

# Urban Lighting Workshop

아시아도시조명워크숍

June 29(Thu) ~ 30(Fri), 2017

● Hotel President, Seoul, Korea

**FINAL REPORT**

# Urban Lighting Workshop

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\* Due to copyright issue Some materials are not  
contained in the report



# Welcome remarks for Urban Lighting Workshop



Park Won-soon  
Mayor of Seoul

Ladies and gentlemen! My name is Park Won-soon and I am the Mayor of Seoul.

We are very pleased to see Seoul become the venue for this year's Urban Lighting Workshop. The LUCI Annual General Meeting was also successfully held in Seoul, last year. On this occasion, we would like to express our sincere gratitude to LUCI and CityNet staff and delegates from Asian cities for taking time out of their busy schedules to attend this meaningful event. This lighting workshop is aimed to strengthen exchanges, cooperation, and networking among Asian cities in lighting policies and technologies.

For the systematic and sustainable development of urban lighting, we should have opportunities to break down interurban boundaries, facilitate communication and collaboration, research together, and share information and knowledge. In this vein, this workshop is deemed to be especially meaningful and important.

We firmly believe that this event will serve as the first and significant opportunity to boost cooperation among Asian cities and their joint growth.

Thank you once again for visiting Seoul and we hope that you will have an enjoyable and comfortable time here in the capital of the Republic of Korea.



Mary-Ann Schreurs  
Vice Mayor of Eindhoven  
LUCI President

After a very successful event last November in Seoul for the LUCI Annual General Meeting, bringing together over 700 participants in the course of three days focused on urban lighting and its many facets, we are honored to come back to Seoul this June for a workshop with Asian cities on sustainable urban lighting.

LUCI, the international network on urban lighting, has been connecting cities around the world since 2002 and helping them improve their urban lighting. Working together, cities and lighting professionals have grasped, over the years, the importance and the potential of light, and in recent years, light and urban lighting worldwide has taken a new crucial significance. As LUCI celebrates its 15th anniversary in 2017, the network continues to play its role as the international platform for exchange of information, transfer of knowledge and co-creation of the best solutions for sustainable and innovative light strategies in cities, giving new meaning to one of mankind's all time basic needs. With a strong focus on helping to improve the quality of people's lives.

This is why LUCI has just established its first Regional Office, one for Asia, in Seoul, to support Asian cities as they develop their lighting strategies. We aim to boost the regional development of the lighting community and reflect the lighting culture and identity of Asian cities in the global conversation on urban lighting. This first Urban Lighting Workshop for Asian cities marks a clear step in this direction.

We hope that over the course of these two days, we will get to know each other, have meaningful dialogue and input from experts that will allow us to progress together, and that each and every one of us can come back home with new inspirations and tools for a better management of this strategic topic that is light in our cities.

We want to thank Seoul Metropolitan Government and CityNet, our partners in the organisation of this event, for the fruitful collaboration that has enabled us to put together such an impressive program. We welcome such a diversity of participants from many cities around Asia, and we thank you all for your contribution to making this workshop a success!



Vijay Jagannathan  
Secretary General CityNet

Lighting shapes how we as humans perceive and interact with the world. It plays a central role in one of our most basic of human experiences, and as such, urban lighting is a pre-eminent issue that faces all human settlements. However, despite all this, urban lighting as a public policy issue remains a relatively young field, with comparatively little research to draw from. And yet, it is also an area that shows an enormous amount of potential. For example, in comparison to many other urban infrastructural projects, lighting improvements can be some of the most cost-effective and environmentally sustainable measures a city can implement to improve quality of life for residents. Lighting makes our cities safer, it defines spaces and offers a way for us to transform even the most basic of architectural features into a canvass of art available for all to enjoy. It is precisely because of these qualities of urban lighting that the Urban Lighting Workshop in Seoul is such a critical event. Together, we will be able to better understand how we can put the limitless possibilities of urban lighting to actionable practice in Asia.

Accordingly, we would like to thank the Seoul Metropolitan government for hosting the Urban Lighting Workshop in your wonderful city. We would also like to thank the LUCI Association for co-organizing the event and co-developing such a comprehensive program, and for bringing the European perspective on urban lighting to Asia. Most of all, we would like to thank all of you, the workshop participants, for all of your hard work in preparation for the workshop, and coming all the way to Seoul ultimately making this event possible. Let us together explore the possibilities sustainable urban lighting can offer each of our cities in Asia.

# Background of Urban Lighting workshop

## Background

Urban lighting, a crucial element of a city's urban infrastructure, is an important public service that local authorities need to provide for their citizens. However in many cities, urban lighting is equipped with old and inefficient technologies. As outdated lighting technology is costly due to its high consumption of electricity, this can be a burden, and in some cities it can account for up to 10 % of the overall budget. Streetlights represent one of the most cost-effective opportunities for energy savings and for reducing municipalities' energy costs and greenhouse gas (GHG) emissions. The use of energy-efficient lighting technologies (such as LEDs, intelligent lighting or off-grid solar streetlights for example) has great potential to save costs due to reduction in electricity consumption.

Well-planned urban lighting using new energy efficient technologies does not only reduce energy consumption costs and makes cities more sustainable, it is also a tool to improve the quality of life in cities. Improving the lights in the city will have substantial co-benefits even if they can be hard to economically quantify. In addition to improving visibility on roads and increasing perception of safety and security in the city at night, good urban lighting supports local economic development. Through a better design of public spaces, through city branding, lighting will make the city more attractive for tourists and residents; it will help create an identity for the city. Light also has major positive impacts on health & wellbeing, social cohesion and cultural awareness.

Last but not least, urban lighting is rapidly and undeniably evolving into a smart city solutions carrier. The lighting grid can be a smart grid for future public services aimed at increasing the quality of city life. This is part of the digital transition cities worldwide are facing at the moment, and a new, integrated innovative approach towards urban lighting is badly needed with a broader field of different stakeholders. The mega-city of Seoul, which has comprehensive urban lighting policy, strategy and actions plans to ensure sustainable urban lighting and which, in 2017, upgraded its lighting plan to include innovative energy-saving street lights with advanced IT and LED technology is the ideal city to host this workshop.

## Learning Objectives

This workshop presented a unique opportunity to meet and learn from urban lighting experts and engage in peer to peer knowledge, transfer and exchange of good practices and solutions. This was enabled especially through group discussions and analysis, interactive work sessions, networking and site visits. Workshop participants received:

### ■ Understand the opportunities and benefits of sustainable, well-planned urban lighting

- Understand the cost-saving effects of energy-efficient street lighting
- Understand other benefits such as improved and attractive public spaces, social cohesion, reinforcing city identity, positive effects on local economy, etc.
- Identify areas of action and improvement in urban lighting in their cities

### ■ Get an overview of the implementation process towards renewed lighting

- Explore options and technologies available for street lighting renewal such as retro-fitting, LEDs, intelligent lighting, off-grid solar streetlights, etc.
- Explore urban lighting financing options in the region and innovative financial models
- Learn from good practices, lessons learned and innovative solutions from other cities worldwide

### ■ Get an idea of the role of urban lighting in smart city concepts and how to process the digital transition in lighting

- What do we expect from future lighting?
- How do we identify and share citizen's needs and ideas?
- How to accelerate existing and future knowledge (Roadmapping)?
- How to strengthen collective knowledge & network connections?

### ■ Establish new partnerships, facilitate city-to-city cooperation and similar initiatives after the workshop



# Program

## ● Day 1 (June 29)

Time Frame	Program	Remarks
09:00~09:30	• Registration	Ivy Hall (19F)
09:30~10:20	<ul style="list-style-type: none"> <li>• <b>Welcome Speech</b> <ul style="list-style-type: none"> <li>- Hak-Jin Kim (Director-General of Urban Planning, Seoul)</li> </ul> </li> <li>• <b>Congratulatory Speech</b> <ul style="list-style-type: none"> <li>- Choung-Tae Kim (Committee Chairman of City Planning &amp; Management Committee)</li> </ul> </li> <li>• <b>Keynote Speech (CityNet)</b> <ul style="list-style-type: none"> <li>- Felix Kalkowsky (Program Officer, CityNet)</li> </ul> </li> <li>• <b>Keynote Speech (LUCI)</b> <ul style="list-style-type: none"> <li>- Mark Burton-Page (General Director, LUCI)</li> <li>- Rik Van Stiphout (Program Advisor Light &amp; Culture, LUCI Executive Committee)</li> </ul> </li> </ul>	Ivy Hall (19F)
10:20~10:30	Break	VIP II
10:30~12:00	<ul style="list-style-type: none"> <li>• <b>Session 1: Asia's Urban Lighting Policy</b> <ul style="list-style-type: none"> <li>- Semarang City for Public Lighting (Indonesia): Claudia Prasetyani (Head of planning of the facilities, Semarang Housing and Settlement Department)</li> <li>- Lighting System of Da Nang City (Viet Nam): Vu Tran Huynh Vuong Hoai (Deputy Head of Energy Management, Department of Industry and Trade)</li> <li>- City Harmonized Through Lighting (Thailand): Pongsak Yingchoncharoen (Mayor, Yala City Municipality)</li> <li>- MOT Smart street light plan (Philippines): Patrick John (CEO, Polaris Innercircle INC.)</li> <li>- Q&amp;A</li> </ul> </li> </ul>	
12:00~14:00	Lunch	Jumbo (18F)
14:00~15:40	<ul style="list-style-type: none"> <li>• <b>Session 2: Case Presentation</b> <ul style="list-style-type: none"> <li>- <b>Seoul's Lighting Policy</b> <ol style="list-style-type: none"> <li>1. Seoul's Lighting Policy                             <ul style="list-style-type: none"> <li>Dae-Kwon Kim (Team Manager of Urban Light Policy Division, Seoul)</li> </ul> </li> <li>2. . Architectural Media, The New Dimension of Media Facade                             <ul style="list-style-type: none"> <li>Joon-Su Ha (Professor, Koomin University in seoul)</li> </ul> </li> <li>3. Korea's first "Free Outdoor Billboard Display Zone" at WTC Seoul                             <ul style="list-style-type: none"> <li>Jung-Woo Park (Senior Manager, Korea International Trade Association)</li> </ul> </li> </ol> </li> <li>- <b>European and International case studies on urban lighting</b> <ol style="list-style-type: none"> <li>1. Mark Burton-Page (General Director, LUCI)</li> <li>2. Rik Van Stiphout (Program Advisor Light &amp; Culture, LUCI Executive Committee)</li> <li>3. Don Slater (Professor, London School of Economics)</li> </ol> </li> <li>- Q&amp;A</li> </ul> </li> </ul>	Ivy Hall (19F)
15:40~16:00	Break	VIP II
16:00~17:30	<ul style="list-style-type: none"> <li>• <b>Group Discussion: Asia's Urban Lighting – Cases and Status</b> <ul style="list-style-type: none"> <li>- <b>Group Discussions based on SWOT Analyses by City</b> <ul style="list-style-type: none"> <li>* Four Groups (8~9 persons per group)</li> <li>* 15-minute Discussion by Theme</li> </ul> </li> <li>- Presentation of Deliverables based on Analyses</li> </ul> </li> </ul>	Ivy Hall (19F)
17:30~19:00	Dinner	Jumbo (18F)
19:00~21:40	Seoul Night Tour	

# Program

## ● Day 2 (June 30)

Time Frame	Program	Remarks
09:00~09:20	• Registration	Ivy Hall (19F)
09:20~09:30	• Program Information	Ivy Hall (19F)
09:30~10:00	<ul style="list-style-type: none"> <li>• Session 3: Tools for Saving Urban Lighting Energy and Costs               <ul style="list-style-type: none"> <li>- Building Energy Efficient Cities in Southeast Asia: Applying SUEEP Framework <i>Energy and Costs Savings with LED Street Lighting in Da Nang and Surabaya</i> : Ranjan K. Bose (Senior Consultant, The World Bank) * Video Presentation via Skype</li> <li>- Urban lighting in city Climate change agendas : Mark Burton-Page (General Director, LUCI)</li> </ul> </li> </ul>	Ivy Hall (19F)
10:00~10:10	Break	VIP II
10:10~11:50	<ul style="list-style-type: none"> <li>• Session 4: Urban Lighting as a Tool for Urban Development Strategy               <ul style="list-style-type: none"> <li>- Urban lighting as a social tool for urban development : Don Slater (Professor, London School of Economics)</li> <li>- Jinju Yudeung Festival, as the global festival of Korea : Jung-Chae Jeong (Chief Director, Department of Tourism Promotion of Jinju City)</li> <li>- Smart City and Lighting Development in Asia : Young-Ho Baik (Urban light policy advisory committee member of Seoul City)</li> <li>- Q&amp;A</li> </ul> </li> </ul>	Ivy Hall (19F)
11:50~13:30	Lunch	Charmant (1F)
13:30~16:00	<ul style="list-style-type: none"> <li>• Group Discussion: Road mapping for intelligent urban lighting After a feedback on the lessons learnt from the City of Eindhoven, participants are invited to an interactive group discussion with the objective to provide them with tools to think strategically on urban lighting for their cities. The session is moderated by Rik Van Stiphout and Don Slater with the support of Lighting experts from Seoul, LUCI and City Net.               <ul style="list-style-type: none"> <li>- Lessons learnt from the City of Eindhoven, introduction to Roadmapping</li> <li>- Definition of group discussion</li> <li>- Breakout session 1: identify main challenges for cities</li> <li>- Q&amp;A: Plenary feedback</li> <li>- Breakout session 2: Strategy for a Roadmap in your city</li> <li>- Q&amp;A: Plenary feedback</li> </ul> </li> </ul>	
16:00~16:10	Break	VIP II
16:10~16:30	<ul style="list-style-type: none"> <li>• Introduction of Regional Office for Asia : Dea-Hoon Seo (Director of Urban Light Policy Division, Seoul)</li> <li>• Wrap-Up               <ul style="list-style-type: none"> <li>- Gathering Questionnaires * Distribute questionnaires in the process of registration</li> <li>- Granting Urban Lighting Workshop Certificates to Participants</li> </ul> </li> </ul>	Ivy Hall (19F)
16:30	• Closing	





## Welcome Speech

Nation / City	Republic of Korea / Seoul
Name	Hak-Jin Kim
Affiliation	Seoul Metropolitan Government Urban Planning
Position	Director-General



## Congratulatory Speech

Nation / City	Republic of Korea / Seoul
Name	Choung-Tae Kim
Affiliation	City Planning & Management Committee
Position	Committee Chairman



## Introduction of LUCI Regional office for Asia

Nation / City	Republic of Korea / Seoul
Name	Dea-Hoon Seo
Affiliation	Urban Light Policy Division
Position	Director



## Session2

Nation / City	Republic of Korea / Seoul
Name	Dea-Gwun Kim
Affiliation	Seoul Metropolitan Government Urban Light Policy Division
Position	Team Manager



## Session 2

Nation / City	Republic of Korea / Seoul
Name	Joon-Soo Ha
Affiliation	College of Design, Kookmin University
Position	Dean



## Session 2

Nation / City	Republic of Korea / Seoul
Name	Jung-Woo Park
Affiliation	Korea International Trade Association
Position	Senior Manager



## Session 4

Nation / City	Republic of Korea / Seoul
Name	Young-Ho Baik
Affiliation	Urban light policy advisory committee of Seoul City
Position	Committee member



## Session 4

Nation / City	Republic of Korea / Jinju
Name	Jung-Chae Jeong
Affiliation	Culture & Environment Bureau/Deptment of Tourism Promotion
Position	Chief Director



## Keynote Speech I Session2 I Session3

Name	Mark Burton-Page
Affiliation	LUCI - Lighting Urban Community International
Position	General Director



## Keynote Speech

Name	Felix Kalkowsky
Affiliation	CityNet
Position	Program Officer



## Keynote Speech I Session 2

Nation / City	Netherlands / City of Eindhoven
Name	Rik Van Stiphout
Affiliation	Member of the LUCI Executive Committee, representative of the LUCI president (in the absence of)
Position	Program Advisor Light & Culture



## Session 2 I Session 4

Nation / City	United Kingdom / London
Name	Don Slater
Affiliation	London School of Economics
Position	Professor





## Session 3

Nation / City	United States of America / Washington, DC
Name	Ranjan K. Bose
Affiliation	World Bank
Position	Senior Consultant



## Asia's Urban Lighting Policy-Semarang (Indonesia)

Nation / City	Indonesia / Semarang
Name	Claudia Prasetyani
Affiliation	Semarang Housing and Settlement Department
Position	Head of planning of the facilities, infrastructure and public utilities section



## Asia's Urban Lighting Policy-Da Nang (Viet Nam)

Nation / City	Viet Nam / Da Nang
Name	Vu Tran Huynh Vuong Hoai
Affiliation	Department of Industry and Trade(DOIT)
Position	Deputy Head of Energy Management Division



## Asia's Urban Lighting Policy-Yala (Thailand)

Nation / City	Thailand / Yala
Name	Pongsak Yingchoncharoen
Affiliation	Yala City Municipality
Position	Mayor



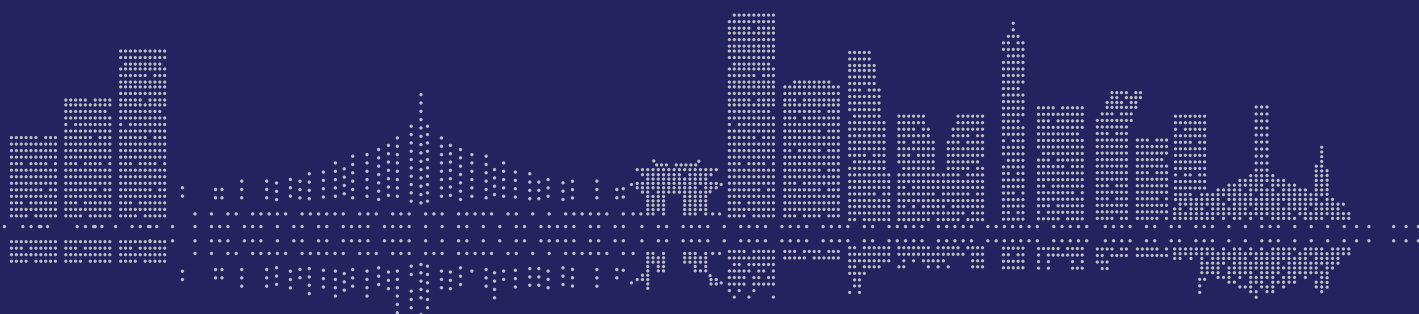
## Asia's Urban Lighting policy- Philippines

Nation / City	Philippines / Manila
Name	Patrick John
Affiliation	Polaris Innercircle INC.
Position	CEO

# Day 1

## Asia's Urban Lighting Policy

- **Semarang City for Public Lighting / Indonesia** ..... 10  
Claudia Prasetyani  
(Head of planning of the facilities, Semarang Housing and Settlement Department)
- **Lighting System of Da Nang City / Viet Nam** ..... 18  
Vu Tran Huynh Vuong Hoai  
(Deputy Head of Energy Management, Department of Industry and Trade)
- **City Harmonized Through Lighting / Thailand** ..... 26  
Pongsak Yingchoncharoen  
(Mayor, Yala City Municipality)
- **MOT Smart street light plan / Philippines** ..... 34  
Patrick John  
(CEO, Polaris Inncircle INC.)







# Day 1-Session1

## Asia's Urban Lighting Policy

Semarang City for Public Lighting -Indonesia

**Claudia Prasetyani**  
(Head of planning of the facilities, Semarang Housing  
and Settlement Department)



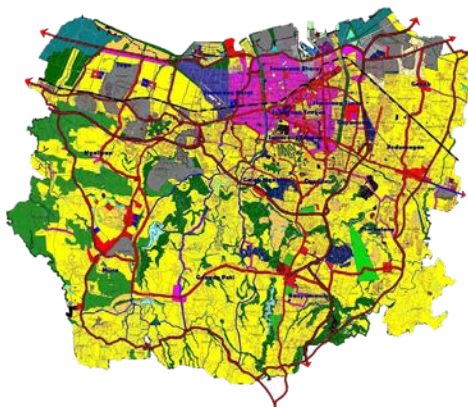
## HOUSING AND SETTLEMENT DEPARTMENT THE SEMARANG CITY GOVERNMENT

### SEMARANG CITY URBAN LIGHTING

<http://www.semarangkota.go.id>

Presented by :  
**CLAUDIA PRASETYANI**  
email : [claudiasetiawan@gmail.com](mailto:claudiasetiawan@gmail.com)

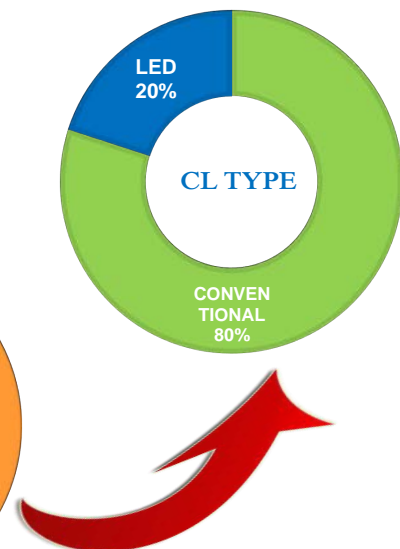
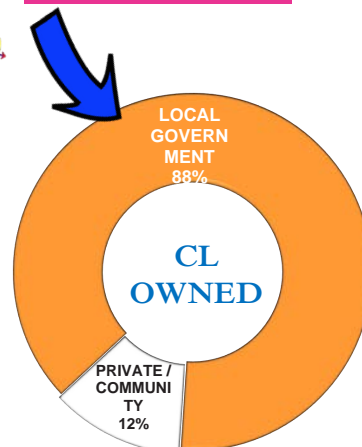
## RECENT CONDITION



The width of SC 363,70 km<sup>2</sup>  
16 SD 177 villages  
Population ±1,5 million

89%

COVERAGE OF  
CITY LIGHTING





## WHAT SEMARANG HAVE DONE

### 1. Change to LED



2014  
5%

% of LED

2017  
35%



### 2. Metering infrastructure

2014  
65%

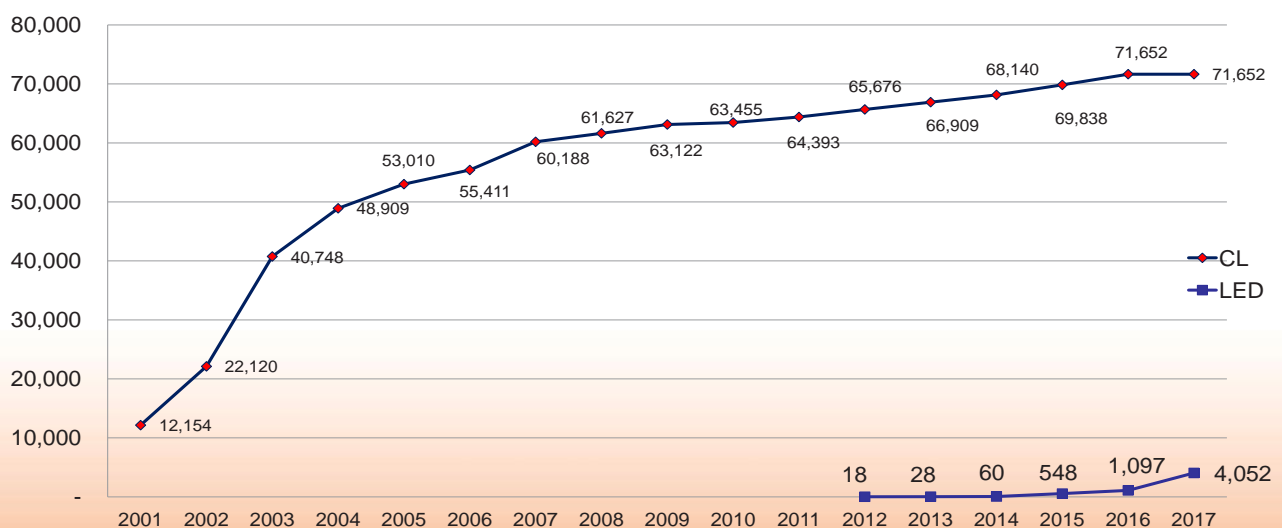
% of CL which use  
new metering system

2017  
96%

### 3. Smart Lighting

- Piloting use of smart lighting on 2015 amount 315 SL (Grant ADB/ministry of public works)
- CSR Panasonic 50 SL (2017)
- 2895 SL (on progress 2017)

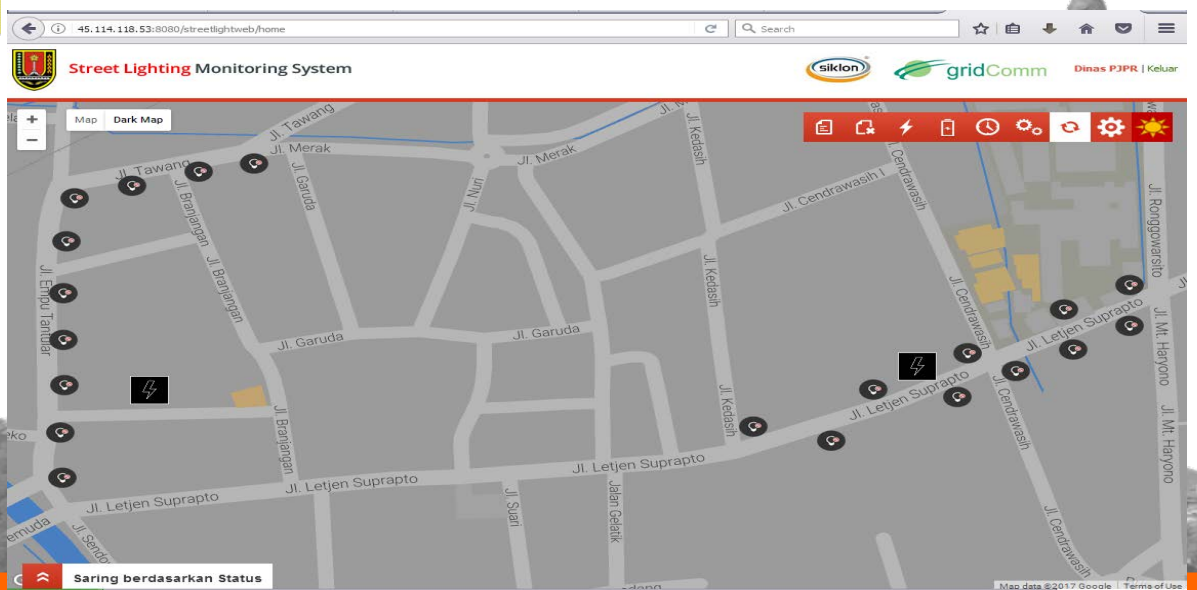
## The Number of CL points







## Street Lighting Monitoring System base on GIS



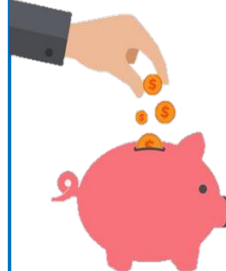
[www.semarangkota.go.id](http://www.semarangkota.go.id)

## BENEFITS GAINED



**ENERGY  
SAVINGS**  
**30%**

Reducing electricity use for  
CL



**GOVT SPENDING  
SAVING**

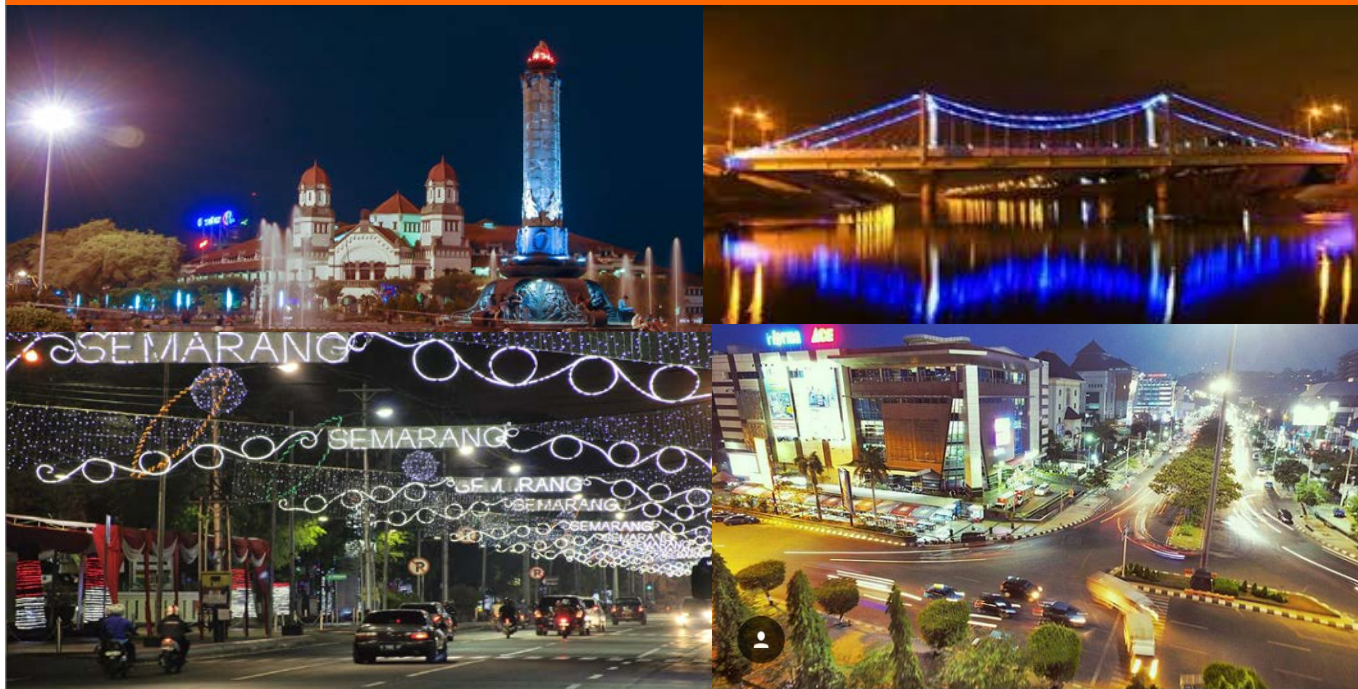
**2%**

Cutting off govt spending on  
CL' electricity use and  
avoided lamp replacement





**Street lighting changes the face of the city and drives the economy of society**



**Socio-economic activities of the community at night**



[www.semarangkota.go.id](http://www.semarangkota.go.id)





## Semarang Night Festival Events

semarang night carnival



Western flood canal festival



Floating stage on tentoonstelling night festival



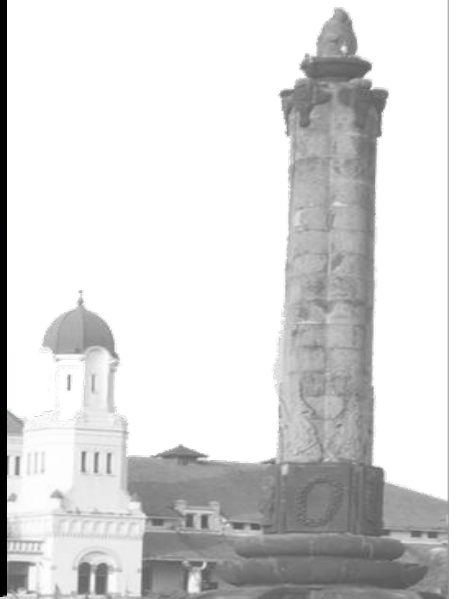
## Smart City Lighting

Before (HPS 250W)  
5 Lux

Jl. Soekarno Hatta (Semarang)

After (LED 200W)  
55 Lux

Support by: Panasonic LED



[www.semarangkota.go.id](http://www.semarangkota.go.id)





## *Old town of Semarang City*



### Old Town Area

- Support by SIKLON
- LED (smart system) 200 W
- 8 meter



[www.semarangkota.go.id](http://www.semarangkota.go.id)

## CHALLENGE

### 1. Govt budget constraint

Need more than 300 billions IDR (\$ 21 Millions) to change all CL to LED; and more than 720 billions IDR (\$ 51,4 Millions) to change all CL into integrated-smart lighting system

### 2. Lack use of ICT

There's only 13 from 38 Main roads which use ICT to control CL

## Note

1. Use of LEDs can save government expenditure

2. CL can revive an area, mobilize community activities and drive the economy

3. The use of Smart System will be one of the answers to the challenges of providing lighting in the city of Semarang





# Day 1-Session1

## Asia's Urban Lighting Policy

Lighting System of Da Nang City / Viet Nam

**Vu Tran Huynh Vuong Hoai**  
(Deputy Head of Energy Management, Department of  
Industry and Trade)

Urban  
Lighting  
Workshop



DEPARTMENT OF INDUSTRY  
AND TRADE

Urban Lighting Workshop

CITYNET

## LIGHTING SYSTEM OF DANANG CITY

*Seoul, ngày 29 tháng 6 năm 2017*

### SITUATION

2

- Danang currently has about 70,000 public lighting units, mostly Mercury discharge lamps, metal halides, sodium.
- These high-pressure lights use old, energy-intensive technology.



## SITUATION

3



## MANAGEMENT MEASURES

4

In order to save energy in public lighting, over the years, Danang city has adopted many management and technical measures such as the time to turn on, turn off the lights for each season of the year, use the dimming method to reduce the light output from late night to early morning when traffic is reduced.



## MANAGEMENT MEASURES

5

Average lighting system operates 12 hours per day, specifically:

- From 5pm to 11pm: All bulbs are bright;
- From 11pm to 2am the following morning: Operated under the regime of "two shine - one shade off";
- From 2am to 5am: Operates under the "one shine - two shadows off" mode;
- From 5am: All bulbs are shade of.

## Advantages and disadvantages of this management measures

6

These measures may still be appropriate under current conditions, as most of Danang's public lighting is Sodium High Voltage, however there are some limitations, such as the lighting system needs many workers and most manual controls. In addition, the most basic limitation is the division of phase lights over time will reduce the quality of lighting

## **SOLUTION**

7

- 1. Other solutions for saving the energy for the discharge lamp?**
- 2. Change the highlight of technology?**

## **SELECTION SOLUTION**

8

**Public lighting using LED technology is a trend that needs to be researched and installed to replace high voltage discharge lamps with many advantages such as energy saving (over 40%), long life (3 times), environmentally friendly, modern design while still keeping technical requirements and lighting art, in addition to the LEDs built into the modules should facilitate the replacement, repair and suitable for lighting control**

9

## The construction uses LED lighting

### Han River Bridge



Before



After

10

## The construction uses LED lighting

### Dragon Bridge, across the Han River





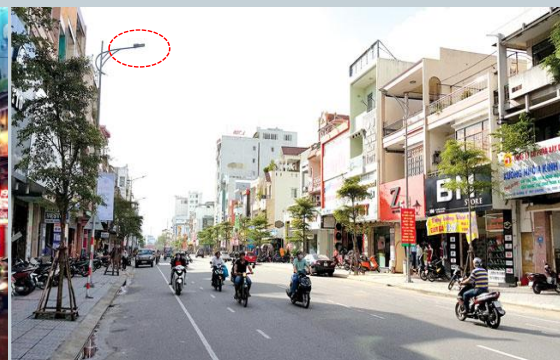
11

## The construction uses LED lighting

### Business Street Le Duan



Before



After

## POTENTIAL

12

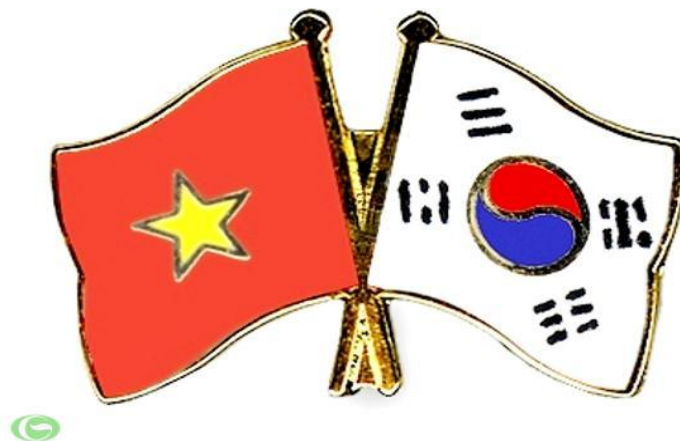
The buildings and streets to install LED lights mentioned above are too modest compared to the scale and potential of electricity saving of the city.

In the long run, there must be a solution to change and widespread application of LED lighting technology to save energy, increase lighting efficiency.

## PILOT PROJECT TO REPLACE THE PUBLIC LIGHTING SYSTEM WITH LEDS

Originate inevitable trends and from the benefits of LEDs, Department of Industry and Trade is advising the People's Committee of Da Nang city to set up a pilot project to replace 5% of the public lighting system with LEDs for the purpose:

- Timely service for the APEC event took place in November 2017 in Da Nang city.
- Promote the implementation of the Law on Energy Efficiency and Conservation in Public Lighting.
- Enhance the application of modern lighting technology high efficiency, electricity saving to improve the quality of public lighting system, saving electricity costs, maintenance costs, greenhouse gas emission reduction (CO<sub>2</sub>)



**THANK YOU!**



# Day 1-Session1

## Asia's Urban Lighting Policy

City Harmonized Through Lighting / Thailand

Pongsak Yingchoncharoen  
(Mayor, Yala City Municipality)

Urban  
Lighting  
Workshop





## City Harmonized Through Lighting



Yala City Municipality  
Yala, Thailand

## Most Well Planned







## Natural Resources



## Fruit City







## Participation City



## We love Yala







## Night Life



## Good Day @ Yala







## Refresh and Change Perception



## Refresh and Change Perception







## Night Life



## Good Day @ Yala









## Day 1-Session1

### Asia's Urban Lighting Policy

MOT Smart street light plan / Philippines

Patrick John  
(CEO, Polaris Innercircle INC.)

Urban  
Lighting  
Workshop



# Asia Urban light Workshop

## MOT Smart street light plan

Sustainability - Smart city - Self supporting







## Lighting accounts for 15~40% of country electricity use

Green house gases attributed to lighting = 70% of emissions from all passenger cars

**For many countries, street lights energy cost become a burden for the Treasury**



Philippines will be one of the most fast growing countries in electricity consumption for coming 10 years

## Summary

### MOT look for smart street to smart city



- Maximum energy savings on street lighting
- Minimum street light maintenance costs
- Intelligent & automatic street light operation
- Smart street light contribute to smart city development
- New policy for smart street light plan



## Case in Manila



## HPS 225W to Smart LED 125W





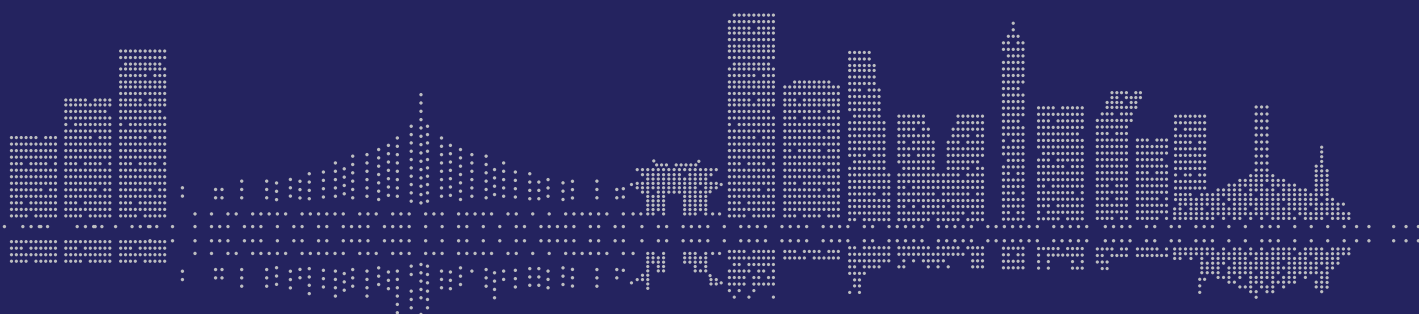
2 times bright and 78% energy savings

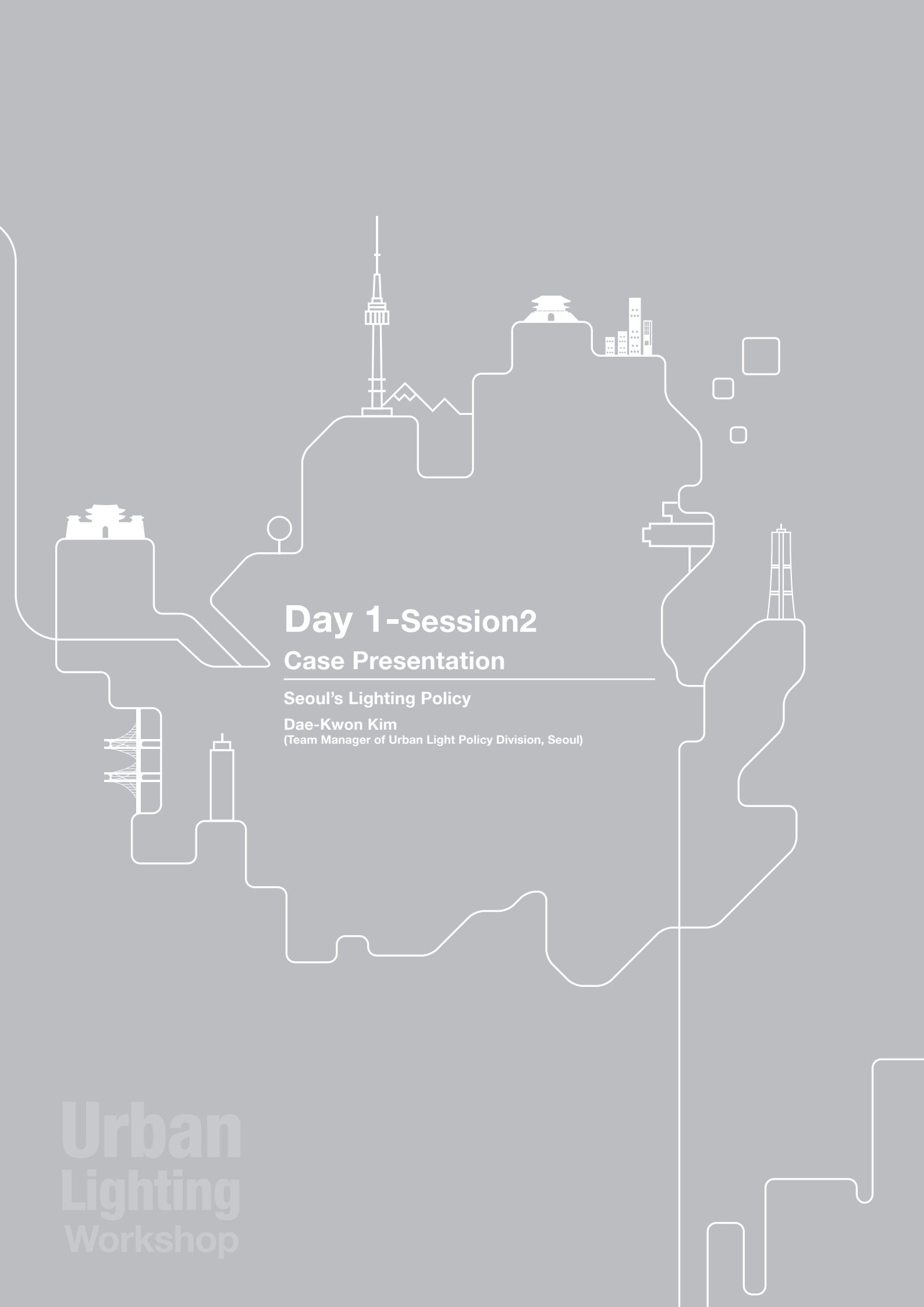


# Day 1

## Case Presentation

- **Seoul's Lighting Policy**  
Dae-Kwon Kim ..... 40  
(Team Manager of Urban Light Policy Division, Seoul)
- **Korea's first "Free Outdoor Billboard Display Zone" at WTC Seoul**  
Jung-Woo Park ..... 63  
(Senior Manager, Korea International Trade Association)
- **European and International case studies on urban lighting**  
Rik Van Stiphout ..... 75  
(Program Advisor Light & Culture, LUCI Executive Committee)  
Mark Burton-Page ..... 85  
(General Director, LUCI)  
Don Slater ..... 97  
(Professor, London School of Economics)





## Day 1-Session2

### Case Presentation

Seoul's Lighting Policy

Dae-Kwon Kim

(Team Manager of Urban Light Policy Division, Seoul)

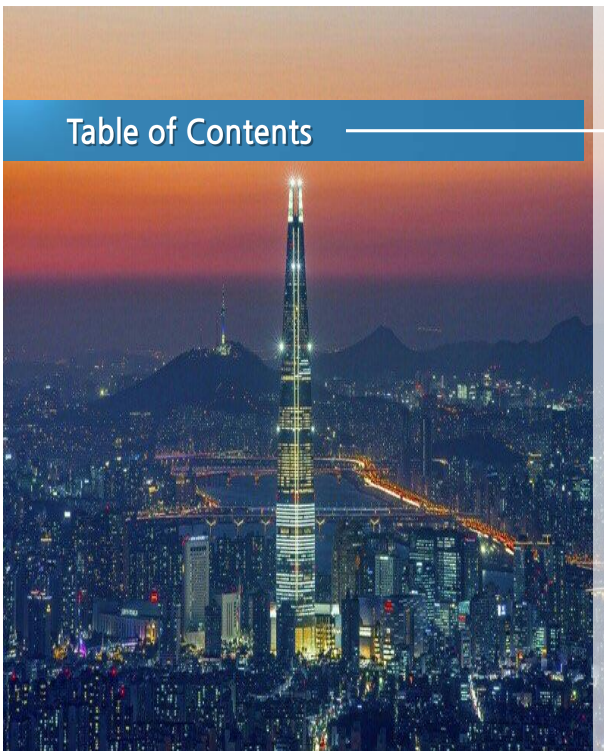




## Seoul's Lighting Policies



### Table of Contents



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3. Direction of Seoul's Lighting Policies	10p
4. Seoul's Lighting Policies: Vision and Basic Strategy	14p
4.1 Zero Pollution	
4.2 Energy-Saving	
4.3 Tourism Promotion	
4.4 Citizens' Participation	
※ Top 10 Nightscapes in Seoul	



## Seoul Profile - Statistics

Introduce Seoul, the hub of Asia.



	Population 10,236,408 (Metropolitan Area: 22,630,569)
	Area 605.33 km <sup>2</sup>
	Budget KRW 32.4 trillion
	History 2,000 years
	Number of Tourists (2016) 13.57 million
	Power Consumption (2016) 45,381,483,836Kwh

I • SEOUL • U  
너와 나의 서울



Seoul in 1920s

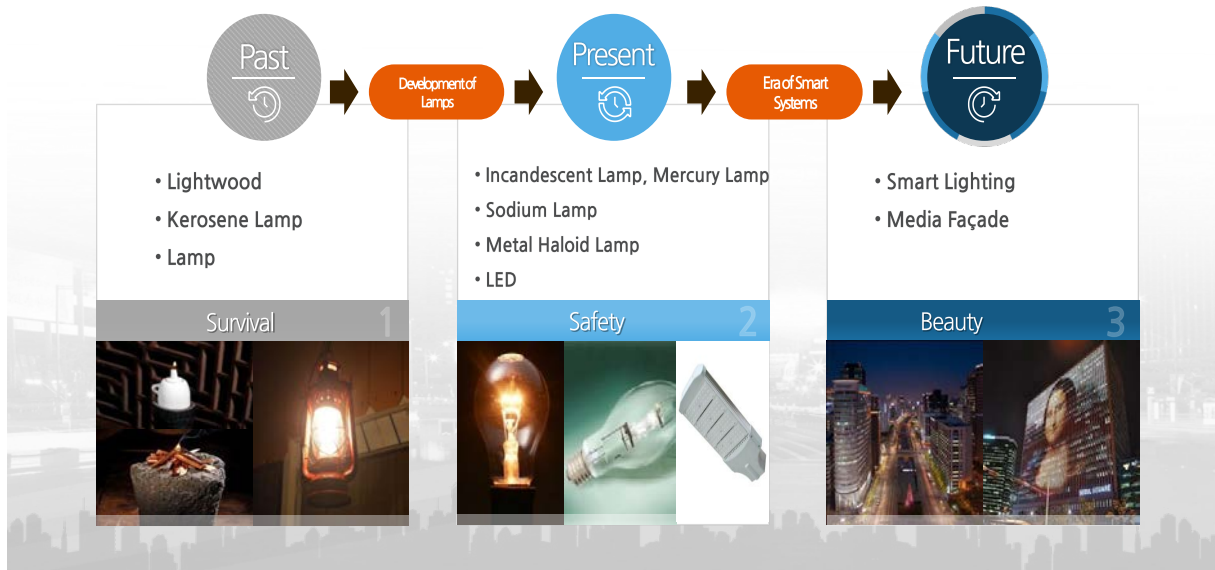


Seoul in 2017



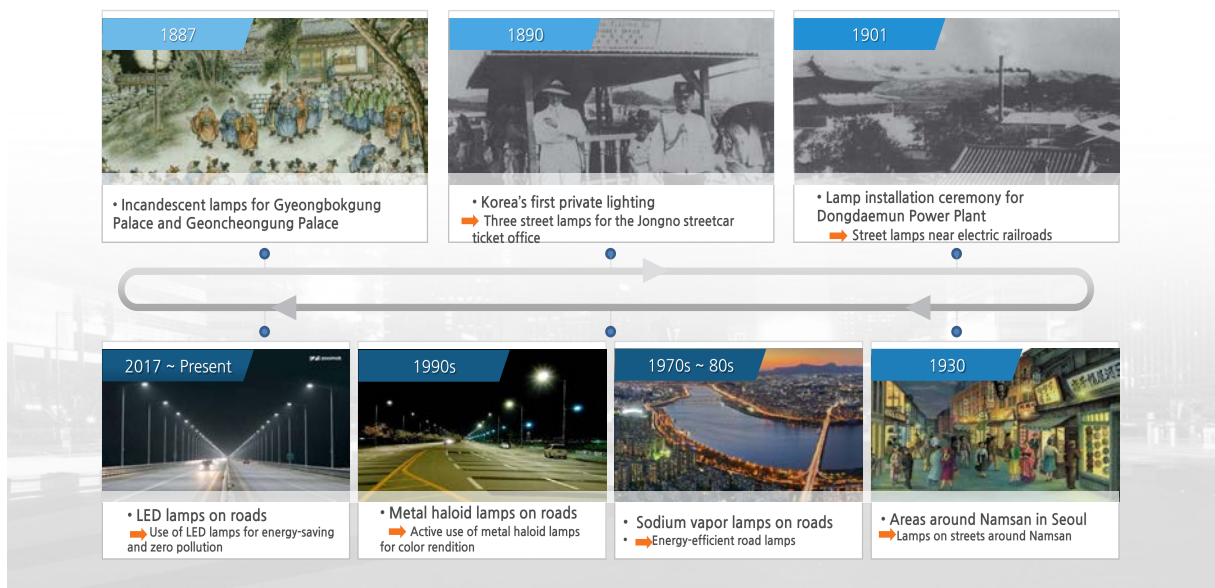
## History of Seoul's Lighting - Growth

### Evolution of Lighting



## History of Seoul's Lighting - Evolution of Light

### History of Street Lighting



## Seoul Profile - Lighting

### Public lighting

Total	Street Lights	Security Lights	Park Lights
531,957	265,304	228,697	37,446



Decorative lighting (510)



Media façade (42)



Advertisement lighting (1,346,890)

### Operation

#### Street lights

Namsan street light control center  
→ turns on/off lamps via wireless remote control



#### Security lights

turns on/off lamps individually (electronic systems, GPS, etc.)



#### Park lights

Namsan street light control center  
→ turns on/off lamps via radio waves or electronic systems.

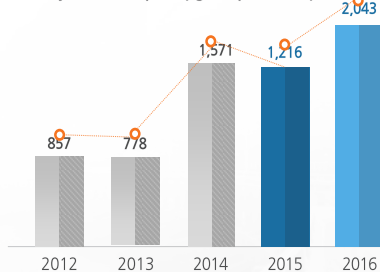


## Seoul Profile - Light Pollution

Light pollution-related complaints : **Too much light** is projected toward house windows.

### Light pollution-related complaints

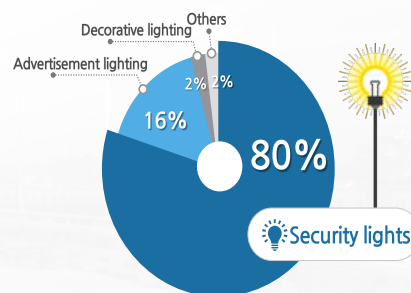
→ Sleep disorder, inconveniences in daily lives, difficulties in making astronomical observations, ecosystem disruption, glare problems, etc.



Classification	Total	2016	2015	2014	2013	2012	Pre-2011
Number of complaints	8,729	2,043	1,216	1,571	778	857	2,264

### Main causes of light pollution

→ Security lights in residential areas cause sleep disorder.

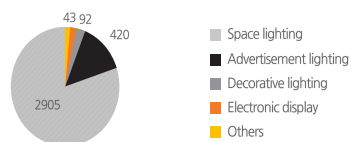


About **81%** of civil complaints come from space lighting such as security lights, street lights, and park lights. Sleep disorder from artificial lighting accounts for **86%** of light pollution damage.

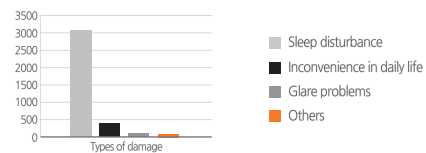


## Seoul Profile - Light Pollution (2)

### Types of Light Pollution



1. Types of causes of civil complaints



2. Types of damage from light pollution

## Direction of Seoul's Lighting Policies

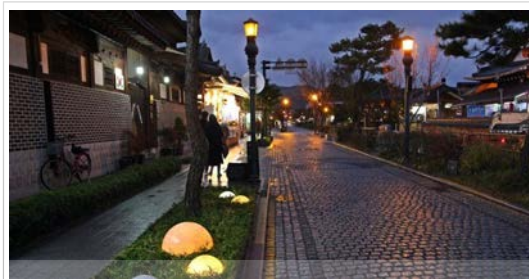




## Direction of Seoul's Lighting Policies

### Safety maintenance

- **Light brightness guidelines**  
(Ordinance for the Prevention of Light Pollution, Nightscape Guideline)  
Minimum intensity of illumination: street lights (15 lx), security lights (3~5 lx), park lights (6 lx)
- **Eco-friendly lighting (LED)**
- **Lighting that prevents light pollution (cutoff-type lamps)**

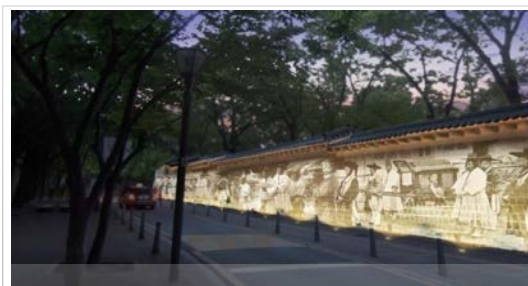


Infrastructure lighting

## Direction of Seoul's Lighting Policies

### Identity

- Nightscape specialization by region (urban regeneration, historic/cultural sites, etc.)
  - Nightscape program promotion (creative lighting, etc.)
  - Establishment of a framework for citizens' participation
- ➡ Nightscape specialization connected with local economy



Accent lighting



## Direction of Seoul's Lighting Policies

### Beauty

- Landmark
- Skyline
- Light festival promotion

➔ Development of hands-on content



Landscape lighting

## Seoul's Lighting Policies: Vision

### VISION

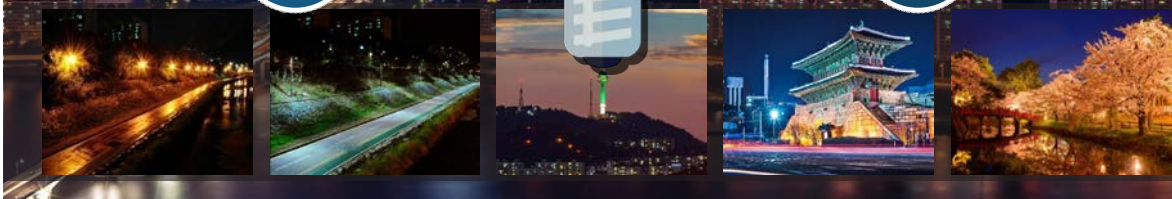
Comfortable urban light

Zero  
Pollution

Energy-  
Saving

Citizens'  
Participation

Tourism  
Promotion





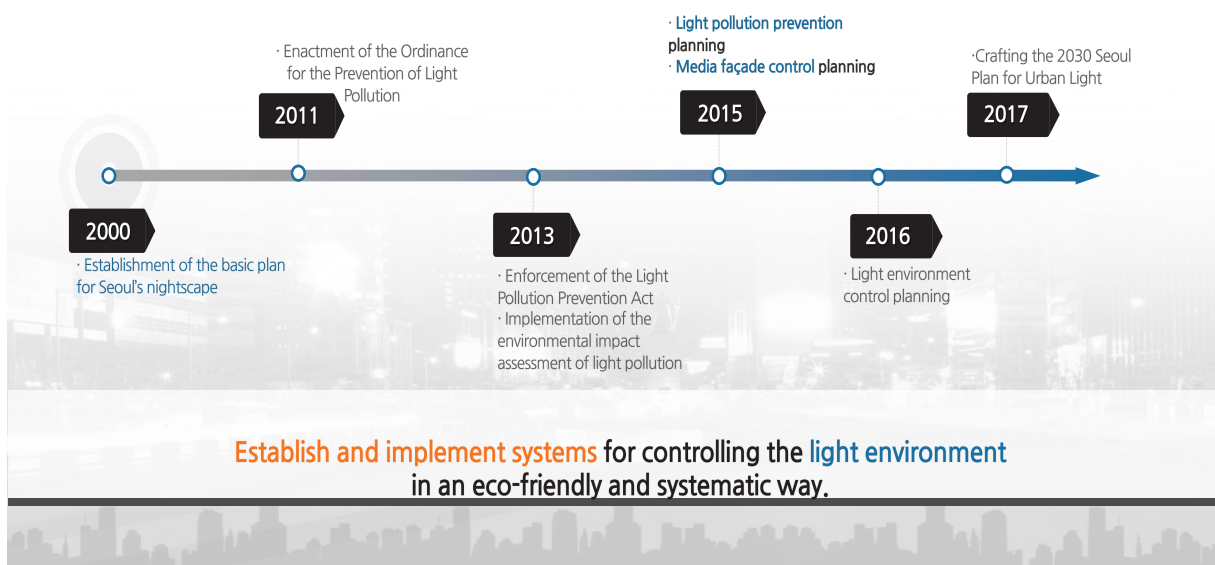
## Seoul's Lighting Policies: Basic Strategy

Seoul's Lighting Policies: Strategy (15 projects in 4 areas)



## Basic Strategy (1): Zero Pollution

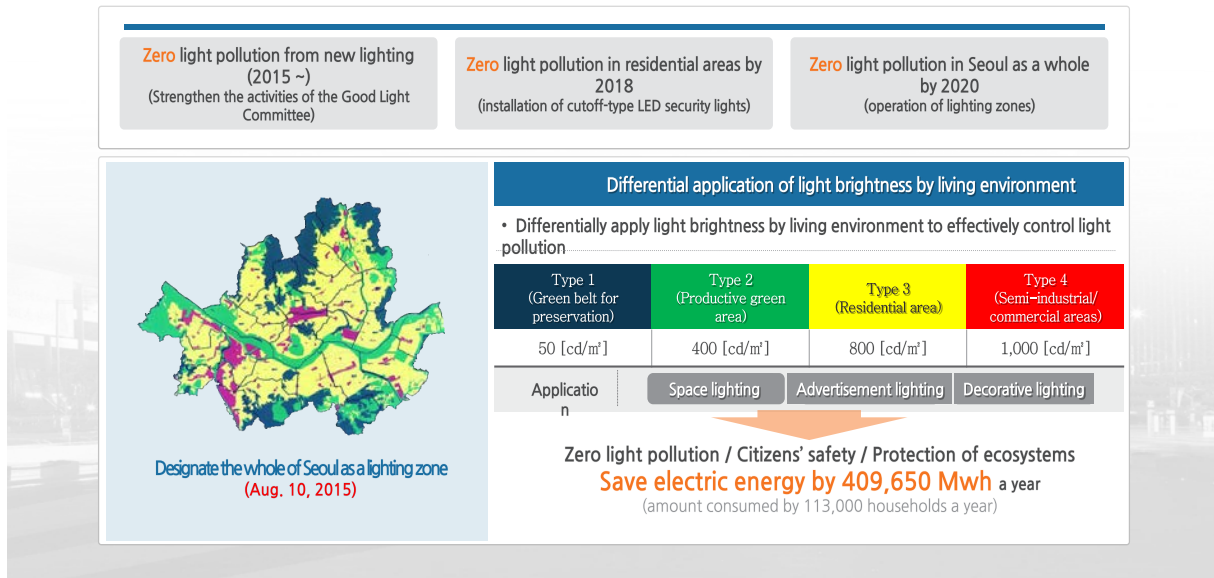
System Improvement and Implementation





## Basic Strategy (1): Zero Pollution

### Designation and operation of lighting zones (1)



## Basic Strategy (1): Zero Pollution

### Designation and operation of lighting zones (2): Allowable amount of light emitted

Lighting	Measurement Criteria (unit)	Standard Value	Lighting Zones				
			Type 1 (green belt for preservation)	Type 2 (productive green area)	Type 3 (residential area)	Type 4 Semi-industrial area	Commercial area
Space lighting, electric signs	Vertical illumination for residential areas (lx)	Maximum	10 or lower			15 or lower	25 or lower
Advertisements	Light-emitting surface brightness (cd/m²)	Maximum	50 or lower	400 or lower	<b>800 or lower</b>	900 or lower	1000 or lower
Electric signs	Light-emitting surface brightness (cd/m²)	Average (before/after 24:00)	400/50 or lower	800/400 or lower	<b>1000/800 or lower</b>	1250/900 or lower	1500/1000 or lower
Decorative lighting	Light-emitting surface brightness (cd/m²)	Average	5 or lower		15 or lower	20 or lower	25 or lower
		Maximum	20 or lower	60 or lower	<b>180 or lower</b>	240 or lower	300 or lower



## Basic Strategy (1): Zero Pollution

### Good Light Committee (1)

Prevent **light pollution** in advance  
via **review/counseling** from the phase of lighting planning



#### Good Light Committee

- ✓ Every Tuesday (14:00): hold and operate committee meetings **on a regular basis**
- ✓ Participants : lighting planners and agencies
- ✓ Process  
: proposes and explains plans and necessary measures by agenda → Q&A (members) → decision-making

#### Key matters reviewed

- ✓ **Review by lighting plan**
  - Compliance with regulations on the allowable amount of light emitted
  - Application of nightscape guidelines by lighting
  - Energy-saving plans, technical advice, recommendations, etc.
- ✓ **Matters on Articles 5 and 9 of the Act, Article 5 of the Ordinance, etc.**

Review civil complaints

Apply for deliberation

Review and submit items

Hold the committee

Report decisions

Monitoring

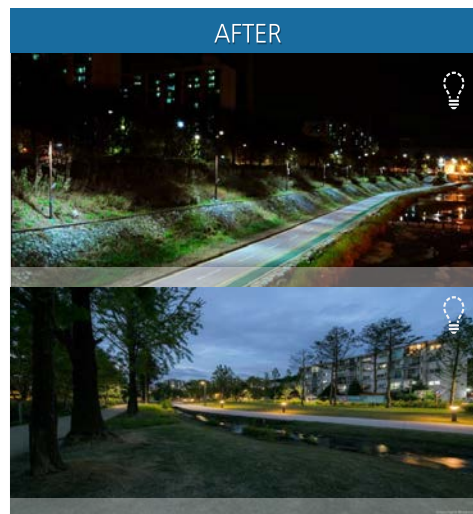
## Basic Strategy (1): Zero Pollution

### Good Light Committee (2)

BEFORE



AFTER



## Basic Strategy (2): Energy-Saving

### Smart City in Lighting

#### Introduction of smart lighting systems

#### Street Lights / Park Lights / Security Lights

Devise Seoul's outdoor LED lighting standards (converter, module)

**Dimming control LED**  
Standardize power supply (2018)

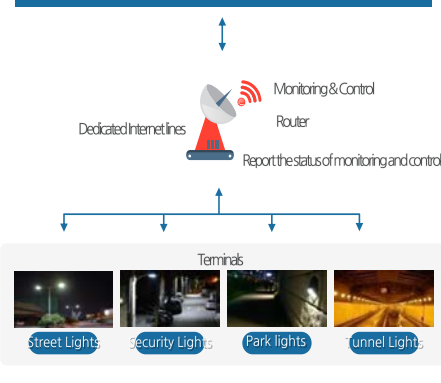
**Smart lighting system**  
Expand its supply annually (2017)

Establishment of IoT sensors for detecting vehicles and pedestrians  
Establishment of a dimming system using weather conditions  
Gather and use big data by time period

Expand the system gradually following a pilot project

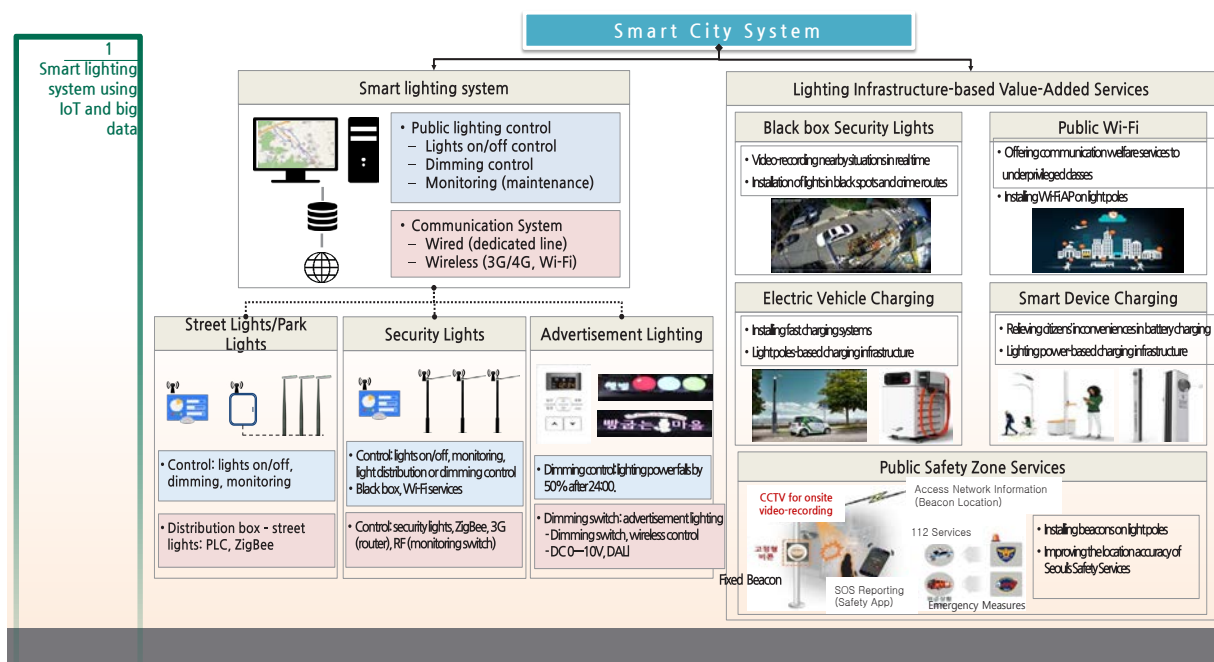


Central Control Center



**Differentiated lighting infrastructure** (light fixtures: 600,000; light poles: 200,000)

## Smart city in lighting (1) - Basic Configuration




## Smart city in lighting (2) - Safety Services Using Alley Security Lights(Black Boxes)


2


Smart City in Lighting: Value-Added Services

**Crime-Ridden Areas**




**Black Spots / Crime Routes**







**Around a school zone (Inwang Elementary School)**



**Districts vulnerable to illegal trash dumping**



※ Black box video



- LED 50W
- Full HD or HD video-recording
- SD card: 128GB
- Video-recording for up to 10 days
- Installed at 10 sites

## Smart City in Lighting (3) - Free Wi-Fi Services

2

Smart City in Lighting: Value-Added Services

**Wi-Fi services**



**Better services for citizens - health/traffic information, two-way media**





- A daily average of a floating population: 6,275
- Service speed: 2Mbps



- 51 -



## Smart City in Lighting (4) - EV Charging Services

2

Smart City in  
Lighting: Value-  
Added Services

### Installation of EV charging systems

Towed Vehicles Storage Office in Hongje



Driver's route while  
charging EV



• Installation site: Towed Vehicles Storage Office in Hongje, Seodaemun-gu, Seoul

• Parking capacity: 125 vehicles

\*(local residents' + towed vehicles storage)

Seoul's Ordinance for Facilitating the Development and Distribution of Eco-Friendly Vehicles:

- Parking facilities with 100 or more parking spaces should have EV charging systems.

### Better Services for Citizens



※ Ministry of Environment: Charging Stations in Seoul



※ Seodaemun-gu (4 sites: 'Seodaemun-gu Office,' 'Hongjeon 1 dong: public parking lot number 4,' 'DMC View Xi Complexes 1 and 2')

EV charging stations: 133 in Seoul

EV charging system installation plans

- 2 fast chargers

- 40 minutes is required for slow charging

- Power system capacity: 200kW (two more systems can be installed in the future.)

## Smart City in Lighting (5) - Smart Device Charging Services

2

Smart City in  
Lighting: Value-  
Added Services

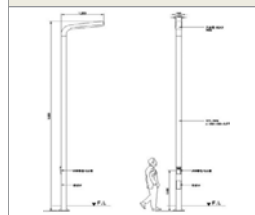
### Pilot Project Streets and Parks

Pilot Project Streets



※ Installation of Water-Proof Earth Leakage Breakers

Parks



• Pilot project streets

- Areas with a large floating population and visited by a number of citizens

- Six units installed

- Stand-alone (around distribution boxes or street lights)

- Safety devices embedded (water-proof earth leakage breakers)

• Parks

- Public spaces visited by citizens: enough time for charging

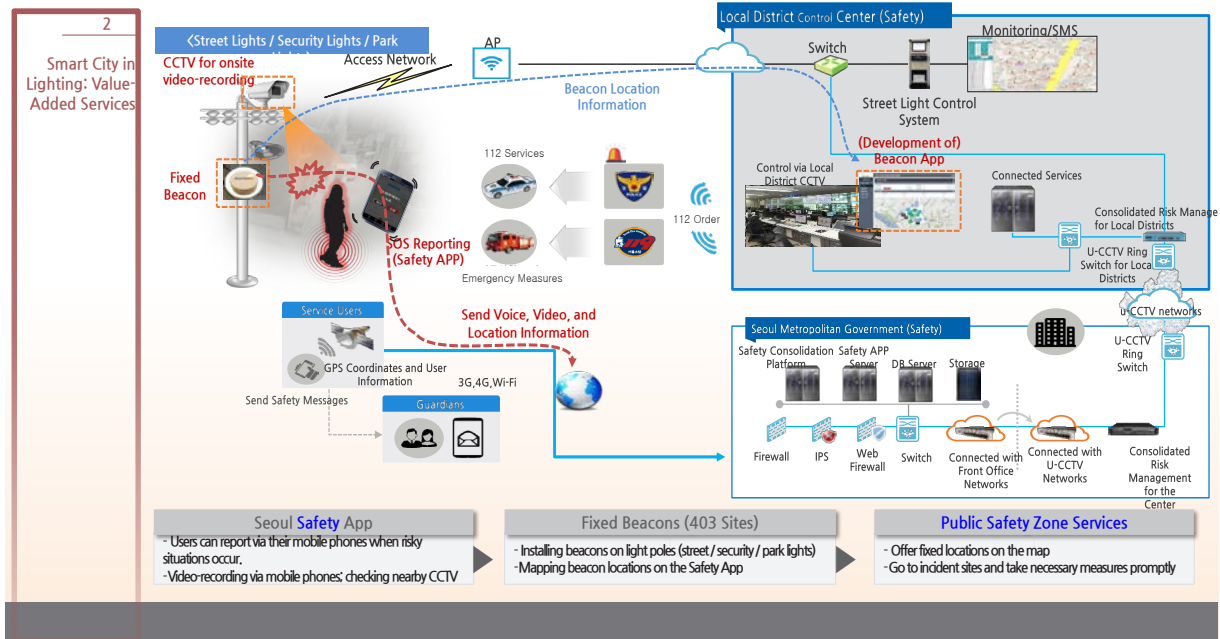
- One unit installed

- Use park lights in which charging devices are embedded.

### Installation Locations



## Smart City in Lighting (6) - Public Safety Zone Services



## Basic Strategy (2): Energy-Saving

Full-scale distribution of public LED lighting



Gradual distribution of outdoor public LED lighting  
such as street lights and security lights - 2018

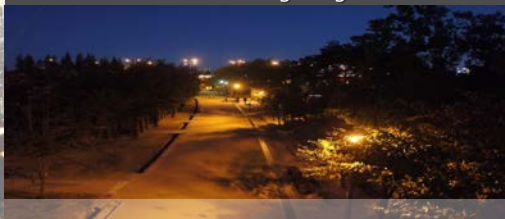
By year 4%, 2014 (20,000); 9%, 2015 (20,000); 100%, 2016 ~ 2018 (430,000)

Installation

- ✓ Make it mandatory to use LED lighting when improving or newly installing street, security, and park lights
- ✓ Cooperate with SPC for LED.

⇒ ※ SPC for LED: private company that is established to install LED lighting

Sodium Lighting



LED Lighting



## Basic Strategy (2): Energy-Saving

Projects to improve the light environment of residential districts (1)

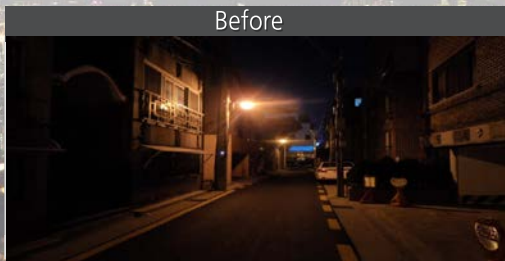


Replace outdated security lights in residential districts,  
which account for 80% or more of civil complaints

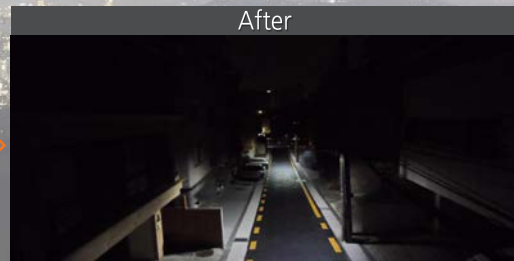
**Performance** replaced 15,443 lights since 2012

**Installation**

- ✓ Replace outdated diffusion-type security lights in residential districts by LED security lights
- ✓ Diffusion-type sodium security lights → cutoff-type LED security lights



Before



After

## Basic Strategy (2): Energy-Saving

Projects to improve the light environment of residential districts (2)

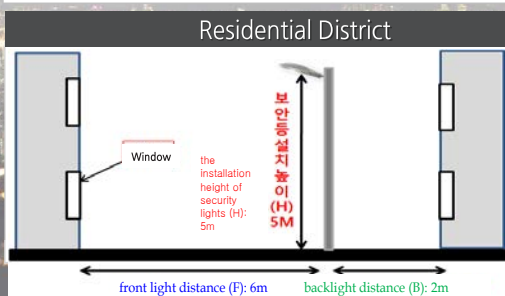


Use HFBS when installing security lights

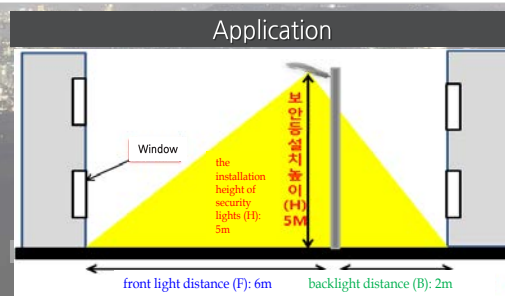
**Background** conduct a complex simulation because current lighting fixture specifications are not specific enough to identify light trespass.

**Application**

- ✓ Use HFBS that reflects the shapes and characteristics of alleys
- ✓ Create HFBS by using the height of the light distribution pile (H), the front light distance (F), the backlight distance (B), and the minimum span (S).



Residential District



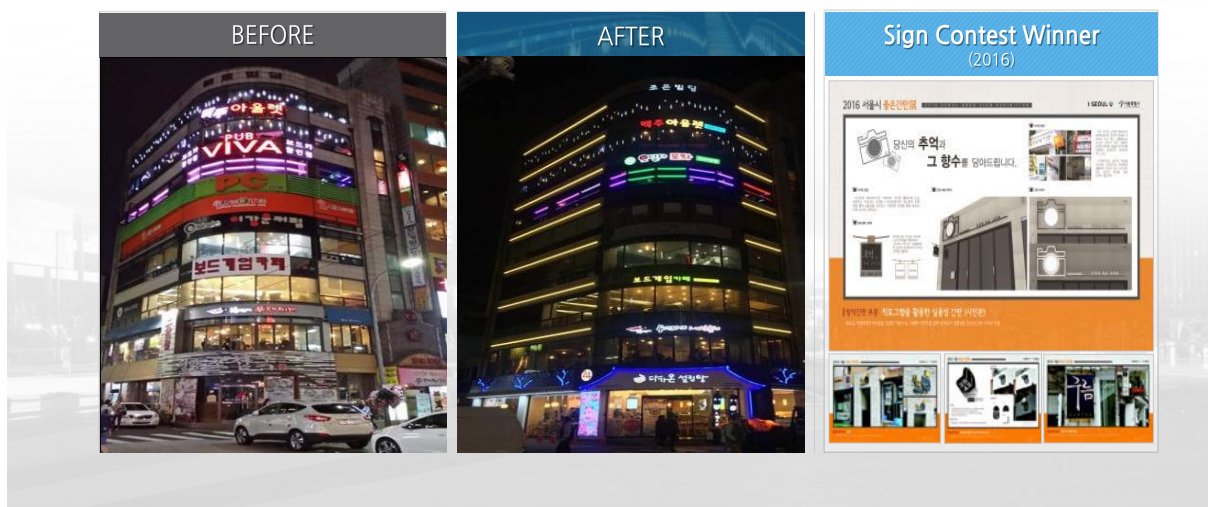
Application



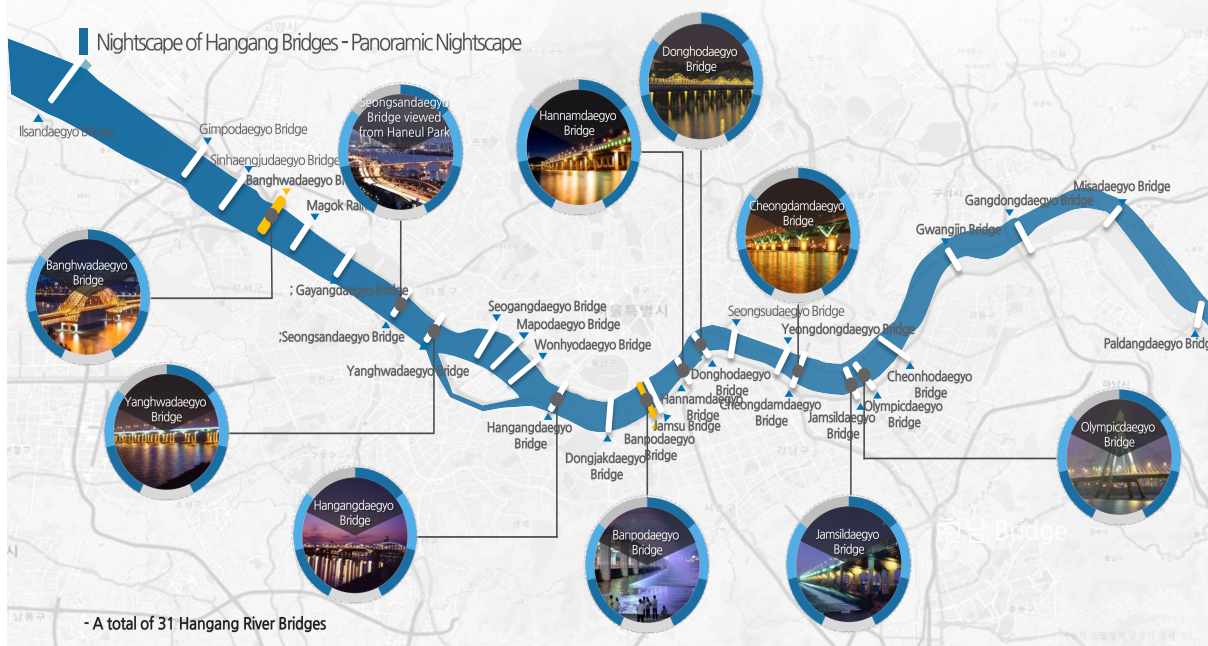
## Basic Strategy (2): Energy-Saving

## LED Sign Improvement

- Improve **outdated, flashy**, and big signs, considering local conditions: choose 10 local districts every year.
- Promote citizens' participation via Sign Contests: hold a sign contest and select winners (every October).

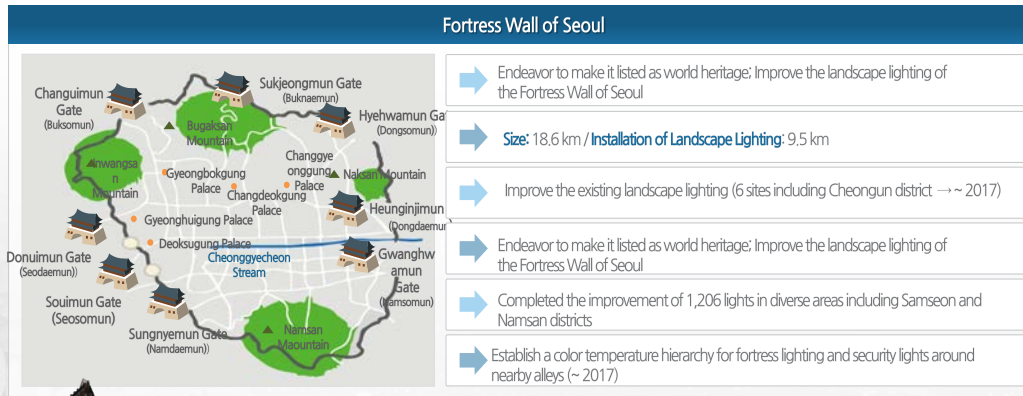


### Basic Strategy (3): Tourism Promotion



## Basic Strategy (3): Tourism Promotion

### Fortress Wall of Seoul: Landscape Lighting (1)



## Fortress Wall of Seoul, a Pride of Seoul

Seoul's lighting policies: mid-to-long-term plans  
서울의 조명정책 중장기 계획 33

## Basic Strategy (3): Tourism Promotion

### Dignity of the Fortress Wall of Seoul, with a history of 600 years

**Resolve nightscape issues** attributed to outdated lighting facilities  
and **light diffusion around the Fortress Wall**

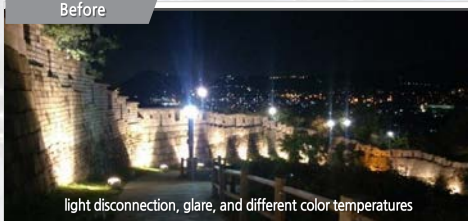
#### Improve existing landscape lighting facilities - 6 sites including Cheongun district (~2017)

- Replaced 1,206 lights in areas including Samseon and Namsan districts
- Established IoT-based lighting systems that can control colors and the brightness of light

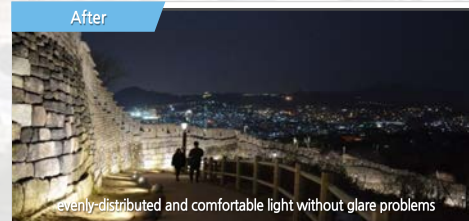
#### Wall lighting and security lights in nearby alleys - establish a color temperature hierarchy (~2017)

- Wall lighting: 2,000 ~ 3,000K Warm White
- Security lights: 4,000 ~ 5,000K Cool White
- Improve the light environment of alleys in residential districts, focusing on areas around the Wall.

Before



After



서울의 조명정책 중장기 계획 34



## Basic Strategy (3): Tourism Promotion

Light festival in 4 main gates in Seoul

- Improve infrastructure in 4 main gates (Gwanghwamun Square ~ Deoksugung Stonewall Walkway), operating a citizens' participation-based light festival.



서울의 조명정책의 방향성 제언 35

## Basic Strategy (3): Tourism Promotion

Image lighting for Namsan Seoul Tower



### • Imaging status

- 16 types of themes including the natural environment of Namsan
- Mugunghwa, pine trees, Taeguk, Haechi, etc.

### • Operation hours

- 18:00 ~ 22:00, for 10 minutes every hour on the hour

### • Content improvement plan

- Printing out photographs that tourists take; projecting mobile phone text messages onto the Tower


➤ Create dynamic and interesting images by developing various types of content.





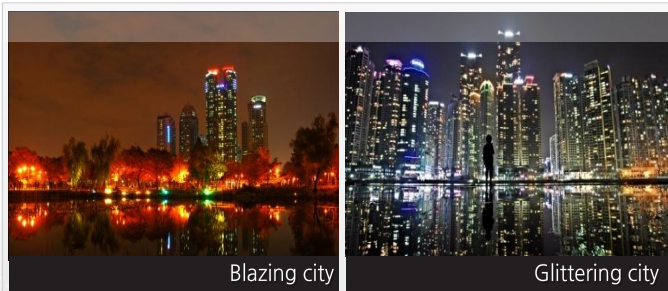
## Basic Strategy (4): Citizens' Participation

Light pollution photo / UCC contest



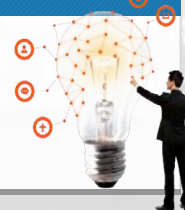
**Photo and UCC contest (every March ~August)**

- serves as an opportunity to **think over the light environment** together with children and teenagers
- (Themes: light pollution in daily lives and beautiful light)
- More than 3,000 items are submitted and 70 winners are chosen every year.



### Contest winners

Encourage citizens to have more interest in the **light environment** in daily lives, **creating a consensus on the formation of good light** and **inducing their participation**.



## Basic Strategy (4): Citizens' Participation

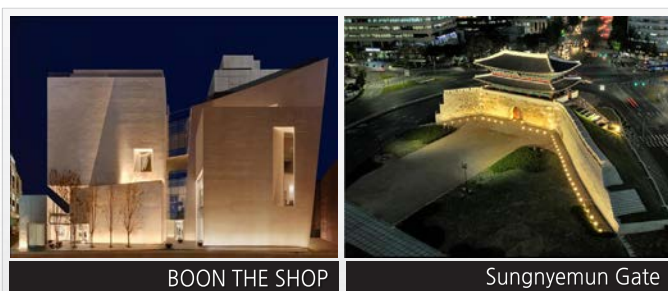
Seoul's Good Light Awards



**Time: March ~ August, every year**

**Awards: academic research, design, construction, and contents in lighting**

- Professionals in lighting who have contributed to the development of Seoul's urban lighting
- Hold good light operation seminars for better communication with citizens



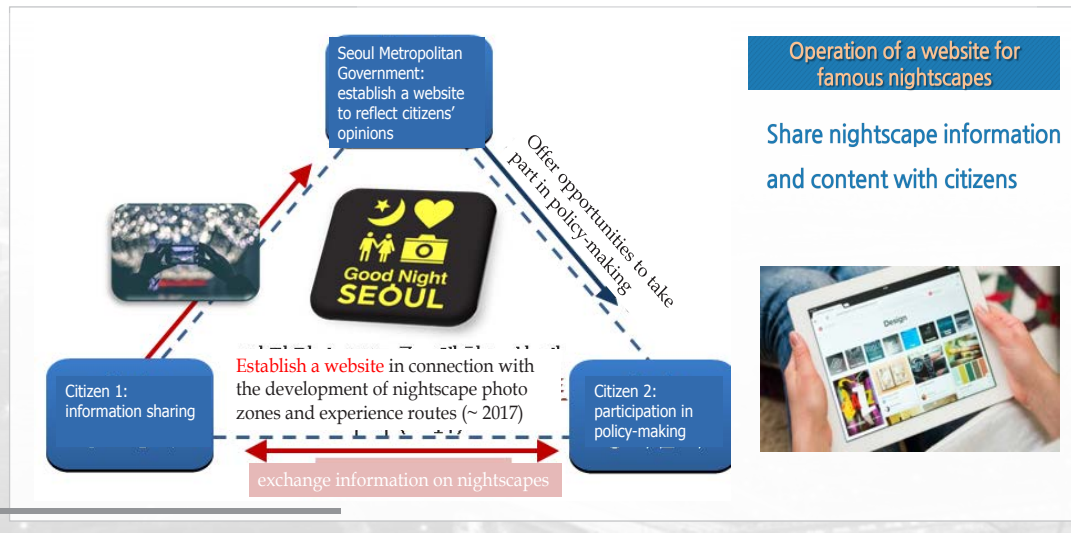
### Good Light Awards Winners

Promote the development of the lighting industry and local economy



## Basic Strategy (4): Citizens' Participation

### Website for Famous Nightscapes



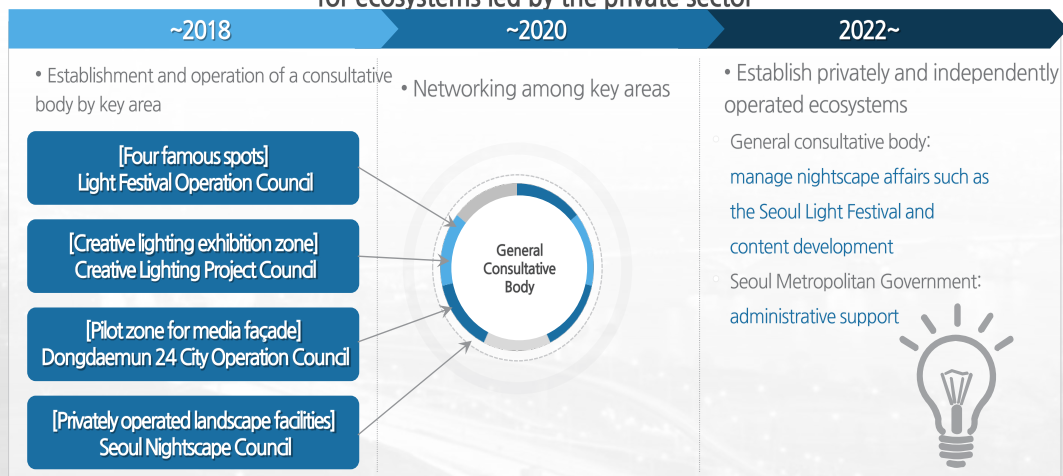
서울의 조명정책 중장기 계획 39

## Basic Strategy (4): Citizens' Participation

### Ecosystems for nightscapes

Organize and operate a public-private consultative body to set up a framework

for ecosystems led by the private sector



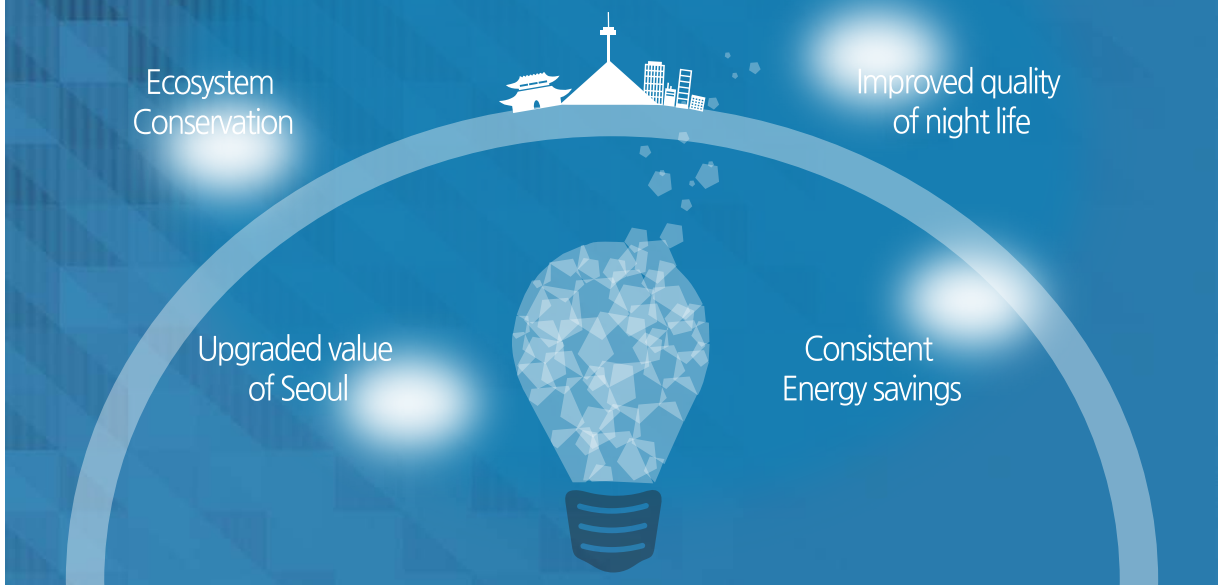
서울의 조명정책 중장기 계획 40



## Maebongsan Palgakjeong Pavillion



## Seoul Urban Lighting Policy is for.....







Thank you very much!



## Day 1-Session2

### Case Presentation

Korea's first "Free Outdoor Billboard Display Zone" at WTC Seoul

**Jung-Woo Park**  
(Senior Manager, Korea International Trade Association)



## Project outline for the Free Outdoor Advertising Zone at Korea World Trade Center

1

## Contents

- I** Project outline and operation goals
- II** Five key programs
- III** Outdoor advertising installation plan

2



## I Project outline and operation goals

- Current status of the target zone
- Project outline
- K-Pop concerts at C-Festival in Yeongdong-daero
- Korea Craft Beer Show at Coex Urban Park Festival
- Project operation goals

3

### I . Project outline and operation goals

### Current status of the target zone

◆ Target zone: Gangnam MICE Special Tourist Zone (KWTC) (area: 190,386m<sup>2</sup>)



Use	Facility name (12 buildings)	Scope
Cultural facilities	COEX	5 floors
	COEX Artium	6 floors
	Trade Tower	54 floors
Business facilities	ASEM Tower	41 floors
	Korea City Air Tower	26 floors
	Korea City Air Terminal	7 floors
	Parnas Tower	40 floors
	Convention Annex	6 floors
Shopping facilities	Hyundai Dept. Store COEX Branch	11 floors
	Oakwood Premier Hotel	26 floors
Accommodation facilities	Grand InterContinental Hotel	33 floors
	InterContinental Hotel Seoul COEX	29 floors



[Business]



coex



[Accommodation]



INTERCONTINENTAL  
HOTELS & RESORTS



[Fun]



MEGABOX  
SM ENTERTAINMENT



[Shopping & Food]



HYUNDAI  
LOTTE DUTY FREE



[Service]



CALT  
한국도심관광

4



- Birth of Korean Times Square -

World Trade Center zone in Samseong-dong designated as the first 'Free Outdoor Advertising Zone' in Korea



Creation of a global-level tourist landmark combining outdoor advertising and digital arts/culture to drive local economy

Project outline

- Date of designation: Dec. 1, 2016 (Ministry of Interior)
- No. of designated zones: 1 (first)
- Designated zone: World Trade Center zone in Samseong-dong (78,400m<sup>2</sup>)
- Economic impact (media investment): KRW 318.8 billion (KRW 235.3 billion in production and 83.5 billion in added value)

Screening result

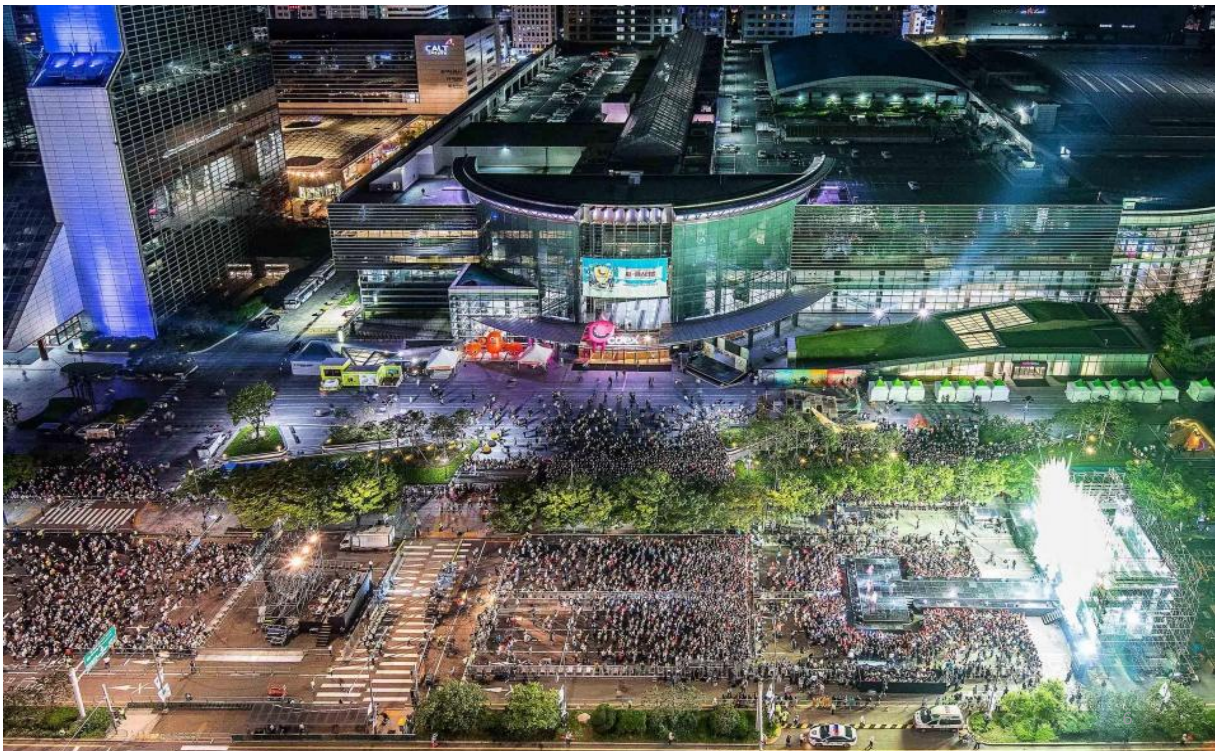
- Highest scores in 5 categories including local tourism promotion strategy, resident response, feasibility, composition of outdoor advertising, and willingness for implementation

Development plan

- Stage 1 (Introduction: 2017~): Creation of K-POP Square around Samseong Station
- Stage 2 (Expansion: 2020~): Establishment of a landmark through development of GBC and Yeongdong-daero
- Stage 3 (Completion: 2023~): Transmission of media art in the entire target zone

I. Project outline and operation goals

K-POP concerts at C-Festival in Yeongdong-daero







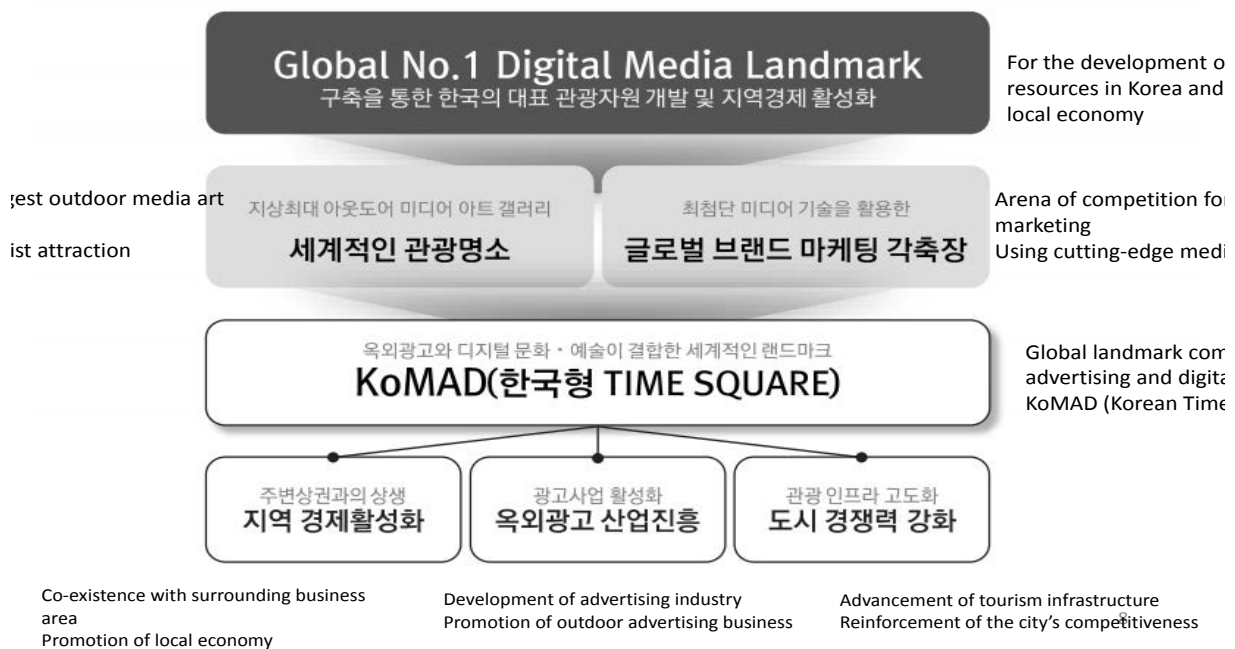
## I . Project outline and operation goals

## Korea Craft Beer Show at Coex Urban Park Festival



## I . Project outline and operation goals

## Project operation goals







II

## Five key programs

- K-POP Square construction program
- Landmark media development program
- Innovation Park construction program
- Festival organization program
- Digital amenities development program

9

### II . Five key programs

#### K-POP Square construction program

(1) K-POP 스퀘어 조성 사업  
• 초대형 미디어월 및 한류체험 광장

(1) K-POP Square  
construction program  
• Extra-large media wall and  
Hallyu experience square

Perspective view (투시도)



10



## II . Five key programs

### Landmark media development program

#### (2) 랜드마크 미디어 구축사업

- KoMAD Waterfall  
(미디어 아트 동시 송출, 매일 저녁 정사~10분간)

#### (2) Landmark media development program

- KoMAD Waterfall  
(Simultaneous transmission of media art, on the hour every evening for 10 min)



## II . Five key programs

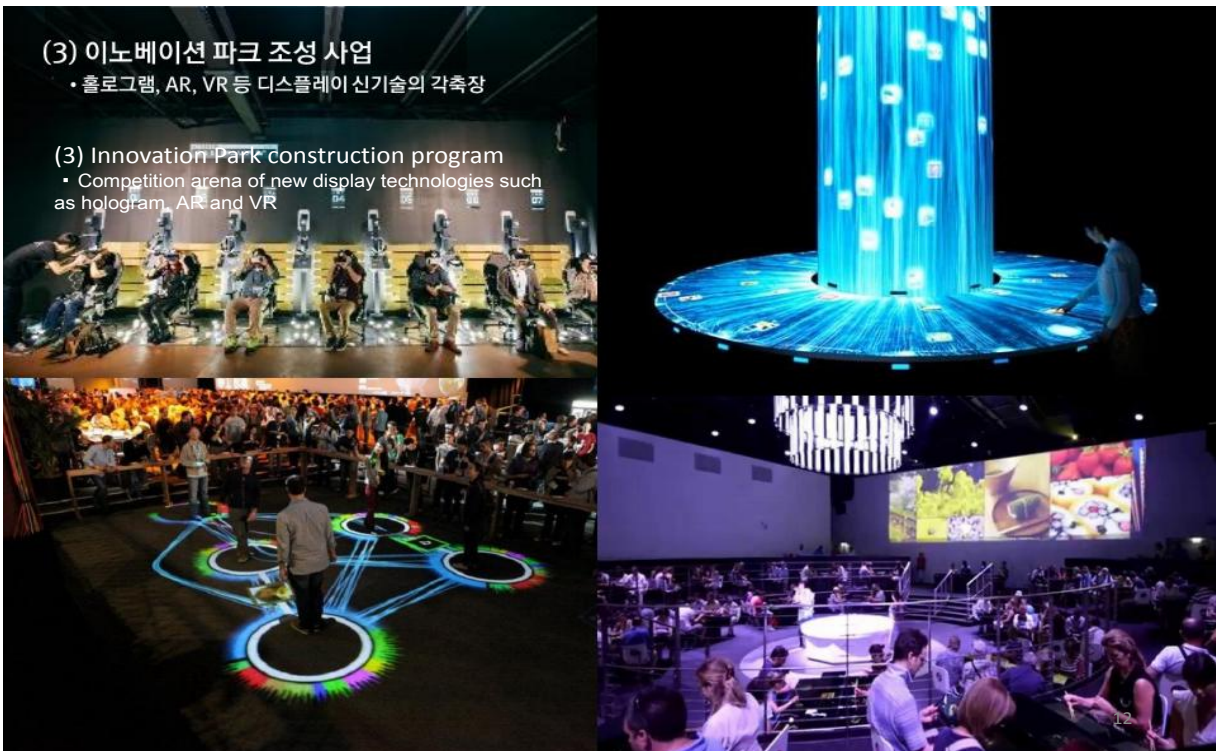
### Innovation Park construction program

#### (3) 이노베이션 파크 조성 사업

- 홀로그램, AR, VR 등 디스플레이 신기술의 각축장

#### (3) Innovation Park construction program

- Competition arena of new display technologies such as hologram, AR and VR







## II . Five key programs

### Festival organization program

#### (4) 페스티벌 운영 사업

- 영동대로 메가이벤트 연계  
(영동대로 카운트다운, 3단계 완성기 View)

#### (4) Festival organization program

- In connection with mega-events in Yeongdong-daero (New Year's countdown, view of stage 3 completion)



## II . Five key programs

### Digital amenities development program

#### (5) 디지털 어메니티 구축 사업

- 버스쉘터, 지하철 입구, 디지털배너 등 편의시설 디지털화

#### (5) Digital amenities development program

- Digitalization of convenient facilities such as bus shelters, subway entrances and digital banners







III

## Outdoor advertising installation plan

- Current photo of the target zone
- Overall aerial view
- View of advertising installation

15

### III. Outdoor advertising installation plan

#### Current photo of the target zone





III. Outdoor advertising  
installation plan

Overall aerial view



III. Outdoor advertising  
installation plan

View of advertising installation





View of advertising installation

III. Outdoor advertising  
installation plan

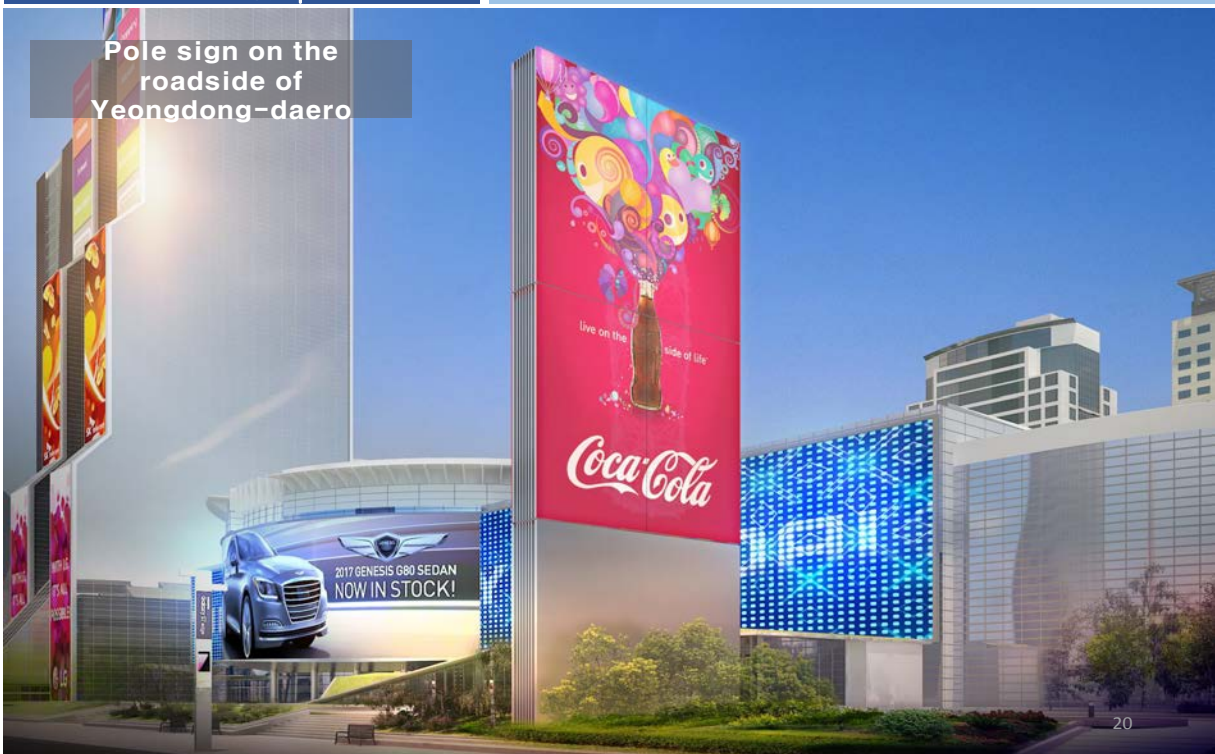
Media art at the eastern  
entrance (crown) of COEX



View of advertising installation

III. Outdoor advertising  
installation plan

Pole sign on the  
roadside of  
Yeongdong-daero





View of advertising installation

III. Outdoor advertising installation plan

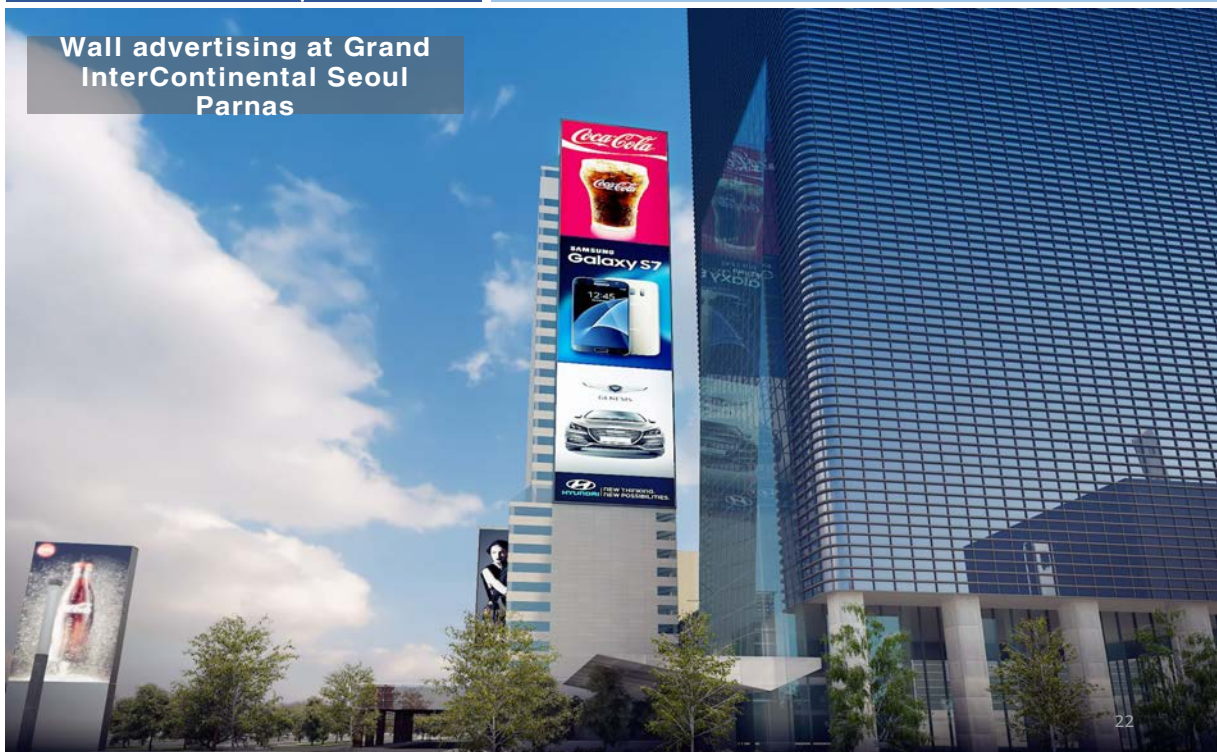
Wall advertising at Hyundai Dept. Store



View of advertising installation

III. Outdoor advertising installation plan

Wall advertising at Grand InterContinental Seoul Parnas





## Day 1-Session2

### Case Presentation

European and International case studies on  
urban lighting - Liveable Cities

**Rik Van Stiphout**

(Program Advisor Light & Culture, LUCI Executive Committee)

Urban  
Lighting  
Workshop



## Liveable Cities

1 Rik van Stiphout – Programme advisor Light & Culture  
Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea



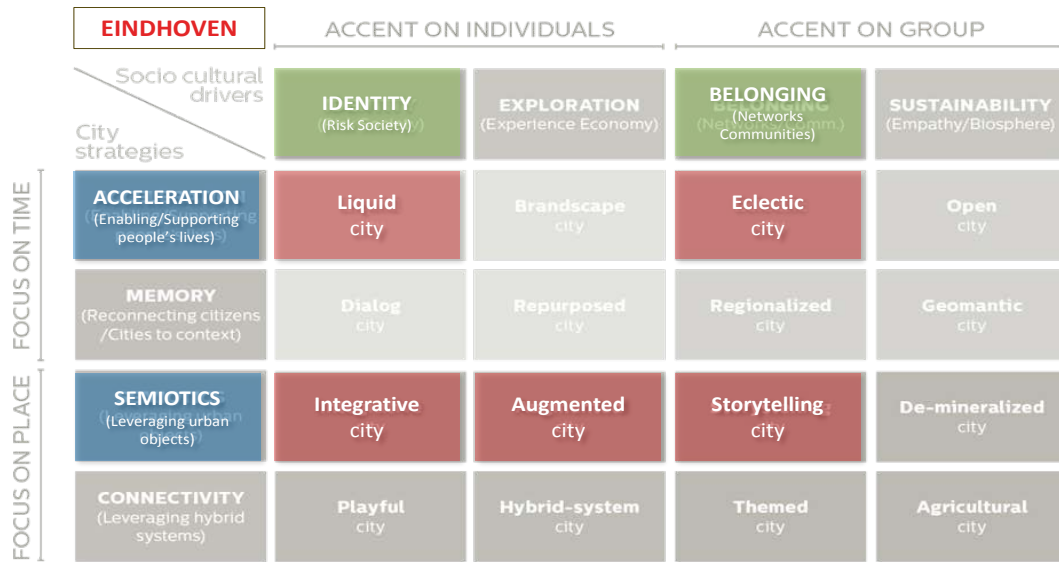
		ACCENT ON INDIVIDUALS		ACCENT ON GROUP	
FOCUS ON PLACE FOCUS ON TIME	Socio cultural drivers City strategies	IDENTITY (Risk Society)	EXPLORATION (Experience Economy)	BELONGING (Networks/Comm.)	SUSTAINABILITY (Empathy/Biosphere)
	ACCELERATION (Enabling/Supporting people's lives)	Liquid city	Brandscape city	Eclectic city	Open city
	MEMORY (Reconnecting citizens /Cities to context)	Dialog city	Repurposed city	Regionalized city	Geomantic city
	SEMIOTICS (Leveraging urban objects)	Integrative city	Augmented city	Storytelling city	De-mineralized city
	CONNECTIVITY (Leveraging hybrid systems)	Playful city	Hybrid-system city	Themed city	Agricultural city

Courtesy of Royal Philips

2 Rik van Stiphout – Programme advisor Light & Culture  
Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea

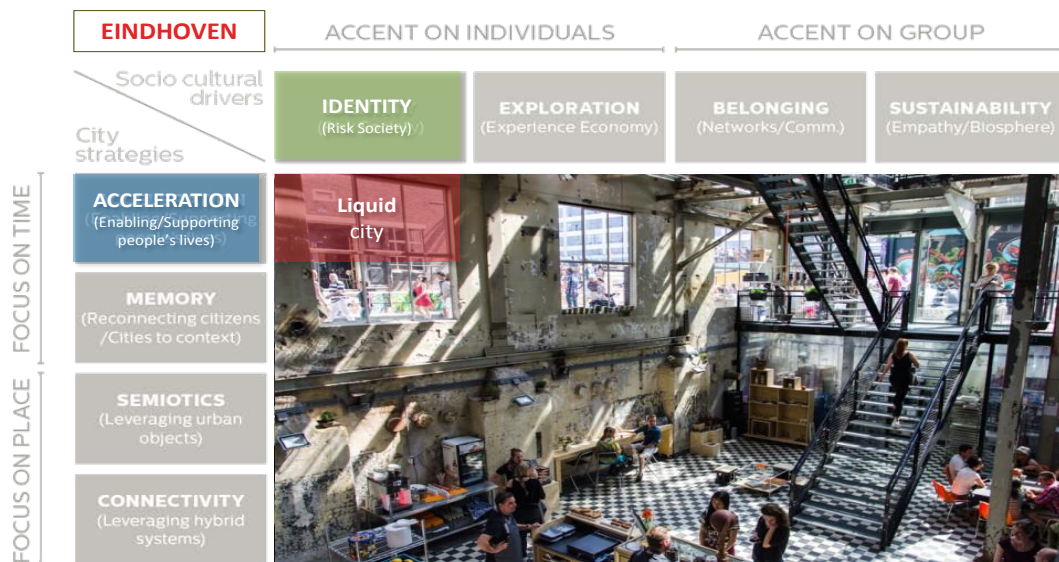






Courtesy of Royal Philips

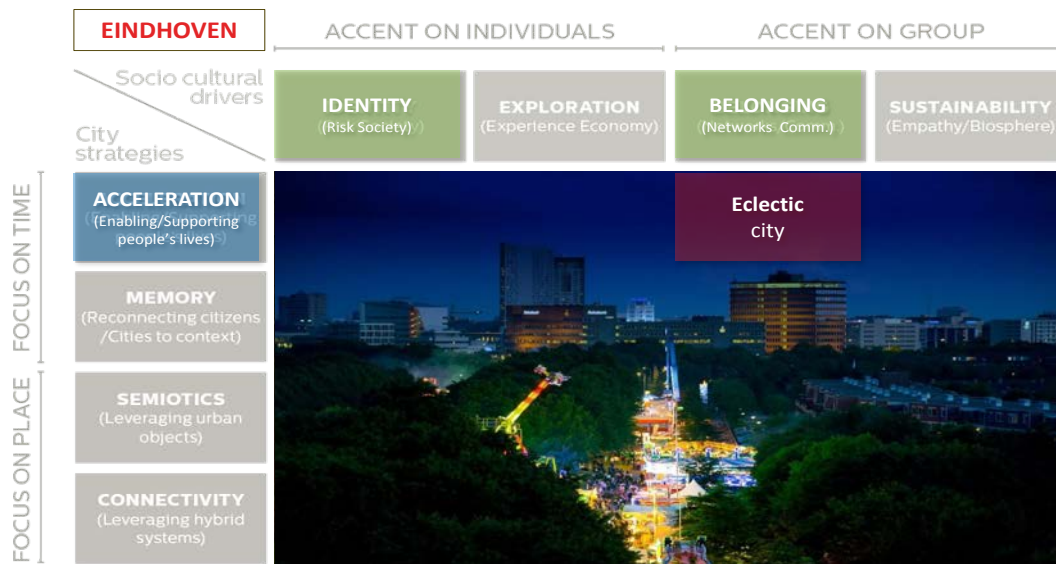
3 Rik van Stiphout – Programme advisor Light & Culture  
Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea



Courtesy of Royal Philips

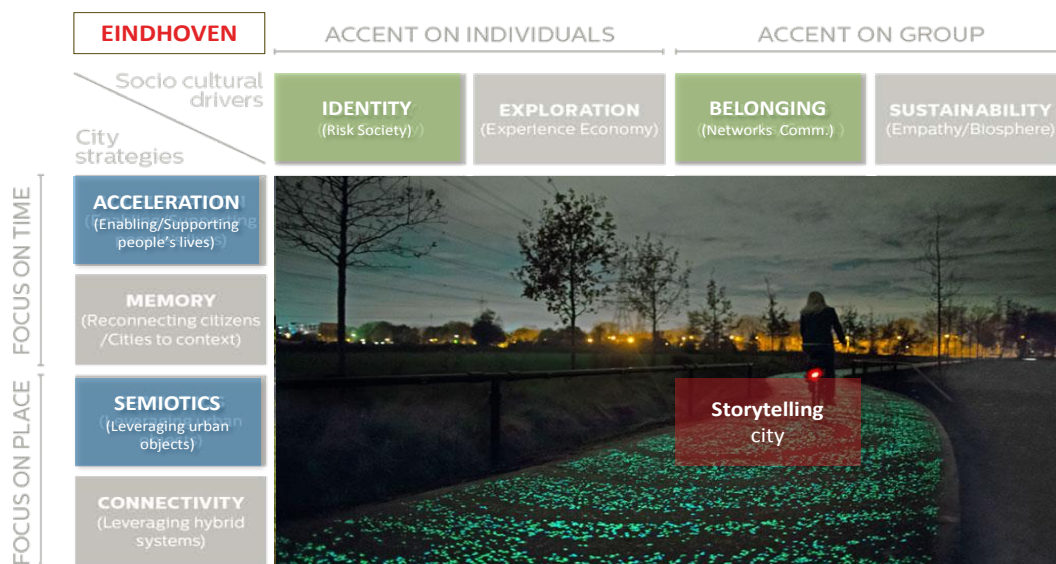
4 Rik van Stiphout – Programme advisor Light & Culture  
Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea





Courtesy of Royal Philips

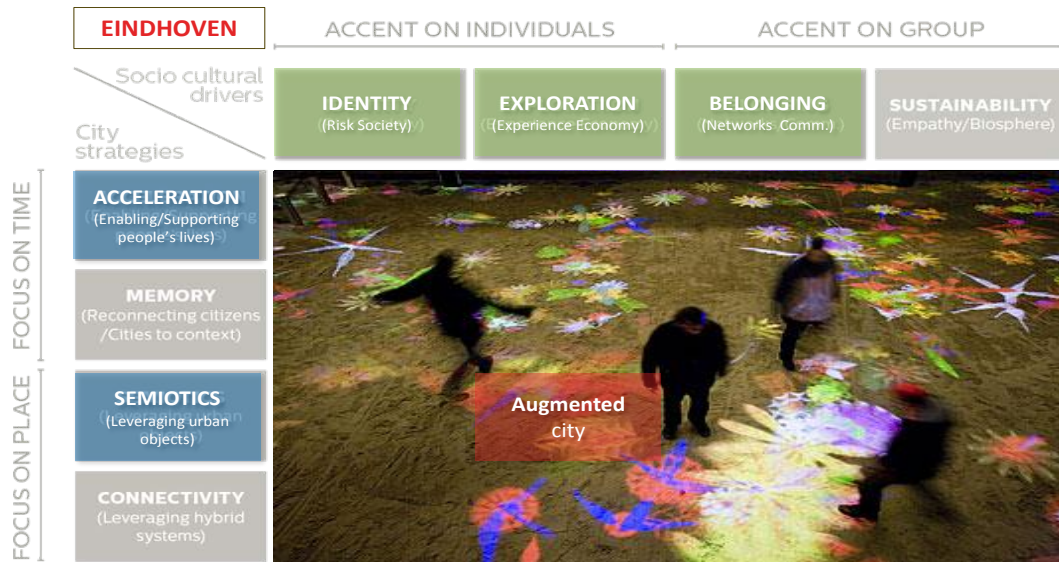
5 Rik van Stiphout – Programme advisor Light & Culture  
Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea



Courtesy of Royal Philips

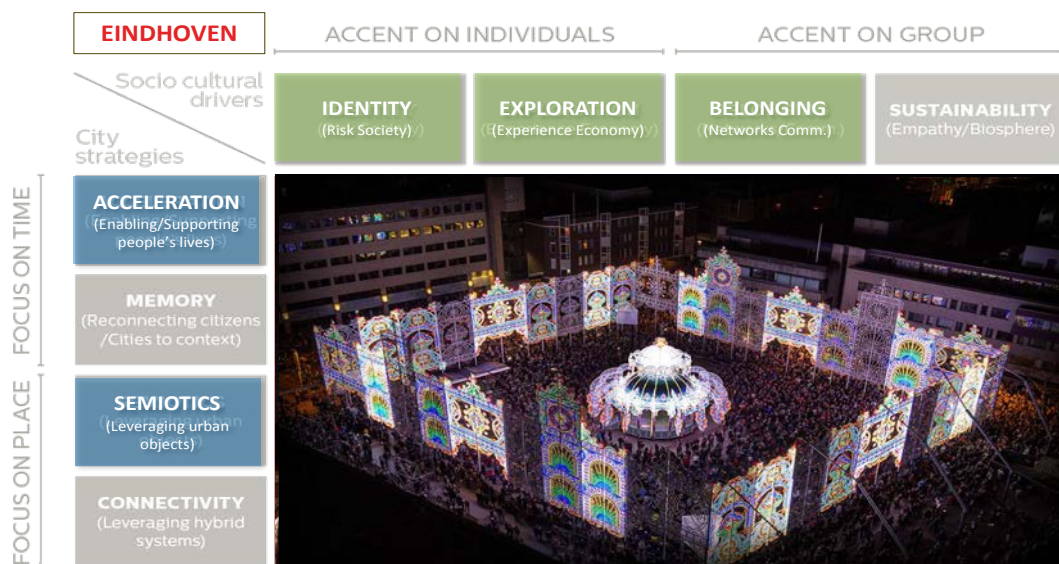
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Courtesy of Royal Philips

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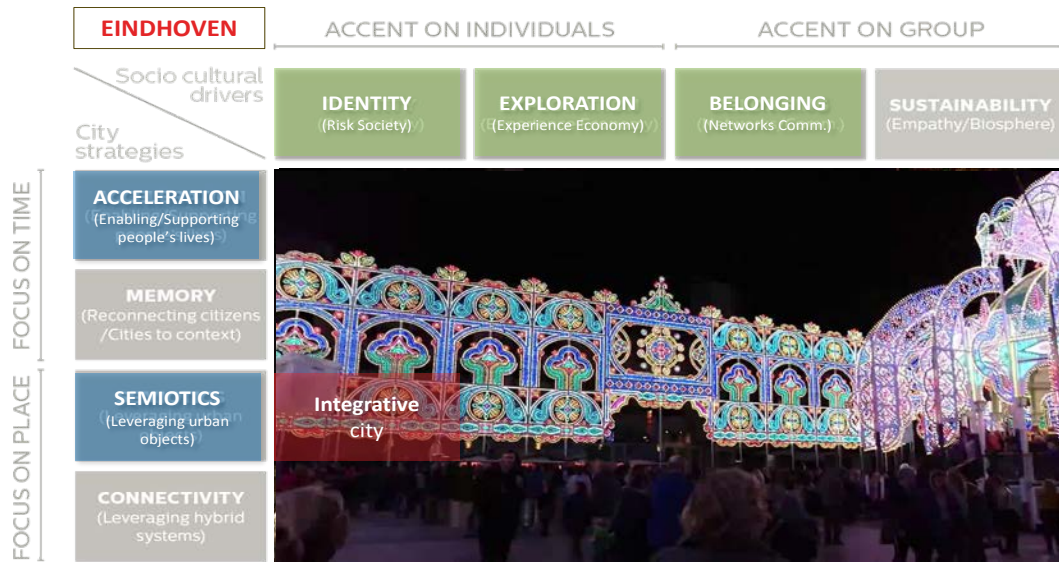


Courtesy of Royal Philips

8 Rik van Stiphout – Programme advisor Light & Culture  
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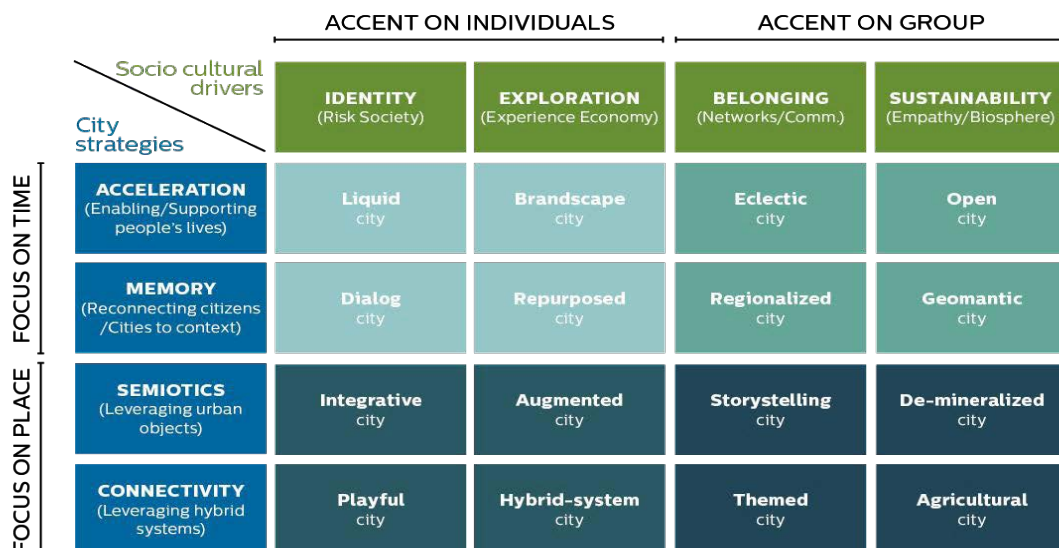






Courtesy of Royal Philips

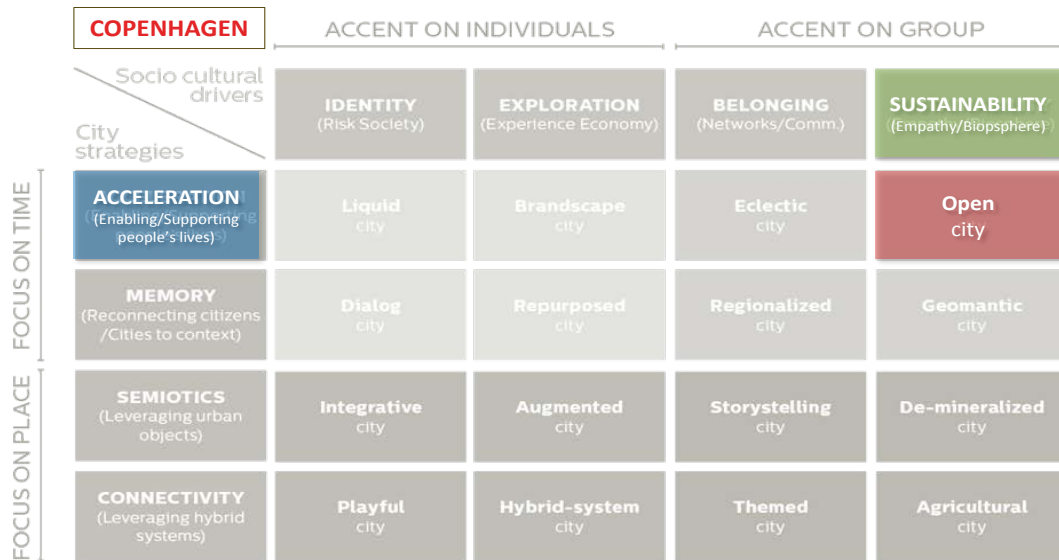
9 Rik van Stiphout – Programme advisor Light & Culture  
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Courtesy of Royal Philips

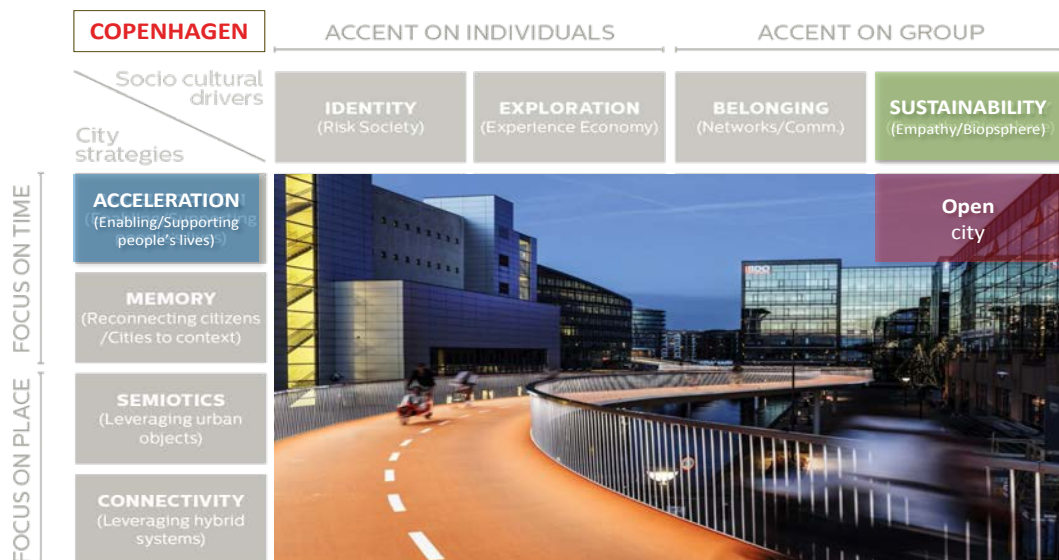
10 Rik van Stiphout – Programme advisor Light & Culture  
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Courtesy of Royal Philips

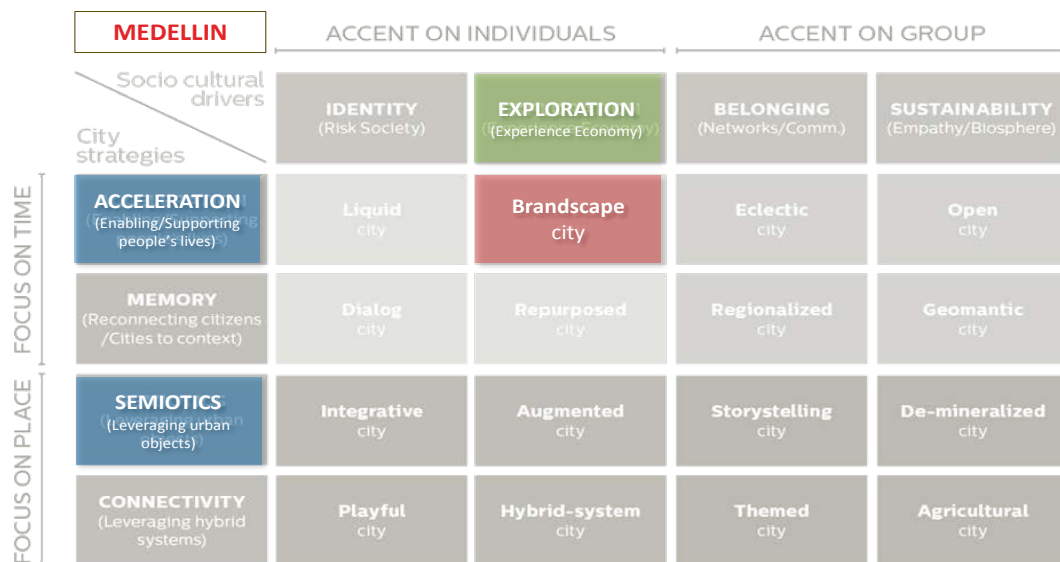
11 Rik van Stiphout – Programme advisor Light & Culture  
Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea



Courtesy of Royal Philips

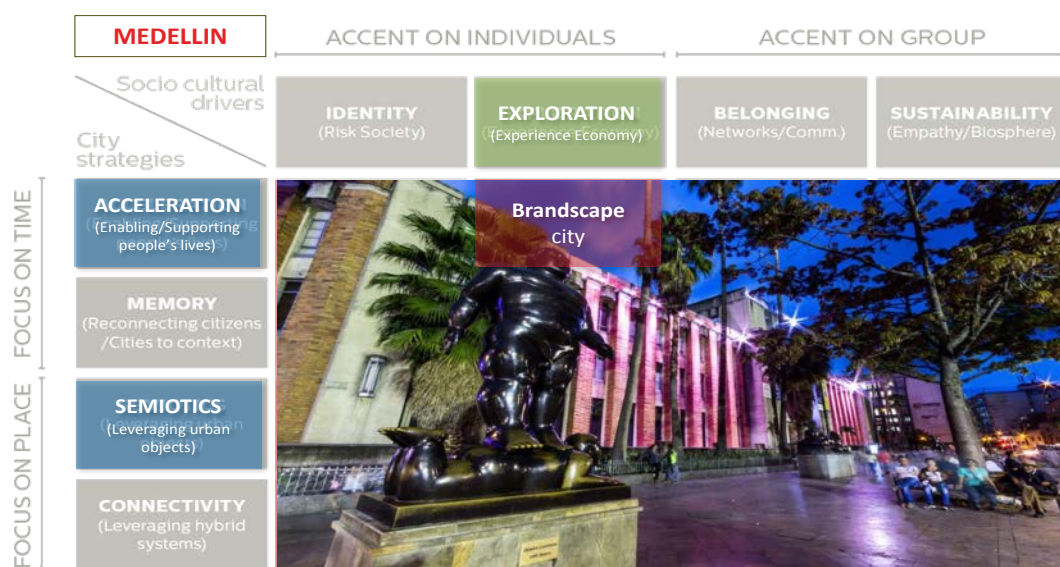
12 Rik van Stiphout – Programme advisor Light & Culture  
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13 Rik van Stiphout – Programme advisor Light & Culture  
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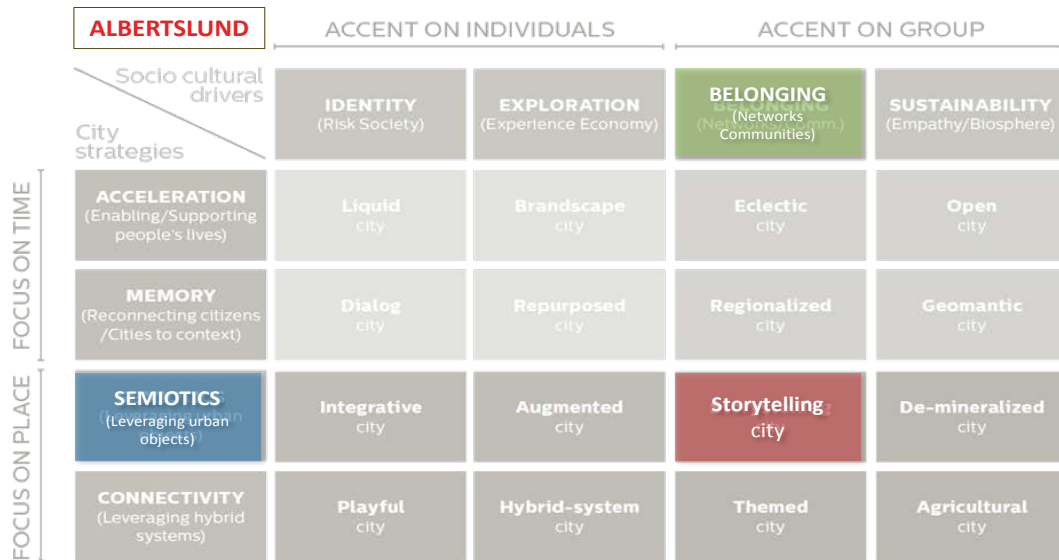


Courtesy of Royal Philips

14 Rik van Stiphout – Programme advisor Light & Culture  
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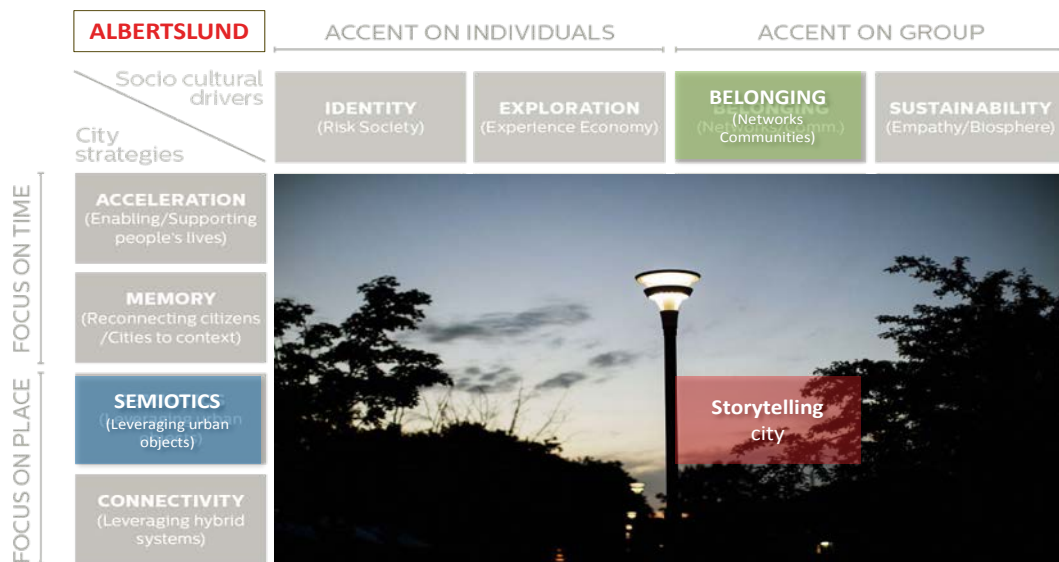






Courtesy of Royal Philips

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Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea



Courtesy of Royal Philips

16 Rik van Stiphout – Programme advisor Light & Culture  
Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea





Courtesy of Royal Philips

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Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea



[www.eindhoven.nl/slimlicht/](http://www.eindhoven.nl/slimlicht/)

[www.strijp-s.nl/en/home](http://www.strijp-s.nl/en/home)

[www.gloweindhoven.nl/en](http://www.gloweindhoven.nl/en)



18 Rik van Stiphout – Programme advisor Light & Culture  
Urban Lighting Workshop , June 29 /30 -2017, Hotel President, Seoul Korea





## Day 1-Session2

### Case Presentation

European and International case studies on  
urban lighting

**Mark Burton**  
(General Director, LUCI)

**Urban  
Lighting  
Workshop**

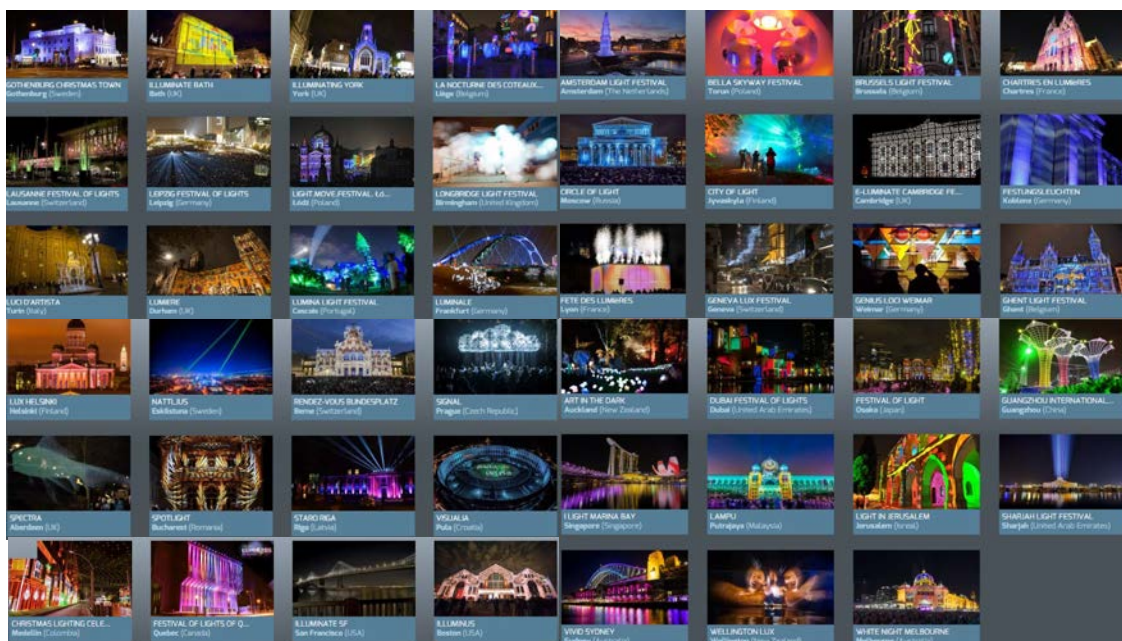




# European and International case studies on urban lighting

29th June 2017 – Urban Lighting Workshop  
Seoul

## Festivals of Lights

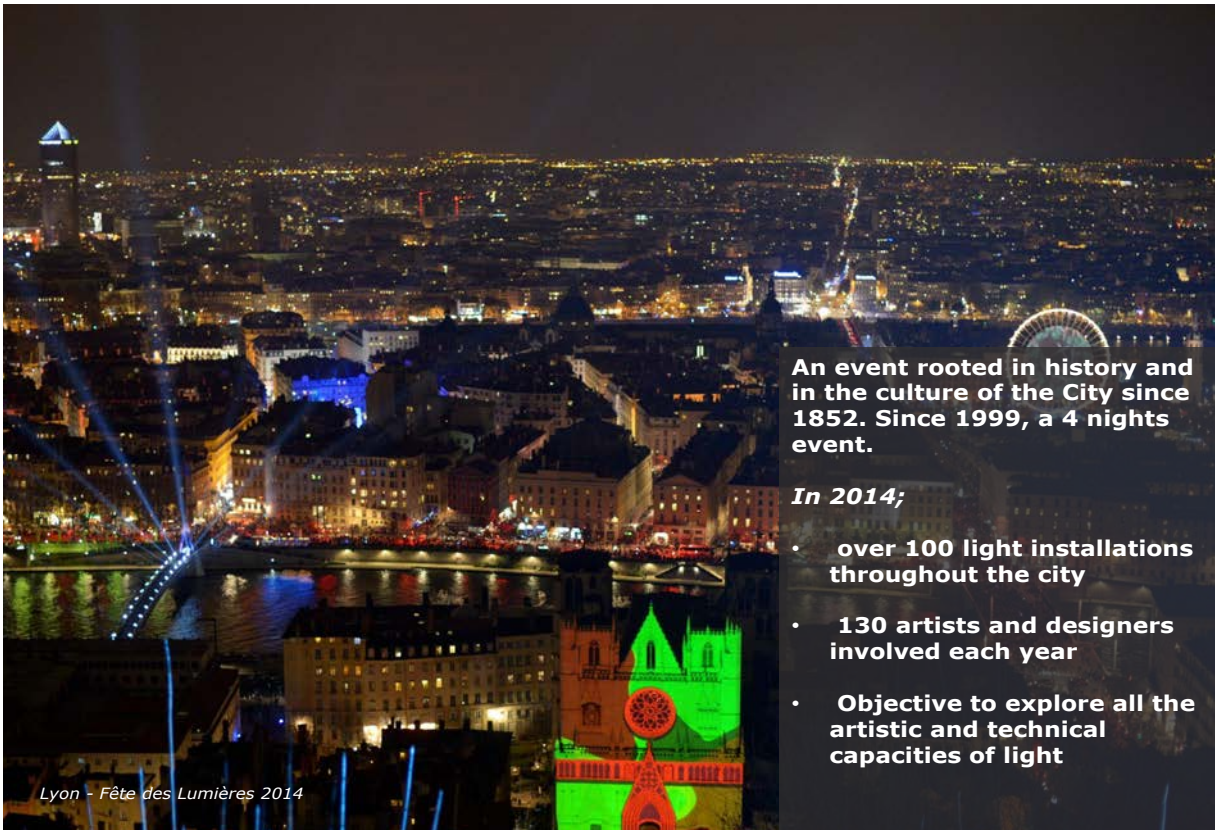




## Fête des Lumières - Lyon



Lyon - Fête des Lumières 2014 (photo: Muriek Chaulet ; lighting design: -Color or not - Yves Caizergues)



Lyon - Fête des Lumières 2014

An event rooted in history and in the culture of the City since 1852. Since 1999, a 4 nights event.

*In 2014;*

- over 100 light installations throughout the city
- 130 artists and designers involved each year
- Objective to explore all the artistic and technical capacities of light



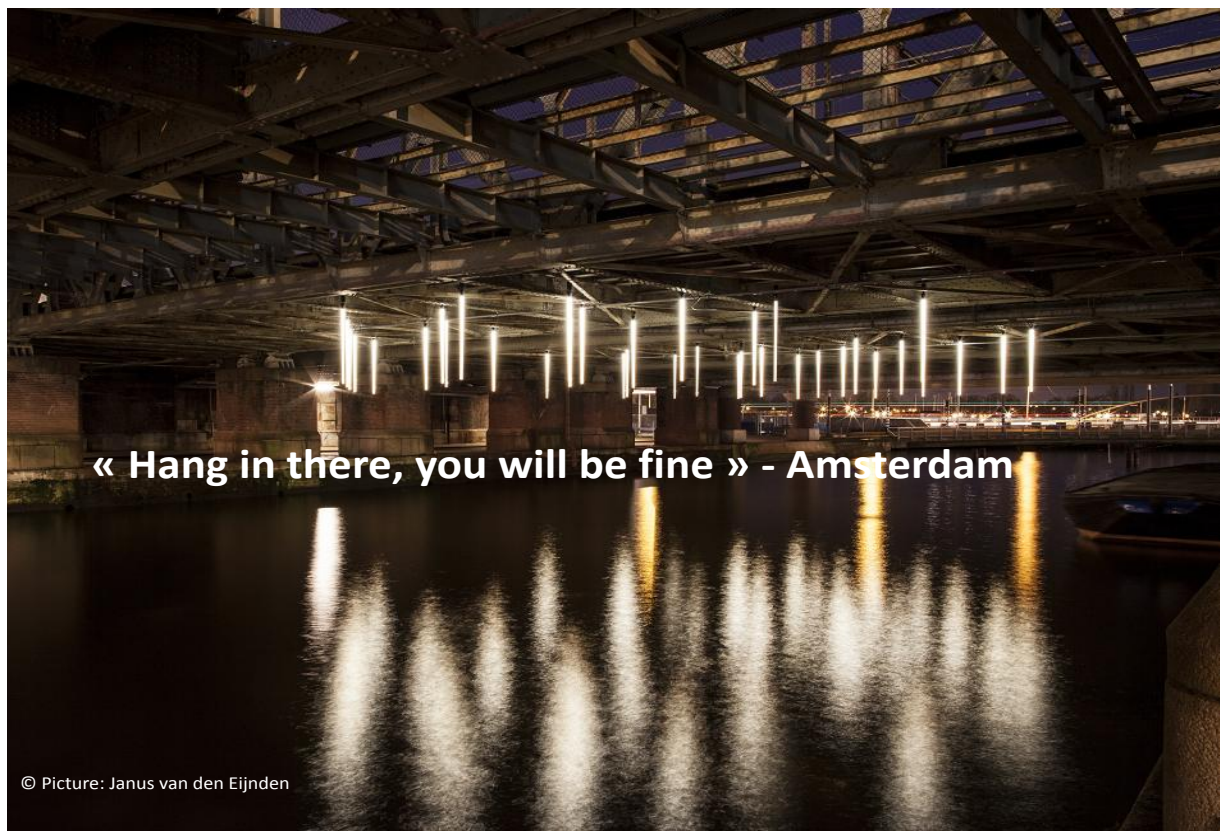






« Silo 468 » - Helsinki

© Picture: Tuomas Uusheimo – City of Helsinki



« Hang in there, you will be fine » - Amsterdam

© Picture: Janus van den Eijnden





## Light and Art in Gothenburg



© Göteborg Konst, picture: perpixel.se

## City of Gothenburg: More eyes in Tynnered project



© Göteborg Konst, picture: perpixel.se





## City of Gothenburg: More eyes in Tynnered project



Före upprustning

© Göteborg Konst, picture: perpixel.se

## City of Gothenburg: More eyes in Tynnered project



© Göteborg Konst, picture: perpixel.se





## City of Gothenburg: More eyes in Tynnered project



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## City of Gothenburg: More eyes in Tynnered project



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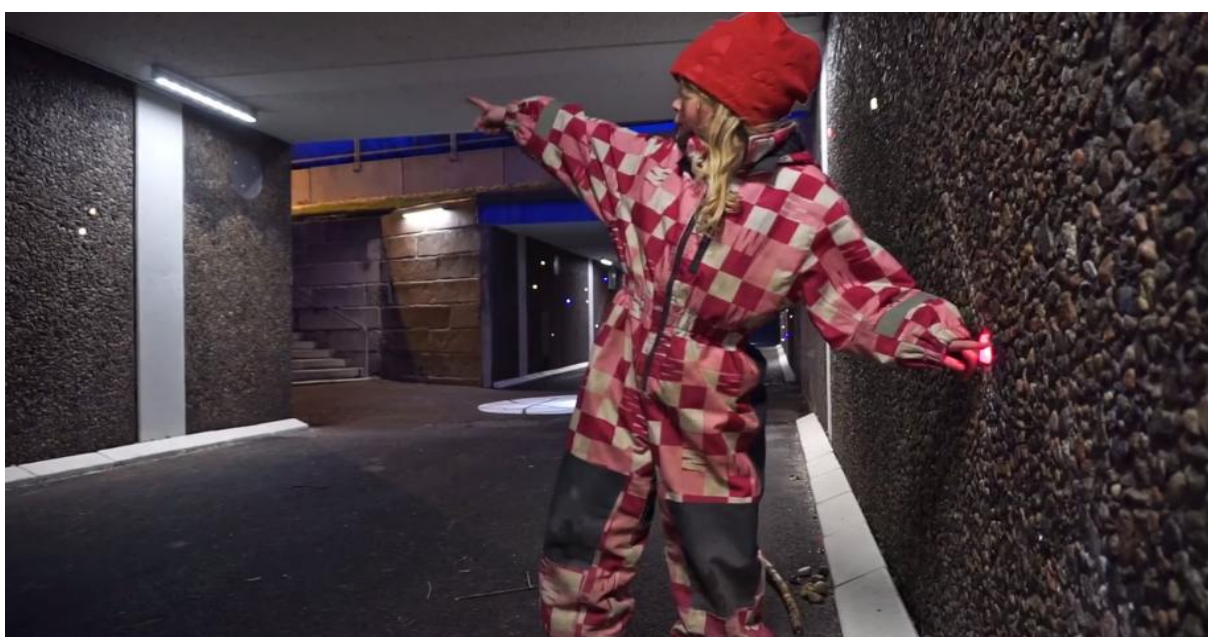


## City of Gothenburg: More eyes in Tynnered project



© Göteborg Konst, picture: perpixel.se

## City of Gothenburg: More eyes in Tynnered project



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## City of Gothenburg: More eyes in Tynnered project



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## City of Gothenburg: More eyes in Tynnered project



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## City of Gothenburg: More eyes in Tynnered project



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ANY QUESTIONS ?



Thank you for your  
attention !

Mark Burton-Page  
General Director  
[mark.burtonpage@luciassociation.org](mailto:mark.burtonpage@luciassociation.org)



## Day 1-Session2

### Case Presentation

European and International case studies on urban lighting - A tale of two cities: Lighting design in Cartagena, Colombia

**Don Slater**  
(Professor, London School of Economics)

Urban  
Lighting  
Workshop





## A tale of two cities: Lighting design in Cartagena, Colombia

Don Slater  
London School of Economics

**CONFIGURING LIGHT**  
staging the social



**Nighttime design – Building better communities with light**

- Nighttime needs to be designed
- small, repeated lighting interventions
- community 'buy-in'
- social research methodologies

**Nighttime Design**

Leni Schwendinger, Arup urban lighting group





The 'other Cartagena'

...the 'ghost town'



- Working class and marginalized barrio of Cartagena
- UNESCO World Heritage site.
- Rapidly gentrifying
- Complex population in 'temporary equilibrium'
- People value edgy, cool atmosphere

**Getsemani**  
**Cartagena, Colombia**





Nighttime in Getsemani *is* an atmosphere shared by different people doing very different things



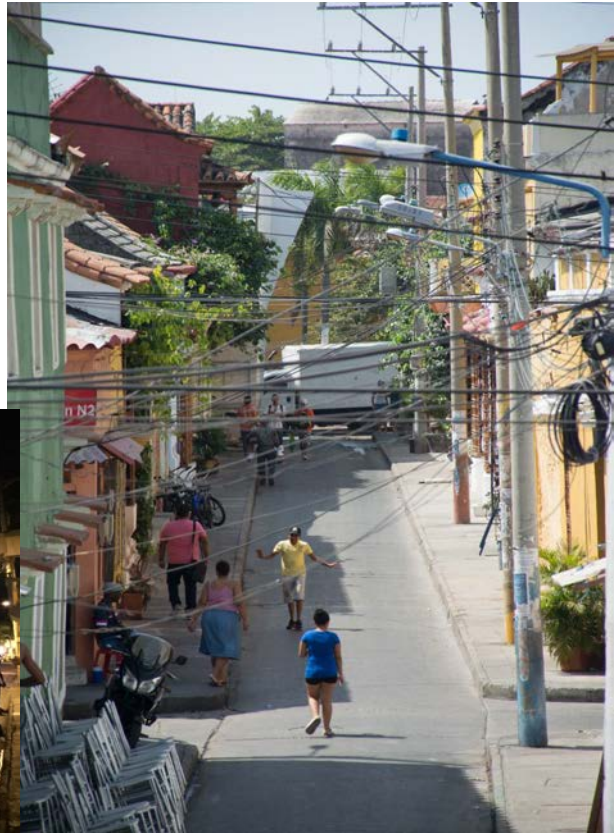
No Design....but many 'designs' ...different layers come from different projects and practices

Lighting and atmosphere come from activities as much as municipal planning





Exciting atmosphere or infrastructure failure?



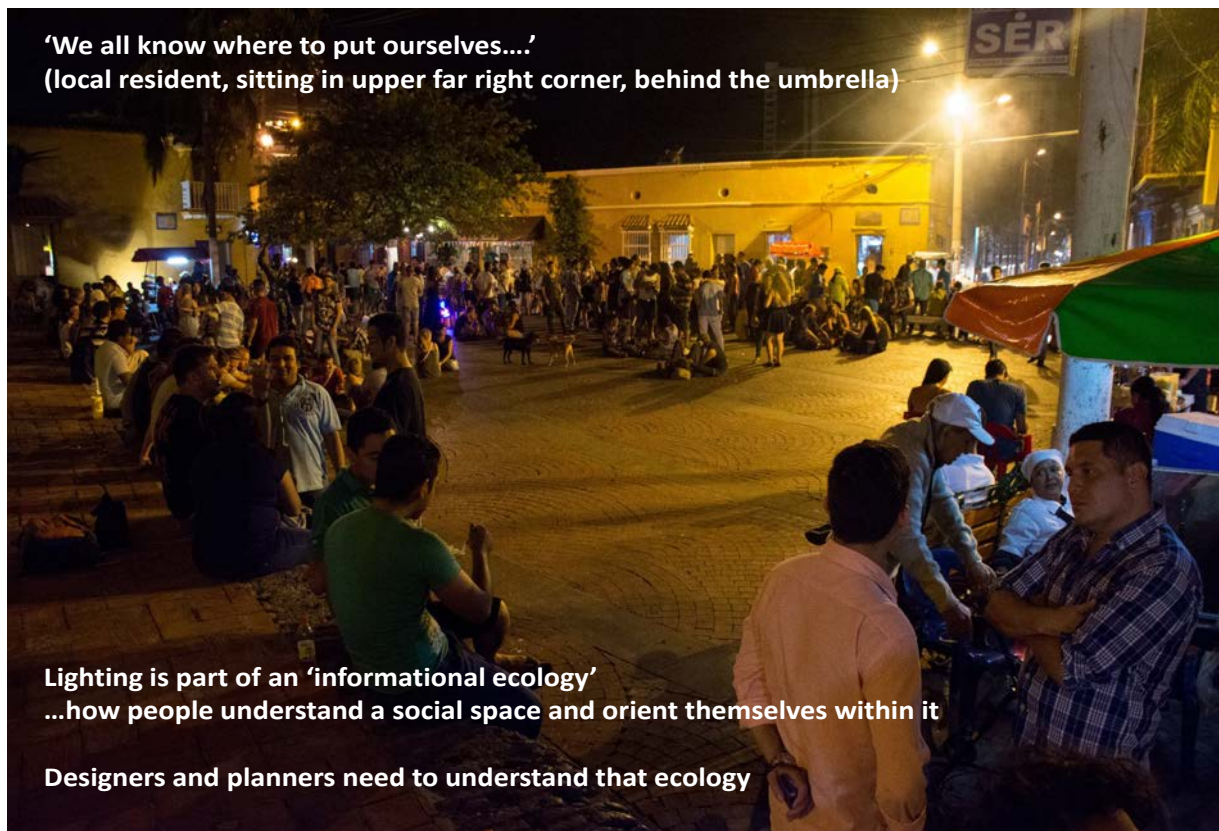
From designs to Design  
Homogenised light and materials  
Conventionalised cultural forms  
Ordered lighting







Lighting for buildings or for people?



'We all know where to put ourselves....'  
(local resident, sitting in upper far right corner, behind the umbrella)

Lighting is part of an 'informational ecology'  
...how people understand a social space and orient themselves within it

Designers and planners need to understand that ecology



## Research

- Interviews with wide range of users of the place
- Spatial analysis
- Observation
- Photo analysis
- Workshops – show Leni's cards



The design response....









# CONFIGURING LIGHT

## staging the social

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[www.configuringlight.org](http://www.configuringlight.org)  
[www.socialnightscapes.org](http://www.socialnightscapes.org)

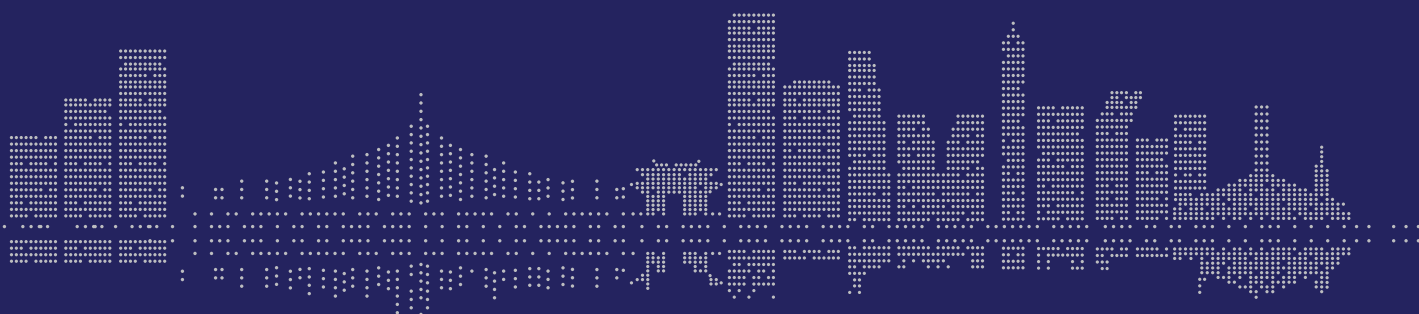
Facebook: Configuring Light/Staging the Social  
Twitter: @configlight

# Day 2

## Tools for Saving Urban Lighting Energy and Costs

- **Building Energy Efficient Cities in Southeast Asia: Applying SUEEP Framework  
Energy and Costs Savings with LED Street Lighting in Da Nang and Surabaya**

Ranjan K. Bose ..... 107  
(Senior Consultant, The World Bank)







## Day 2-Session3

### Tools for Saving Urban Lighting Energy and Costs

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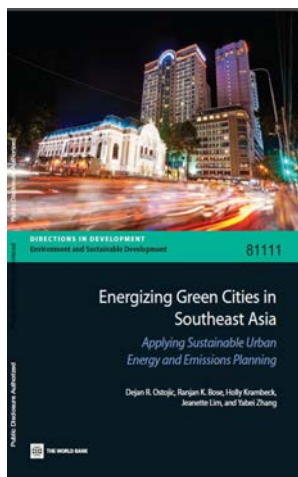
#### Building Energy Efficient Cities in Southeast Asia: Applying SUEEP Framework

- Energy and Costs Savings with LED Street Lighting in  
Da Nang and Surabaya

**Ranjan K. Bose**  
(Senior Consultant, The World Bank)



## Building Energy Efficient Cities in Southeast Asia: Applying SUEEP Framework Energy and Cost Savings with LED Street Lighting in Da Nang and Surabaya



**Ranjan Bose, Ph.D.**  
Sr. Energy Efficiency Consultant  
World Bank, Washington, DC  
[rbose@worldbank.org](mailto:rbose@worldbank.org)

*Presentation at*  
Urban Lighting Workshop

*Jointly organized by*

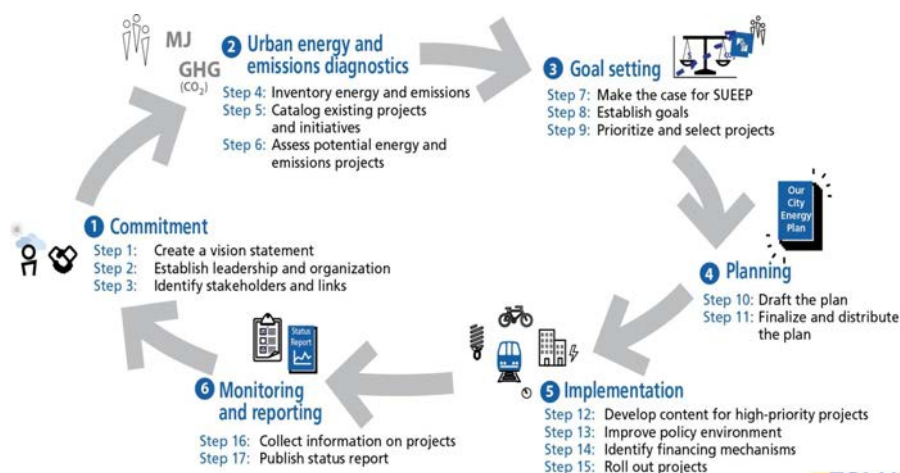
- ☐ City of Seoul
- ☐ LUCI (Lighting Urban Community International)
- ☐ CityNet

*Held at*  
Seoul, June 29-30, 2017

## SUEEP - Sustainable Urban Energy and Emissions Planning From vision to implementation

SUEEP aims to provide guidance to municipal governments for formulating and implementing long term urban energy and emissions sustainability plans.

### SUEEP Process



## SUEEP - 3 Pilot Cities



## Summary of Structural and Economic Data for Pilot Cities

Parameter	Cebu City	Da Nang	Surabaya
Population (m)	0.8	0.9	2.8
City area (km <sup>2</sup> )	291	1,283	327
Population density (per km <sup>2</sup> )	2,748	711	8,458
GDP/cap/year (\$)	5,732	1,627	8,261
Economic structure (%)			
Services	73	56	50
Industry	19	42	32
Agriculture/other	8	2	18

Source: Phase I pilot study.

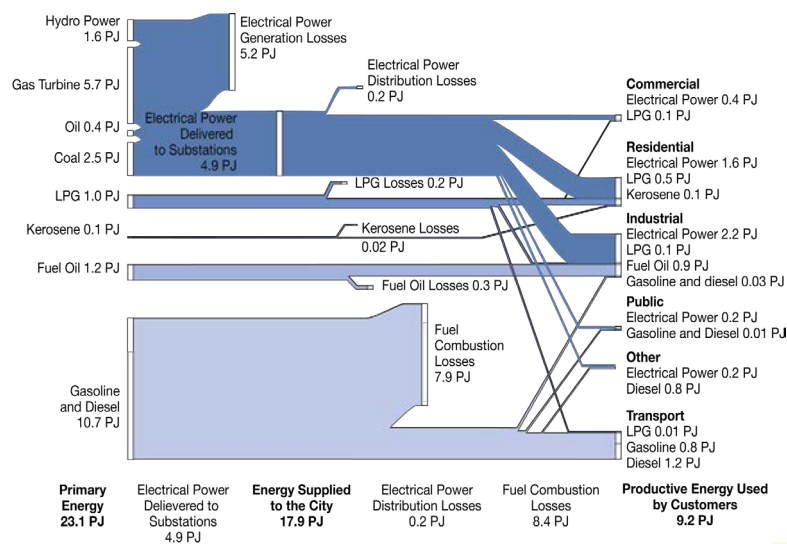
Note: GDP = gross domestic product; km<sup>2</sup> = square kilometer; m = millions.





## Da Nang: Energy balance (2010)

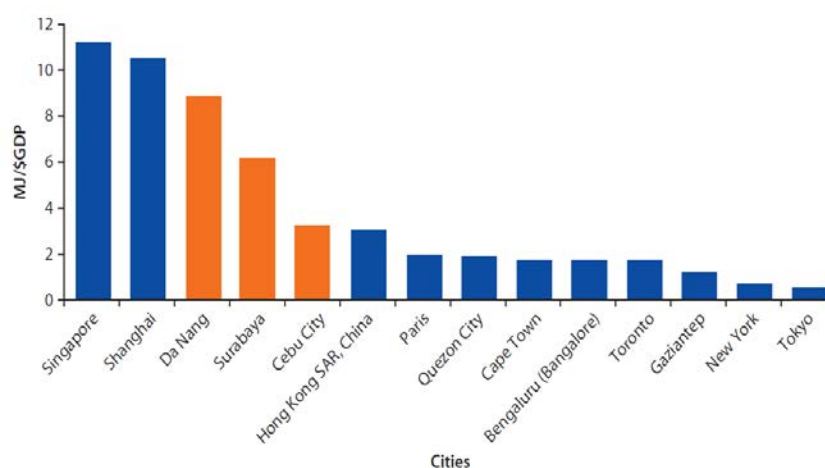
*Maps patterns of primary and secondary energy supply and use in a city, as well as efficiency of energy conversion.*



## Understanding the Cities:

**Tool for Rapid Assessment of City Energy (TRACE)**

Primary Energy Consumption Per Unit of GDP, TRACE 2010



Source: Phase I pilot study.

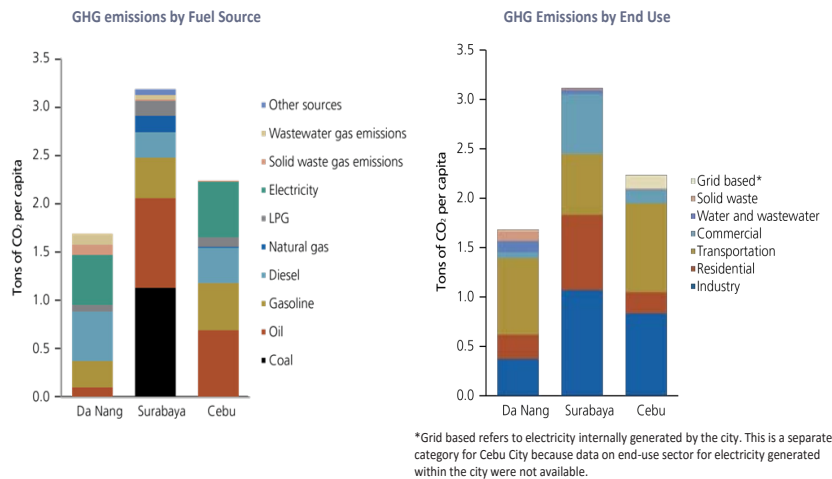
Note: GDP = gross domestic product; MJ = megajoules.



## Understanding the Cities:

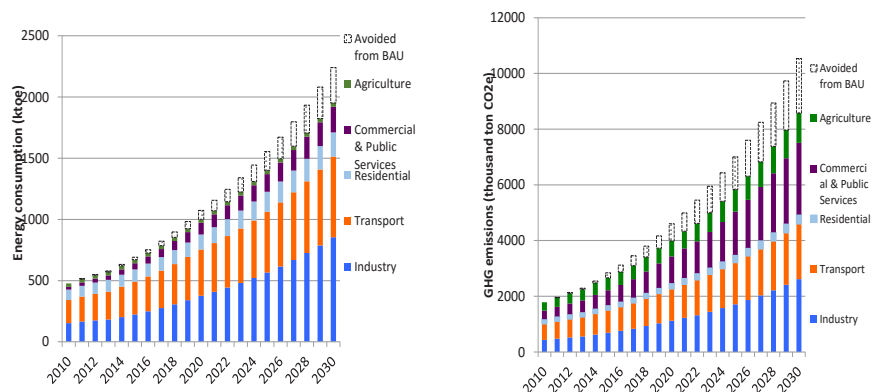
### GHG emissions inventory

*Determines the main sources of GHG emissions from city energy use.*



## Da Nang : Energy & Emissions Reduction Potential

### Green Growth Scenario Results – Target Setting



Target for reduction (compared to the BAU scenario)	2020	2030
Energy consumption	7%	13%
GHG emissions associated with energy consumption	15%	23%



## Priority Projects

### Da Nang

1. LED street lighting retrofit
2. Septage processing for Renewable Energy generation
3. Waste-to-Energy at Khanh Son landfill site
4. Large scale solar to industrial zones
5. BRT feeder

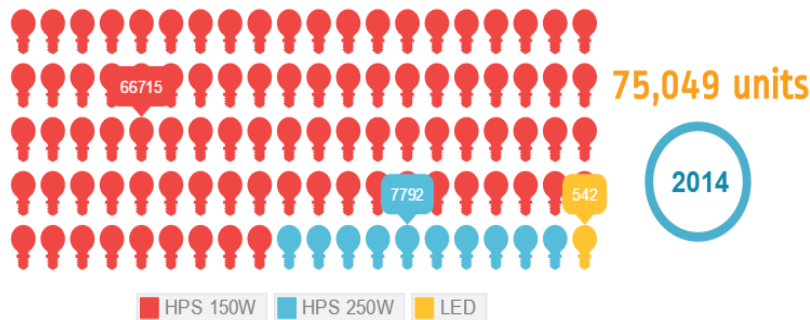
### Surabaya

1. LED street light retrofit
2. Wealth from Recycling at Super Depots
3. Water Pumping
4. IT-Based Integrated Ticketing
5. Upgrade Water Pipeline to Improve Water Quality
6. Green Buildings
7. Improve Performance of Pumping

## Surabaya Public Lighting: Retrofit with LED



## Public Lighting: Current Status of Street and Outdoor Lighting



HPS Luminaires and Lighting Poles in Surabaya



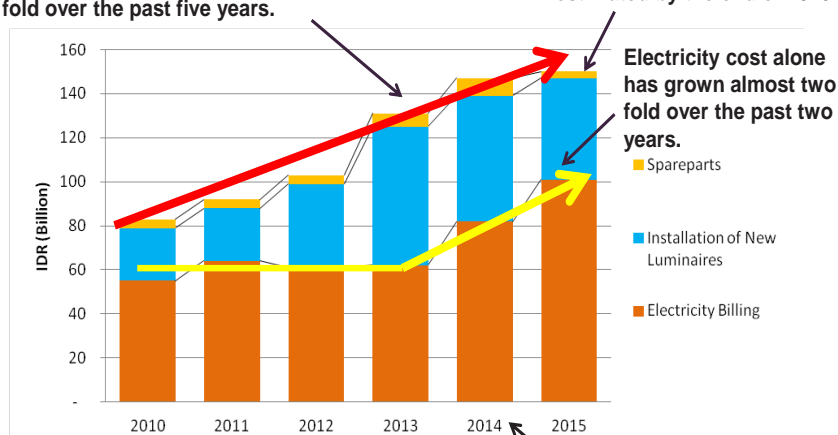
LED Luminaires and Lighting Poles in Surabaya



## Public Lighting: Rising Operating and Capital Expenditures

Operating and capital expenditure of street and outdoor lighting in Surabaya has grown almost two fold over the past five years.

The total cost of US\$11.5 million (IDR 150 billion) is estimated by the end of 2015.

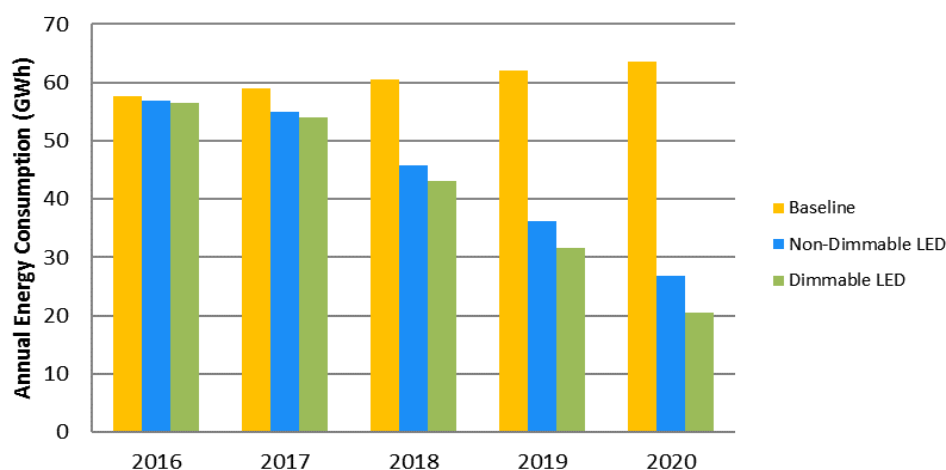


Source: Bappeko and DKP, 2015

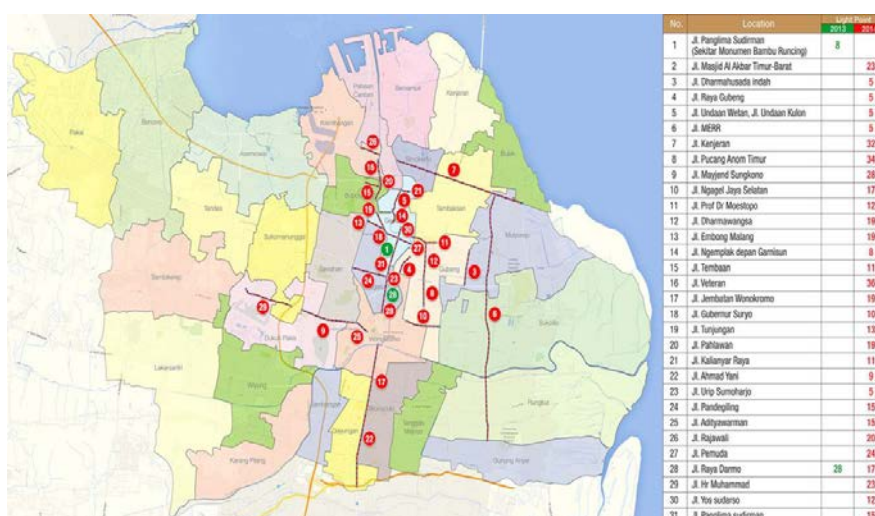
About 75,000 light points, approximately 5,000 light points are added into the system annually.



## Energy Savings Potential with LED



## Public Lighting: Locations of LED Installations in 2013 and 2014 in Surabaya



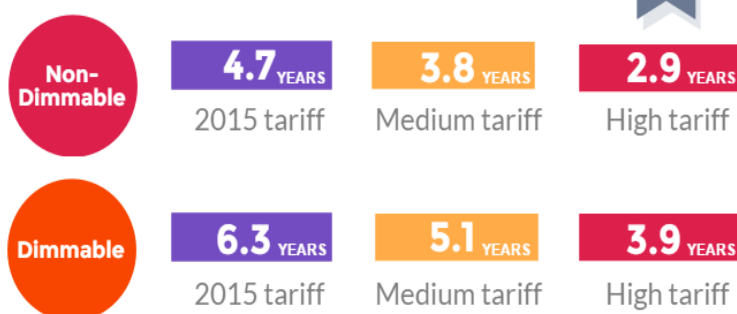
➤ 95% of the street and outdoor lighting is metered

## Public Lighting: Economic Feasibility of Non-Dimmable vs. Dimmable LED

### Estimated Savings and Costs for Non-Dimmable and Dimmable LED

LED Technologies for HPS Retrofits in Surabaya

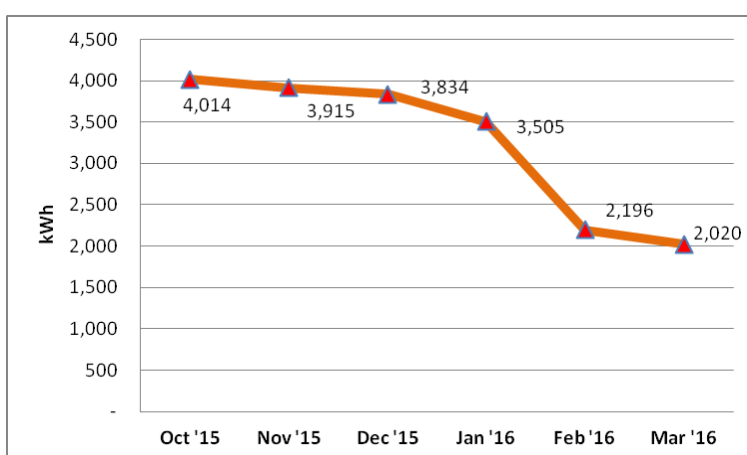
PAYBACK PERIOD



Note: 2015 Tariff = US\$0.12/kWh; Medium Tariff = US\$0.15/kWh; High Tariff = US\$0.20/kWh



## Public Lighting: LED Pilot Phase shows 50% energy savings



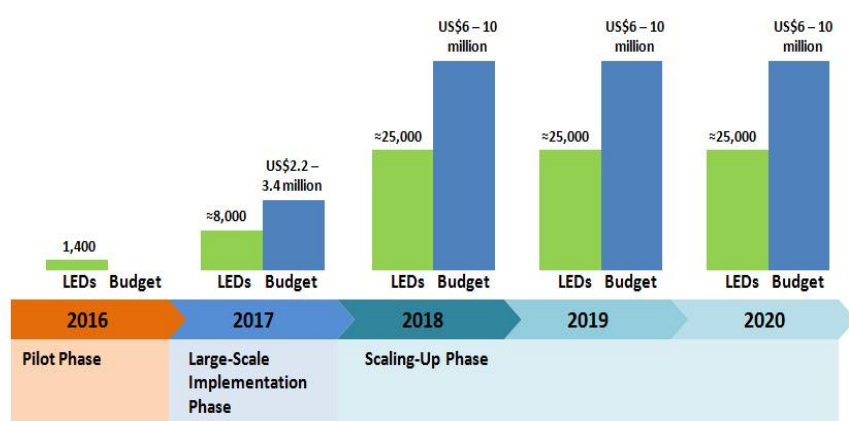
The LED pilot projects implemented by the CGS have confirmed that energy consumed by LED luminaires is half (or less) for the same luminaire light output.

- With the current electricity tariff of about US\$0.12/kWh, the payback period of LED investment is about 5 years





## Public Lighting: Phased-Step LED Implementation Proposal



❑ **US\$19-\$27 million required over the 5-year period to completely change over to LED.**



## Public Lighting: Financing Option for LED

Financing Options	Pros	Cons	Applicability for Surabaya
<b>Equity Financing (through APBD)</b>	Current practice	Limited funding size	Short term, small scale investment (< US\$ 3 million)
<b>Debt Financing (private sector leasing with repayments through APBD)</b>	Applicable under current regulatory framework	No experience in Surabaya	Small to medium scale investment (US\$ 3-5 million)
<b>Energy Service Companies (ESCOs)</b>	Private sector investment	No supported regulatory framework	Medium to large scale investment
<b>Public-Private Partnership</b>	Private sector investment	No experience at the local government level	Large scale investment
<b>PT. SMI/RIDF Loans</b>	Supported by the national government	No experience at the local government level	Large scale investment
<b>International Climate Finance</b>	Large scale financing with TA	No experience at the local government level	Large scale investment





## Conclusions

Operating and capital expenditures for street and outdoor lighting in Surabaya are on the rise.

LED technologies are proven to be viable for Surabaya (based on the results of pilot implementation).

Different financing options are available for the CGS to consider and apply for implementation.

EE street and outdoor lighting in Surabaya can be implemented in 3 phases from 2016 to 2020 with a cumulative investment of US\$19-27million.

The simple payback period for the citywide investment will be 5-6 years (US\$0.12/kWh) and 3-4 years (US\$0.20/kWh) depending on types of LED chosen and electricity cost.

LEDs will result in annual electricity and maintenance cost savings of about US\$5-7 million after 2020.

## Da Nang Public Lighting: Retrofit with LED



## Proposal Summary

### Phase I – Project Pilot

- ☐ To upgrade 9-10% of the existing 62,000 conventional street lights to an LED system, with optional automatic controls.
- ☐ The pilot will provide necessary data to implement the scale-up in Phase II

### Phase II – Project Scale-up

- ☐ Following successful implementation of Phase 1, the project can be scaled-up throughout Da Nang City

## Preliminary Findings

- ☐ Replacing mercury vapor lighting (~6000 light posts) with LEDs for street lighting will
  - reduce 67% electricity use
  - save \$290,000 per year in energy and maintenance costs
  - pay off \$1.6 million investment in a little over 6 years

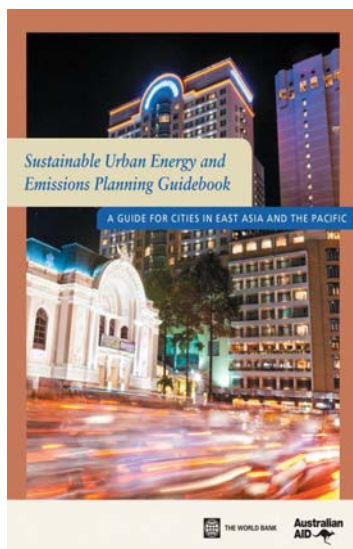


## Status of the LED retrofit project for street lighting

- ☐ Da Nang People's Committee desired a competitive financing arrangement denominated in local currency
- ☐ The city government approved following two companies to participate in the planning process of LED for street lighting in the city
  - ☐ Philips Electronics Vietnam Co., Ltd
  - ☐ Stanley Electric, Japan
- ☐ Both companies were asked to submit their investment scale proposal to the City government.
- ☐ The City government after reviewing the proposals shall consider organizing a meeting with the relevant agencies and units to select the optimal implementation plan
- ☐ The City government will notify the World Bank once the final implementation plan including financing arrangements has been agreed upon.







Thank You !

[rbose@worldbank.org](mailto:rbose@worldbank.org)

For further details on SUEEP please visit:

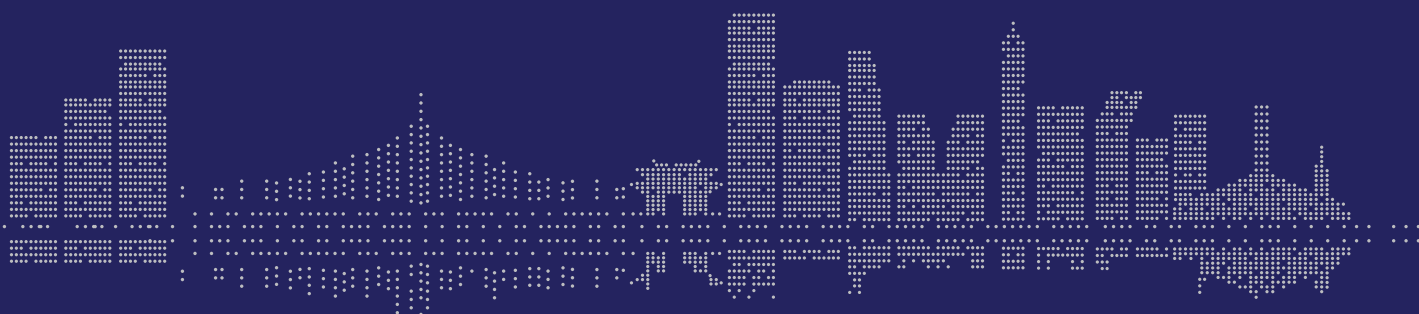
[http://www-wds.worldbank.org/external/default/WDSCContentServer/WDSP/IB/2013/09/19/000442464\\_20130919113535/Rendered/PDF/811110PUB0Gree0Box0379830B00PUBLIC0.pdf](http://www-wds.worldbank.org/external/default/WDSCContentServer/WDSP/IB/2013/09/19/000442464_20130919113535/Rendered/PDF/811110PUB0Gree0Box0379830B00PUBLIC0.pdf)

23

# Day 2

## Urban Lighting as a Tool for Urban Development Strategy

- **Urban lighting as a social tool for urban development**  
Don Slater ..... 121  
(Professor, London School of Economics)
- **Jinju Yudeung Festival**  
Jung-Chae Jeong ..... 133  
(Chief Director, Department of Tourism Promotion of Jinju City)
- **Smart City and Lighting Development in Asia**  
Young-Ho Baik ..... 147  
(Urban light policy advisory committee member of Seoul City)





## Day 2-Session4

### Urban Lighting as a Tool for Urban Development Strategy

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Urban lighting as a social tool for urban  
development - Social Lighting

**Don Slater**  
(Professor, London School of Economics)

**Urban  
Lighting  
Workshop**





Dr Joanne Entwistle  
CMCI, King's College London

Dr Don Slater  
Sociology, LSE

Dr Elettra Bordonaro  
iGuzzini Visiting Research Fellow, LSE

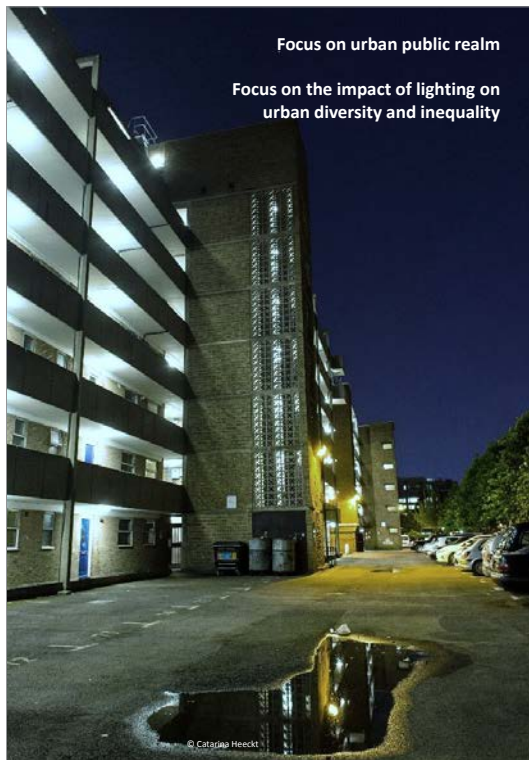
- Academic social research and methodologies
- Consultancies for cities and developers
- Professional training workshops on social research in design
- Public awareness events to raise the profile of lighting





Focus on urban public realm

Focus on the impact of lighting on urban diversity and inequality



## Configuring Light

...light is a material that is configured through expertise, technologies, practices

...collaboration between social research and design/planning professionals

...how designers and planners can more knowledgeably engage social spaces

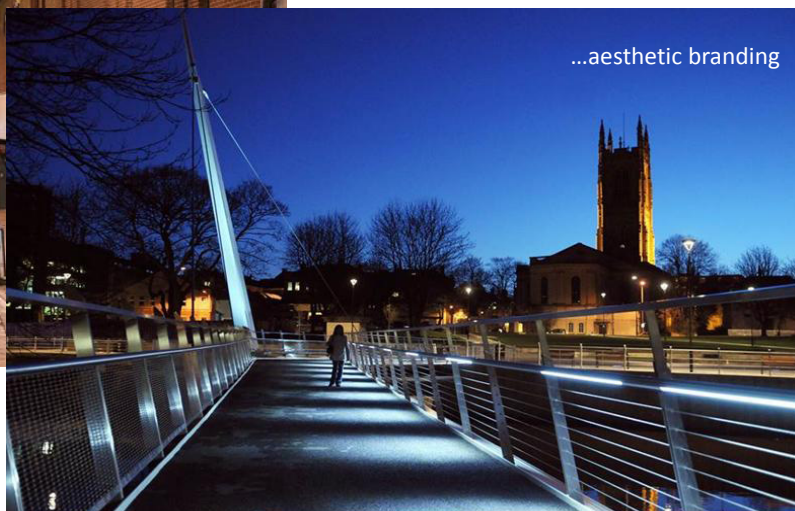


Functional lighting...



## What do we mean by the 'social' in lighting...?

...aesthetic branding





## What do we mean by the 'social' in lighting...?

**Diversity:** Identify and understand different *types* of social actors (neither 'people' nor 'individuals')

**Practices:** Map movements, activities, events

**Places:** Research spatial identities, atmospheres, meanings, conflicts



## TACKLING SOCIAL INEQUALITIES IN PUBLIC LIGHTING

CONFIGURING LIGHT  
staging the social

LSE

THE LONDON SCHOOL  
OF ECONOMICS AND  
POLITICAL SCIENCE

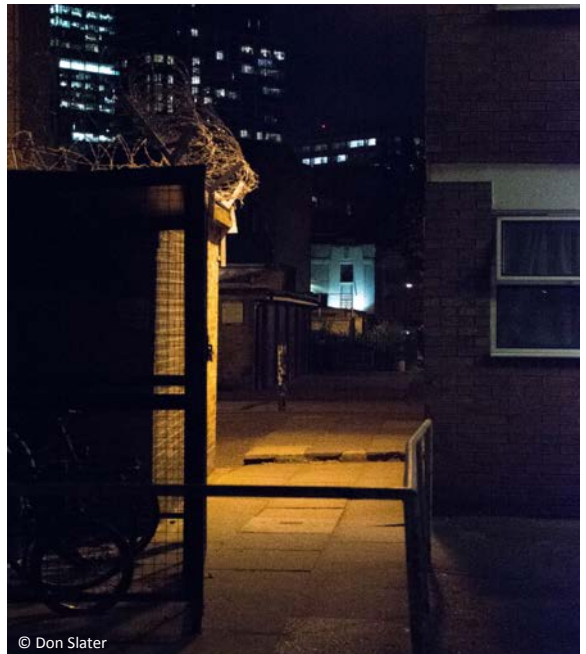




#### **Value:** place vs. problem



#### **Marking space:** connection vs. separation

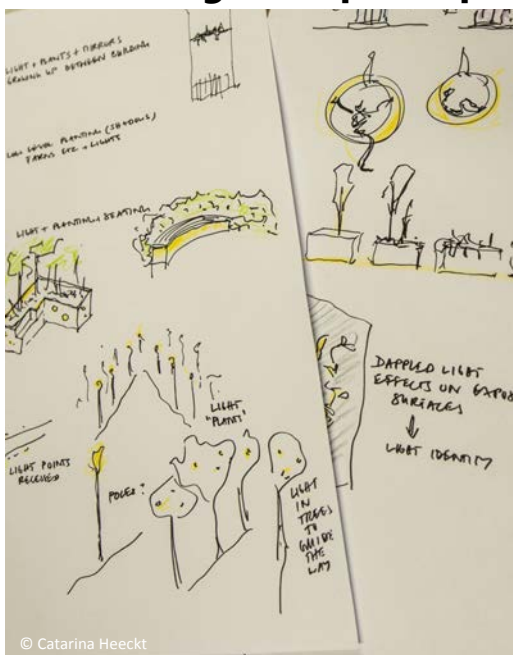




#### Diversity: diversity vs. design



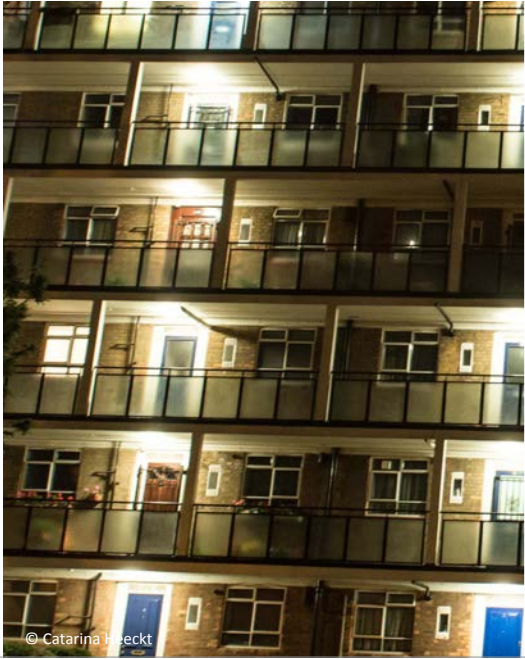
#### Knowledge and participation: expert vs. 'lay' knowledge







**(Ine-)Quality of Infrastructure : cost vs. care**

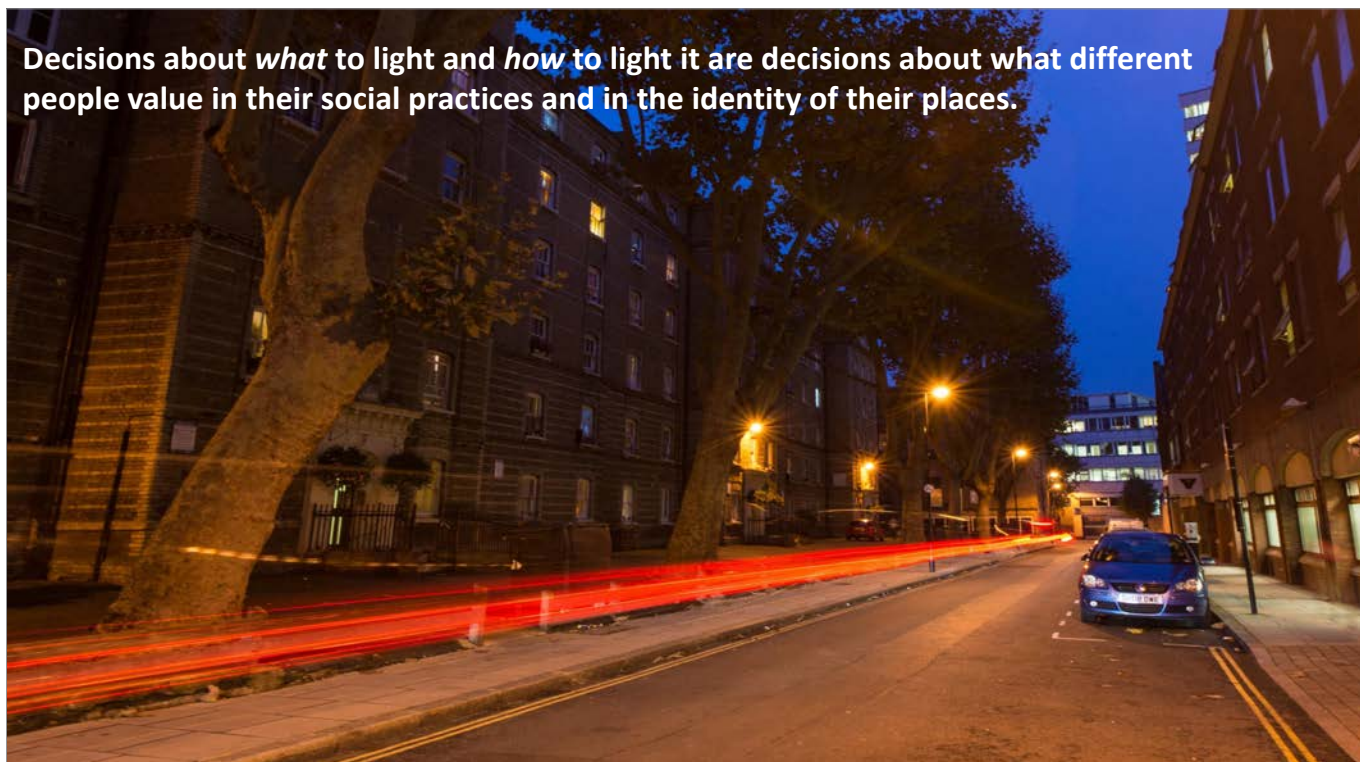


**Tackling social inequalities in public lighting means placing equal value, within planning, design and maintenance, on the needs of all stakeholders in order to create public spaces that are socially meaningful, practically enabling, aesthetically engaging and openly accessible.**





Decisions about *what* to light and *how* to light it are decisions about what different people value in their social practices and in the identity of their places.

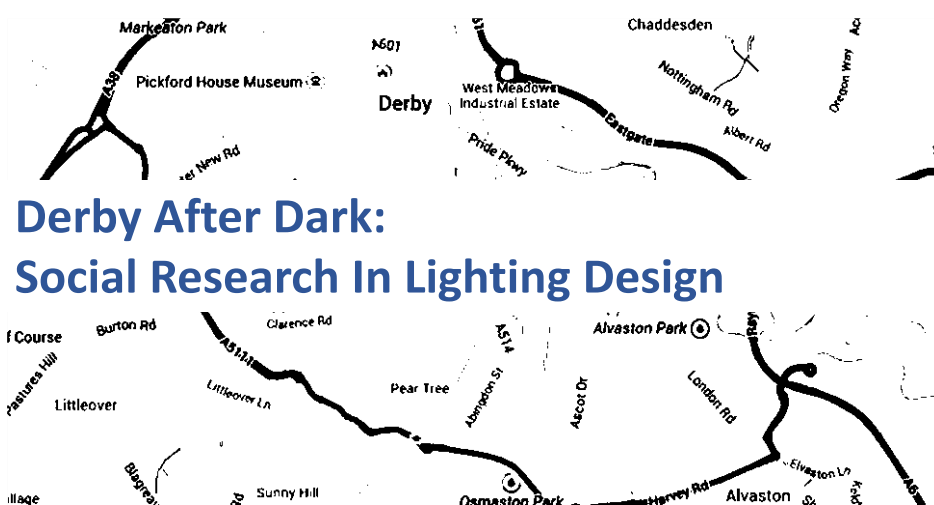


## CONFIGURING LIGHT

staging the social



THE LONDON SCHOOL  
OF ECONOMICS AND  
POLITICAL SCIENCE

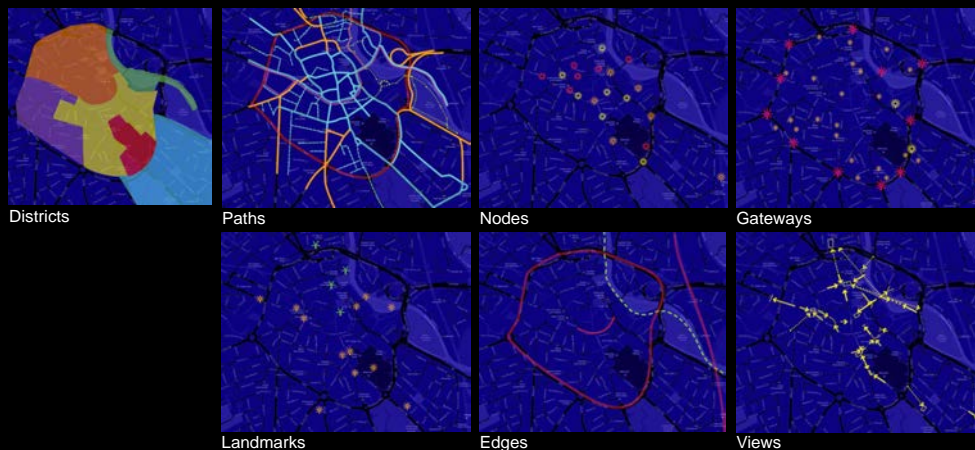




Derby after Dark

Analysis/ Legibility

SPEIRS + MAJOR



© 2013 Speirs + Major LLP.



**Energy costs and sustainability**

**What are people's social practices, and what energy demands do these practices generate?**

**'Smart' lighting**

**What should lighting be smart *about*? What information should it generate and respond to?**



Interviews  
Observation  
Photo/video analysis  
Walkabouts

How do we learn about lighting  
and ‘the social’?

Social research needs to be...

- Responsive and creative: city-specific
- In close dialogue with planning and design
- Iterative and questioning

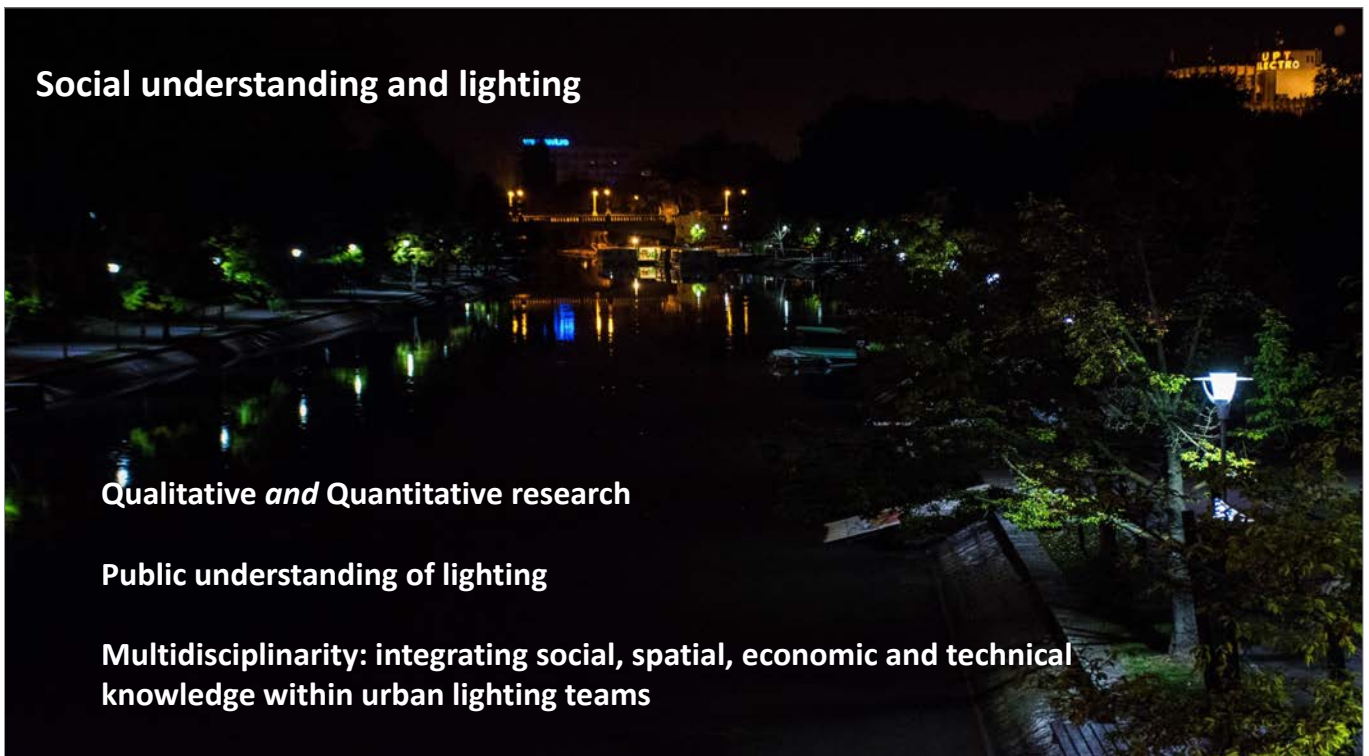


Social understanding and lighting

Qualitative *and* Quantitative research

Public understanding of lighting

Multidisciplinary: integrating social, spatial, economic and technical knowledge within urban lighting teams







# CONFIGURING LIGHT

## staging the social

---

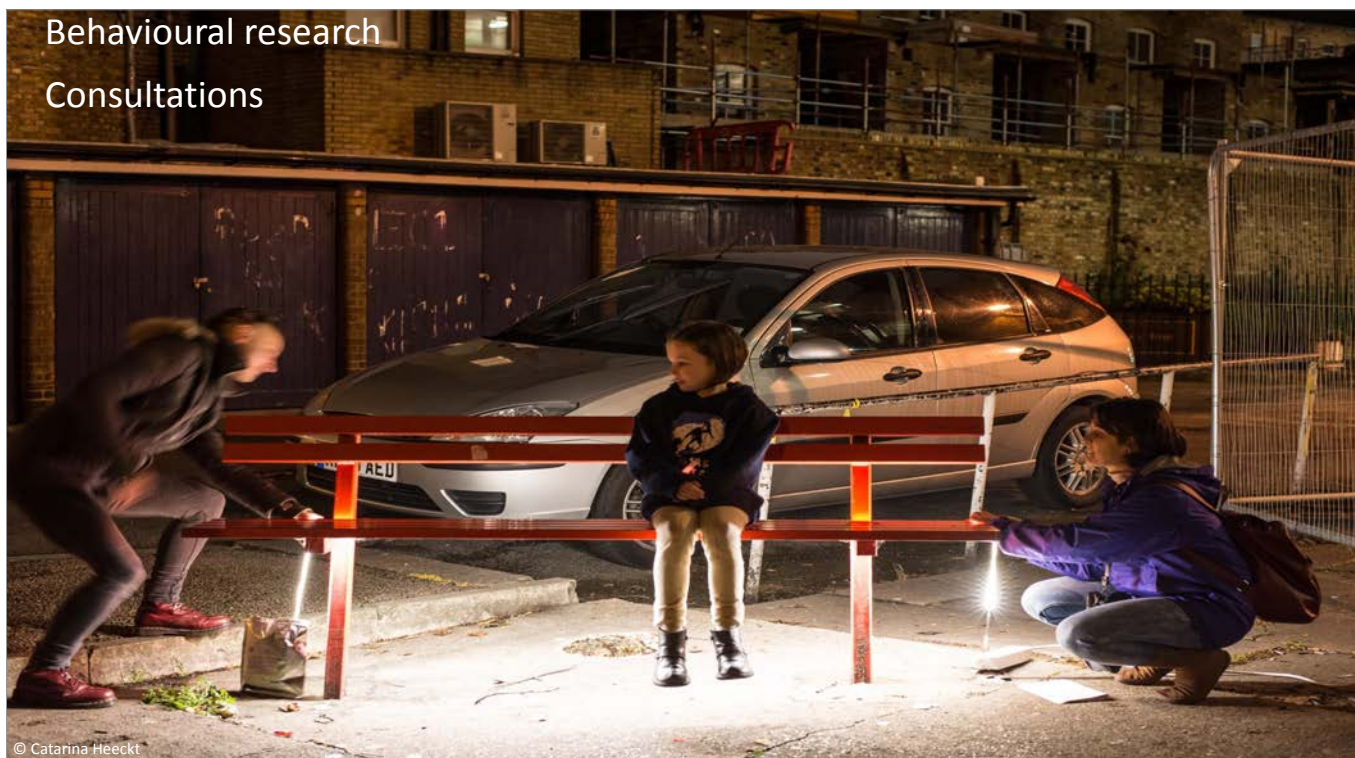
[www.configuringlight.org](http://www.configuringlight.org)

Facebook: Configuring Light/Staging the Social

Twitter: @configlight

Behavioural research

Consultations



© Catanna Heeckt





## Day 2-Session4

### Urban Lighting as a Tool for Urban Development Strategy

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Jinju Yudeung Festival

**Jung-Chae Jeong**

(Chief Director, Department of Tourism Promotion of Jinju City)

Urban  
Lighting  
Workshop





The Global Festival in Korea

## Jinju Yudeung Festival



## Contents

The Global Festival in Korea  
**Jinju Yudeung Festival**

01

Introduction of Jinju

02

Introduction of Jinju Yudeung Festival

03

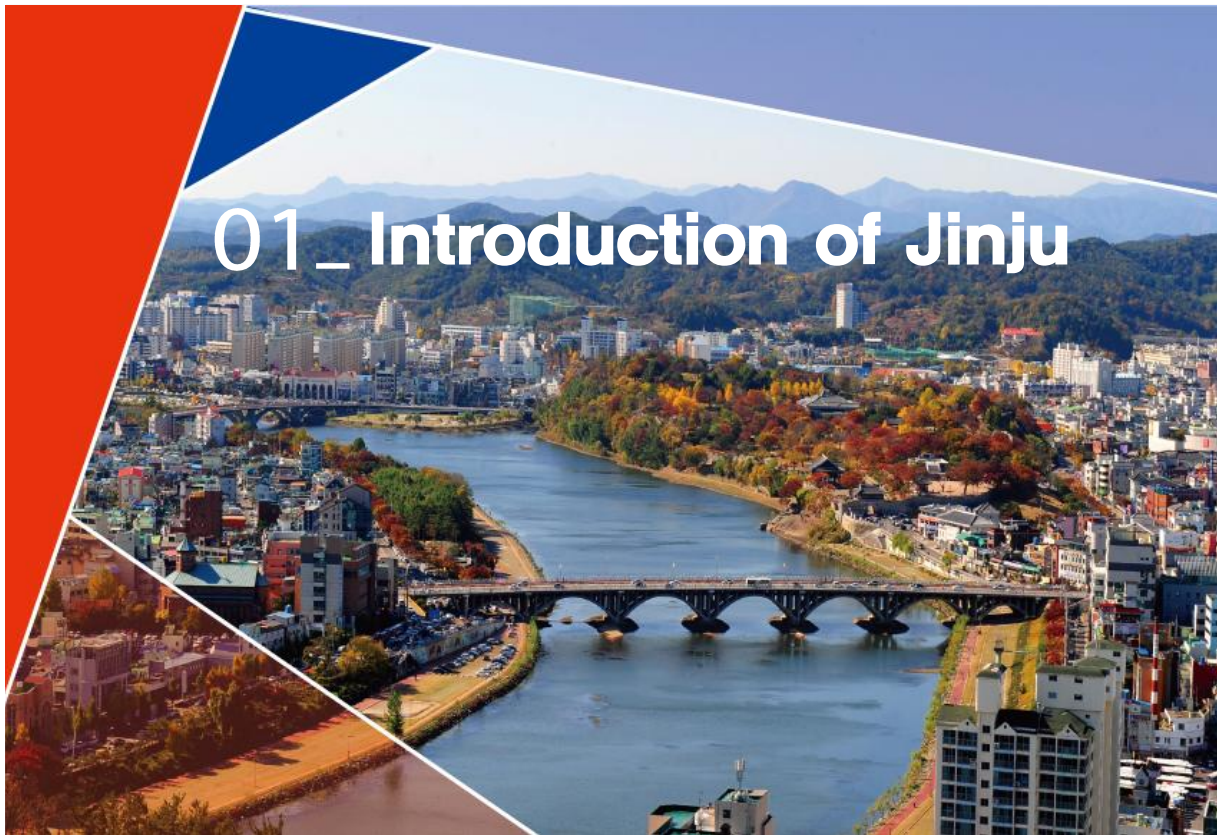
The excellence of Jinju Yudeung Festival

04

The globalization of Jinju Yudeung Festival

05

The future vision of Jinju Yudeung Festival



## Jinju, the central city of the Southern Region in Korea

Area	712.96km <sup>2</sup> (6.8% of Gyeongnam Province)
Population	360,000 (10.2% of Gyeongnam Province)
Financial Status	1,080 billion KRW (General Accounting 839.1 Special Accounting 240.9)
Administrative Districts	1 eup, 15 myeons and 14 dongs (337 ris, 557 tongs and 4,018 bans)
Administrative Organization	5 bureaus 29 divisions, 2 direct control centers, 5 operation offices, 30 eup, myeon and dong (1,509 public officers)





1-2

## Introduction of Jinju

The origin city of festival in Korea  
**World Festival & Event City**



The New Hub City leading Korea  
**The city of Industry & Culture**



1-3

## Introduction of Jinju

The No.1 agricultural products  
exporting city in Korea



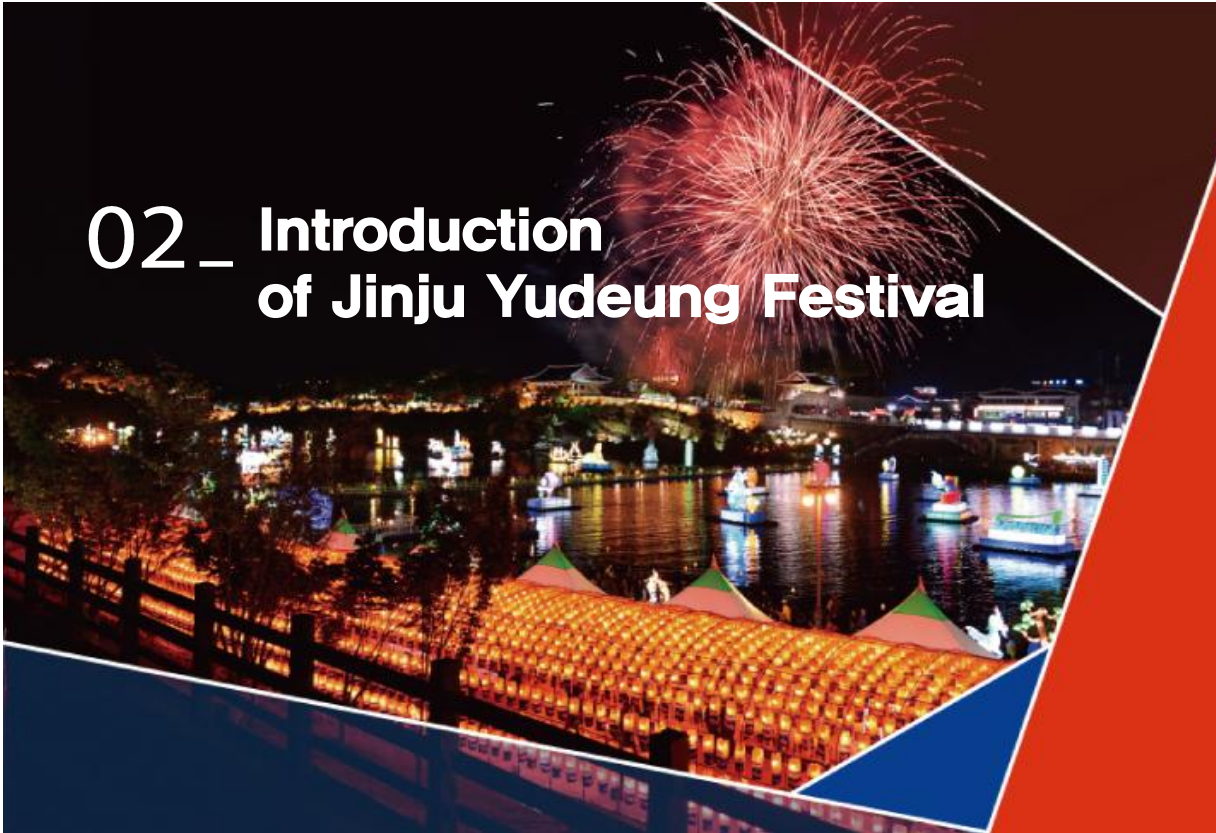
The role model city  
of welfare policies in Korea







## 02\_ Introduction of Jinju Yudeung Festival



2-1

### Introduction of Jinju Yudeung Festival



#### The origin of Jinju Yudeung Festival

The festival derived from the yudeungs which were flied to the sky and floated on the Namgang River during the Japanese Invasion in 1592 as means of military signals and communication with families out of the Jinjuseong Fortress.

**One of the programs in Gaecheon Art Festival, the origin local art festival in Korea**

⇒ Separated from Gaecheon Art Festival in 2000





2-2

## Introduction of Jinju Yudeung Festival



### The development process of Jinju Yudeung Festival



2-3

## Introduction of Jinju Yudeung Festival



### Briefing of Jinju Yudeung Festival

Duration	2017. 10. 1. ~ 10. 15. (for 15 days)
Venue	Around Jinjuseong Fortress and Namgang River, Jinju City, Gyeongnam Province, the South Korea
Organized	by Jinju City and Jinju Culture & Art Foundation
Conducted	by Jinju Yudeung Festival Committee
Contents	36 events (16 main events, 12 experience & participation, 8 unit events) ( <b>exhibition of more than 70,000 yudeungs</b> from small to big sized wishing lanterns, creative lanterns and symbolic lanterns)
Budget	4 billion KRW(0.6 of subsidy and 3.4 own funds)



2-4

## Introduction of Jinju Yudeung Festival



### Main Programs



Fireworks on the river



Wishing Lantern Tunnel



The Theme Road outlined the site



Experience of making and floating lantern



Lanterns on the Namgang River



Lanterns on Korean tradition

2-5

## Introduction of Jinju Yudeung Festival



### The feature of Jinju Yudeung Festival

- The original festival specializing the history of Jinju
- The participation-typed festival developed with the citizen's support and mayor's will
- The night festival harmonizing Jinjuseong Fortress, Namgang River and the lanterns
- The most popular festival attracting lovers, friends, families and foreigners







## 03 – The excellence of Jinju Yudeung Festival



### The excellence of Jinju Yudeung Festival

3-1

The highest independence rate among festivals in Korea

The first local festival which began becoming charged in 2015

#### The background of becoming charged

- Changes in the policy of the Central Government: Festival sunset policy, general subsidy, total amount limit system in event & festival
- The limitation of existing independence and long-term development of the festival



From the festival budget in 2016, there was income of 3.4 billion KRW (85% independence rate)

- Income from ticketing 2.4 billion KRW
- Others 1 billion KRW (sales of wishing lanterns, experience of floating lanterns, advertisement and so on)



3-2

## The excellence of Jinju Yudeung Festival



### The World Festival & Event City

- Selected twice by IFEA in 2010 and 2015
- Awarded 7 golden, 3 silver and 2 bronze prizes from Pinnacle Awards by IFEA

### Global festival selected by the Central Government

- The first Korean festival which was exported overseas
- Exporting Korean tradition through the festival



3-3

## The excellence of Jinju Yudeung Festival



### More efficient and competitive than big-scaled expo

A profitable festival having lower investment costs and no extra expenses after the event, compared with other expos

Division	Duration	Investment	Visitors		Investment per a visitor	Note
			Total	Daily mean		
Expo A	5.12 ~ 8.12 (for 93 days)	2,100 billion KRW	8.2million	88 thousand	260,000 KRW	—
Jinju Yudeung Festival	10.1 ~ 10.14 (for 14 days)	2.3 billion KRW	2.2million	157 thousand	1,000 KRW	—

Contrast table for Jinju Yudeung Festival and Expo A (2012)







3-4

## The excellence of Jinju Yudeung Festival

### Rushes of bench-marking and love-calls for the festival

- More than 200 persons from 20 local governments to bench-mark the festival and love-calls (2016)
- Love-calls for the yudeungs from international events like FIFA U-20 World Cup and Pyeongchang's 2018 Winter
- Orders of manufacturing the yudeungs from 3 biggest temples in Korea, public organizations and businesses



## 04\_ The globalization of Jinju Yudeung Festival







4-1

## The globalization of Jinju Yudeung Festival

### The Yudeung lighting the world

Canada

Winterlude Festival(the first entering the overseas), Niagara Light Festival

U S A

LA Korean Festival, Tucson, Hidalgo, IFEA General Conference

China

Xian Chengqiang Denghui



※ Jinju Yudeung Festival has enhanced the status of Korea and the brand value of Jinju by spreading the Korean culture in the world

4-2

## The globalization of Jinju Yudeung Festival



Winterlude Festival, Ottawa & Niagara Light Festival, Niagara Falls, Canada



The Border Fest 2015, Hidalgo, USA



International presses



4-3

## The globalization of Jinju Yudeung Festival

### The Activation of international exchanges through yudeung

- Expansion of cultural exchanges with international cities in Canada, USA, China and Australia
  - festival exchange with Xian, China and MOU agreement with Auckland New Zealand
- Becoming the member of LUCI and mutual cooperation in visiting, education, culture and economic exchanges

Jinju Yudeung Festival will play a role as an accelerator in the cooperative development of cities



## 05\_ The future vision of Jinju Yudeung







5-1

## The future vision of Jinju Yudeung Festival

### The improvement and independence of Jinju Yudeung Festival

- Enhancing the dynamic images and story-tellings, and creating high-tech lanterns
- Developing creative contents and various experience and participation programs
- Expanding the participation of businesses, developing souvenirs and finding various profit business



5-2

## The future vision of Jinju Yudeung Festival

### The processing of becoming the mecca of yudeung and industrialization

- Organizing Yudeung Research Institute and promoting the specialists
- Grafting yudeung onto city sculptures and wall-paintings and symbolization
- Construction of Jinju Yudeung Theme District by connecting the infrastructure of institute, exhibition & experience hall, and watchtower and local business area







5-3

## The future vision of Jinju Yudeung Festival

### The 5 World Luxury Festival attracting the world

- Expanding the entering Europe and New Zealand succeeding to USA, Canada and Asia
- Developing to one of 5 global festivals by industrialization and globalization of the festival
- Making the luxury festival by dignifying Korean colors, designs and artistic value



# Thank You.





## Day 2-Session4

### Urban Lighting as a Tool for Urban Development Strategy

Smart City and Lighting Development in Asia

Young-Ho Baik

(Urban light policy advisory committee member of Seoul City)

Urban  
Lighting  
Workshop



# Smart City & Smart Lighting

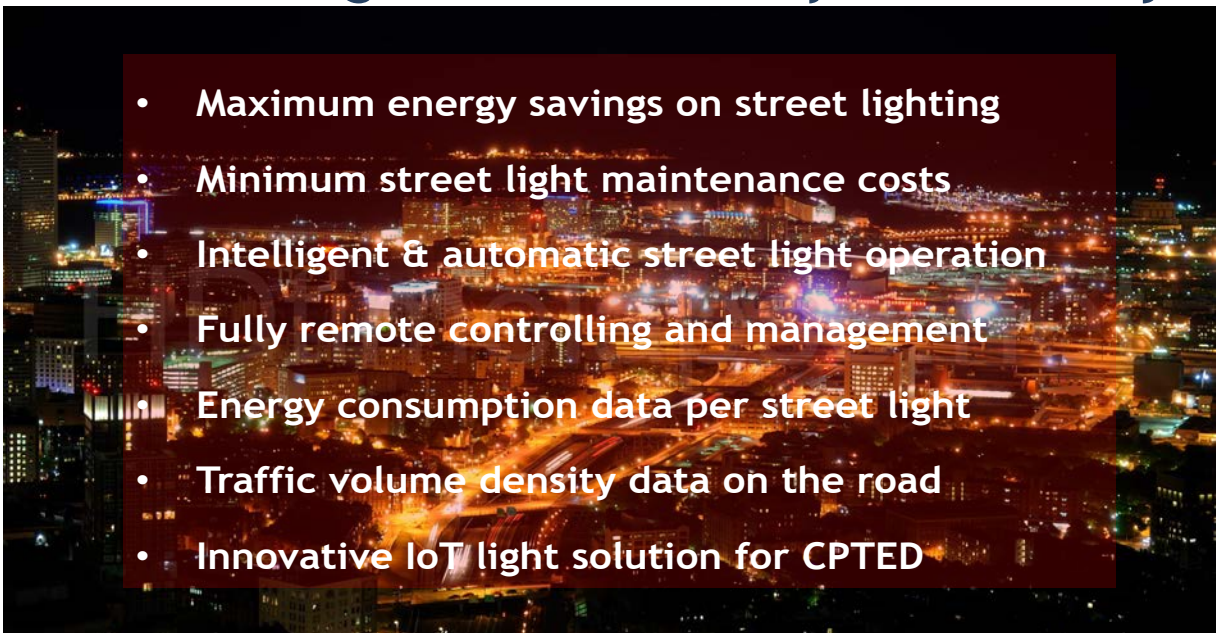
## Development in Asia Countries



### Executive summary

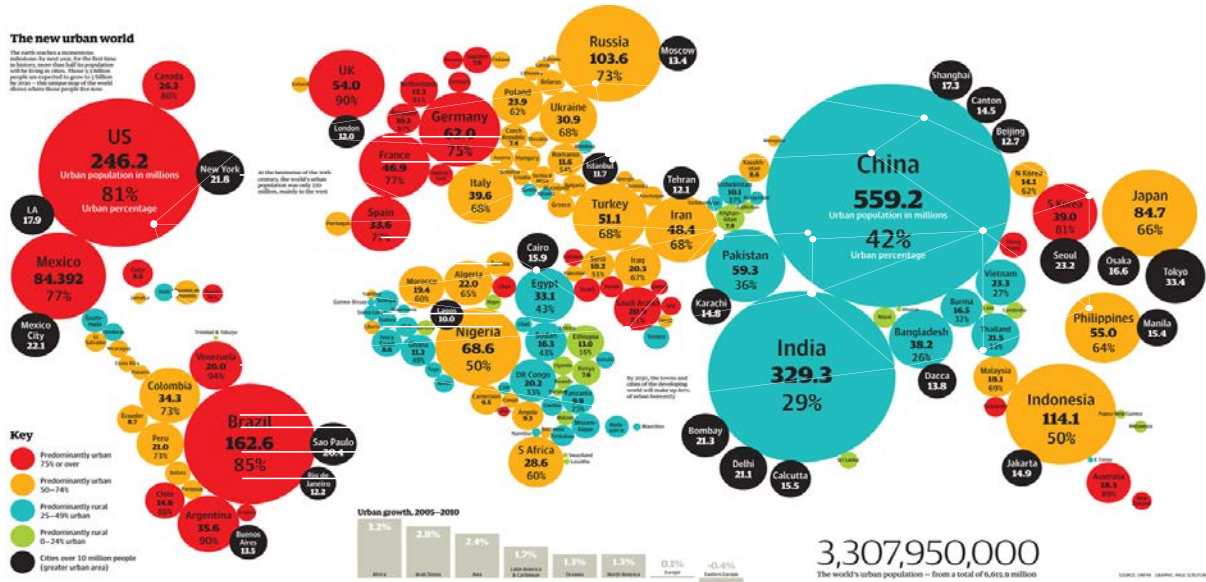
IoT street lights is the core way to smart city

- Maximum energy savings on street lighting
- Minimum street light maintenance costs
- Intelligent & automatic street light operation
- Fully remote controlling and management
- Energy consumption data per street light
- Traffic volume density data on the road
- Innovative IoT light solution for CPTED





## Worlds Urban Population



### Statics

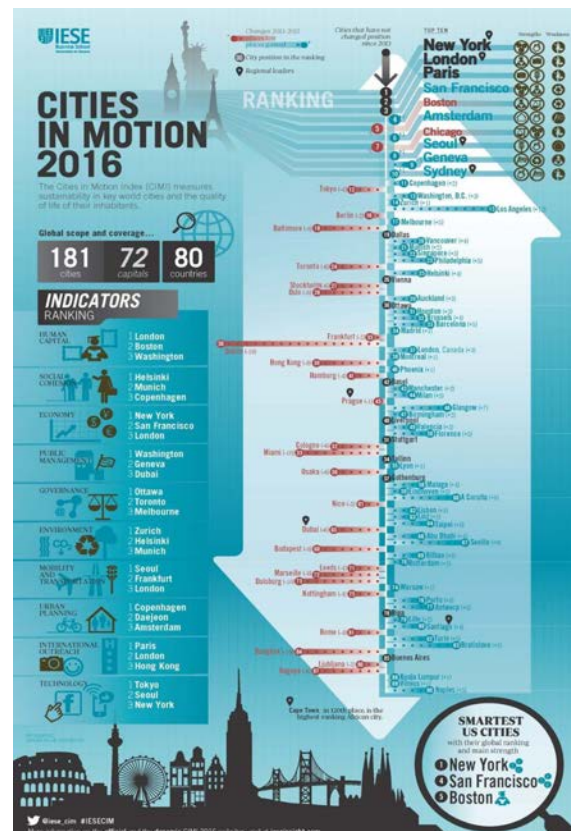
Population : Asia 4.3bln, Africa 1bln, America 0.9bln and Europe 0.8bln

**70% of world's population will live cities by 2050**

**Livable world cities are essential for a prosperous future**

### 10 distinct dimensions of urban life

1. The economy
2. Technology
3. Human capital
4. Social cohesion
5. International outreach
6. The environment
7. Mobility & transportation
8. Urban planning
9. Public management
10. Governance



## A Smart City

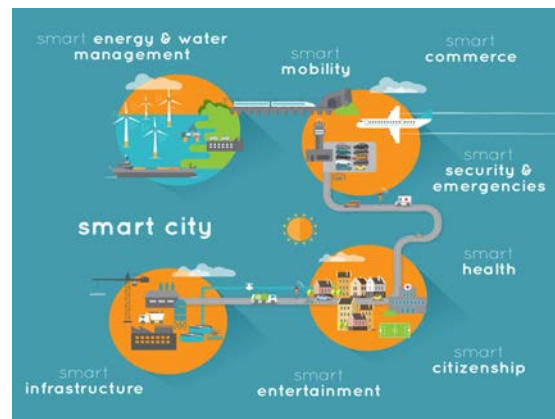
A place where the traditional infrastructures, services and networks are improved and made more efficient with the help of ICT technologies



A Smart City is a place where the traditional infrastructures, services and networks are improved and made more efficient with the help of ICT technologies, meeting the needs of its citizens and businesses. Collecting data from **smart devices and sensors embedded in roads**, power grids, buildings, transportation, infrastructures and others using **smart software** for digital added value services, **is crucial for Smart Cities**.

The Internet of Things (IoT) appears to be one horizontal enabler for Smart City applications.

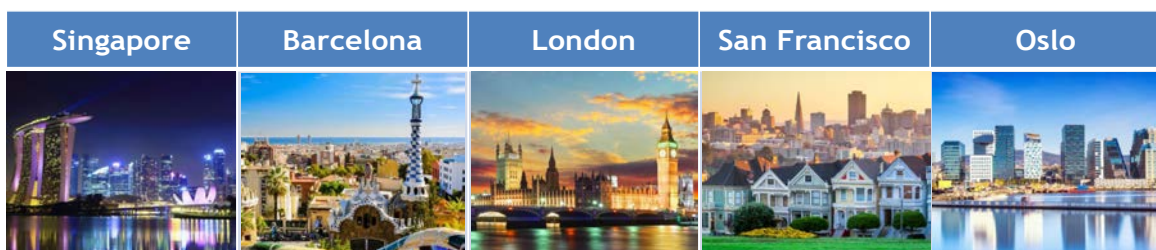
eureka-smart-cities-org



## The World's 5 Smartest Cities

Adoption of smart grid technologies, intelligent lighting, the use of information technology to improve traffic, Wi-Fi access points, smartphone penetration, and the app landscape.

Market research firm Juniper Research (Basingstoke, UK)



"Not all cities are declaring a budget for what they are putting into smart cities, So we look at the economic output of these cities with the assumption that it is going to feedback into the local government to help pay for future smart cities technologies."

Juniper Research



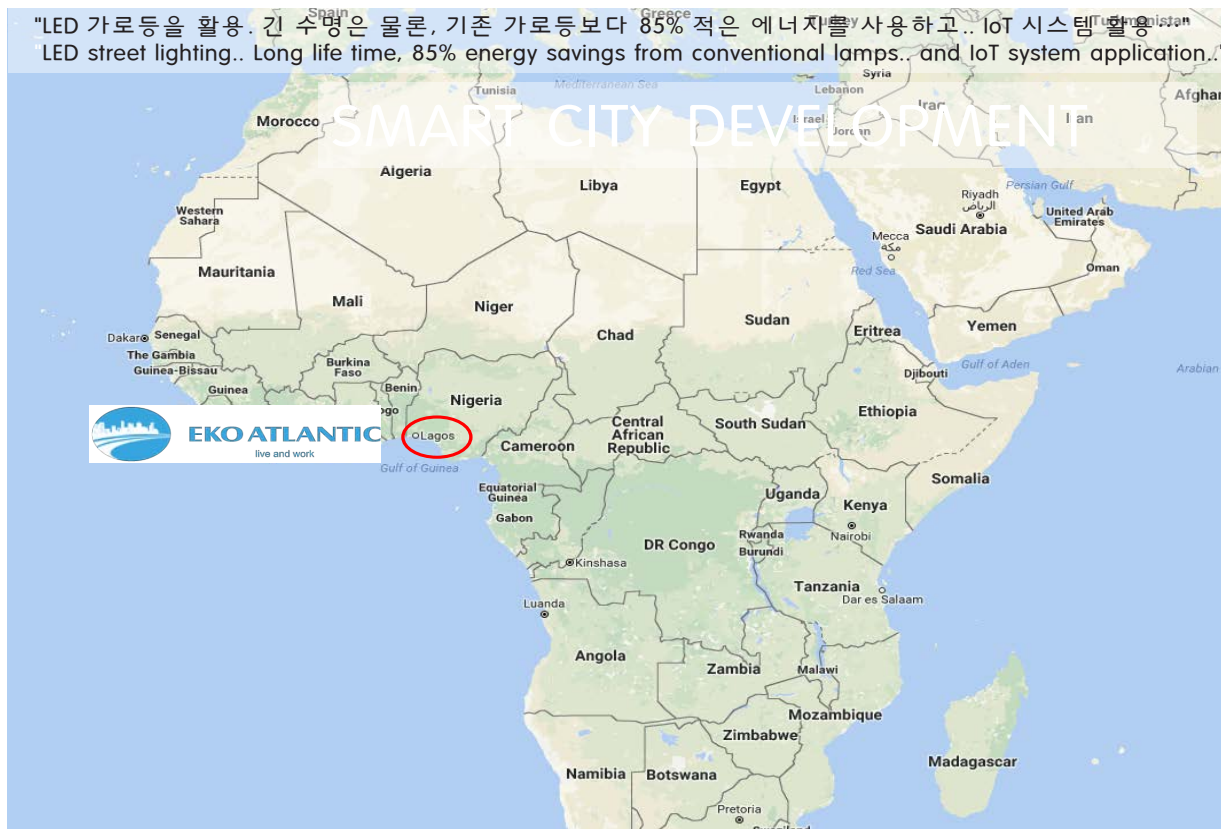
## India Smart City Development



### Prime Minister Narendra Modi's plan to develop 100 Smart Cities in the country

The first 20 cities to be developed as Smart Cities will be announced on Thursday, Urban Development Minister M Venkaiah Naidu said on Wednesday. These cities will be developed to have basic infrastructure through assured water and power supply, sanitation and solid waste management, efficient urban mobility and public transport, IT connectivity, e-governance and citizen participation.

ECOLANT







# Smart Cities



# Why need light?

Artificial 人工 buatann कृत्रिम கைநிர்வியம்  
செயற்கை artipisyal 인공 hàn tạo

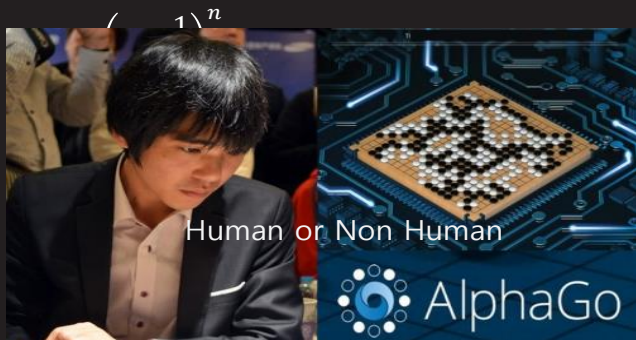


# Why need light?

Artificial 人工 buatann कृत्रिम கைநிழல்  
செயற்கை artipisyal 인공 hàn tạo

# Who need light?

Artificial 人工 buatann कृत्रिम கைநிழல்  
செயற்கை artipisyal 인공 hàn tạo



$$= 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots, \quad -\infty < x < \infty$$



## LIGHTING 130 years

The lighting industry is undergoing a remarkable transformation & from high to low consumption



from analogue to digital  
from conventional to LED



from low to high lm/w  
from high to low consumption



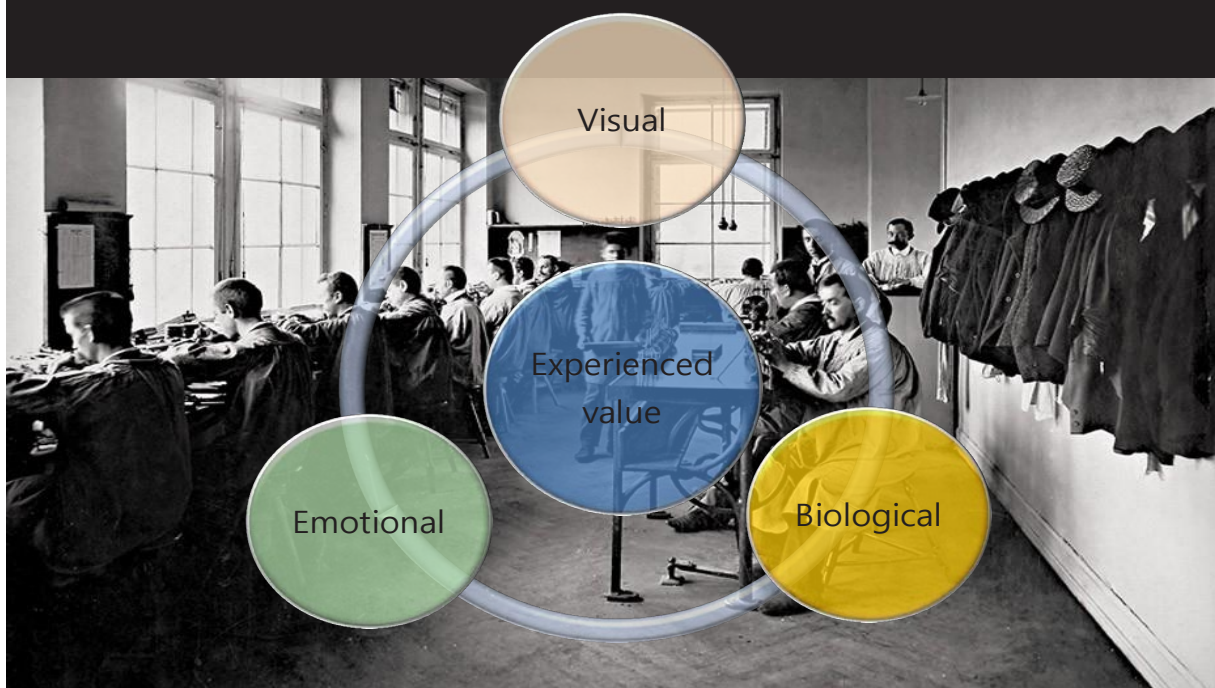
& from functional hardware to sophisticated but simple convergence



from functional to emotional  
from passive to active choice



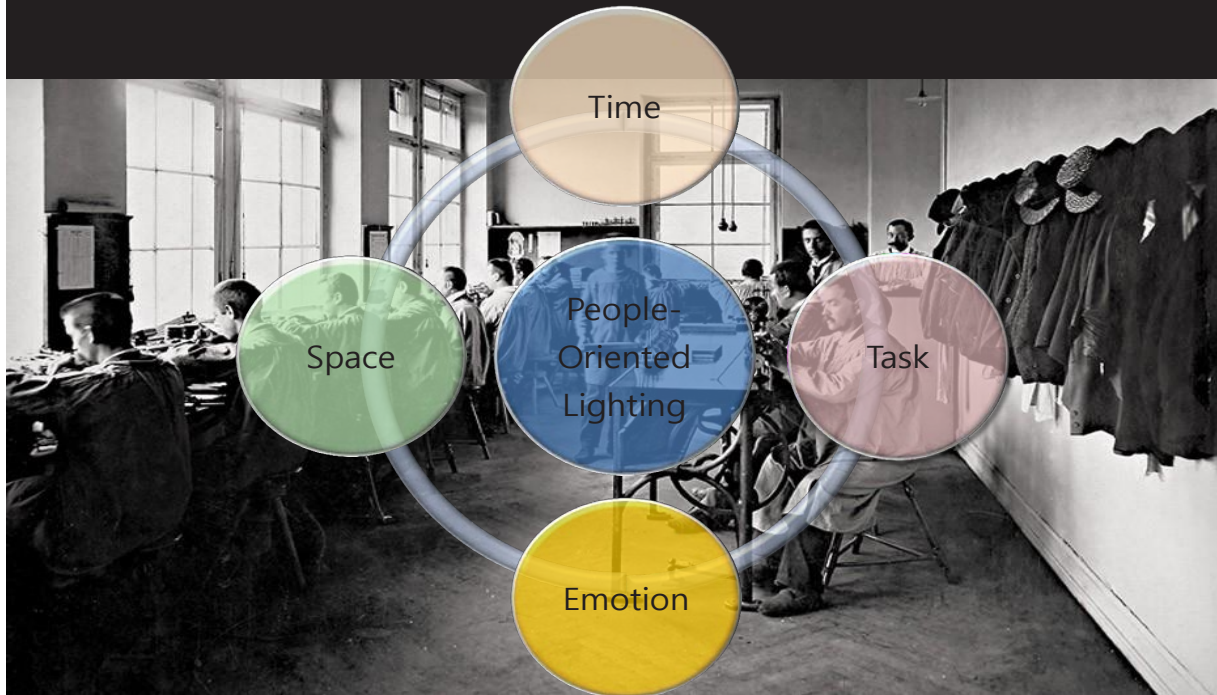
## Three roles of Lighting







## or Four roles of Lighting



## Objectives of Lighting roles

- Improve concentration, safety and productivity
- Promote people's well-being, moods and health
- Help aging people perform better
- Support the healing process at healthcare facilities
- Help prevent possible problems from irregular work hours e.g. shift work





## Age vs workplace illumination

500 lux vs 3000 lux



How Many Street lights  
?

What does it mean  
?

Implications to City  
?



40,000km

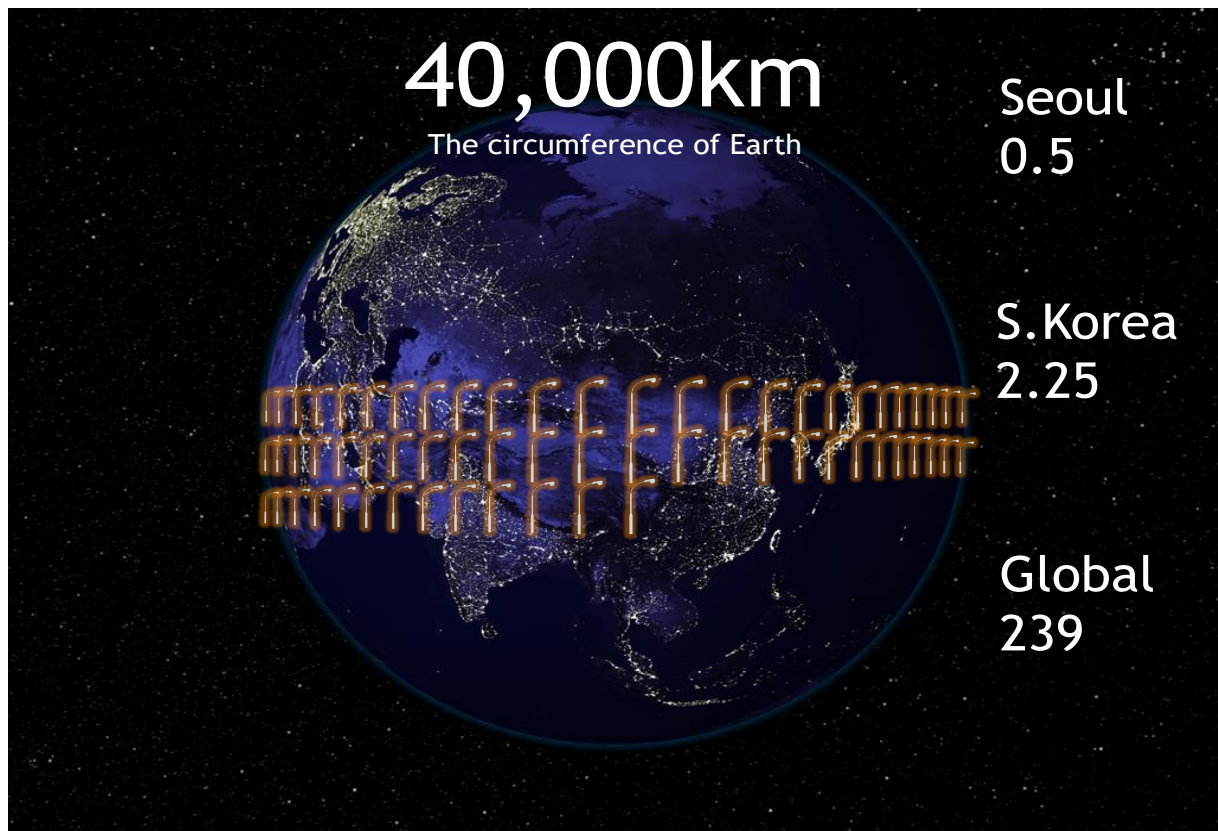
#### The circumference of Earth

The circumference of Earth at the equator is about 24,874 miles (40,030 km), but from pole-to-pole — the meridional circumference — Earth is only 24,860 miles (40,008 km) around. This shape, caused by the flattening at the poles, is called an oblate spheroid.

384,000km

#### Average distance between Earth and Moon

Average distance from the center of Earth to the center of the Moon. More technically, it is the mean semi-major axis of the geocentric lunar orbit. It may also refer to the time-averaged distance between the centers of the Earth and the Moon, or less commonly, the instantaneous Earth–Moon distance. The lunar distance is approximately 400,000 kilometers

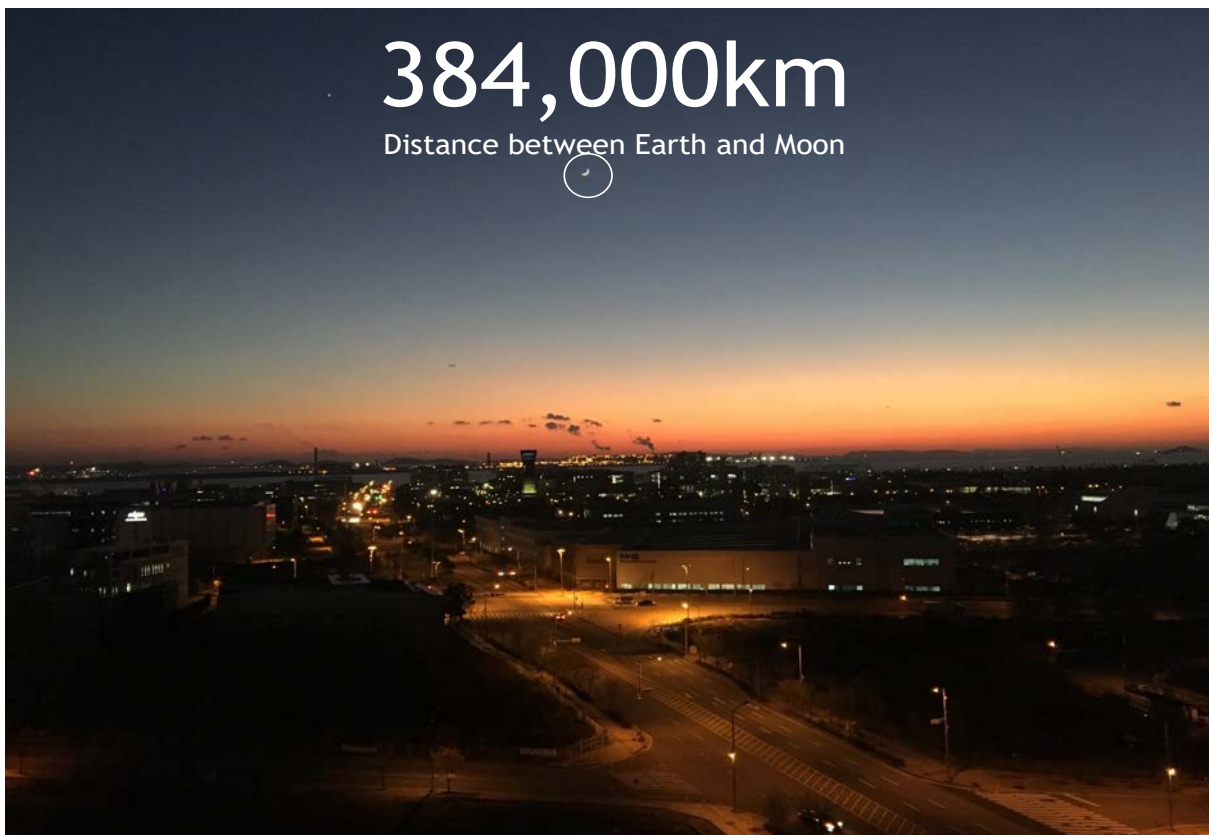






384,000km

Distance between Earth and Moon



384,000km

Distance between Earth and Moon

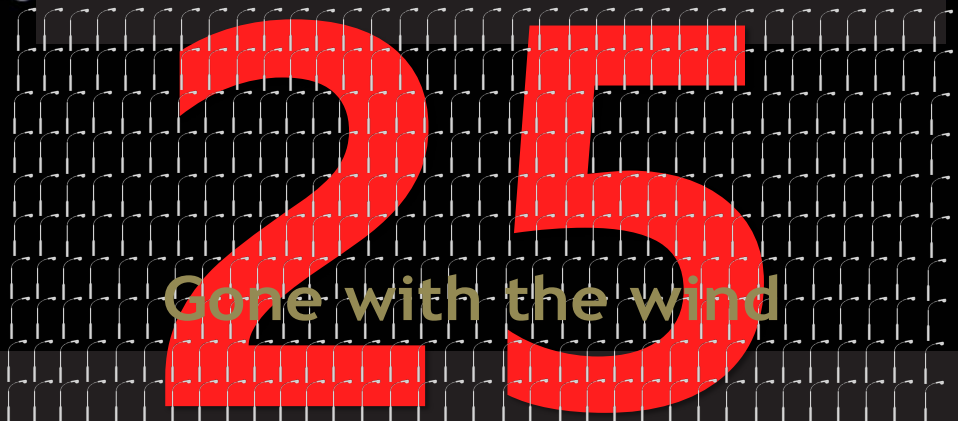
Earth



Moon



25  
Gone with the wind





Much lower than SUN light



Maldives







INCHEON CITY, KOREA



GANGNEUNG CITY, KOREA



SEOUL CITY, KOREA



SEJONG CITY, KOREA

What do you think?



BEFORE



AFTER



Good visibility



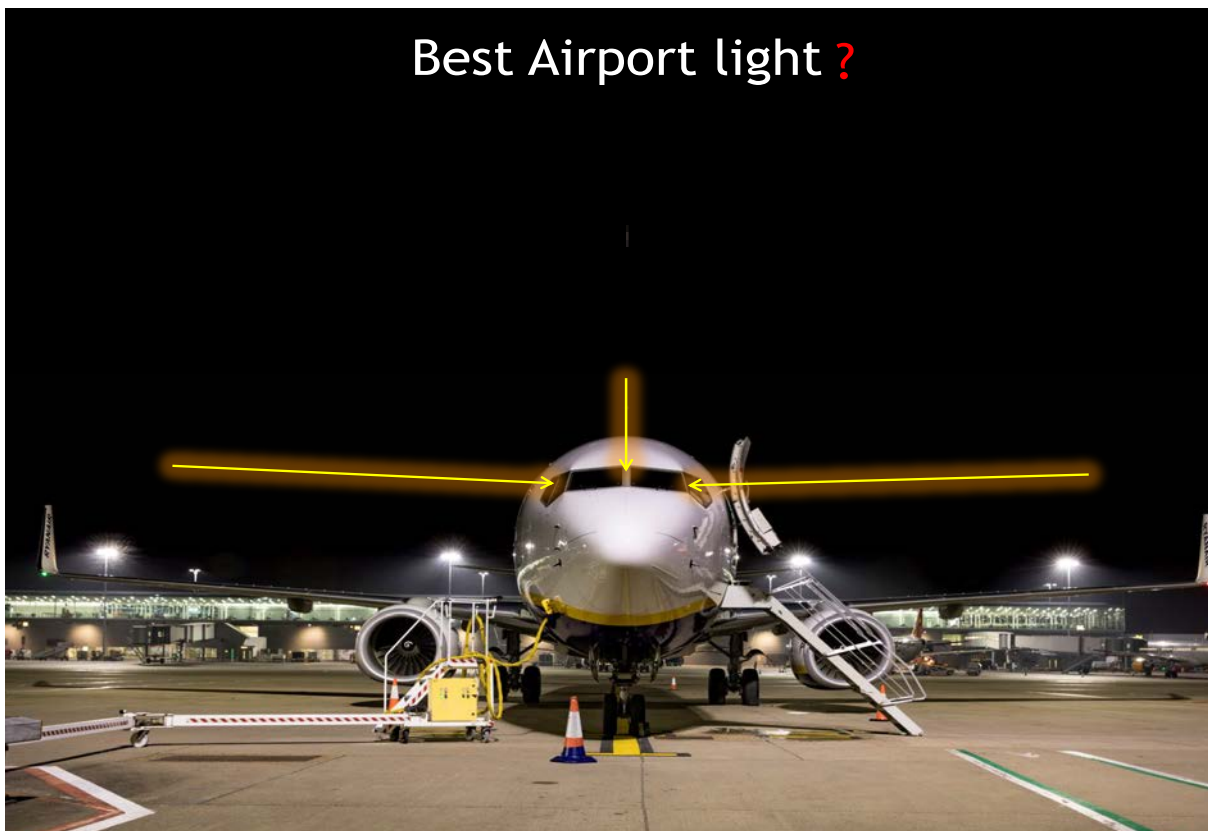




## Great energy savings



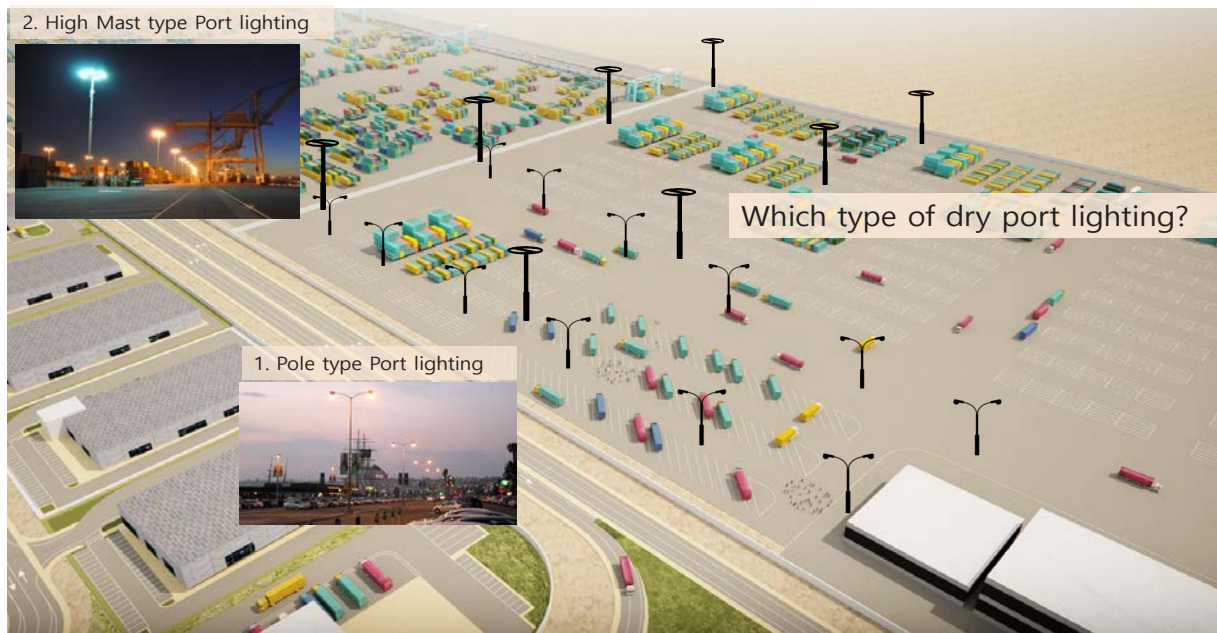
## Best Airport light ?







## Dry Port Yard lighting system type



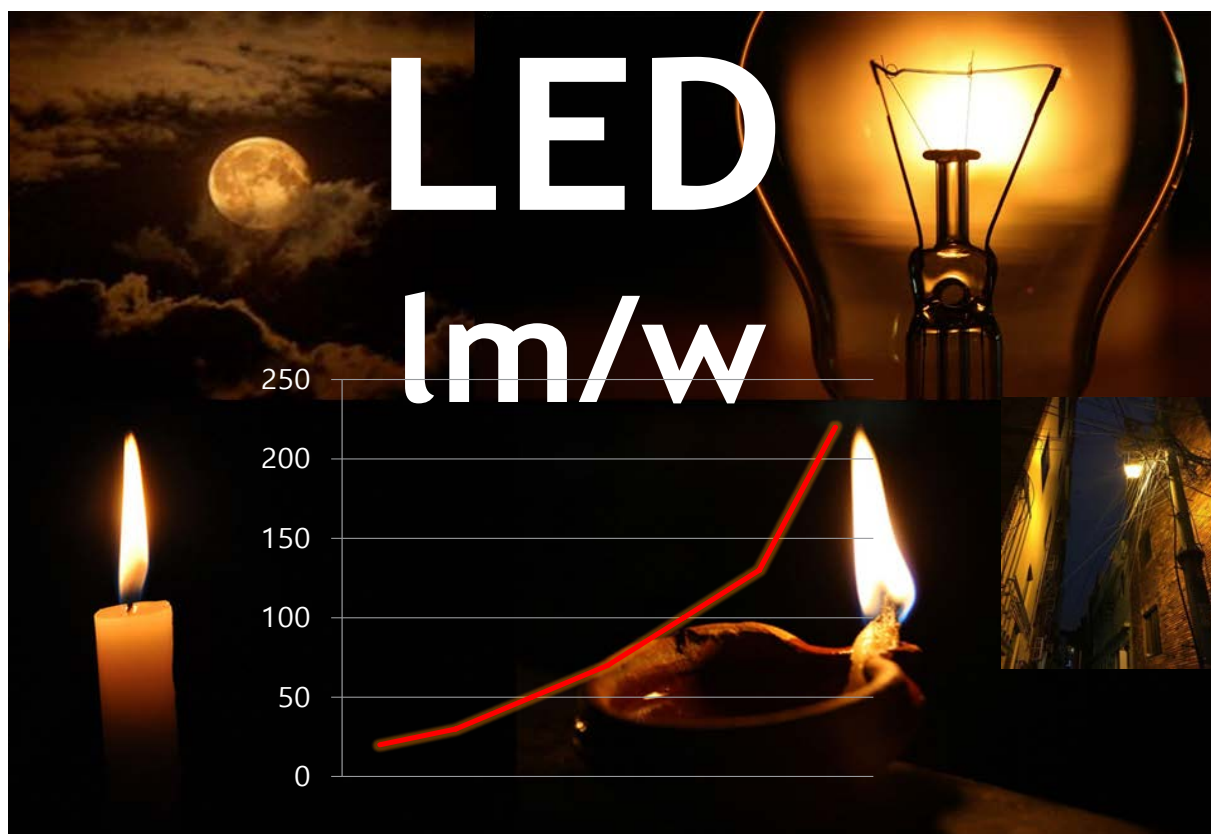
## Smart Street light Technologies in Asia Countries

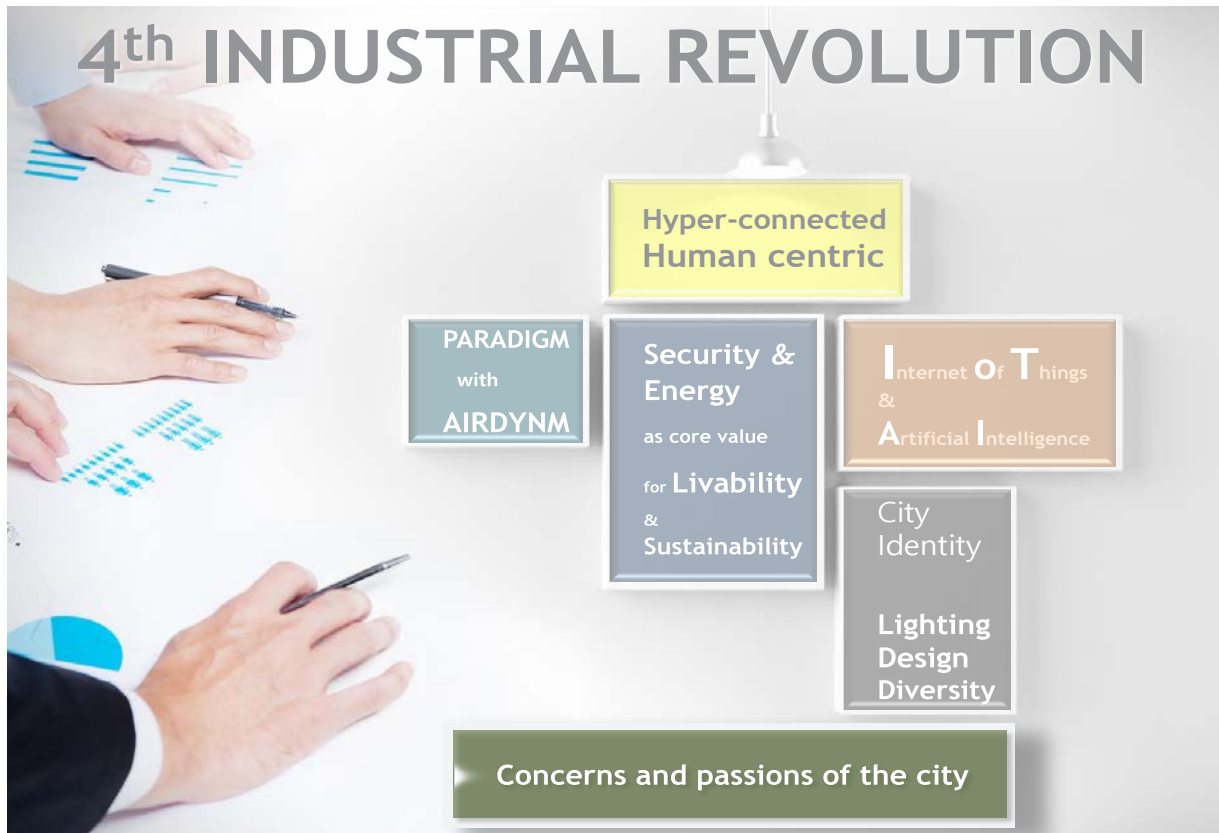


## Smart Lighting :

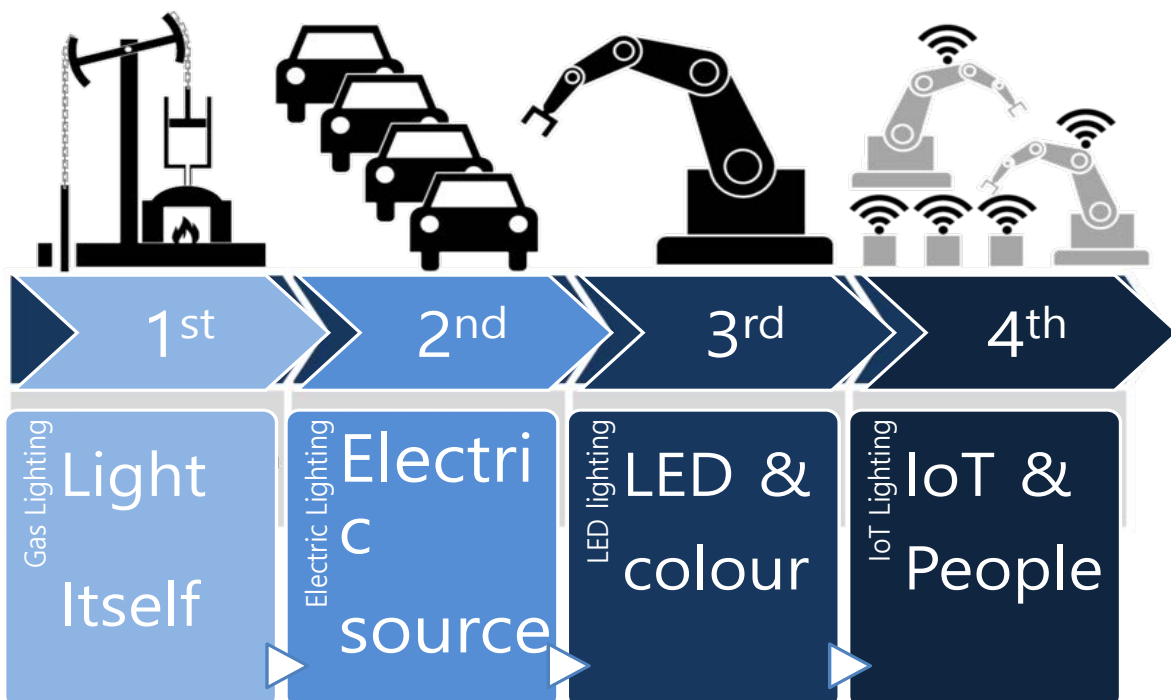


### Co-creation between Light and Communication





## 4<sup>th</sup> Industrial Revolution and IoT street Lighting







## IoT Street lights platform for Smart City

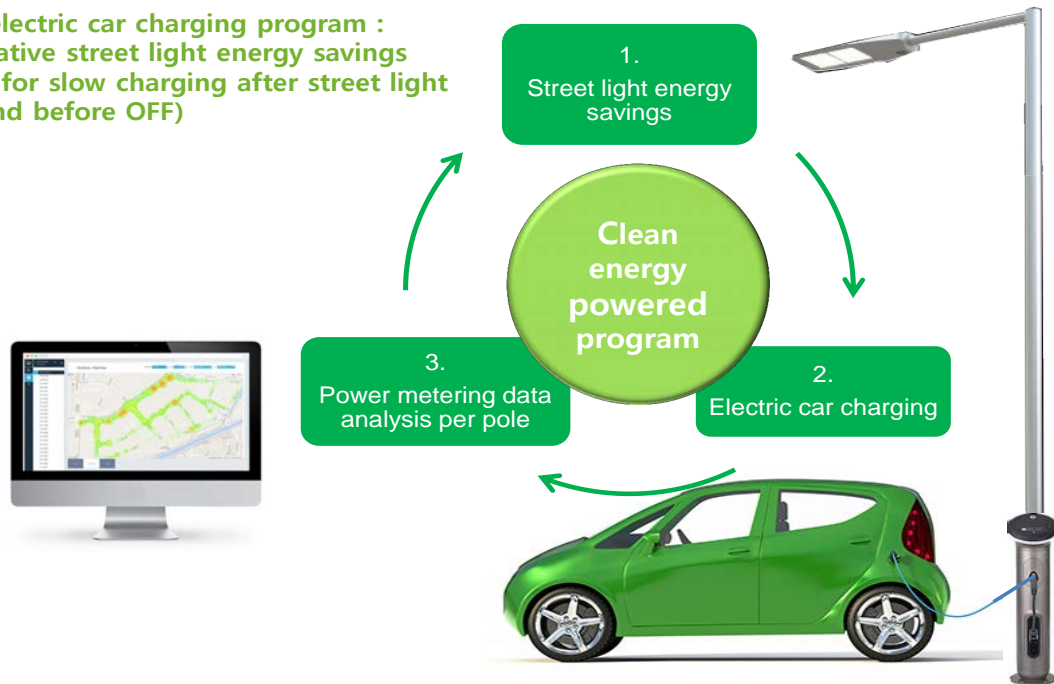


Street lights system spread out on the citywide is one of the most important public assets for smart city development and realization.

The service of intelligent lighting will not only make cities more energy-efficient but can also make them safer, improve the operation of transport and allow them to become more responsive, interactive and adaptable to citizens' needs.

## Smart street light & electric car charging system

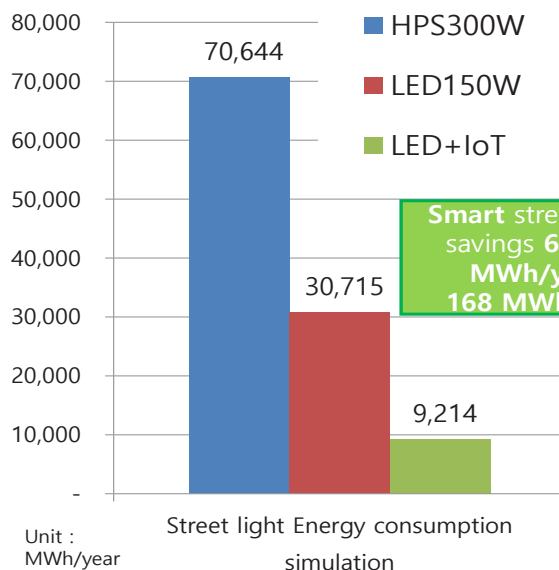
Free electric car charging program :  
Innovative street light energy savings  
(Only for slow charging after street light  
ON and before OFF)



### Simulation

#### Street light energy savings to Electric car charging

Simulation from 51,000 of HPS 300W street lights in a town



**47,000**  
**cars**  
charging per day  
without extra electricity  
power generation

\* If Electric car average driving distance/day is 50km, then 129,000 cars could be charging per day



## Hawaii, global first 100% carbon zero street light operation with synergy between Tesla solar power generation and IoT street light solution

*Tesla will power the Hawaiian island of Kauai with solar panels and its giant battery packs.*

*The solar farm is composed of 54,978 solar panels with 13 megawatts of solar generation capacity. Tesla has also installed 270 of its large commercial battery*

**Renewable energy + IoT solutions =  
Global 1<sup>st</sup> carbon zero street light management**

*system in phases.*

*KIUC signed a contract with Tesla to purchase 1 kilowatt-hour of electricity for \$.139 over a 20-year time frame.*



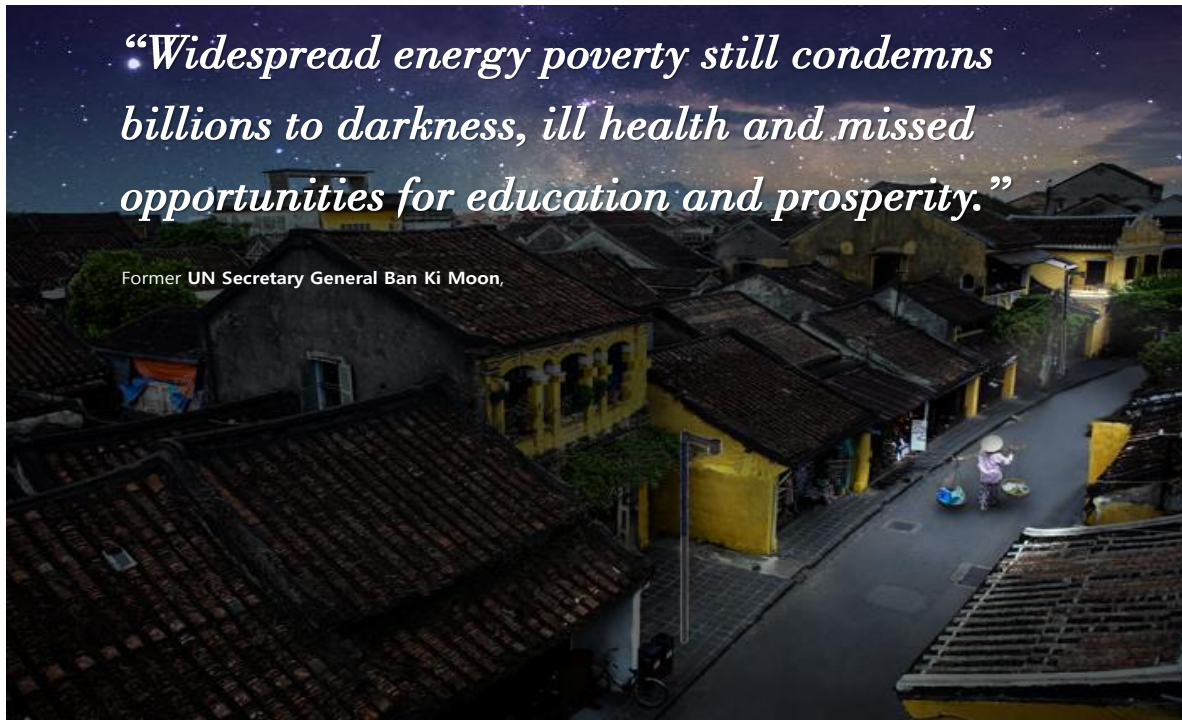
## Smart Lighting for Smart city





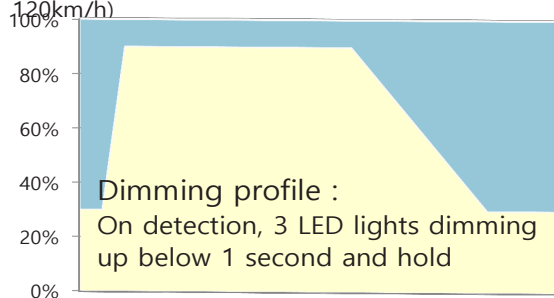


## Smart Lighting for Smart city



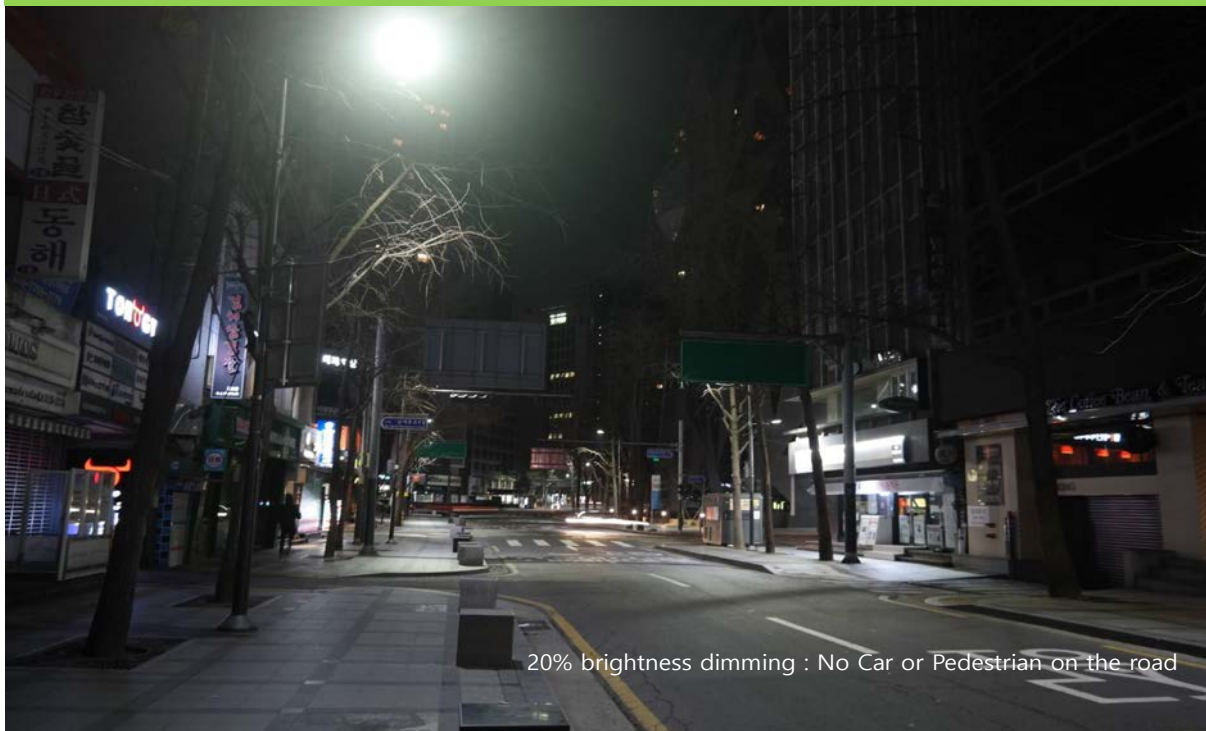
## Smart Dimming Operation

Speed limit : 60km/h street  
 Driving distance : 16.67m /sec  
 Neighboring : 3 LED lights dimming-up  
 Dimming distance : 90m ( 33.3m with 120km/h)





## Seoul city, Korea case



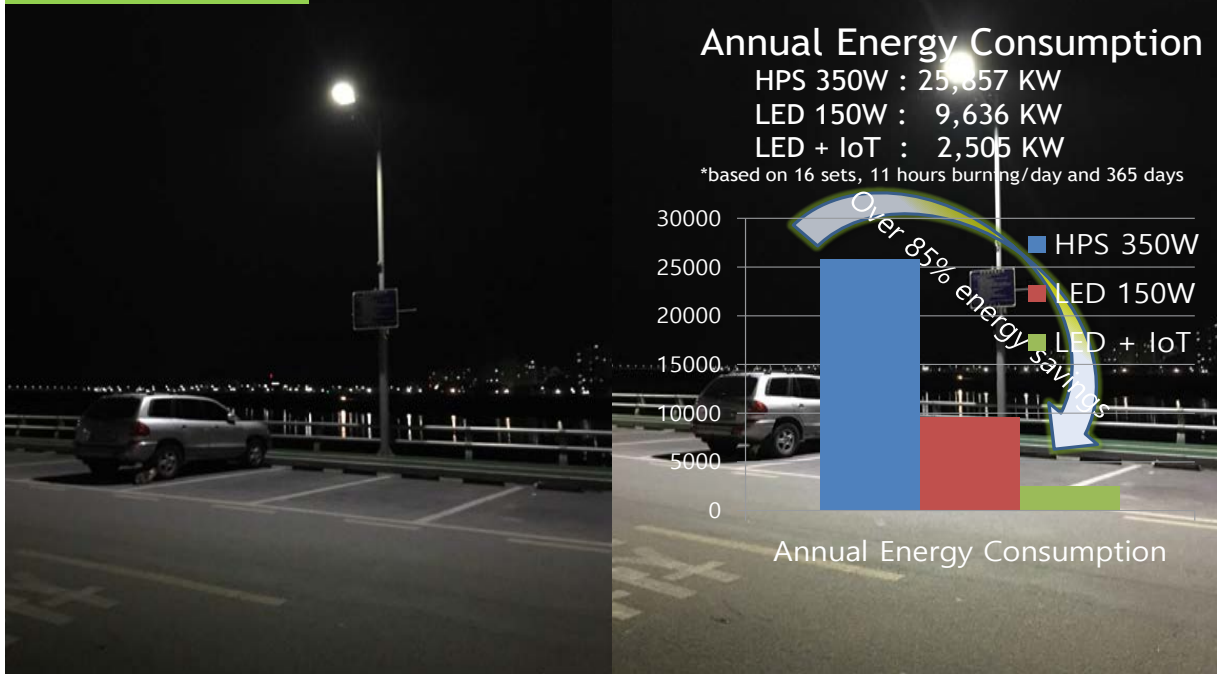
## Seoul city, Korea case







## Yeoju city



Dimming 20% (22.2lux)

Full bright 100% (58.6lux)

## Smart street for energy savings and CPTED



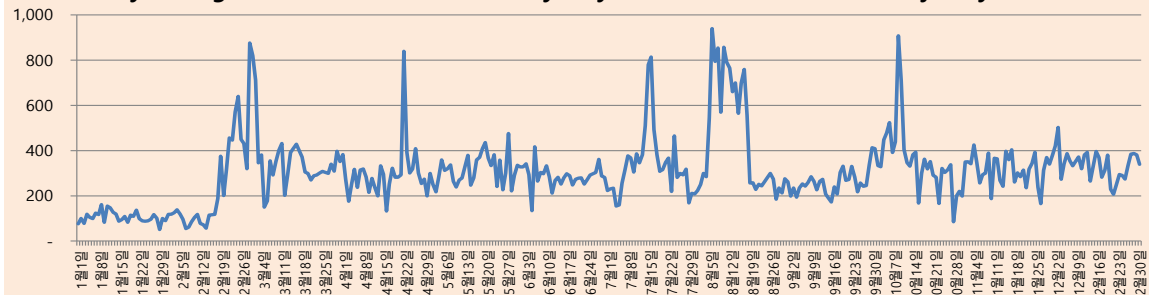


## Smart sensors for traffic density data

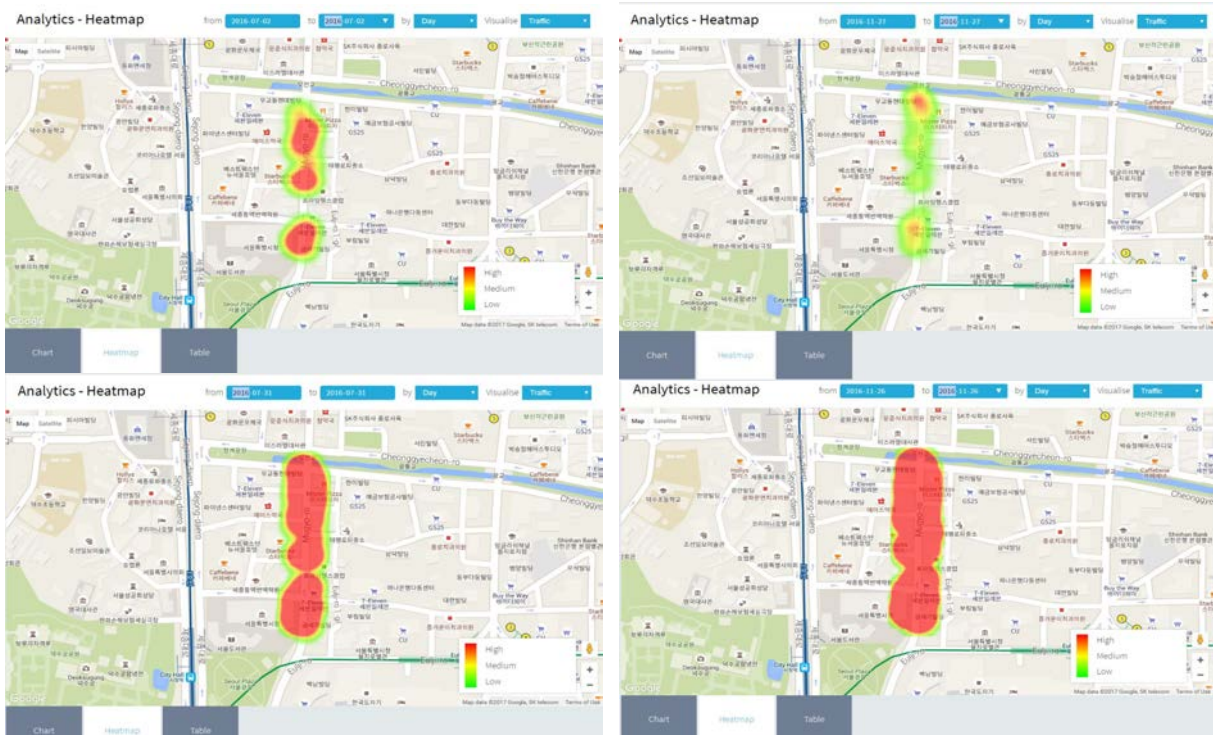
Smart sensor light control system provides traffic volume data on the street of city.



Daily average traffic volume/hour, 2016 yearly total : Actual data on Yeoju city, Korea

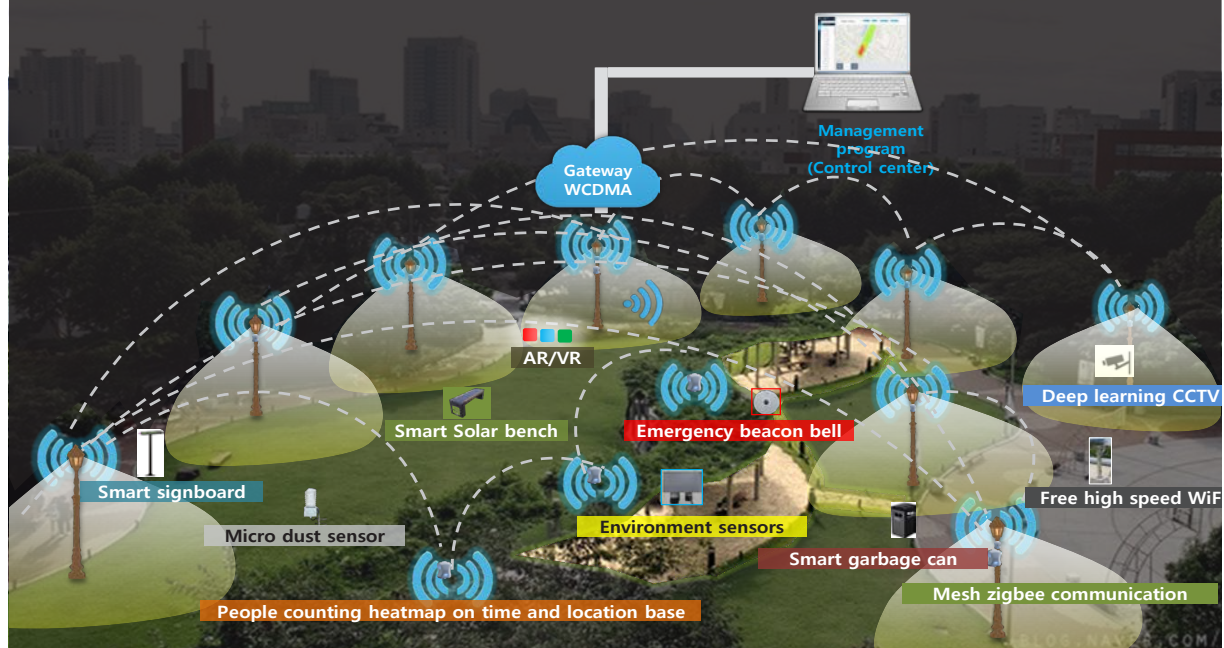


## Traffic volume analysis case , Seoul City

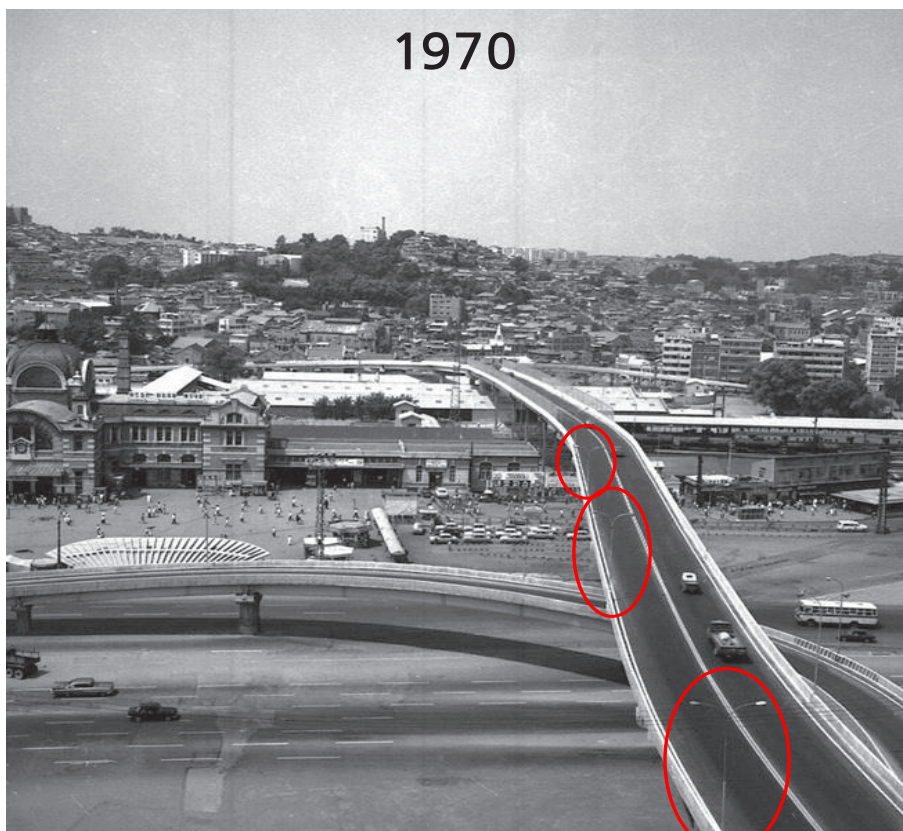




## SMART PARK in DAEGU CITY, KOREA



1970

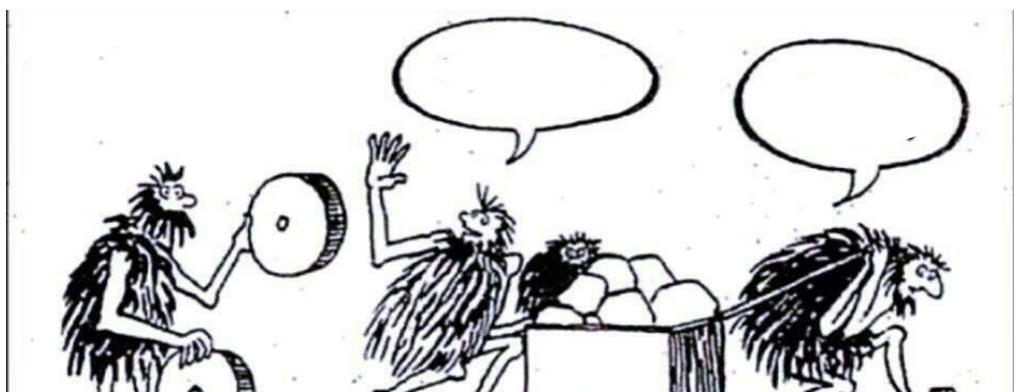






## Smart LED lighting plan and execution

You are the most challengeable competitor?





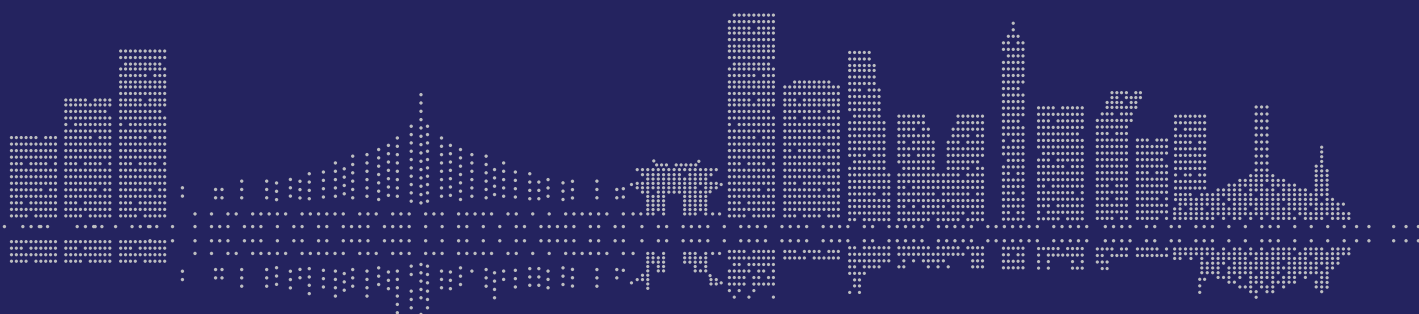


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# Group Discussion

## SWOT Analysis & Roadmapping

- Summary of the SWOT Session at the Urban Lighting ..... 177  
Workshop (June 29)
- Summary of the “Roadmapping for intelligent urban lighting” ..... 179  
session (June 30)

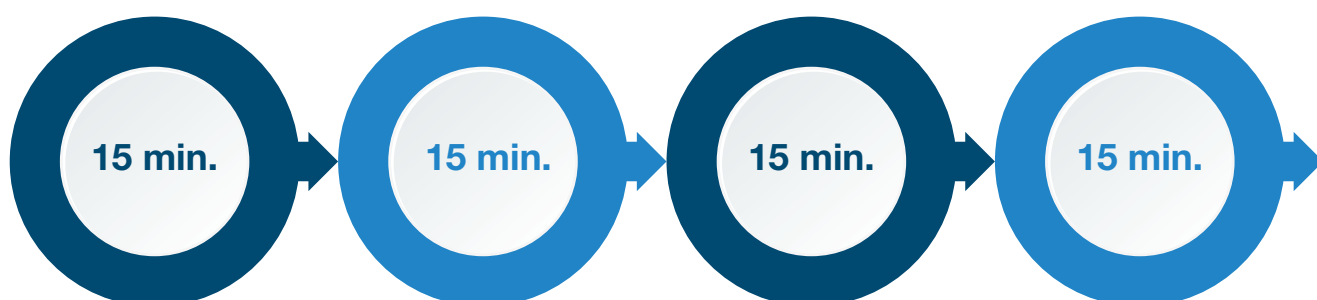


# Summary of the SWOT Session at the Urban Lighting Workshop

**Day 1, June 29, 16:00-17:30**

Prior to the workshop the participants were asked to fill out a brief questionnaire about strengths, weaknesses, opportunities and threats (SWOT) of urban lighting in their cities. The purpose of the questionnaire was to help the participants and the workshop organizers – particularly the facilitators of the interactive SWOT session – to prepare in advance. Many workshop participants filled out the provided template (see Annex 1) and submitted to the workshop organizers before the event. At the beginning of the interactive session Felix Kalkowsky explained the basics of a SWOT analysis and how the methodology will be integrated into a dynamic group discussion. The workshop participants were divided into four groups:

Group 1	Group 2	Group 3	Group 4
<ul style="list-style-type: none"> <li>• Da Nang</li> <li>• Semarang</li> <li>• Ports Authority Philippines</li> <li>• Quezon</li> <li>• Seoul</li> </ul>	<ul style="list-style-type: none"> <li>• Haiphong</li> <li>• Hue</li> <li>• Bogor</li> <li>• Busan</li> <li>• Seoul</li> </ul>	<ul style="list-style-type: none"> <li>• Bangkok</li> <li>• Yala</li> <li>• Gwangju</li> <li>• Seoul</li> </ul>	<ul style="list-style-type: none"> <li>• Negombo</li> <li>• Thimphu</li> <li>• Bharatpur</li> <li>• Jinju</li> <li>• Seoul</li> </ul>
Strengths	Weaknesses	Opportunities	Threats
<b>Facilitators</b> Dong Hoon Shin Rik van Stiphout	<b>Facilitators</b> Jaehyun Park Mark Burton-Page	<b>Facilitators</b> Jaeyoo Hyeon Don Slater	<b>Facilitators</b> Felix Kalkowsky Jihye Baik





# Summary of the SWOT Session at the Urban Lighting Workshop

Each group gathered around one large round table. The groups were visited by a team of facilitators. Each facilitator team covered only one of the four indicators or characteristics strengths, weaknesses, opportunities or threats. The facilitators asked the workshop participants about further details in regard to urban lighting in their cities and defined strengths, weaknesses, opportunities and threats. The key points were written on white boards at each group station (see Annex 2 for transcript from white boards). After 15 minutes the facilitators moved on to the next group. The session concluded after each group was visited by all facilitators so that every group discussed and defined all points of SWOT.

After the interactive session the facilitators compiled the results of the group discussions. In summary four key areas for urban lighting were identified:

## Technology

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Improved energy efficiency</li> <li>Reduced costs and GHG emissions</li> </ul>	<ul style="list-style-type: none"> <li>Too complex lighting system</li> <li>Lack of trained staff</li> <li>Old lighting infrastructure</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Further improvements of energy efficiency</li> <li>Smarter light management</li> </ul>	<ul style="list-style-type: none"> <li>Trained staff leave</li> <li>Rapid urbanization and population growth with increasing demand</li> <li>What happens to old lamps?</li> </ul>

## Quality of Light

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Good design</li> <li>Economical benefits</li> </ul>	<ul style="list-style-type: none"> <li>Too bright / too dark, wrong color (wrong light in the wrong place)</li> <li>Light pollution</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Make the city beautiful with aesthetic lighting design</li> <li>Improve safety</li> <li>Tourism</li> <li>Develop culture</li> <li>Crime prevention</li> </ul>	<ul style="list-style-type: none"> <li>Unsafe mobility</li> <li>Light pollution harms environment and wellbeing</li> </ul>

## Governance

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Good city administration, communication with citizens</li> <li>participatory budgeting</li> </ul>	<ul style="list-style-type: none"> <li>Lack of strategy</li> <li>Find consensus for the right strategy</li> <li>Silos</li> <li>No clear procurement regulations</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>High awareness among citizens</li> <li>Cooperation with other cities and networks</li> </ul>	<ul style="list-style-type: none"> <li>Change of political commitment</li> </ul>

## Finance

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Sufficient budget</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient budget</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Innovative financing schemes (PPP)</li> <li>Donor organizations</li> </ul>	<ul style="list-style-type: none"> <li>Budget cuts from central government</li> <li>Economical decline</li> </ul>

# Summary of the “Roadmapping for intelligent urban lighting” session

## Urban Lighting Workshop –29 & 30 June 2017 Seoul

Summary of the “Roadmapping for intelligent urban lighting” session, day 2, 13.30 – 16.00

On the whole, the 2-day workshop gave a strong sense of the very varied range of issues that Asian cities need to engage in order to do strategic urban lighting, with the added challenge of dealing with cities of very different sizes, histories and resources.

The complexity of urban lighting was reflected firstly in the presentations. The talks presented diverse case studies of urban lighting strategy, including Seoul, Eindhoven and a Latin American study. There was also a strong focus on spectacular lighting – eg, media facades, festivals (Yudeung Festival of Jinju) and public light art. A full session addressed issues of energy saving, climate change and cost. Finally, various talks emphasized the importance, and difficulty of integrating social aspects of lighting into the more economic and technical strategies.

Two interactive sessions allowed participants to explore these various issues, in terms of their own city but also in comparison with other municipalities. Both sessions asked people to focus particularly on the practical issues involved in developing a coherent, robust and sustainable strategy for urban lighting. The first of these sessions asked delegates to engage in a SWOT analysis, considering strengths, weaknesses, opportunities and threats they could identify separately or in common.

The second session focused on “Roadmapping for intelligent urban lighting session”. After a feedback on the lessons learnt from the Roadmapping process ongoing in the City of Eindhoven, participants were invited to a group discussion with the objective to provide them with tools to think strategically on urban lighting for their cities.

The session was moderated by Professor Don Slater, London School of Economics and Mr Rik Van Stiphout, Program Advisor Light & Culture of the City of Eindhoven, with the support of experts from Seoul, LUCI and CityNet. The objective of the session was for the participants, divided into 4 groups, to be able to respond to two main areas of questions:

- What are the challenges and goals for urban lighting in your city: what overall vision for urban lighting do they want to promote for their city?
- How will you develop a strategic plan for urban lighting in your city: what kind of resources and planning is needed to unroll that vision over the future?

**A set of thought starters and themes to discuss had been presented on three different levels:**

■ **Security, safety and well-being**

- What are the night-time risks that most concern your city and its people?
- Are there particular people with particular security issues (eg. Women, older people, minorities)?
- What kind of lighting do you think will help improve either safety or the perception of safety?

■ **Atmosphere, identity and aesthetics**

- What elements of your city's visual identity and atmosphere should lighting preserve or promote?
- How do aesthetics of your city center connect to residential and commercial areas?

■ **Sustainability, energy and smartness**

- How can lighting in your city support sustainable development?
- What should your city's lighting be "smart" about? What should it respond to?
- How should your lighting work with other infrastructure? transport? Water resources?



**The outcomes of the group discussion were rich and wide-ranging conversations, and are difficult to summarize. Several themes stood out:**

01

There was considerable – even surprising - agreement about problems and priorities, despite cities of very different size and profile. Perhaps the major difference was the extent to which urban lighting was focused more on aesthetic and heritage features as opposed to energy cost savings through LED implementation (though these issues clearly overlapped in most cities).

02

An overriding concern was how to implement LED and reap maximum benefits in terms of both cost saving and control systems. Most cities see this as the main task they face, which leads to an equally common concern with getting the right financial and political resources to meet this challenge.

03

Most cities were concerned about getting the right financing and political support for such strategic investment. They all underlined the value of municipal networking, including organizations like LUCI and CityNet. Similarly, many cities emphasized the struggle to make citizens and governors aware of the importance of lighting as urban infrastructure.

04

Safety and security issues loomed large as priority issues though significant difference emerged in what these terms meant for different cities (eg, vandalism, ethnic violence, tourism, accidents).

05

A few cities raised the importance of involving lighting designers in planning urban lighting strategies that are often dominated by engineering and economic considerations.



# Urban Lighting Workshop

June 29(Thu) 2017





# Urban Lighting Workshop

June 30(Fri) 2017



# Participants

Nation	Affiliation	Membership	Name	Position	Department
Bhutan	Thimphu Municipality	CityNet	Kinzang Gyeltshen	Head of Section	Electrical Section
	Thimphu Municipality	CityNet	Sonam Tobgay	Electrical Assistant Engineer	Electrical Section
Indonesia	Bogor City	CityNet	Feby Darmawan	Head of Section Public Street Lighting	Department of Housing and Settlement
	Semarang City	CityNet	Claudia Prasetyani	Head of Planning Facilities, Infrastructure and Utilities Section	Housing and Residential Department
Korea	Seoul	-	Dae-Hoon Seo	Director	Seoul Metropolitan Government Urban Planning
		LUCI	Dae-Kwon Kim	Team Manager	Urban Light Policy Division
		LUCI	Jin Soo Bae	Team Manager	Urban Light Policy Division
		LUCI	Go-Woon Jeon	Manager	Urban Light Policy Division
		LUCI	Jin-Hwa Park	Manager/Specialist	Urban Light Policy Division
		LUCI	Hong-Seok Kim	Manager	Urban Light Policy Division
		LUCI	Jong-Wook Hwang	Manager	Urban Light Policy Division
	Gwangju Metropolitan City	LUCI	Kwon Kang	Director	Urban Renewal Policy Division
		LUCI	In-su Kong	In charge of the LUCI	Urban Renewal Policy Division
		LUCI	Yung Rae Chung	Urban Scenery Director	Urban Renewal Policy Division
		LUCI	Jeongsu Seo	In charge of the Scenery	Urban Renewal Policy Division
	Busan Metropolitan City	LUCI	Chuel Gyu Han	Public Servant	Cityscape Management
		LUCI	Eul Yong Yun	Public Servant	Cityscape Management
	Jinju City	LUCI	Jung Chae Jeong	Chief Director	Department of Tourism Promotion
		LUCI	Yu Do Park	Manager	Department of Urban Planning
		LUCI	Yeong Hun An	Public Officer	Enterprise & Commerce Dept
		LUCI	Nam Gyeong Lee	-	Department of Urban Planning
		LUCI	Sang Kyun Ha	Translator	Enterprise & Commerce Dept
		LUCI	Gyong Seob Cho	Manager	Enterprise & Commerce Dept
		LUCI	Yong Kyun Koo	-	Department of Tourism Promotion
	-	LUCI	Gyung Yong Jang	-	Department of Tourism Promotion



# Participants

Nation	Affiliation	Membership	Name	Position	Department
Nepal	Bharatpur Metropolitan City	CityNet	Prem Raj Joshi	Mayor/Executive Officer	Bharatpur Metropolitan City Office
Philippines	Quezon City	CityNet	Ricardo Aureo	Head and Officer-In-Charge	Quezon City Task Force on Streetlights and City General Service Department
	Manila City (Philippine Ports Authority)	Non-Member	Antonio C. Ignacio, Jr.	Manager	Administrative Services Dept.
	Manila City (Philippine Ports Authority)	Non-Member	Patrick John	CEO	Polaris Innercircle INC.
Sri Lanka	Negombo City	LUCI, CityNet	Saleem Sakaula	Deputy mayor and member of western provincial council	Government
Thailand	Bangkok Metropolitan Administration	CityNet	Supakorn Nookuea	Electrical Engineer	Department of Public Works
	Yala City Municipality	LUCI	Pongsak Yingchoncharoen	Mayor	Ministry of the Interior
	Yala City (ONGA Artful Light Co., Ltd.)	LUCI	Dutchanee Ongarjsiri	Vice President	-
	Yala City (ONGA Artful Light Co., Ltd.)	LUCI	Ming Zhang	President	-
Vietnam	Da Nang City	CityNet	Vu Tran Huynh Vuong Hoai	Deputy Head of energy management division	Department of Industry and Trade
	Da Nang City	CityNet	Minh Huy Tran	Specialist	Energy management department
	Haiphong City	CityNet	Le Tuan Anh	Vice head of Sea border, Islands and NGO Management Division	Foreign Affairs Department
	Haiphong City	CityNet	Nguyen Van An	Vice-Chairman	Haiphong Union of Science and Technology Associations
	Haiphong City	CityNet	Do Trong Tuan	Senior Official of Haiphong Department of Foreign Affairs	Foreign Affairs Department
	Hue City	LUCI, CityNet	Nhu Chinh Le	Vice Director	Hue City Center of Green Park
	Hue City	LUCI, CityNet	Phuoc Le Viet Huu	Officer	Urban Management Division



The Urban Lighting Workshop has been organized by Seoul Metropolitan Government, LUCI and City Net

## PHILIPS

Philips Lighting Korea was a supporting partner of the Urban Lighting Workshop:

Benefits of Sustainable Urban Lighting and helped to cover some of the expenses



# Urban Lighting Workshop

## 아시아도시조명워크숍



CITYNET