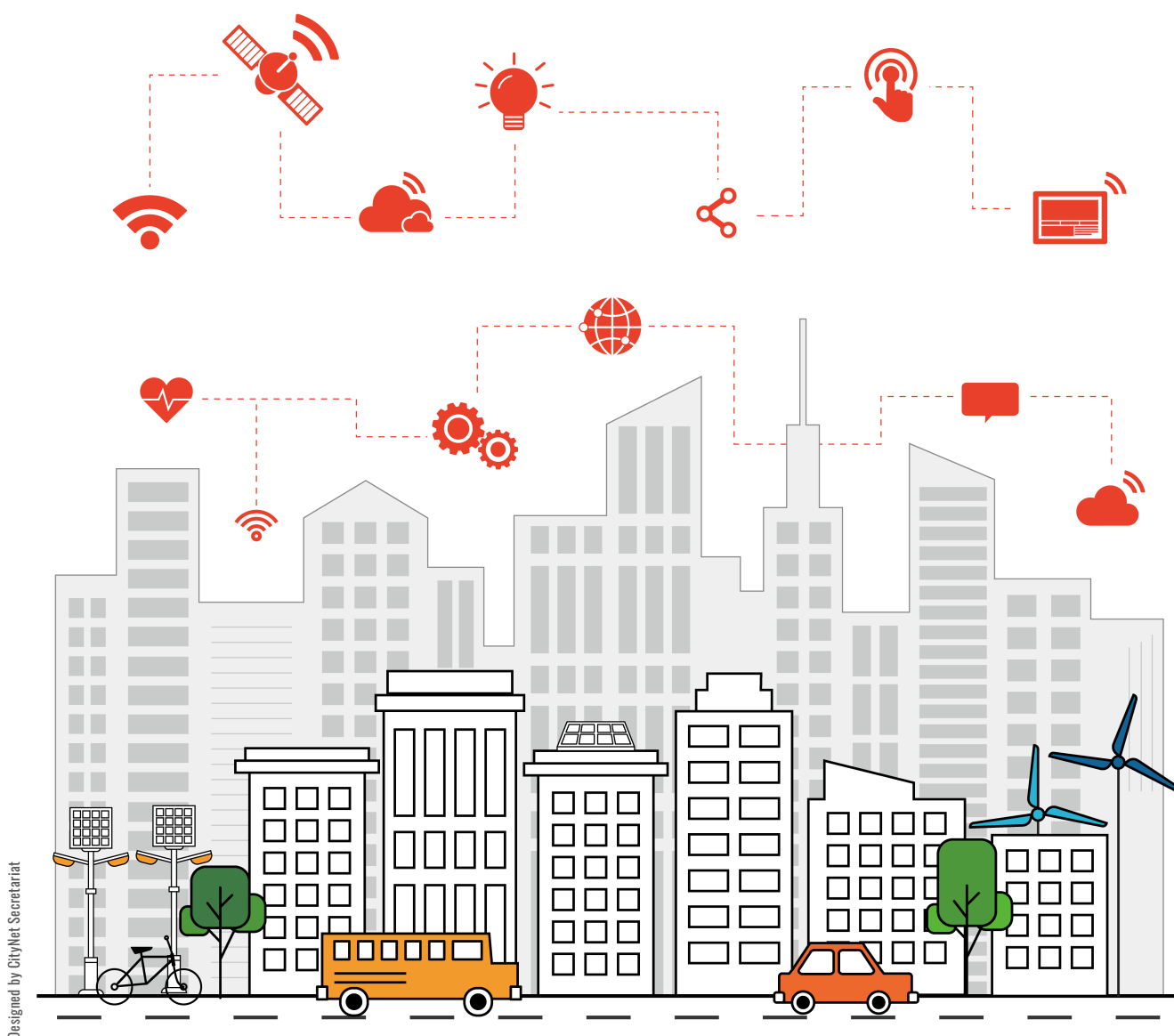


# RECIPRO: CITY

THE ANNUAL PUBLICATION  
SUPPORTS LOCAL ACTION  
FOR THE IMPLEMENTATION OF  
THE 2030 AGENDA



Designed by CityNet Secretariat

RECIPRO:CITY  
ISSUE NO.03





The RECIPRO:CITY is created as an annual publication of the Urban SDG Knowledge Platform in order to support all readers in sharing best practices on urban policies, and to introduce the connected activities under the platform. This 3rd Issue is focusing on sharing Asia Pacific region cases on smart city development in accordance with policy priorities and urban development progress.

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## INTRODUCTION

# ABOUT URBAN SDG KNOWLEDGE PLATFORM

## + INTRODUCTION

The Urban SDG Knowledge Platform was established in collaboration with the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the Seoul Metropolitan Government (SMG) and CityNet to promote and support knowledge sharing and city-to-city cooperation for sustainable urban development.

The Urban SDG Knowledge Platform supports local action for the implementation of the 2030 Agenda for Sustainable Development, by: providing a repository of policies, initiatives and best practices at the city level from municipal governments and other stakeholders; facilitating north-south, south-south, and triangular cooperation by linking cities that have developed specific policies and strategies with other cities interested in learning from and replicating them; and, facilitating regional follow-up and review of the implementation of the 2030 Agenda for Sustainable Development by providing a platform for local governments to share progress and lessons learned.

The RECIPRO:CITY is the annual publication of the Urban SDG Knowledge Platform created in order to support the sharing of best practices on urban policies and introduce the on-going offline activities to all the readers. During 2019, the platform was provided with information about workshop activities from the CityNet Secretariat along with the Seoul Metropolitan Government and the UNESCAP. During those activities it received development policies cases regarding smart cities development at the local level from the participants. The RECIPRO:CITY 3rd Issue is focusing on sharing those cases in order to highlight the importance of understanding smart cities development priorities in accordance with the cities' needs and urban development progress.

## + ACKNOWLEDGMENTS

The writing of this publication was led by the CityNet Secretariat staff and has benefited from the expert inputs from the Seoul Metropolitan Government, Kuala Lumpur City Hall, Kathmandu Metropolitan City, Colombo Municipal Council, Banda Aceh Municipality, and PLANMalaysia. This publication has been reviewed by members of CityNet Secretariat, however some details information may differ with each city current condition.

# ORGANIZERS



## + CITYNET SECRETARIAT

CityNet is the largest association of urban stakeholders committed to sustainable development in the Asia Pacific region. Established in 1987 with the support of UNESCAP, UNDP and UN-Habitat, the network of cities has grown to include 154 municipalities, NGOs, private sector and research centers. CityNet connects actors, exchange knowledge and build commitment to more sustainable and resilient cities. Through capacity building, city-to-city cooperation and tangible projects, we help our members respond to Climate Change, Disaster, Sustainable Development Goals (SDGs) and rising Infrastructure demands.



## + SEOUL METROPOLITAN GOVERNMENT

Seoul Metropolitan Government (SMG) is the administrative organization of the city of Seoul. Seoul is the capital city of the Republic of Korea and has been the center of the country throughout its long history from prehistoric era to the present day. In addition, in just five decades, Seoul has seen its population increase by 43.3 percent and income soaring by 1,389 percent. Along with this fast and tremendous development of Seoul, there were strenuous efforts to tackle urban challenges. With those efforts, Seoul is now one of the most prosperous cities in the world.



## + UN ESCAP

The Economic and Social Commission for Asia and the Pacific (ESCAP) serves as the United Nations' regional hub promoting cooperation among countries to achieve inclusive and sustainable development. The largest regional intergovernmental platform with 53 Member States and 9 associate members, ESCAP has emerged as a strong regional think-tank offering countries sound analytical products that shed insight into the evolving economic, social and environmental dynamics of the region. The Commission's strategic focus is to deliver on the 2030 Agenda for Sustainable Development.





DATABASE  
-  
FEATURE STORY

# Malaysia Smart Cities Initiatives: National Strategy to develop Smart Cities (Malaysia)

*The growth of smart cities in most major cities in Malaysia is part of the national strategy. Cities in Malaysia are making efforts to go digital with artificial intelligence and cloud computing capabilities.*

Case submitted by: Plan Malaysia  
Case edited by: CityNet Secretariat



## + INTRODUCTION

According to the World Population Prospect: The 2018 Revision<sup>(1)</sup>, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Projections show that urbanization, the gradual shift in residence of the human population from rural to urban areas, combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050, where close to 90% of this increase is taking place in Asia and Africa, according to a new United Nations data.

Based on a projection by the United Nations Department of Economic and Social Affairs (DESA)<sup>(2)</sup>, it is estimated that

Malaysia's population shows, similar trend to the rest of the world, where it will increase exponentially within the next three decades. Malaysia registered the urbanization rate of 75%, which is more than 20 percent higher than the global urbanization rate. By 2050, the country is projected to register the urbanization rate of between 85 and 90 per cent. The increased in the urbanization rate will includes changes and challenges. Thus, the government believes that it is crucial to make early preparations for the future to ensure that Kuala Lumpur and other cities will continue to experience rapid growth and remain competitive.<sup>(3)</sup>

Nevertheless, the rapid urban population growth

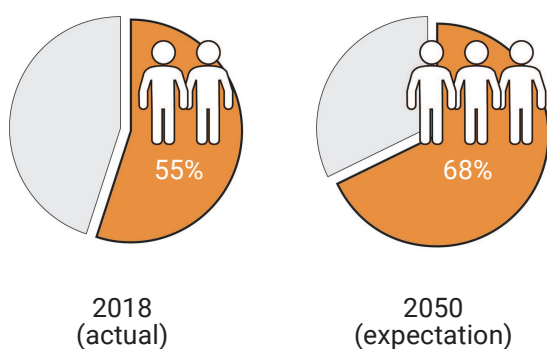
(1) <https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.htm>

(2) <https://www.un.org/development/desa/en/>

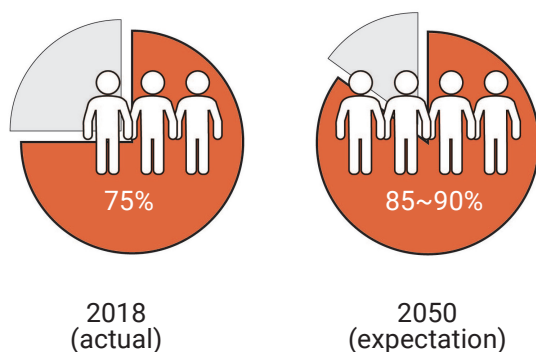
(3) <https://www.worldbank.org/en/news/feature/2015/01/26/malaysia-among-most-urbanized-countries-in-east-asia>

requires a continuous sustainable development and efforts for a better livability. The expansion of cities faces a variety of challenges. Problems arising from rapid urbanization indicates a loss of basic functionalities to be a livable place: for example, difficulty in waste management, scarcity of resources, air pollution, human health concerns, traffic congestion, and inadequate, deteriorating and aging infrastructures. In this sense, these problems become complicated and uncontrollable, where rapid growth of urban population also adds pressure on city infrastructure, leading to the increasing demands on its services and distribution of resources.

### WORLD'S POPULATION LIVES IN URBAN AREAS



### MALAYSIA'S POPULATION LIVES IN URBAN AREAS



Urbanization should always be planned according to the latest, current and future economic trends. Dealing with this, Smart City is one of the options to tackle these problems. The smart city approaches have emerged as ways to solve problems inherited through rapid urbanization. A city should provide safe living, sufficient recreational facilities, electricity and telecommunications and efficient public transportation system. On the other hand, innovation will also influence the smart solution for smart cities, where its role in promoting new idea and practices will change to adopt and meet human need and values. However, a smart

city will also strive for a high degree of social inclusion. A smart city needs to consider resource preservation while ensuring high quality of life combined with innovation in all fields.

The meaning of smartness in the urban or metropolitan context not only indicates utilizing cutting-edge information and communication technologies (ICTs), but how we manage and develop policies and Smart City is identified as one of the comprehensive commitment to innovation in technology.



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation ⑨

Make cities and human settlements inclusive, safe, resilient and sustainable ⑪

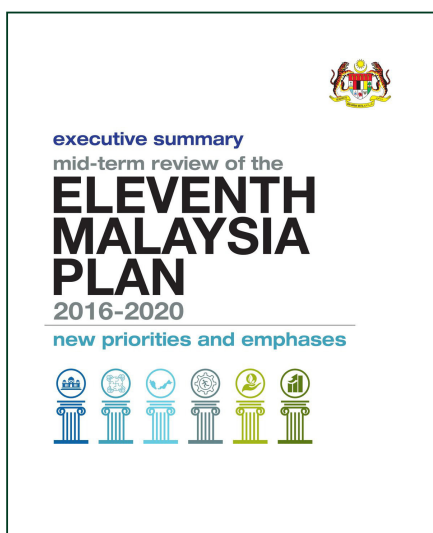
Strengthen the means of implementation and revitalize the global partnership for sustainable development ⑰

“Smart City strategies for innovation must reflect the consideration on management and policy as well as technology.”

## + WHY SMART CITY INITIATIVE IN MALAYSIA

Malaysian cities, with the smart city blueprints, green initiatives, and its efforts on digital artificial intelligence capabilities, can become the model for other countries in the region. Recently, there are many good examples of urban development initiatives that can be emulated into other cities. The smart city concept is an example where new ideas in promoting city planning, construction, management and services are using the Internet of Things, Artificial Intelligence (A.I), cloud computing, big data and spatial geographic information integration.

The emphasized towards making Malaysian cities into smart cities has been highlighted in Malaysia's development plans such as the Eleventh Malaysia Plan (11MP), the National Physical Plan 3 (NPP3), The National Urbanization Policy 2 (NUP2) Malaysia Smart City Framework, Low Carbon City Framework and etc. The development of smart cities is also to uplift Malaysian Cities competitiveness and support Malaysia's commitment towards global agenda that are Sustainable Development Goals (SDGs) and New Urban Agenda.

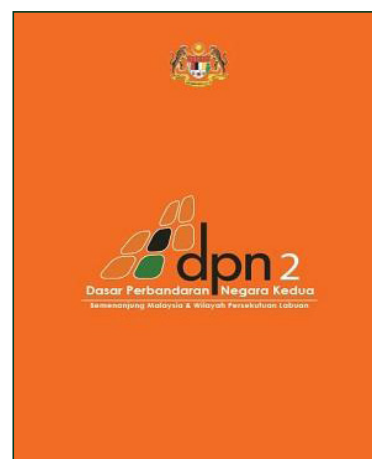
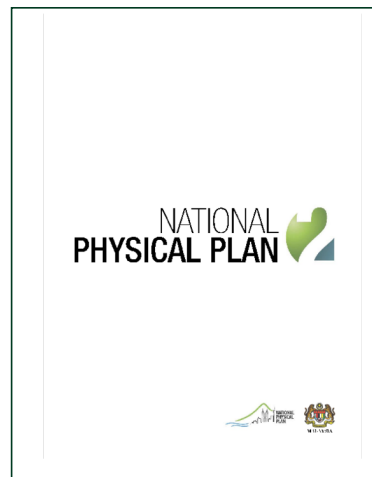


(2) Eleventh Malaysia Plan (11MP) Report

Besides this, the Malaysia Communication & Multimedia Commission (MCMC) has also proposed the National Fiberisation & Connectivity Plan (NFCP) that is timely and is expected to accelerate the implementation of the Smart City initiative throughout Malaysia through the digital infrastructure strengthening actions.

Recently, Malaysia have also launched the Malaysia Smart City Framework basically will serve as a guideline for local governments all across the country to develop cities into smart cities. This guideline will be a reminder for the respective local governments to take progressive steps to upgrade connectivity, infrastructure and effectiveness of communication with the people.

(3) National Physical Plan (NPP3) Report



(4) National Urbanization Policy 2 (NUP 2) Report

It will help to improve the life quality of the people. The five pilot cities selected to be upgraded into smart cities, are Kulim, Kuala Lumpur, Johor Baru, Kota Kinabalu and Kuching.

The goal for Smart City Initiatives under the Malaysia Smart City Framework includes:

- 1) To develop an overall framework (blueprint) for smart cities development in Malaysia;
- 2) As references to all implementing agencies and stakeholders to guide and to ensure a systematic implementation of smart city development in Malaysia;
- 3) To translate and define the main concept of smart city related to smart living, smart governance, smart economy, smart environment, smart people and smart mobility;
- 4) To establish policies, strategies, and action plan base on urban categories with reference to the national urbanization policy;
- 5) To formulate the implementation and monitoring mechanism on smart city development;
- 6) Malaysia Smart City Framework comprising all three tiers of government as well as private sector participation to streamline and coordinate the development of smart cities in Malaysia.

## + NEW TECHNOLOGIES AND INITIATIVES INTRODUCTION

The examples of smart city initiatives that have been implemented are Kuala Lumpur, Iskandar Malaysia, Smart Selangor, Penang, Putrajaya and Cyberjaya. Many more are following suit. Below are the cities in Malaysia that have come out with the Smart City Blueprints. There are Kuala Lumpur, Putrajaya, Iskandar Malaysia (Johor), Selangor and Cyberjaya.

It is interesting to note that many of the major cities

in the world evolved without a blueprint. Kuala Lumpur (capital city of Malaysia), for instance was a mining settlement before it grew organically into what it is today. As cities grow, planners and policy makers face unenviable task of addressing the numerous problems associated with urban planning and management.

There are several approaches on smart cities initiatives highlighted as the graphic below:

### MALAYSIA SMART CITY INITIATIVES



KUALA LUMPUR	PUTRAJAYA	ISKANDAR	SELANGOR	CYBERJAYA
<ol style="list-style-type: none"> <li>1. World's firms</li> <li>2. Talent</li> <li>3. HSR system</li> <li>4. Integrated MRT</li> <li>5. Revitalising River</li> <li>6. Greening KL / KV</li> <li>7. Iconic places attractions</li> <li>8. Comprehensive pedestrian network</li> <li>9. Solid waste management</li> </ol>	<ol style="list-style-type: none"> <li>1. Smart Transportation &amp; Mobility</li> <li>2. Smart Home &amp; Environment</li> <li>3. Smart Governance</li> <li>4. Smart Infrastructure &amp; Utilities</li> <li>5. Smart Safety &amp; Security</li> <li>6. Smart Economy</li> <li>7. Smart Community</li> </ol>	<ol style="list-style-type: none"> <li>1. Smart Economy</li> <li>2. Smart Governance</li> <li>3. Smart Environment</li> <li>4. Smart Mobility</li> <li>5. Smart People</li> <li>6. Smart Living</li> </ol>	<ol style="list-style-type: none"> <li>1. Smart Governance</li> <li>2. Smart Digital Infra</li> <li>3. Smart Mobility</li> <li>4. Smart Waste</li> <li>5. Smart Healthcare</li> <li>6. Smart Education</li> <li>7. Smart Water Smart</li> <li>8. Energy &amp; Utility</li> <li>9. Smart Food &amp; Agro</li> <li>10. Smart Safety &amp; Security</li> <li>11. Smart Building</li> <li>12. Smart Disaster</li> </ol>	<ol style="list-style-type: none"> <li>1. Twelve (12) dimensions of Smart Selangor</li> <li>2. People/community participation or involvement</li> <li>3. Fully supports all the four (4) main elements established in the Low Carbon City Framework &amp; Assessment System(LCCF).</li> </ol>



## + KUALA LUMPUR



(5) Kuala Lumpur Logo

Kuala Lumpur is likely to become a smart city by next year as Alibaba Cloud's "Malaysia City Brain" pilot project is completed. The initiative will use Alibaba Cloud's artificial intelligence programme as well as big data analytics to produce real-time traffic predictions using video and image recognition technologies to combat traffic congestion in the city. The initiative is a localised replication of Alibaba Cloud's ET City Brain, which was implemented in Hangzhou in 2016. Kuala Lumpur is the first city to adopt the technology outside of China on a trial basis. Alibaba Cloud, the cloud computing arm of Alibaba Group, has implemented this technology in about 10 cities in China to alleviate traffic congestion.

### > ITIS (INTEGRATED TRANSPORT INFORMATION SYSTEM)

ITIS Provide the public with real-time information on the traffic conditions of our roads and highways so that we can have a "clear way to go."

ITIS will be able to provide the public with real time information on:

- Areas of traffic congestion;
- Expected traveling time from one point to another;
- Cause of traffic congestion;
- Alternative route to get to the next destination;

"Kuala Lumpur City Hall has selected Integrated Transport Information System (ITIS) to improve the planning and traffic flow in the city."

### > GOKL JOURNEY PLANNER

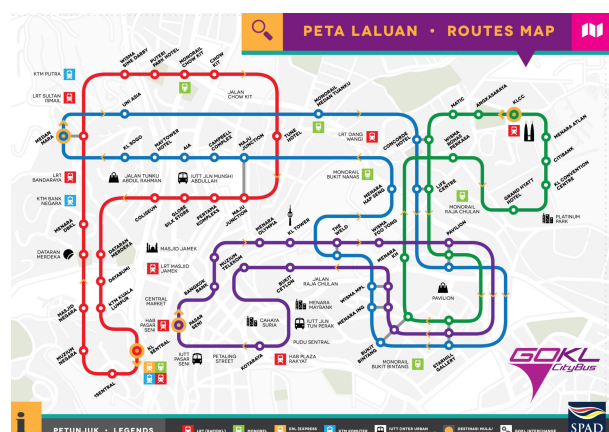
Intelligent transportation solution allowing aggregation, reporting and analysis of real-time devices data. It will make it easier for the public to get real-time information about bus schedules and movements. The real time information include arrival and departure time as well as bus status information.



(6) GoKL City Bus Logo



(7) GoKL City Bus



(8) GoKL City Bus Route Map

## + PUTRAJAYA



(9) Putrajaya Logo

The seat of the Federal Government administration was shifted from Kuala Lumpur to Putrajaya in 1999.<sup>(4)</sup> Putrajaya was planned to embrace two major themes: A city- in- a- garden and an intelligent city. Putrajaya was intended as an independent city employing federal government employees and those in service industry positions to serve them. Sustainability concept is clearly evident in the designation of almost 40% of its total city area of 4,931 hectares specifically for green and open spaces in the Putrajaya Master plan.

With the progression of Putrajaya becoming a Smart City, the city hopes that with the implementation of Internet of Things (IoT) and other information and communication technology (ICT) innovations, Putrajaya Corporation will further propel the city to become a global model city in the next years.<sup>(5)</sup>

### THE 4 BIG MOVES STATED IN THE PUTRAJAYA STRUCTURE PLAN 2025

- 1 Transforming Putrajaya into a green city, one that commits towards continuously improving the quality of living environment by ensuring that its urban activities and redevelopment reduces carbon emission, encourages green business and green lifestyle.
- 2 Invigorate the city through a more diverse economic activities, allowing activities and creating spaces that encourage a more vibrant city that is livable.
- 3 Further enhanced the government Precinct, the core Island and the Civic Precinct to be more distinct in its function and legibility within the city's context.
- 4 Holistically addressed a greener travel plan for the city and connectivity between the city and its surrounding areas. These includes providing facilities and infrastructures that encourages people to walk, cycle and use public transportation on their daily activities.

## > SMART INFRASTRUCTURE & UTILITIES

To provide the basic infrastructure to upgrade the city's capabilities and capacities towards a Smart City status.

Provided services:

- Communication;
- Street & Compound Lighting;
- Facilities Management;
- Waste Management System.

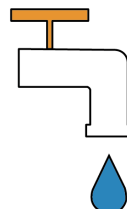
## > SMART HOME & ENVIRONMENT

To ensure that the environmental conditions of Putrajaya will be constantly monitored to allow for a high quality environment; Provide for effective and efficient water management to reduce wastage; Monitoring the energy use of buildings in the city so as to reduce consumption, and save on carbon emission.

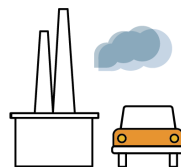
### SMART HOME & ENVIRONMENT ACTIONS



Air quality monitoring



Water usage monitoring



Green House Gas emission monitoring



24 hours Home monitoring

(4), (5) Putrajaya Smart City Blue Print



## + ISKANDAR



(10) Iskandar Logo

Smart City Iskandar Malaysia with its 6 Dimensions and 28 Characters of Smart Cities, serves as a tool to expedite the Iskandar Malaysia vision and it is one of the main sources of references for any parties interested in smart cities development in Malaysia. Examples of smart components initiated by Iskandar Malaysia are the Mobility Management System, Smart Decision System (Urban Observatory), Healthcare Integrated Hub and Bus Trans Iskandar.

Iskandar Malaysia made further inroads in realising the smart city plan consistent with the government's acknowledgement of the need for smart city developments that focus on strengthening infrastructure to support future growth.

## &gt; INTEGRATED OPERATION CENTRE (IOC)

The IOC, the first ever in Malaysia, serves as a centralised command centre for Internet of Things (IoT) operations of various smart city services. This will enable Inneonusa to provide a single nationwide monitoring dashboard to coordinate operations of smart services involving physical devices and sensors, vehicles, buildings as well as incidents and events.

## &gt; SUNGAI SEGGET RIVER REVITALISATION

Sungai Segget River Revitalisation project involves the development of a Centralised Sewerage Treatment Plant (CSTP) and a Flood Mitigation System for Sungai Segget. The CSTP integrates two (world class) infrastructure system comprising of Sequencing Batch Reactor and SCADA monitoring system to achieve Class 11-B water quality.

(11) Segget River (Past)



(12) Segget River (Present)

## + SELANGOR



(13) Selangor Logo

The Selangor State Government has also successfully developed a blueprint focusing on 12 smart domains to spearhead Selangor as a smart state by 2025. The government of Selangor have implemented 5 of the domains, namely Smart Governance, Smart Digital Infrastructure, Smart Transport & Mobility, Smart Waste Management and Smart Safety & Security. The Smart Selangor initiative by the Selangor State Government seeks to leverage the Internet of Things (IoT) solutions in improving the quality of life of its citizen, in line with the urbanisation wave. A sustainable Smart Selangor begin with nurturing a smart society that promotes a culture of inclusiveness, resilience, and innovation. The government committed to provide a safe, well-administered environment that caters to the aspirations of its people.

### > SMART SELANGOR PARKING

Smart Selangor Parking is a street parking system, which authorizes private vehicle parking using a 2-step parking payment by simply inputting the car number and selecting parking duration. The payment for parking must be made 2 hours prior to the actual parking time.



(14) Smart Selangor Parking application

### > SMART SELANGOR COMMAND CENTRE (SSCC)

Gathering and managing data of disaster in Selangor compound and disaster trans-state boundaries. All the data acquired will be taken into account for further action by the state government or National Disaster Management Agency (NADMA).



(16) Smart Selangor Command Centre (SSCC)

(15) Smart Selangor Parking poster





## + CYBERJAYA

# MALAYSIA CYBERJAYA

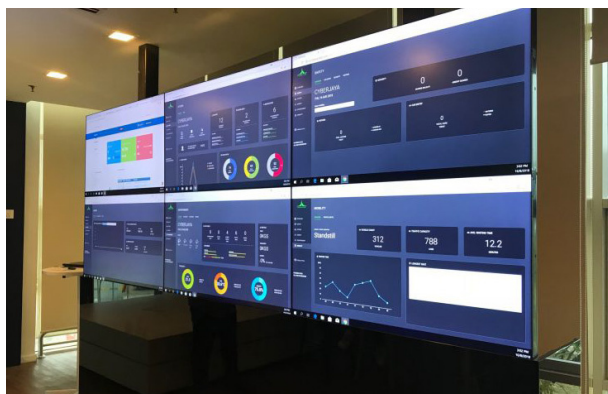
(17) Cyberjaya Logo

A city that started from a mere oil palm plantation, Cyberjaya has undergone a dramatic transformation; from an ICT Hub under the Multimedia Super Corridor into a Global Tech Hub that's a critical contributor to Malaysia's digital economy.

## > CITY DASHBOARD FOR BIG DATA PROJECTS

One of the most exciting projects in Cyberjaya is the city dashboard which makes it truly unique and is not found in other cities in Malaysia.

Since the city is installed with IoT sensors and implemented with other pilot projects that generate large amount of data, a common platform that pulls all the different data sources is being hosted at Cyberview's office. The city dashboard displays various data in a presentable format. It's still a work in progress and more data is currently being pulled into the platform.



(18) Cyberjaya City Dashboard

## > HOME TO FORTUNE 500 AND GLOBAL TECH COMPANIES

There are close to 500 companies in Cyberjaya which are focusing on IT and technologies. Cyberjaya's rank as the world's 3rd best outsourcing destination, a product of the initial mandate. The new focus is going beyond ICT and more on new innovation and technologies. Following to these mandates, Cyberjaya is now home to various tech local and global tech companies.



(19) Cyberjaya facility



(20) Cyberjaya City Centre Masterplan

## + PENANG



(21) Penang Logo

The priority for this year will be to transform Penang into a smart city which is in line with Penang 2030 'A Family-Focused Green and Smart State'. Penang is pushing ahead with its smart city initiatives with the planned formation of an "umbrella body" called Digital Penang Corporation (DPC). The corporation will coordinate the various endeavours in meeting the state's smart city goals. Basically, the development of the smart city in Penang consists of four main strategic cores that include governance, people, data and infrastructure.

### > PENANG DIGITAL LIBRARY

Penang Digital library has expanded and there's so much more to look forward to while you get your hands on over 3,000 e-books, e-magazines, and reference journals. Spending over RM10.8 million for Penang Digital Library Phase 2, impressive addition they've built which includes restaurants, cafes as well as digital infrastructure and information technology.



(22) Penang Digital Library (Exterior)



(23) Penang Digital Library (Interior)



(24) Penang Island

### > SMART BUS STOP

Encourage more people to use the public transport. CCTV camera and a panic button installed at the smart bus stop to enhance safety. Other features include rooftop solar panels, WiFi facility, digital directory, digital advertising signage and more.



(25) Penang Smart Bus Stop



DATABASE  
-  
CASE STUDIES ON TRANSPORT SYSTEM



# Integrated Transport Information System (ITIS)

## (Kuala Lumpur City Hall, Malaysia)

RECIPIRO:CITY

*ITIS is a comprehensive traffic information system developed by Kuala Lumpur City Hall to monitor traffic flow and analyze data on road conditions in Klang Valley to provide a better transportation system to the users.*

Case submitted by: Kuala Lumpur City Hall, Malaysia  
Case edited by: CityNet Secretariat

(26) Mass Rapid Transit (MRT) in Kuala Lumpur



### + BACKGROUND<sup>(6)</sup>

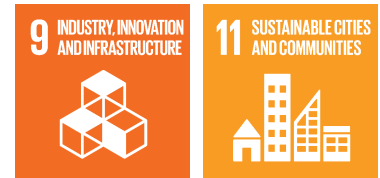
Kuala Lumpur, officially the Federal Territory of Kuala Lumpur and commonly known as KL, is the national capital and largest city in Malaysia. As the global city of Malaysia, it covers an area of 243 km<sup>2</sup> and has an estimated population of 1.73 million as of 2016. Greater Kuala Lumpur, also known as the Klang Valley, is an urban agglomeration of 7.25 million people as of 2017. It is among the fastest growing metropolitan regions in Southeast Asia, in both population and economic development.

Considering the transportation modes of Kuala Lumpur, the first airport, known as Simpang Airport, commenced operation in 1952, and was the main airport for Malaysia until 1965. The Kuala Lumpur Mini Bus service is one of the oldest bus services in Malaysia and commenced operation in 1975. Taxis have been a common sight in Kuala Lumpur ever since the 1950s. Kuala Lumpur bus system was also introduced to increase the ridership and improve Kuala Lumpur's public transport system.

<sup>(6)</sup> Transport in Kuala Lumpur, Wikipedia, [https://en.wikipedia.org/wiki/Kuala\\_Lumpur](https://en.wikipedia.org/wiki/Kuala_Lumpur)



(27) Traffic congestion in Kuala Lumpur



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation <sup>9</sup>

Make cities and human settlements inclusive, safe, resilient and sustainable <sup>11</sup>

## + CHALLENGES

Kuala Lumpur has a comprehensive road system supported by an extensive range of public transport networks, such as Mass Rapid Transit (MRT), Light Rapid Transit (LRT), monorail, commuter rail and an airport rail link. Each year the number of vehicles entering the capital region is increasing. Although various public transport infrastructure and facilities are provided, in 2006, the average use of public transport was considered one of the lowest in the Asia region. Therefore, the traffic congestion problem still is considered as a big challenge in the city.

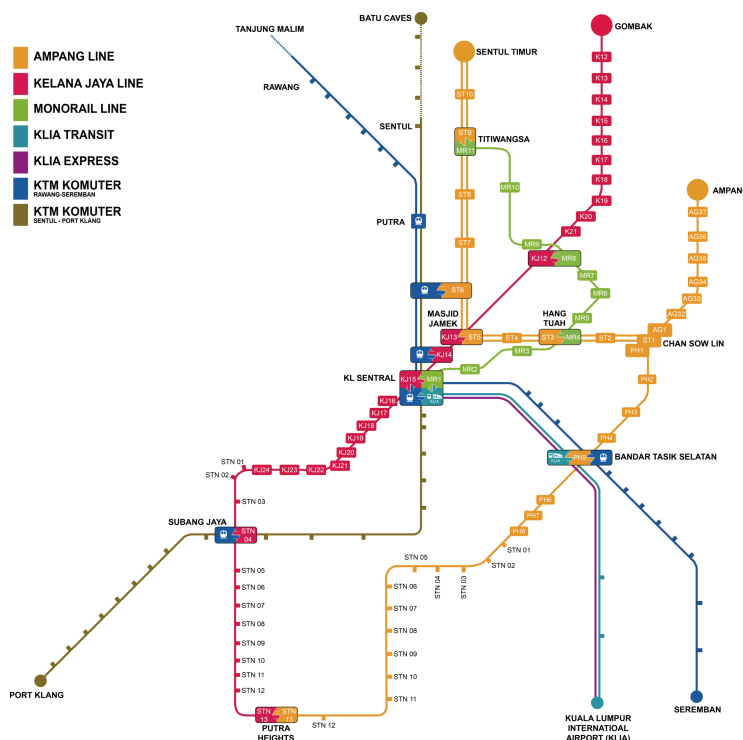
## + OBJECTIVES

In line with one of the objectives of the Structural Plan Kuala Lumpur 2020 to improve the management of the Klang Valley's transport infrastructure system, Kuala

Lumpur City Hall has selected Integrated Transport Information System (ITIS) to improve the planning and traffic flow in the city.

With the introduction of ITIS, Kuala Lumpur expects to solve the need to collect, share and make available accurate and up-to-date traffic information to road users to help them ease their traffic woes in the Klang Valley. With a comprehensive traffic management system, ITIS will integrate the current road transport network and provide accurate situation of traffic conditions since both motorists and commuters would be able to know in advance what to expect along the way.

## KLANG VALLEY INTEGRATED RAIL SYSTEM



## MALAYSIA RAIL PUBLIC TRANSPORTATION



Mass Rapid Transit (MRT)



Light Rapid Transit (LRT)



Monorail



Commuter Rail



Airport Rail

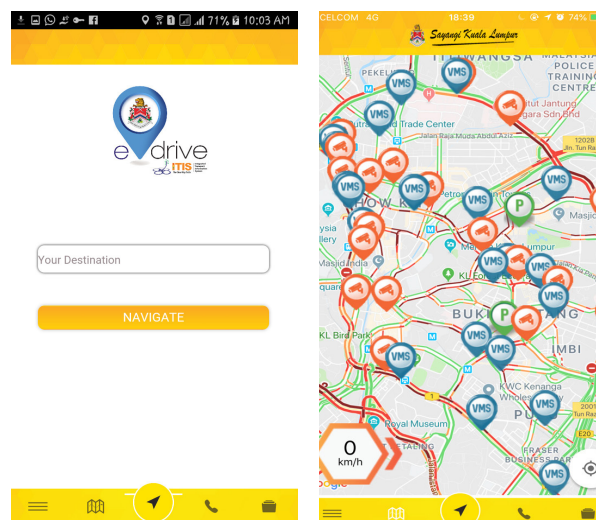


## + ACTIONS AND IMPLEMENTATION

Work on the ITIS project started in 2003. This project which was awarded on a design-build basis, is the first step towards the coordinated integration of existing but separated traffic planning and management systems in Kuala Lumpur. The first stage of ITIS project was completed in mid-2005 and has since been providing real time reporting and incident management for the city. This large scale complex project involved, among other, the installation of over 250 CCTV cameras for traffic monitoring at key junctions, 700 video-based vehicle detector stations, 140 status message signs and 1600 units of vehicle tracking machines. Real-time information are currently disseminated to the public via a call center, through online portal ([www.itis.com.my](http://www.itis.com.my)), and arrangements with radio media. In addition, many efforts are currently being developed to expend the diverse channels of communications via commercial media.

Since the development start from ITIS, it has provided the Kuala Lumpur City Hall a wide platform to launch improved services in new planned areas, integration of previously disparate systems and an operational model for smart partnerships between various public and private agencies under the same government. The continuous challenges are related to how best to find ways to expand and to further improve the ITIS system to better serve the big vision of making Kuala Lumpur a safe city with a well implemented transportation infrastructure.

Efforts to achieve this big vision would include expanding the information dissemination channels either through partnerships with the media, application service providers or via local broadcasting station, enhancing the system to include elements of public security, enforcement of traffic and/or adoption of new technologies in management of traffic violations, and to increase penetration of the system in new roadways. While developing and expanding ITIS, there is a need to

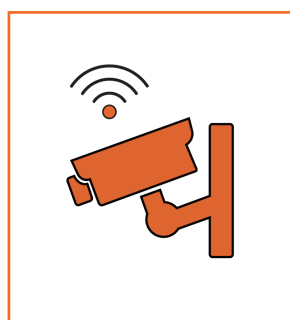


(28) E-drive application

consider balancing technology with available operating resources and improving capacity of human resources.

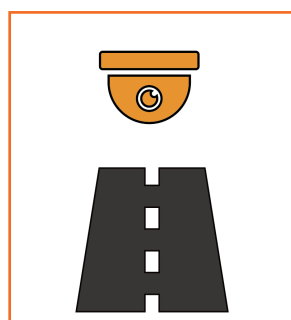
ITIS has been a significant and successful ongoing project for Kuala Lumpur City Hall in its continuing efforts to make Kuala Lumpur a safe city with a well managed transportation infrastructure. The physical implementation of this complex project included many challenges since the project involved the construction of over 1000+ new pieces of road furniture to support the new transportation system installation. Given the limited spaces of the city, particularly in the city center, it was essential to find ways to recombine multiple poles into a single functional unit. Also, for the project optimal performance, it is required that expertise from a large number of partners including traffic engineering, transport planning, transportation system analysis, IT, GIS, civil, electrical engineers, legal advisory, customer support staff and others be included. Lastly, since the project involved many actors and stakeholders due to the big scale of the project, managing expectations from all sectors was also considered key to secure the success of such a complex project.

### THE 1<sup>ST</sup> STAGE OF INTEGRATED TRANSPORT INFORMATION SYSTEM (ITIS) PROJECT



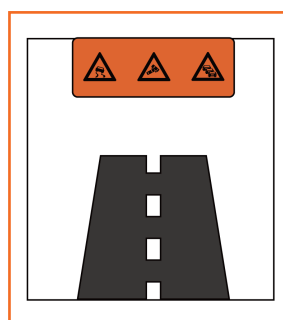
CCTVs

250



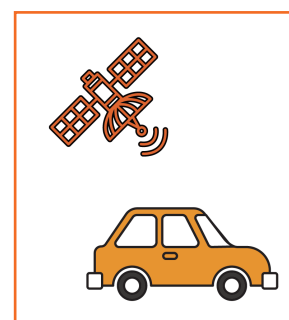
Video-based  
Vehicle Detector Stations

700



Status Message Signs

140



Vehicle Tracking Machines

1,600

## + IMPACTS AND EXPECTATIONS

After the implementation of ITIS, the city benefited from the two way communication between ITIS and the users. The communication supports motorists and commuters to make decisions on choosing routes, modes and schedules. It also enables real-time capture of traffic information for incident management and long-term transport planning. It alleviates traffic congestion and delays during rush hour periods and emergency situations and reduce accidents and its impacts on highways. Improves emergency assistance for motorists and commuters. Reduce travel times and promotes more uniform traffic flow. Reduces bad effects in the environment since it reduce pollution due to the less time in traffics. Provides comfort. Improves utilization of available road capacity. And, lastly improves quality of life in the Klang Valley.

## + REPLICABILITY AND SCALABILITY

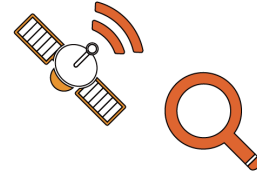
Although Integrated Transport Information System (ITIS) may refer to all modes of transport, in 7th July of 2010, the European Union defined ITS as system in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, traffic management, as others modes of transport. ITIS may improve the efficiency of transport in many different kinds of situations. This system has been widely and successfully implemented in major cities around the worlds, bringing significant benefits to motorists and commuters.

Similar system can be found implemented in Seoul, Singapore, Sydney, Perth, and major cities worldwide. It can also be considered to solve many traffic congestion and safety problems in cities still being in the process of development.

## EXPECTATIONS OF IMPLEMENTATION OF ITIS



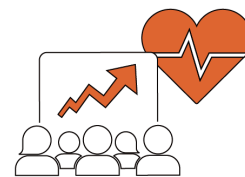
Choose route, mode, and schedule



Real-time capture for incident management



Enable long-term transport planning



Improve emergency assistance

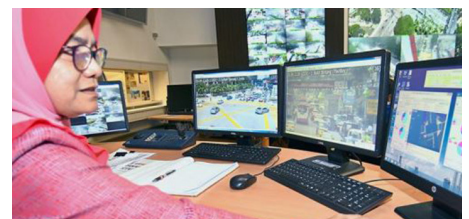


Reduce travel time



(29) ITIS control center

(30) ITIS operator showing how she can control the traffic lights



# Solar Powered Street Lights

## (Kathmandu Metropolitan City, Nepal)

*Solar powered street lights system <sup>(7)</sup> uses its own power generated from clean energy, and with a monitoring sensor system make it possible to prevent energy loss.*

Case submitted by: Kathmandu Metropolitan City  
Case edited by: CityNet Secretariat



(31) Kathmandu Metropolitan City

### + BACKGROUND<sup>(8)</sup>

Kathmandu is the capital and largest city of Nepal, with a population of about one million. Kathmandu is also the second largest metropolis in term of area after Pokhara in hilly region.

Kathmandu, also known as “City of Temples” with one of the oldest Pagoda known as Pashupatinath Temple, stands at an elevation of approximately 1,400 meters above sea level in the bowl-shaped Kathmandu Valley in central Nepal.

The valley is historically termed as “Nepal Mandala” and has been the home of Nepali people, a cosmopolitan urban civilization in the Himalayas foothills. The city was the royal capital of the Kingdom of Nepal and hosts palaces, mansions and gardens of the Nepalese aristocracy. It has been home to the headquarters of

the South Asian Association for Regional Cooperation (SAARC) since 1985.

Today, it is the seat of government of the Nepalese republic established in 2008; and is part of the Province No. 3 in Nepalese administrative geography.

Kathmandu is and has been for many years the centre of Nepal’s history, art, culture, and economy. It has a multiethnic population within a Hindu and Buddhist majority. It is also the home of the Newars. Religious and cultural festivities form a major part of the lives of people residing in Kathmandu.

Historic areas of Kathmandu were severely damaged by a 7.8 magnitude earthquake on 25 April 2015. Some of the buildings have been restored and some are in the process of reconstruction.

(7) <http://www.urbansdgplatform.org/admin/content/viewCsdDetail.msc>

(8) <https://en.wikipedia.org/wiki/Kathmandu>



## + CHALLENGES



(32) Kathmandu electricity

From 2006, for a decade, most cities from Nepal faced major challenges of lack of lighting caused by daily long black outs that would go for up to 16 hours. Residential and industrial sectors were highly affected making quality of life very poor. Power backup system and generators ran by diesel were expensive but high demand in the market. During that period, public spaces as parks and streets were far from being well used during late afternoon and night time. In order to address this energy crisis, solar generated energy system, known as solar panels, were introduced in the Nepali market. This system generated clean energy, was easy to install and operate, and created no pressure in the existing national electricity grid and non-renewable energy.

## + OBJECTIVES

With the time, solar power gained popularity in residential sectors and in 2014, Kathmandu Metropolitan City (KMC) with the support from Asia Development Bank (ADB), decided to introduce solar power street lighting system to KMC. Since then, this system is being widely used in major roads to residential alleys in the city, and the energy crisis ended in 2016. Since then, every year the local government is allocating a specific budget to keep this project sustainable.



Ensure access to affordable, reliable, sustainable and modern energy for all 7

Make cities and human settlements inclusive, safe, resilient and sustainable 11

Ensure sustainable consumption and production patterns 12

(33) Solar panel system at UN House in Kathmandu





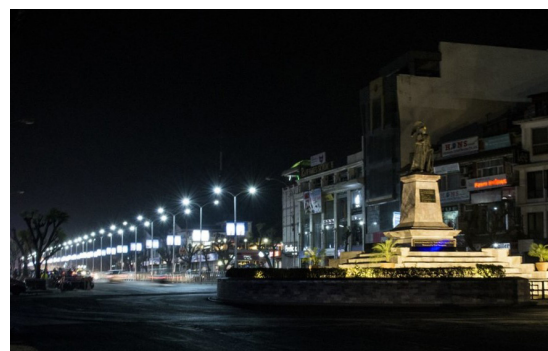
## + ACTIONS AND IMPLEMENTATIONS

The street lighting system uses its own power generated from clean energy. The system has a sensor that allows easy operation and efficient street light with a minimum operational cost. With the introduction of solar street lights, conflict between KMC and Nepal Electricity Authority over high electricity bill coming from street lights usage has come to an end. The installation cost is shared among public and private stakeholders. Private sector draws benefit from displayed advertisement that runs from solar energy.

This initiative is under the responsibility of Infrastructure Development Department of KMC.

The mentioned department is in charge of planning, developing, managing and maintaining the street lights. Every fiscal year, Kathmandu allocate budget of around 600,000 USD to keep this project sustainable and upgrade the required equipment when necessary.

(34) Solar street lights installed in residential alley



(35) Solar street lights at night time

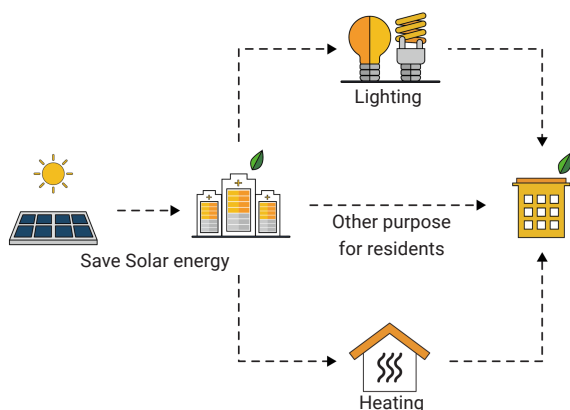
(36) Kathmandu Metropolitan City (Past)



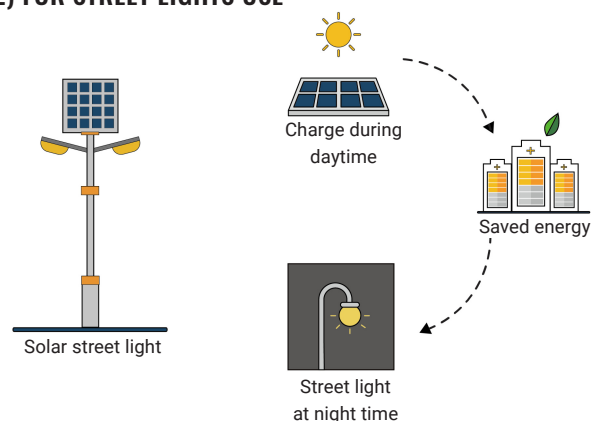
(37) Kathmandu Metropolitan City (Present)

## SOLAR ENERGY SAVING STRUCTURE SYSTEM

### 1) FOR RESIDENTS USE



### 2) FOR STREET LIGHTS USE



### + IMPACTS AND EXPECTATIONS

The solar powered street lights initiative has introduced solar technology to the residents of Kathmandu City. Solar energy system is now used widely for heating, lighting and other purposes in residences. The local government is also using the energy produced by the solar panels in traffic lights from roads. Citizens have now more easy access to clean and efficient energy, also it makes the streets safe and accessible for all.

### + REPLICABILITY AND SCALABILITY

This initiative has been widely popular across the country. Residents from different areas in the city have requested the government to enlarge the project's scale and replicate in different areas. Cities like Pokhara and Bharatpur have already replicated this practice in accordance to their own local circumstances and needs. The success of solar power street lighting system has only widened its scope in lighting public parks, open spaces and traffic lights.



(39) Bharatpur city

(38) Pokhara city



# On Street Metered Parking Management System

## (Colombo Municipal Council, Sri Lanka)

*As a leading council in the country, the Colombo Municipal Council has now initiated the project of Smart Park system which introduces new technologies on the city's parking management operation while enhancing services to the car users in the city.*

Case submitted by: Colombo Municipal Council

Case edited by: CityNet Secretariat



(40) Colombo city view

### + BACKGROUND <sup>(9),(10)</sup>

Colombo is the commercial capital and largest city of Sri Lanka by population, and is also considered as the financial center of the island and a popular destination. It is located on the west coast of the island and adjacent to the Greater Colombo area which includes Sri Jayawardenepura Kotte, the legislative capital of Sri Lanka and Dehiwala-Mount Lavinia. Colombo is often referred to as the capital since Sri Jayawardenepura Kotte is within the urban area of, and a suburb of, Colombo. It is also the administrative capital of the Western Province

and the district capital of Colombo District.

Colombo is a busy and vibrant place with a mixture of modern life and colonial buildings and ruins.

Like many cities, Colombo's urban area extends well beyond the boundaries of a single local authority, being the home to a majority of Sri Lanka's corporate offices, restaurants and entertainment venues. All those aspects without a proper transportation and parking infrastructure can cause large traffic congestion in the city and citizens' lower satisfaction.

(9) <https://en.wikipedia.org/wiki/Colombo>

(10) <https://en.wikipedia.org/wiki/Colombo#Transport>

## + CHALLENGES <sup>(11)</sup>

Traffic is a big challenge in Colombo since it has an inescapable congestion causing slower speeds, longer trip and increasing of vehicular queuing. With the time spent in the traffic jam, the economic loss to the motorist and the city is colossal; the commuter having wasted time and fuel in search of parking and the city not accruing the full benefits of the public roads.

Traffic congestion is due to our basic mobility problem, which is that too many people want to move at the same time each day. The Colombo Municipal Council (CMC) decided to regulate the parking in the city in 2012 in order to make the best use of parking spaces and try to solve the congestion problem in the city. Previously, parking fee collection and management was done by CMC parking enforcement officer, also known as traffic wardens. In 2010 the private operators were introduced mainly due to non-availability of sufficient traffic wardens to be assigned in all places in the city. Also, revenue collection was very much less than the revenue potential.



Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all <sup>8</sup>

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation <sup>9</sup>

Strengthen the means of implementation and revitalize the global partnership for sustainable development <sup>17</sup>

## + OBJECTIVES

As a leading council in the country, the Colombo Municipal Council has now initiated the project of Smart Park system which introduces new technologies on the city's parking management operation while enhancing services to the car users in the city.

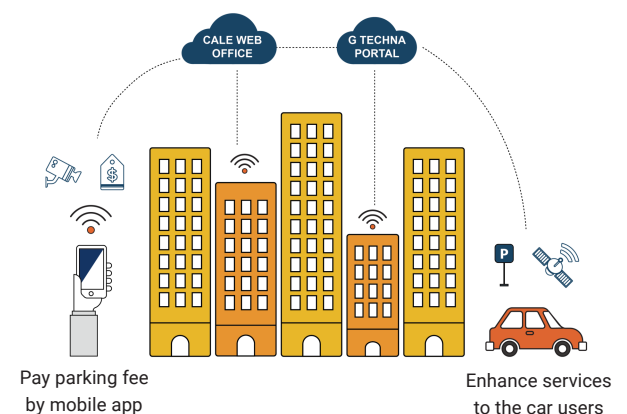
The project includes installation of parking meters along the entire Galle Road, R.A. de Mel Mawatha and all by roads connecting to these roads and the parking management operator is Tenaga Car Parks (Pvt.) Ltd. Colombo Municipal Council have completed installation of parking meters on the first phase, and they are now operational.

(41) Colombo street parking situation (cars)



(42) Colombo street parking situation (motorcycle)

## SMART PARKING MANAGEMENT SYSTEM STRUCTURE



(11) <http://www.ft.lk/opinion/Managed-parking-has-potential-to-transform-Colombo-s-increasingly-congested-streets/14-674609>



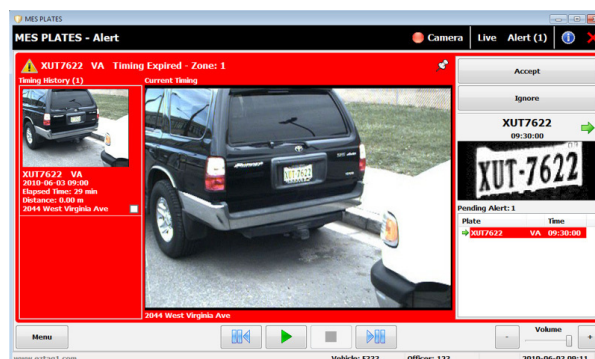
## + ACTIONS AND IMPLEMENTATION <sup>(12),(13)</sup>

Since the newly introduced parking management system requires a large initial capital investment, this project was formulated in a Public-Private Partnership (PPP) method based on revenue sharing. In this partnership, private operator was selected through a two phases competitive bidding process. The final selection was based on points obtained in the technical proposals and total revenue to the Colombo Municipal Council.

With this project, around 150 machines were implemented and the total investment predicted is around LKR 200 Mn according to the officer in charge from CMC. Parking revenue should be shared in between CMC and the private operator on the percentage quoted in the financial proposal of selected bidder.

In addition to CMC and private operator, many other stakeholders were involved in this project to highlight its operation. Western Provincial Council supported on approving the amended laws on parking management; Department of Motor Traffic provided support by sharing vehicle database and collection of fines when transferring the vehicle ownership; Sri Lanka Police help by doing law enforcement on vehicles parked in non-dedicated spaces; Provincial Department of Motor Traffic does the collection of fines at the time of renewing licenses; and Urban Development Authority provide support by amending and updating existing regulations to increase the street parking facilities in the city development stage.

(43) Colombo enforcement system



(44) Cale WebOffice

(45) Public awareness campaign for Park Smart



(46) Tenaga Park Smart pay point

(12) <http://www.colombo.mc.gov.lk/news-more.php?id=30>

(13) <http://www.urbansdgplatform.org/admin/content/viewCsdDetail.msc>

## + IMPACTS AND EXPECTATIONS

The new parking system will benefit the public and business community as the availability of vacant parking slots will increase with this system introduction.

The new technology implemented will enable motor vehicle user to pay using a touch card introduced by Dialog Axiata Sri Lanka or by cash, for the users' convenience. Further on, the payment option will be extended through a mobile application. Users are encouraged to use the touch card as a payment option for the parking fee, as the payment machine does no refund or give back the change if the cash deposit is selected as the payment option.

## + REPLICABILITY AND SCALABILITY <sup>(14)</sup>

Since introduction of effective street parking management has strong benefits, greatly reducing problems such as congestion and public transport delays, this system is very well recommended for any city who has a high number of private vehicle users.

This project is also suitable for other municipal councils to support managing limited enable spaces for on-street parking in Sri Lanka.



(47) Sri Lanka police supports law enforcement on vehicles parked in non dedicated places



(48) Parking meters and hand held device

(49) Parking meters in Colombo



(14) [https://www.sutp.org/files/contents/documents/resources/B\\_Technical-Documents/GIZ\\_SUTP\\_TD14\\_On\\_Street\\_Parking\\_Management\\_en.pdf](https://www.sutp.org/files/contents/documents/resources/B_Technical-Documents/GIZ_SUTP_TD14_On_Street_Parking_Management_en.pdf)



# E-Berindah (Banda Aceh, Indonesia)

*The E-Berindah<sup>(15)</sup> application is an android-based application developed by Banda Aceh City government in 2018 for the cleanliness and beauty surveillance system through monitoring and evaluation activities.*

Case submitted by: Banda Aceh Municipality  
Case edited by: CityNet Secretariat



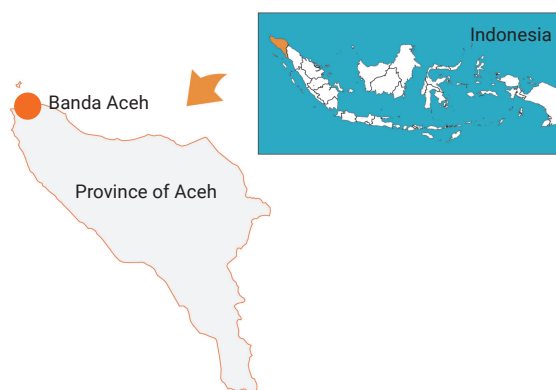
(50) Banda Aceh

## + BACKGROUND <sup>(16)</sup>

Banda Aceh, formerly Kutaraja, is the capital and largest city in the province of Aceh, Indonesia. It is located on the island of Sumatra and has an elevation of 35 meters. The city covers an area of 64 square kilometers and has a population of 219,070 people. Banda Aceh is located on the northwestern tip of Indonesia at the mouth of the Aceh River.

The city was originally established as Banda Aceh Darussalam Kandang and served as a capital and hub for the Sultanate of Aceh upon its foundation in the late 15th century.

## LOCATION OF BANDA ACEH



(15) <http://www.urbansdgplatform.org/admin/content/viewCsdDetail.msc>

(16) [https://en.wikipedia.org/wiki/Banda\\_Aceh](https://en.wikipedia.org/wiki/Banda_Aceh)

## + CHALLENGES

After the 2004 tsunami disaster, Banda Aceh City developed rapidly and became a tsunami and Islamic tourism destination. Until 2018, there were 393,400 people visiting the city of Banda Aceh, from both domestic and international. Therefore, the local government is always putting great effort to keep the city clean and beautiful. The challenge of cleanliness is considered as a shared responsibility involving strategies which targets the willingness of citizens to support cleanliness and beauty of the city.



(51) Devastation of Banda Aceh after the tsunami in 2004

## + OBJECTIVES

To manage the cleanliness of Banda Aceh, the government launched in 2018 the E-Berindah, an application to maximize and evaluate the cleanliness and beauty of the city. The application was developed by the Banda Aceh Environment, Cleanliness and Urban Beauty (DLHK3) department under the Banda Aceh City Government. The name represents an abbreviation of clean and beautiful and the government believes that this initiative will bring extensive benefits so as to be able to improve the welfare of the community.

One of the tools from E-Berindah includes a monitoring system which involve volunteers from the community who can access this application. The results are all shared in an online platform and followed up by officers in the Banda Aceh City Government. Locations which would be monitored include main roads, canals, public facilities, river banks, stations and others, each location having its own indicator that serve as monitoring guidelines.



Ensure availability and sustainable management of **6** water and sanitation for all

Reduce inequality within and among countries **10**

Make cities and human settlements inclusive, safe, **11** resilient and sustainable

Take urgent action to combat climate change and its **13** impacts

Strengthen the means of implementation and revitalize **17** the global partnership for sustainable development

(52) Seaside of Banda Aceh after the tsunami in 2004



(53) A man scavage the rubbles after the tsunami in 2004





(54) DLHK3 activities

## + ACTIONS AND IMPLEMENTATIONS

The need for E-Berindah e-mobile application was first mentioned during the Level IV Leadership Education and Training held in Banda Aceh in 2018 focusing on local government participants. During the training, participants had to create their own projects which would be developed by each respective department. During the workshop the lack of qualified staff, and limited resource capacity to proceed city's cleanliness monitoring were highlighted leading to the plan to create this online application where citizens would be able to take pictures directly from the field and submit to the focal person and department in charge.

The implementation process was done as follow:

1. Develop a business process application framework (April 2018)
2. Seek support from various stakeholders in the implementation of activities (1-15 May 2018)
3. FGD with relevant stakeholders: internal DLHK3 officials and staff, communities, managers and other agencies (15-30 May 2018)
4. Building the E-Berindah application (April - 15 June 2018)
5. Application Trial and Evaluation (15-30 June 2018)
6. Launching the E-Mobile application by the mayor of Banda Aceh (7 June 2018)
7. Implementation (June 7, 2018 until now)

With this initiative, citizens and small communities are more aware of their surrounding environment to keep a clean and beautiful city.

Monitoring and evaluation are carried out every month by solving the problems indicated on the app. The application is being updated every six (6) months to guarantee a more practical and easier way for the users to engage better with the platform.



(56) E-Berindah logo

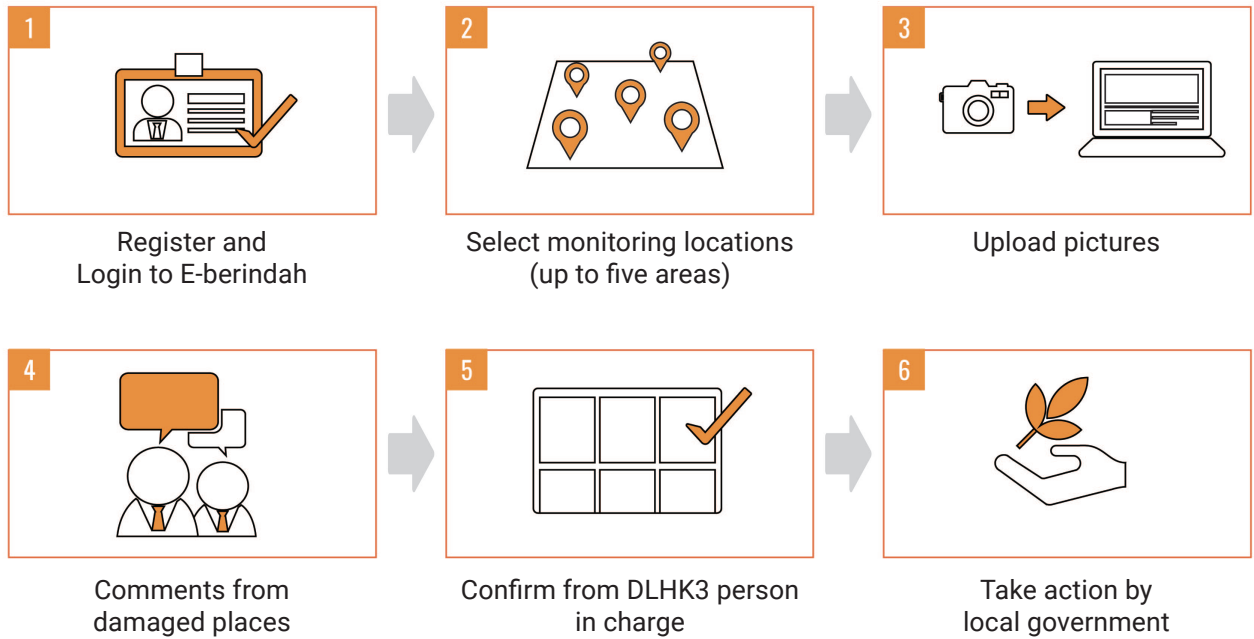


(55) DLHK3 logo

(57) E-Berindah application



## E-BERINDAH PROCESS



## + IMPACTS AND EXPECTATIONS

This initiative embodies sustainable communities, where local governments collaborate with several different communities to jointly monitor the cleanliness and beauty of Banda Aceh. This initiative is very effective in overcoming personal limitations and the number of reachable locations which shall be monitored. Prior to this initiative, DLHK3 only had 7 personnel who would be in charge of monitoring the city in the field. However, after the implementation of E-Berindah, community involvement has increased with participation from various communities including environmental community, grab community, and motorcycle taxi community. In 2019, there have been 443 volunteer accounts that monitor the cleanliness and beauty of Banda Aceh with a range of 242 locations including category of roadways, parks and green areas, public facilities, temporary disposal site, and riverbanks.

In addition, previously it was very difficult for the environmental community to partner with DLHK3. However with the introduction of E-Berindah mobile application, many actions such as National Waste Care Day, Cleanup Day, Car Free Day, and others have been carried out.

## + REPLICABILITY AND SCALABILITY

This E-Berindah initiative can be replicable to other parties and can increase public awareness to preserve the environment and the community's social economy. To also other cities which has a small community and a large number of tourist coming, this application can also be created to improve the city cleanliness and community involvement.

*“The challenge of cleanliness is considered as a shared responsibility involving strategies which targets the willingness of citizens to support cleanliness and beauty of the city.”*

# Car Sharing in Seoul

## (Seoul Metropolitan Government, Republic of Korea)

*The Car Sharing policy from Seoul <sup>(17)</sup> support to alleviate air pollution and traffic problems through car-sharing service among citizens.*

Case submitted by: Seoul Metropolitan Government  
Case edited by: CityNet Secretariat



(58) Seoul city view

### + BACKGROUND

As people depend more heavily on automobiles and increasingly drive their private vehicles, many impacts came as result, such as air pollution, higher demand for fuel, and heavy traffic congestion. Seoul Metropolitan Government has developed various urban policies to reduce the vehicle traffic congestion created by private vehicles. Recently, the global trend has been toward policies on effective use of vehicles, with one of the best known being car sharing. Car sharing is an arrangement where non-owners can use a car, and this activity is currently very common in Europe and North America.

In Republic of Korea, public awareness regarding car ownership is changing, and advanced wireless communications, such as smart phones, have made it much more convenient to book and hire cars, opening new possibilities for the car sharing program. With the shifting opinion of car ownership, Seoul has made plans to offer car sharing as part of its transportation demand management policy, curtailing vehicle ownership when it is not required and providing the service to those people who are otherwise unlikely to have access to private cars.

(17) <http://www.urbansdgplatform.org/admin/content/viewCsdDetail.msc>



## + CHALLENGES

With the implementation of Car Sharing in Seoul, social problems caused by illegal operation of cars and high accident rate are being one of the most considered challenges from its operation.

Non-qualified users to drive a car, such as unlicensed drivers, can easily access those cars which causes safe and social problems. In order to solve those problems, the government is currently establishing a “Driver Identification System” starting from 2017 in accordance with the National Passenger Automobile Transport Business Act.

### CHALLENGES FROM CAR SHARING OPERATION



In addition, the accident rate in 2016 for Car Sharing companies is about 43.7%, which is relatively high compared to the accident rate for short period rental cars. If high accident rate of Car Sharing vehicles continues, the car insurance system, under which the Car sharing company is registered, will have a negative income.



Make cities and human settlements inclusive, safe, resilient and sustainable 11

Take urgent action to combat climate change and its impacts 13

## + OBJECTIVES

Car sharing aims to improve the Seoul's urban transportation system. The most successful model of the sharing system in Seoul is called SOCAR.

As one shared car can replace approximately 16.8 personally-owned cars and parking lot spaces, car sharing has the potential to solve numerous parking and environment-related problems. This project stands to become a representative model of the Seoul's sharing economy, as it achieves a perfect collaboration of both public and private resources.

(59) SOCAR online platform



(61) SOCAR in Seoul



(60) Mobile application connected to the automobile



## + ACTIONS AND IMPLEMENTATIONS

In September 2012, the Mayor of Seoul declared the beginning of the “Seoul: A Sharing City” campaign, which focuses on bringing back a tradition of sharing, which has a long cultural history in Republic of Korea, to solve the social and economic problems in the city. Officially referred as the “Car Sharing Service”, this policy was considered as one of the most important program in making Seoul a “sharing city”.

For this policy, Seoul Metropolitan Government recruited contestants, reviewed operating plans and services for citizens, reviewed strategies to promote public interest, and signed a partnership agreement with 2 national private companies. In a public contest held in February 2013, the “Car Sharing” program was named “Nanum Car” which means car sharing in Korean. In an effort to encourage the use of eco-friendly cars, Seoul also initiated an electric car sharing service in May 2012 before the general car sharing service began, but due to delays in making an agreement with the program entities

as well as construction of the appropriate infrastructure and system integration, the program officially began in May 2013, 3 months after the official introduction of the gasoline-driven car sharing service.

The car sharing service started with 292 outlets and 492 cars in February 2013. According to the SMG in 2017, 11,700 “Nanum Cars” are currently being operated in 1,366 locations in Seoul, and an average of 6,200 people use them every day. As of 2018, the total number of members of the car-sharing service was about 1.93 million, a significant increase from 0.13 million in 2013. The outlets are located near public parking lots run by the local administrative districts of Seoul or by public institutions, and car rentals are possible at anytime all over the city. The plans for the electric car sharing service are to build additional infrastructure such as dedicated parking spaces for electric cars and the installation of electric chargers.

### CAR SHARING SERVICE RESULTS IN 2017



11,700 Cars  
being used as car sharing



1,366 Locations  
where the service is provided



6,200 People  
using the service daily

(62) Nanum car parking lot





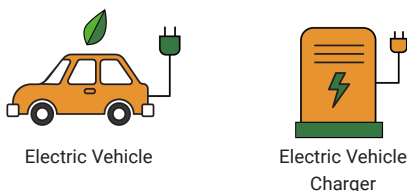
(63) Nanum car - electric vehicle

## + IMPACTS AND EXPECTATIONS

The “Car Sharing” policy brought many positive results to the city once it was implemented. According to the 2018 Environmental Improvement Projects of Green Car, a leading car-sharing company similar as SOCAR, provided environmental data that almost 700 tons of exhaust gas was reduced with the analysis on the operation of its electric car sharing service from July 2014 to March 2018.

In addition, it also produced the result of reducing 1.25 vehicles on road per one shared vehicle. According to a national survey conducted in March 2017, 35.8% of car-sharing users gave up or postpones their purchase of vehicles after the introduction of the new sharing system, confirming the reduction in traffic demand.

According to the “Special Comprehensive Plan” submitted by the SMG in March 2017 for further expectations, aims to reduce traffic volume of cars inside Seoul’s Hanyang City Wall(16.7km<sup>2</sup>) by 30% until 2030. Several proposals are being announced to achieve this goal including Nanum-cars. By 2020, it aims to replace 200 internal car-sharing vehicles with 100% battery electric vehicles, which will reduce greenhouse gases.



## + REPLICABILITY AND SCALABILITY

Many systems for share mobility have been introduced and one of those is the car sharing program. This system has spread in various global markets with a dense number of urban population. Since Asia region has shown an increasing urban population growth and high demand for transportation infrastructure, this system could be introduced to solve those challenges.

(64) SOCAR electric vehicle



(65) SOCAR electric vehicle charging system





# The Role of Technology in the Creation of Climate Smart Cities (Penang, Malaysia)

*Technology such as remote sensing and thermal imaging plays a fundamental role as part of an evidence-based approach in formulating nature-based solutions tackling impacts of climate change.*

Case submitted by: Think City  
Case edited by: CityNet Secretariat



(66) Armenian Park in George Town, Penang

## + BACKGROUND

Climate change impacts are already unfolding all over the world, with some regions being more affected than others. That is the case with Southeast Asia, which has been identified as one of the three regions in the world to be hardest hit in the future (together with India and sub-Saharan Africa)<sup>(18)</sup>.

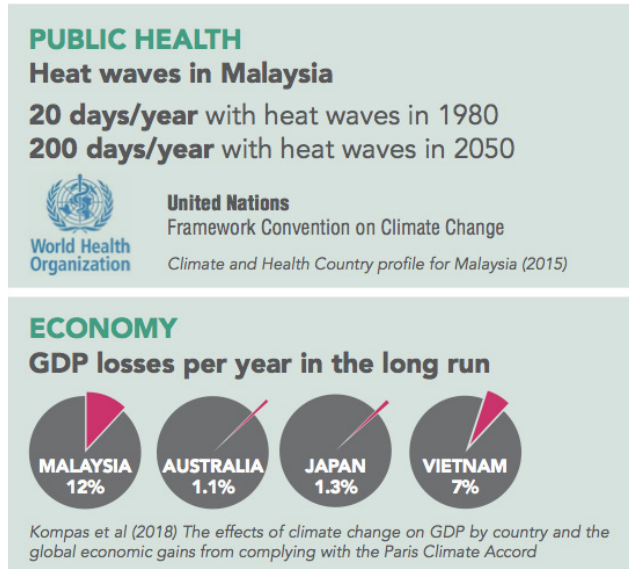
Climate change impacts are diverse: sea level rise, extreme weather events and rising temperatures, among others. Short and medium-term threats vary according to location, making localised, needs-based responses of utmost importance.

Urban areas are particularly sensitive to these impacts,

due to high concentrations of population, infrastructure and property. The additional challenge posed by the urban heat island (UHI) effect, which intensifies rising temperatures in cities, exposes these areas further to heat stress and amplifies its impacts on public health.

According to the World Health Organisation, under a high emissions scenario, the number of days with heat waves in Malaysia is predicted to increase from 20 per year in 1980 to 200 per year in 2050. In the case of Penang, extreme weather events frequently lead to flooding, causing destruction of infrastructure and property, and possibly the loss of lives.

(18) Intergovernmental Panel on Climate Change. 2018. Special Report on Global Warming of 1.5°C.



(67) Impacts of climate change on public health and economy in Malaysia



Make cities and human settlements inclusive, safe, resilient and sustainable 11

Take urgent action to combat climate change and its impacts 13

## + OBJECTIVES

To withstand and recover from the inevitable impacts of climate change, Think City<sup>(19)</sup> is developing a nature-based climate adaptation programme for the urban areas of Penang, harnessing remote sensing and thermal imaging to acquire information about the city's surface temperature. The main goal of the programme is to reduce overall temperatures by 1.5°C five to six years after project implementation.

The programme aims to enhance Penang's urban resilience by reducing human and ecosystem health vulnerability to climate change impacts and extreme weather events. It does this by implementing nature-based solutions such as introducing green spaces and promoting airflow to reduce surface temperatures. The programme will also incorporate social components to build capacity, awareness and address social resilience.

As the main cause of the UHI effect is modification of land surfaces, fluctuations and anomalies in surface temperature of urban areas in Penang will be observed and analysed using remote sensing and thermal imaging. Remote sensing measures surface and atmospheric temperatures by capitalising thermal-specific sensors such as Landsat's Thermal Infrared Sensor (TIRS) and aircraft-mounted Thermal Infrared Multispectral Scanner (TIMS). It is able to show the stark increase of global

average temperature over the decades. Thermal imaging converts infrared radiation (heat) into images that depict the spatial distribution of temperature differences in a scene viewed by a thermal camera.<sup>(20)</sup>

This data will enable the identification of buildings and neighbourhoods that exacerbate the UHI effect, allowing for targeted nature-based solutions in the most heat stressed areas of Penang.

*“The climate adaptation programme aims to enhance Penang's urban resilience by reducing human and ecosystem health vulnerability to climate change impacts and extreme weather events.”*

(19) Think City is a Malaysian social purpose organisation dedicated to the creation of more sustainable, liveable and resilient cities. Adopting a community-centric, evidence-based approach, Think City focuses on four main areas of practice: Placemaking, Resilience, Analytics and

Conservation.

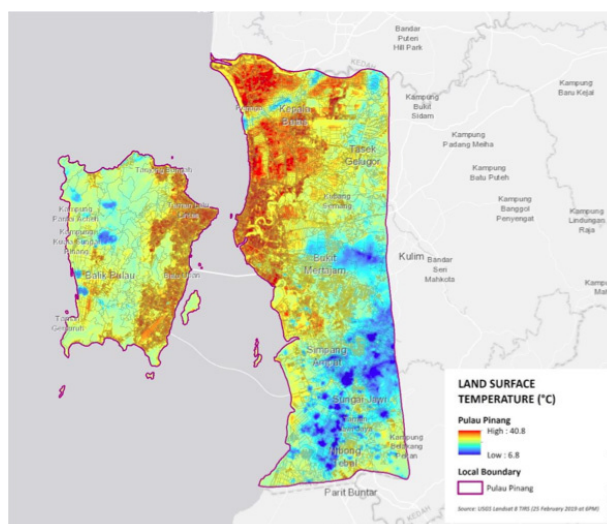
(20) Havens, K. and Sharp, E. 2016. Thermal Imaging Techniques to Survey and Monitor Animals in the Wild.



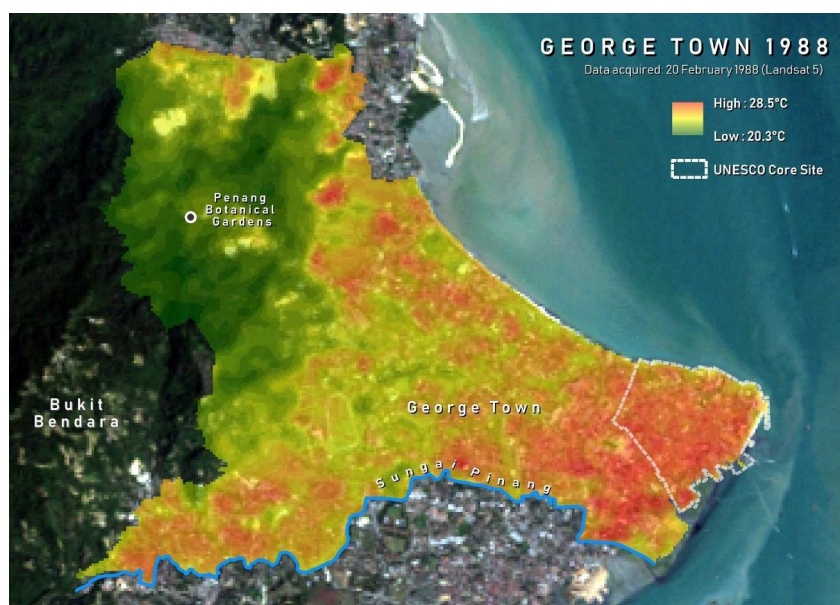
## + ACTIONS AND IMPLEMENTATIONS

Remote sensing is being used in the programme at three different levels: a) identifying the most heat stressed urban areas as priorities for intervention; b) monitoring pilot project development in order to identify effective strategies for replication; and c) monitoring and evaluating the programme's impacts.

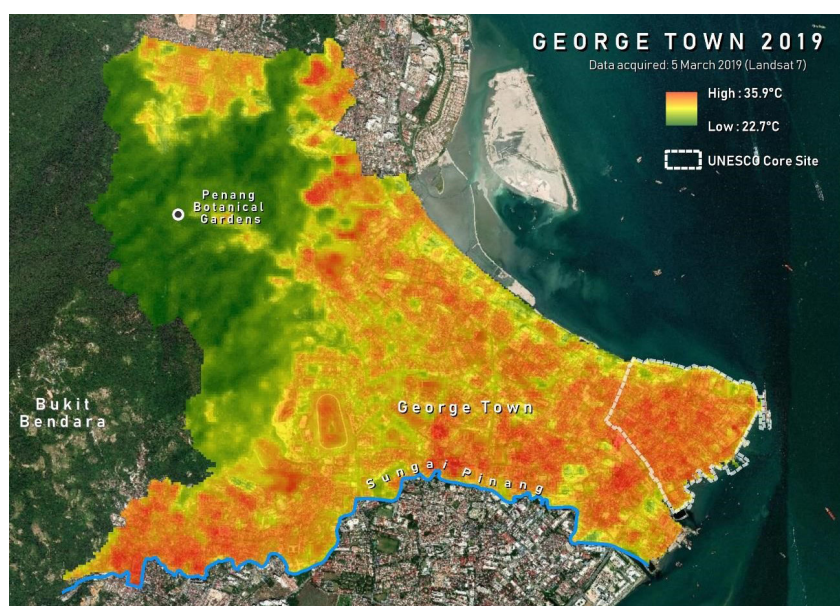
Remote sensing provides information regarding the most heat stressed areas of the city, which in the case of Penang is the UNESCO Core Site.<sup>(21)</sup> This is also the area with relatively fewer green spaces. The data collected for George Town, Penang in late February 1988 and in early March 2019 shows an increase of 7.4°C for maximum surface temperature and of 2.4°C for minimum surface temperature.



(68) Satellite image showing land surface temperature in Penang, late February 2019.



(69) Land surface temperature in George Town, Penang, 1988.



(70) Land surface temperature in Georgetown, Penang, 2019.

Thermal imaging used to explore surface temperature at ground level confirms the remote sensing data for the hottest part of George Town (the UNESCO Core site, which has almost no street trees) and for the coolest part of George Town (the northwest area, which has more street trees).

Thermal imaging of both areas taken on the same day (12 July 2019) at just one hour apart reveals a significant increase in surface temperature in the UNESCO Core Site compared to the northwest part of the city, with the maximum temperature in the UNESCO Core Site increasing by 28.8°C.

Linking the two types of imagery data obtained via remote sensing and thermal imaging substantially assists in the formation of nature-based solutions, as they quantify the impacts of green spaces and predict the direct/indirect cooling benefits of green spaces.

The nature-based climate adaptation programme in development has two main components: built projects, and strategic projects and actions. While the built projects component addresses the need for building physical resilience using nature-based solutions, the strategic projects and actions component addresses the necessary strengthening of community resilience and capacity building.

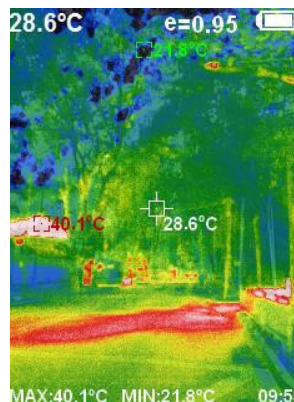
## + IMPACTS AND EXPECTATIONS

The built projects will allow for the urban areas of Penang to remain livable when climate change impacts strike more harshly than they have so far. The anticipated reduction of atmosphere temperature by 1.5°C five to six years after project implementation is expected to increase over time, as trees mature.

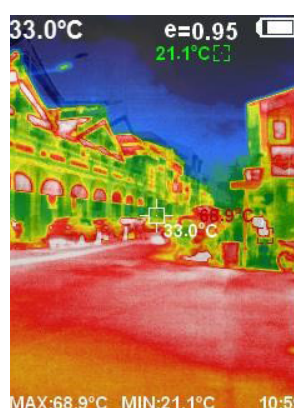
Simulation models will be developed to assess the impact of the programme during the planning and design stages using specialised software such as Ladybug, which integrates weather data analysis into advanced simulation in a parametric environment, and Dragonfly, which models and estimates large-scale climate phenomena.

Integration of parametric tools of specialised software allows for efficient evaluation and estimation of both major and minor adjustments, helping inform and support the design and decision-making process. It also allows for evaluation of the programme's impact over time.

The organisational structure proposed for the programme is composed of multiple entities at local, municipal, regional and national level. The most significant challenge will be bringing all stakeholders together in agreement for developing and contributing to the programme.



(71) Thermal imaging of Jalan Brown, a partially shaded tree-lined street in the greenest and coolest part of George Town, Penang (north-west area) on 12 July 2019. Interruptions in canopy shading result in sharp surface temperature increases. Produced by Think City using Perfect Prime IT0006 Thermal Imager Camera



(72) Thermal imaging of Lebuhraya Gereja, a non-shaded street in the hottest part of George Town, Penang (UNESCO Core Site) on 12 July 2019. Produced by Think City using Perfect Prime IT0006 Thermal Imager Camera

Effective data sharing throughout the duration of the programme will be key to managing multi-stakeholder engagement. Providing stakeholders with a clear visual representation of what the programme will look like and how each of its components affect them will enable better understanding and generate more support.

## + REPLICABILITY AND SCALABILITY

Climate change is a global issue, which has great potential to be addressed by nature-based solutions and technology. Remote sensing and thermal imaging provide accurate insights about the climate system and its changes, support the formulation of nature-based solutions, and develop the capacity of cities in using smart city applications. Both tools can be reapplied in other urban projects seeking to use evidence-based design.

(21) The historical core of George Town has been listed as a UNESCO World Heritage Site since 2008, for having cultural, historical or other form of significance and is legally protected by international treaties.







# SUSTAINABLE DEVELOPMENT GOALS(SDGs) MONITORING AND EVALUATING SYSTEM

## Monitoring Sustainable Development Goals (SDGs) through Urban SDG Knowledge Platform

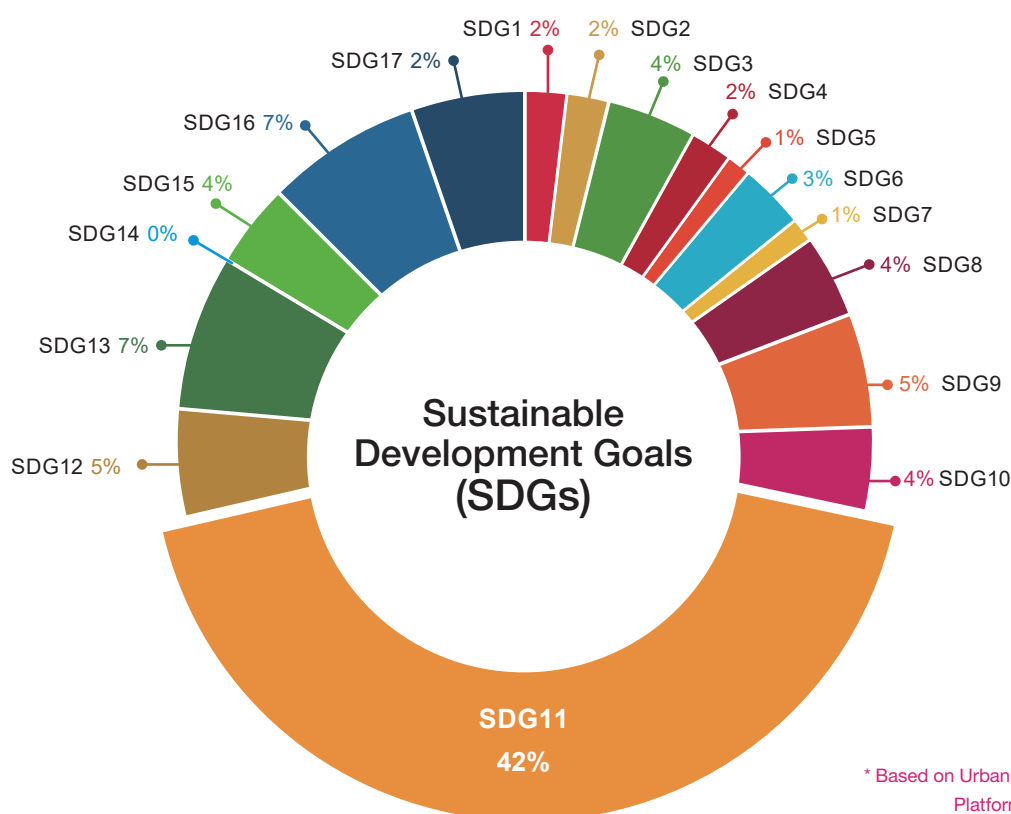
Many cities are experiencing high level urban growth, particularly in regions from Asia and the Pacific, Africa and Latin America. United Nations demographers estimate that Asia and the Pacific became majority urban for the first time in history in 2019 with more than 50 per cent of the region's population living in cities. <sup>(22)</sup>

As a result of this process, as countries urbanize, populations and economies become concentrated in urban areas, leading to changes in lifestyle and work. However, many cities are struggling to develop a sustainable management to support this transition from rural to urban areas. As an example, it is often a challenge to provide affordable access to land and housing, support basic livelihoods, supply municipal services and

implement longer-term planning and policy decisions. <sup>(23)</sup>

The 2030 Agenda for Sustainable Development maps out a path towards greater sustainability. The 2030 Agenda builds upon the Millennium Development Goals and calls on countries to achieve 17 Sustainable Development Goals (SDGs) until 2030, through efforts to end poverty, fight inequality and injustice, and tackle climate change. In addition, the SDGs explicitly acknowledge the important role that cities play in the pursuit of sustainable development. At the same time, cities will play a crucial role in the 2030 Agenda because much of the action required will be taken at the local level. <sup>(24)</sup>

### URBAN SDG KNOWLEDGE PLATFORM CASES DISTRIBUTION BY CITYNET



To support local actions for the implementation of the 2030 Agenda for Sustainable Development, the Urban SDG Knowledge Platform was created in 2017 with the support of CityNet, Seoul Metropolitan Government and United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). Since then it receive more than 200 best practices on urban development policies mostly from Asia region. To better monitor on how the best practices are supporting the SDGs, the practices are being separated according to the respective 17 Sustainable Development Goals.

Among the cases that we received, it is notable that the practices are focusing on the SDG 11 which stands for sustainable cities and communities. SDG 11 is focused on cities, with targets to ensure access to safe and affordable housing and basic services, upgrade slums, expand public transport, promote inclusive and sustainable urbanization, protect cultural and natural heritage, reduce the number of casualties due to disaster, and increase resilience.

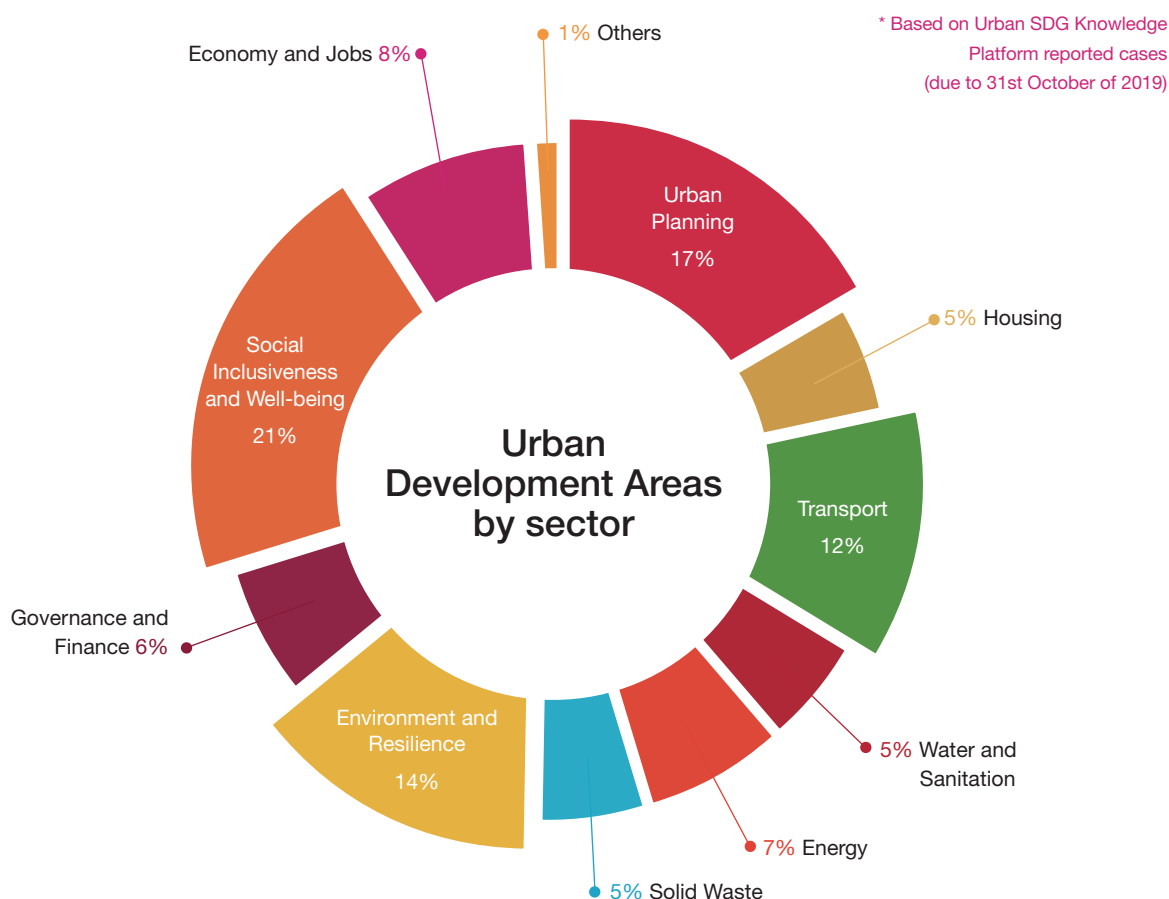
## + URBAN DEVELOPMENT AREAS BY SECTOR

Best practices uploaded at the Urban SDG Knowledge Platform were also divided in 11 development sectors including (1) Urban Planning; (2) Housing; (3) Transport; (4) Water and Sanitation; (5) Energy; (6) Solid Waste; (7) Environment and Resilience; (8) Governance and Finance;

(9) Social Inclusiveness and Well-being; (10) Economy and Jobs; and (11) Others.

For the cases uploaded in the Urban SDG Knowledge Platform, (9) Social Inclusiveness and Well-being sector has the most highest number of cases shared.

### URBAN DEVELOPMENT AREAS BY SECTOR



Monitoring cases uploaded on the Urban SDG Knowledge Platform is very important to build an evidence base about how cities are contributing to achieve the SDGs with their local urban development policies.

Furthermore, the Urban SDG Knowledge Platform will keep track on progress towards the SDGs with the purpose of supporting the creation of valuable information for further analysis.

(22) Future of AP Cities Report 2019, United Nations 2019, [www.unescap.org](http://www.unescap.org)  
 (23) <http://www.urbansdgplatform.org/board/cities.msc#1>

(24) <http://www.urbansdgplatform.org/board/cities.msc#1>

# REVIEW ON LOCAL READINESS FOR IMPLEMENTING THE SDGS CASES

## URBAN DEVELOPMENT AREAS BY SECTOR

The Review on Local Readiness for Implementing the SDGs Cases research is an important resource to explore policies and actions from sustainable development perspective. This research identifies the challenges of cities and support decision makers to plan a development pathway based on the cases from the Urban SDG Knowledge Platform.

Asia-Pacific region have made considerable progress in harnessing urban policies to enhance their economic development, address urban challenges and create a sustainable living environment with a better life quality for their residents. While recognizing that the Asia-Pacific region is exceedingly diverse, ranging from small island development States to powerful global economies, this review shares major development strategies and visions of cities and analyze how the cases from the Urban SDG Knowledge Platform could be implemented at the local level to support the region in achieving the 2030 Agenda

for Sustainable Development and the New Urban Agenda.

During 2018, this research was conducted in collaboration with Urban Development Research Institute (URDI) located in Jakarta, Indonesia. The research was divided in two (2) phases. During the first one, URDI worked on understanding the current development plan and process from Indonesia. After, among the uploaded cases from the Urban SDG Knowledge Platform, URDI selected 30 cases and conducted an analysis on how and why those cases would be a good practice to be implemented in Indonesia's cities and what would be the challenges and benefits. In 2019, CityNet is collaborating with Local Government Academy (LGA) located in Pasig City, Philippines. The results from these researches could be used as a background to improve local government governance across urban policies to overcome inequalities by learning and sharing planning decisions.



(73) Review on local readiness for implementing the SDGs cases

Partner in 2018:

**URDi**

Urban and Regional Development Institute  
Lembaga Komunikasi Pengembangan Perkotaan dan Daerah

(74) URDI logo

Partners in 2019:



(75) LGA logo

**thinkCITY**  
REJUVENATING THE CITY TOGETHER

(76) Think City logo

The research opens an opportunity for urban stakeholders to strengthen local planning and development of national system of cities.

For those interested in more information, please contact the CityNet Secretariat at: [sdgplatform@citynet-ap.org](mailto:sdgplatform@citynet-ap.org).

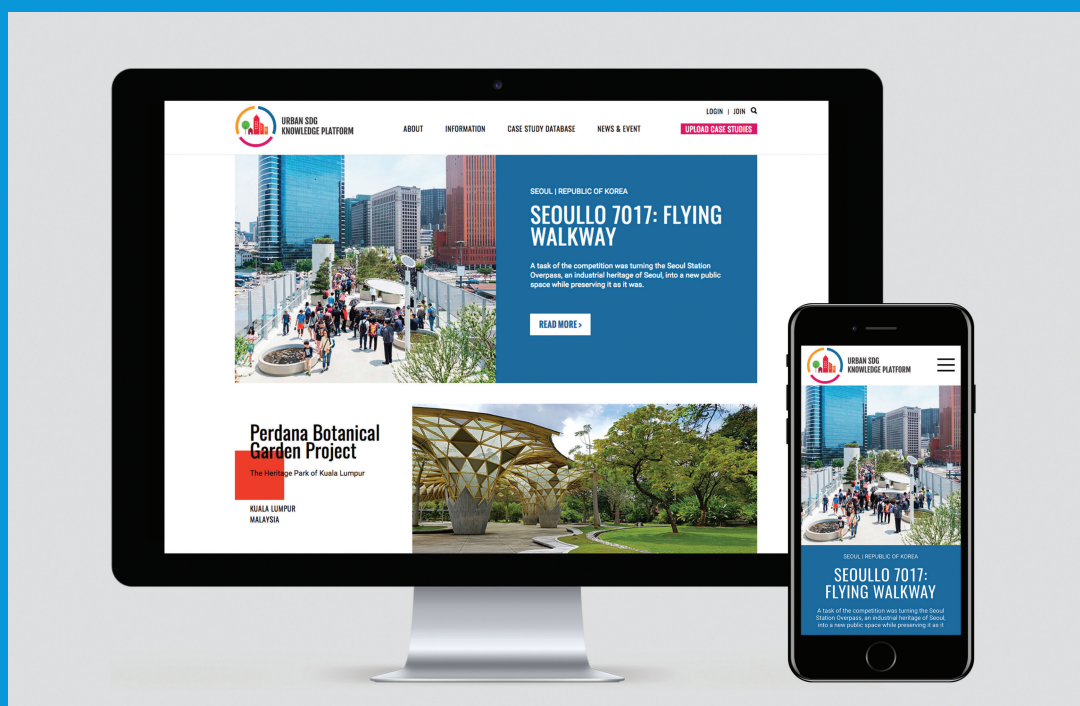
## Image source

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# Introduction to The Urban SDG Knowledge Platform

The Urban SDG Knowledge Platform  
[www.urbansdgplatform.org](http://www.urbansdgplatform.org)



CityNet, the Seoul Metropolitan Government and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) have established the Urban SDG Knowledge Platform to promote and support knowledge sharing and city-to-city cooperation for sustainable urban development. This initiative is a follow-up of the 2016 International Forum on Urban Policy for Sustainable Development Goals (SDGs) held in Seoul, Republic of Korea; and a response to the 2015 Sixth Asia Pacific Urban Forum (APUF-6) Jakarta Call for Action held in Jakarta, Indonesia. Both forums were held in order to deliberate and contribute action-oriented recommendations to the region's leaders, focused strongly on an implementation agenda, including scaling up existing successful practices by fostering knowledge sharing.

The Urban SDG Knowledge Platform is intended to support local action for the implementation of the 2030

Agenda for Sustainable Development, including through up-take and replication of successful initiatives and good practices, conduction of capacity building workshops and technical assistance, and partnering with urban think tanks to analyze best practices implementation in the local level.

Through the Urban SDG Knowledge Platform project, CityNet, the Seoul Metropolitan Government and the UN ESCAP will continuously scale up its efforts to foster sustainable urban development in the Asia Pacific region. By working together among various stakeholders and partners, the Urban SDG Knowledge Platform will keep connecting resources to further contribute to the city-to-city and city-to-multilateral cooperation. Through connecting urban stakeholders together, the Urban SDG Knowledge Platform will ensure that no cities are left behind from the implementation of the 2030 Agenda for Sustainable Development.



The Urban SDG Knowledge Platform initiative is a follow-up of the 2016 International Forum on Urban Policy for Sustainable Development Goals (SDGs) held in Seoul, Republic of Korea; and a response to the 2015 Sixth Asia Pacific Urban Forum (APUF-6) Jakarta Call for Action held in Jakarta, Indonesia. Both forums were held in order to deliberate and contribute action-oriented recommendations to the region's leaders, focused strongly on an implementation agenda, including scaling up existing successful practices by fostering knowledge sharing.