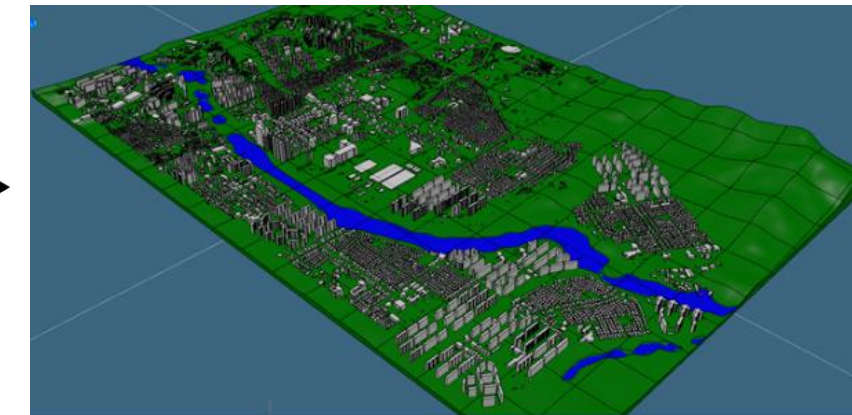
## the Application of Digital Twin Model(Windway Simulation)



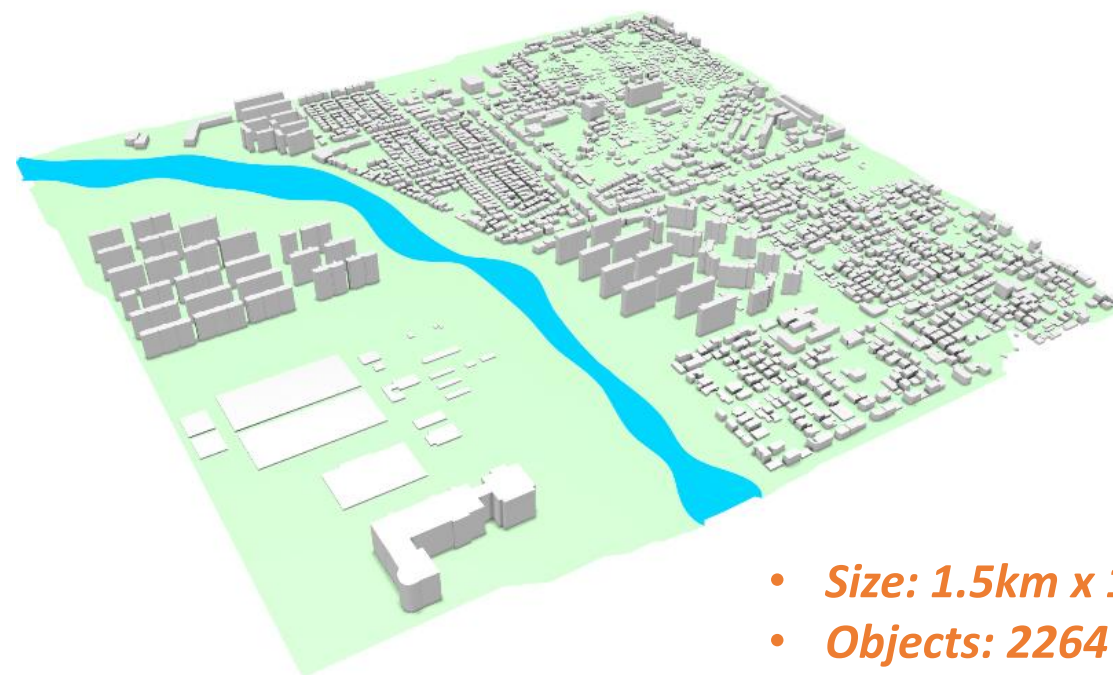
2D map



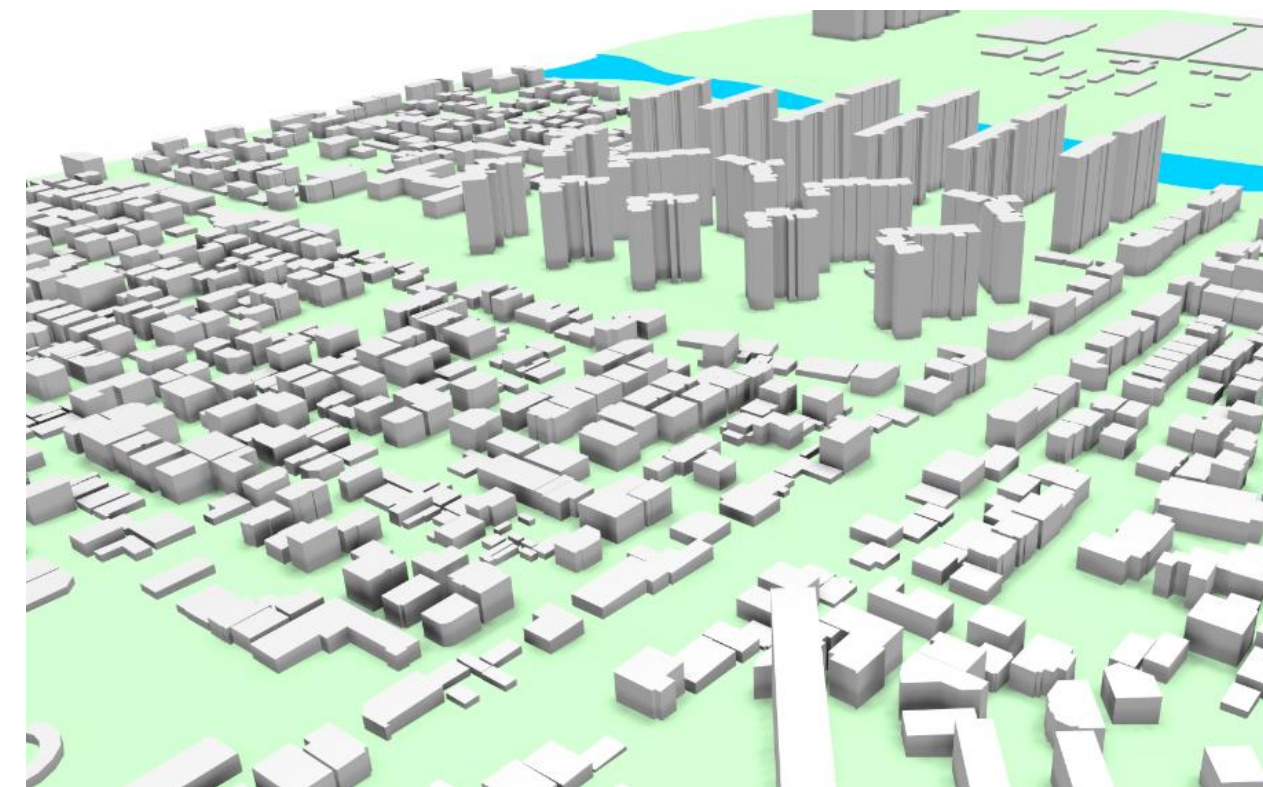
3D modeling with CATIA



Geometry clean-up for simulation



- Size: 1.5km x 1.5km
- Objects: 2264



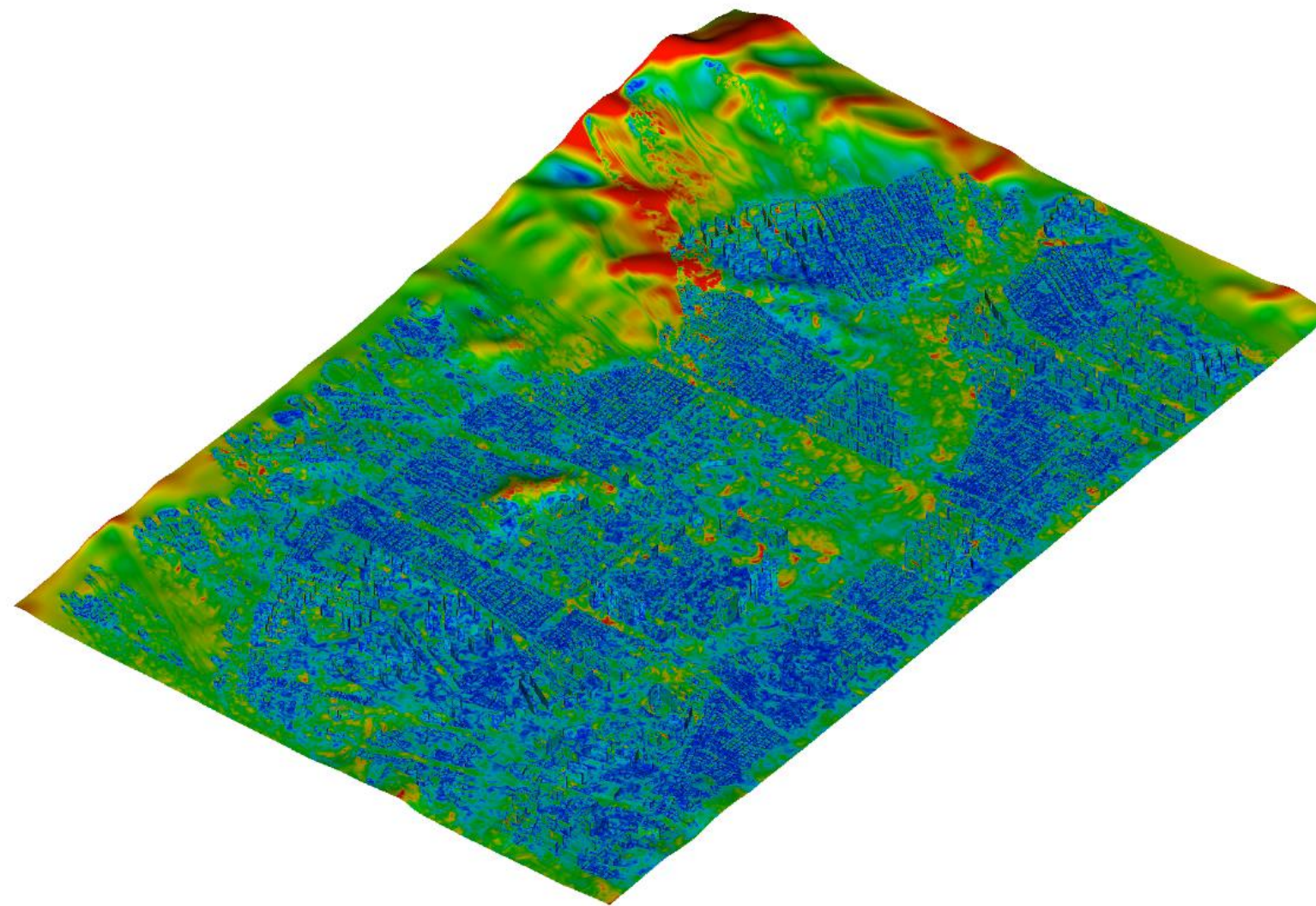


# LX Smart City Digital Twin Project

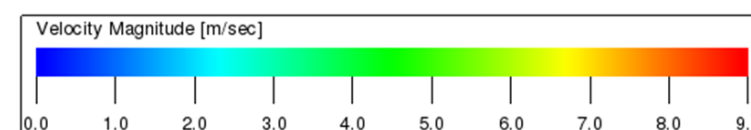
## the Application of Digital Twin Model(Windway Simulation)

- the wind velocity distribution over Jeon-ju area (northwester with the speed of 5-7m/s)

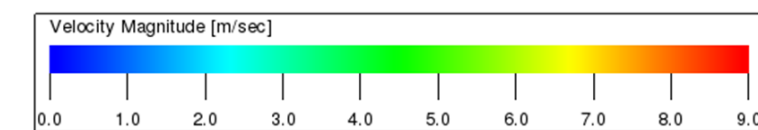
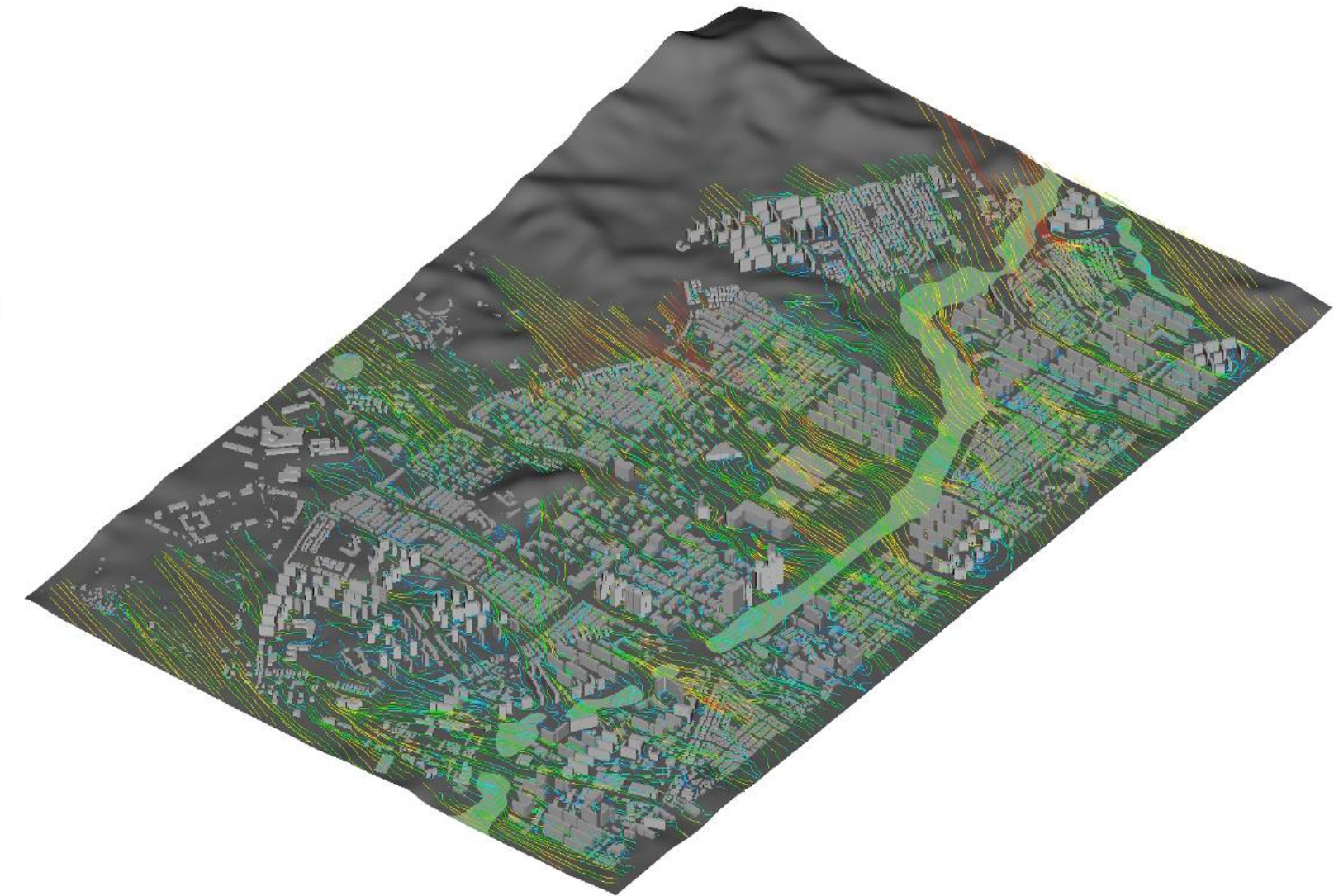
 wind velocity distribution(near surface)



*on Near Surface*



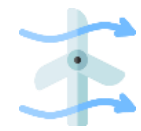
 wind velocity distribution(25m from the surface)



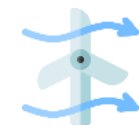
# LX Smart City Digital Twin Project

## the Application of Digital Twin Model(Windway Simulation)

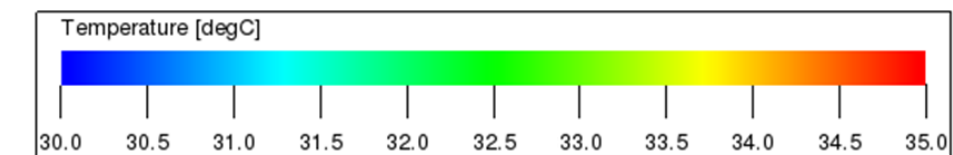
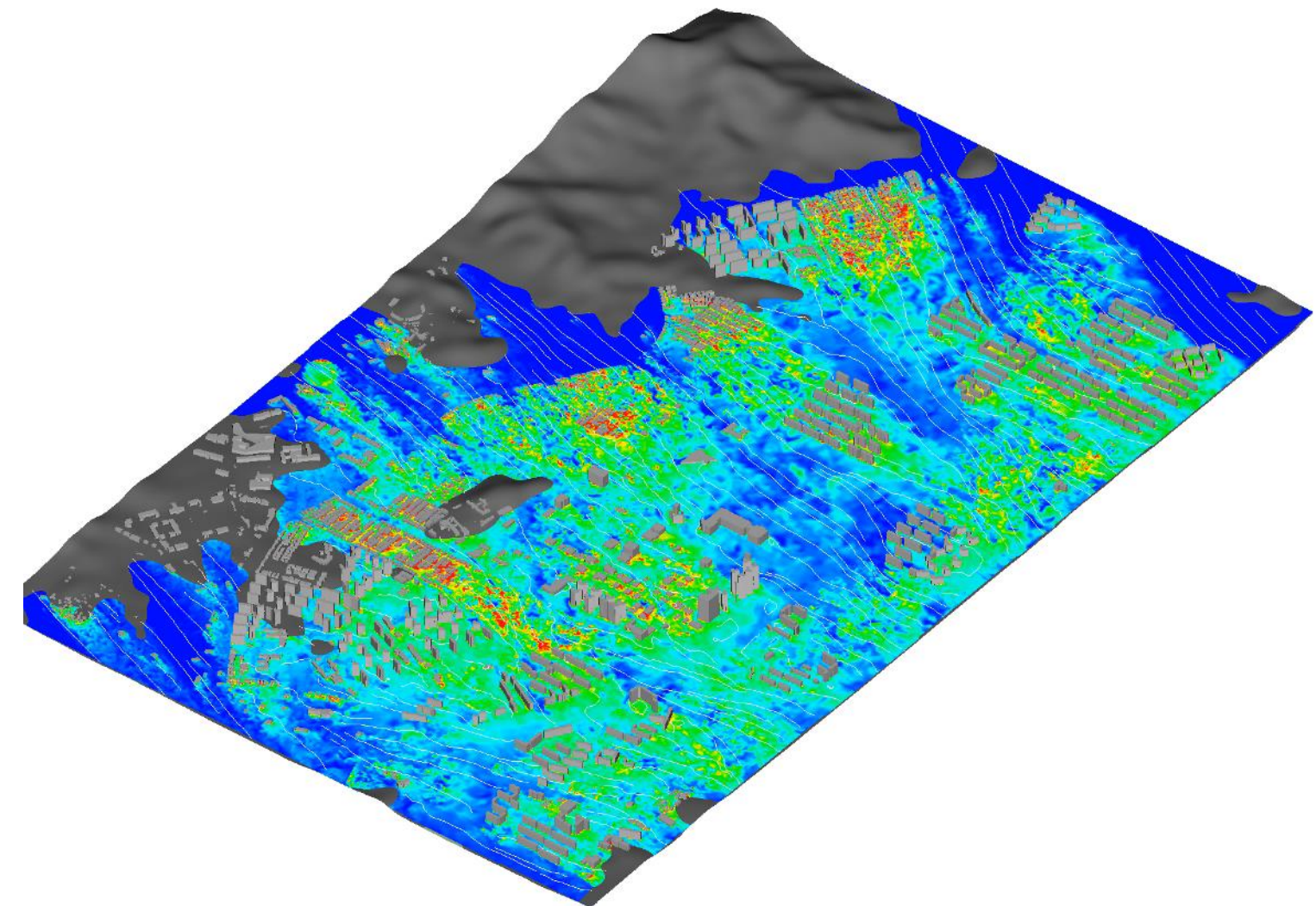
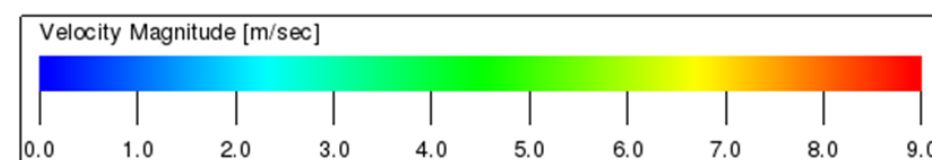
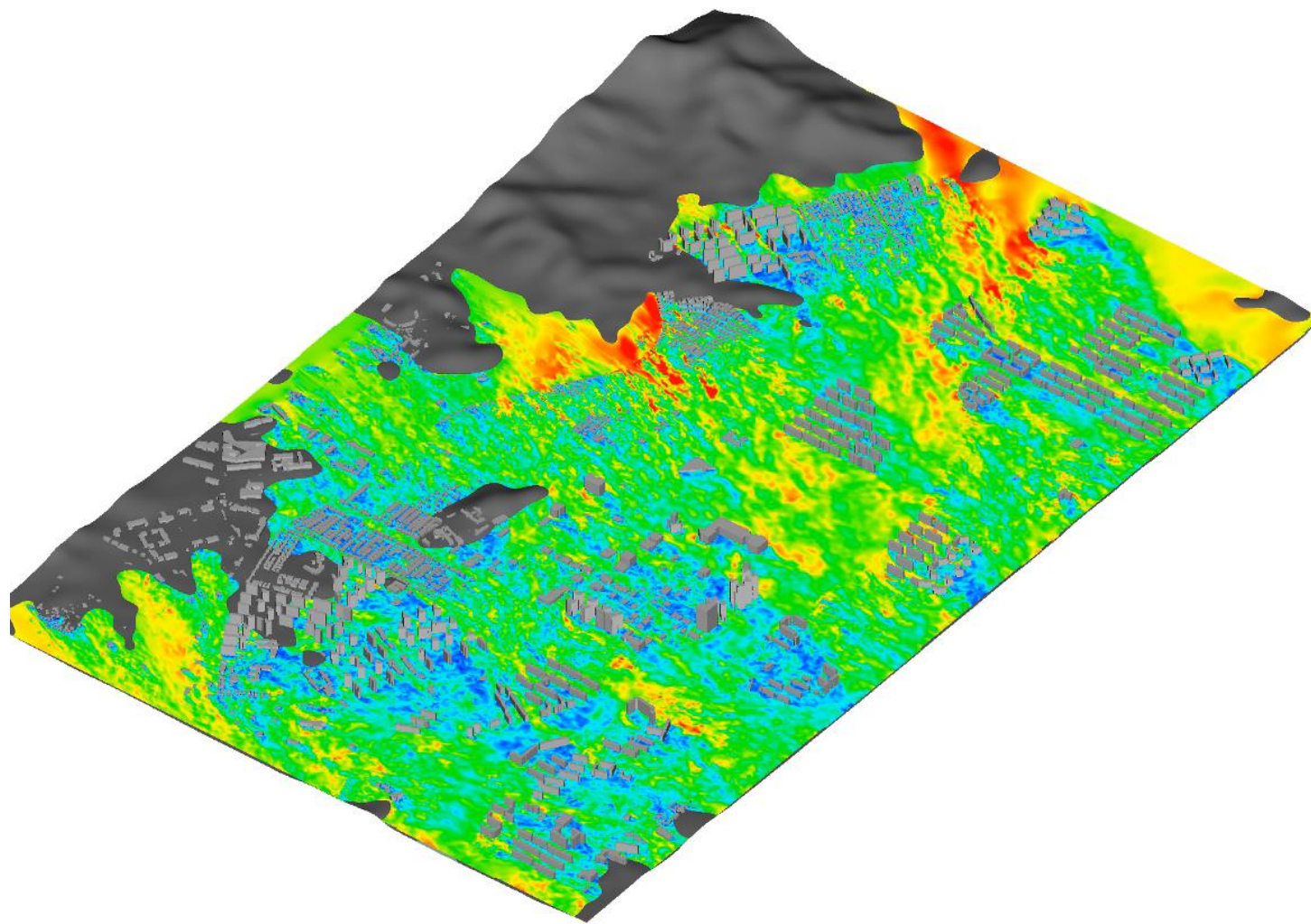
- trajectory & transection of wind over Jeon-ju area (northwester with the speed of 5-7m/s)



wind velocity distribution(25m from the surface)



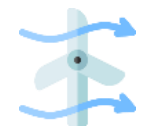
air temperature (25m from the surface)



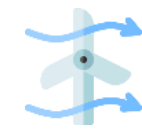
# LX Smart City Digital Twin Project

## the Application of Digital Twin Model(Windway Simulation)

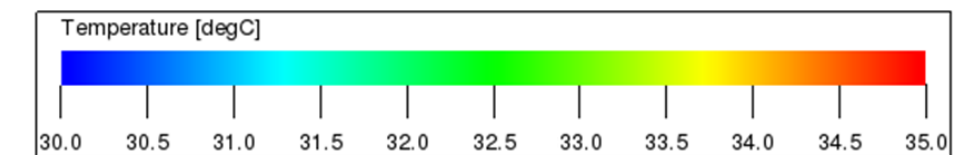
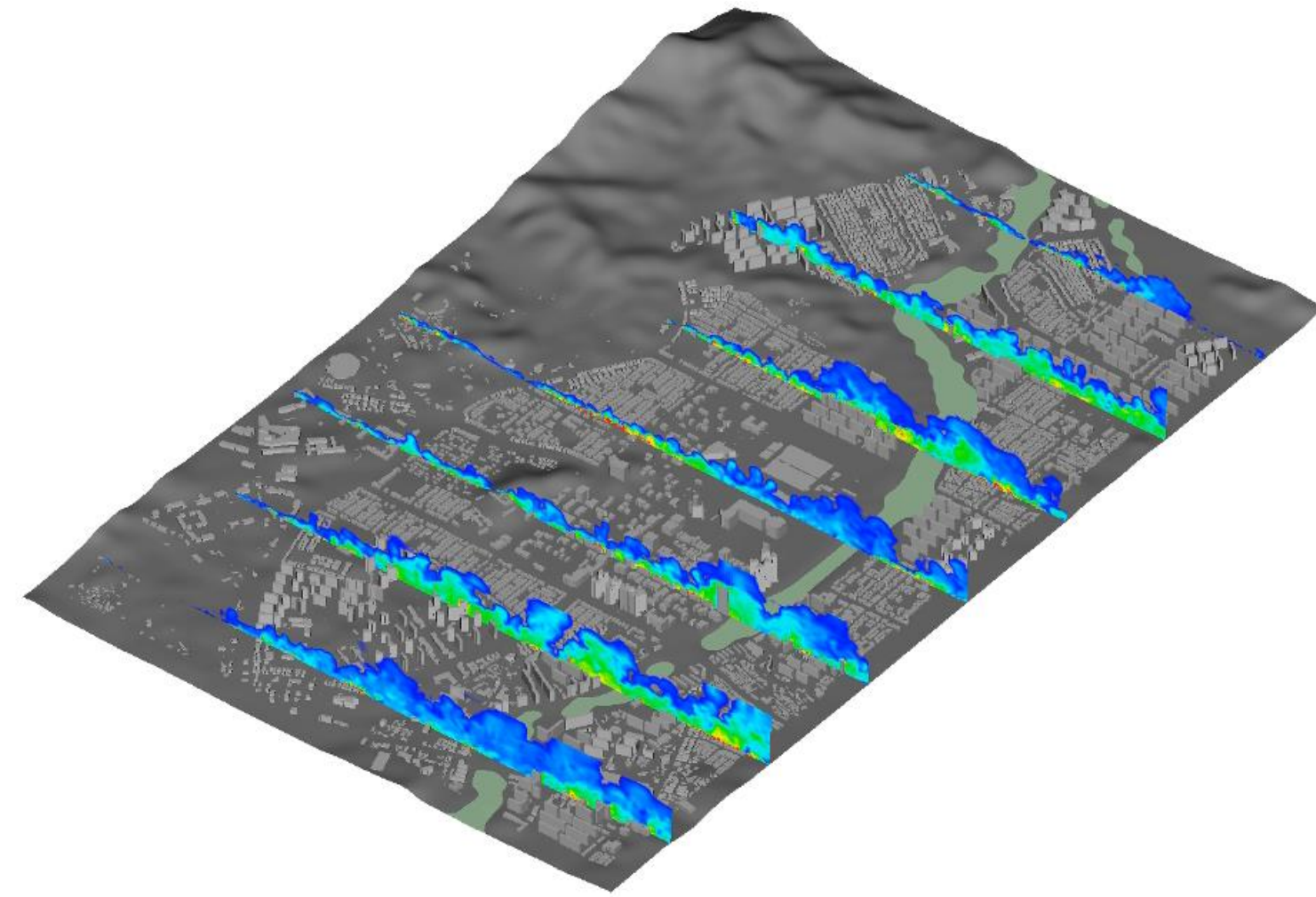
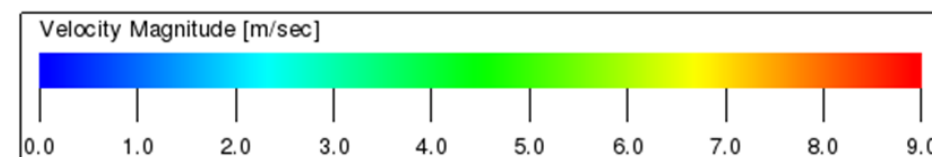
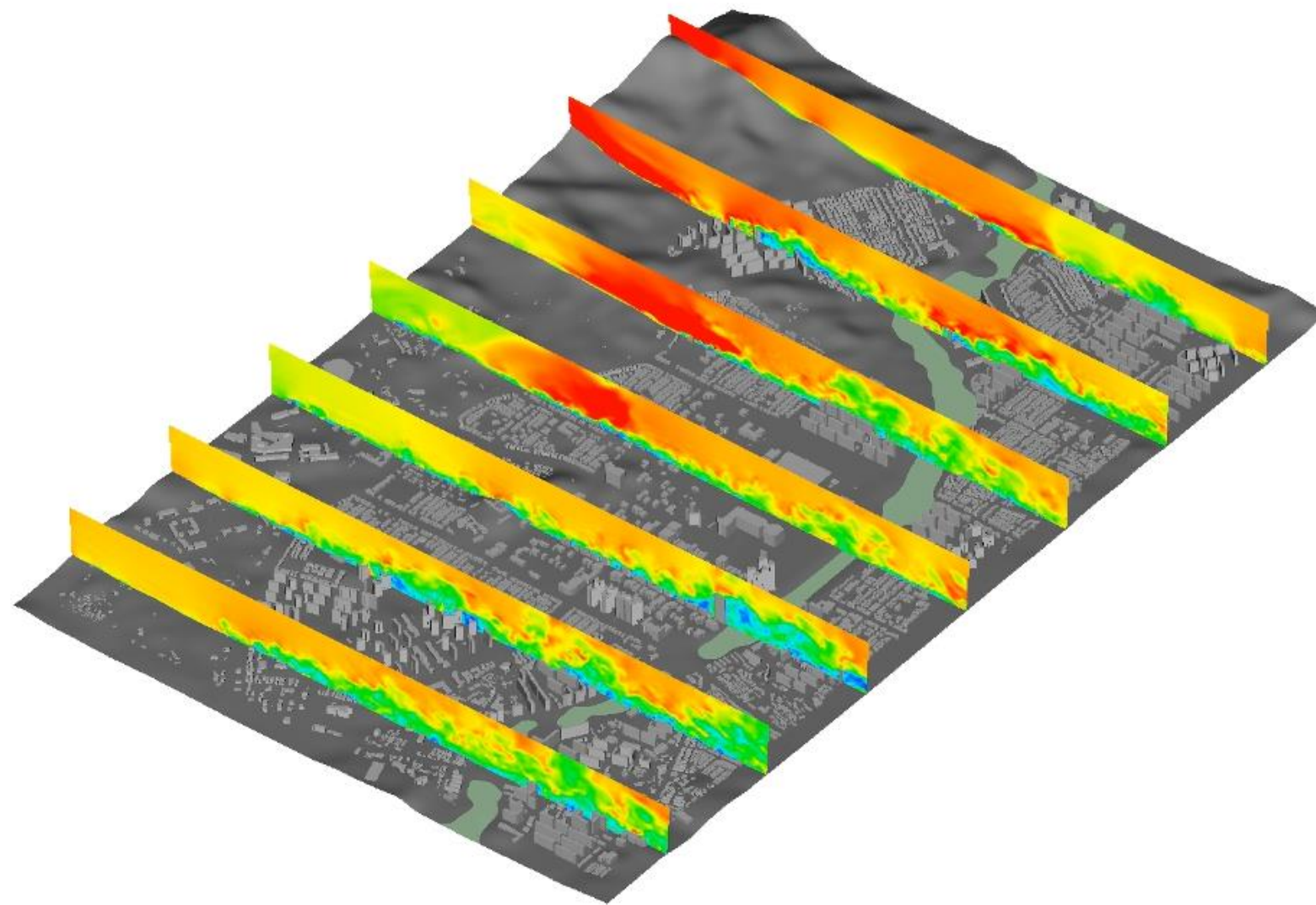
- trajectory & transection of wind over Jeon-ju area (northwester with the speed of 5-7m/s)



wind velocity distribution(25m from the surface)



air temperature (25m from the surface)



# LX Smart City Digital Twin Project

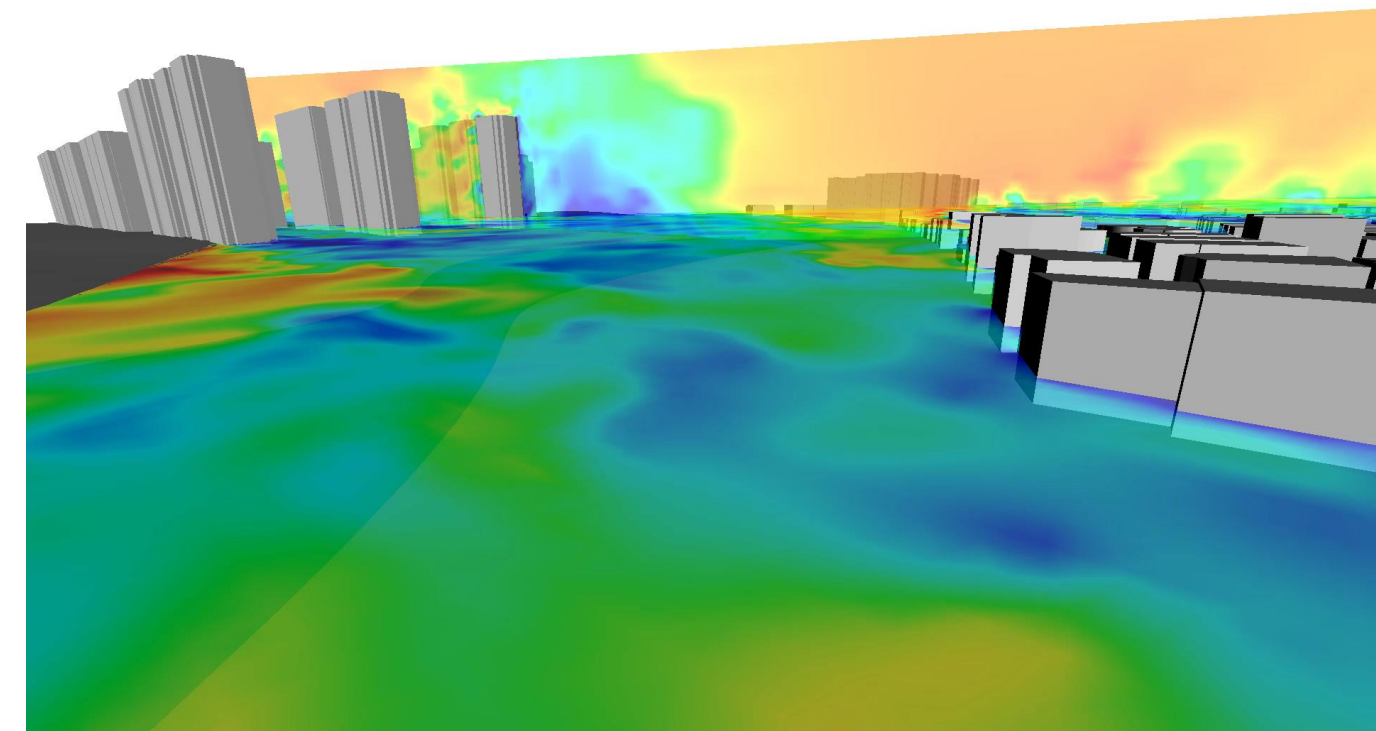
## the Application of Digital Twin Model(Windway Simulation)

- trajectory & transection of wind over Jeon-ju area (northwester with the speed of 5-7m/s)

 road view



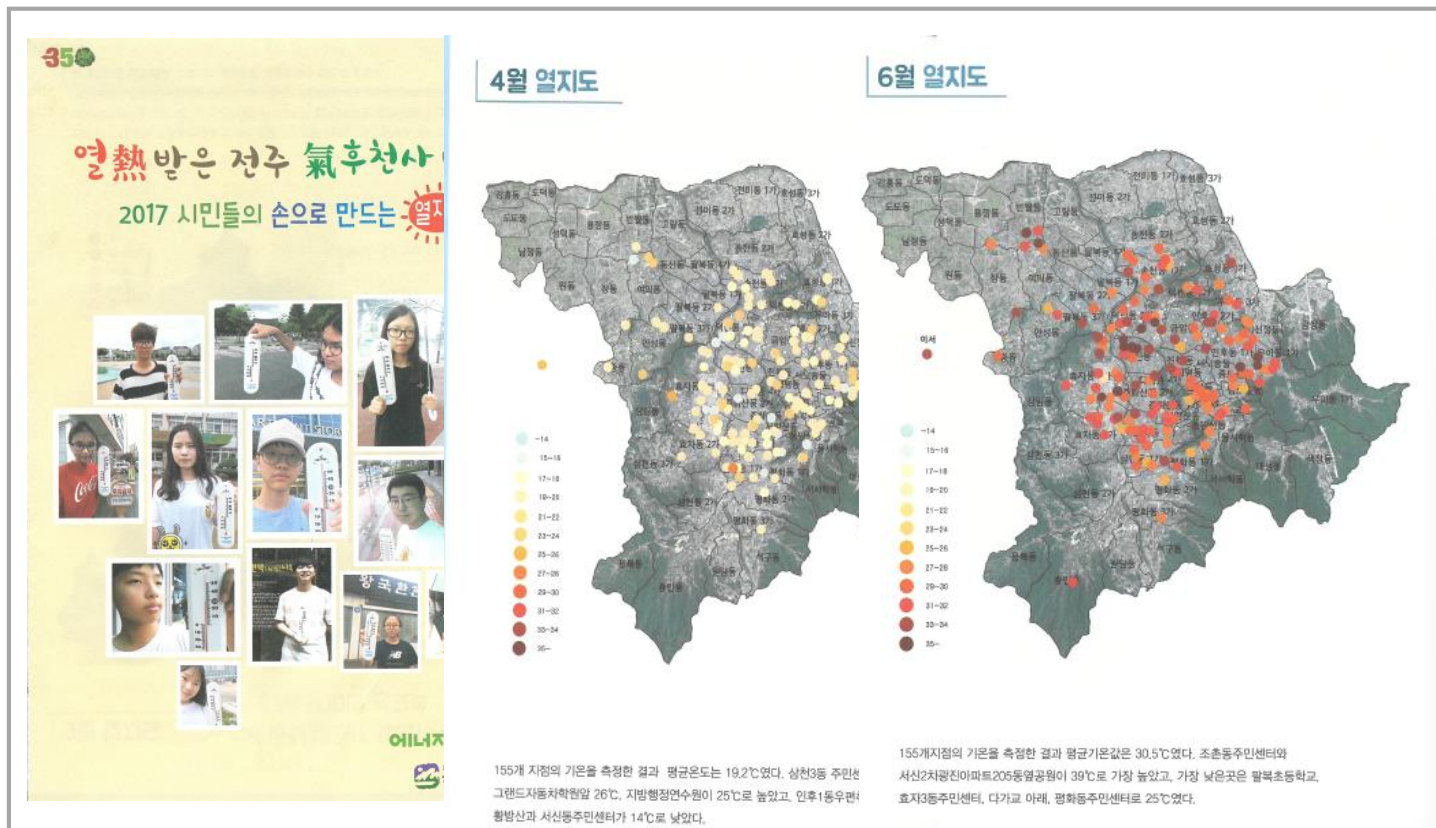
 Digital twin



# LX Smart City Digital Twin Project

LX & Jeon-ju city has introduced the spatial analysis model to support the civic organization to solve the heat island issue in Jeon-ju city.

## AS-IS



### ✓ Current Method

- Each datum was marked manually on the map.

## TO-Be



### ✓ Co-work between LX & Jeon-ju city

- The data were analysed on the LX Big Data Platform.

S M A R T C I T Y 스마트 시티

전 주 J E O N J U



시원한 전주

A COOL CITY JEONJU



깨끗한 전주

A CLEAN CITY JEONJU



안전한 전주

A SAFE CITY JEONJU



건강한 전주

A HEALTHY CITY JEONJU

「스마트시티 디지털트윈 사업단」

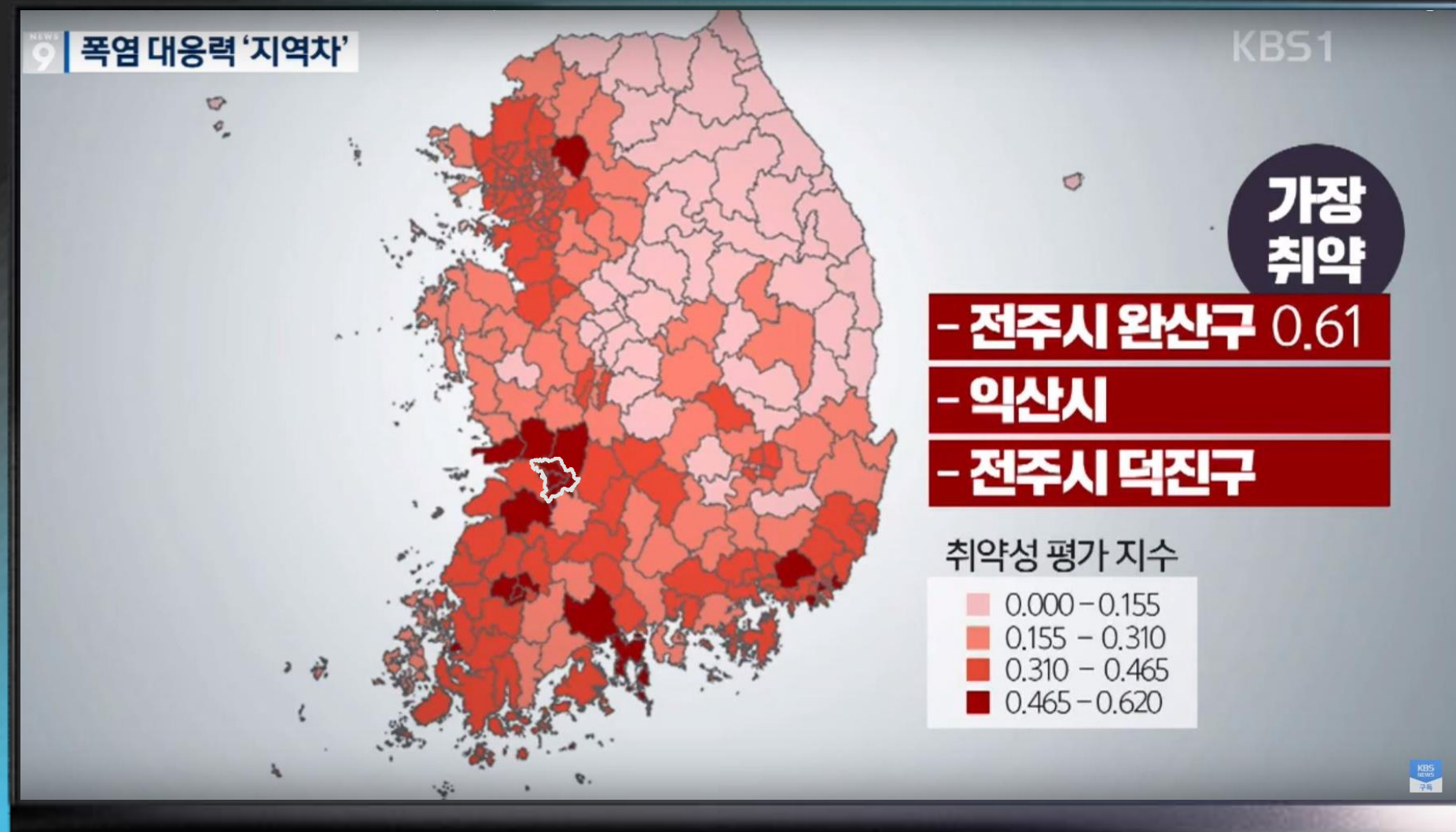


A COOL CITY  
JEONJU

시원한 전주

STEP

# ① Identification of current issues



Local official

*"I really want to know the best places to set up shade canopies."*



STEP

# ① Air Temperature Measurement



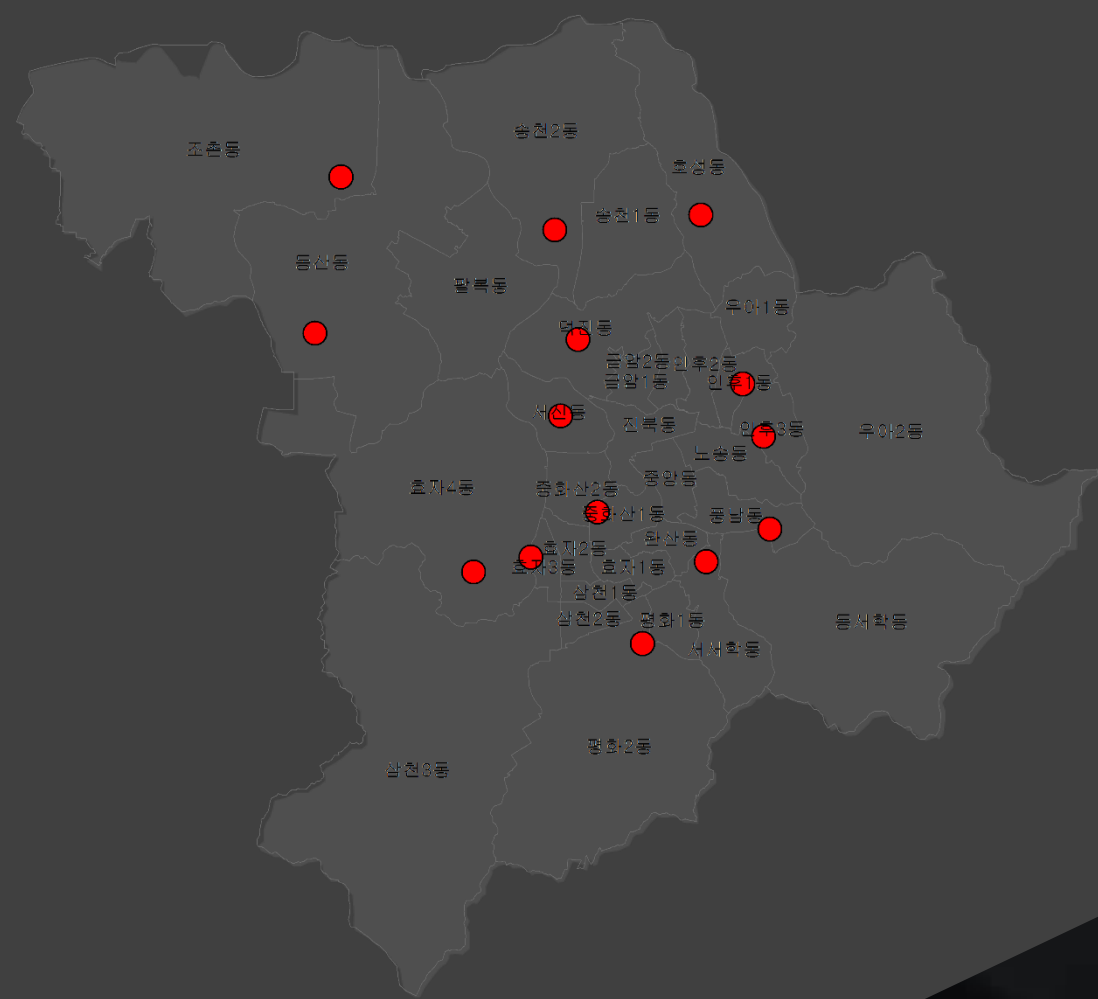
Administrative data

Supplemented by

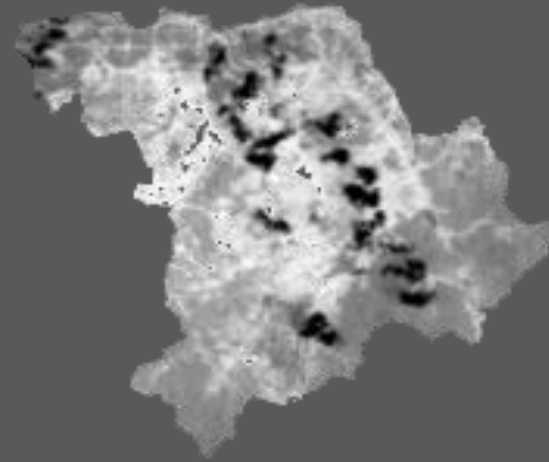


Satellite Imagery

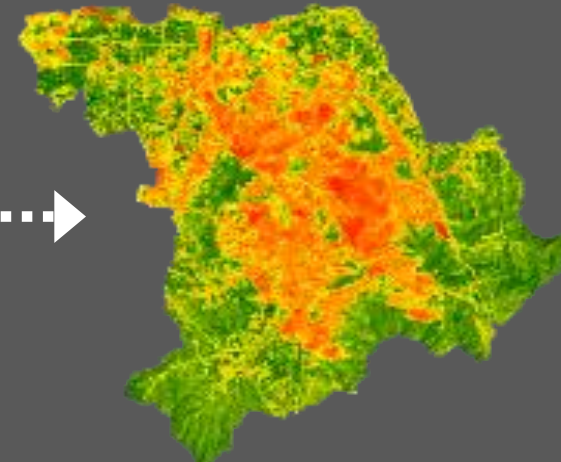
● 전주시 열섬 측정망



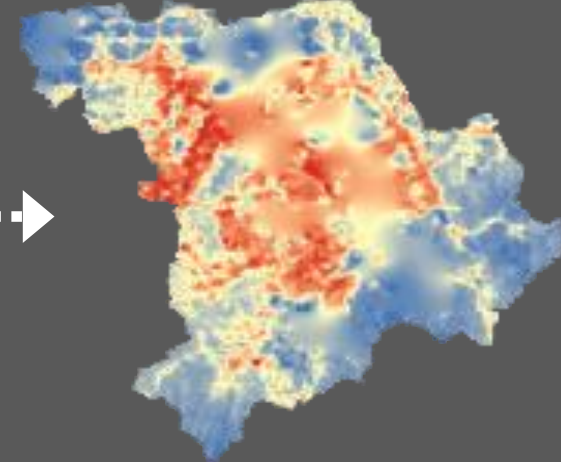
위성영상



정규화식생지수(NDVI)



대기온도



STEP

# ② Distribution pattern of people vulnerable to heat



Type of people vulnerable to heat identified by public data



Elders who live alone



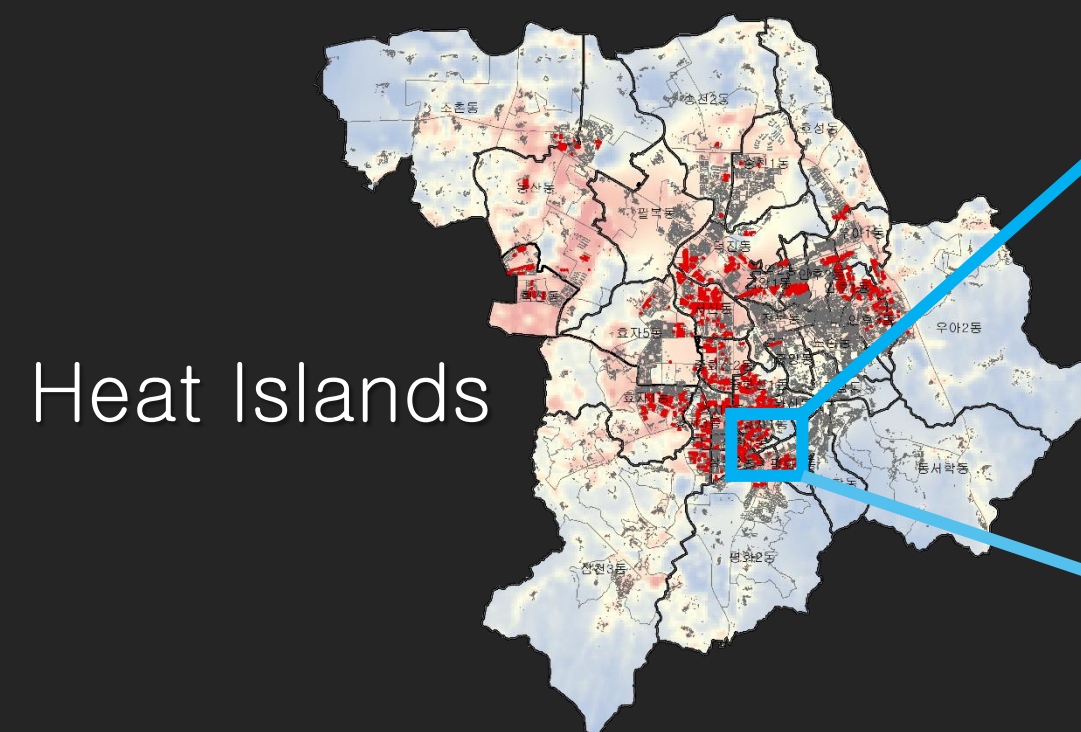
People aged over 65



People living on basic pension



people aged under 14



Heat Islands

Highly dense areas with elders who live alone

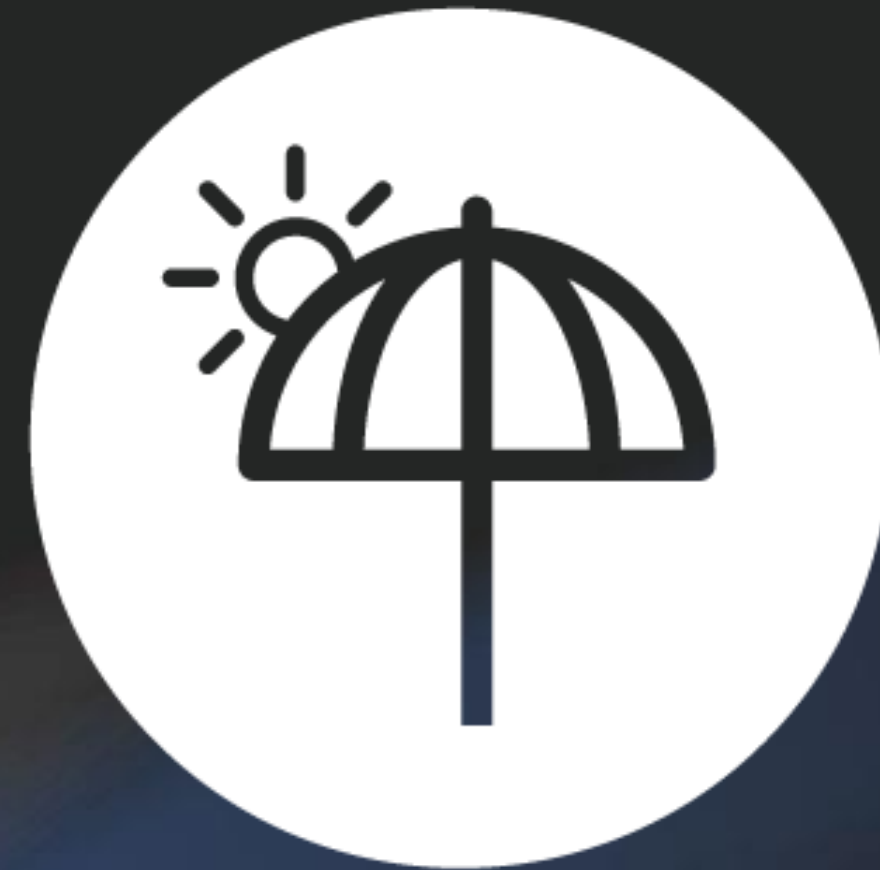


STEP

③ To select best sites for shelters & shade canopies in case of heat wave



heat shelters



shade canopies

STEP

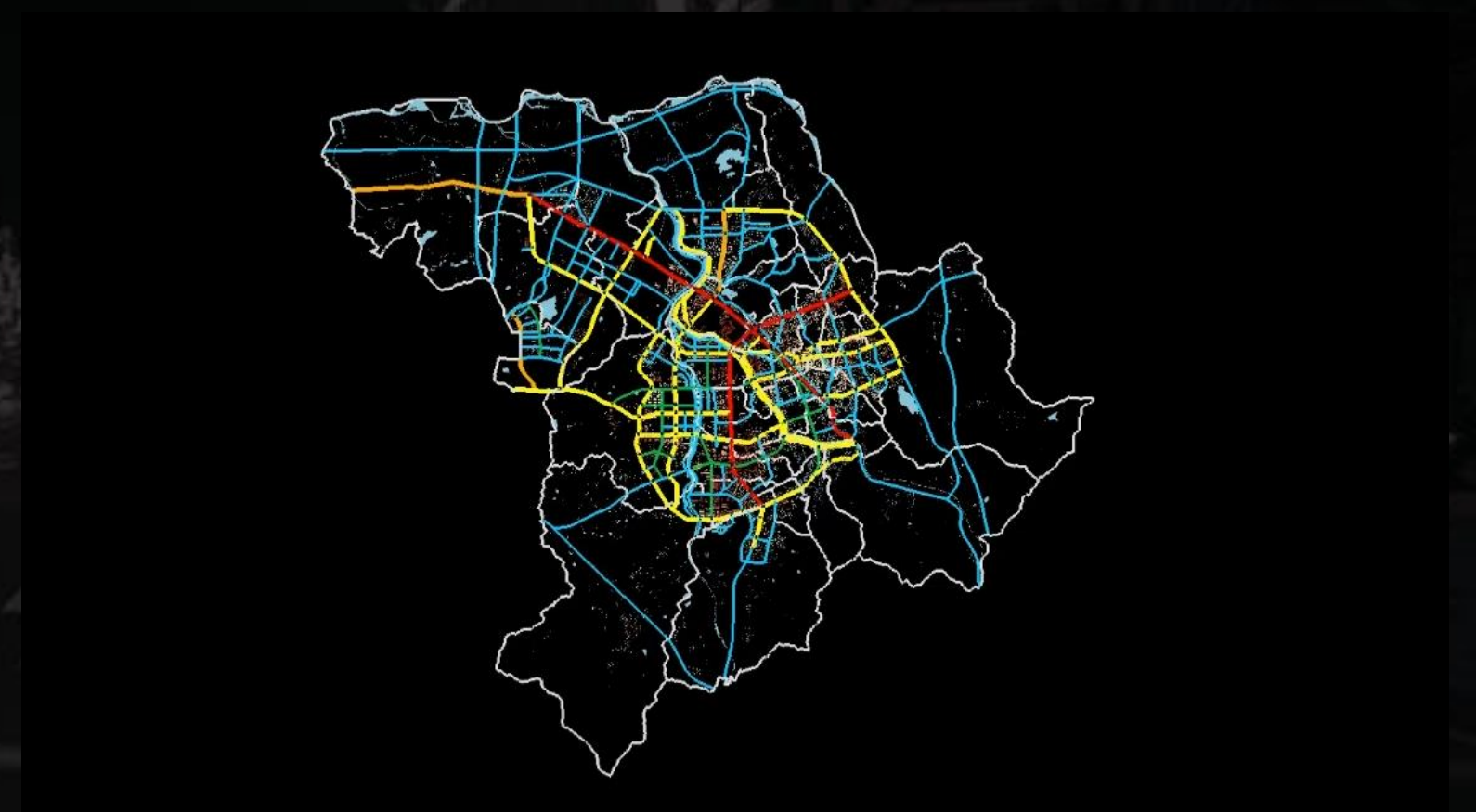
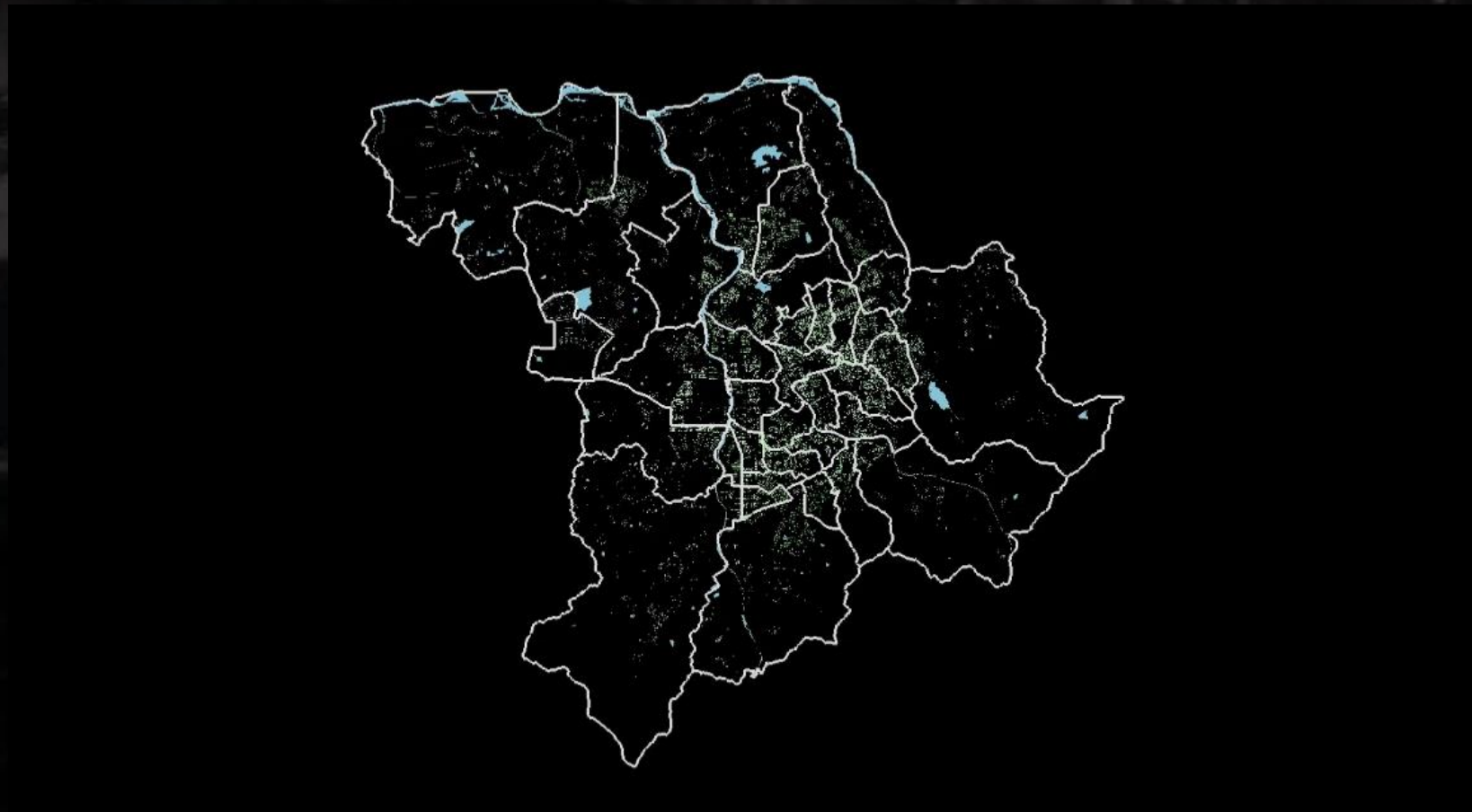
# ③ To select best sites for shelters & shade canopies in case of heat wave



Blind spots of heat shelter



Suitable sites for shade canopies



distance

walking distance  
From home



supports

people vulnerable to  
heat wave



intersections

wide roads with  
over 6 lanes



population

crosswalk with  
High pedestrian  
volume



exceptions

Street trees  
building shades

STEP

# ① the best places to plant trees

*Is there any place  
to plant a tree  
at least?*

1,000만 그루 나무로  
도시가  
정원이 됩니다

이후엔 인자구름 대신 푸르른 하늘을,  
땀 흘리는 아스팔트 대신 시원한 그늘을,  
시끄러운 자동차 경적 대신 새 울음소리가 들리는 가운데 전주 -  
1,000만 그루 나무 심기로 전주가 더 시원해집니다.

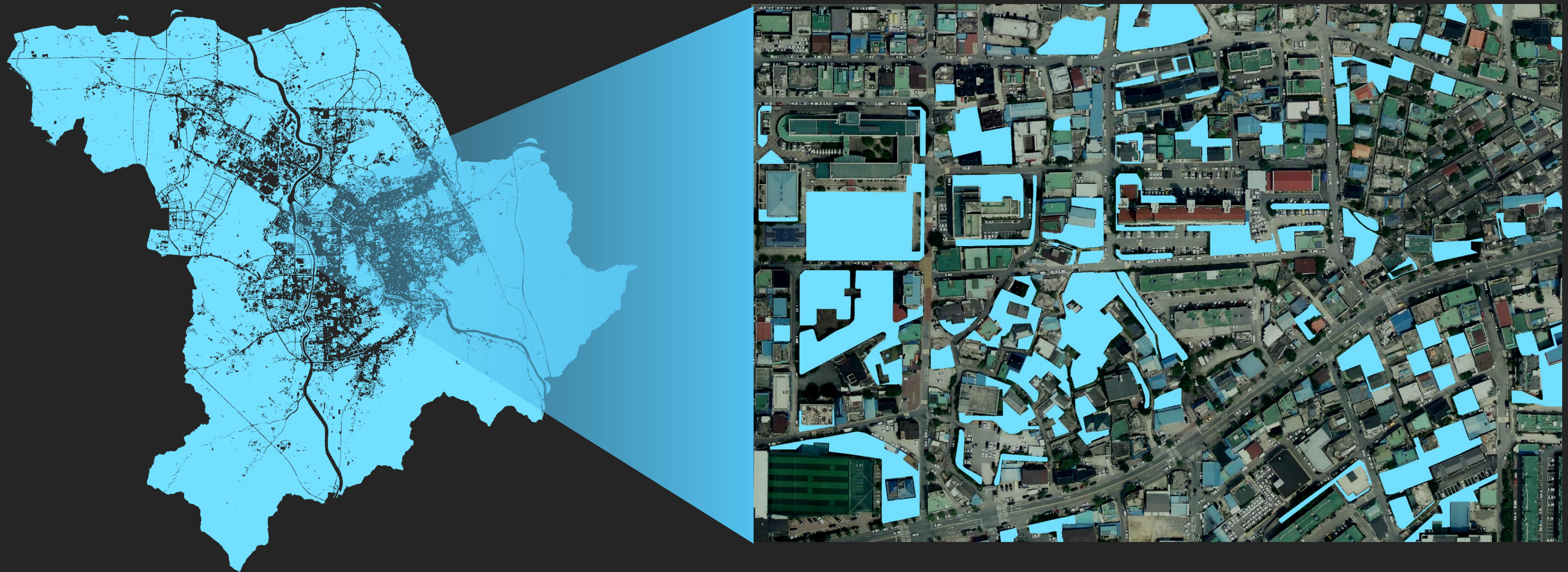
미세먼지가 40.9% 줄어듭니다  
기온이 3~7℃ 낮아집니다  
자동차 소음이 75% 줄어듭니다

1000만 그루 가든시티전주

STEP

# ① the best places to plant trees

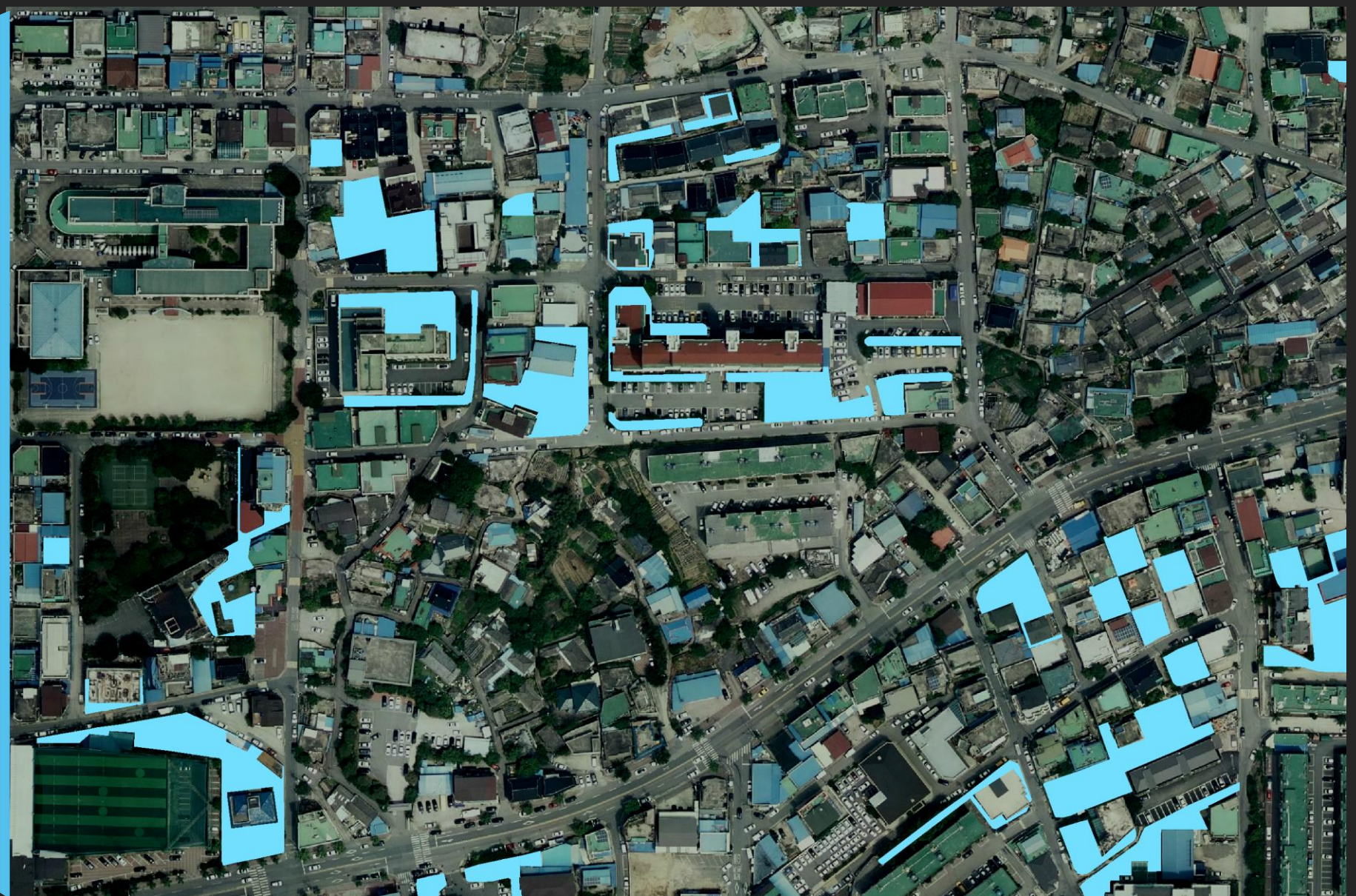
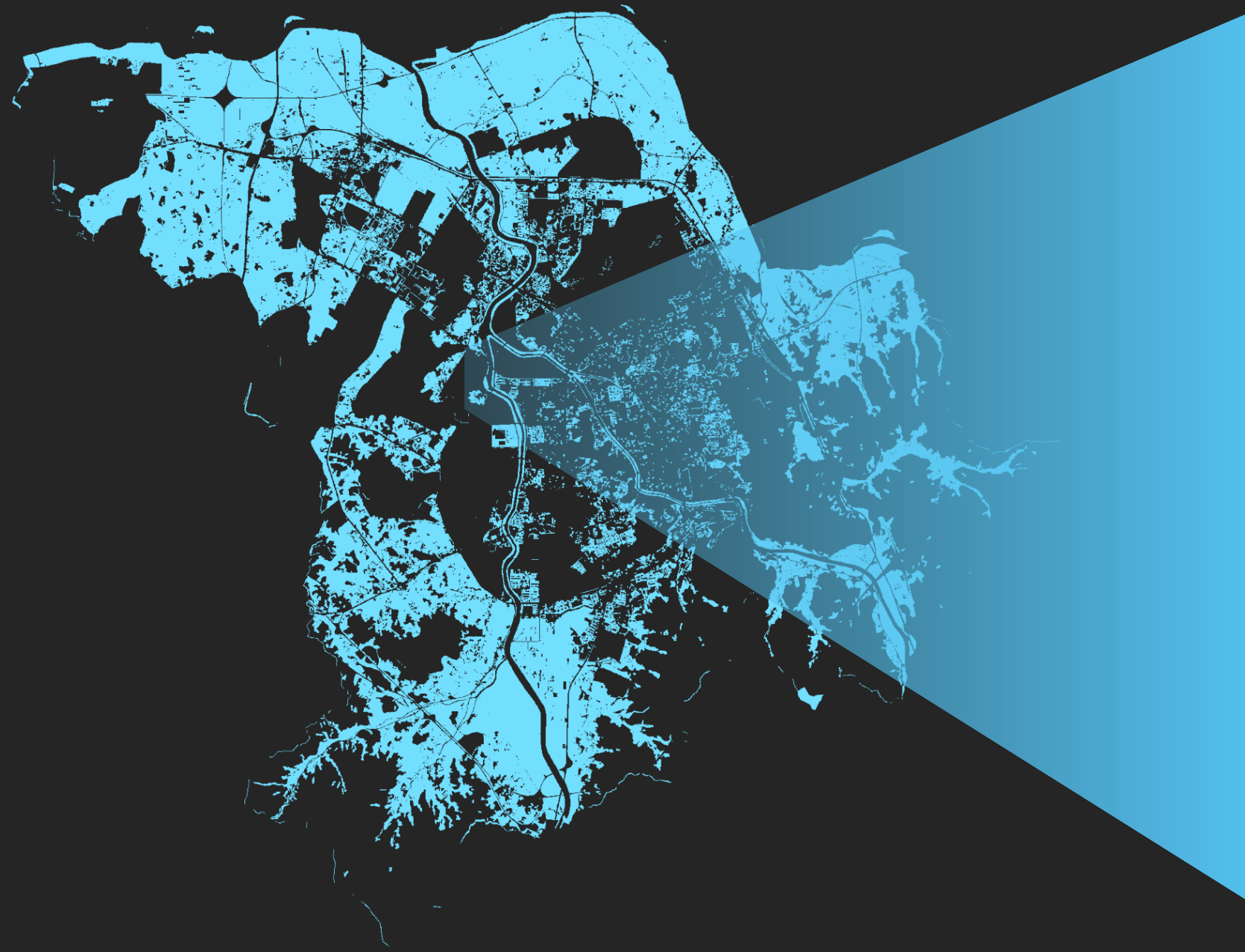
current land use



STEP

# ① the best places to plant trees

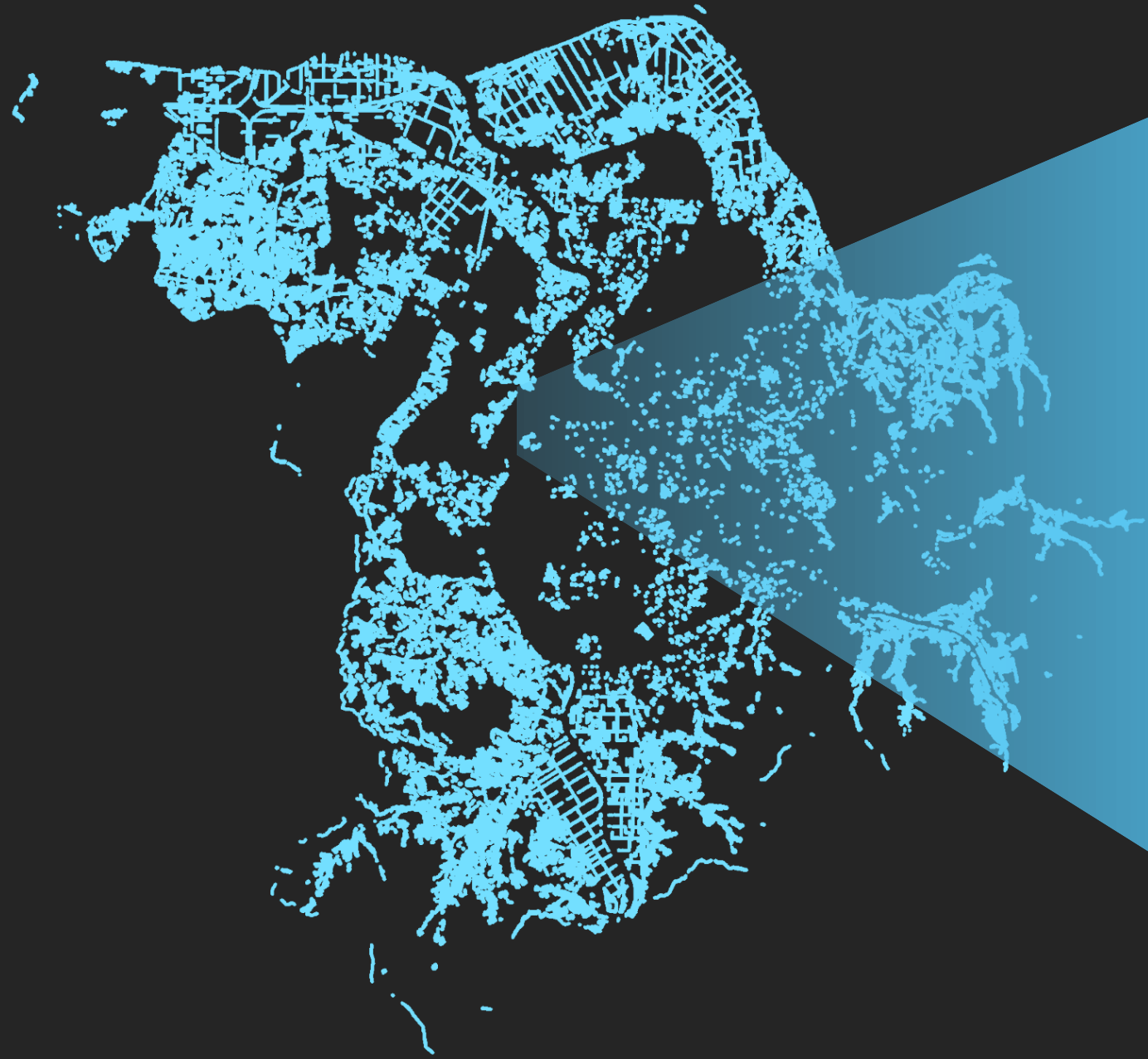
current land use ► urban plan



STEP

# ① the best places to plant trees

current land use ► urban plan ► exclusion  
(sewer, gas station, etc.)

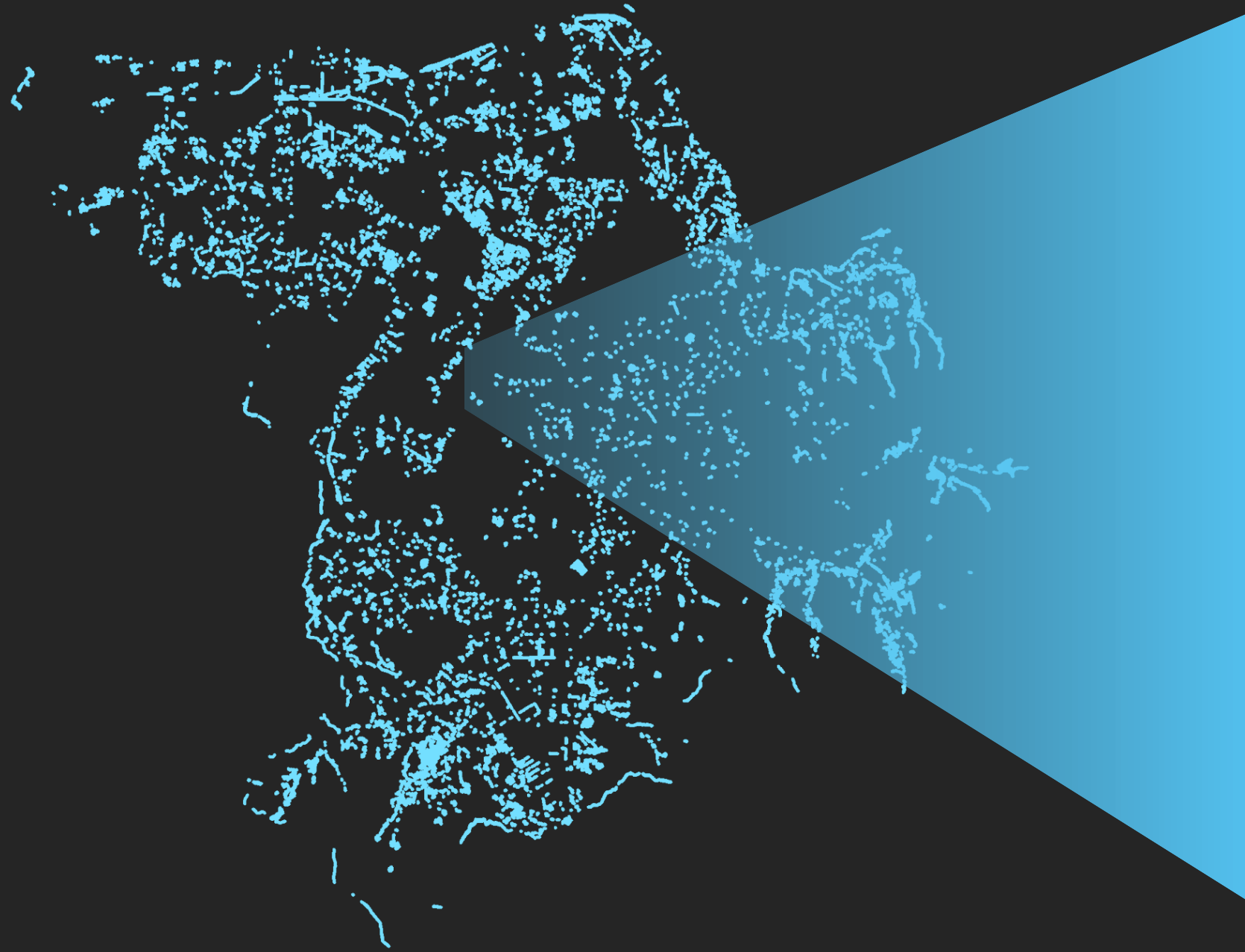




STEP

# ① the best places to plant trees

current land use ► urban plan ► exclusion  
(sewer, gas station,  
etc.) ► minimum plant area



STEP

## ② Suggestion of type of trees on each area

PM



accessibility to parks

soil grade



CO2 emission

population



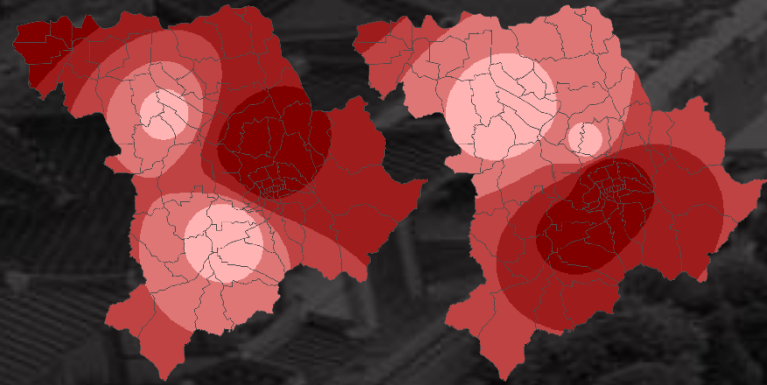
value of lands



STEP

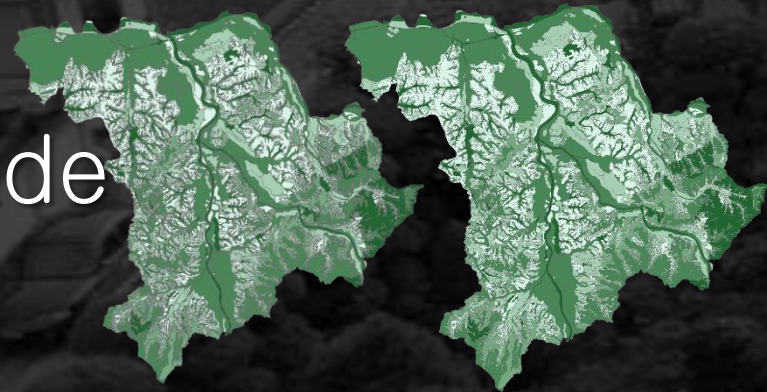
# ② Suggestion of type of trees on each area

PM



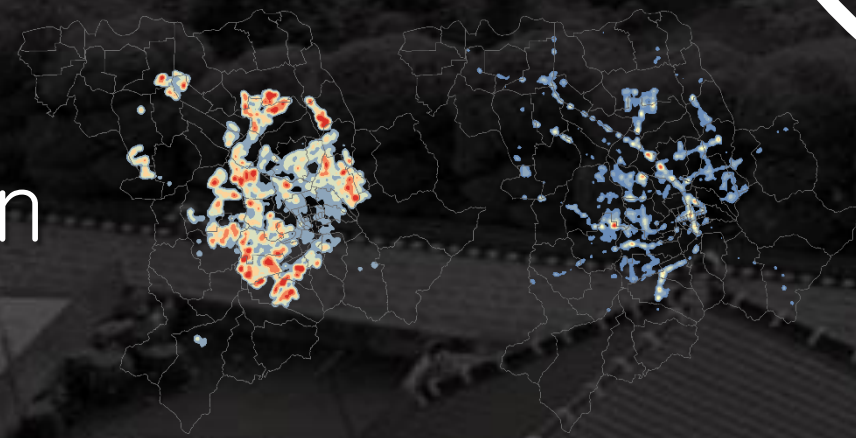
accessibility to parks

soil grade



CO2 emission

population

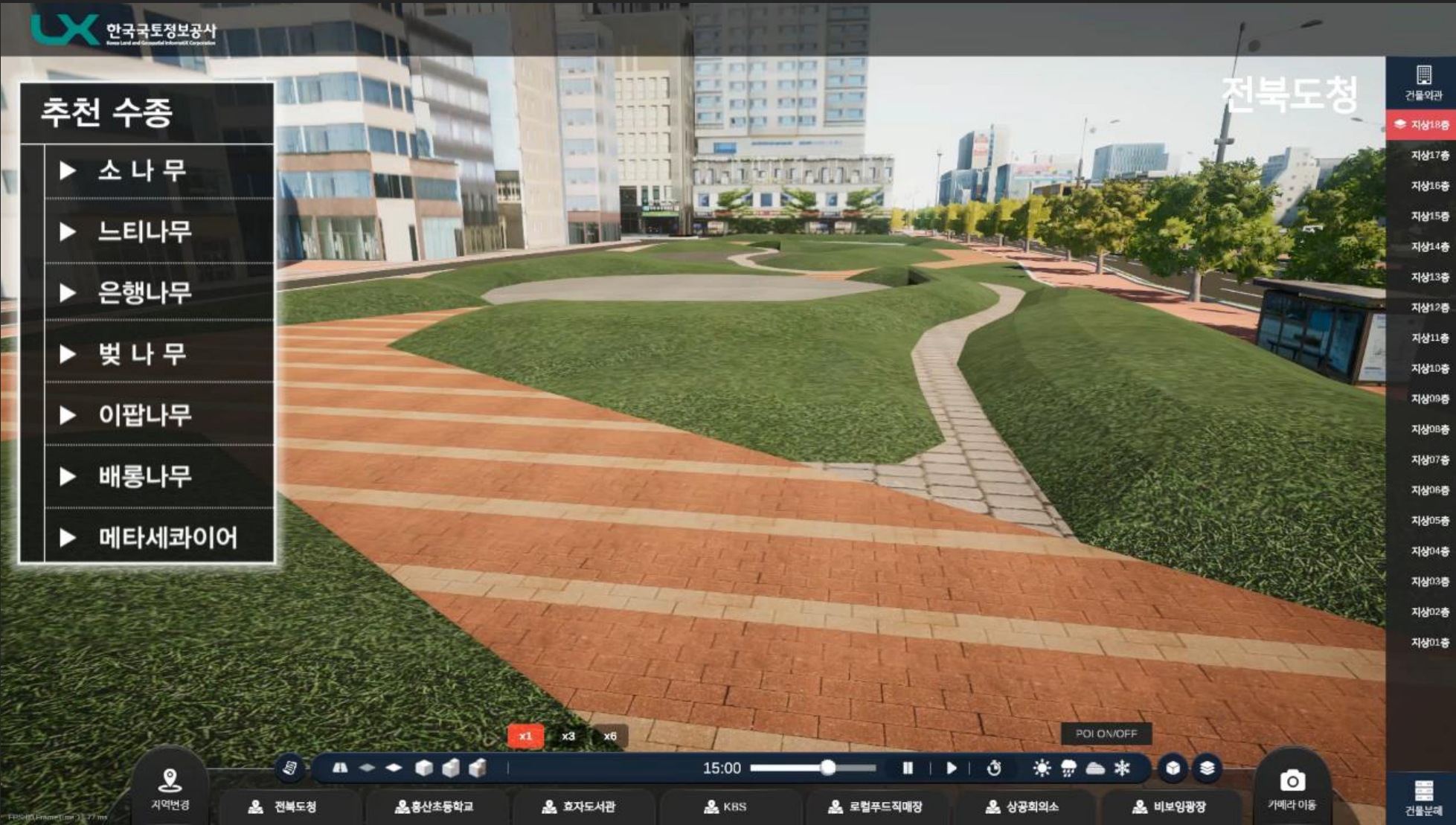


value of lands



STEP

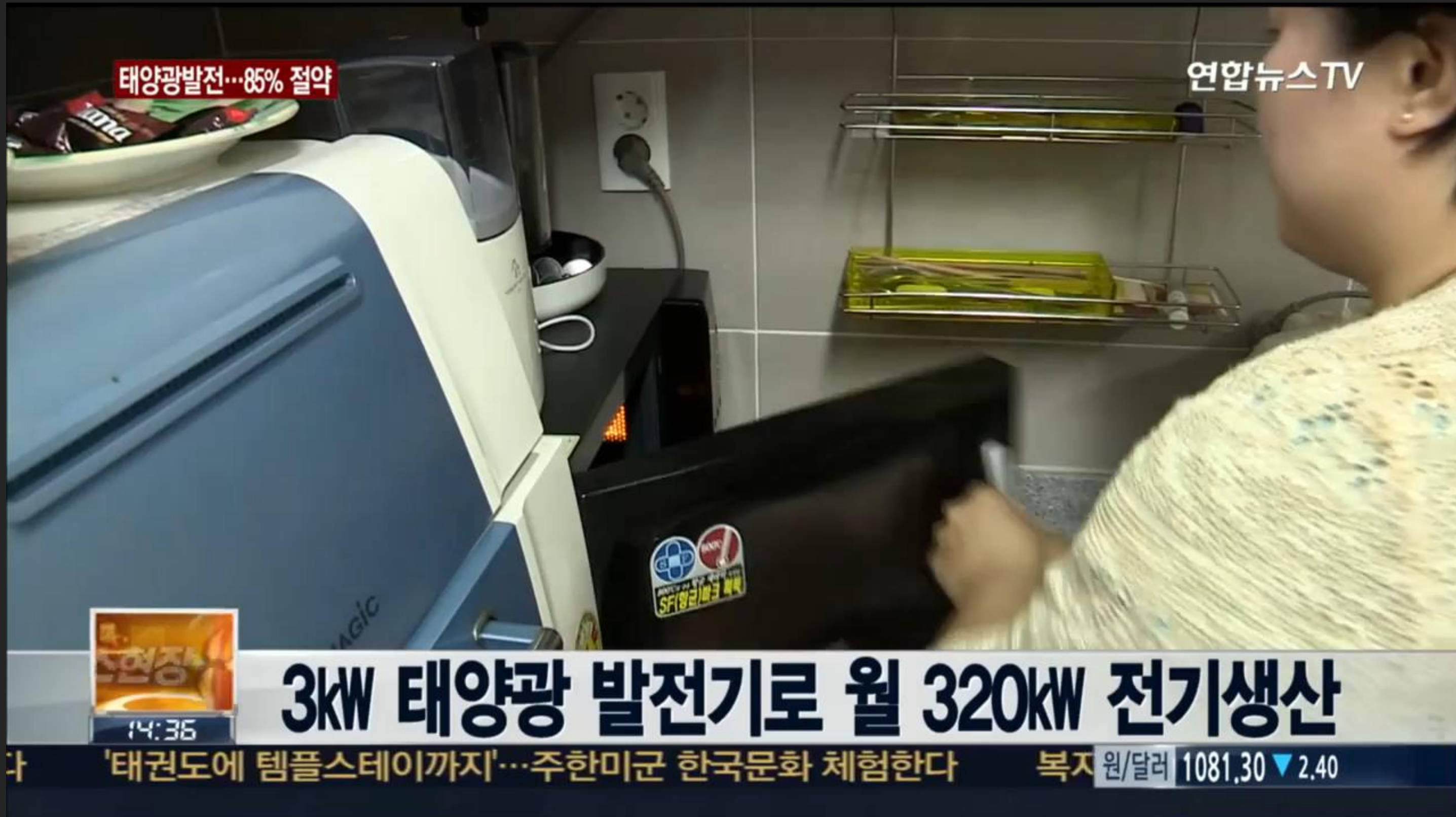
# ③ Planting simulation on Digital Twin Model of Jeon-ju City



STEP

# ① Case Study on Sunlight Generation

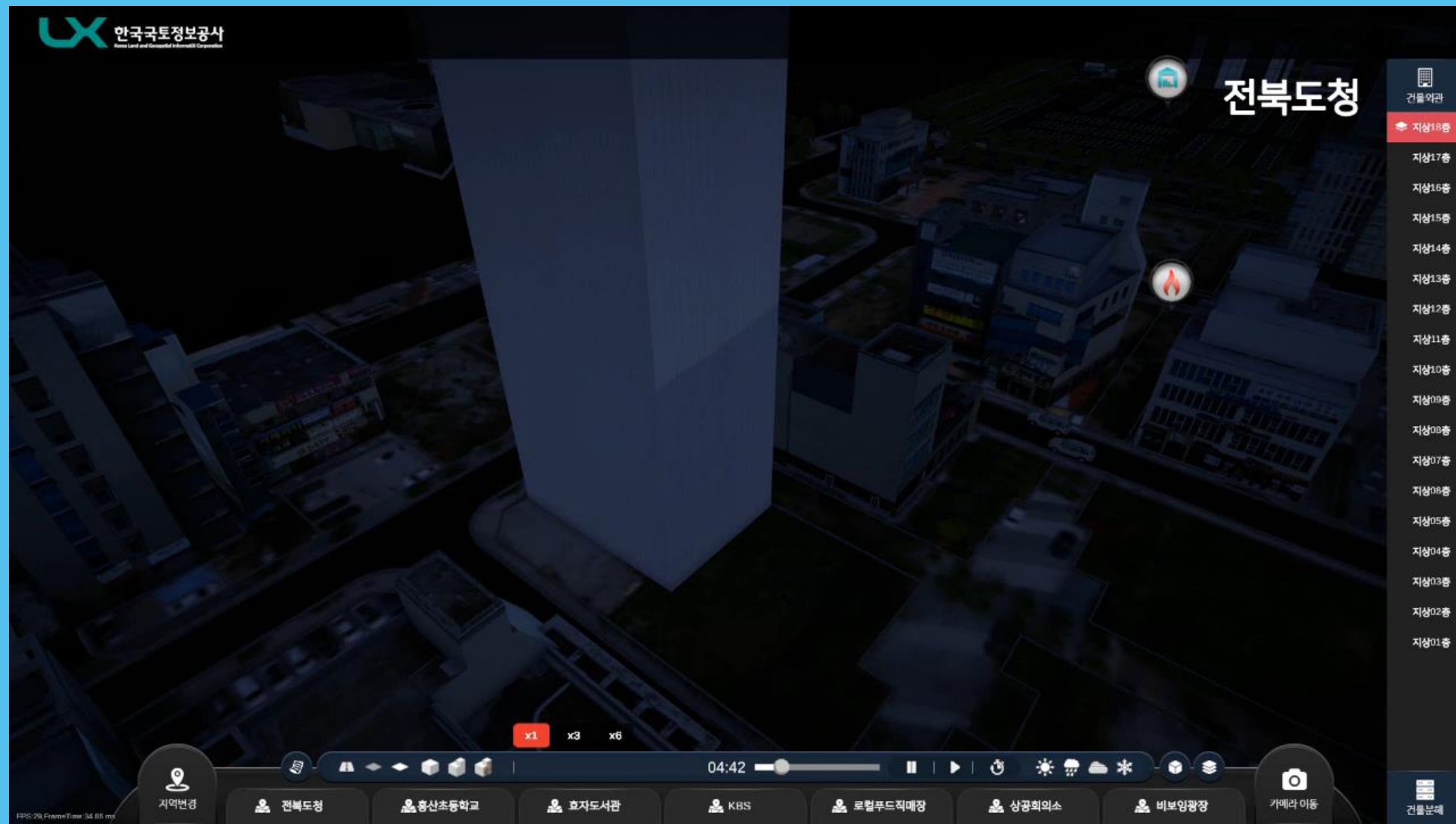
Identifying issues on sunlight generation for home use & needs of the civil official in charge of the generation



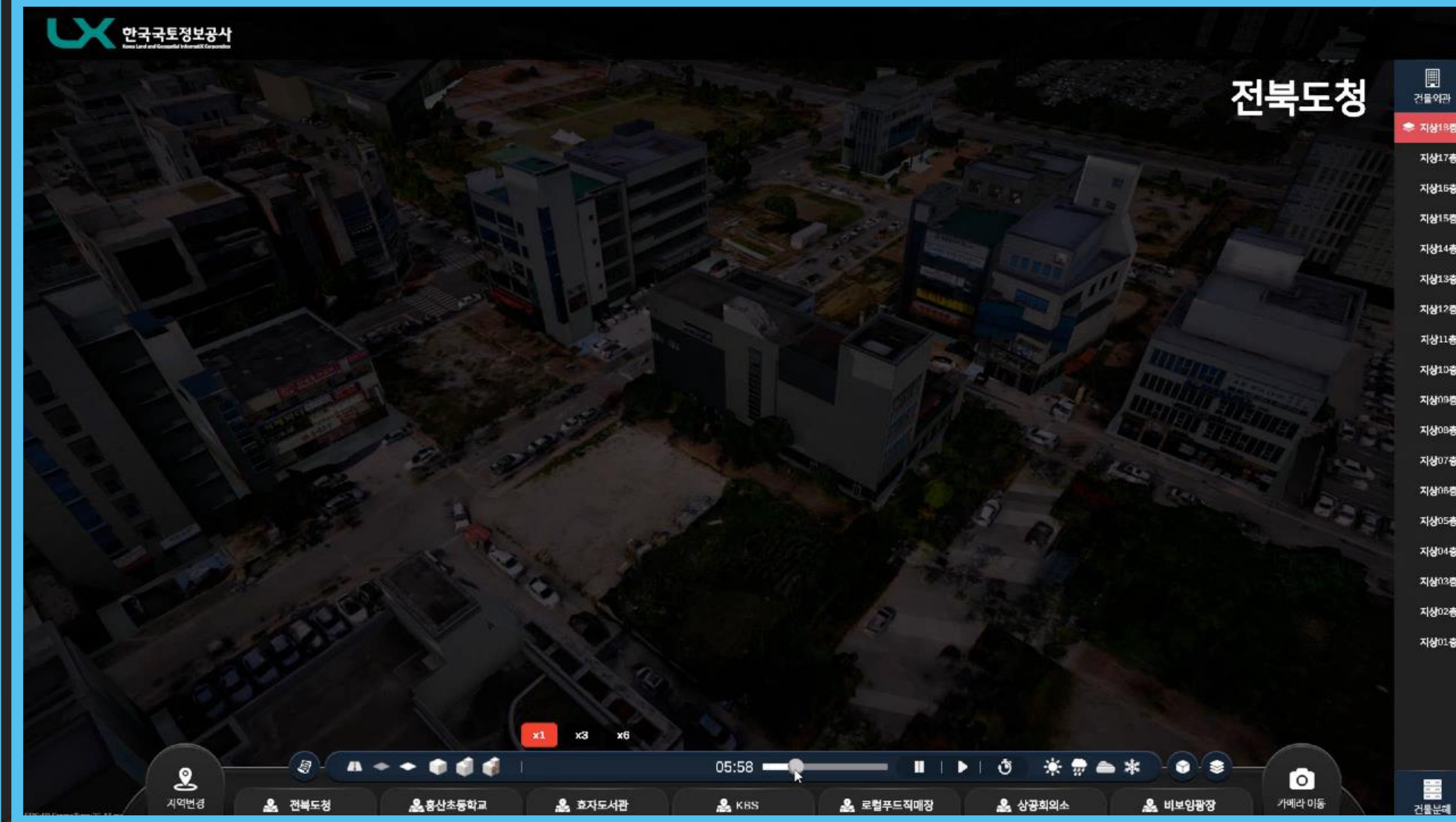
STEP

## ② Shade Comparison

with high building vicinity



without high building vicinity



Result: the amount of electricity generated varies with the surroundings of solar panels.



# LX Analysis Result



Actual Power Consumption



Solar radiation Quantity



Analysis on Solar generating Efficiency for each building



STEP

### ③ Simulation on Solar Power Generation for Home Use

*“How much electricity bill can be reduced?”*



*“Where to start the solar panel propagation project?”*





2019

25th July, 2019  
PM 14:00 – PM 18:00

# Jeon-ju Smart City & Digital Twin Conference

주최\_  *Jeonju Smart City & Digital Twin Conference*

주관\_  한국국토정보공사

  
한컴그룹

  
Jeonju IT&CT Industry Promotion Agency

