●No.2 “Showcase of private sector technologies and solutions for smart city development”

Moderator: Dr. Alfonso Vegara (Special Advisor for Y-PORT Center / Founder and Honorary President, Fundación Metrópoli)

| | City/Organization | Title | Name |
|---|---|---|---|
| 1 | Japan International Cooperation Agency | Executive Technical Advisor, Infrastructure and Peacebuilding Department | Mr. Toshiyuki Iwama |
| 2 | United Nations Industrial Development Organization | Deputy Head, Investment and Technology Promotion Office (ITPO), Tokyo | Mr. Hideki Murakami |
| 3 | JFE Engineering Corporation | General Manager, Global Business Development | Mr. Gen Takahashi |
| 4 | IKEA Japan K.K. | Store Manager, IKEA Kohoku | Mr. Edwards William |
| 5 | NEC Corporation | Deputy General Manager, Global SI Service Business Development Division | Mr. Taisuke Yoshida |
| 6 | Panasonic Corporation | General Manager, CRE Business Development Group, Business Solution Division | Mr. Tomohiko Miyahara |
| 7 | Deloitte Tohmatsu Consulting LLC | Partner, Automotive Sector | Dr. Lei Zhou |
| 8 | IBM Japan | IBM Distinguished Engineer, Cognitive Solutions | Mr. Akihisa Sakurai |
| 9 | Carcar City | Mayor | Mr. Nicepuro Lauron Apura |
| 10 | Baguio City | City Government Department Head II, City Environment & Parks Management Office | Ms. Maria Adelaida Coloma Lacsamana |
| 11 | Pemerintah Kota Banda Aceh | City Manager | Mr. Bahagia |

| | | | |
|---|---|---|---|
| 12 | Maputo | National Director, IT - Infrastructure and Access, INTIC - National Institute of ICT – Mozambique | Mr. Flávio Sancho de Almeida |
| 13 | Gran Conception | Director, Metropolitan Region branch, CORFO Chilean Econbomic Development Agency | Ms. Claudia Namishan Labbe |
| 14 | Castries | Physical Planning Officer, Physical Planning, Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives | Ms. Elena Wells |
| 15 | Casablanca | Assistant Director, IT and Digital Transformation, Casa Prestations | Mr. Najib Ouradi |

# Introducing ICT to Urban Transport System
# A Case in Vientiane, Lao P.D.R.

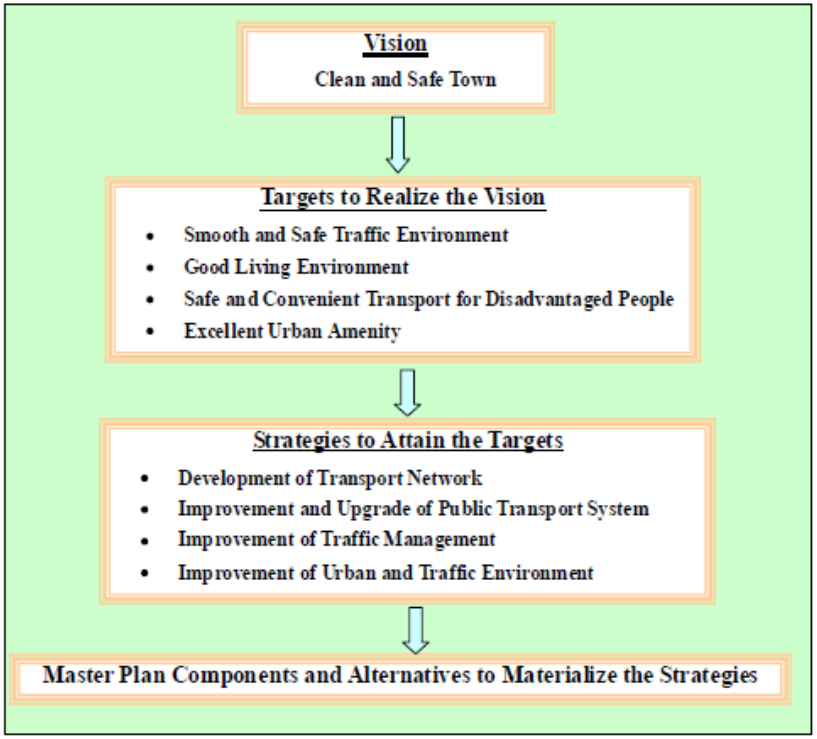
18 November 2016

Toshiyuki IWAMA (Mr.)

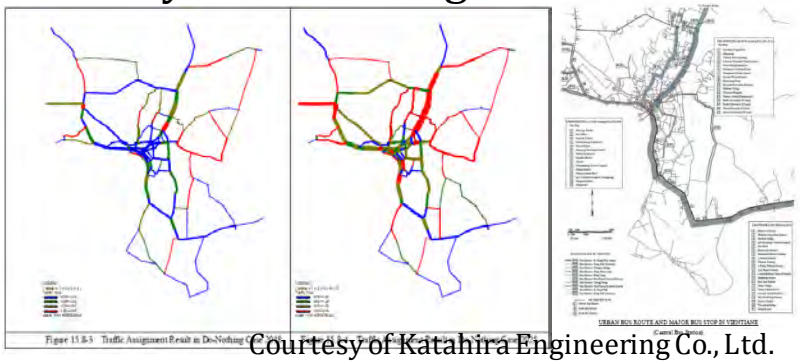
Infrastructure and Peacebuilding Department
Japan International Cooperation Agency (JICA)

# Case in Lao P.D.R.

- Comprehensive Urban Transport Master Plan in Vientiane




Policy and Planning Frameworks



Courtesy of Katahira Engineering Co., Ltd.


Courtesy of Eagle Bus Co., Ltd.

Operation Status (congestion) Demand Analyses

Road Network Structure
Inner Ring Road
Intersection Imp.
Demand Mng.

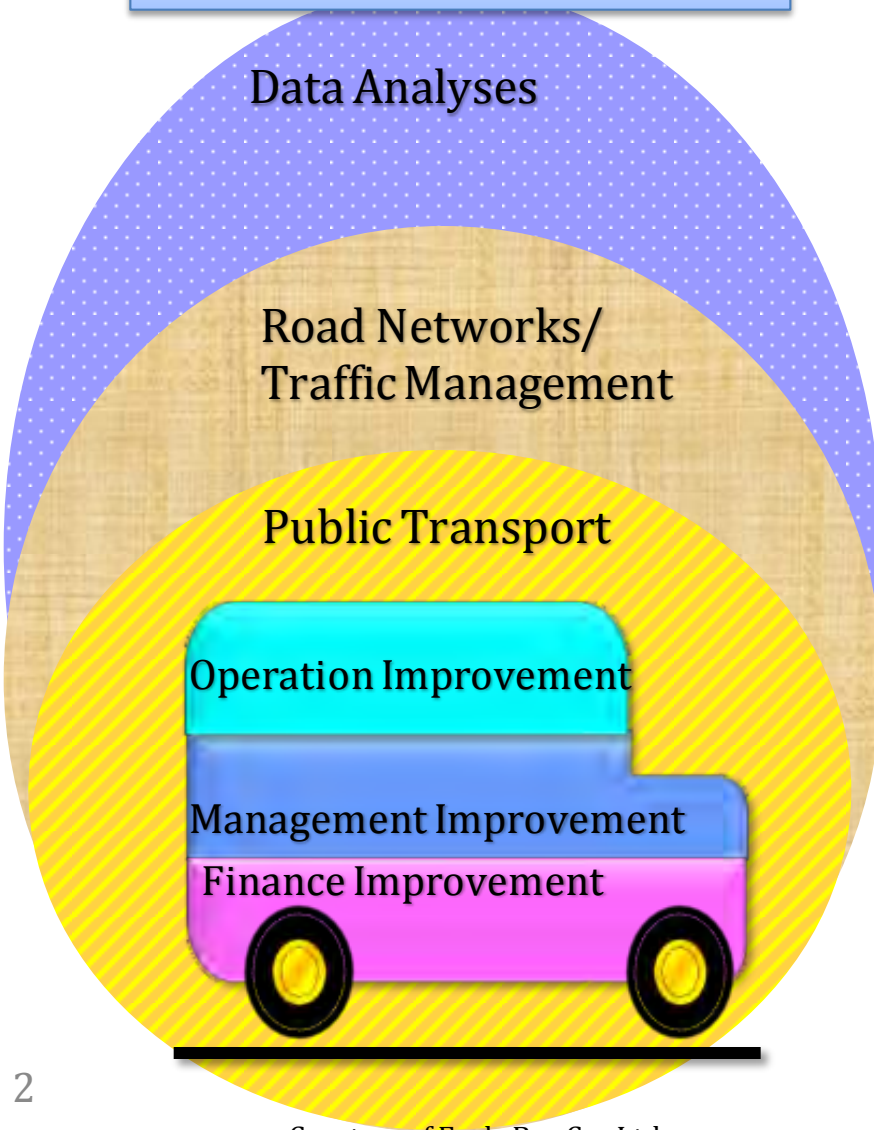
Bus Capacity Imp.
Bus Operation Imp.
Bus Service Imp.
Demand Creation

**ICT as an enhancer for realizing those proposals**

# How Can ICT Improve Transport MP?

| ICT Tools | Output |
|---|---|
| Smart Phone<br>GPS and Wi-Fi<br>Packet Sensor | Bus Location<br>User Distribution<br>O-D Analysis<br>Car Velocity |
| Elucidating Bus Operation by Analyzing Passenger Data | Bus Efficiency<br>Service Quality<br>Demand Creation<br>Revenue Imp. |
| Bus Pass System Using FeliCa | Revenue Improvement<br>Service Quality |

Effect on Transport MP



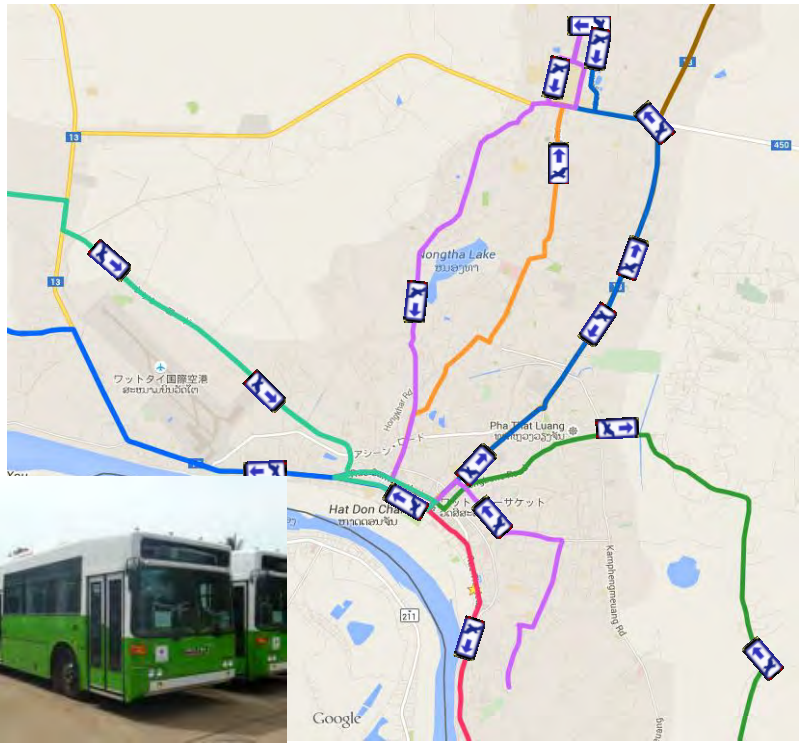

Courtesy of Eagle Bus Co., Ltd.

# Smart Phone GPS and Wi-Fi Packet Sensor

## Bus Location System

- Mitigate traffic congestion in the Vientiane urban area by using two systems
  - (1) Public bus location system
  - (2) Traffic survey system utilize Wi-Fi Packet Sensors

(1) Bus Location System

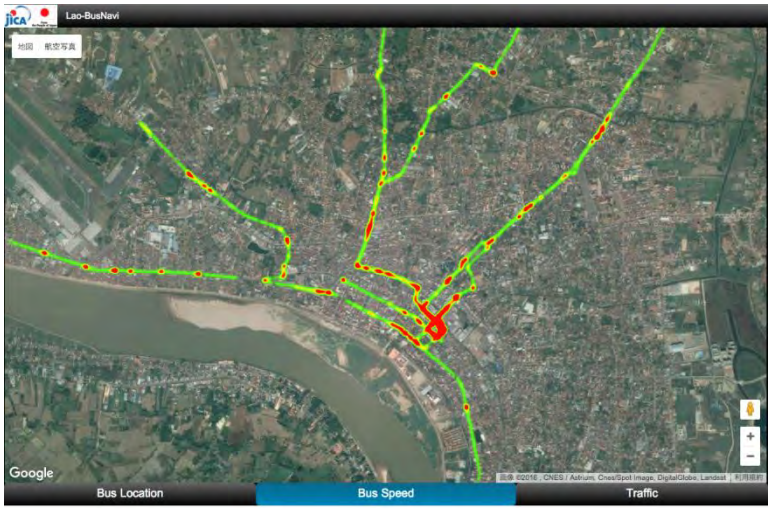



(2) Wi-Fi Packet Sensor

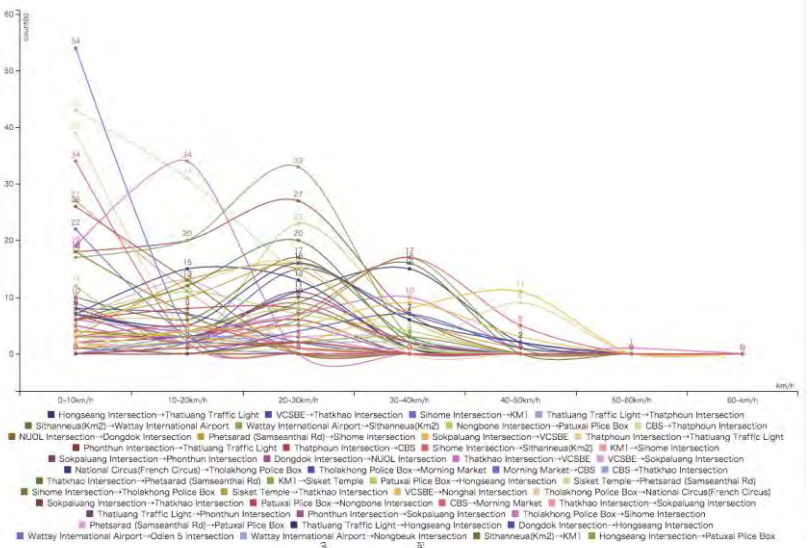

Courtesy of Japan Research Institute for Social Systems Co., Ltd.

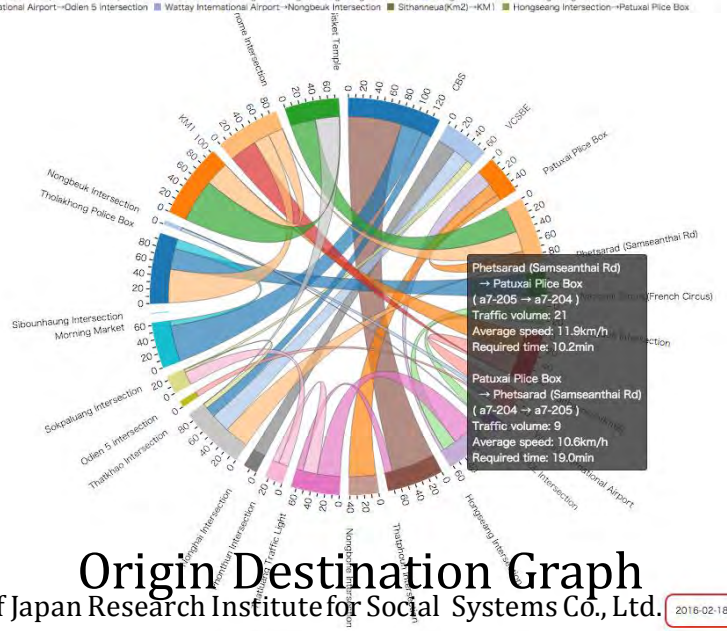
# Smart Phone GPS and Wi-Fi Packet Sensor

## Congested Section by using Bus Prove

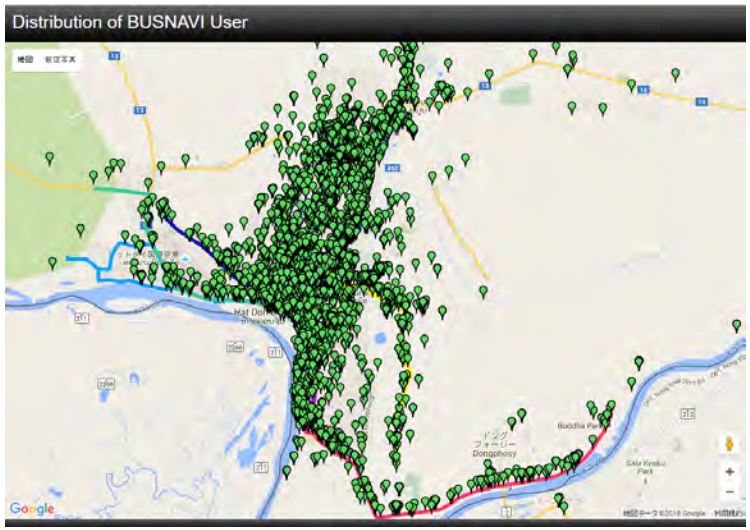



## Car Velocity Distribution





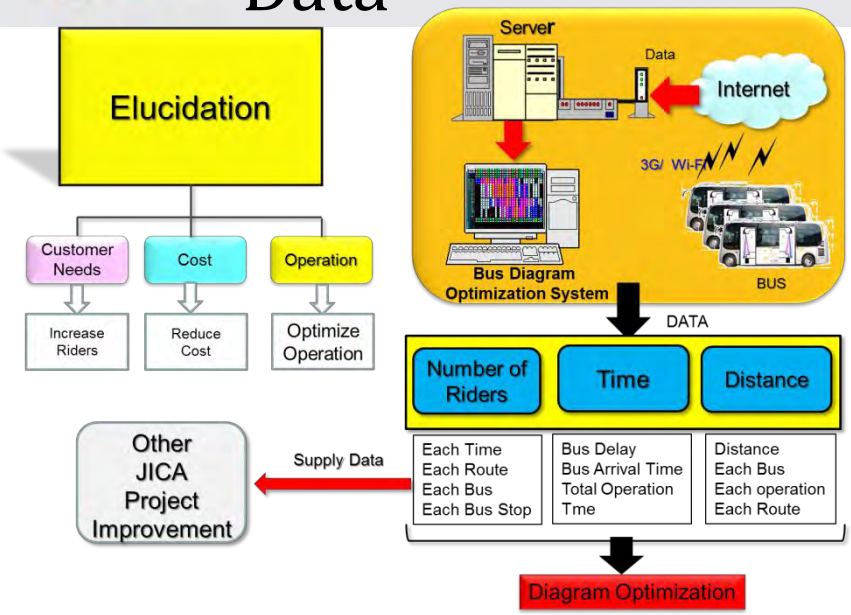

## Distribution of Users




## Origin Destination Graph

Courtesy of Japan Research Institute for Social Systems Co., Ltd.

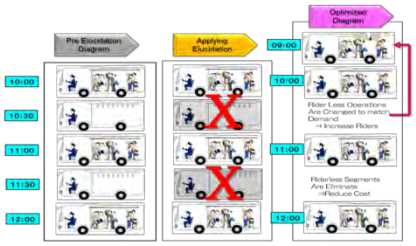
# Elucidating Bus Operation by Analyzing Passenger Data




## Efficiency

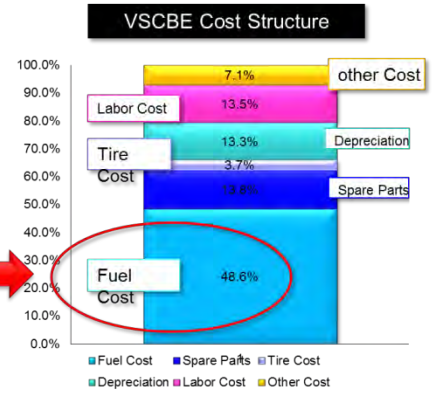
### Increase Bus Runs without adding any Buses

Using bus data. route modification enables us to increase bus runs without adding any buses

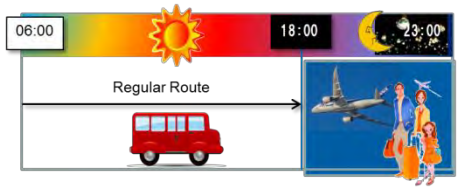


### Eliminate Waste

Fuel Cost
Finding the unprofitable lines and inefficient routes will reduce fuel cost.




### Create Demand




### Connectivity

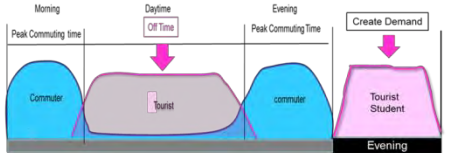
Matching rider needs with service.

In Most cities in the world, scheduled bus operation Time is longer than Vientiane.
Expanding service through longer operations and new destinations improves service.

### Tourist Riders

Introducing Tourists is a good way to increase bus ridership.

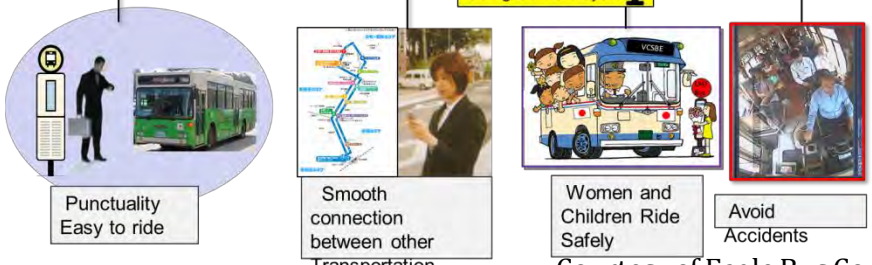
Reason
1. Vientiane has many tourist sights
2. Many Tourists from Europe and America visit Vientiane but do not use VSCBE Buses
3. We can increase income by serving these Tourists .




## Improve Quality

### Quality is Key to Sustainable Transportation

We define Quality as Safety and Customer Satisfaction






Courtesy of Eagle Bus Co., Ltd.

# Bus Pass System using FeliCa

- To increase customer base and income of the Bus Company, the bus pass system targeting at university students was introduced as trial.


Resistration of SBP at Phonsavanh High School


SBP Explanation Seminar at Schools Which Located in VCSBE Bus Routes

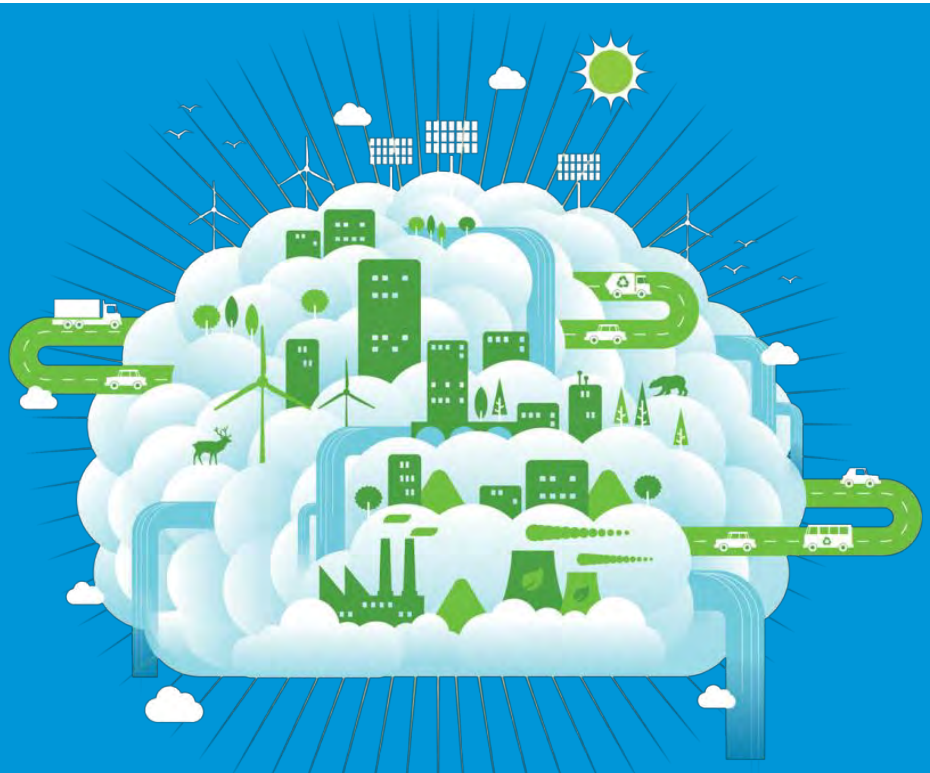


Courtesy of Katahira Engineering Co., Ltd.

Thank you very much for your attention.

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

# UNIDO's Support to Foster Smart City Development



*Hideki Murakami*
*Deputy Head*
*UNIDO Investment and Technology Promotion Office (ITPO), Tokyo*

INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT

# About UNIDO

**Overview**

- In 1966 UNIDO was established under the UN system, becoming the 16th specialized agency in 1985
- UNIDO's mandate: promote and accelerate ***inclusive and sustainable industrial development*** in developing countries and economies in transition

- 170 Member States
- Director General: Mr. LI Yong
- Headquarters: Vienna, Austria
- 3 Liaison Offices
- 53 regional/country offices
- 8 Investment and Technology Promotion Offices (ITPOs)

# UNIDO ITPO Tokyo

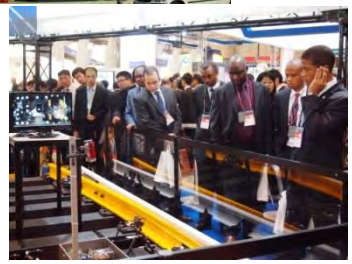
**Main activities**

1. *Delegate Programme* – Delegates are invited to Japan for investment and technology promotion for 1-2 weeks

2. *Seminars/Forums* – Investment and technology opportunities are promoted to Japanese private sector


3. *Technology Transfer* – Technology matching is encouraged through Environmental Technology Database

4. *Capacity Building* – Visits to technology exhibitions & factories are organized for representatives of public and private sectors from developing countries



***UNIDO connects Japanese technologies to recipient country/city!***

# Smart Technology Delegate: India

**Mr. Sanjay Parikh** (Chennai, India) from Indo-Japan Chamber of Commerce & Industry was invited to "Smart Community Japan 2016" exhibition in Tokyo, in June 2016

During the exhibition, at the UNIDO booth a total of **16 business meetings** were organized with Japanese companies interested in business opportunities in the field of smart technology development in India → **Business matching**


Several Japanese companies with concrete projects showed interest and some sent business missions to India for fact-finding survey. On-going projects are monitored and followed up

→ **Follow-up with Japanese companies**

# Smart Technology Delegate: India

**On-going projects**

1. A Japanese company proposes power-saving system for ATM, by utilizing their smart power router

   → Local need: ATM kiosks in India consume too much energy as they need to be cooled. Smart system to monitor energy usage is needed.


2. Energy Audit is planned by a Japanese organization for shopping malls and hotels in Channai

   → Local need: Shopping malls and luxurious hotels are keen on energy efficiency to maintain sustainable society. Energy Audit is expected to provide smart energy-saving solutions.

# Interested in UNIDO Delegate Programme?

***UNIDO invited water technology experts in 2014-2015***


**Chittagong, Bangladesh**
***2014***

**Bangalore, India**
***2015***




**Mandalay, Myanmar**
***2014***

**Phnom Penh, Cambodia**
***2015***

**Jakarta, Indonesia**
***2015***

# Thank you

**UNIDO ITPO Tokyo**

Tel: +81-3-6433-5520
E-mail: itpo.tokyo@unido.org
URL: www.unido.or.jp

# Smart City Development

- JFE Advanced Environmental Infrastructure and Solutions

JFE Engineering Corporation

# City Development with JFE Technology

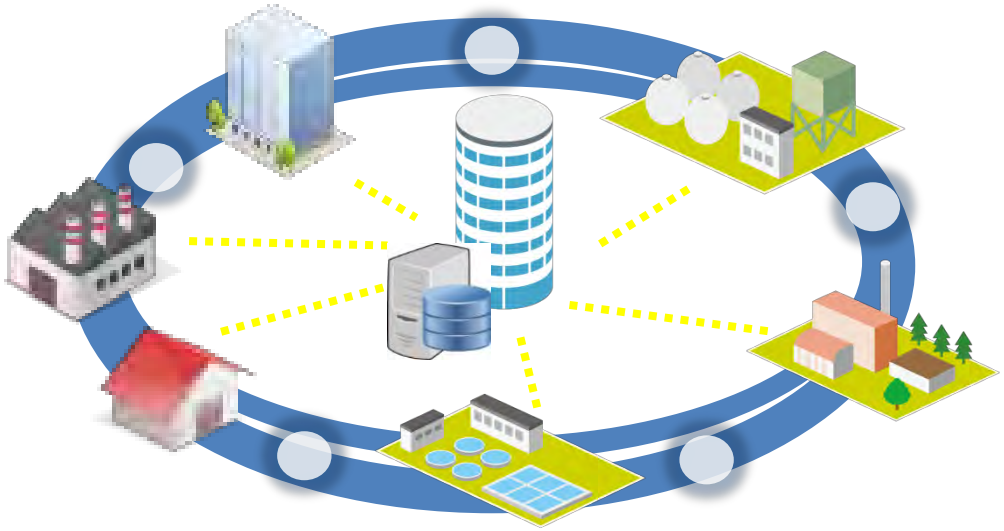
# Utility Recycling – Case of Yokohama


Source : City of Yokohama

# Smart Environment Management

## IT optimizes:

- Real-time utility demand and supply balance
- Integrated town operation and service management
- Biogas and biomass production from wastes and O&M
- Power generation plants operation in mass
- Water treatment and recycle with economic efficiency



# JFE Hyper Remote - Smart Management of WTE


- ✓ Realize safe and stable operation
- ✓ Avoid troubles and respond quickly
- ✓ Optimize management of power sales

- ◆ 24-hours remote management, monitoring, and operation support for plants
- ◆ Optimum and speedy professional service by technical experts in JFE HQ during plant diagnosis or when a problem has occurred

# Thank you

People & Planet Positive
IKEA Group Sustainability Strategy for 2020

Please visit People & Plane

ピープル・アンド・プラネット・ポジティブ
イケア・グループ２０２０年までのサステナビリティ戦略

IKEA.jp/sustainability

オリジナル: ２０１２年１０月
改訂版: ２０１４年６月
日本語訳: ２０１６年４月

IKEA

10YEARS
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\Orchestrating a brighter world NEC

# Sustainable improvement to quality of life

- Bespoke technologies for each stage of the cities -

Taisuke Yoshida

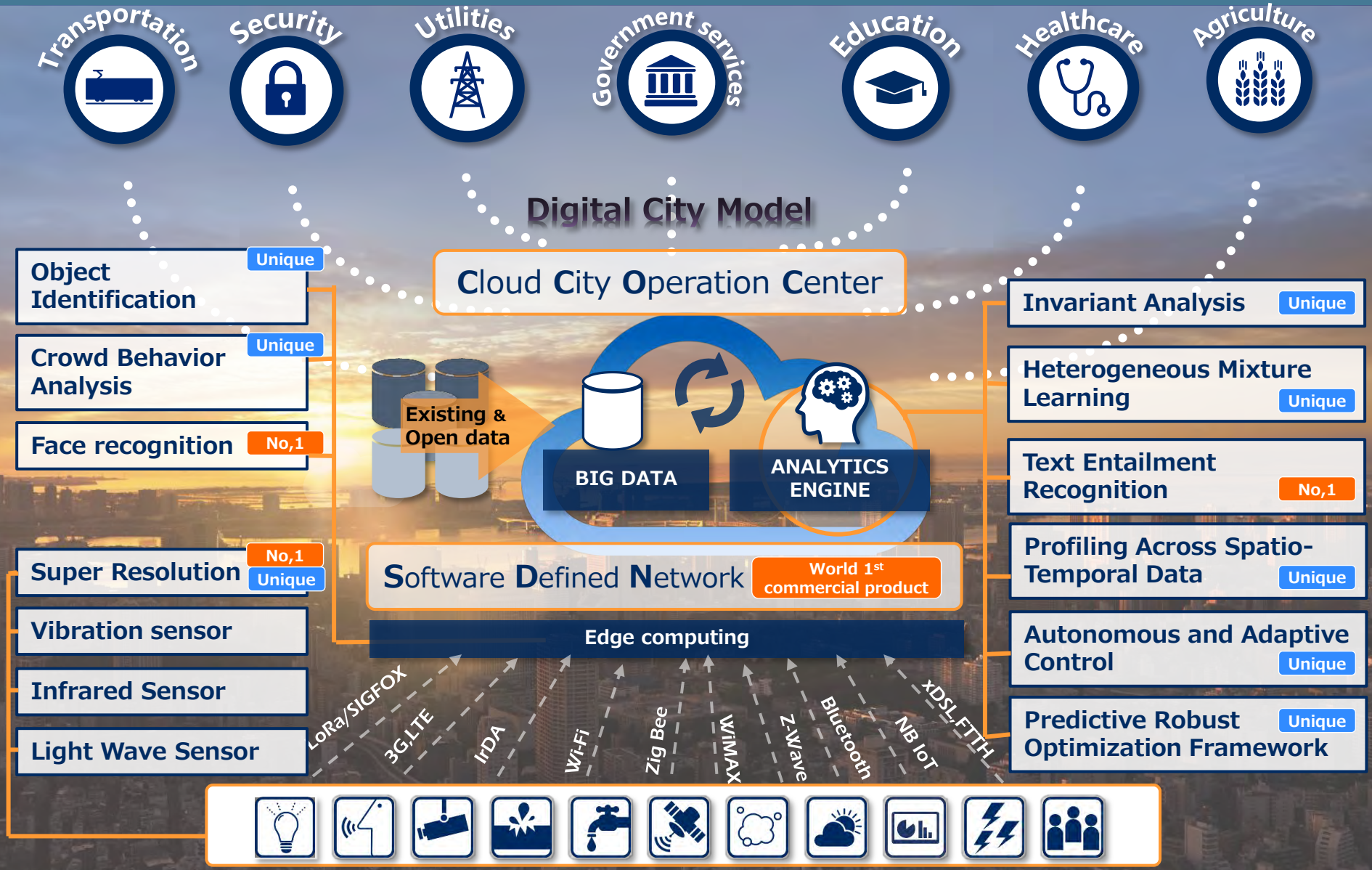
Global SI Service Business Development Division

NEC Corporation

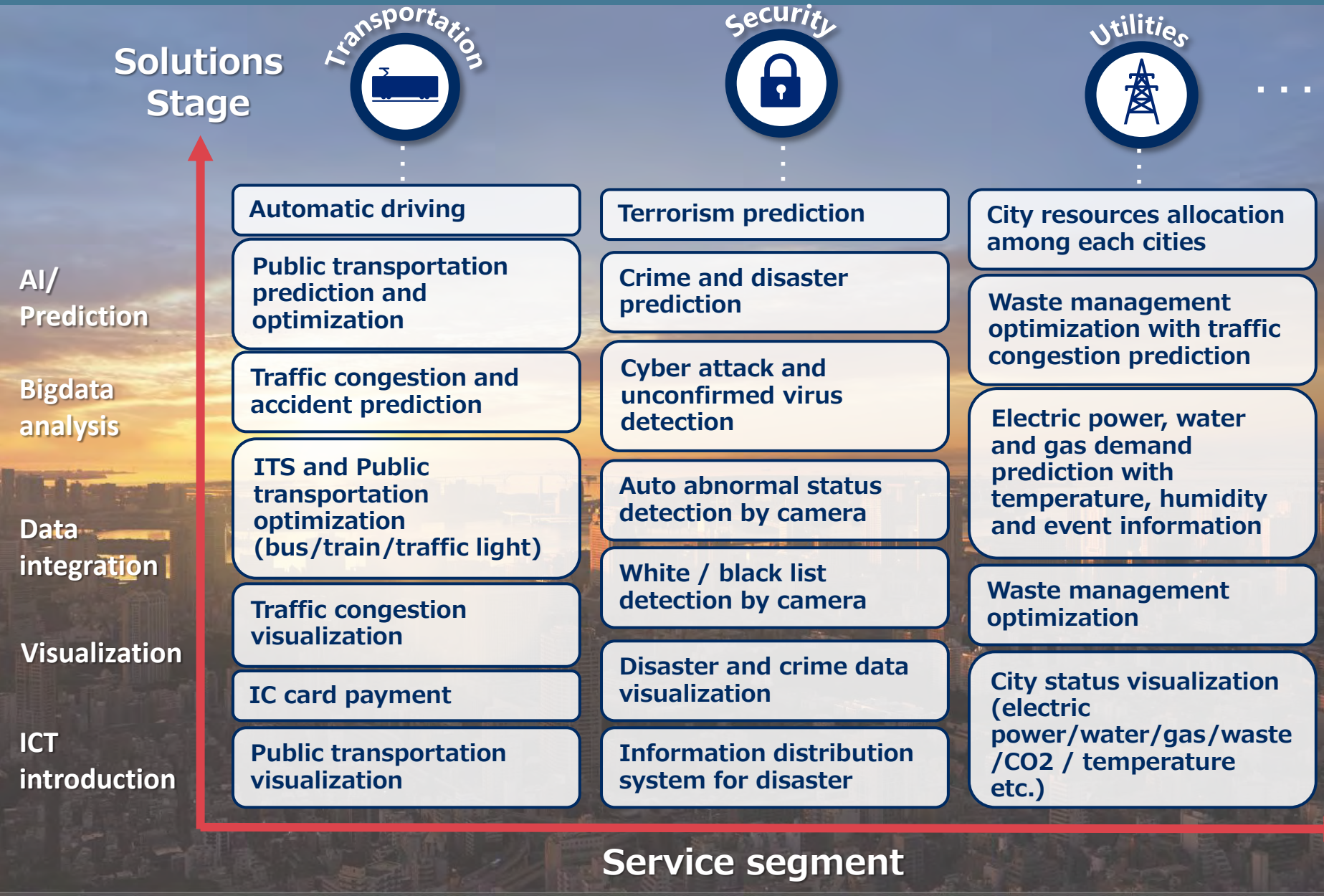
2016 18th Nov

# NEC's concept towards sustainable development goals

# Technologies to realize sustainable city



# Solutions examples for each stage of the cities

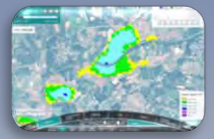


# NEC's experiences

## Spain

-Waste management optimization
-City status visualization

## Thailand



-Disaster prediction (flood)

## Hong Kong

-Bus monitoring and optimization

## Japan

-City security prediction (TSUNAMI / land-sliding)
-IC card payment
-Bus monitoring and optimization
-Information distribution system for disaster
-City resource analyze and prediction

## India

-Bus monitoring and optimization

## Argentina

-City security monitor and control
-Auto abnormal status detection by camera

## Singapore

-Auto abnormal status detection by camera
-Bus monitoring, optimization, and driver behavior analysis

## Philippine's

-Information distribution system for disaster

## New Zealand

-Road plan optimization by traffic congestion visualization
-City status visualization
-Crime mapping and visualization


Orchestrating a brighter world
NEC

# Panasonic's Smart City Development
## ～ Sustainable Smart Town(SST) Project～

FujisawaSST

TsunashimaSST
YOKOHAMA

Nov. 18, 2016

Panasonic Corporation

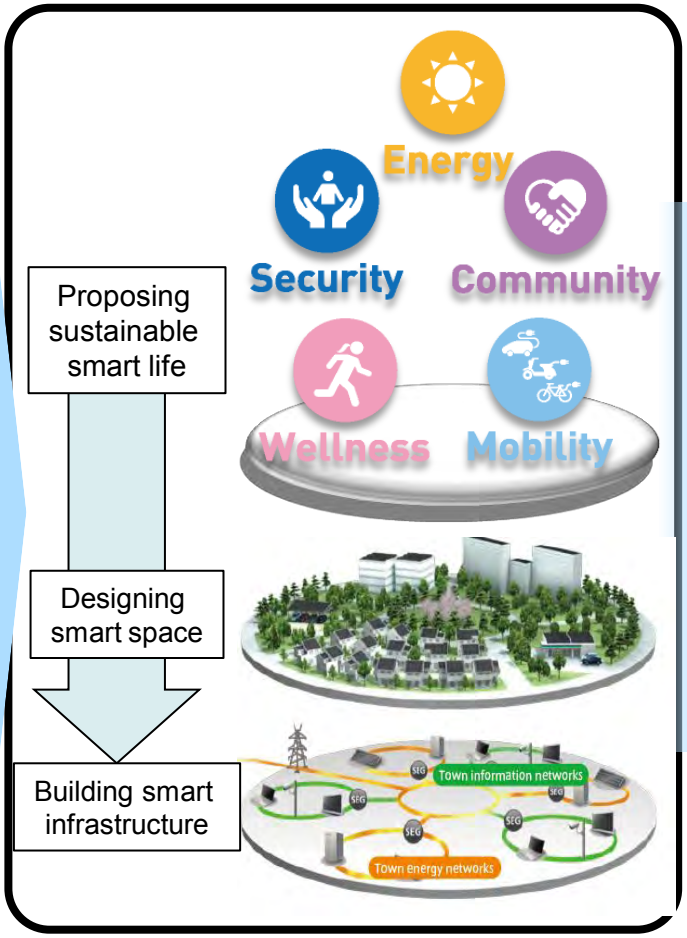
# Panasonic's Sustainable Smart Town(SST)

## Develop community based on sustainable & smart lifestyles from the point of view of a consumer electronics company.

### Panasonic group's aims

Together with our partners in various industries, we will continue to provide "better living" for our customers


### SST Concept

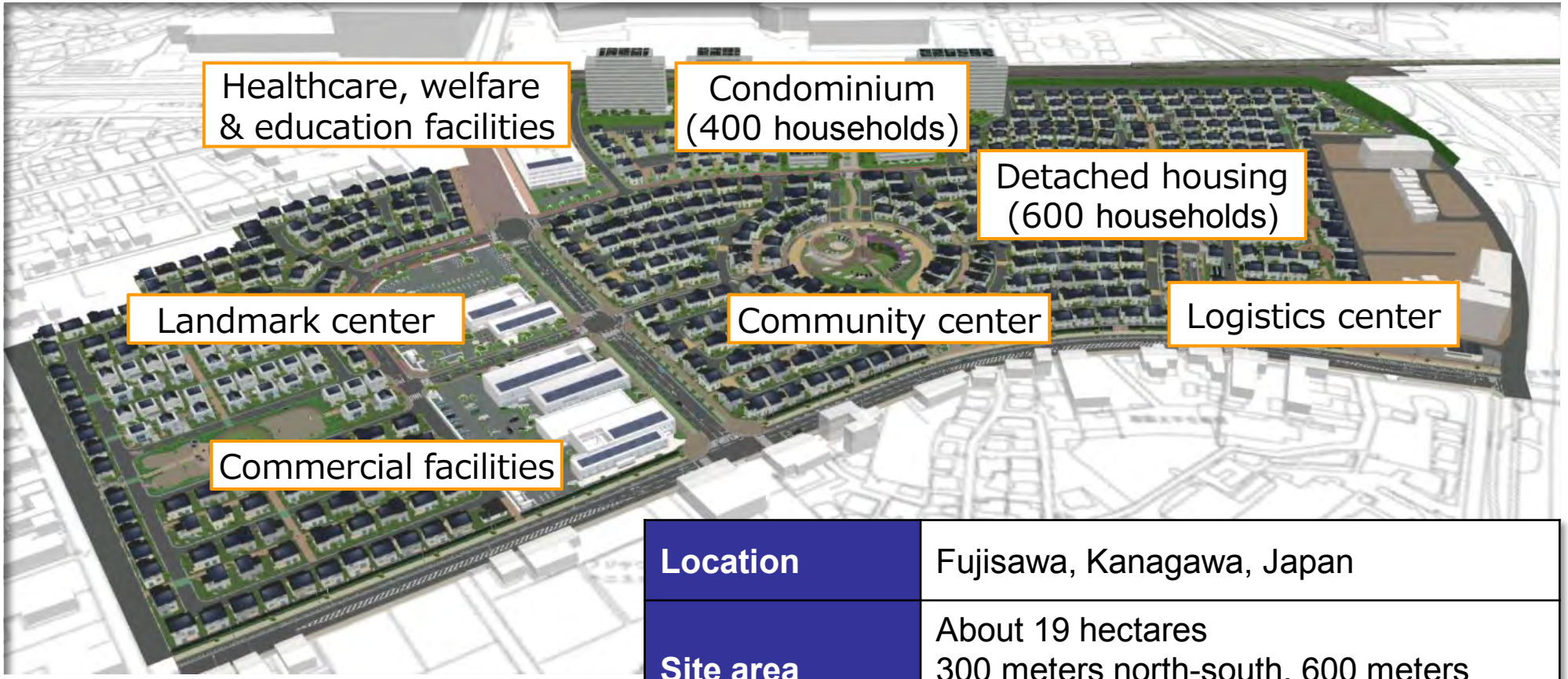



### Practical Case

FujisawaSST

TsunashimaSST
YOKOHAMA

# Developing a complex centering around housing




| | |
|---|---|
| **Location** | Fujisawa, Kanagawa, Japan |
| **Site area** | About 19 hectares<br>300 meters north-south, 600 meters east-west |
| **Schedule** | Opening in spring 2014, to be completed in fiscal 2020 |

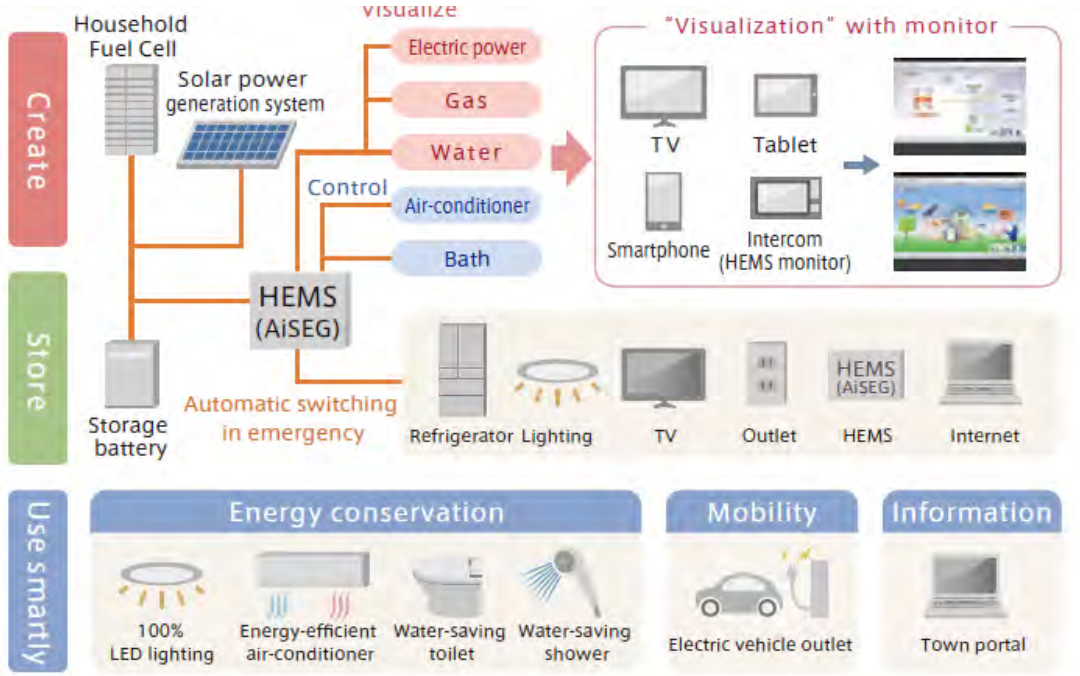
**Town targets**

- $CO_2$ 70% reduction
- Water Consumption 30 % reduction
- Renewable energy Usage Over 30 % reduction
- Lifeline maintenance 3 days

## Energy

The largest distributed energy management system in the world(*)


Solar power (3MW) and storage batteries (3MWh) are installed the Fujisawa SST.




*1 As at Oct. 1st, 2012

# The urban-type of smart city project, collaborating with various facilities and condominium

1.Smart commercial facility
2.Town management Center
3.Town energy center
4.Hydrogen refueling station
5.International student Dormitory
6. Technical Development Center
7. Smart condominium
(94 households)

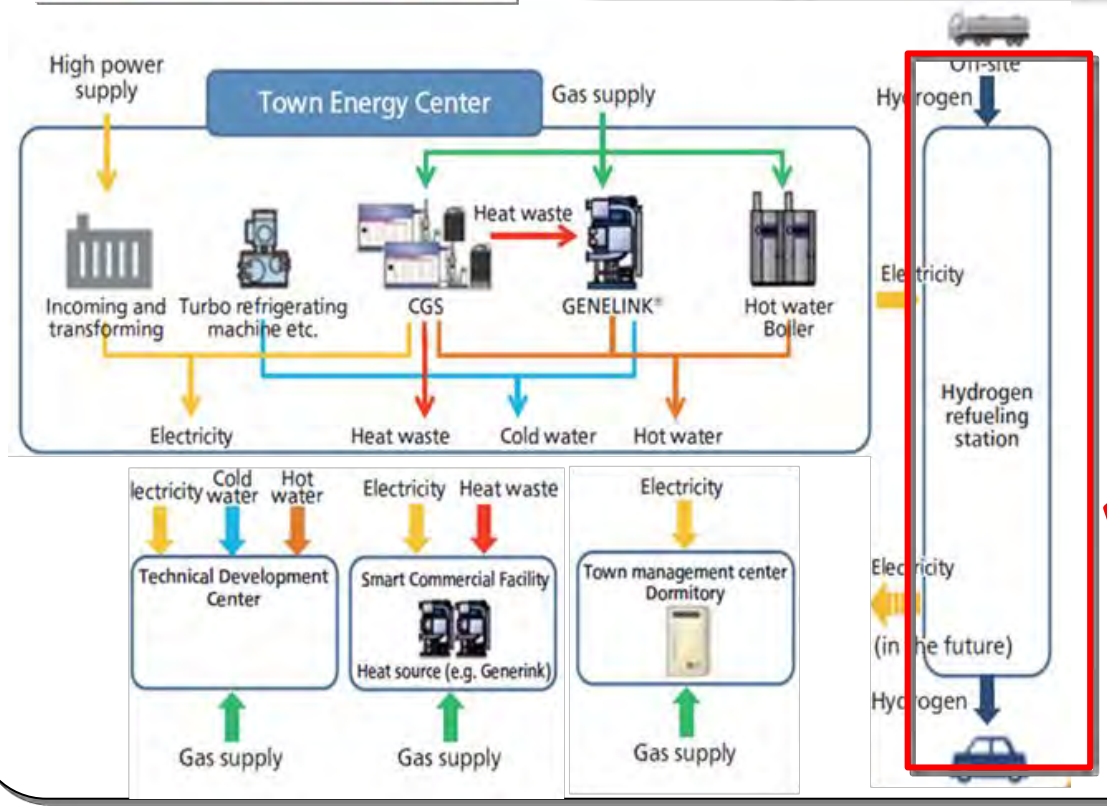

| | |
|---|---|
| Location | Tsunashima, Yokohama city, Kanagawa, Japan |
| Site area | About 3.8 hectares |
| Schedule | Opening in spring 2018 |

## Town targets

| $CO_2$ | Water Consumption | New energy (*1) Usage | Lifeline maintenance |
|---|---|---|---|
| $CO_2$ 40% reduction | 30 % reduction | Over 30 % reduction | 3 days |

## Energy

**Managing energy by optimizing energy from multiple sources in a town**

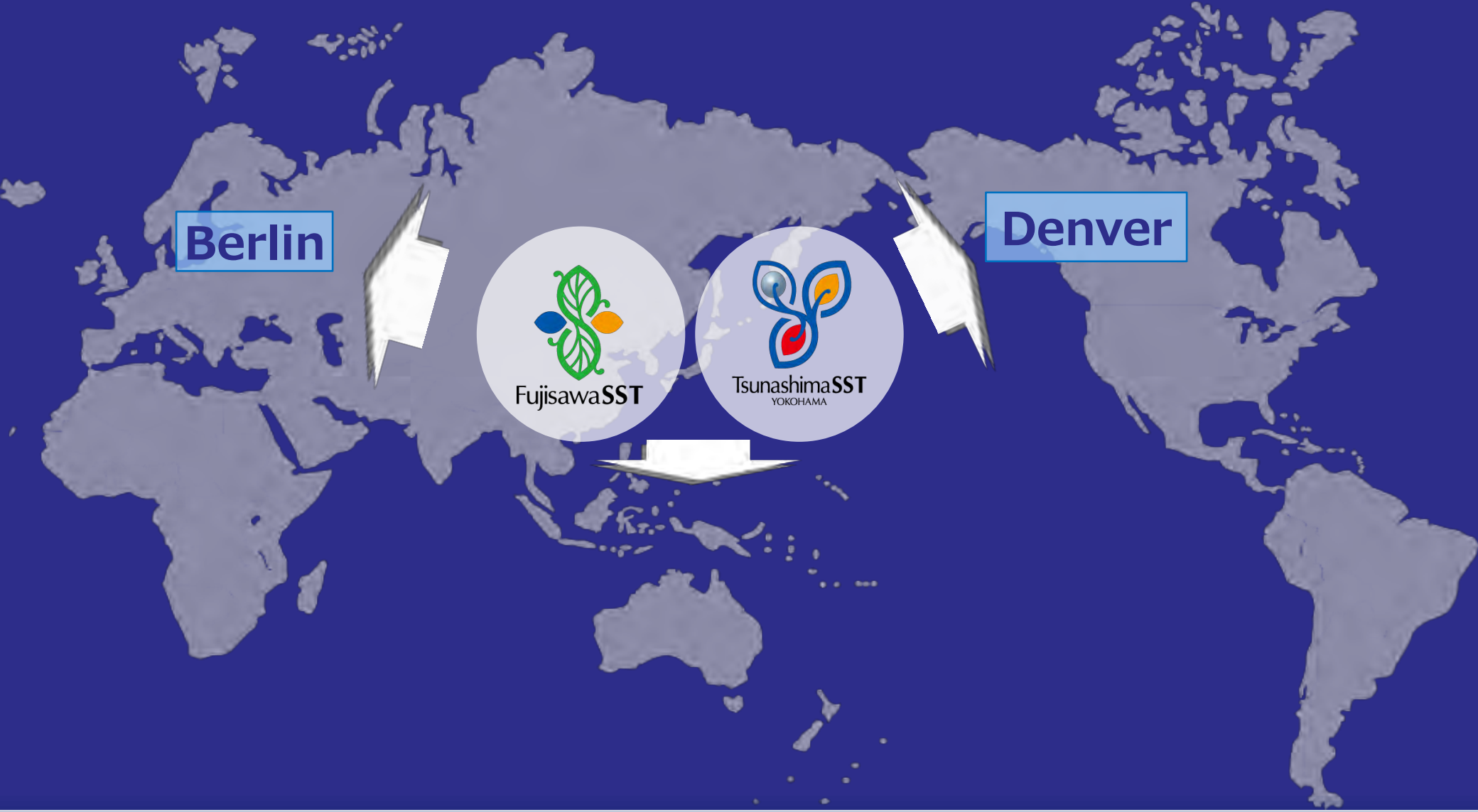



### Use hydrogen for many purposes

Use the field and demonstrate Panasonic's hydrogen-related technology such as pure hydrogen type fuel cell.

*1Includes reusable new energy and new technologies contributing to energy diversity such as "Natural gas Co-generation"

[Under consideration]




**Deploy Fujisawa SST and Tsunashima SST ‘s solutions to overseas smart cities, such as Asia, Europe, and America.**

# Enabling IoT for Smart Cities

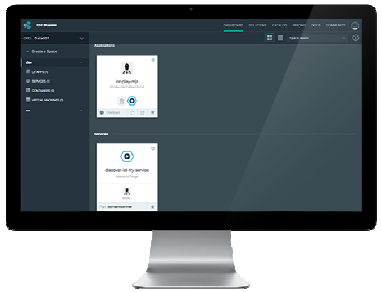
Enabling sensor devices - that cellular technology has struggled to address – for IoT devices with Low Power Wide Area technology

Akihisa Sakurai
Distinguished Engineer, IBM Japan

# IBM and the Internet of Things

**IoT is driving digital disruption of the physical world**

IBM offers a range of products and services to help businesses in every industry take advantage of the power of the Internet of Things. This includes access to a technology platform that uses natural language processing and machine learning to reveal insights from large amounts of unstructured data (IBM Watson).



## Accelerating advances in technology

- Cognitive Analytics
- Cloud Computing
- Pervasive Connectivity
- Product Lifecycle Management
- Embedded sensors

## Are transforming every part of business

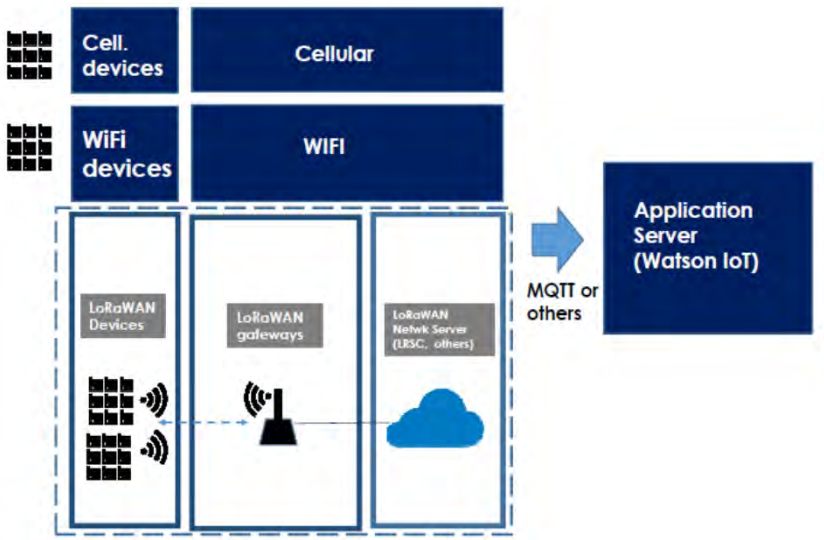
- Boosting operational performance and lowering costs
- Driving engagement and customer experience
- Creating new products and business models
- Advancing environmental leadership

# IoT needs new types of M2M communication to fully deploy

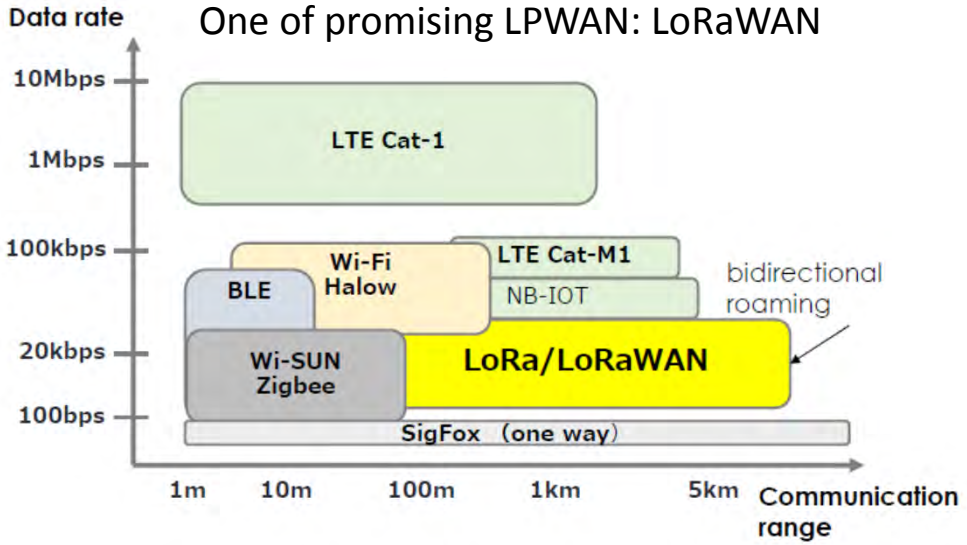
**The prevalent GSM or G3 (cellular) network was not designed for and is not a good match for the communication characteristics and requirements of IoT applications:**

1. low-throughput with a strong uplink bias,
2. low energy consumption for devices operating on batteries for years,
3. long wireless range to reach into basements without repeaters,
4. lower cost to keep both the initial investment and running costs low,
5. localizing mobile devices down to a couple of meters (indoor and outdoor).

Low Power Wide Area Network




One of promising LPWAN: LoRaWAN



# LoRaWAN and IBM Long Range Signaling & Control (LRSC)

## Smart city

- parking, traffic sensors and control, infrastructure monitoring, street lighting,
  waste management, building management, vending machines

## Smart environments & industrial

- forest fire detection, air pollution, earthquake sensors, avalanche and landslide
  prevention, equipment status, factory control

## Smart agriculture

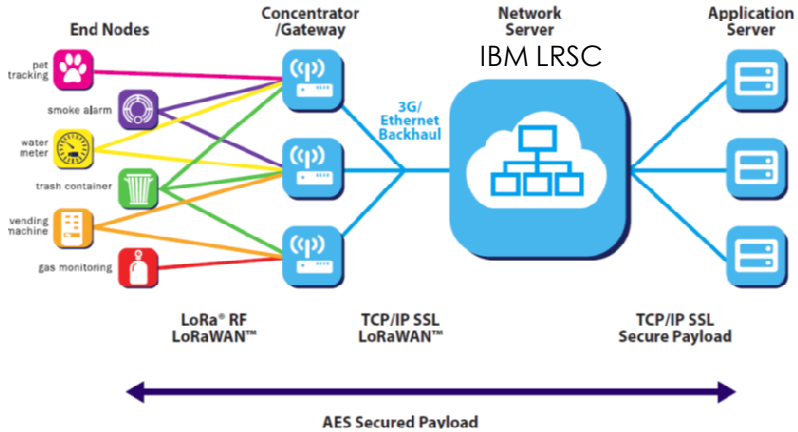
- spray optimization, drought alerting, grow monitoring, irrigation systems,
  environmental and pollution indicators, stock and production flows

## Smart home and metering

- power meters, water meters, gas meters, smoke detectors, security systems

## Smart tracking

- animals, bikes, motorcycles, goods, logistics




LoRaWAN as a LPWAN configuration

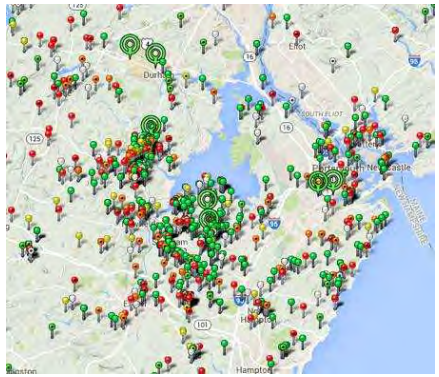
## Secured bi-directional sub-GHz link

- Spread-spectrum approach whereby different spreading factors don't interfere with each other
- Range > 2 km in urban areas, > 10 km in rural areas (i.e., reaches meters in basements)
- Data rates between 0.3 kbps (SF12) and 10 kbps (SF7), 50 kbps via FSK
- Dynamically trades data rate against range, up to +20dBm TX power, 157 dB link budget
- 10 mA RX current, < 200 nA sleep current
- Allows localization of end devices via a combination of time-of-flight and RSSI
- Gateways can receive multiple messages from different end devices simultaneously
- leverage existing elevated base-station locations
- Capacity can be incrementally increased by reducing cell size
- Complete hardware solution (end devices and concentrator for gateways)

# Network as a Service provider Senet, Inc. builds a large-scale Internet of Things infrastructure to tap new markets

**Business challenge:** Senet is America's first LPWA Network as a Service provider, renting out its wireless IoT infrastructure to clients, the first of which come from the residential heating industry. On average, heating oil delivery drivers visit each customer six times per year, at a cost of $50-100. Often the deliveries are made when the tanks are still at half capacity. If they could deliver at 40 percent, the firms could make less runs at an annual savings of $1-$1.5 million.


**Solution:** Senet swapped its GSM based technology and turned to LoRaWAN-based IoT M2M network using long-range, low-power sensors connecting the fuel tanks to the cloud. This IBM technology not only scales better, but it's highly secure, enabling Senet to grow to new vertical markets. Today Senet covers 70,000 sq miles with more than 40,000 sensors.



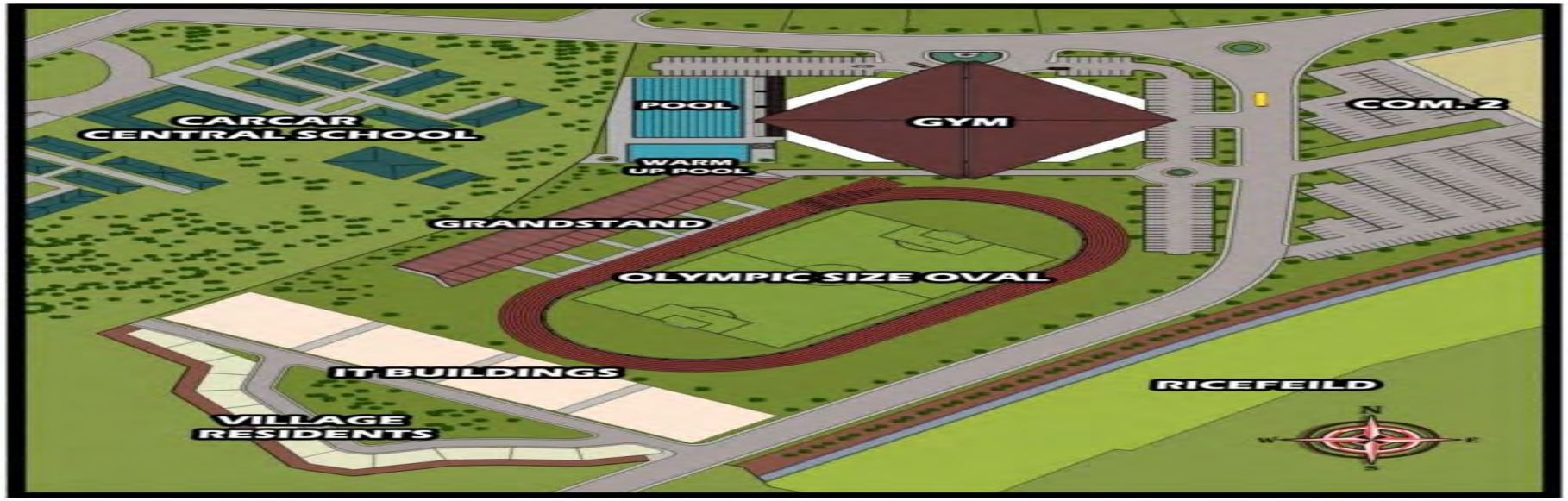
# THE PROPOSED NEW CARCAR CITY CENTER


# THE NEW CITY HALL
# NOW UNDER CONSTRUCTION



# THE PROPOSED PUBLIC TRANSPORT TERMINAL

NORTHEAST AERIAL VIEW OF THE PUBLIC MARKET



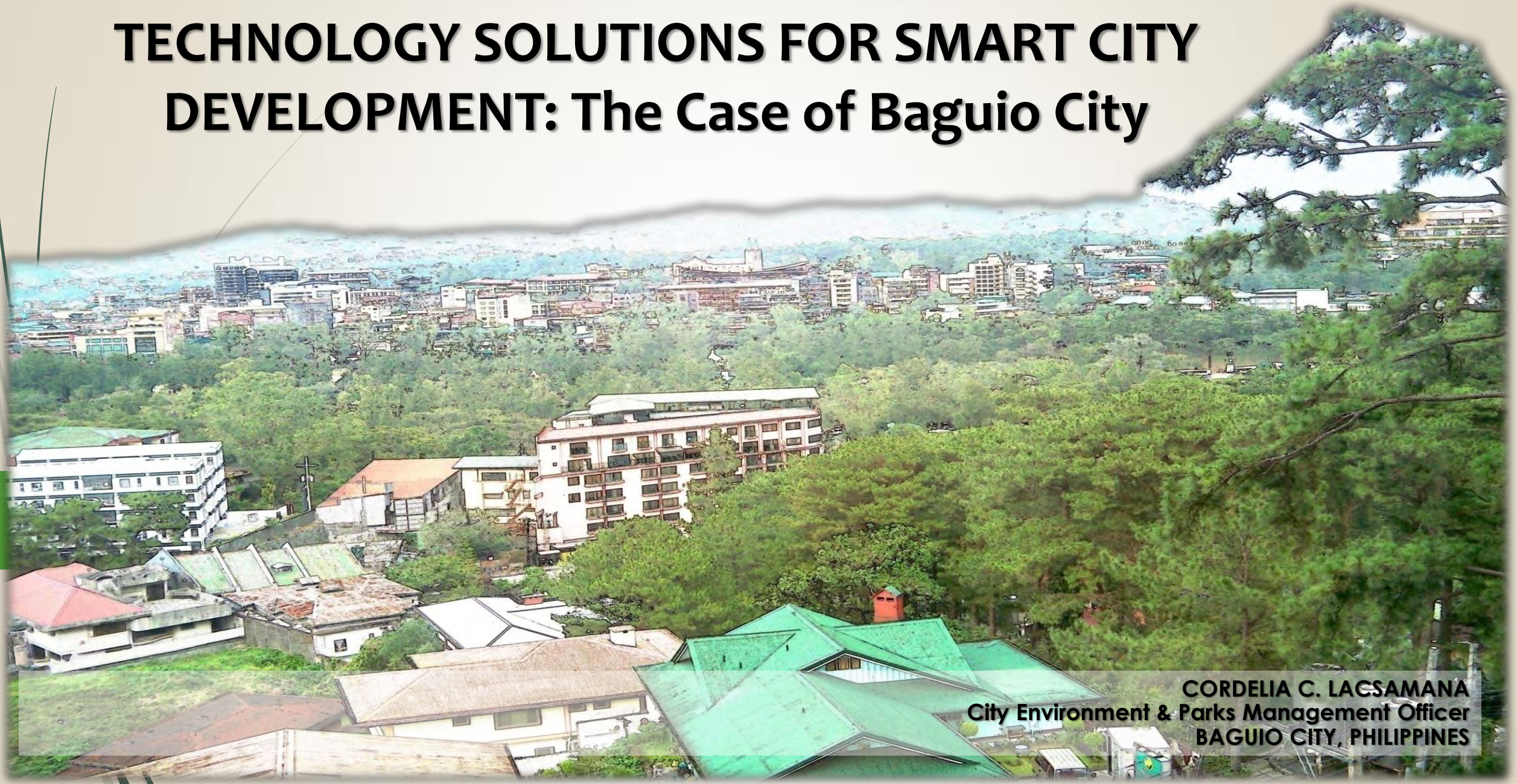

## SITE DEVELOPMENT PLAN

**VIEW OF OLYMPIC SIZE SWIMMING POOL**

**SOUTHWEST GRANDSTAND AND OLYMPIC SIZE OVAL**

VIEW OF THE WALK WAY WATER WAY RICE FIELD AND  THE PUBLIC PLAZA

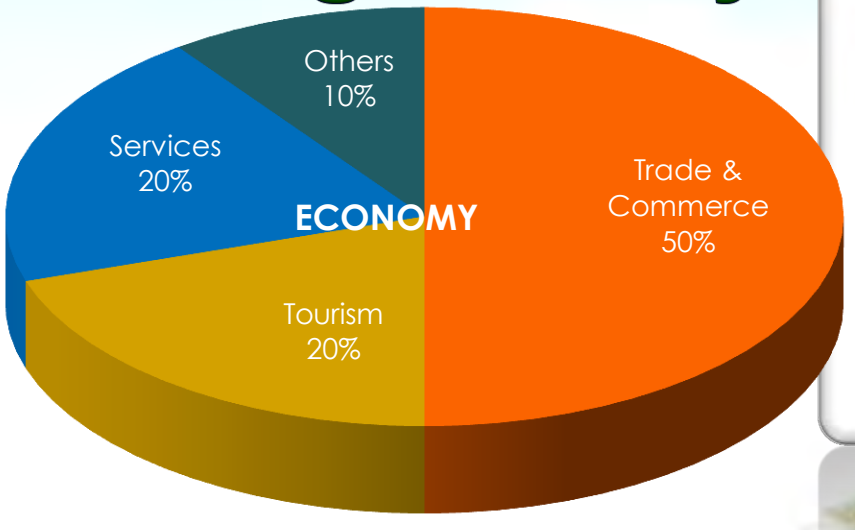
# TECHNOLOGY SOLUTIONS FOR SMART CITY DEVELOPMENT: The Case of Baguio City



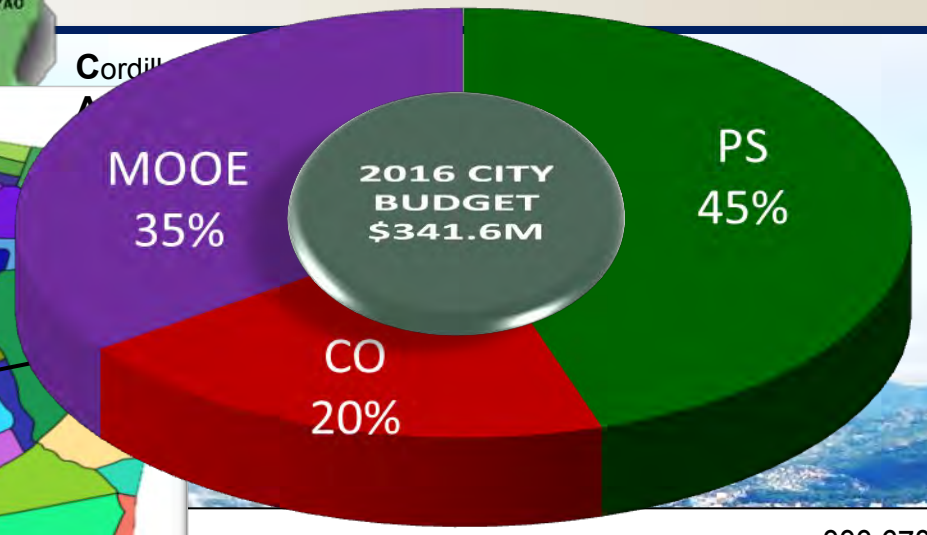
CORDELIA C. LACSAMANA
City Environment & Parks Management Officer
BAGUIO CITY, PHILIPPINES

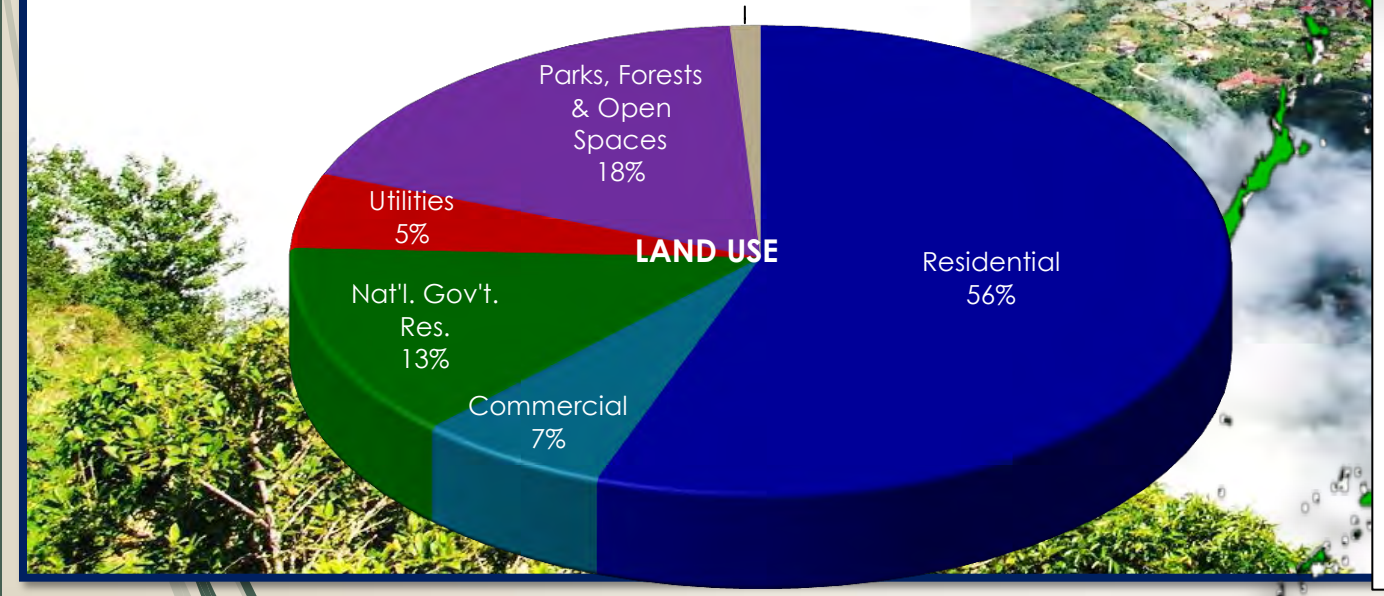
# Quick Facts

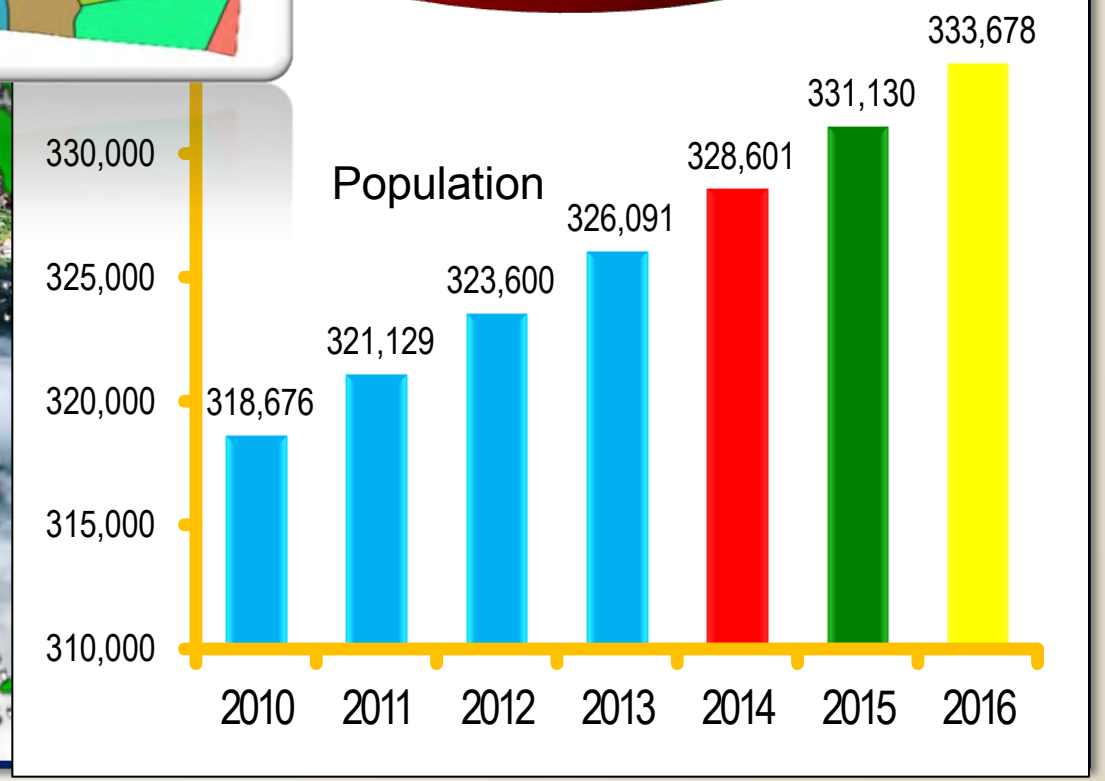
## Baguio City







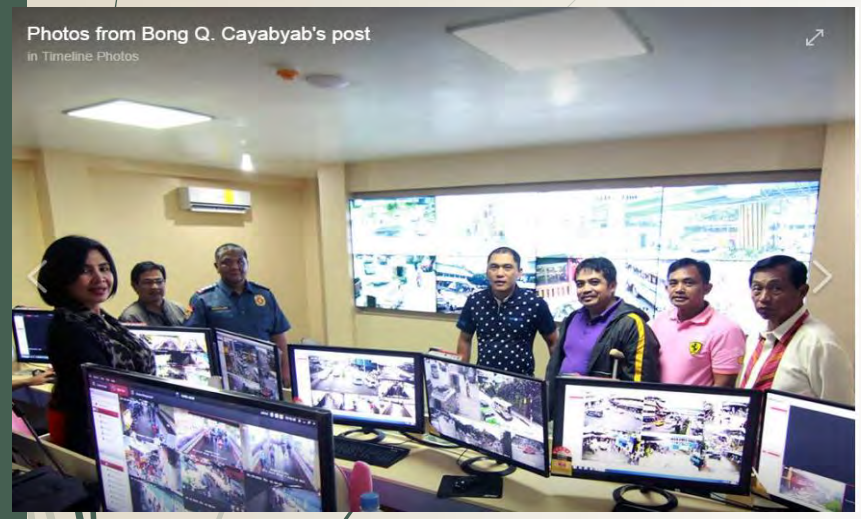
# City Vision:

***"A breathe taking City of Pines, a living stage of culture & arts in harmony with nature , a prime tourist destination & center of quality education, with secured, responsible empowered and united people"***

# LEGAL BASIS :

- RA 7160 particularly Section 16, General Welfare which estates in part that:***"every local government unit exercises the powers necessary and proper for the governance such as the promotion of health and safety, enhancement of prosperity, improvement of morals, the maintenance of peace and order, and the preservation of comfort and convenience of the inhabitants within their respective territorial jurisdictions."***

# THE CITYWIDE CCTV SURVEILLANCE PROJECT




## "BAGUIO CITY SAFE AND CONNECTED"

LIVABILITY

SAFETY

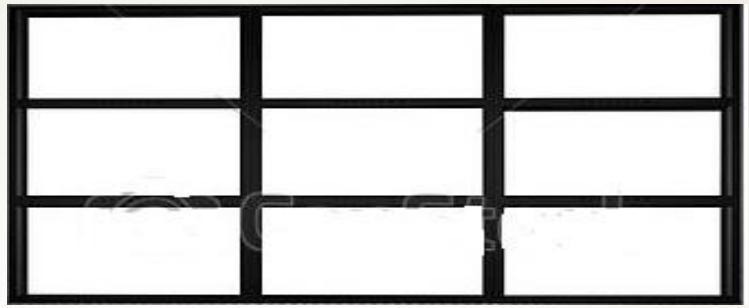
RESILIENCE

## COORDINATIVE APPROACH METHOD (CAM)

**Information**, **People**, **Technology** and **Intelligent Solutions**

# NERVE CENTER

## 24/7 OPERATION



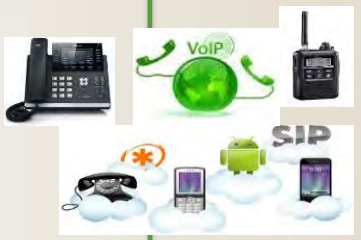
8 x 47" Video Wall Main Monitoring (maximum 16 x 47")

City Gov't Offices

- BCPO
- Traffic Management. Group
- Baguio Fire Department
- Baguio City 911
- POSD
- CDRRMC
- BCEMS
- Barangay Officials
- Various Civic Action Groups
- Hospitals
- Business Associations

Public, Concerned Citizens

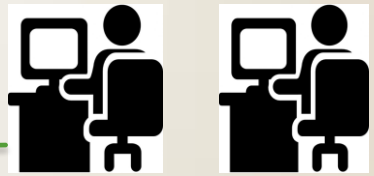
6 monitoring operatives – assigned w/ 10 initial locations each to conduct real-time monitoring





Dispatcher

Operations Officer



Call Receiver/Reception Operatives

OUTGOING DISPATCHING

INCOMING

## CENTER OF COORDINATION

# HOW THE SYSTEM OPERATES???

- SYSTEMATIC CENTRALIZED OPERATIONS DASHBOARD (SCOD)
- STANDARD OPERATING PROCEDURE (SOP)

# WHAT ARE EXPECTED RESULTS???

Effectively address a wider spectrum of Basic Urban Services:

- Public safety and security related incidences: Crime tracking and the security of important key locations, CBD, School, Malls
- Health and Sanitation
- Public order: Traffic Management, Public Infra and Utilities Monitoring
- Emergency Situations, i.e. Accidents (Road, Human), Fire
- Disasters and Calamities as component of the Early Warning System and Monitoring during events.


CORDELIA C. LACSAMANA
City Environment & Parks Management Officer
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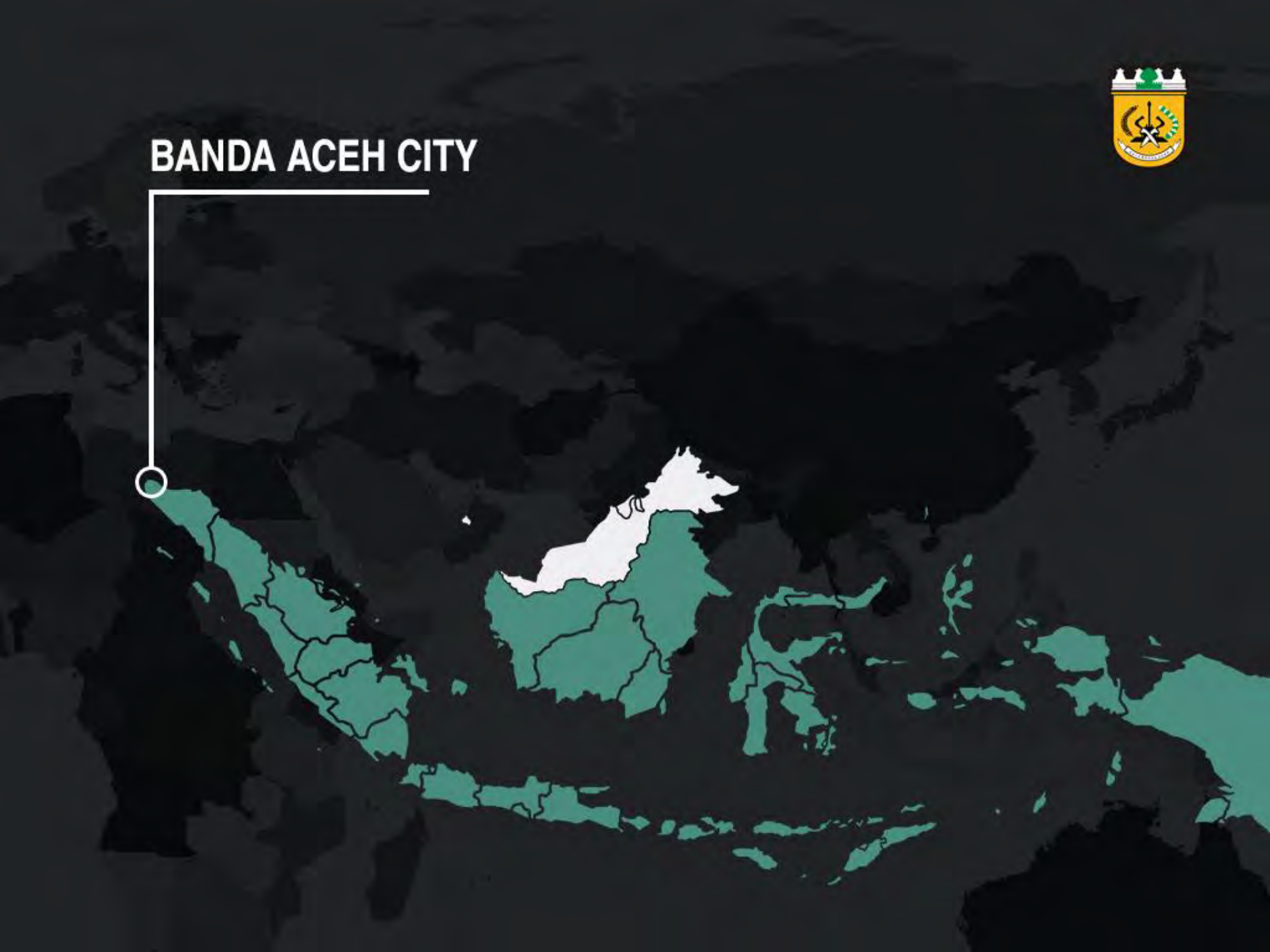
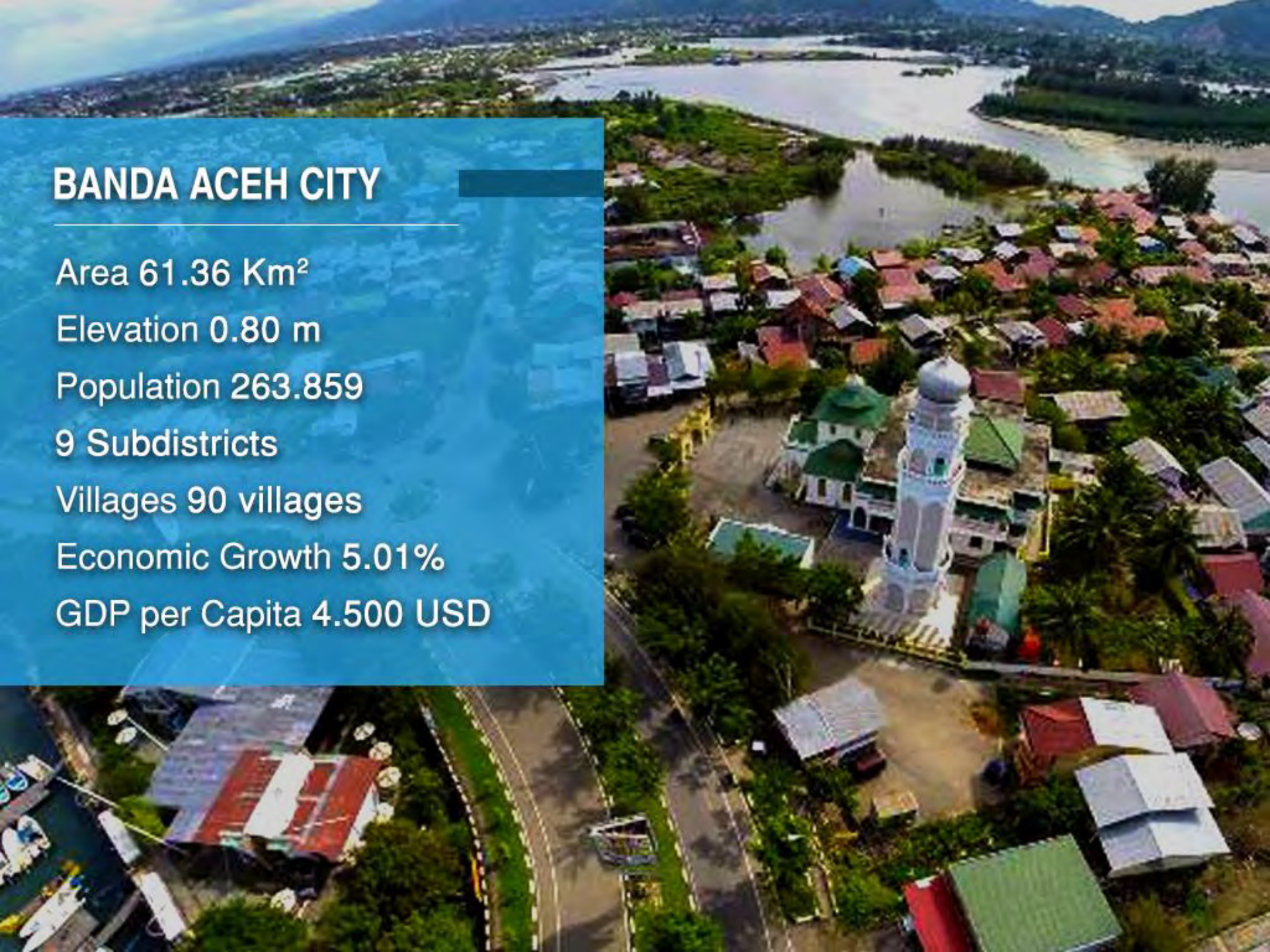
Baguio City, Philippines


# Showcase of Private Sector Technologies and Solutions For Smart City Development

The 5th Asia Smart City Conference

Friday, November 18th, 2016
Intercontinental Yokohama Grand Hotel


BANDA ACEH CITY



## BANDA ACEH CITY

Area 61.36 Km²

Elevation 0.80 m

Population 263.859

9 Subdistricts

Villages 90 villages

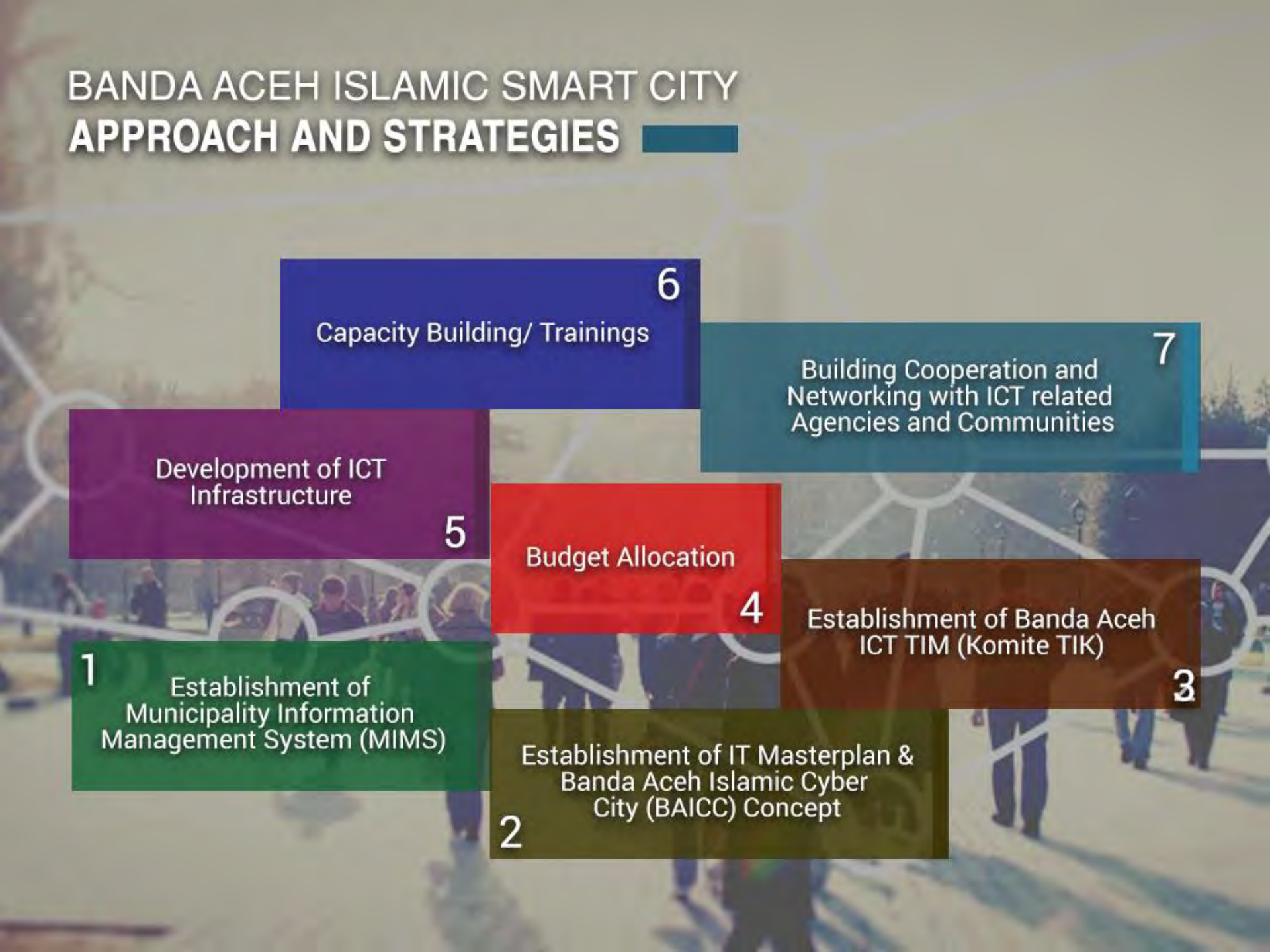
Economic Growth 5.01%

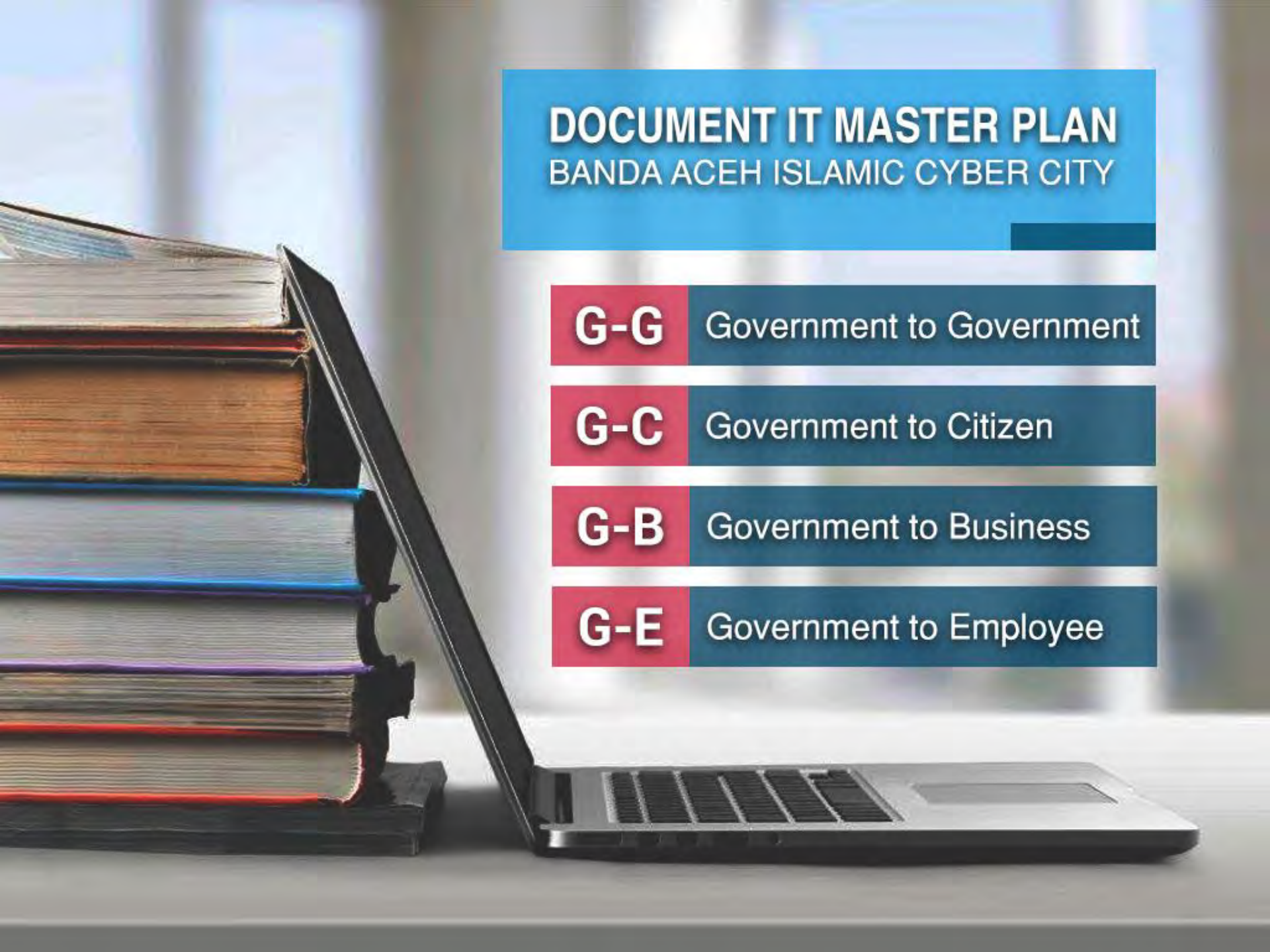
GDP per Capita 4.500 USD

# BANDA ACEH ISLAMIC SMART CITY

- The City that using ICT to find appropriate solution for urban issues and agendas.
- Integrate the concept with the local wisdom and characteristic such as Islamic values.

# BANDA ACEH ISLAMIC SMART CITY
## APPROACH AND STRATEGIES




DOCUMENT IT MASTER PLAN
BANDA ACEH ISLAMIC CYBER CITY
G-G
Government to Government
G-C
Government to Citizen
G-B
Government to Business
G-E
Government to Employee

# OUR ACHIEVEMENTS

**83**

**APPLICATIONS FOR PUBLIC SERVICES**

http://layanan.bandaacehkota.go.id

**11**

**OUT OF 41 AGENCIES ARE NOW OPEN DATA**

http://data.bandaacehkota.go.id

**MOST OF THE APPLICATIONS ARE DEVELOPED INDEPENDENTLY BY THE CITY GOVERNMENT**

# WHAT DO WE DO?

## Adopt the triple helix concept GOVERNMENT – ACADEMICS – PRIVATE SECTOR to boost ICT innovation

- Strengthen cooperation and partnership with universities (academics)
- Support the development/improvement of ICT businesses especially at the local level
- Support and strengthen ICT communities capacity

# COOPERATION AND PARTNERSHIP WITH PRIVATE SECTORS

PT Telkom (Indonesian Telecommunication Company)

- **E-Puskesmas**
- **E-Village**
- **Smart Village**
- **T-Drive application for local busway system and garbage truck**
- **Digital Innovation Lounge (DILo)**

# DIGITAL INNOVATION LOUNGE (DILO)

- MoU with PT Telkom and Indonesian IT Community Group (MIKTI) in 2016.
- To provide a place to educate people and improve their capacity on ICT/Digital understanding.
- To facilitate development of digital creative industries and entrepreneurships.
- To conduct seminar, workshop, trainings, exhibition and festival, and digital competition.
- 34 community groups.

# WIFI FACILITIES

**Free Speedy Area**

**“A cup of wifi”**

Free wifi at 96 coffee shops

# COOPERATION AND PARTNERSHIP WITH PRIVATE SECTORS

Markplus. Inc.

- Monitoring the progress of smart city concept implementation in Indonesia.
- Measuring the impact of digital initiatives.
- Sharing knowledge on smart city development.

# COOPERATION AND PARTNERSHIP WITH PRIVATE SECTORS

IT Communities

- Trainings
- Healthy internet's campaign
- Introduction to Open Source (OS) application
- Game designs

# ONLINE PERMITS

- Integrated with BPJS Ketenagakerjaan (Workers' insurance system)
- Permit status notification services via SMS
- One stop service system (SIMSATU)
- Online permits application
- Online Registration
- Permits information and non-permits investment online system (SPIPISE) Integrated with National Investment Coordination Board (BKPM)

# KEY SUCCESS

- Commitments: Policies, Actions and Sustainability
- Keen on learning
- Starting with small things and utilizing available resources
- Be open and build the networks

# CHALLENGES AND TARGETS

- Improve the private sector's role in Smart City Development.
- Revise the BAICC (Banda Aceh Islamic Cyber City) document into BAISC (Banda Aceh Islamic Smart City).
- Development of Command Centre, Data Centre, and Fiber Optic network.
- Development of Banda Aceh Madani Education Centre (BMEC).
- Development of Digital Museum and Smart Library.
- Improve digital base services for education, health and transportation.
- Capacity building for community and civil servants.

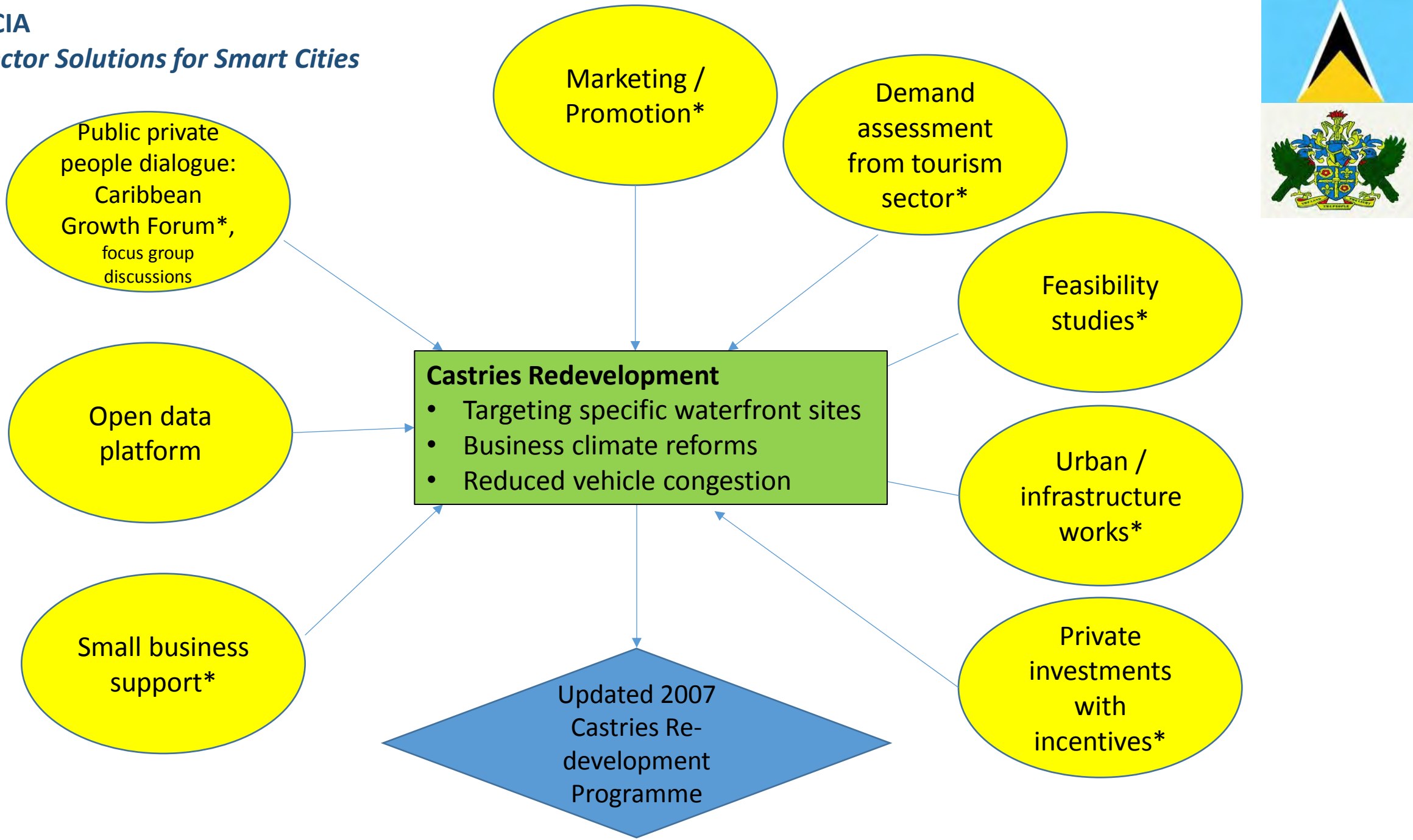

Thank You

# SAINT LUCIA

## *Private Sector Solutions for a Smart City*


**SAINT LUCIA**

***Private Sector Solutions for Smart Cities***




*Funded under 2017-2023 Eastern Caribbean Regional Tourism Competitiveness Project