

## City-to-City Collaboration

### Toward Smart and Green Island of Batam

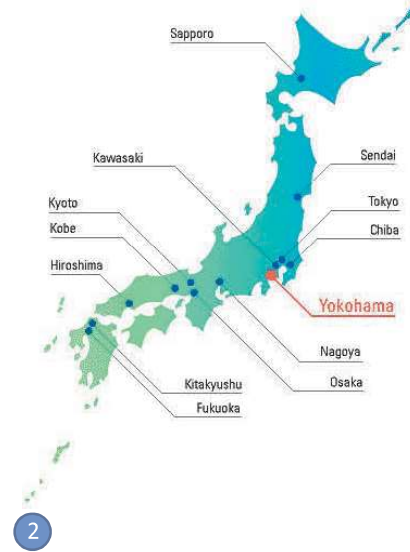


Development Cooperation Division, International Affairs Bureau  
City of Yokohama

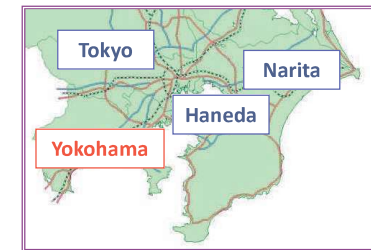
© City of Yokohama 2015

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## Overview of Yokohama City



- International port city  
Opening of port of Yokohama in 1859
- Population: approx. 3.7 million  
Largest city in Japan
- GDP: approx. 12.7 trillion JPY  
(approx. 107 billion USD)
- 21 minutes from Haneda Airport (Tokyo)



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## External Recognition on Achievement by the City of Yokohama

LEE KUAN YEW  
WORLD CITY  
PRIZE

2014 SPECIAL MENTION: CITY OF YOKOHAMA



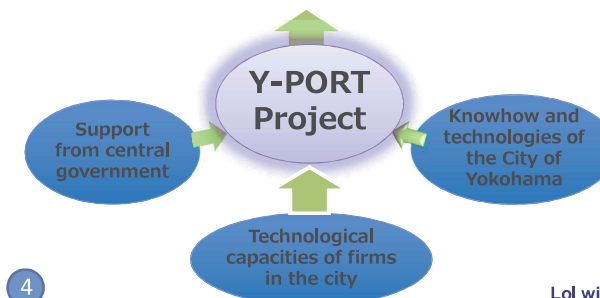
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## Yokohama's International Development Cooperation – Y-PORT

### Yokohama Partnership of Resources and Technologies

*It is essential to provide **not simple products but solutions** through combining technologies and knowhow of the public and private sectors*

### Enhancement of international technical cooperation



Lol with the City of Batam in May, 2015

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## City to City Collaboration in Batam

Letter of Intent on Technical Cooperation for Sustainable Urban Development Signed with the City of Batam, on 27th May, 2015 for 3 years

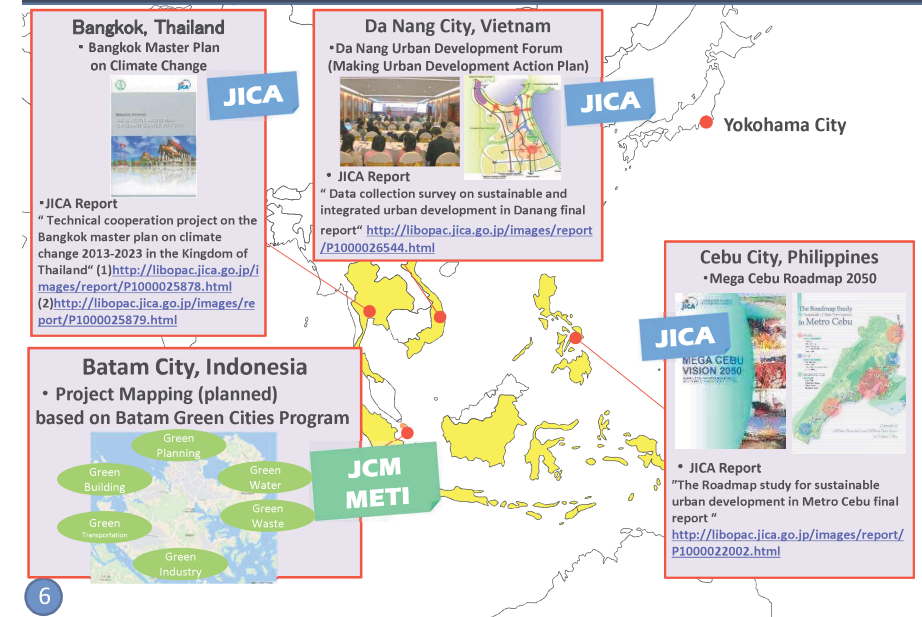
**To be renewed by March 2018**

### Contents of Agreement

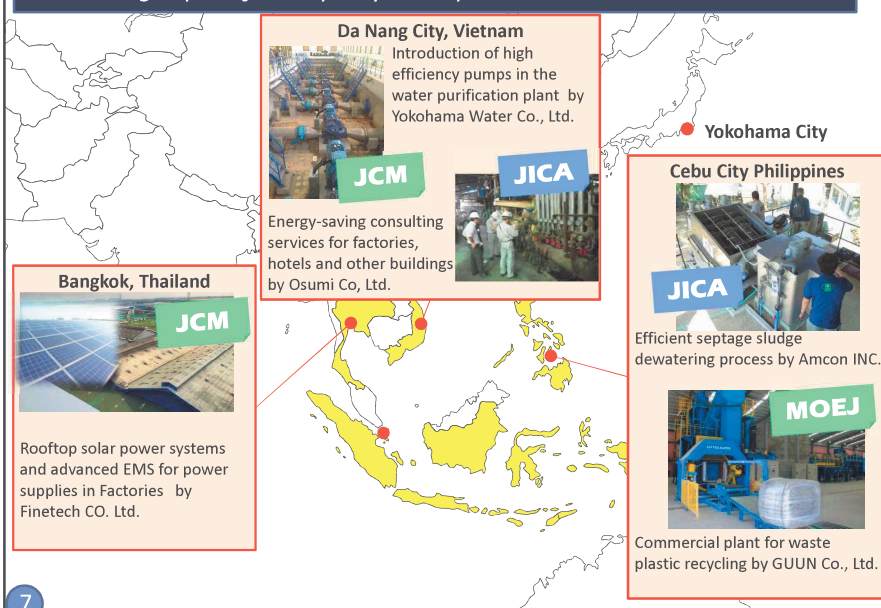
1. The City of Yokohama will offer technical advice in promoting the eco-city development of the City of Batam.
2. **The Parties will encourage participation of the private sector and academic organizations.**
3. The Parties will take action to obtain cooperation of the governments of both countries and international organizations.
4. The Parties will mutually provide information essential to implementing the above collaboration effectively.



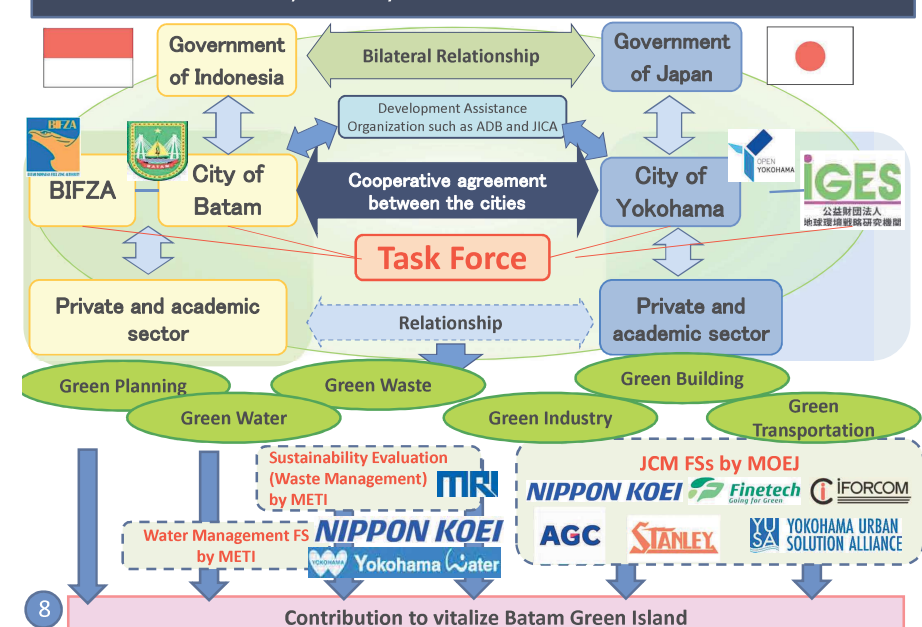
## Master Plans which the City of Yokohama has worked together with Four Cities under City-to-City collaboration



## Flagship Projects by City to City Collaboration in Four Cities



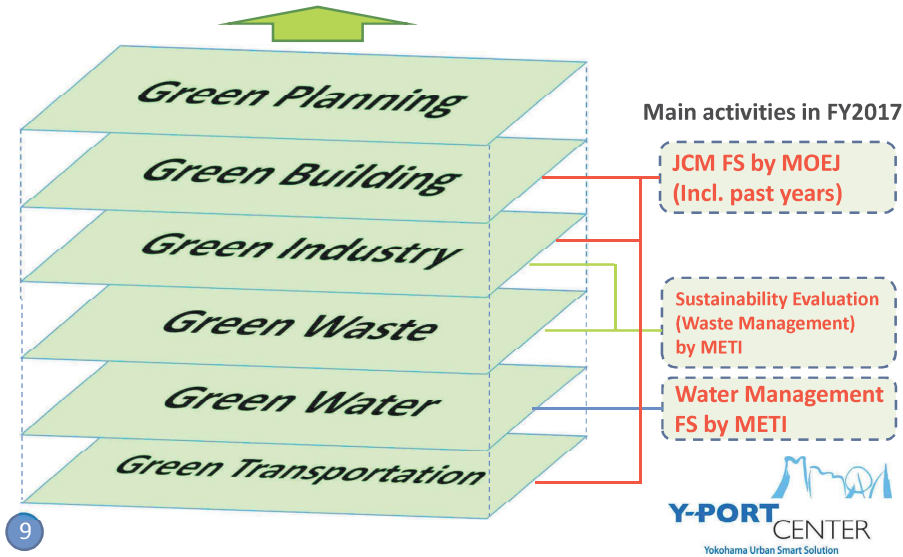
## Framework of City-to-City Collaboration with Batam in this Year





## Inter-Relations of Six Pillar Sectors through Tripartite Collaboration among Batam City, BIFZA and Yokohama City

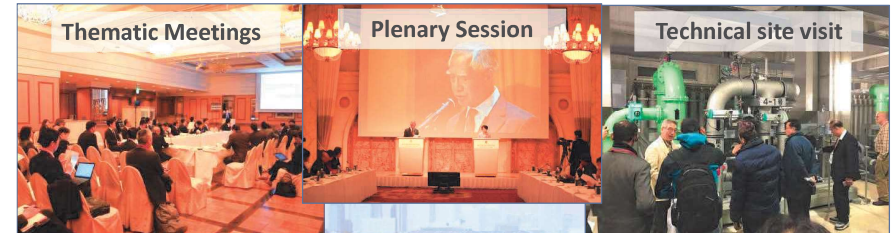
### Project Mapping toward Batam Green Island



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## Sharing best practices on smart urban solutions

### Join in the 6<sup>TH</sup> Asia Smart City Conference on OCTOBER 27<sup>TH</sup> 2017 in Yokohama

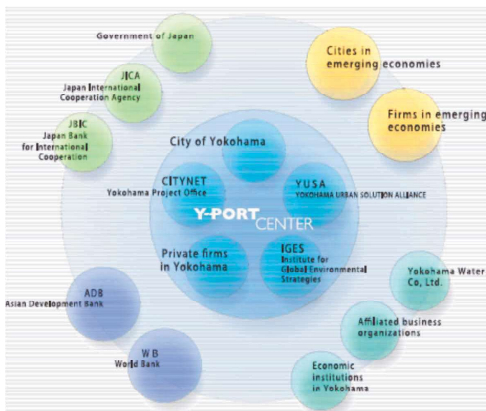


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## Y-PORT CENTER – Knowledge hub for smart city management

Please visit our web site:  
<http://www.city.yokohama.lg.jp/kokusai/yport/en/>

Development Cooperation Division,  
 International Affairs Bureau  
**City of Yokohama, Japan**  
 Email : [ki-yport@city.yokohama.jp](mailto:ki-yport@city.yokohama.jp)



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Thank you for your attention



## Progress of city-to-city collaboration and targets of the project this year

Project for Development of Low-carbon City  
through City-to-City Collaboration between  
Batam and Yokohama

October 5, 2017  
SAITO Tetsuya  
Nippon Koei Co., Ltd.

## Contents

1. Summary: Objective and Structure
2. History: Milestones especially on FY2016
3. Six Pillars: Major sectors for collaboration
4. Target and Approach for FY2017

October 5, 2017

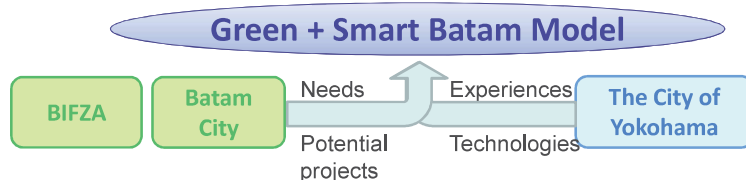
Progress and Targets (Batam-Yokohama Collaboration)

NIPPON KOEI  
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## Objectives: city-to-city collaboration

1 Summary

- Our project aims to
  - promote JCM project formulation
  - support Green City Programme of Batam
- “Best available solutions for Batam” needs to be considered through collaboration.



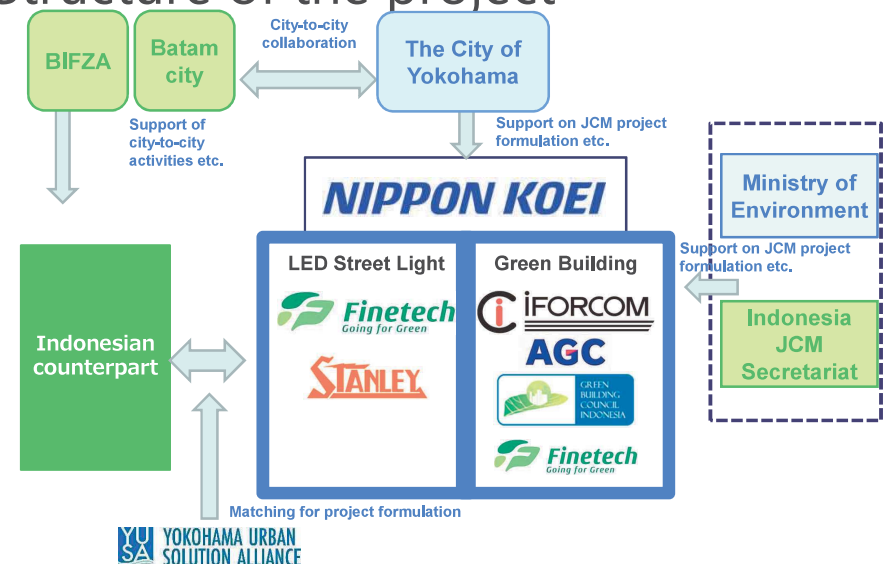
October 5, 2017

Progress and Targets (Batam-Yokohama Collaboration)

NIPPON KOEI  
3

## Structure of the project

1 Summary



October 5, 2017

Progress and Targets (Batam-Yokohama Collaboration)

NIPPON KOEI  
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## History: city-to-city collaboration

Time	Milestone
May, 2015	Lol was signed between Mayor of Batam City and Mayor of the City of Yokohama in Yokohama
FY2015	Implemented 3 Feasibility Studies <ul style="list-style-type: none"> <li>- Sludge dehydrating FS</li> <li>- Spent bleaching earth treatment and bio-fuel production FS</li> <li>- Airport energy saving FS</li> </ul>
Jan, 2016	Announced to establish the task force for city-to-city collaboration
FY2016	Implemented 4 Feasibility Studies <ul style="list-style-type: none"> <li>- F/S on Energy Saving Solutions               <ul style="list-style-type: none"> <li>Ferry terminals</li> <li>Hospitals</li> <li>Harris hotels</li> </ul> </li> <li>- F/S on High Efficiency Thermal Desorption Units               <ul style="list-style-type: none"> <li>PT MEGA GREEN TECHNOLOGY</li> </ul> </li> </ul>

## History: FY2016 Project (1)

Time	Milestone
Jul, 2016	Kick-off meeting in Batam
Aug, 2016	Establishment of Taskforce for City-to-City Collaboration
Oct, 2016	Site tour in Japan City-to-City Collaboration Seminar in Kitakyusyu
Nov, 2016	COP22 in Morocco Batam Investment Seminar in Yokohama



## History: FY2016 Project (2)

Time	Milestone
Dec, 2016	Study on Project Map
Jan, 2017	Final seminar in Batam City-to-City Collaboration Seminar in Tokyo with site visit
Feb, 2017	Finalization of project map (1 <sup>st</sup> version) and F/S plan
Mar, 2017	Reporting
Apr-May, 2017	Application for Model Project 2017

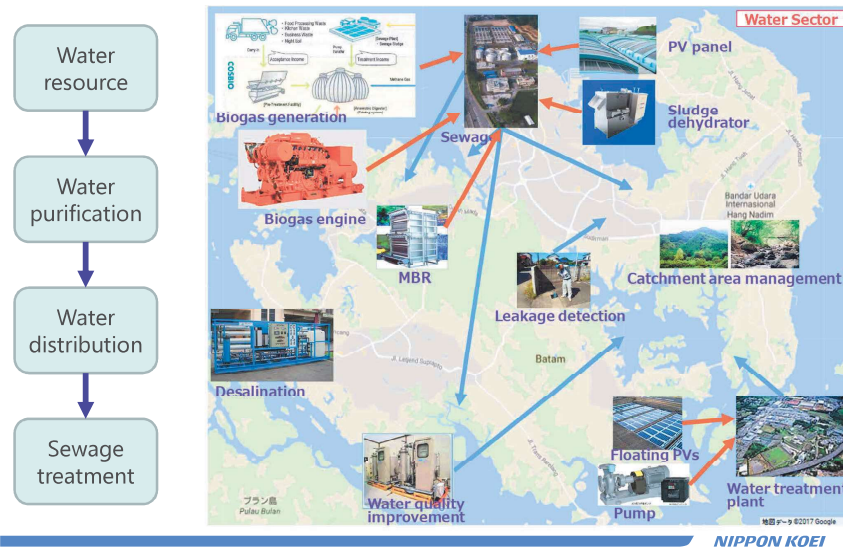


# Project Map

Initial Draft of Tables to Develop the Project Mapping (As of 29 November 2020)

Item	Development plans of Batam	Technologies in need	Potential technology providers in Yokohama and potential support schemes
Development plans of Batam	...	...	...
Technologies in need	...	...	...
Potential technology providers in Yokohama and potential support schemes	...	...	...

## Project Map (water sector)



October 5, 2017

Progress and Targets (Batam-Yokohama Collaboration)

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## Six Pillars of City-to-City Collaboration toward Green and Smart Island, Batam

6 pillars	Reason of Setting
<b>Green Planning</b>	<b>Mainstreaming of climate change mitigation and adaptation</b> into master plans such as energy saving and water management including setting targets for CO2 emission reduction
<b>Green Water</b>	The <b>bottleneck of environmental carrying capacity of Batam is water</b> , which will be severe within 10 years. In near future, best-mix for rainwater, recycle water and desalination is inevitable.
<b>Green Waste</b>	Considering <b>industrial waste as well as domestic waste</b> , appropriate management of final disposal sites, development of incineration facility and industrial waste treatment facilities are needed.
<b>Green Industry</b>	With <b>many industrial estates in Batam</b> as the free trade zone, energy saving, management, peak-cut and sustainable production activities related to water and waste needs to be considered.
<b>Green Building</b>	More than 20 <b>high-rise buildings</b> are planned to be built in a few years. Concept of Green Building needs to be introduced as soon as possible.
<b>Green Transportation</b>	Although <b>smart transportation and public transportation</b> is limited in Batam, it is expected to reduce CO2 emission from transportation through introduction of LED street light, BRT, LRT and so on.

October 5, 2017

Progress and Targets (Batam-Yokohama Collaboration)

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## Progress of City-to-City Collaboration

Sector under city to city collaboration (6 pillars of project map)	2015 City to city collaboration	2016 City to city collaboration	2017 City to city collaboration	2018 City to city collaboration	Future
	Initiation of city to city collaboration	Deepen of city to city collaboration	Implementation of project under collaboration at planning scheme	Energy saving policy making and implementation of core project	Expansion to other cities as Batam-Yokohama model
<b>Green Planning</b>	Information collection on needs of Batam side and discussion on collaboration framework	Development of project map: 6 pillars of city to city collaboration for Batam's future vision as green city	Target setting for low carbon society - standardization of green building - Support of development of water management MP	Support of monitoring for target achievement and study of land use plan	Support of development a plan for climate change mitigation and adaptation
<b>Green Water</b>	Sludge dehydrating FS		WATER Water management FS	Sewerage FS Clean water FS Desalination of seawater FS	Recycle water project Clean water project Desalination of seawater project
<b>Green Waste</b>	Spent bleaching earth treatment and bio-fuel production FS	Thermal Desorption Unit FS (Industrial waste management)	Thermal Desorption Unit project (proposed/not selected) Sustainability Evaluation: Waste Management	Waste power generation FS	Waste power generation project
<b>Green Industry</b>			Solar PV system in industrial park (proposed/not selected)	Eco industrial park FS co-generation FS	Eco industrial park project co-generation project
<b>Green Building</b>	Airport energy saving FS	Hotel energy saving FS Ferry terminal FS Hospital energy saving FS	Airport energy saving project (proposed/withdrawn) Ferry terminal project (to be promoted by B to B) Green building FS (Office building and Shopping mall)	Green building (hotel) project Green building (shopping mall) project	Green building (office building) project Saving energy new airport terminal project
<b>Green Transportation</b>			Smart LED street light FS	LED street light project BRT/smart transport FS	BRT project LRT project

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## Progress of City-to-City Collaboration

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<b>Green Transportation</b>			Smart LED street light FS	LED street light project BRT/smart transport FS	BRT project LRT project

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# Targets and Approach for FY2017

“toward sustainable extension for all Batam”

## Green Transportation

- Smart LED street light Project in Nagoya / Industrial Parks / Ports



## Green Planning

- Standardization of Smart LED street lighting system
- M/P on LED street light

## Green Building

- Green Building Project for shopping mall / office building / residential building



## Green Planning

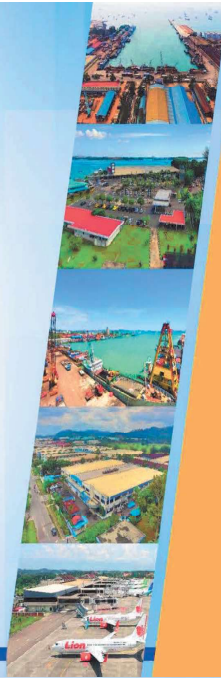
- Drafting Mayor's regulation for Green Building
- Setting target to increase green buildings in Batam

# WATER & WASTE MANAGEMENT

(1. Water 2. WASTE 3. HAZARDOUS WASTE)

Batam, Oct 5, 2017

www.bpbatam.go.id



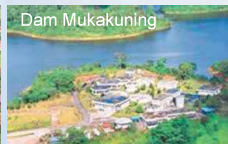
## 1. WATER MANAGEMENT



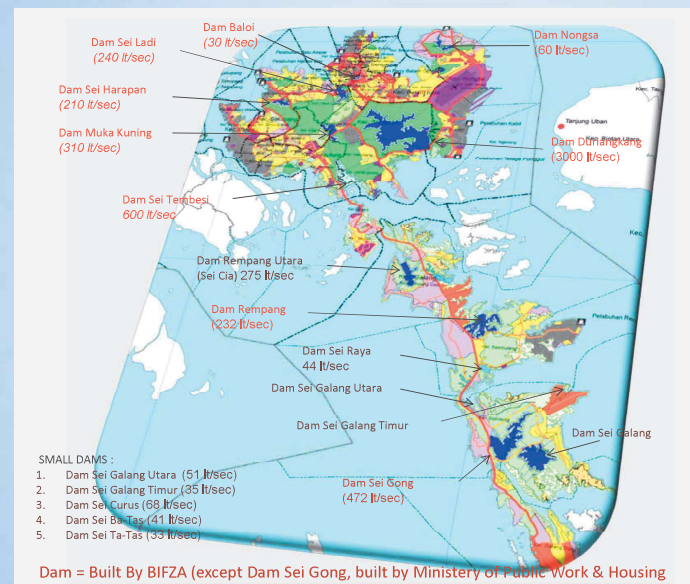
## PROVIDING OF RAW WATER

Source of raw water in Batam Area (Batam, Rempang and Galang Island):

1. Maximizing existing reservoirs;/Dams;
2. Build of new reservoirs;
3. Recycling of domestic waste water;
4. Sea desalination (SWRO);
5. Supply from Bintan Island;
6. Supply from Lingga Island;
7. Supply from Kampar River;



## RESERVOIRS in BATAM AREA

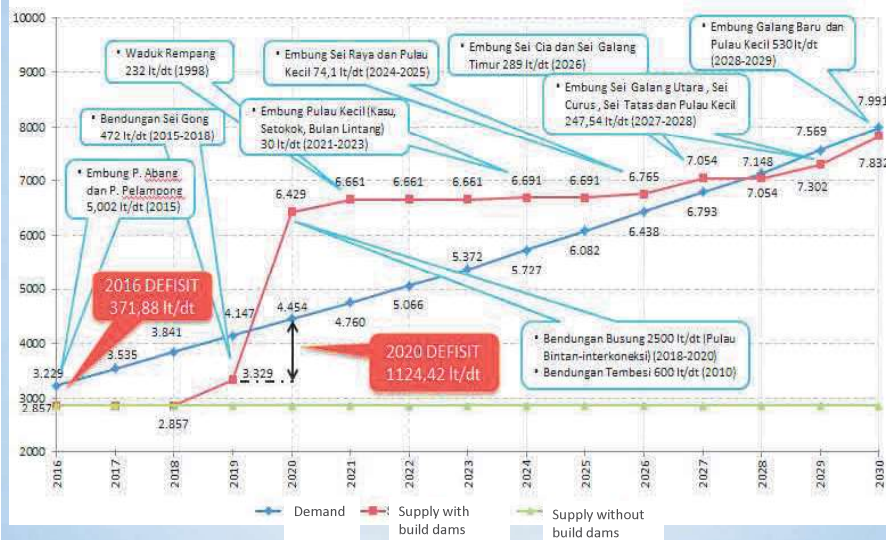


- Total Cap. In Batam Island 4.450 lt/sec
- Total Cap. In Rempang, Galang, Galang Baru Island 1.251 lt/sec
- For Consumption : 2 Million people (now 1.2 Million)
- Future plan
  - Sei Busung
  - Bintan Bay
  - Sea Water Reverse Osmosis (SWRO) For Max Consumption. 2,500,000 People

Water consumption  
199 lt / day/capita



## SCHEME OF PLATFORMING THE WATER CONSUMPTION IN BATAM AREA



## CONNECTION & COVERAGE

### Number of Connection & Coverage Area



## PLANTS & RESERVOIRS



## DAM DURIANGKANG PROBLEMS AS ONE OF THE LARGEST RAW WATER SOURCES IN BATAM (70%)

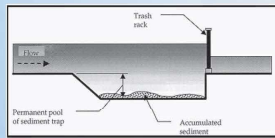




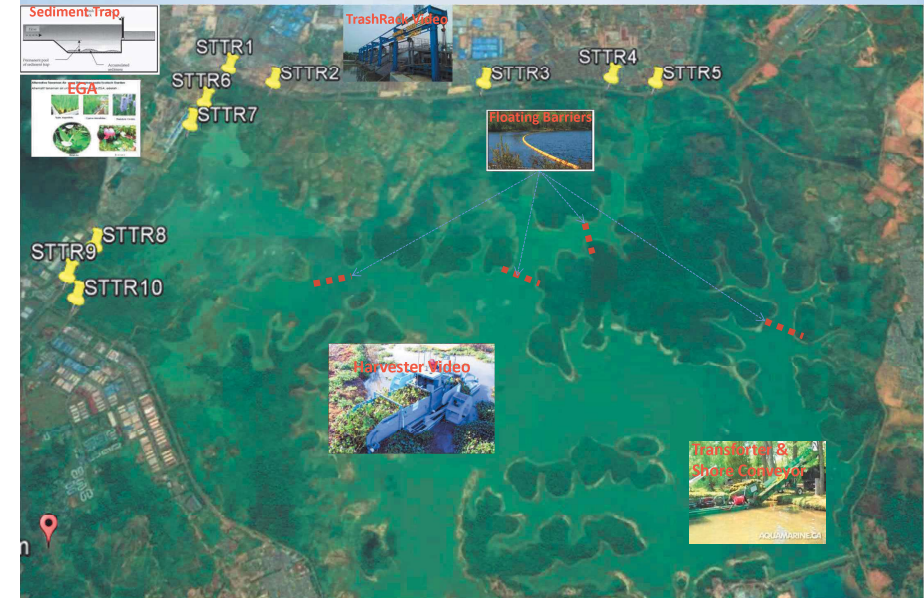
## SOME OF SOLUTION

### Development and Procurement Plans :

1. **Sediment Trap Development** ; is a water structure that serves to precipitate incoming sediments with the aim of collecting and removing sand and mud particles.
2. Installation of **Trash Rack**; is one of the water buildings made of steel plate where its function is to filter garbage / debris carried by the flow of water to keep the channel / reservoir clean from waste.
3. Application of **Ecotech Garden Technology (EGA)**; one of the solutions to eliminate pollutants from the exhausts of Gray Water, and there is the possibility of a septic tank containing pollutants (BOD, COD, N, P, K Detergent) and Odor.
4. **Floating Barriers** Installation; Floating is made for containment and control of debris, plants and floating particles. Perfect for calm and moving water areas, this blast features top flotation, impermeable rack and lower beam to successfully control and hold the goods.
5. **Procurement of Harvester (water hyacinth cleaner)**; cleaning water hyacinth scattered in Duriangkang Reservoir by using water hyacinth cleaning machine.
6. Control and Control of Illegal Buildings in Catchment Area (DTA) Duriangkang Reservoir.



## 10 LOCATION FOR SEDIMENT TRAP & TRASH RACK (STTR) AT DAM DURIANGKANG



## 2. WASTE WATER MANAGEMENT



### STP EXISTING, BATAM CENTRE (Cap. 33 lt/sec)

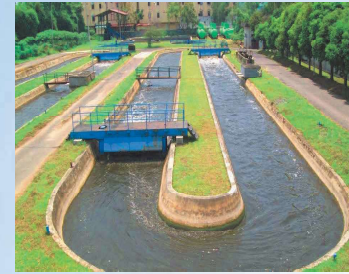




## STP CONDITION :

1. Oxidation ditch (33 L/sec), STP area 2 Ha;
2. Collector pipe network 11,000 m + 4 pump house;
3. Current operating capacity  $\pm 10\%$  or 3.3 L / dt
  - From the existing pipeline (housing, offices)
  - From the truck septic (13 units)
4. Revitalization:
  - KemenPUPR project in 2012
  - Softloan Korea, construction started, August 2017 for 30 months

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THE DEVELOPMENT OF  
WASTE WATER

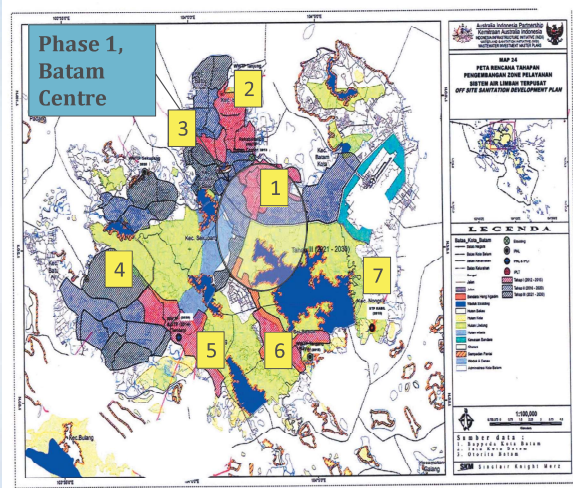
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## MASTER PLAN WWTP ( INDII-AUSAID, 2011 )

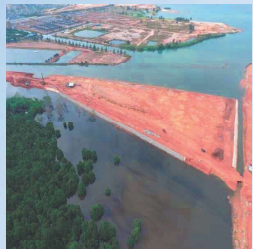
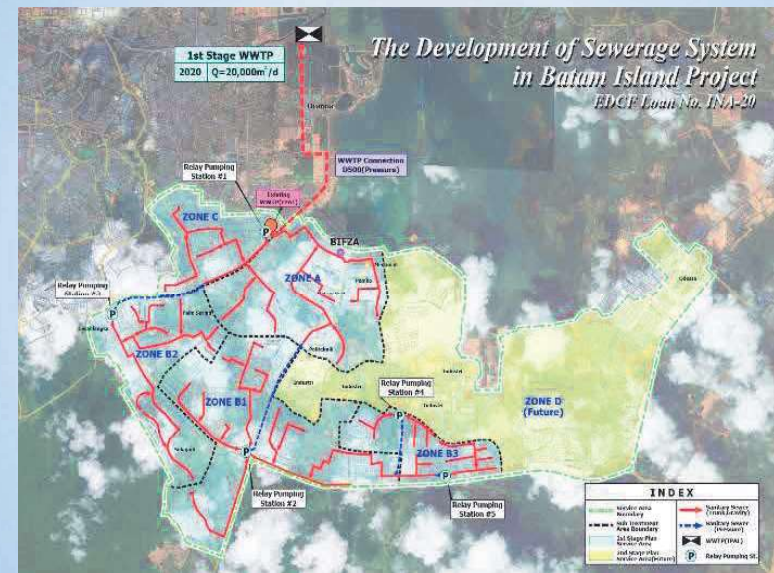
Build 7 integrated WWTP :

1. Batam Centre
2. Bengkong
3. Tanjung Uma
4. Sekupang
5. Tembesi
6. Telaga Pungur, dan
7. Kabil



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## Phase 1, BATAM CENTRE AREA



### WWTP PLAN at BENGKONG (SOFT LOAN KOREA, for Batam Centre area)

- Capacity: 20,000 m<sup>3</sup> / day or 231 lt/sec;
- 5 Pump Station;
- 114 Km of pipes and 11,000 house connections
- Construction 24 month, commisiioning 6 month
- Budget : USD 43 Million



## STOCKYARD





### EXCAVATION for PIPELINE (August 2017)



## 3. HAZARDOUS WASTE



## Condition of Hazardous Waste Treatment Area (KPLI-B3)

1. BIFZA has A Hazardous Waste Treatment Area at Kabil (KPLI B3) 20 Ha and will be developed to 60 Ha;
2. There are 38 Tenant of Hazardous waste in Batam (As a Transporters, collectors, Processors and Users)





## Number Of Hazardous Waste in 5 Years

	LIQUID (kg)	SOLID (kg)	SLUDGE (kg)
2012	5.980.959	30.369.107	1.923.249
2013	5.343.237	29.078.633	2.905.261
2014	4.399.732	27.967.375	1.545.302
2015	3.730.943	40.371.643	1.563.530
2016	5.530.597	42.066.217	4.525.674

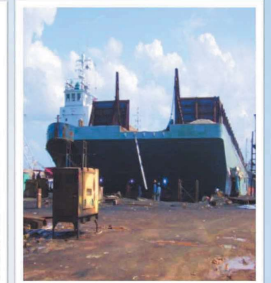


## INDUSTRI OFFSHORE, FABRIKASI DAN SHIPYARD

- In 2007 there were 76 shipyard companies; in 2016 there were 97 shipyard (shiprepair & shipbuilding);

Generally perform activities: blasting, painting, welding, hoarding, cleaning tanks;

Potential Waste B3: used sandblast, used battery, slop oil, sludge oil, Water Oil asbestos, used paint can, expired paint, contaminated waste.



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- In 2016 there are 627 companies producing B3 waste, and of that amount about 40% are manufacturing & electronic companies;

activities: assembly, manufacture, stamping, molding, electrogalvanizing, and others;

Potential Haz. Waste : electronic waste (cutting PCB, rejected goods), solvent, Flux, WWTP sludge, paint, expired material, fluororesens (Hg) lamp, contaminated waste.

## ELECTRONIC INDUSTRIES

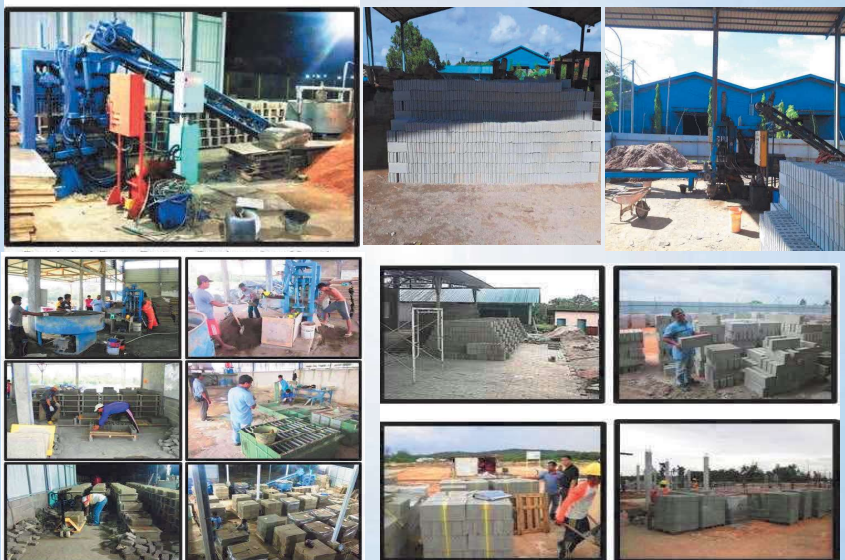


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## RECYCLING of FLY ASH & CARBIDE



## TRANSPORTATION



## HAZARDOUS WASTE STORAGE



## LIQUID TREATMENT(ELECTROCOAGULANT)



Electrocoagulant  
Machine



Reactor



Filter Press & liquid Ditch



INCINERATOR (CAP. 750 KG/H)



PRESSING



PRESSING DRUMS



LAMP CRUSHING MACHINE





## PCB CRUSHING MACHINE



## DESTILATION



Liquid waste : Thinner, Etanol. Hydrocarbon, solvent & others .



## PROCESSING MIX HWSF



## USED GARNET TREATMENT



Used Garnet from  
Waste Generators



Screening Process



Material to Export



Material After Process







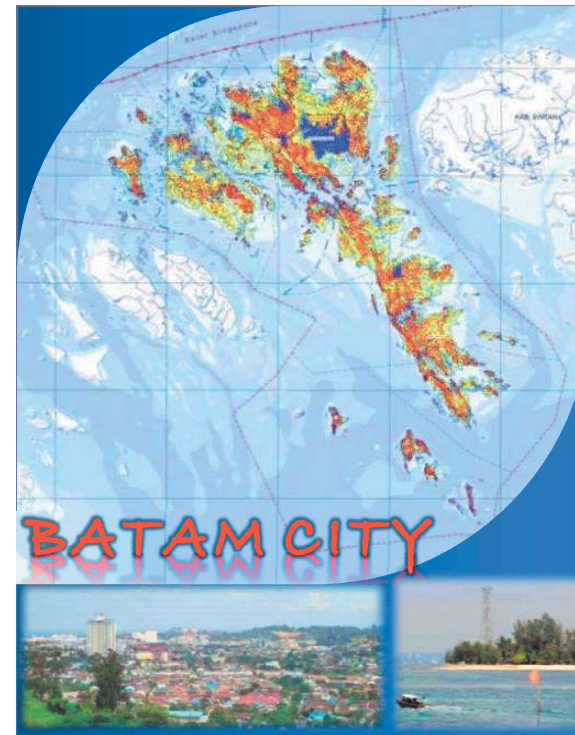
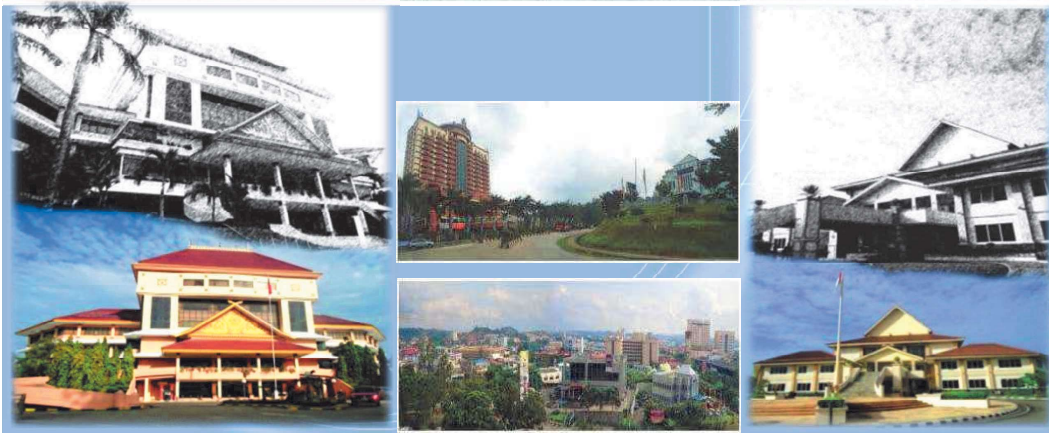
The Master Plan shows a development site with several blocks and infrastructure. The blocks are color-coded: red for existing blocks (Blok A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z), yellow for existing blocks (Blok A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z), blue for existing blocks (Blok A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z), and green for existing blocks (Blok A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z). The site is bounded by a road to the north (ROW 50 M), a road to the east (ROW 50 M), a road to the south (ROW 100 M), and a road to the west (ROW 100 M). The site is divided into several blocks, including Blok A, Blok B, Blok C, Blok D, Blok E, Blok F, Blok G, Blok H, Blok I, Blok J, Blok K, Blok L, Blok M, Blok N, Blok O, Blok P, Blok Q, Blok R, Blok S, Blok T, Blok U, Blok V, Blok W, Blok X, Blok Y, and Blok Z. The site is also divided into several zones, including Blok A, Blok B, Blok C, Blok D, Blok E, Blok F, Blok G, Blok H, Blok I, Blok J, Blok K, Blok L, Blok M, Blok N, Blok O, Blok P, Blok Q, Blok R, Blok S, Blok T, Blok U, Blok V, Blok W, Blok X, Blok Y, and Blok Z. The site is also divided into several zones, including Blok A, Blok B, Blok C, Blok D, Blok E, Blok F, Blok G, Blok H, Blok I, Blok J, Blok K, Blok L, Blok M, Blok N, Blok O, Blok P, Blok Q, Blok R, Blok S, Blok T, Blok U, Blok V, Blok W, Blok X, Blok Y, and Blok Z.



AREA PENGEMBANGAN I



# BATAM CITY LED-STREET LIGHT & GREEN BUILDING



- 12,5** sea miles from Singapore
- 4.265** Km<sup>2</sup> of area  
1.082 Km<sup>2</sup> of land
- 370** islands  
most are small islands  
Environmentally sensitive areas
- 2/3** of the area is design as FTZ
- 1,035** million inhabitants (2015)  
Projected will be 1,3 millions in 2020
- 1,7** million foreign tourists / year  
4 million domestic visitors / year
- 56%** of GDP are from industry  
26 % from trade and services

## VISI PEMBANGUNAN PERKOTAAN NASIONAL

### KOTA BERKELANJUTAN 2050 Kota Berkelanjutan dan Berdayasaing untuk Kesejahteraan Masyarakat



<b>Kota yang aman, nyaman dan layak huni</b>	<b>Kota Hijau yang berkelanjutan iklim dan bencana</b>	<b>Kota berdayasaing berbasis teknologi dan II</b>
Strong Neighbourhoods	Green Openspace	Smart Economy
Walkable	Green Waste	Smart People
Affordable	Green Transportation	Smart Governance
Comfortable	Green Water	Smart Mobility
Cultural	Green Energy	Smart Environment
Connectivity	Green Building	Smart Living

**Membangun IDENTITAS PERKOTAAN INDONESIA**  
berbasis karakter fisik, keunggulan ekonomi, budaya lokal

**Membangun keterkaitan dan manfaat antarkota dan desa-kota dalam SISTEM PERKOTAAN NASIONAL** berbasis kewilayahan

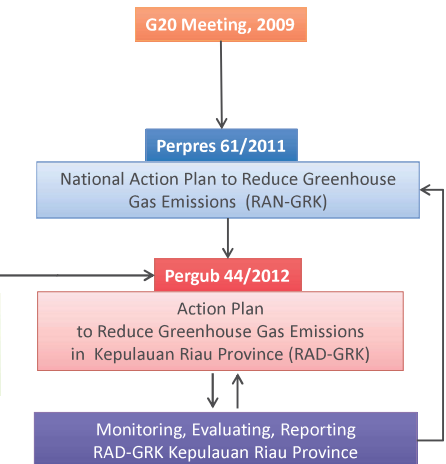
Kebijakan dan Strategi Pembangunan Perkotaan Nasional

## INDONESIA'S COMMITMENT in COP 21 PARIS, on DECEMBER 2015

- Climate change is a strategic and development challenge facing Indonesia.
- Indonesia emits significant levels of GHG and its highly vulnerable to climate change.



**SK Gub 498/2012**  
Establishment of  
Team coordination  
to formulize RAD-GRK in  
Kepulauan Riau Province



A 29% reduction in emissions by 2030 compared to business as usual, and will increase its reduction goal to 41%, conditional on support from international cooperation



## IMPLEMENTATION RAN-GRK

GHG emission reduction in 5 priority sectors :  
Forestry and peatland, agriculture, energy, industry and transport

1<sup>st</sup> phase:  
Preparation to implement by ministries and national agencies

3<sup>rd</sup> phase:  
Change of Indonesia Government and Climate Change became one of issues in National Medium Term Development Plan 2015-2019  
Review of RAN-GRK

5<sup>th</sup> Phase:  
Mechanisms for Monitoring, Evaluating, Reporting of RAN-GRK along with its verification

The Implementation Progress on National Action Plan to Reduce Greenhouse Gas Emissions (RAN-GRK)

2010-2012	2013-2015	2015-2017	2017-2019	2020
	2 <sup>nd</sup> Phase: Implementation of RAN-GRK and Monitoring, Evaluating, Reporting		4 <sup>th</sup> Phase: RAN-GRK start to be verify	5 <sup>th</sup> Phase: achievement of GHG emissions reduction target (26%)



## BATAM TOWARDS GREEN & SMART CITY



Urban Solutions  
MEMBER OF THE RMA GROUP



Additional attributes:

- Green Air
- Green Industry

Figure 2: Indonesia's existing Green City concept (Source: Ministry of Public Works, Indonesia)

## VISION

"Batam a Peaceful, Competitive, Modern, Prosperous and Dignified Worlds City"

1. To promote good governance in Batam
2. To create faithful and competitive local human resource and prosperous society
3. **To build Batam with environment-friendly design, modern infrastructure, and friendly green comfortable designed settlement based on national culture**
4. To strengthen the industrial sector, services, trade, tourism, transshipment, marine and agriculture in supporting local economy
5. To strengthen community-based economy by small, medium entrepreneurship and cooperatives which are synergized with the domestic industry and market
6. To boost the development of hinterland areas to support the economy of Batam

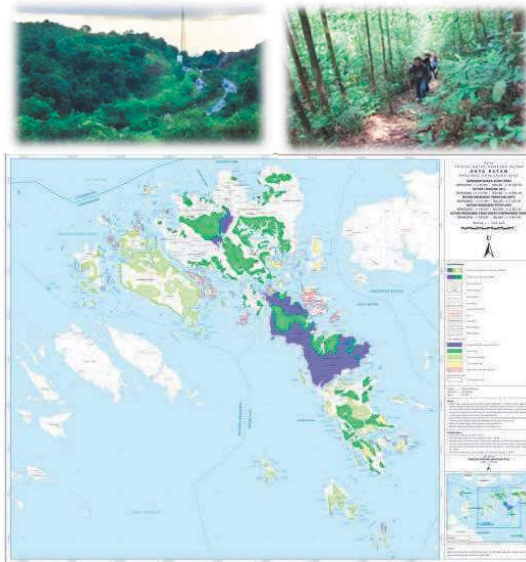


## Strategic Issues 2016-2021

1. Economic growth
2. Education
3. Accessibility of health services
4. Tourism destination
5. Small and medium enterprises
6. Jobs
7. **Sustainable Development**
  - **Contributes on MDGS and Post-2015 Development Agenda**
  - **Development with Smart and green city**
8. MEA (Asean Economic Community)
9. Industry/ Manufacture
10. Science and Technology
11. Maritime

**BATAM CITY'S FOREST AREA**  
Refers to Minister of Forestry  
Decree Number 76/Menhut-  
II/2015

FOREST ZONE	BATAM	
	AREA (Ha)	%
Watershed/ protected forest	20,943.56	20.35
Production forest	2,342.78	2.28
Forest zone can be converted	4,099.81	3.98
Limited Production Forest	9,268.70	9.00
Conservation Forest (TWA)	901.62	0.88
Conservation Forest/TB	10,170.37	9.88
<b>Total</b>	<b>47,726.86</b>	<b>46.37</b>



**PROJECTS HAS BEEN CHOSEN**

	PROJECTS	BATAM GREEN CITY
1	Enhancement of Green Open Space Quality and Quantity	
2	Reduction of Domestic Solid Waste Generation	
3	Enhancement of Water Supply and Wastewater Management Performance	
4	Development, Enhancement and Maintenance/Rehabilitation of Transportation Infrastructure	
5	Development of WWTP to reduce domestic waste	
6	Enhancement of Right of Way (ROW) and Median of Road as Green Open Space	
7	Management and Supervision of Mining, Electricity, Oil-Fuel and Gas	
8	Development, Quality Enhancement and Supervision of Building	
9	<b>Additional Project: Start to Develop LED and Green Building</b>	

**BATAM GREEN CITY: PRIORITIZED PROGRAMS**

Rank	Score	Program No.	Program	Program Attribute
1	6.910	9	Spatial Planning and Control	Green Planning & Design
2	6.585	14	Enhancement of Environmental Degradation and Pollution Control	Green Water & Waste
3	6.473	10	Management of Land Use	Green Planning & Design
4	6.465	15	Enhancement of Environmental Protection and Management Infrastructure	Green Planning & Design, Green Water & Waste
5	6.308	16	Enhancement of Environmental Mangement and Natural Resources Conservation	Green Open Space
6	6.205	12	Development, Maintenance, and Enhancement of Settlement and Housing Infrastructure	Green Planning & Design, Green Building & Community
7	5.839	4	Enhancement of Green Open Space Quality and Quantity	Green Open Space
8	5.828	13	<b>Development, Quality Enhancement and Supervision of Building</b>	<b>Green Building</b>
9	5.690	18	Development, Enhancement and Maintenance/Rehabilitation of Transportation Infrastructure	Green Transportation
10	5.687	8	Enhancement of Water Supply and Wastewater Management Performance	Green Water
11	5.675	19	Enhancement of Community Transportation Service	Green Transportation
12	5.468	11	Management and Supervision of Mining, Electricity, Oil-Fuel and Gas	Green Energy
13	5.425	7	Enhancement of Drainage Network & Flood Control	Green Water
14	5.352	5	Protection of water sources / dams and catchment areas	Green Water
15	5.292	1	Reduction of Domestic Solid Waste Generation	Green Waste
16	5.068	2	Reduction of Industrial Solid Waste Generation	Green Waste
17	5.061	6	Development of WWTP to reduce domestic waste	Green Water
18	4.888	3	Enhancement of Right of Way (ROW) and Median of Road as Green Open Space	Green Open Space
19	4.778	17	Enhancement of Security and Comfortability of Community Environment and Handling of Natural Disaster	Climate Change Mitigation & Adaptation

	SHORT TERM	MEDIUM TERM	LONG TERM
1	<b>GREENARY:</b> -Active Park in Urban Area - Green lane in the main roads	-Active Park in every District - Green lane in secondary roads  -Botanical garden	- Active park in every district and residential - Green lane in all roads and area under the fly over - Botanical Garden, mangrove conservation and study centre
2	<b>TRANSPORTATION:</b> - Walkways and Cycle lane in CBD and main urban area - 6 corridor Semi-BRT	- Walkways and cycle lane in CBD and residential - 10 Corridor Semi-BRT	Walk ways and cycle lane in whole areas -BRT - LRT
3	<b>SOLID WASTE MNAGEMENT</b> -Sanitary landfill - bank sampah (garbage bank)	- Waste to Energy	- Waste to energy
4	<b>WASTE WATER MANAGEMENT</b> - Sludge Treatment Plant	-Sludge Treatment Plant -Batam Centre WWTP	-Sludge Treatment Plant -Batam Centre WWTP - 4 New Zona WWTP (Batu Ampar, Sagulung, Tanjungpiayu, Nongsa)
5	<b>Drinking Water</b> -6 reservoir	-6 reservoir - Operating Tembesi Estuary Dam - Development of Gong Estuary Dam -Developing SWRO in Belakang Padang (Small Island)	-6 reservoir - Operation of Tembesi Estuary Dam - Enhacement of of Gong Estuary Dam and other Dam in Rempang-Galang - SWRO in Belakang Padang and other small island
6	<b>ENERGY:</b> -Gas Power Plant (Panaran) - SPBG (Gas refilling station) natural gas for public transport and government vehicle -Gas pipeline distribution network -Solar Home System	- Gas Power Plant (Panaran and Tanjung Uncang) - SPBG (Gas refilling station natural) for public -Gas pipeline distribution network -Solar Home System	- Gas Power Plant (Panaran and Tanjung Uncang) - SPBG (Gas refilling station) natural gas for public transport and government vehicle -Gas pipeline distribution network -Solar Home System - Waste to energy
7	- Green building (government building)	Green building (government and public building)	Green building (government public building and industry)



## LED Street Light and Green Building

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• LED Street Light<ul style="list-style-type: none"><li>– Clear concept/definition: saving, long life light, environmental friendly technology used, cheap etc..</li><li>– Potential market in Batam &gt;&gt; 300,000 units</li><li>– of those old-new protocol/main street , (public-private: office, hotel, apartment, supermall ) street, house complex and industrial park street etc.</li></ul></li></ul> | <ul style="list-style-type: none"><li>• Green Building<ul style="list-style-type: none"><li>– Clear concept/definition: saving (resources), environmental friendly technology, modern-natural, renewable, material used, cheap etc.... not meaning of “green painting building”</li><li>– of those old-new highrise building (public-private: office, hotel, apartment, supermall), house complex and industrial park etc.c.</li></ul></li></ul> |
|--|--|

## BATAM CITY EXISTING CONDITION

- Existing forest/green space is remained 23% (KLHS-2016)
- It is far a way:
  - Should have been of 46 % (Permen Ministry of Forest)
  - Original Batam city design of 60-70% (Mr. Habibie- former developer)
  - Our neighbor Singapore (City in the Forest/ Forest in the city concept)
- Existing installed capacity of water supply is remained 400 l/s (KLHS-2016) which is enough only for 50% of more than 25 new highrise buildings
- Existing environmental (land, water, air) damage is also reach to critical points
- Existing installed street light using conventional light type and constructed building using big amount of capital investment

## BATAM CITY EFFORTS

- Welcome proposal from any institution/company in introducing of LED Street Light and Green Building:
  - Assessment/FS
  - Concept/model
  - Sharing experiences
  - Field testing equipment
  - Etc.
- For Green Building:
  - Asked the company who is proposed a new building (highrise or cluster/complex/park) during AMDAL (Environmental analysis Document Evaluation) processing:
    - » Save the water by recycling
    - » Save energy by using natural energy as well natural light
    - » Sorting MSW/domestic waste etc.
  - Periodically done of reforest /replant in Batam island by involving of communities

## BATAM NEED for LED STREET LIGHT and GREEN BUILDING

- Assessment of Existing condition of Street Light and Building
- Appropriate Model for LED Street Light and Green Building:
  - Old installed conventional Street Light and constructed Building
  - New street and building
  - Rules as law enforcement
  - Pilot project for both of LED and Green introducing in old and new type of Street Light and Building
  - Etc...



- **BATAM CITY AND YOKOHAMA CITY** concluded a Letter of Intent on technical cooperation for sustainable urban development

Green Electricity and Energy Saving  
leveraged by Renewable Energy Scheme

Environment Countermeasure Program  
(Waste Treatment / Sludge Treatment / Air Pollution Problems etc.)

Disaster Management Program  
(Smart City Infra Development in conjunction with Renewable Energy Scheme)

Urban Traffic Control Scheme

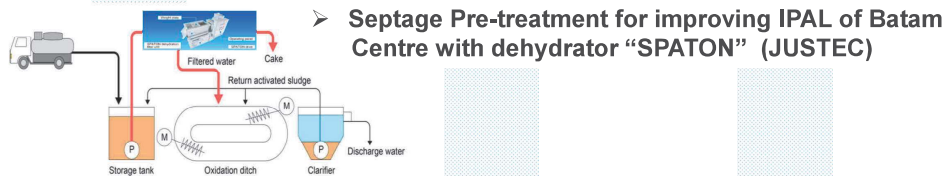


## Smart/Green Infrastructure: (Wastewater)

### Phase approaching Project

#### Generation 1

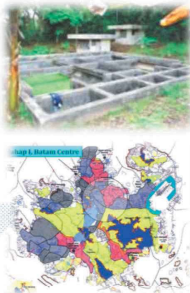
Where we are



#### Generation 2

➤ Improving IPAL of Hang Nadim Airport for Eco-Airport

➤ Expanding to other IPALs



## Smart/Green Infrastructure: (Energy)

### Phase approaching Project



#### Generation 1

Where we are

➤ Energy-saving A/C System Project, supporting Eco-Airport Plan (iFORCOM)



#### Generation 2

➤ Energy-saving Ferry terminal Project



➤ Energy-saving Hospital Project



## Smart/Green Infrastructure: Industry

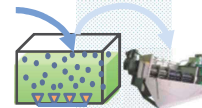
### Phase approaching Project



#### Generation 1:

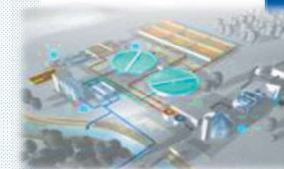
Where we are

➤ Microbubble Flocculation Tank and "Volute" Dewatering Equipment, for PT. Desa Air Cargo (AMCON)



#### Generation 2

➤ High-efficiency Wastewater Treatment Project for Industrial Complexes, such as BATAMINDO, Panbil and Kabil





Phase approaching Project



Generation 1:

- Roof-top PV System with Demand Control Implementation Project (FINETECH)



Generation 2:

- Waste-to-Energy (Edible-oil Refinery) Project (FINETECH)
- PV System with Advanced Demand Control Implementation Project

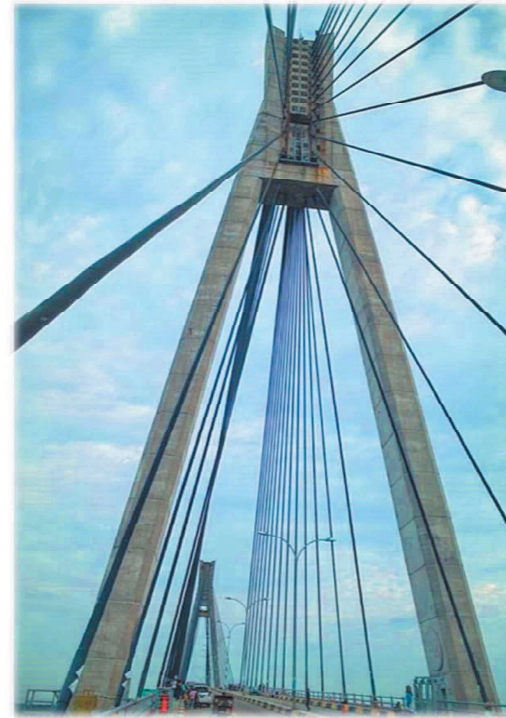


Generation 3:

- Add-on Biomass (Waste)-based Power Generator with Advanced Demand Control Implementation Project



Where we are



THANK YOU

# JCM Feasibility Study Kick-off Meeting “Green Island BATAM” ( Creating Projects for Low-Carbon Technology)

October 10, 2017, Batam, Indonesia



## Going for Green



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## FINETEC: Head Office / Labo / Plant / Subsidy



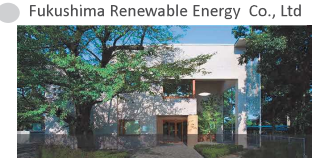
**Head Office (Laboratory: Tokyo Institute of Technology)**  
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**Aizu-wakamatsu Office**  
In FUKUSHIMA Pref.

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## New Business Entity in collaboration with Yokohama City



**Finetech**  
Going for Green  
**FINETECH Co., Ltd**  
as  
the Board Member Company  
of  
**YUSA**  
Under the Y-PORT Initiative

“New Business Entity” established

**Yokohama Urban Solution Alliance**



Wider Scope of  
Global Sustainable Growth Scheme

II

- ADB's Development Fund
- GCF  
(Green Climate Fund)
- GPSC  
(Global Platform for Sustainable City)

- Realize Y-PORT'S Initiative of Yokohama City
- Approach with Smart & Green Technology
- Provide Expertise of Urban Development

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## Smart Green Park (Trademark of FINETECH)



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## Capacity Building Activities : OFFICIAL SITE VISIT By BATAM CITY Government / BIFZA Authorities

FINETECH received the BATAM Delegation  
at the "FINETECH's SMART GREEN PARK"  
in 2015 and 2016



Smart Green Park



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## Green Island BATAM Conceptual Mapping through JCM-FS

Phase 1 / 2015

Phase 2 / 2016

Phase 3 / 2017

- Areas of Critical to Improvement and Development are Identified.
- Project Candidates are defined and shortlisted.
- Projects are consolidated into the created project mapping.



Explore  
Technology Implementation  
Opportunities

- ◆ LED Street Lights
- ◆ LED Industry Areas
- ◆ LED Port Areas
- +
- ◆ Smart Monitoring & Controlling System
- ◆ PV Solar System
- ◆ Other opportunities

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## F/S Project Overview: LED Street Lights

### ➤ Scope of Study to Introduce follows; ➤ Targeted Sites

- Installation of the state-of-the-art **Smart LED Street Lights** manufactured by Japanese Technology, replacing from the existing conventional lights.
- Installation of **Smart Monitoring and Controlling System** to maximize efficiency of LED Street Lights capability in accordance with the surrounding circumstances.



### ➤ Key Features of Technologies

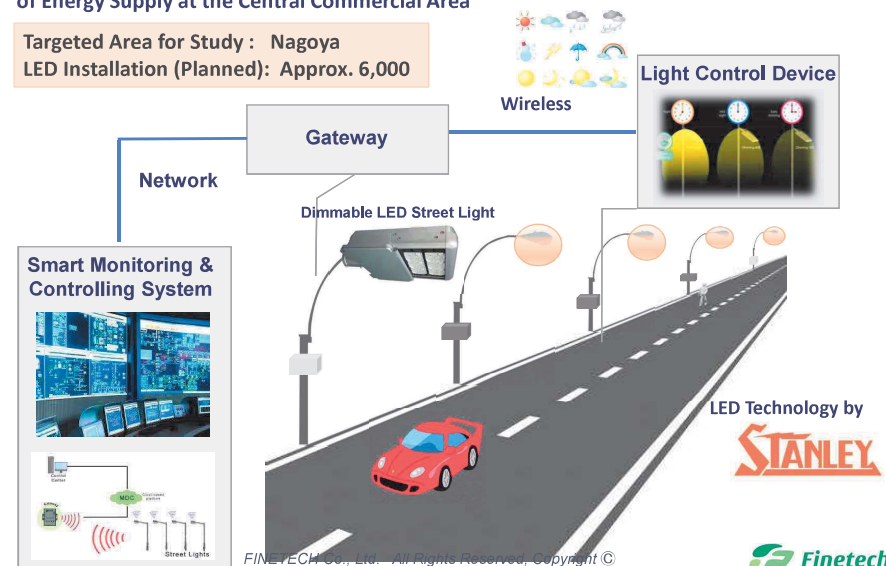
- ◆ **Remote Monitoring Technology** to minimize man-power maintenance for individual street light.
- ◆ **Alarming Function** to detect failures, such as LED lamp damages, cable damages, electric leakage etc.
- ◆ **Various Key Energy Index Measurements** of Illuminance, Voltage Value, Current Value, Energy Consumption Level.
- ◆ **Remote Controlling Technology** to command Dimming and On & Off for Individual LED Street Light.



## LED Street Lights with Smart Monitoring & Controlling System

- LED Street Lights Technologies with Smart Monitoring & Controlling System for Utilization of Energy Supply at the Central Commercial Area

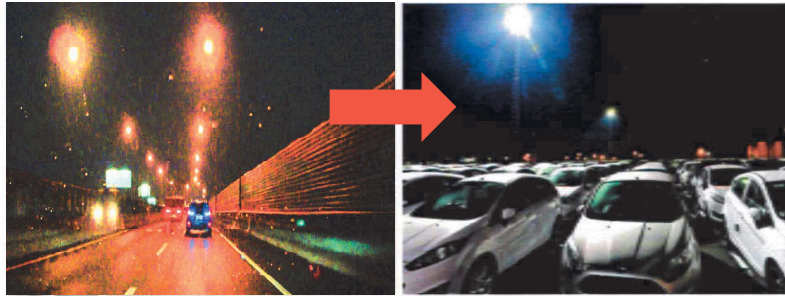
Targeted Area for Study : Nagoya  
LED Installation (Planned): Approx. 6,000



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## Strong Effect of LED Street Lights Installation



- 70% Energy Saving compared with conventional High Pressure Sodium
- Man-power Maintenance Reduction by Smart Monitoring & Controlling
- Further More Energy Consumption Reduction with PV Solar System

**Significant CO2 Emission Reduction / Significant OPEX Cost Reduction**

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## LED Floodlight for Harbor by Stanley Electric Co., Ltd



### ➤ Unique Feature of Stanley's LED floodlights for Port Facility

The world first **ClassNK** certified LED for Port Facilities!!



Koichi Fujiwara, Chairman and President, ClassNK;  
Masahiro Sagae Executive Officer,  
Executive General Manager Lighting  
Application Division, Stanley Electric

The impetus behind the development of Type Certification of LED floodlights for Port Facilities was two-fold ; aiding the further development of innovative technologies in order to provide the maritime industry with eco-efficient solutions, while ensuring the safety of any new projects. Based on its extensive experience in certifying products, materials and equipment for marine use, these guidelines set out the high levels of durability and safety essential for LED floodlights.

### ➤ Product



**Dimensions**  
485mm x 481mm x 262mm  
**Power Consumption**  
340W  
**Luminous flux**  
39,000lm  
**Luminous efficacy**  
111lm/W

### ➤ Installed Example



**Destination**  
Belgium  
**Terminal type**  
RORO Terminal  
**Start-up date**  
November 2016  
**LED lightings numbers**  
120 pcs

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## Image of LED Floodlight for Harbor in Batam



### ➤ Installation for Batam Port



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## APPENDIX



## APPENDIX

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## Green Island BATAM Conceptual Mapping



Where we are..

Phase 1 / 2015

Phase 2 / 2016

Phase 3 / 2017

- Areas of Critical to Improvement and Development are Identified.
- Project Candidates are defined and shortlisted.
- Projects are consolidated into the created project mapping.

Green Transportation

Green Building

Green Industry

Green Waste

Green Water

Green Planning



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Explore Technology Implementation Opportunities

◆ Spent Bleaching Earth Safety Treatment for Palm Oil Manufacturing



Reuse & Resale and Safety Disposal

Finetech  
Going for Green

FINETECH



## For Safety Disposal of Spent Bleaching Earth



- For safety Disposal of Spent Bleaching Earth at the Palm Oil factory, we will collaborate with manufactures and transporters to find out solution in comply with B3 Hazardous Waste Management

- Under the strict operation of B3 management, FINETECH will try to find out opportunities of Waste-to-Material Technology Implementation, focusing on Spent Bleaching Earth emitted from Palm Oil Refinery Factories.

Palm Oil Manufacturing Factory in BATAM



Spent Bleaching Earth



- Applying our technology of the "Super-heated Steam" to Spent Bleaching Earth with high oil content, oil essences could be separated and recovered for safety disposal of Spent Bleaching earth waste.



Waste Recovering Machine by Super-heated Technology



Recovered Oil



Safe Disposal

Going for Green

*the way we work...*

[www.finetech.co.jp](http://www.finetech.co.jp)



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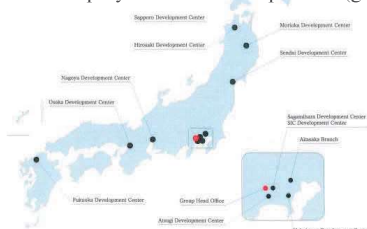
Finetech  
Going for Green



## ① Company Profile

### 1.1 Company Name

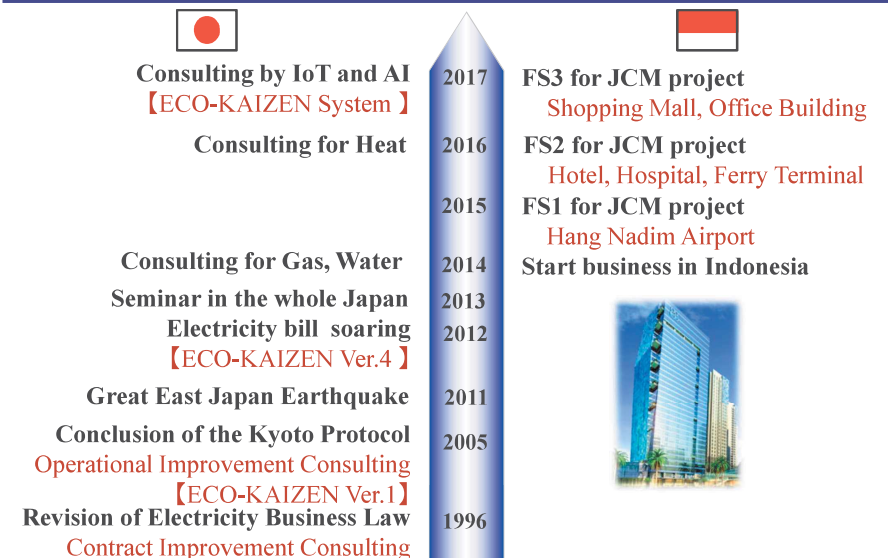
- Company name iFORCOM Co.,Ltd
- Address Kagawa building, 1326 Nakano, Midori-ku, Sagamihara-shi, Kanagawa 252-0157, Japan
- Telephone +81-42-784-5700
- Fax +81-42-784-5540
- Establishment October 1985
- Representative Hiroshi Kagawa (Representative director)
- Capital ¥100,000,000
- Employees 350 persons (group whole)



## Agenda

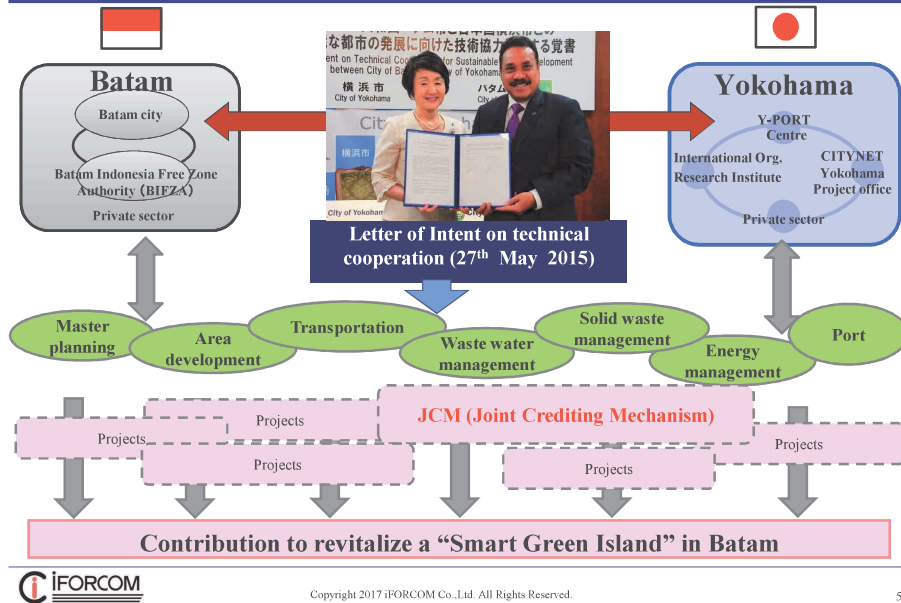
- ① **Company Profile**
  - 1.1 Company Name
  - 1.2 History
- ② **City to City Collaboration**
- ③ **JCM Project**
  - 3.1 Scheme
  - 3.2 Feasibility Study (FS)
- ④ **Our Solutions**
  - 4.1 Definition
  - 4.2 Monitoring System
  - 4.3 Equipment Improvement
  - 4.4 Operational Improvement
  - 4.5 Track Record
- ⑤ **Schedule**
- ⑥ **Project Map**

## 1.2 History



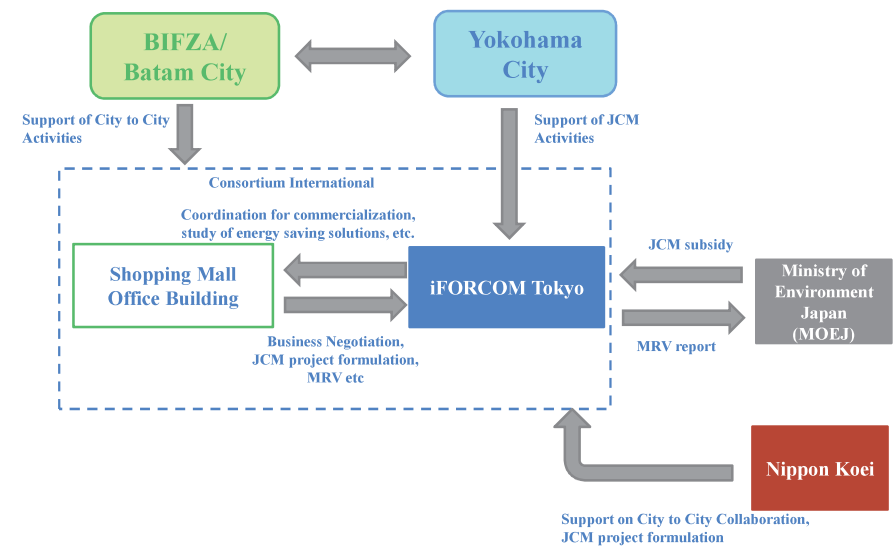


## ② City to City Collaboration



## ③ JCM Project

### 3.1 Scheme



## 3.2 Feasibility Study (FS)

### FS 1 2015

- Energy-saving A/C System Project, supporting Eco-Airport Plan



JCM project application ⇒ adopted

It is canceled because there is a plan to expand the airport.

### FS 2 2016

- Energy-saving Ferry terminal Project
- Energy-saving Hospital Project
- Energy-saving Hotel Project



JCM project application

It does not continue to JCM project because the scale is small.

### FS 3 2017

- Green Building for Shopping mall, Office Building



It is expected to be a JCM project.

## ④ Our Solutions

### 4.1 Definition

#### ① Monitoring System

To set up equipment for monitoring the electricity usage.

#### ② Equipment Improvement

It established the inverter to the pump (motor) that comes with chiller, cooling water pumps, cold water pumps, AHU to control the output.

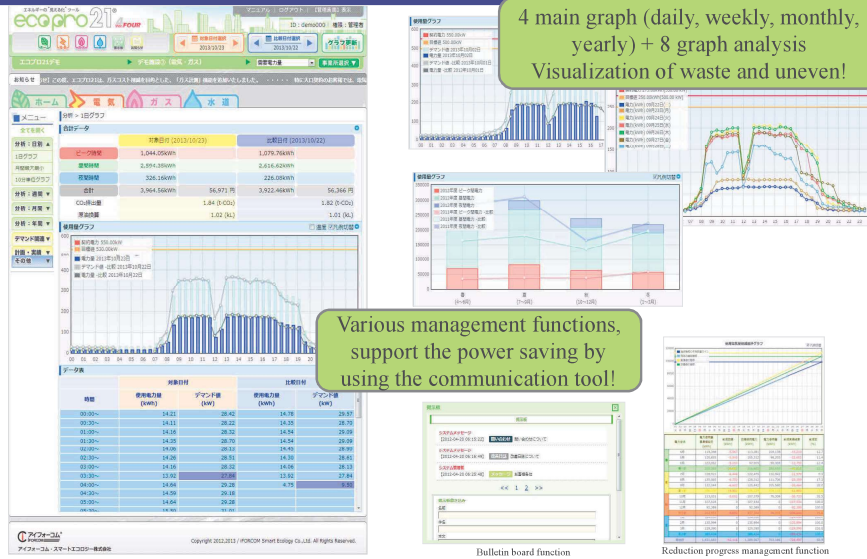
Check the operational status, it can also be carried schedule operation.

#### ③ Operational Improvement

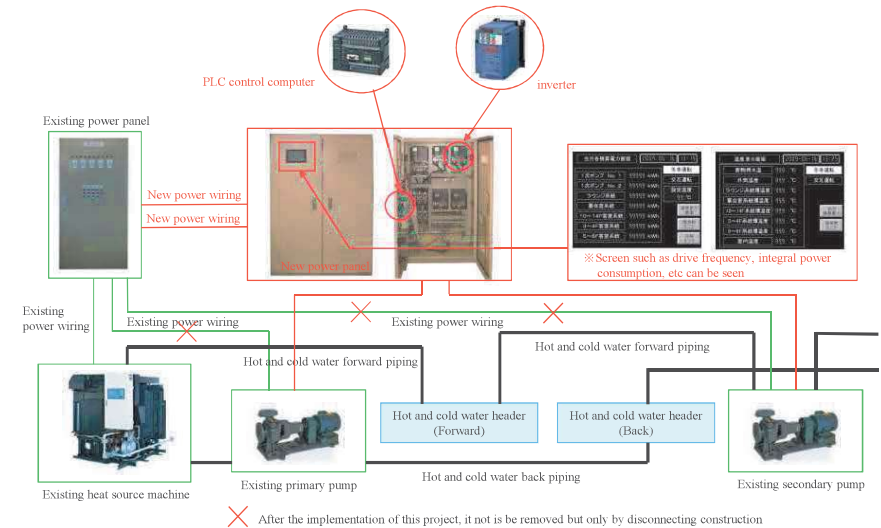
Check the usage of existing facilities, and by optimizing the operation method to reduce power consumption and achieve energy saving, saving CO2.

- Investigation in detail for the usage of office equipment, air conditioning (air conditioning related such as chiller, air handling units)
- Research and analysis for the optimal use development
- Rules formulated on how to use, documenting

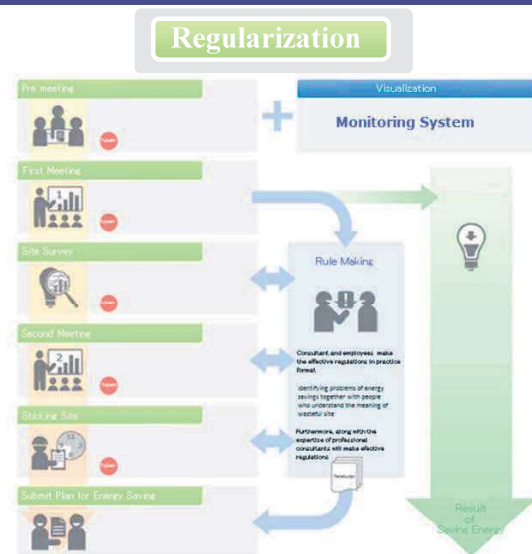
## 4.2 Monitoring System



## 4.3 Equipment Improvement



## 4.4 Operational Improvement

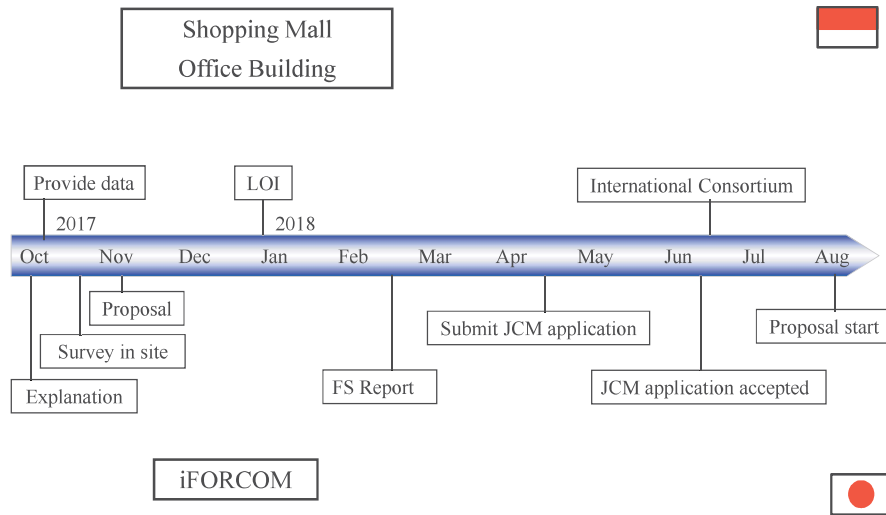


## 4.4 Track Record

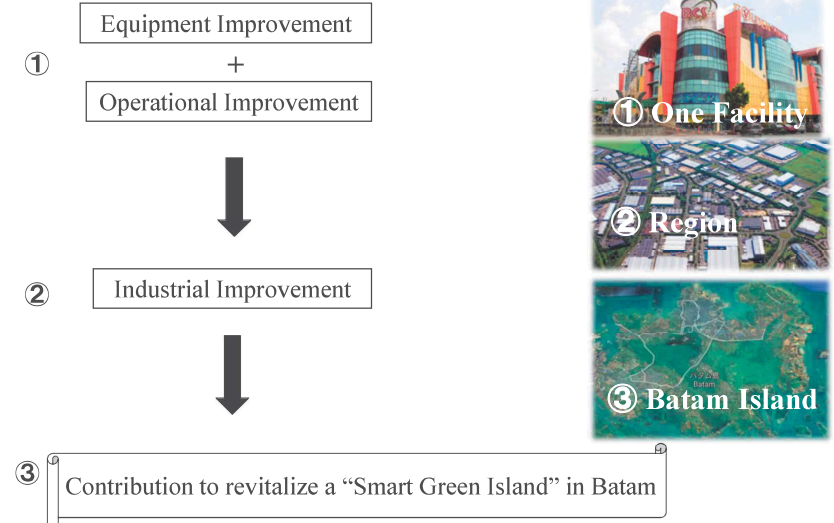




## ⑤ Schedule



## ⑥ Project Map



*Thanks for listening*



# Green Building solution

**AGC**

Asahi Glass Co., Ltd.

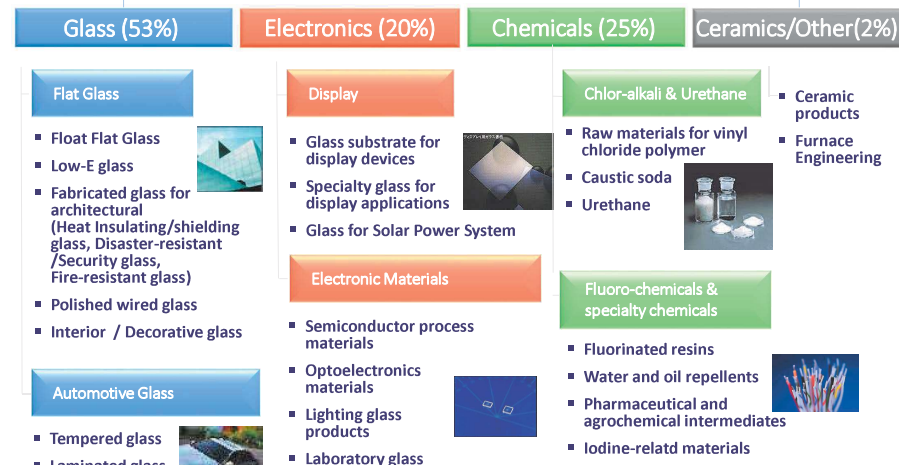
**AGC**

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## AGC Group Business Overview

Confidential

**AGC Group** (Net sales JPY 1,2826 billion (FY2016))



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Confidential  
Results of FY2016

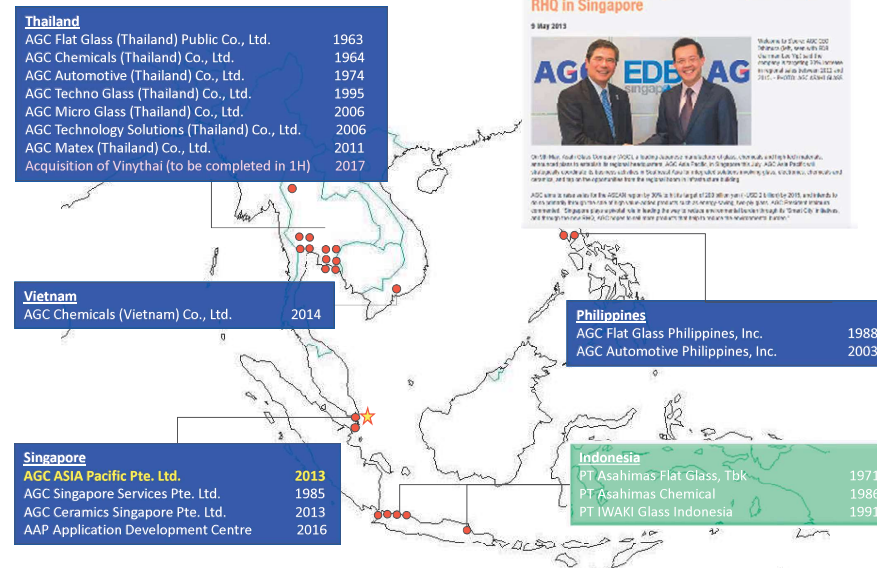
## AGC Affiliates in 30 Countries; Group Employees: ~ 51,000



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※ Consolidated subsidiaries

## AGC Development in South East Asia Since 1963



Asahi Glass Company announces plan to open RHQ in Singapore

9 May 2013



On 9 May 2013, Asahi Glass Company (AGC) announced its plan to establish a new headquarters (RHQ) in Singapore. The RHQ will be responsible for managing AGC's business in Southeast Asia, including Thailand, Vietnam, Philippines, and Indonesia. The RHQ will also be responsible for managing AGC's business in the Asia-Pacific region, including Japan, China, and Korea. The RHQ will be established in Singapore in 2013, and will be responsible for managing AGC's business in the Asia-Pacific region, including Japan, China, and Korea.



## AGC Business Domains & Market Segments



3 Business Domains are categorized into 10 market segments. AGC develop products by bringing together the technologies that AGC has cultivated since its establishment in 1907



AGC, an everyday essential part of our world

## AGC Glass Products



## AGC Solutions for Green Building & Construction

**Eco Glass**

The products with various functions such as thermal insulation, energy saving, disaster prevention, and sound insulation.

**Lightweight solar cell module (Leoflex)**

AGC has considerably reduced the weight of solar cell modules, which enhances flexibility in the installation sites and sizes of the solar cells.

**GPV (Glass Integrated PV) (SUNJOULE)**

Solar cell module for receiving sunlight on its single or both surfaces. It can be also used not only a PV cell module, also a fence and a sound barrier.

**Light weight Mounting System for Solar Module (Plalloy™)**

AGC's original FRP Plalloy is used as the light weight, highly durable frame of a solar module. Its specific gravity is 72% of that of aluminum, and 24% of that of iron.

**High durable Fluoropolymer Film**

ETFE is a thermo plastic fluoropolymer. While maintaining chemical resistance, electrical / mechanical characteristics and high moldability, ETFE is a film material that is lightweight and has high design-flexibility and light transmittance.

**Fluoropolymer for Coatings (Lumiflon)**

This material protects buildings and bridges without fading for a long time. Repairing is unnecessary for more than 30 years. This material is used for a landmark construction all over the world.

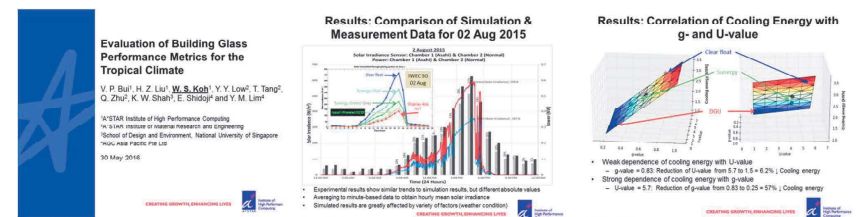
**Polyurethane Raw Materials for Insulation (Polyether Polyol: PPG)**

PPGs are used for various insulation products as a raw materials. It contribute for high insulation and light weight.

## AGC Low-E glass



This Low-E double glazing glass is coated with a special metallic film to reduce thermal emissivity. It blocks the inflow of solar radiation heat, thus increasing cooling efficiency, and blocks the outflow of heater radiation heat during the winter, thus increasing heating efficiency. AGC has a range of soft coated and hard coated glasses with varied properties.





## AGC Low-E glass

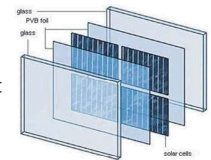


## AGC Glass Integrated Photovoltaics – Sunjoule, Sudare

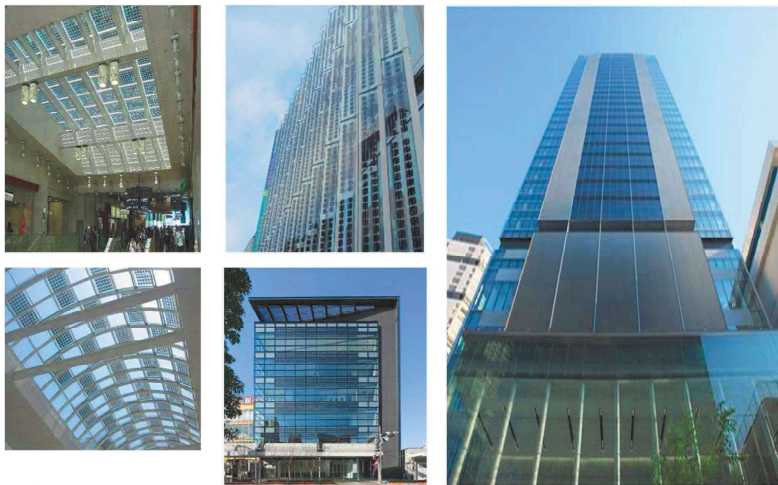


Sunjoule is a laminated safety glass building material with embedded solar cells. The shape and size of each module can be customized to match creative architectural designs. The thickness of the glass can also be customized accordingly to meet wind load pressures, making it suitable for Building Integrated Applications.

Utilizing AGC's coated glass technology, Sunjoule is now available with Low-E coating and can be laminated or double glazed, offering energy efficient glass modules that can harvest clean and green solar renewable energy.



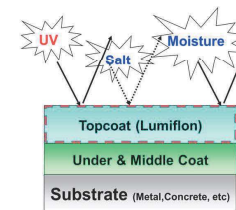
## AGC Glass Integrated Photovoltaics – Sunjoule, Sudare



Harvest Energy, through use of GIPV

## AGC Heat Reflective Paint – Bonnflon (Lumiflon based coating)

Bonnflon™ Sunbarrier, is a solar-heat-reflective fluorinated-resin-based paint which is a combination of pigments that reflect infrared rays and a fluorinated resin coating. Bonnflon™ Sunbarrier, has a high reflectance rate of infrared rays. This prevents the heat from penetrating the building.



Lumiflon coating  
⇒ long lasting in harsh environment



Bonnflon™ Sunbarrier was used for the Aoyama Gakuin Memorial Hall, a university gymnasium built by Obayashi Corporation

- Bonnflon™ Sunbarrier reflects four times more solar heat than a normal fluorinated resin based paint of the same colour.
- The surface temperature of sections of a building rooftop painted with Bonnflon™ Sunbarrier were 12 degrees Celsius lower than unpainted sections.





## AGC Lumiflon based Coating on Aluminium / ACP

 <b>Jotun Powder Coating</b> <b>"Corro-Coat Durasol"</b>  (Indonesia)	 <b>Mitsubishi Plastics</b> <b>"Alpolic"</b>  (Singapore) (UAE)	 <b>Dulux Powder Coating</b> <b>"Fluoraset FP"</b>  (Israel)	 <b>Interpon Akzo Powder Coatings</b> <b>"Interpon D-3000"</b>  (UAE)
<b>World Trade Center II</b>  (Location: Jakarta, Indonesia) <b>Green Mark "Gold"</b>	<b>Bahrain World Trade Center</b>  (Location: Manama, Bahrain) <b>LEED "Platinum"</b>	<b>Deolitte Center</b>  (Location: Auckland, New Zealand) <b>Green Star "5-Star"</b>	<b>Pearl River Tower</b>  (Location: Guangzhou, China) <b>Low Energy Building</b>



## AGC Flexible Façade Solution - ETFE Film



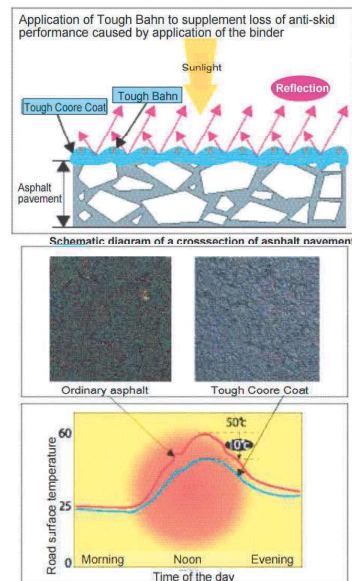
- 2 layered Cushion for Façade
- Clear / Printed Film available
- LED Illumination that can change colour by electrical control
- Chemical resistance
- Easy to Clean
- Printable
- Proven reliability



## AGC Heat shielding pavement material Tough Bahn



"Tough Coore®" is a ceramic product for heat-shielding road-surface. It consists of very hard pigments of alumina-zirconia eutectics combined with heat-shielding binder for application on road surface. "Tough Bahn®", colored aggregate, developed to prevent slippage of vehicles on the road and make the division of lanes clear, is also widely used.



### Product Sustainability

Industry certification is an important benchmarking tool, ensuring that the performance of AGC's products commensurate with both local and global standards. Over the years, the AGC group has amassed many forms of certification for its products and manufacturing standards

2017 Singapore BCA - SGBC Sustainability Leadership Award in Green Building Product Category.



In Singapore, AGC was the first glass manufacturer to pursue the SGBPLS certification. At the moment, 8 different glazing products are certified.



The Cradle to Cradle Certified™ products program is an approach which aims to evaluate a product's overall sustainability across its entire life cycle. It expands the definition of design quality to include positive effects on economic, ecological and social health. Eight AGC product ranges have been awarded C2C certification: float glass, magnetron-coated glass, glossy painted glass, matt painted glass, acid-etched glass, mirrors, laminated glass and insulating glass.



VOC Label for interior glass under the new French Law N° 2011-321 of March 23rd 2011



## Green Buildings

AGC award-winning Green building.

The AGC Glass Headquarters building has been certified "Excellent" by the Building Research Establishment Environmental Assessment Methodology (BREEAM).

AGC Asia Pacific pursued Green Mark Gold plus for its premises, when it moved to a new office.



AGC is also the **regional partner** of the Asia Pacific regional network of the **World Green Building council**.



# Thank You

Embrace Change for Better Tomorrow

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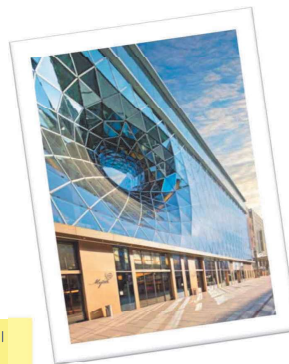


$$OTTV = \alpha((1-WWR)*U_w)*T_{Deq}) + (WWR*U_f*\Delta T) + (WWR*SC*CF)$$

Building Type : Commercial  
Floor area : 20,000 sqmt

- ☐  $\alpha = 0.89$  (assumption of red bricks)
- ☐ WWR (Window to Wall Ratio) = 0.44
- ☐ U Wall = 2.11 w/m<sup>2</sup>.K (wall spandrel system)
- ☐ T<sub>Deq</sub> = 10 K
- ☐ U Fenestration = U Value glass (by assumption, actual value)
- ☐  $\Delta T$  = Temperature difference between outdoor and indoor = 5K
- ☐ SC = Shading coefficient of glass (actual value)
- ☐ CF = Solar correction factor (average value, 147 w/m<sup>2</sup>)

Note : The above calculation is a rough estimation for simulation purposes. In actual situation, there are more factors that will affect the calculation. Example, building orientation, window frame performance, etc. Please contact your M&E consultant to provide a better simulation.





## Outline of The Presentation



Brief Concept of JCM

JCM Financing Scheme

JCM Project Implementation

City-to-City Cooperation



2

## Joint Crediting Mechanism (JCM)



The Joint Crediting Mechanism as a G-to-G scheme which encourages private sector organizations to invest in Low Carbon Development activities in Indonesia through incentive from the Government of Japan.

JCM Cooperation between Government Indonesia and Japan was signed in 2013

Indonesia JCM Secretariat was established in 2014

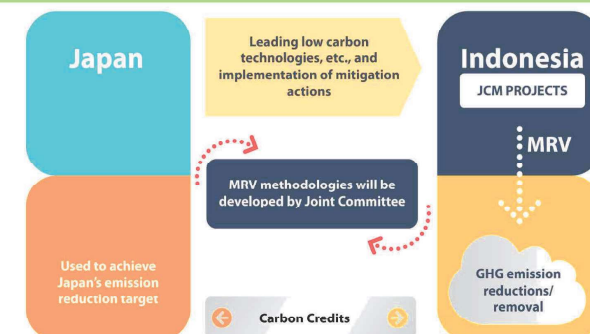
In 2016, the first JCM credit was issued in Indonesia and in the world

JCM cooperation is not only conducted by Japan and Indonesia, but also with other 17 developing countries.



3

## Basic Concept of JCM

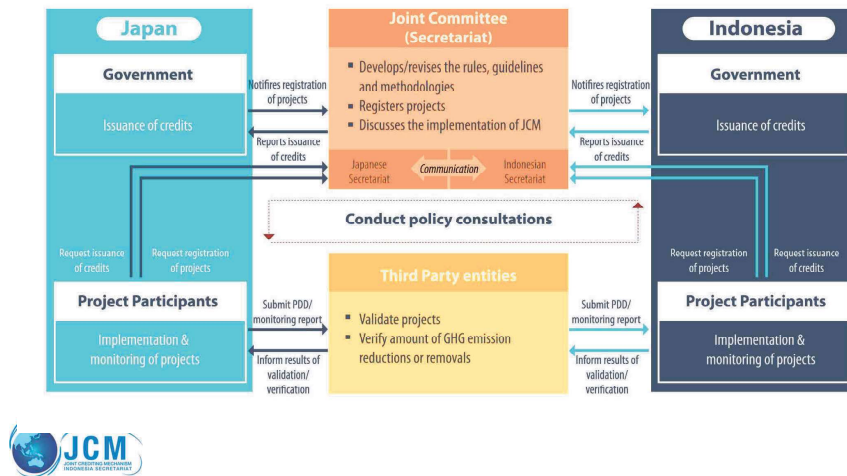


### The Objective of JCM

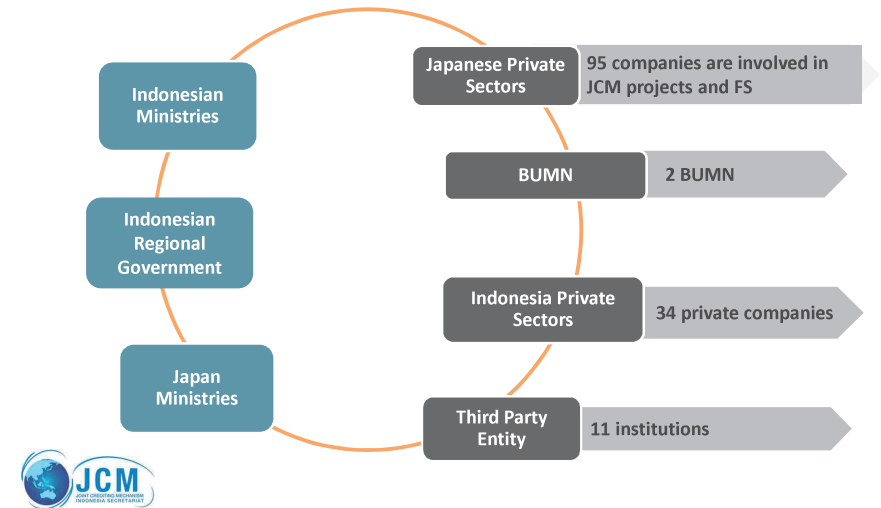
- Facilitate diffusion of leading low carbon technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to sustainable development of developing countries.
- Evaluate contributions to GHG emission reductions/removals from developed countries in a quantitative manner, through mitigation actions implemented in developing countries and use those emission reductions or removals to achieve emission reduction targets of the developed countries.
- Contribute to the ultimate objective of the UNFCCC by facilitating global actions for emission reductions or removals



## The JCM Cooperation Scheme

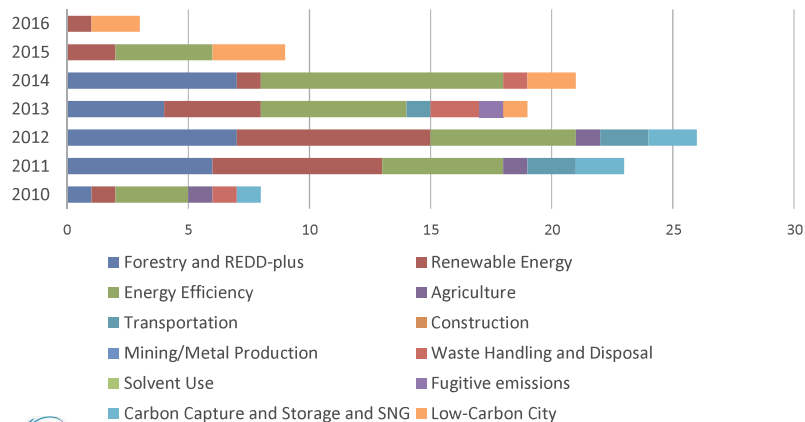


## Institutions Related with JCM



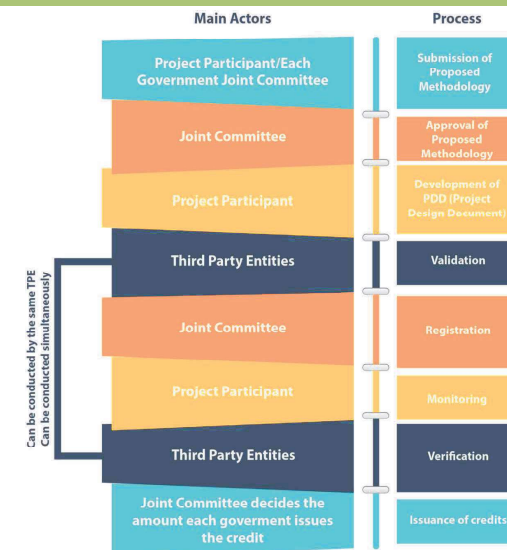
## Feasibility Study

Feasibility Studies Conducted (2010-2016)



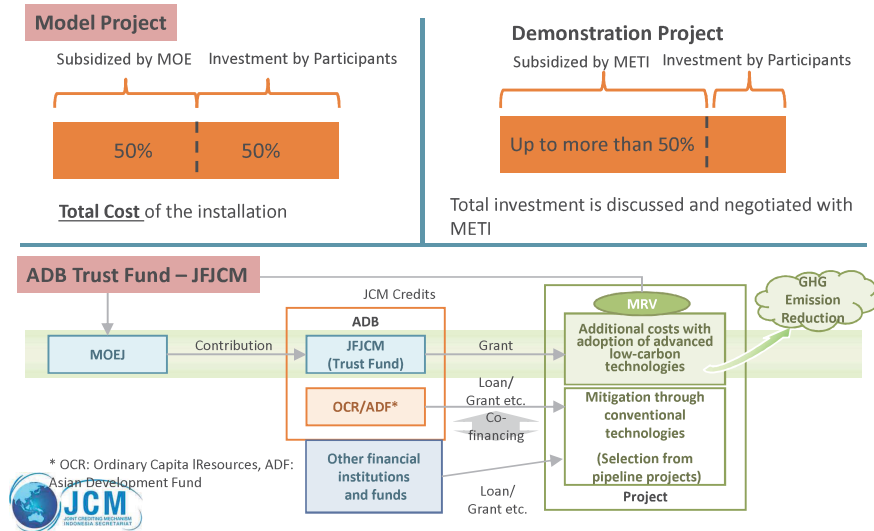
\*Per 2016, 112 feasibility studies have been conducted;

## JCM Project Cycle

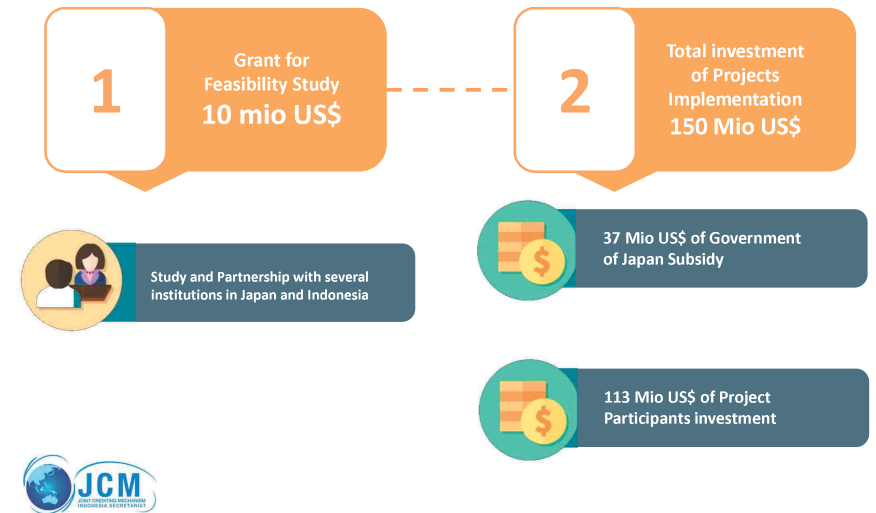




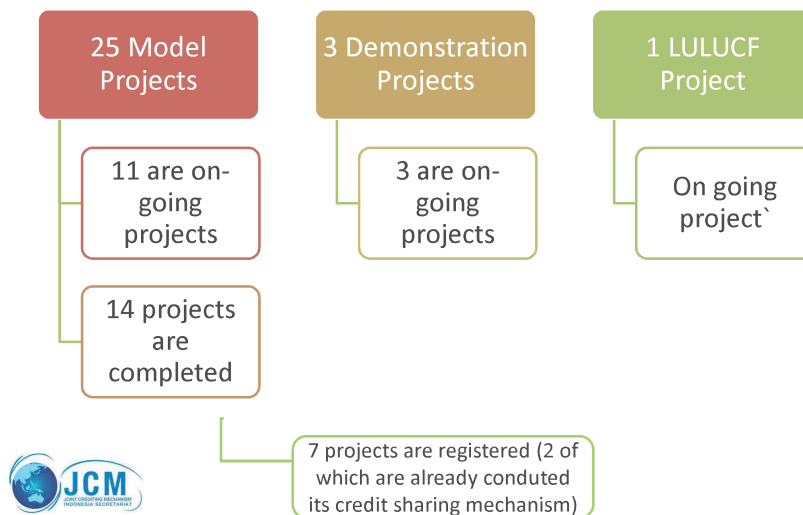
## Financing Scheme



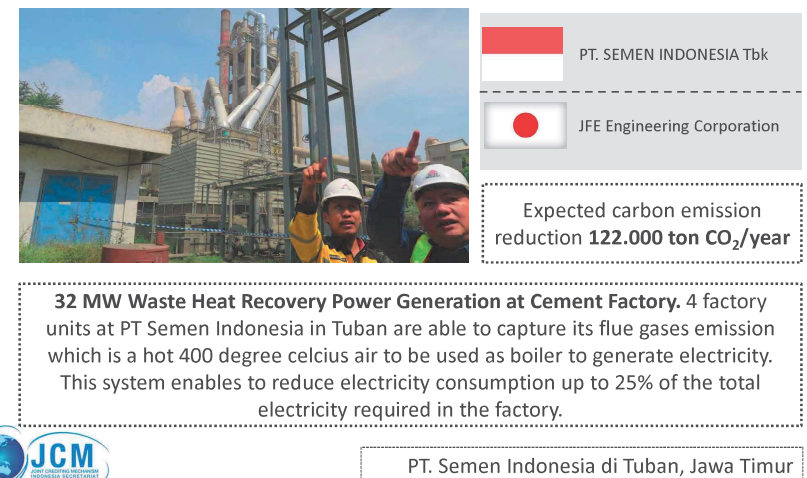
## Total Investment of JCM Implementation in Indonesia



## JCM Projects in Indonesia



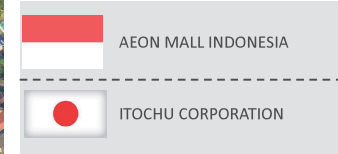
## Power Generation by Waste-heat Recovery in Cement Factory



## Power Generation by Waste-heat Recovery in Cement Factory



## Installation of Solar Power System and Storage Battery to Commercial Facilities



Expected carbon emission reduction **549 ton CO<sub>2</sub>/year**

**500 KW Installation of Solar Power System and Storage Battery to Commercial Factory.** The recently-operated Rooftop Solar Power generates 500 KW electricity for lighting system in shopping center.

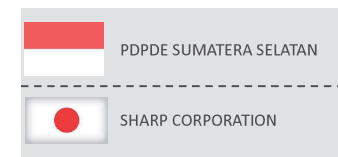


Aeon Mall, Jakarta Garden City, Cakung Jakarta Timur

## Installation of Solar Power System and Storage Battery to Commercial Facilities



## Solar PV Power Plant Project in Jakabaring Sport City



Expected Carbon Emission Reduction **1.303 ton CO<sub>2</sub>/year**

This solar power installed in Jakabaring sport center is able to generate electricity of 1.6 MW. This project is prepared for the electricity supply in Asian Games 2018 and promotes green sport event in South Sumatera. The project is expected to be completed in January 2018.





Stadion Jakabaring, Palembang South Sumatera



## Installation of Gas Co-generation System for Automobile Manufacturing Plant



	PT. TOYOTA MOTOR MANUFACTURING INDONESIA
	TOYOTA TSUHO CORPORATION

Expected Carbon Emission  
reduction **20.310 ton CO<sub>2</sub>/year**

**8 MW cogeneration system** at PT. Toyota Motor Indonesia.  
This cogeneration system is able to deliver 30% of the total factory electricity demand and also replaces the needs of utilising the other two boilers.



PT. Toyota Mobile Manufacturing Indonesia, Karawang Jawa Barat

## Installation of Gas Co-generation System for Automobile Manufacturing Plant





## Installation of Gas Co-generation System for Automobile Manufacturing Plant



PT. Toyota Mobile Manufacturing Indonesia, Karawang Jawa Barat

## Energy Saving for Air-Conditioning at Shopping Mall with High Efficiency Centrifugal Chiller



	PT. PAKUWON JATI,Tbk
	NTT FACILITIES,INC

Expected carbon emission  
reduction **966 ton CO<sub>2</sub>/year**

NTT Facilities dan PT. Pakuwon Jati Tbk, worked together to implement a highly efficient chiller (*centrifugal chiller*). This chiller is able to reduce electricity usage of 1.136 MW/year. This chiller is utilised for the shopping center air-conditioner operational usage.



Mall Tunjungan Plaza Surabaya Jawa Timur

## Energy Saving for Air-Conditioning at Shopping Mall with High Efficiency Centrifugal Chiller



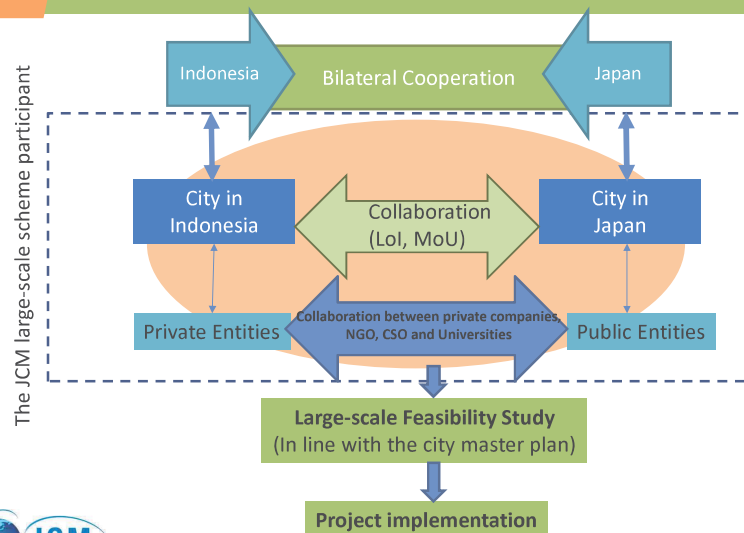
Mall Tunjungan Plaza Surabaya Jawa Timur

## Energy Saving for Air-Conditioning at Shopping Mall with High Efficiency Centrifugal Chiller

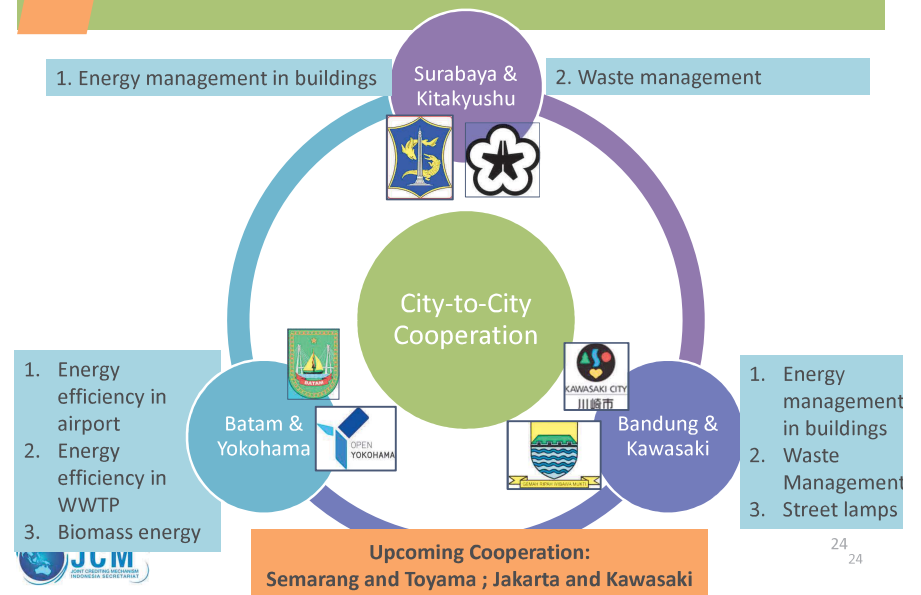


Mall Tunjungan Plaza Surabaya Jawa Timur

## JCM City-to-City Scheme



## City-to City Cooperation





## City-to City Cooperation

### Semarang and Toyama Upcoming Studies

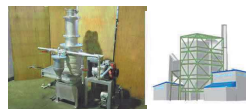
- The upcoming studies are going to be implemented in Semarang. These studies focus on these scope such as:

#### Transportation



Conversion of existing BRT to CNG fuel bus

#### Renewable Energy



Biomass, Small Hydro, and Solar PV Power Generation

#### Energy Efficiency



Air-Conditioning; Co-Generation; Boiler



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**Thank you! Terima kasih!**

Our website: <http://jcm.ekon.go.id>

Contact us at [secretariat@jcmindonesia.com](mailto:secretariat@jcmindonesia.com)

Sekretariat JCM Indonesia

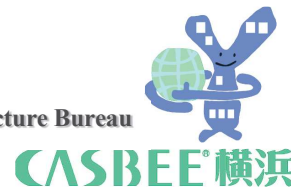
Gedung Kementerian Koordinator Bidang Perekonomian Lt.2  
Jl. Medan Merdeka Barat 7, Jakarta 10110



Jan 25<sup>th</sup>, 2018

# CASBEE YOKOHAMA Comprehensive Assessment System for Built Environment Efficiency

Ms. Akiko MASAKI  
Director for Building and Environment Coordination  
Building Instruction Department, Housing and Architecture Bureau



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### 1 Introduction

- ① Background of the development of CASBEE Yokohama
- ② Objectives of promoting green building regulation
- ③ Setting of targeted building for reporting system

### 2 CASBEE Yokohama

- ① Reporting system
- ② Assessment system 'CASBEE Yokohama'
- ③ Publication of assessment results
- ④ Indication of built environment performance
- ⑤ Certification system and examples



2



### 1. Introduction

#### <Background of the development of CASBEE Yokohama (2005)>

- ◆ Emission from buildings (heat, GHG, water, noise & vibration etc.) from construction to demolition is a burden on the environment of vicinity, city and whole world.
- ◆ In order to secure comfortable living environment for citizen, it is necessary to consider environmental impacts of large scale buildings
- ◆ Enforcement of Kyoto Protocol

※2002 June Ratification of Kyoto Protocol  
2005 Feb Entry into force of Kyoto Protocol

To mitigate environmental burden, the regulation launched in on April 2005



### 1. Introduction

#### <Objectives>

- ◆ Mitigating energy consumption and environmental burden from buildings
- ◆ Promoting dissemination of buildings with low environmental burden, high environmental quality and long operating life
- ◆ Promoting activities for green city and landscape
- ◆ Promoting development and dissemination of technology for environment-conscious building
- ◆ Promoting understanding of environment-conscious building performance

Promoting efforts with CASBEE Yokohama for environment-conscious building



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## <Setting the building size to be reported>

### ◆ At first (2005)

New buildings with total floor area of 5,000 m<sup>2</sup> or more are mandatorily reported

### ◆ Currently

- Mandatory reporting for building with total floor area of over 2,000 m<sup>2</sup> (since 2010)
- Voluntary reporting system for buildings with total floor area of less than 2,000 m<sup>2</sup> (since 2012)

◆ Mitigating environmental loads of each building by considering built environment efficiency at the designing phase

## <① Reporting system>

◆ The number of voluntary reporting is increasing

◆ The rate of A rank is increasing

Size	(Total) 2005~2016	Rank		Rate
2,000m <sup>2</sup> ≥ (Mandatory)	1471	S	Excellent ★★★★★	3.0%
		A	Very good ★★★★★☆	43.3%
2,000m <sup>2</sup> < (Voluntary)	410	B	Good ★★★★☆	34.7%
		+		
Total	1881	B-	Fairly poor ★★★☆☆	18.6%
		C	Poor ★☆☆☆☆	0.4%

81%

## Owner

Preparation of a built environmental efficiency plan and notification of the plan to the city

## City

Publication of the assessment result of the built environment efficiency plan and the outline of architectural planning through the Internet



**Promotion of the development of buildings with high comprehensive environmental efficiency**

◆ Operation of reporting and certification systems

## <Incentive to obtain high rank in CASBEE Yokohama>

◆ Requires A rank and higher with corresponding other regulations

- Approval of floor area ratio
- Approval of re-development
- Subsidy

◆ Incentive to housing loan

Collaborates with financial institutions (6 institutions) which agree with the purpose of this system

→ A or S (5 institutions), B+ or above (1 institution) of the evaluation of detached house or condominiums

◆ (Some house builder builds only houses with A or above in CASBEE Yokohama)



## 2-① Reporting System



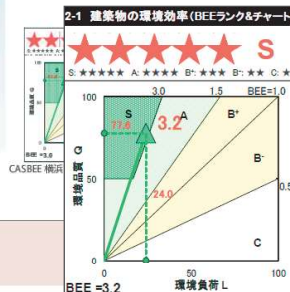
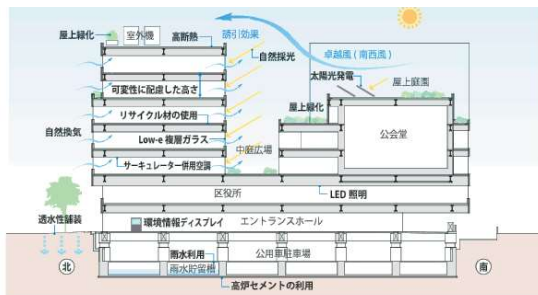
### <Setting the environment conscious standard for local government buildings in Yokohama>

A or S for buildings with over 300m<sup>2</sup>, S for buildings with over 10,000 m<sup>2</sup>

Minami Ward Consolidated office

#### Energy efficient and environment-conscious consolidated office

- Circulator air conditioning system
- Geo-thermal heat system
- Environmental Information display



## 2-② Assessment system



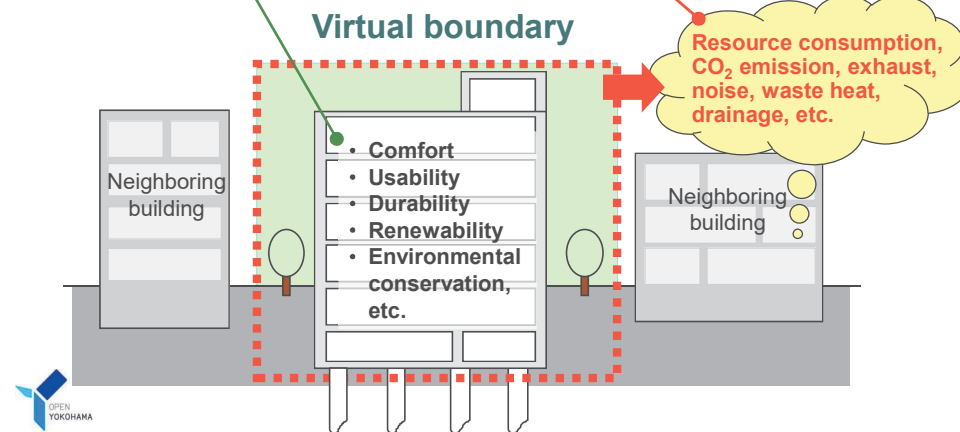
### <Qualities and Loads>

#### Inside a boundary

Efficiency is assessed by environmental qualities in a building.

#### Outside a boundary

Efficiency is assessed by external environmental loads of a building.



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## 2-② Assessment system



### <Reconstruction of 4 categories into Qualities and Loads>

4 major categories (comprise about 80 subcategories)

- (1) Energy consumption
- (2) Resource cycling
- (3) Regional environment
- (4) Indoor environment

Reconstruction of the categories into Qualities and Loads

Q1: Indoor environment  
Q2: Service performance  
Q3: Outdoor environment (inside premises)

Q: Environmental qualities of a building

L1: Energy  
L2: Resources and materials  
L3: Environment outside premises

L: Environmental loads of a building

BEE

Built Environment Efficiency

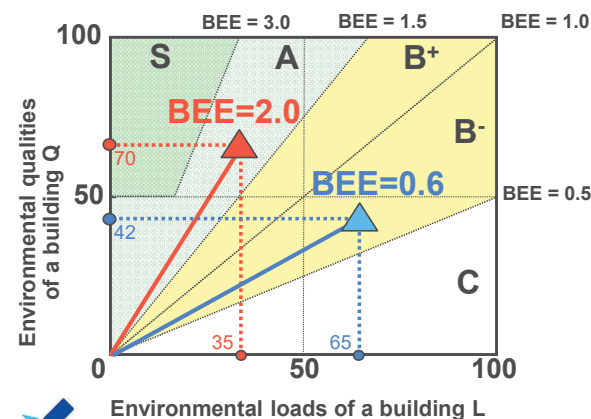


## 2-② Assessment system



### <BEE and rating>

- ◆ The larger gradient a building has, the higher the BEE rate is.
- ◆ BEE is rated on a five-star scale.
- ◆ Assessment result is shown by a graph and the number of stars (★).



#### Relation between BEE and rates

BEE ≥ 3.0 and Q ≥ 50	S: Excellent ★★★★★
1.5 ≤ BEE < 3.0	A: Very Good ★★★★☆
1.0 ≤ BEE < 1.5	B+: Good ★★★☆☆
0.5 ≤ BEE < 1.0	B-: Fairly Poor ★★☆☆☆
BEE < 0.5	C: Poor ★☆☆☆☆





## 2-② Assessment system



### <Characteristics of CASBEE-Yokohama>

- ◆ Partial edit of CASBEE for the exclusive use of Yokohama City
- ◆ Introduction of 4 priority aspects related to environmental efforts promoted by the city



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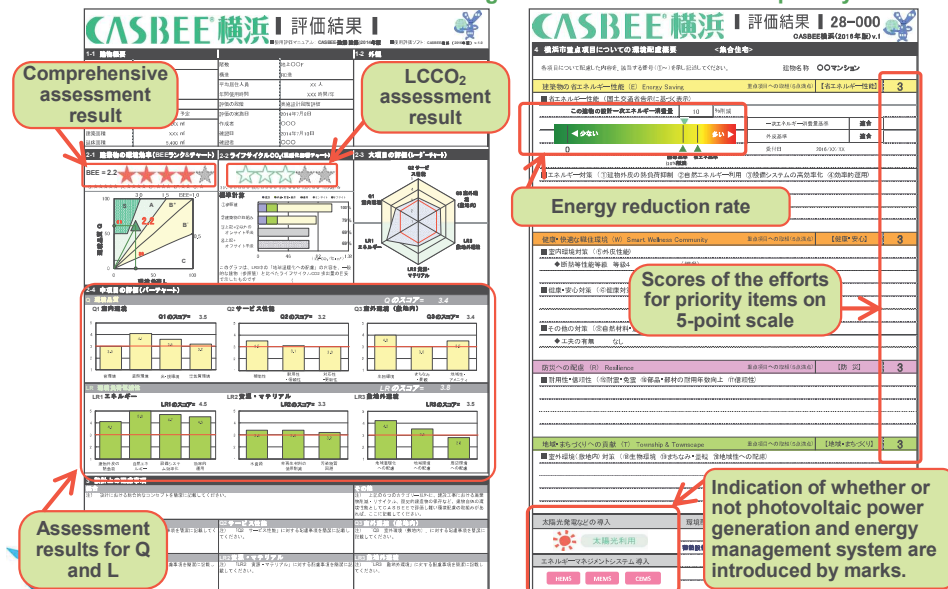


## 2-③ Publication of assessment results



### <Assessment sheet for an entire building>

### <Assessment sheet for priority items>



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## 2-④ Indication of built environment performance



- ◆ Mandatory indication of assessment results on sales and rental advertising



Information provision to consumers through the visualization of environmental performance



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## 2-⑤ Certification system and examples



### <Outline of certification system>

- ◆ Started in April 2006 as a voluntary system
- ◆ promoting CSR (Corporate Social Responsibility)
- ◆ The city certifies buildings based on the assessment of academic experts (free of charge)

### <Public relation of certificated buildings by Yokohama City>

- ◆ Press release of certification by the city
- ◆ certification ceremony (from head of housing and architecture Bureau)
- ◆ Publication of assessment results and project outline on homepage of Yokohama City
- ◆ (Interview by trade magazine and publication on newspaper)

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## 2-⑤ Certification system and examples

### <Certified examples> (all buildings got S in assessment)

The first example:

**Kyosei-Kan Building in Hiyoshi Campus of Keio University**

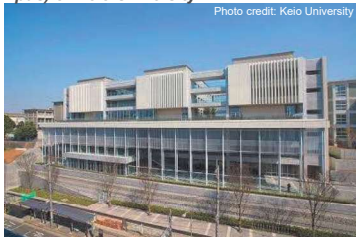
Photo credit: Keio University



The third example:

**Fourth Building Independence Wing (Dokuritsu-Kan), (in Hiyoshi Campus) of Keio University**

Photo credit: Keio University



The second example:

**Global Headquarters of Nissan Motor Co., Ltd.**

Photo credit: Nissan Motor Co., Ltd.



The fourth example: **Yokohama Dia Building**

Photo credit: Hiro Photo Building



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## 2-⑤ Certification system and examples

### <Certified examples> (all buildings got S in assessment)

The fifth example:

**Minato Mirai Grand Central Tower**

Photo credit: SS Tokyo



The sixth example:

**Minato Mirai Center Building**



The seventh example:

**Yokohama Mitsui Building**



Photo credit: Mitsui Fudosan Co., Ltd.

The eighth example:

**Toshiba Corporation, Power Systems and Solutions Company (Keihin) No. 1 Building**



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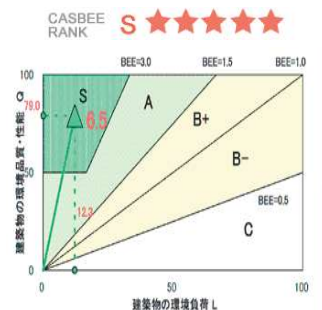


## Global Headquarters of Nissan Motor Co., Ltd.

### Outline of environment-friendly approaches

In the building, natural energy has been proactively utilized for ventilation and daylighting, and the thermal loads have been curbed by utilizing high heat insulating double glass and louvers for curtain walls.

Also, a walkway network penetrating the building is connected to the pedestrian deck so as to make the building as a gateway to the Minato Mirai 21 district from the east exit of Yokohama Station.



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## Minato Mirai Grand Central Tower

### Outline of environment-friendly approaches

Taking advantage of its location next to Yokohama Museum of Art, public arts are arranged at several places in a verdant square in the premises. Illuminated with LED lamps at night, these public arts contribute to creating artistic and cultural atmosphere of the Minato Mirai district.

Also, horizontal louvers and sunlight guiding type automatically controlled blinds are installed in the building to save energy and reduce thermal load.



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## City-to-City Collaboration

### Toward Smart and Green Island of Batam



Development Cooperation Division, International Affairs Bureau  
City of Yokohama

1

## External Recognition on Achievement by the City of Yokohama

LEE KUAN YEW  
WORLD CITY  
PRIZE

2014 SPECIAL MENTION: CITY OF YOKOHAMA

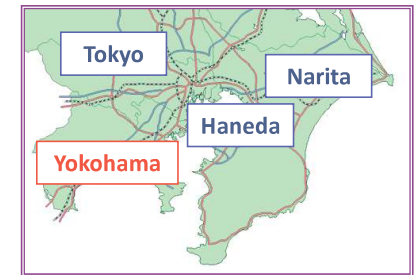


3

## Overview of Yokohama City



- International port city  
Opening of port of Yokohama in 1859
- Population: approx. 3.7 million  
Largest city in Japan
- GDP: approx. 12.7 trillion JPY  
(approx. 107 billion USD)
- 21 minutes from Haneda Airport (Tokyo)



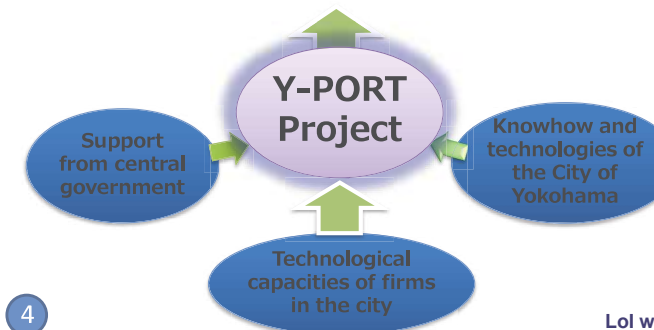
2

## Yokohama's International Development Cooperation – Y-PORT

### Yokohama Partnership of Resources and Technologies

*It is essential to provide **not simple products but solutions** through combining technologies and knowhow of the public and private sectors*

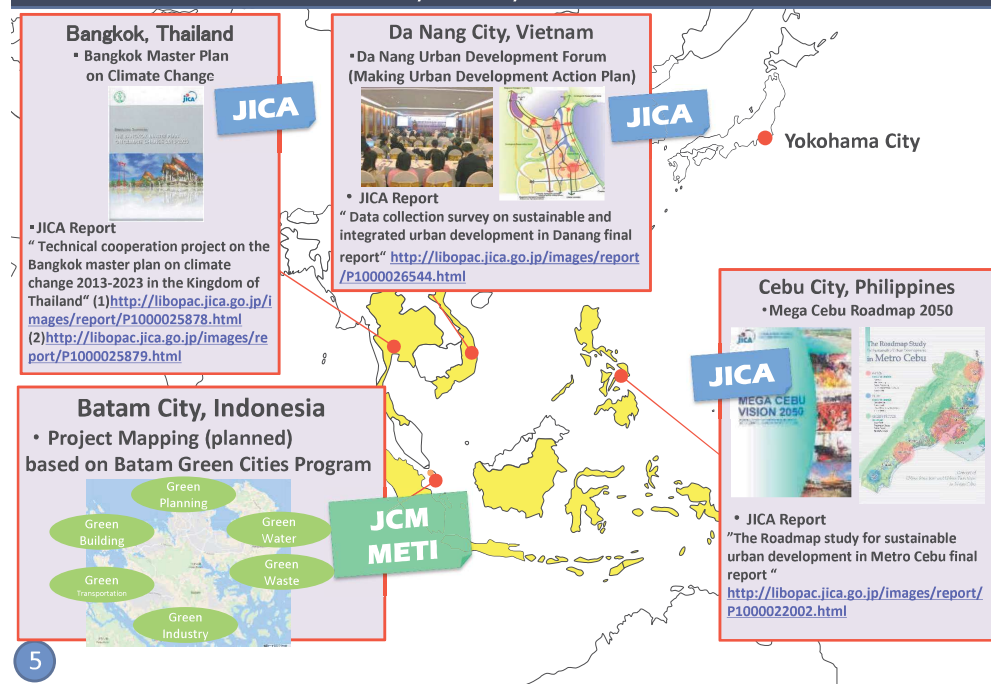
### Enhancement of international technical cooperation



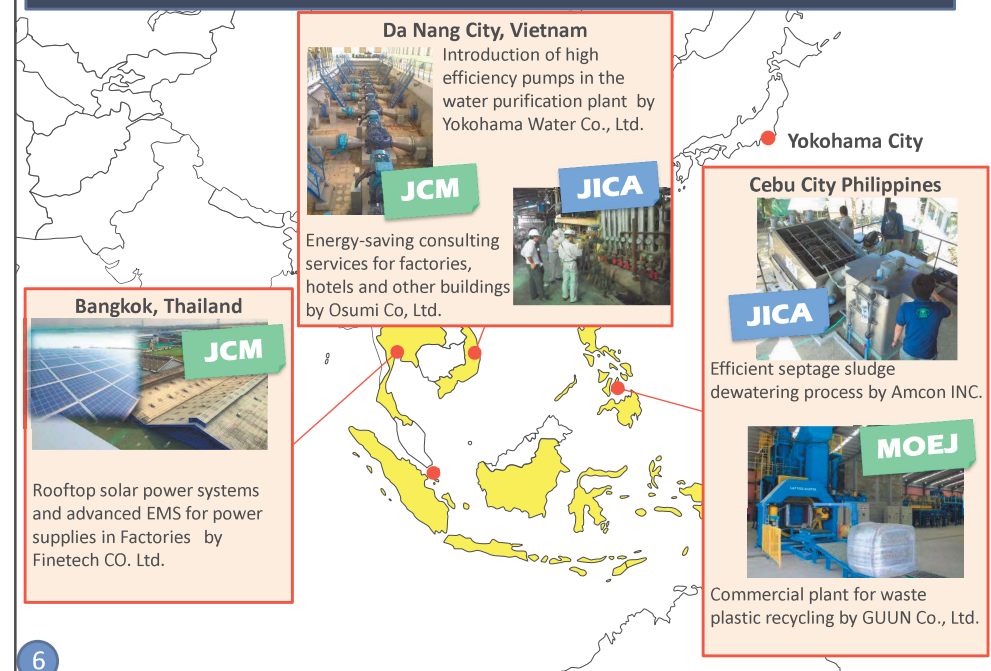
Lol with the City of Batam in May, 2015

4

## Master Plans which the City of Yokohama has worked together with Four Cities under City-to-City collaboration



## Flagship Projects by City to City Collaboration in Four Cities



## City to City Collaboration in Batam

Letter of Intent on Technical Cooperation for Sustainable Urban Development Signed with the City of Batam, on 27th May, 2015 for 3 years

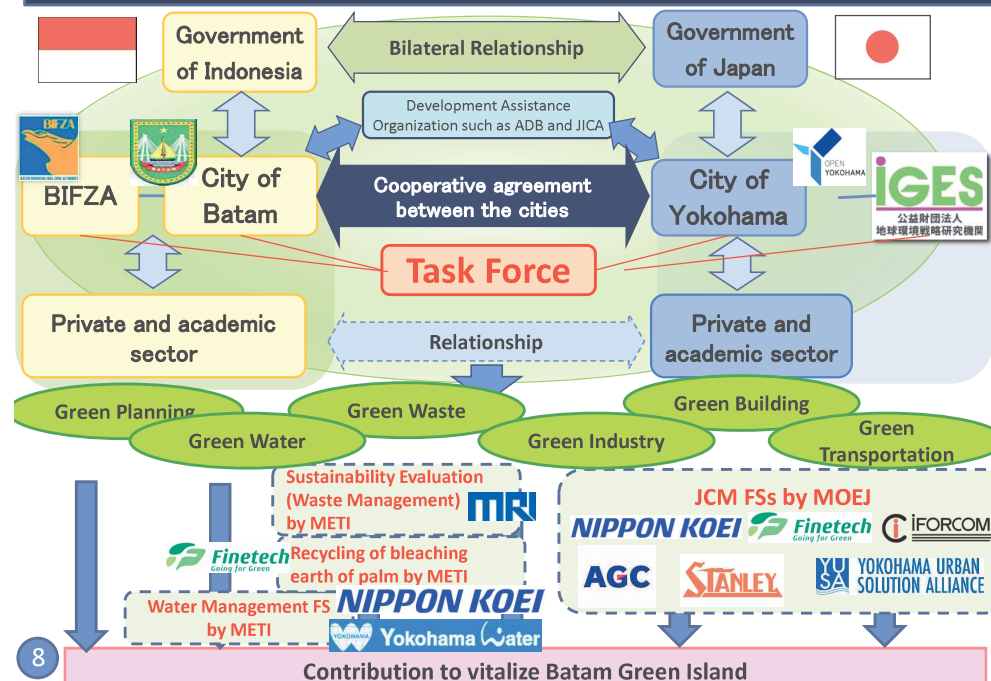


**To be renewed by March 2018 toward becoming a tripartite partnership among Batam City, BIFZA, and Yokohama City**

### Contents of Agreement

1. The City of Yokohama will offer technical advice in promoting the eco-city development of the City of Batam.
  2. The Parties will encourage participation of the private sector and academic organizations.
  3. The Parties will take action to obtain cooperation of the governments of both countries and international organizations.
  4. The Parties will mutually provide information essential to implementing the above collaboration effectively.
- 7

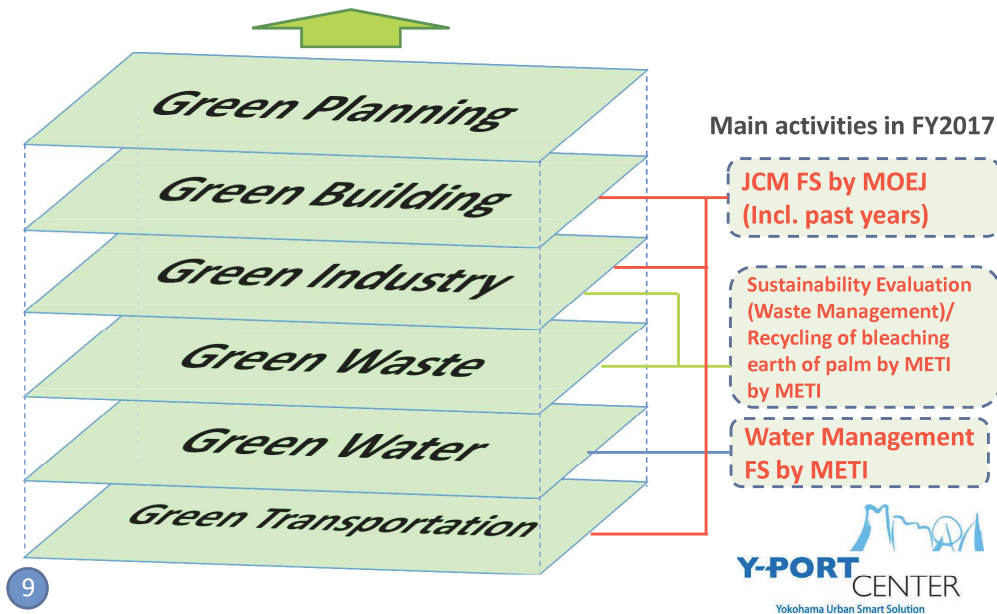
## Framework of City-to-City Collaboration with Batam in this Year





## Inter-Relations of Six Pillar Sectors through Tripartite Collaboration among Batam City, BIFZA and Yokohama City

### Project Mapping toward Batam Green Island



9

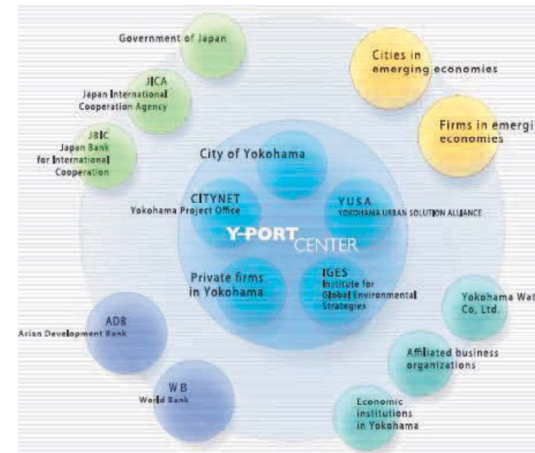
## Y-PORT CENTER – Knowledge hub for smart city management

Please visit our web site:

<http://www.city.yokohama.lg.jp/kokusai/yport/en/>

Development Cooperation Division,  
International Affairs Bureau  
City of Yokohama, Japan  
Email : [ki-yport@city.yokohama.jp](mailto:ki-yport@city.yokohama.jp)

Yokohama Urban Solution Alliance



10

Thank you for your attention





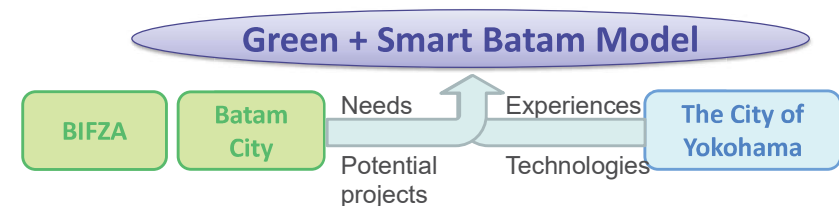
# Objectives: city-to-city collaboration

- Our project aims to
  - promote JCM project formulation
  - support Green City Programme of Batam
- “Best available solutions for Batam” needs to be considered through collaboration.

## Overall Progress of the Project

Project for Development of Low-carbon City through City-to-City Collaboration between Batam and Yokohama

January 25, 2018  
SAITO Tetsuya  
Nippon Koei Co., Ltd.



January 25, 2018 Progress and Targets (Batam-Yokohama Collaboration)

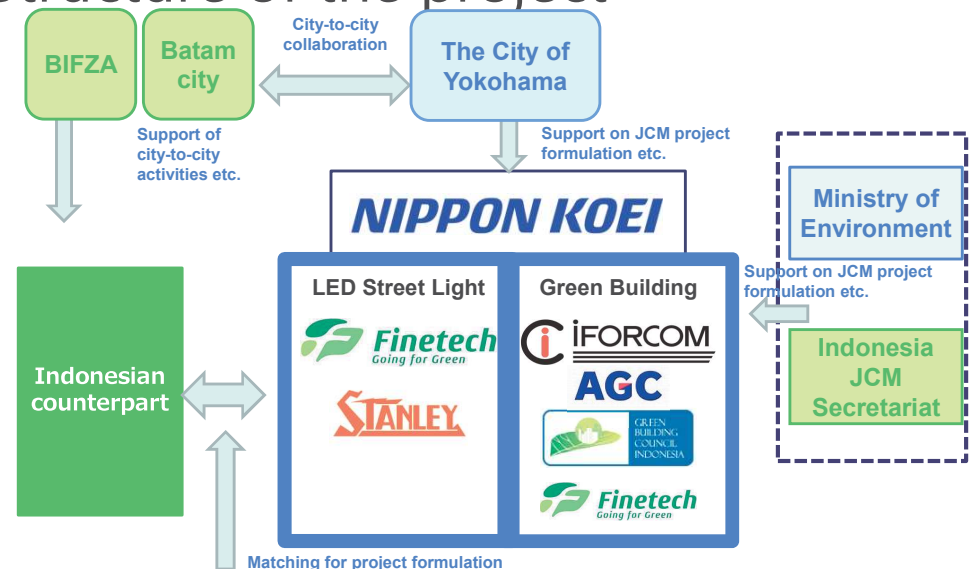
## Objectives: city-to-city collaboration

1 Background

Sector under city to city collaboration (6 pillars of project map)	2015 City to city collaboration	2016 City to city collaboration	2017 City to city collaboration	2018 City to city collaboration	Future
	Initiation of city to city collaboration	Deepen of city to city collaboration	Implementation of project under collaboration at planning scheme	Energy saving policy making and implementation of core project	Expansion to other cities as Batam-Yokohama model
<b>Green Planning</b>	Information collection on needs of Batam side and discussion on collaboration framework	Development of project map: 6 pillars of city to city collaboration for Batam's future vision as green city	Target setting for low carbon society • standardization of green building • Support of development of water management MP	Support of monitoring for target achievement and study of land use plan	Support of development a plan for climate change mitigation and adaptation
<b>Green Water</b>	Sludge dehydrating FS		METI Water management FS	Water treatment project	Sewerage FS & project Desalination of seawater FS & project
<b>Green Waste</b>	Spent bleaching earth treatment and bio-fuel production FS	Thermal Desorption Unit FS (Industrial waste management)	Thermal Desorption Unit project (proposed/not selected) Sustainability Evaluation: Waste Management Spent bleaching earth treatment FS		Spent bleaching earth treatment project
<b>Green Industry</b>			Solar PV system in industrial park (proposed/not selected)	JCM Smart LED street light with PV project	
<b>Green Building</b>	Airport energy saving FS	Hotel energy saving FS Ferry terminal FS Hospital energy saving FS	Airport energy saving project (proposed/withdrawn) Green building FS (Office building and Shopping mall) Smart LED street light FS	Eco industrial park FS Green building (hotel) project (to be promoted by B to B) Green building (ferry terminal) project (to be promoted by B to B) JCM Green building (shopping mall) project	Eco industrial park project
<b>Green Transportation</b>				BRT/smart transport FS	BRT project LRT project

## Structure of the project

1 Background



January 25, 2018 Progress and Targets (Batam-Yokohama Collaboration)



# Targets and Approach for FY2017

"toward sustainable extension for all Batam"

## Green Transportation

- Smart LED street light Project in Nagoya / Industrial Parks / Ports



## Green Planning

- Standardization of Smart LED street lighting system
- M/P on LED street light

## Green Building

- Green Building Project for shopping mall / office building / residential building



## Green Planning

- Drafting Mayor's regulation for Green Building
- Setting target to increase green buildings in Batam

January 25, 2018

Progress and Targets (Batam-Yokohama Collaboration)

NIPPON KOEI

5

# Major events

Month	Milestone
Oct, 2017	Kick-off meeting in Batam
Nov, 2017	Field works in Batam
Dec, 2017	Site tour in Japan for water management sector Field works in Batam
Jan, 2018	Final workshop in Batam



Field Survey (Nov 2017)

January 25, 2018

Overall progress of the project

NIPPON KOEI

7

# Major events

Month	Milestone
Oct, 2017	Kick-off meeting in Batam
Nov, 2017	Field works in Batam
Dec, 2017	Site tour in Japan for water management sector Field works in Batam
Jan, 2018	Final workshop in Batam



Kick-off Seminar (Oct 2017)



Batamindo (Nov 2017)

January 25, 2018

Overall progress of the project

NIPPON KOEI

6

# Major events (plans)

Month	Milestone
Jan, 2018	City-to-City Collaboration Seminar in Tokyo (30 Jan)
Feb, 2018	Discussion on Green Building regulation Seminar & site tour in Japan organized by the University of Tokyo
Mar, 2018	Reporting for FY2017 Application for City-to-city collaboration project in FY2018
Apr-May, 2018	Application for Model Project in FY2018



Courtesy call on International Affairs Bureau of Yokohama City (Dec 2017)

January 25, 2018

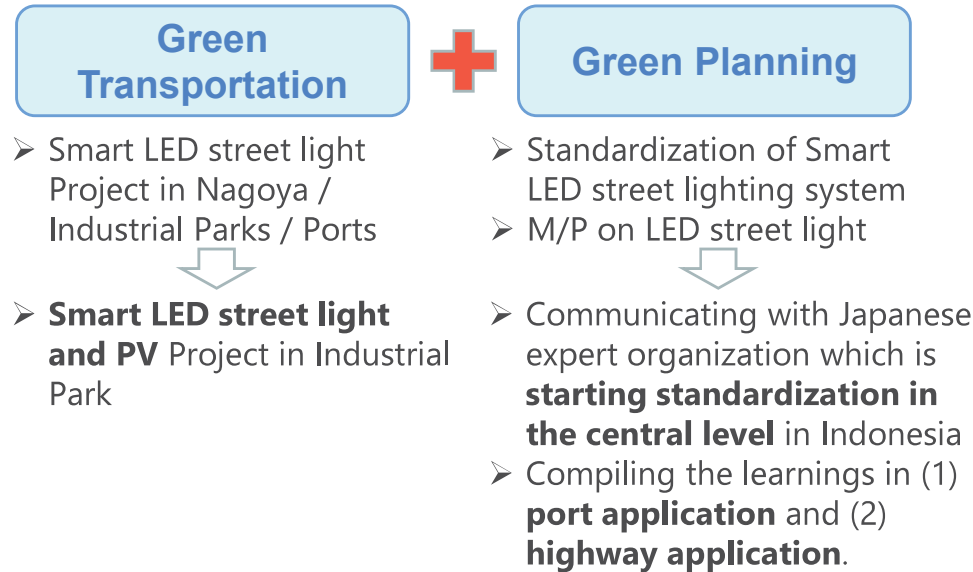
Overall progress of the project

NIPPON KOEI

8

# Achievements

4 Achievements



# Achievements

4 Achievements



January 25, 2018

Overall progress of the project

NIPPON KOEI

9

January 25, 2018

Overall progress of the project

NIPPON KOEI

10

## The Way Forward

5 Future

### (1) Implementasi, implementasi, implementasi !

- Two JCM proposals
- B to B
- Other funding sources

### (2) Maximize effective collaboration

- Support from BIFZA & Pemko (**regulations** + standardization)
- In harmony with "**Smart City Assessment**" initiative
- Being sensitive to **global trend** toward SGDs, ESG and CSR
- Applicability of JCM city-to-city collaboration
  - **GHG reduction from fossil fuel**
- Other funding sources

January 25, 2018

Overall progress of the project

NIPPON KOEI

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# “Smart & Green Island of BATAM” Result of Feasibility Study for Introduction of LED Street Lighting and PV Solar in Industrial Park

Final Workshop in BATAM / 2018

## Going for Green



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### FINETEC: Head Office / Labo / Plant / Subsidiary

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Going for Green

**Head Office (Laboratory: Tokyo Institute of Technology)**  
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4259-3, Nagatsuta-cho, Midori-ku, Yokohama, Kanagawa,  
Japan 226-8510  
TEL: 81+ 0453097901 FAX: 81+ 0453097902  
WEB: www.finetech.co.jp

**Fukushima Renewable Energy Co., Ltd.**

**Kita-kanto Green Plant**

**Tokyo Office**  
Rm407 Kikar Shinjo Kakan, 3-5-8  
Shiba koen, Minato-ku, Tokyo, Japan  
106-0011  
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**Koriyama Incubation center-3**  
1-1 Tamamachi Takasada aza  
Nakakawara, Koriyama-shi, Fukushima,  
Japan 963-1105  
TEL: 81+ 0249436521

**Aizu-wakamatsu Office**  
in FUKUSHIMA Pref.

2969 Omata-cho, Ashikaga-shi,  
Tochigi 328-0141, Japan  
328-0141  
TEL: 81+ 0284648314 FAX: 81+ 0284648315

### Smart Green Park (Trademark of FINETECH)

小水力発電プラント  
風力発電プラント  
バイオ燃料プラント(予定地)  
バイオマス燃料ガス化発電プラント  
太陽光発電プラント  
太陽光発電プラント

### Strategic Alliance with Yokohama City of Japan

**Finetech**  
Going for Green

**YU SA**  
YOKOHAMA URBAN SOLUTION ALLIANCE

**Knowledge and Technology for Sustainable Smart City**

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### Capacity Building Activities : OFFICIAL SITE VISIT

By BATAM CITY Government / BIEZA Authorities

FINETECH received the BATAM Delegation at the “FINETECH’s SMART GREEN PARK” in 2015 and 2016

Smart Green Park

## JCM/FS Findings of Smart & Green Opportunities in Batam

### JCM Opportunities through the Survey in FY 2015-16 in Kabil



#### Key Opportunity #1 : PV Solar Power Generation

- PV Solar Farm System with Advanced Energy Management System for Utilization of Energy Supply at the Industrial Zone



#### Key Opportunity #2 : Oil Sludge Treatment

- Replacement for High Efficiency Equipment of Oil Sludge Treatment Process in the Waste Management Industry



#### Key Opportunity #3 : Spent Bleaching Earth Treatment

- Utilization of palm oil refinery process in which residue oil are extracted from spent bleaching earth in the Palm Oil Refinery Industry

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## Green Island BATAM Conceptual Mapping through JCM-FS

### Where we are..

Phase 1 / 2015

Phase 2 / 2016

Phase 3 / 2017-2018

➢ Areas of Critical to Improvement and Development are Identified.

➢ Project Candidates are defined and shortlisted.

➢ Projects are consolidated into the created project mapping.

**Green Industry**

**Green Building**

**Green Transportation**

**Green Waste**

**Green Water**

**Green Planning**

**Explore Technology Implementation Opportunities**

- ◆ LED Industrial Areas
- ◆ LED Street Lights
- ◆ Smart Monitoring & Controlling System
- ◆ PV Solar Power Generation System

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## F/S Project Overview: LED Street Lights

### ➤ Scope of Study to Introduce follows; ➤ Targeted Sites

- Installation of the state-of-the-art **Smart LED Street Lights** manufactured by Japanese Firm of High Technology
- Installation of **Smart Monitoring and Controlling System** to maximize efficiency of LED Street Lights
- Installation of Innovative **PV Solar Power Generation System** to maximize efficiency of Energy Usage

#### Major Industrial Park Areas



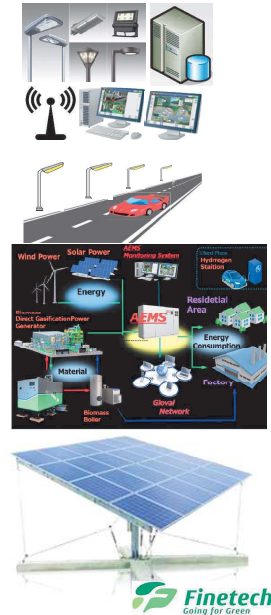
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## Introduction of Key Technologies

### ➤ Key Features of Technologies

- ◆ The-state of art of the LED with **Remote Monitoring Technology** to minimize man-power maintenance for individual street light.
- ◆ **Alarming Function** to detect failures, such as LED lamp damages, cable damages, electric leakage etc.
- ◆ **Various Key Energy Index Measurements** of Illuminance, Voltage Value, Current Value, Energy Consumption Level.
- ◆ **Remote Controlling Technology** to command On & Off for Individual LED Street Light.
- ◆ **High Efficiency PV Solar Power Generation Panel Modules** with **Innovative Sun-tracking System** to maximize and utilize generated electricity.



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## Target (Planned)

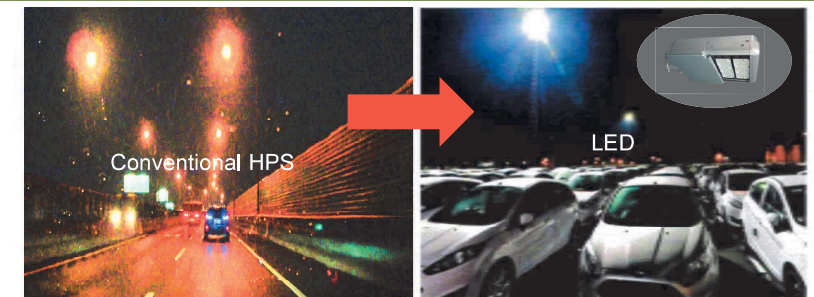
- **LED Installation (Planned): Approx. 600 – 800 units**
- **PV Solar Installation (Planned): Central Power Generation Facility Area Capacity = 1MW (Rooftop + Ground)**



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## Installation of LED Street Lights and Control & Monitoring System



- 70% Energy Saving compared with conventional High Pressure Sodium
- Man-power Maintenance Reduction by Smart Monitoring & Controlling
- Further More Energy Consumption Reduction with more active controlling

**Significant CO2 Emission Reduction / Significant OPEX Cost Reduction**

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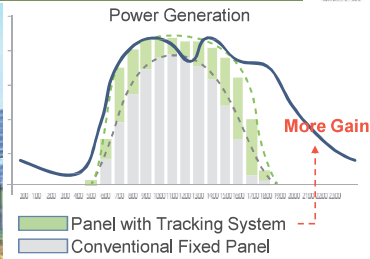




## Installation of PV Solar with Smart Tracking System



Dual – Axis Tracking System



- Power Generation increases by 30%-40%
- More Solar Radiation
- Shorter Payback Period (Initial Cost < Profit Gain)

**Significant CO2 Emission Reduction / High Cost Efficiency**

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## Installation of PV Solar with Smart Tracking System...cont'd



Available onto Roof-top Installation  
 Dual – Axis Tracking



- Synergetic Power Generation Impact with Ground-installation
- More Solar Radiation
- Shorter Payback Period (Initial Cost < Profit Gain)

**Significant CO2 Emission Reduction / High Cost Efficiency**

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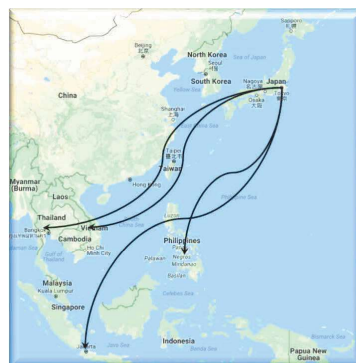




## ① Company Profile

### 1.1 Company Name

- Company name iFORCOM Co.,Ltd
- Address 3-29-11, Tsuruyacho, Kanagawa-ku, Yokohama-shi, Kanagawa 221-0835, Japan
- Telephone +81-45-412-3010
- Fax +81-45-412-3002
- Establishment October 1985
- Representative Hiroshi Kagawa
- Capital ¥100,000,000
- Employees 350 persons (group whole)



Representative office in Indonesia  
EightyEighty @ Kasablanka Office Tower, 18th floor,  
Kota Kasablanka, Jl. Casablanca kav. 88 Jakarta 12870

## Agenda

### ① Company Profile

- 1.1 Company Name
- 1.2 History

### ② City to City Collaboration

- 2.1 Scheme
- 2.2 Feasibility Study (FS)

### ③ Our Solutions

- 3.1 Definition
- 3.2 Monitoring System
- 3.3 Equipment Improvement
- 3.4 Operational Improvement
- 3.5 Track Record

### ④ Schedule

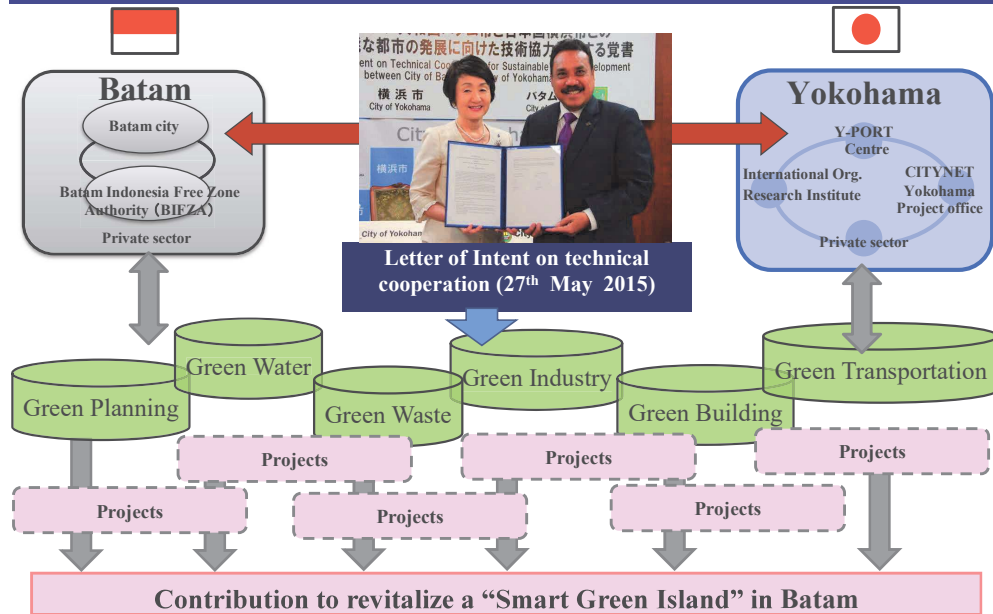
### ⑤ Project Map

## 1.2 History





## ② City to City Collaboration



## ③ Our Solutions

### 3.1 Definition

#### ① Monitoring System

To set up equipment for monitoring the electricity usage.

#### ② Equipment Improvement

It established the inverter to the pump (motor) that comes with chiller, cooling water pumps, cold water pumps, AHU to control the output.

Check the operational status, it can also be carried schedule operation.

#### ③ Operational Improvement

Check the usage of existing facilities, and by optimizing the operation method to reduce power consumption and achieve energy saving, saving CO<sub>2</sub>.

- Investigation in detail for the usage of office equipment, air conditioning (air conditioning related such as chiller, air handling units)
- Research and analysis for the optimal use development
- Rules formulated on how to use, documenting

## 2.2 Feasibility Study (FS)

### FS 1 2015

- Energy-saving A/C System Project, supporting Eco-Airport Plan



JCM project application ⇒ adopted

It is canceled because there is a plan to expand the airport.

Reduction = 1,278,026 kWh (8%)

### FS 2 2016

- Energy-saving Ferry terminal Project
- Energy-saving Hospital Project
- Energy-saving Hotel Project



JCM project application

It does not continue to JCM project because the scale is small.

Reduction = 318,444 (16%)

### FS 3 2017

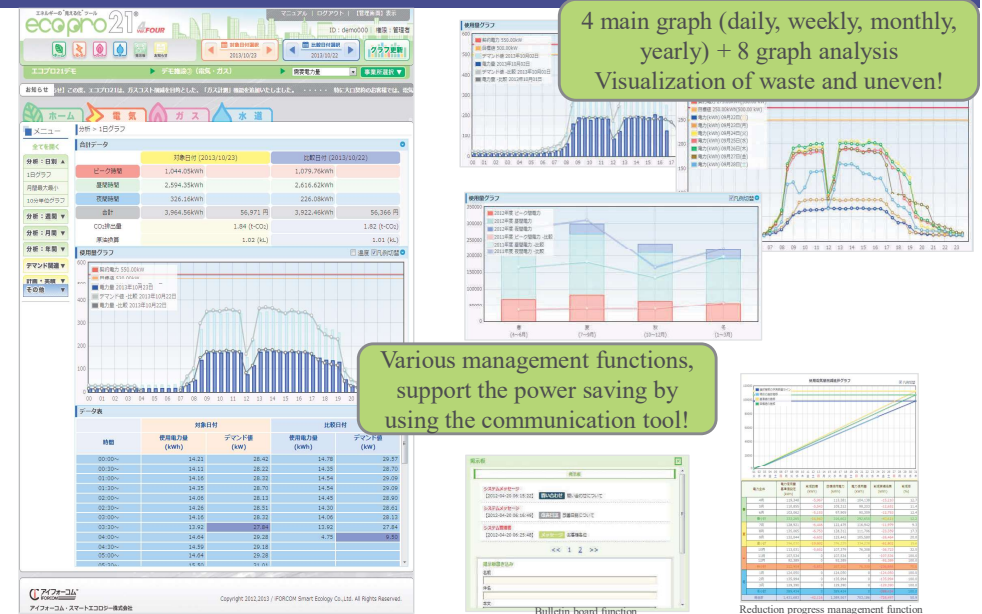
- Green Building for Shopping mall, Office Building



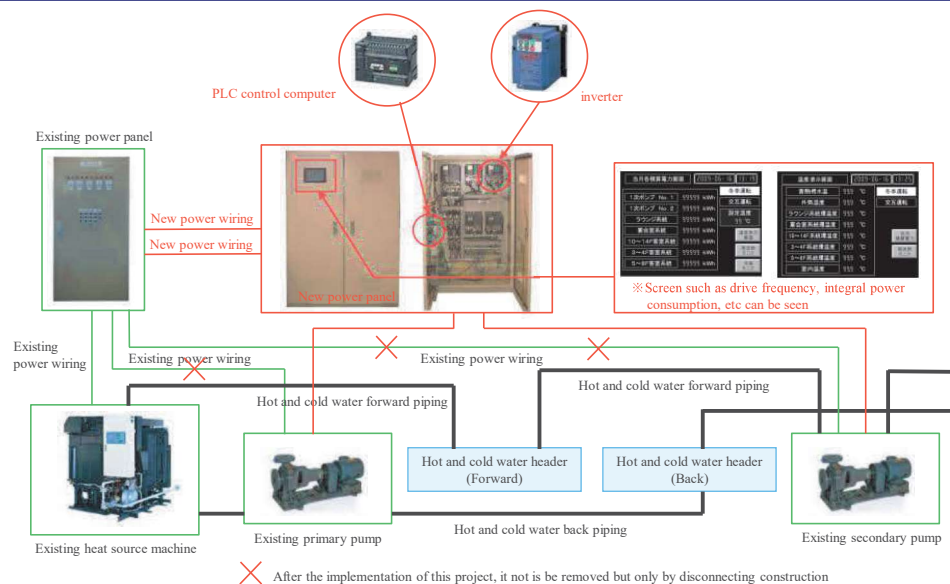
It is expected to be a JCM project.

Reduction = 1,238,354 (15%)

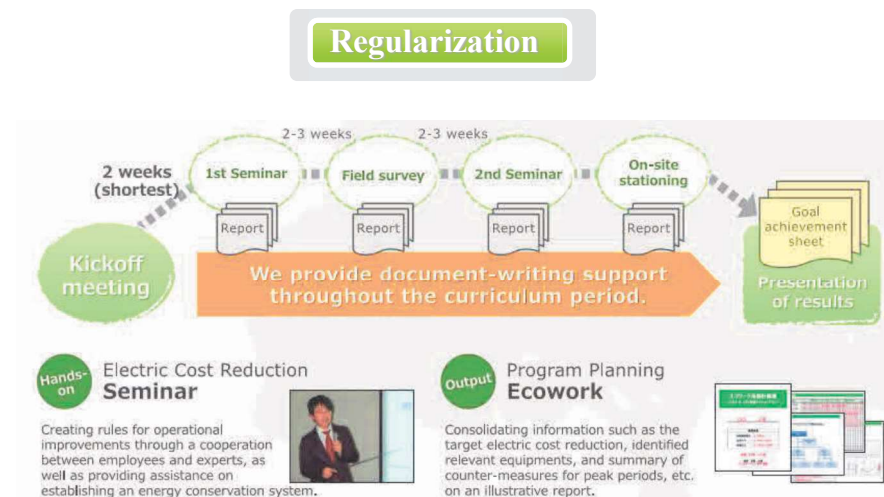
## 3.2 Monitoring System



### 3.3 Equipment Improvement



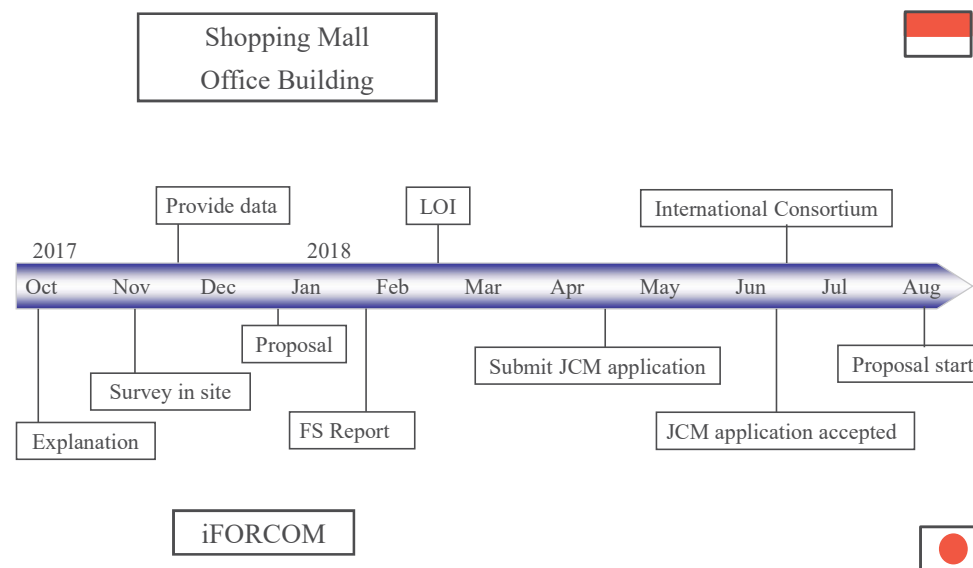
### 3.4 Operational Improvement



### 3.5 Track Record

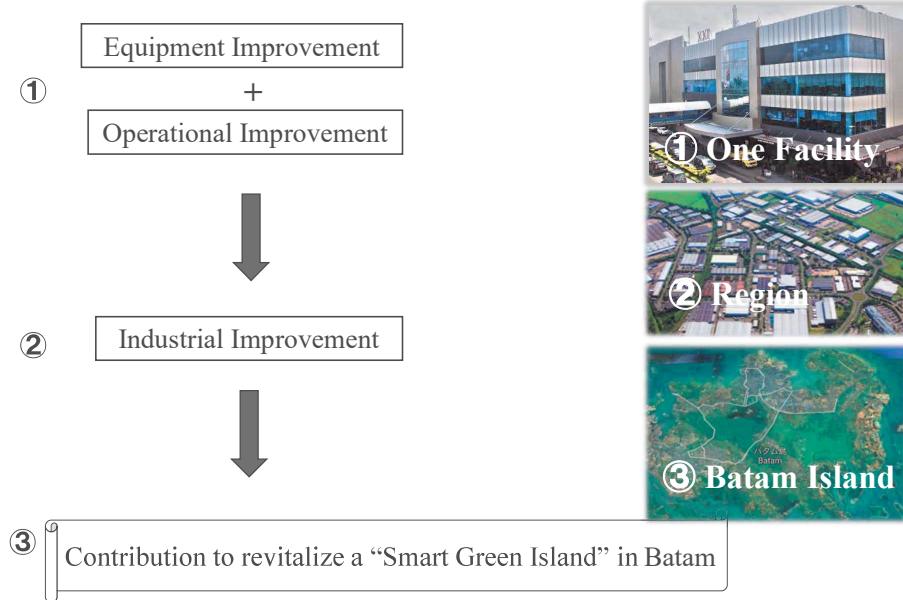


### ④ Schedule





## ⑤ Project Map



*Thanks for listening*

# GARUDA SMART CITY FRAMEWORK & INDONESIA SMART CITY RATING 2017 RESULT FOR BATAM

Prof. Suhono Harso Supangkat

Batam, 25<sup>th</sup> January 2018



## AGENDA

- SMART CITY IN GENERAL
- GARUDA SMART CITY FRAMEWORK (GSCF)
- INDONESIA SMART CITY RATING 2017 REVIEW
- SMART CITY LIVING LAB
- CLOSING REMARKS

## SMART CITY IN GENERAL

### GLOBAL CITY PROBLEM

- In 2008, global urban population exceeded the rural population for the first time (Seto et al., 2008)
- This urbanization trend leads to the increase of energy demands, waste and water services in and around the cities and also calls for more environmental care (Nevens et al., 2013)

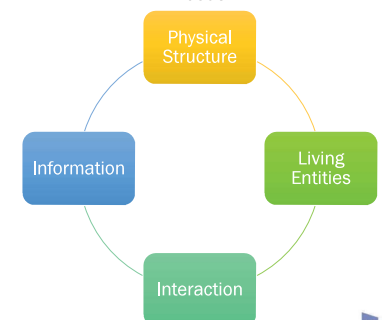
### INDONESIA CITY PROBLEM

- The urban population (53.3 per cent) exceeded the rural population in 2015 (bps.go.id)
- Urbanization causes large land conversion from agricultural areas into industrial estates or from water conservation areas to roads, creating an environment problem (Firman, 2000)
- Urban problems such as waste treatment, clean water, poverty, corruption, criminality, lack of green space

A system of physical structure, living entities, interaction, and information

**City as a system become more and more complicated**

Growing of living entities (human) is very fast, interaction and flow of information exploded and the limitation of physical structure cannot support all the needs





## GLOBAL GOALS FOR SUSTAINABLE DEVELOPMENT

United Nation, in 2015 has agree on the Global goals labelled SDG's the Sustainable Development Goals to replace the Millennium Development Goals agreed in 2000

The 17 goals and 169 targets cover areas like poverty, public health, the environment, education and justice.

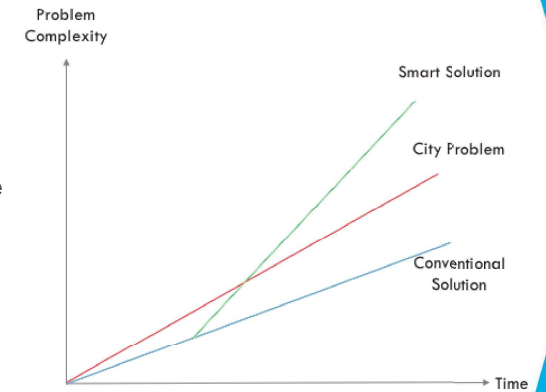
Effort to achieve the SDGs target must go hand-in-hand with a plan that builds economic growth and addresses a range of social needs including health, education, climate change and inequality

### THE GLOBAL GOALS For Sustainable Development



## MOTIVATION

- Complexity of city problem is growing fast.
- In most cases, capacity of conventional solution cannot fulfill the capacity demand of city problem
- City need innovative solution that provide higher capacity of solution
- ICT (Information System and Technology) is potential enabler that enable innovative and effective solution and create high capacity of solution
- But, it should be noted that Smart City is not equal to ICT city or digital city.



## WHAT IS SMART CITY

Kota yang dapat mengelola berbagai sumberdayanya secara efektif dan efisien untuk menyelesaikan berbagai tantangan kota menggunakan solusi inovatif, terintegrasi, dan berkelanjutan untuk menyediakan infrastruktur dan memberikan layanan-layanan kota yang dapat meningkatkan kualitas hidup warganya.

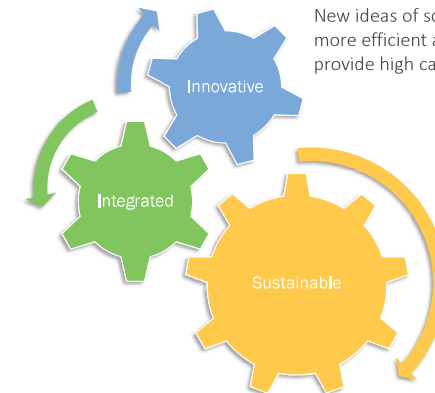
Smart City is a city that can **utilize its resources effectively and efficiently** to solve any city challenges **using innovative, integrated, and sustainable solution** by providing infrastructures and deliver city services to improve Quality of Life.



## SMART SOLUTION CHARACTERISTICS

Solutions should be integrated between government institution as well as between government and non-government, vertical, also horizontal.

Integration cover:  
Business Process,  
Data, Application,  
IT Infrastructure,  
and non-IT Infrastructure



New ideas of solutions that utilize resources more efficient and more effective and provide high capacity of solutions.

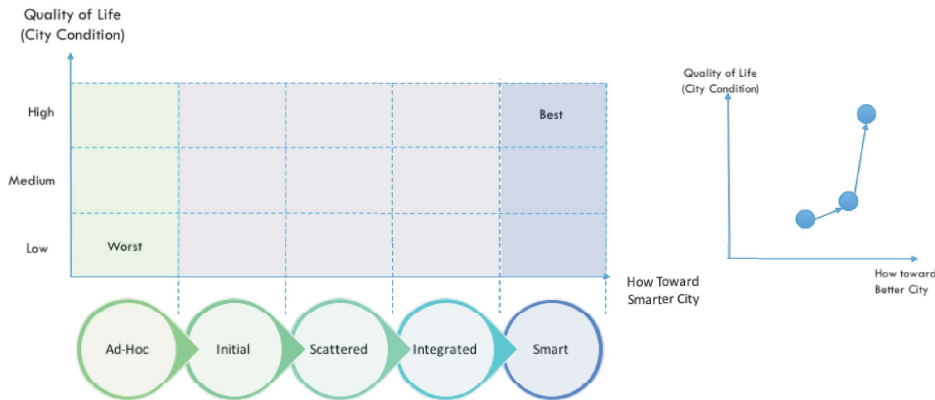
Solution should be designed to be sustained for long time







# SMART CITY VIEW (QOL AND SMART WAY)

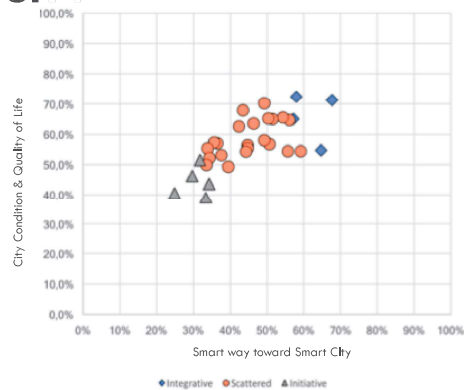


# AVERAGE ACHIEVEMENT FOR 31 CITIES



Bidang	Rata-rata
Center of Economic Activity	60,04%
Education	71,47%
Industry & Tourism	53,68%
Safety & Security	53,74%
Health	69,11%
Public Services	59,62%
Community	54,31%
Transportation & Mobility	62,59%
Energy	46,40%
Spatial Management	61,98%
Environment	60,99%

# INDONESIAN CITY READINESS MAPPING TO SMART CITY



From the measurement results there is no city who reach the ideal smart city condition. Some cities have entered the initial integration level. Most cities are still building in scattered and in the starting phase (initiative)

RATING CRITERIA	ACHIEVEMENT (AVERAGE)			
	31 KOTA	LARGE CITIES	MEDIUM CITIES	SMALL CITIES
KOTA MENUJU CERDAS (SMART CITY)	49,9%	53,2%	52,1%	44,1%
EKONOMI CERDAS (SMART ECONOMY)	59,5%	57,8%	61,0%	59,3%
LINGKUNGAN CERDAS (SMART ENVIRONMENT)	61,3%	58,0%	63,7%	61,8%
SOSIAL CERDAS (SMART SOCIAL)	56,5%	55,4%	57,0%	56,9%
KESEHATAN CERDAS (SMART HEALTH)	69,1%	66,6%	74,3%	65,9%
MOBILITAS (SMART MOBILITY)	62,6%	61,3%	63,6%	62,7%
KEAMANAN DAN KEBENCANAAN KOTA (SAFE & SECURE CITIES)	53,7%	47,8%	54,9%	58,3%
PENGEMBANGAN DAN PENGELOLAAN KOTA (CITY DEVELOPMENT AND MANAGEMENT)	43,8%	50,1%	46,1%	34,9%
DIGITAL GOVERNMENT READINESS	52,4%	59,2%	53,6%	44,3%
KESIAPAN INTEGRASI (INTEGRATION READINESS)	36,4%	40,3%	38,5%	30,3%
KESIAPAN INFRASTRUKTUR (INFRASTRUCTURE READINESS)	61,2%	59,0%	62,6%	61,8%
EKOSISTEM INOVASI (INNOVATION ECOSYSTEM)	57,7%	57,0%	58,5%	57,6%
EKOSISTEM KOMPETITIF (COMPETITIVE ECOSYSTEM)	63,3%	61,1%	64,4%	64,4%
EKOSISTEM TEKNOLOGI FINANSIAL (FINTECH ECOSYSTEM)	34,5%	32,7%	36,5%	34,0%

Based on the results of the mapping conducted, the City Development and Management Process through innovative means as well as the readiness in terms of integration has become a handicap.

# MEASUREMENT INDICATORS MAPPING

All Indicators

## KOTA MENUJU CERDAS (SMART CITY)

### EKONOMI CERDAS (SMART ECONOMY)

- MOBILITAS (SMART MOBILITY)
- EKOSISTEM TEKNOLOGI FINANSIAL (FINTECH ECOSYSTEM)

### SOSIAL CERDAS (SMART SOCIAL)

- KESEHATAN CERDAS (SMART HEALTH)
- KEAMANAN DAN KEBENCANAAN KOTA (SAFE & SECURE CITIES)

### LINGKUNGAN CERDAS (SMART ENVIRONMENT)

### KESIAPAN INFRASTRUKTUR (INFRASTRUCTURE READINESS) EKOSISTEM INOVASI (INNOVATION ECOSYSTEM) EKOSISTEM KOMPETITIF (COMPETITIVE ECOSYSTEM)

### PENGEMBANGAN DAN PENGELOLAAN KOTA (DEVELOPMENT & MANAGEMENT)

- KESIAPAN INTEGRASI (INTEGRATION READINESS)
- DIGITAL GOVERNMENT READINESS

# LIST OF DIMENSIONS AND INDICATORS



## EKONOMI CERDAS (SMART ECONOMY)

- Center of Economic Activity
- Industry & Tourism
- Transportation & Mobility

## SOSIAL CERDAS (SMART SOCIAL)

- Education
- Safety & Security
- Health
- Public Services
- Community

## LINGKUNGAN CERDAS (SMART ENVIRONMENT)

- Energy
- Spatial Management
- Environment



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# LIST OF DIMENSIONS AND INDICATORS



## Center of Economic Activity

- Ratio of traditional market/modern marts to the population, Percentage of population still not optimally serviced in economic sector, Percentage of population living in poverty, Percentage of population in productive age, Rate of open unemployment, Rate of spending per capita, Rate of income per capita, Rate of regional GDP growth, Rate of investment and commerce growth, Rate of foreign and domestic capital growth, Rate of average inflation according to spending groups, Rate of annual product import value growth, Rate of annual product export value growth, Average growth rate of industrial activities, Accessibility improvement for business and entrepreneurship, Average of total business income, Rate of annual tourist visits, Rate of programs' success, Available data, Citizens leveraging ICT for economic and business activities, Internet usage rate for product marketing, Rate of electronic payments, Rate of creative SME development

## Industry & Tourism

- Rate of growth for processing industry, Rate of growth for non-oil and gas processing industry, Accessibility improvement for business and entrepreneurship, Average of total business income

## Transportation & Mobility

- General condition of city roads, The level of congestion of the city to the provision of urban infrastructure, The rate of motor vehicle accidents per day, The ratio of vehicle ownership one family, The number of mass transportation, Availability of mass transportation facilities and infrastructure, Management of mass transportation facilities and infrastructure, The ability to measure the travel time, Availability of travel information, The number of citizens who do not receive transportation services and infrastructure optimally



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# LIST OF DIMENSIONS AND INDICATORS



## Education

- School-age population growth rate, Growth rate of citizens aged 15 and over, Gross enrolment ratio for higher education for citizens aged 19–23 y.o., Rate of drop-outs, Rate of illiteracy for citizens aged 15 and over, Ratio of educators to students, Rate of improvement for formal and non-formal education facility availability, Rate of unemployment, Condition of education facilities, Rate of citizens not provided optimal educational service, Rate of citizens living in poverty, Rate of programs' success, Available data, Capabilities in accessing digital data, Citizens leveraging ICT for educational activities, Internet usage rate for educational system, Rate of digital application technology (e-learning), Rate of school-aged citizens development in terms of ICT utilization for education purposes

## Safety & Security

- Criminality rate, Rate of reported criminal incidences, Ratio of policemen/ citizens, Growth rate of criminal incidences, The rate of occurrence of disasters (earthquakes, floods, fires) nearly every day, Number of poor citizens, Availability of safety/security facilities, Availability of disaster mitigation plans, Number of workers and social institutions per year, Number of citizens with social welfare issues per year, Number of underserved citizens, Participation of government, public, and private sector in improving urban security and reducing criminality, Program success rate, Availability of safety data, Capability in accessing digital data, Number of people using ICT for security activities, Internet usage rates to obtain crime information, Rate of digital application technology usage to support e-security

## Health

- The rate of growth for birth rate, The number of population in productive age, The level of growth for mortality rate, The number of health personnels available, Number of pregnant women, breastfeeding and infants with healthy condition, The ratio of population to health personnel, The ratio of population to health facilities, The rate of malnourished toddlers, The level of the number of patients due to the occurrence of accidents and disasters, The number of people who do not get healthcare optimally, The number of poor people, Access of health services to doctors, hospitals, health centers, Facilities availability at the hospital, The level of the number of people who get the immunization facilities, The success rate of the program, Availability of health data, Capability in accessing digital data, People who use ICTs for health activities, The level of use of the Internet to get health information, The level of digital application technology usage (e-Health)



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# LIST OF DIMENSIONS AND INDICATORS



## Public Services

- Openness / transparency of public service (related with procedures, service fees, and time), Sufficiency of facilities and infrastructure are provided for public services provision, The quality of personnel who serve in the public service sector, The system of public service, Public participation in the public service information retrieval and use of public services, The level of community participation in the social activities both in the digital and physical world, The role of the government, public and private partners in improving comfort and increasing accessibility and transport infrastructure, The success rate of the program

## Community

- The average number of people using communication facilities according to media access communication The average number of residents who do not have digital communication services by district, The rate of interaction between people, The number of non-digital social community, The number of digital social communities (e-community), The rate of openness (procedures, costs, time), Capability in accessing digital data, The number of citizens using ICT for social-digital activities, The rate of Internet usage to get a social-digital information, The level of use for digital application technology (e-Government)



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# LIST OF DIMENSIONS AND INDICATORS

Energy
<ul style="list-style-type: none"> <li>- The availability of reduction in non-renewable energy consumption</li> <li>- Level of biogas production</li> <li>- Rate of behavioral change in the use of new energy carried by urban households</li> <li>- The use of solar energy and wind energy as energy sources</li> <li>- Use of e-vehicle adoption and petrol usage reduction in the transport system</li> <li>- People who use ICT for energy and natural resource management activities</li> <li>- The level of internet usage for information provision and management of energy and natural resources</li> <li>- Availability of data in energy and natural resources sector</li> <li>- Capability in accessing digital data</li> <li>- The rate of electric power generated per year</li> <li>- Natural gas and oil produced</li> <li>- The rate of natural gas and oil sold</li> </ul>

Spatial Management
<ul style="list-style-type: none"> <li>- Compliancy of urban space planning with the spatial regulations</li> <li>- Compliancy of land use plan with TOD (transit-oriented development)</li> <li>- Conformity of urban planning with the face of the city</li> <li>- Planning of green open space</li> <li>- The area of agriculture, plantation, forestry and fishery (existing condition)</li> <li>- The availability of financing cooperation and partnership in the planning, development, improvement (management) of city infrastructure</li> <li>- The sufficiency of budget in managing the structure and pattern of urban space</li> <li>- The availability of government policies related to smart city and urban sustainable development</li> <li>- The availability of data for spatial sector</li> </ul>

Environment
<ul style="list-style-type: none"> <li>- The condition of air quality</li> <li>- The condition of water quality</li> <li>- Control of the air quality</li> <li>- Control of water quality</li> <li>- Control of garbage</li> <li>- Cubication of water sold</li> <li>- Availability of control system utilization and improvement of the quality of water, air and urban waste</li> <li>- The electric power sold per year</li> <li>- Levels of environmental pollution</li> <li>- The presence of a fuel utilization per day</li> <li>- Contamination of water quality, waste and urban air pollution</li> </ul>

# LIST OF DIMENSIONS AND INDICATORS

CITY DEVELOPMENT AND MANAGEMENT
<ul style="list-style-type: none"> <li>• Management, Integration and Sustainability</li> <li>• Digital Government</li> <li>• Strategy and Plan</li> </ul>

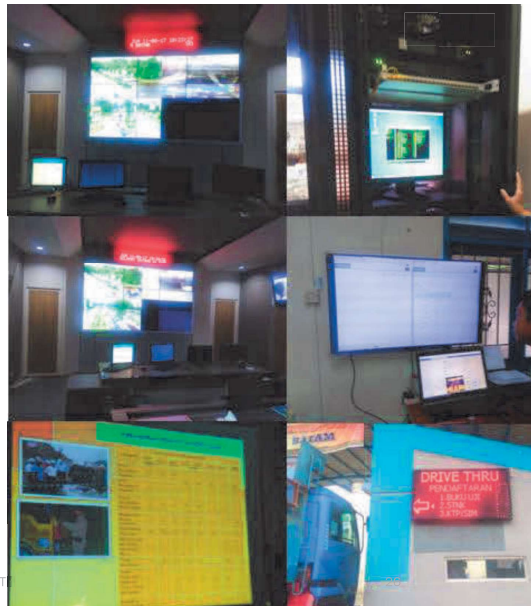
DIGITAL GOVERNMENT READINESS
<ul style="list-style-type: none"> <li>• ICT Development Plan</li> <li>• Quality of ICT Implementation for internal city administration</li> <li>• The existence of City Government Enterprise Architecture</li> <li>• Percentage of OPDs utilizing ICT for Community Services</li> <li>• Percentage of OPD connected to WAN / LAN</li> <li>• Data Center presence in City Government</li> <li>• Adequacy of ICT Resources in City Government</li> </ul>

KESIAPAN INTEGRASI (INTEGRATION READINESS)
<ul style="list-style-type: none"> <li>• Planning Mechanism</li> <li>• Operational Mechanism</li> <li>• Monitoring and Evaluation Mechanism</li> <li>• Change Management Mechanism</li> <li>• Inter-sectoral integration</li> <li>• Program / Innovation Sustainability Strategy</li> </ul>

## BATAM CITY

Batam City's economy is sustained by a variety of driving sectors including communications, industry, shipping, trading and other services that are the result of consumption of both the local population of Batam and export commodities.

In the application of smart city, Batam City uses applications for financial and monitoring activities, tax and PBB applications, media center, as well as setting traffic light with ATCS in control room to unravel congestion.



## BATAM CITY

### CITY CONDITION MEASUREMENT

Dimension	31 City Average	Batam
Center of Economic Activity	60,04%	70,97%
Education	71,47%	78,47%
Industry & Tourism	53,68%	53,12%
Safety & Security	53,74%	55,47%
Health	69,11%	72,85%
Public Services	59,62%	58,28%
Community	54,31%	53,76%
Transportation & Mobility	62,59%	73,95%
Energy	46,40%	55,11%
Spatial Management	61,98%	73,11%
Environment	60,99%	73,66%



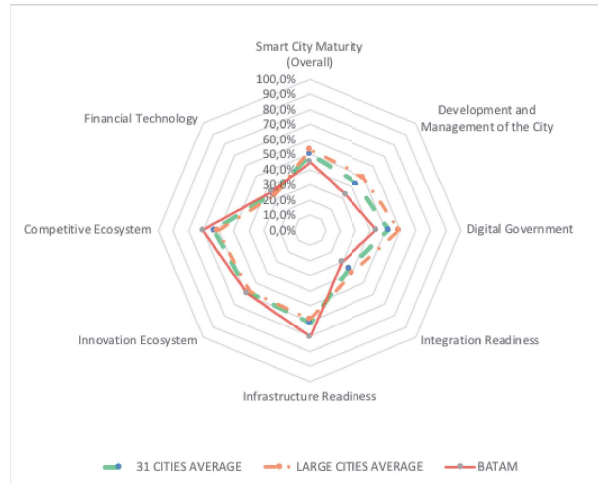
# BATAM CITY

## MEASUREMENT RESULT FOR SPECIAL CATEGORY

KRITERIA	31 CITIES AVERAGE	LARGE CITIES AVERAGE	BATAM
Smart City Maturity (Overall)	49,9%	53,2%	44,7%
Development and Management of the City	43,8%	50,1%	33,4%
Digital Government	52,4%	59,2%	44,3%
Integration Readiness	36,4%	40,3%	30,0%
Infrastructure Readiness	61,2%	59,0%	70,5%
Innovation Ecosystem	57,7%	57,0%	58,9%
Competitive Ecosystem	63,3%	61,1%	70,7%
Financial Technology	34,5%	32,7%	35,9%

Notes:

Above Average
Below Average

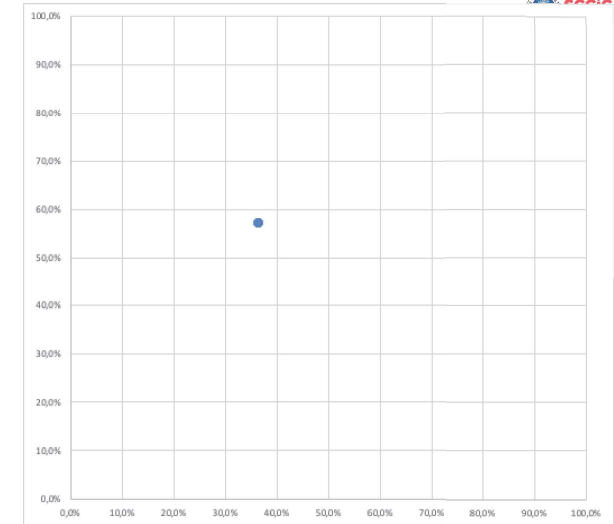


# BATAM CITY MAPPING

END RESULT: 44,7%

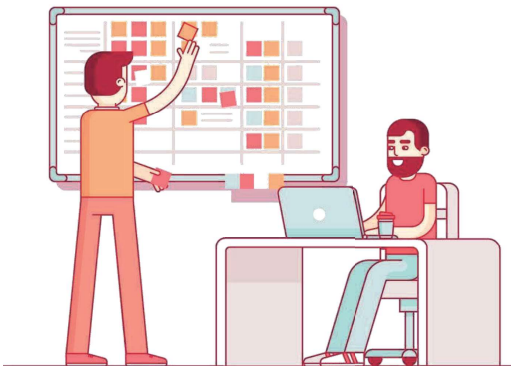
MATURITY LEVEL SCATTERED

City Condition & Quality of Life



# SMART CITY LIVING LAB

By Smart City and Community Innovation Center



SCCIC (Smart City & Community Innovation Center) is Research Community in ITB that have strong motivation to find systematic solution for any city problem or city challenges (can expanded to village, province, nation, or others) and at the same time produce scientific publication as our contribution to scientific world.

## GOALS

Propose smart solution for city, village, province, nation by creating: Model, Architecture, Method, Framework, Solution, Proposed Regulation, etc

## ACTIVITY

Research, Innovation Development, Seminar, International Conference, Scientific Publication, Indonesia Smart City Rating (2015 & 2017), Training, Workshop, Consultations, etc

## OUR APPROACH FOR CO-CREATION PROCESS

- Involving Heterogeneous Smart City Stakeholders through:
  - Co-definition, Co-experience and Co-Elevation



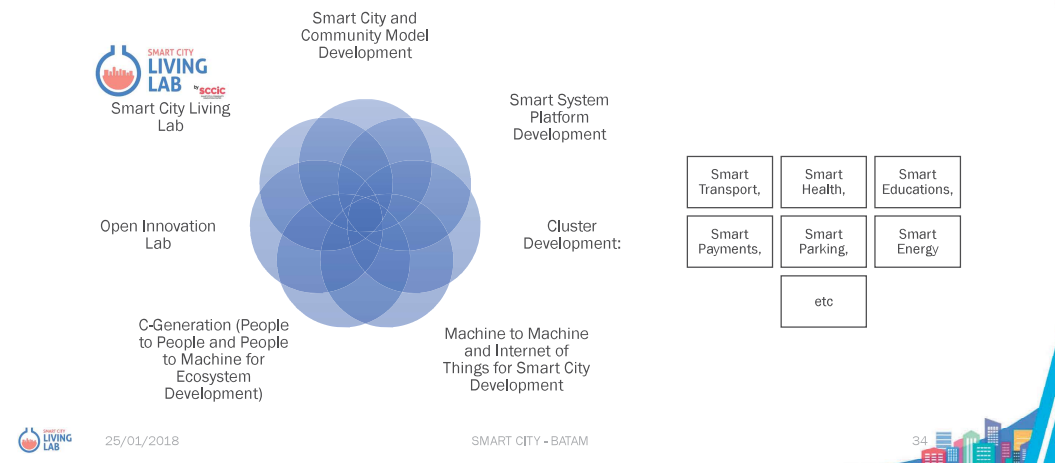
## PERSUASIVE TECHNOLOGY

### Definition

- Technology that is designed to change attitudes or behaviors of the users through persuasion and social influence, but not through coercion (Fogg, 2002)

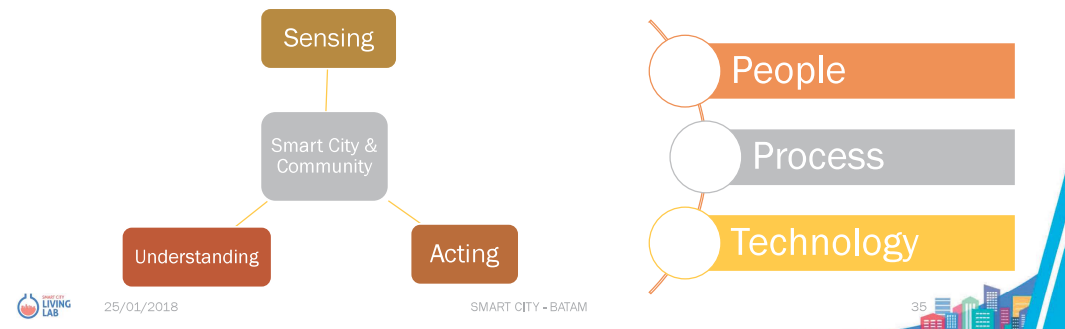


## RESEARCH AND INNOVATION PROGRAM



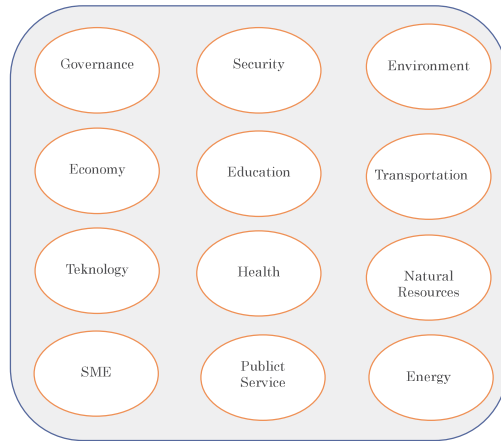
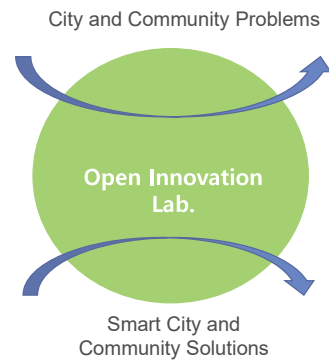
## OPEN INNOVATION LAB

Open Innovation Lab is a program to understand (sense) the real problem of city or and community then to discuss multidisciplinary in this lab and finally proposing a solution with industry and community.





## INNOVATION FOCUS ON SMART CITY AND COMMUNITY



## SMART CITY LIVING OPEN INNOVATION LAB



## SMART CITY LIVING LAB



## CLOSING REMARK

# KEY CHALLENGES AND OPPORTUNITIES



- Building understanding and collaboration between relevant stakeholders. City must be ready to cope with change better through the development of services based on the Smart City concept
- Policies and regulations are an important issue in the development of Smart City, but currently lags behind technological developments.
- One of the biggest challenges is to integrate all solutions.
- The importance of educating the public on how smart city solutions will affect the process of life and how the right decision is the key to success in the future.



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**Prof Suhono Harso Supangkat**

Smart City and Community Living Lab  
Kelompok Keahlian Teknologi Informasi  
Sekolah Teknik Elektro dan Informatika  
Institut Teknologi Bandung  
suhono@stei.itb.ac.id

# GREEN BUILDING CONCEPT

Sebuah upaya untuk membuat lingkungan semakin sehat, nyaman dan berkelanjutan

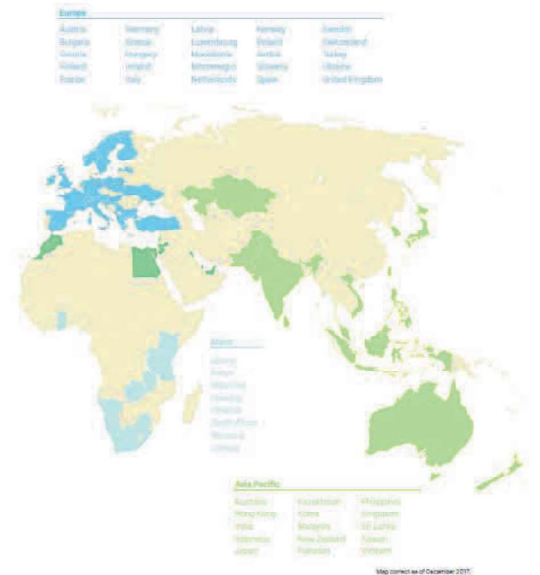
Surendro | Green Building Council Indonesia  
Batam, 25 Januari 2018



Outline:  
Introduction of GBC  
Indonesia  
Why Green Building?  
Concept of Green Building



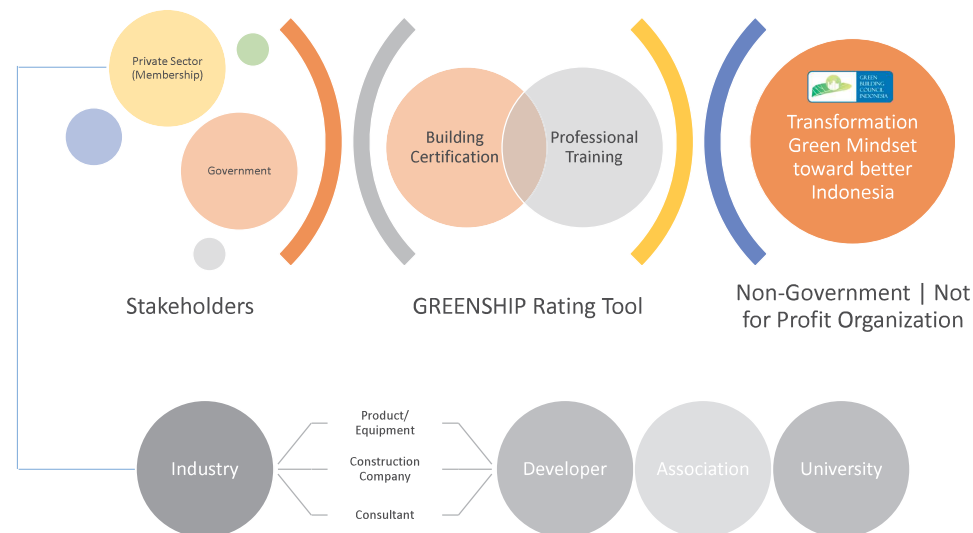
Emerging Member of [World Green Building Council](#)







supporters



6



- Appropriate Site Development
- Energy Efficiency and Conservation
- Water Conservation
- Material Resource and Cycle
- Indoor Health and Comfort
- Building Environment Management



Energy Efficiency

Water Efficiency

Embodied Energy from Building Material



## TRAINING & EDUCATION

GREENSHIP ASSOCIATE Training

GREENSHIP PROFESIONAL Training

## EVENT & PUBLIC RELATIONSHIP

Workshop

Conference

Exhibition



DKI Jakarta  
Governor Regulation  
No. 38 / 2012  
Green Building

Mandatory  
for certain  
building  
size



Offices,  
Malls &  
Apartments

> 50,000 square meter



Hotels &  
Hospitals

> 20,000 square meter



Education  
Facilities

> 10,000 square meter



After 3 years  
implementation

260 buildings

> 15 mil sqm

Saving energy  
853,914  
MWh/year

Cost saving USD  
68.3 mil/year

CO2  
reduction  
605,425  
ton/year

Data source: <https://greenbuilding.jakarta.go.id/#> → design base of NB and self-declare of EB

## JAKARTA GREEN BUILDING

GRAND DESIGN REGULASI PANDUAN PENCAPAIAN KATA MEREKA BERITA PRANALA LUAR KONTAK ENGLISH

## Komitmen 30:30<

Jakarta sebagai *Center of Excellence* Bangunan Gedung Hijau

Pada tahun 2030, Jakarta telah menetapkan visi untuk mengurangi 30% konsumsi energi, 30% emisi CO2 dan 30% konsumsi air (Komitmen 30:30). Temukan lebih lanjut dalam Grand Design Implementasi Bangunan Gedung Hijau.

lebih lanjut



<https://greenbuilding.jakarta.go.id/#>



Bandung City  
Mayor Regulation  
No. 1023 / 2016  
Green Building

## HUMAS KOTA BANDUNG



PERATURAN WALIKOTA BANDUNG  
NO. 1023 TAHUN 2016  
TENTANG BANGUNAN GEDUNG HIJAU

Untuk mendapatkan izin mendirikan bangunan (IMB) dari  
Dinas Tata Ruang (Distaru), bangunan di antaranya harus:



HEMAT AIR



HEMAT LISTRIK



SIRKULASI DAN  
KUALITAS UDARA  
YANG BAIK



MEMPERBANYAK  
RUANG TERBUKA HIJAU



PENANGANAN  
LIMBAH YANG BAIK

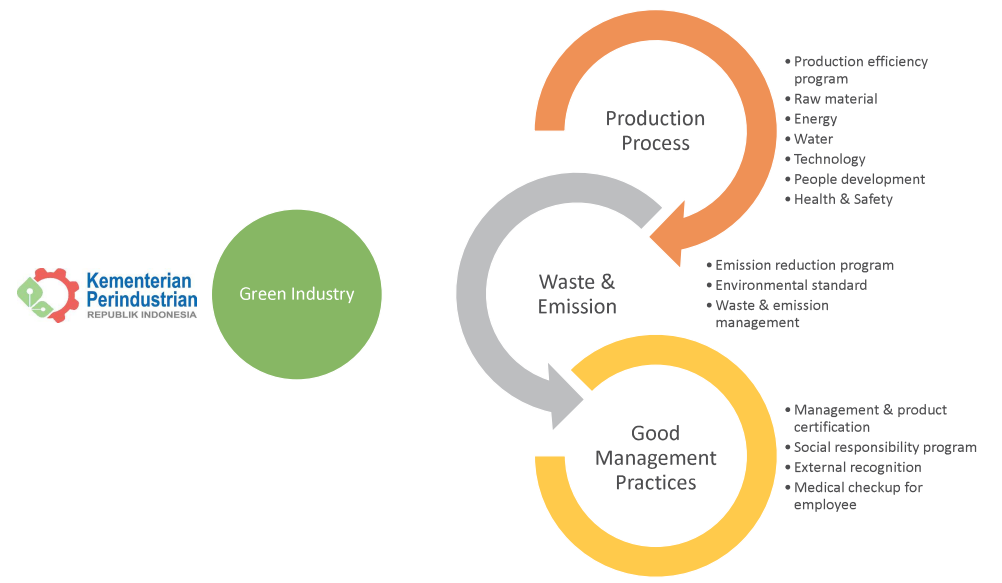


PENGLOLAAN  
SAMPAH YANG BAIK

## Central Government Programs



13

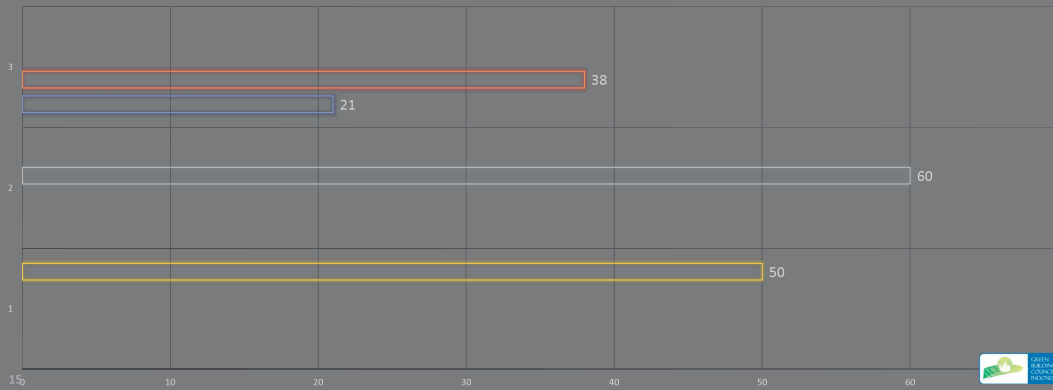


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## ENGAGE CORPORATE AND PROFESSIONAL

### GBC INDONESIA MEMBERSHIP

Core Founder (Individu) Prospective Corp. Member Corporate Member Corporate Founder Member



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## CORPORATE FOUNDER GBC INDONESIA



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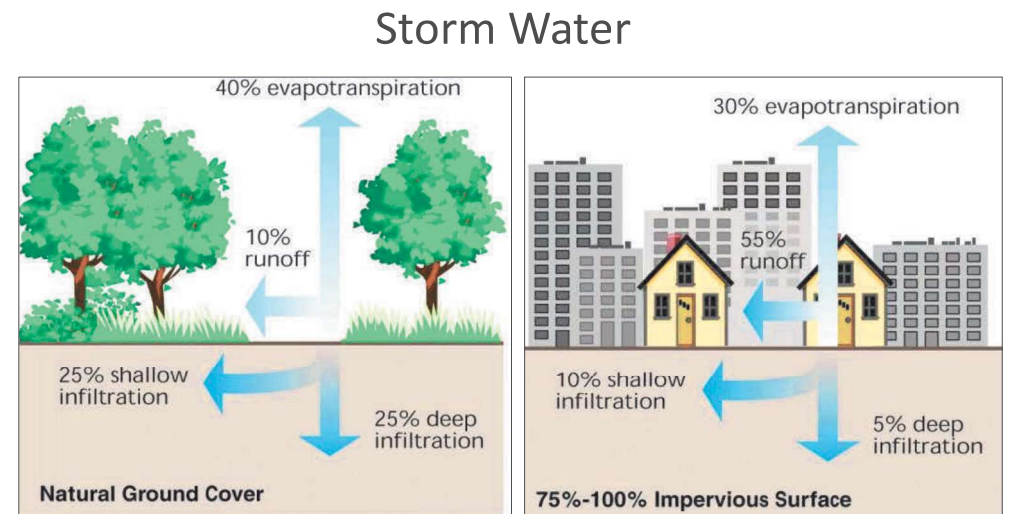




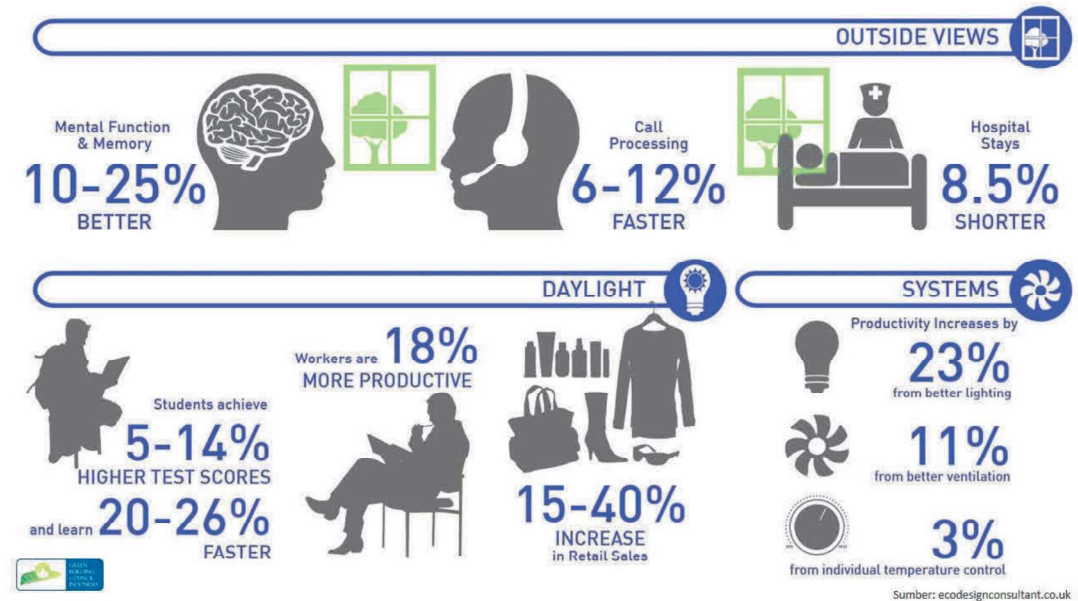
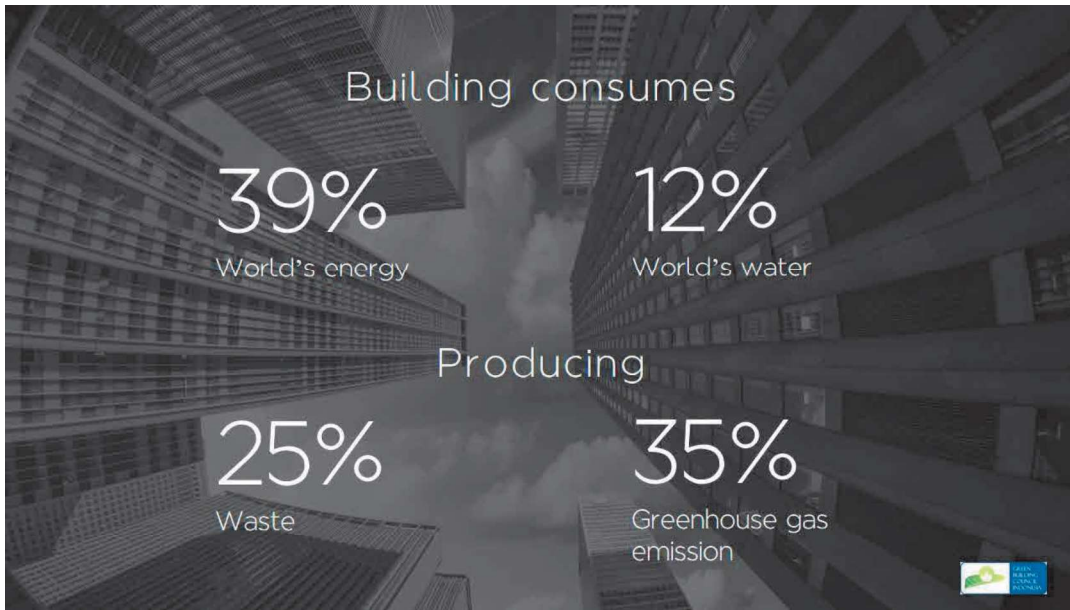
Your results are back. It's climate change. Just how many greenhouse gases have you been consuming?




















## what is green building?

- ▶ Green building (also known as green construction or sustainable building) refers to both a structure and the using of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition. ([https://en.wikipedia.org/wiki/Green\\_building](https://en.wikipedia.org/wiki/Green_building))
- ▶ **Green Building** = Performa Bangunan
- ▶ Bangunan yang Terukur | If we can measure it, we can manage it



GREEN BUILDING COUNCIL INDONESIA

## Green Building Philosophy

**Healthy** + **Environment** + **Built Environment**

=

**Green Building** = **Economic value**

GREEN BUILDING COUNCIL INDONESIA







## TEPAT GUNA LAHAN

Sediakan fasilitas untuk  
pengendara sepeda dan  
pengguna transportasi lainnya



Mengembangkan area  
hijau bangunan



Menciptakan iklim  
mikro pada lingkungan  
bangunan

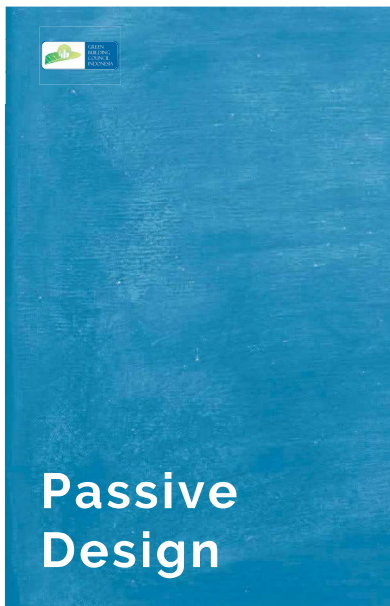




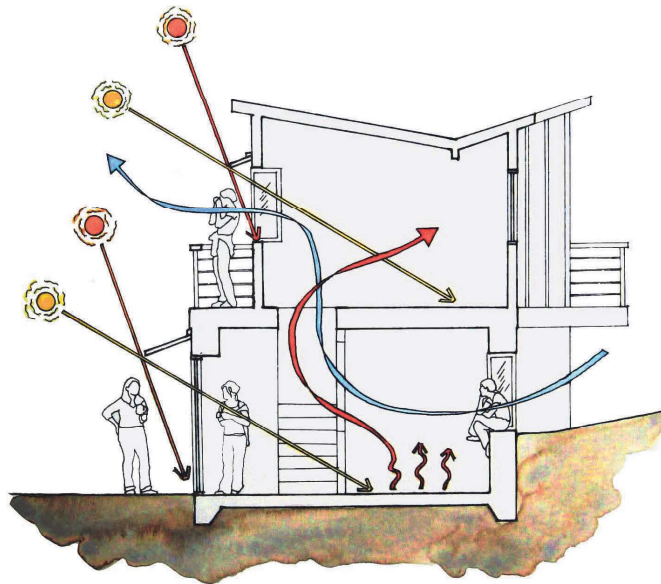
Mempertimbangkan dampak dari lahan terbangun terhadap air limpasan dan infrastruktur drainase



EFISIENSI DAN KONSERVASI ENERGI



Passive Design



Penggunaan peralatan hemat energi

Memaksimalkan pencahayaan alami



Menggunakan energi  
terbarukan



KONSERVASI AIR



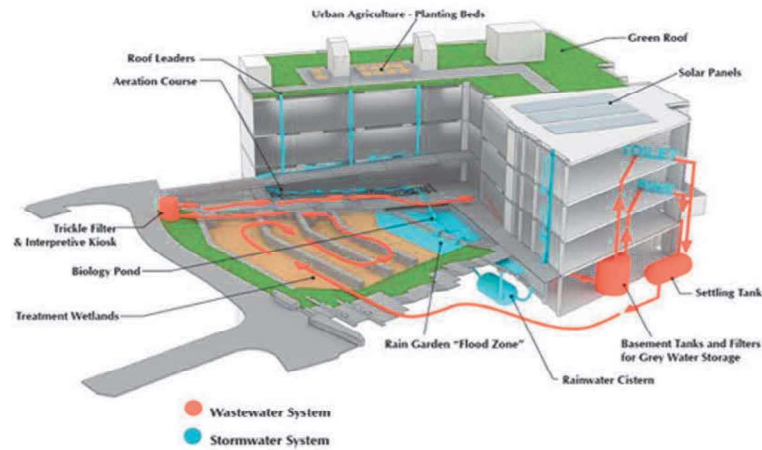
Peralatan hemat air dengan  
menggunakan menggunakan  
sensor



Tanaman yang  
membutuhkan sedikit  
air atau wild plant







## Air daur ulang dan sumber air alternatif



## SUMBER DAN SIKLUS MATERIAL




Material yang diproses dengan cara yang ramah lingkungan dan dari sumber yang berkelanjutan




Pilih material prefab karena ringan dan memiliki sedikit limbah








Mengurangi limbah dan  
memaksimalkan penggunaan kembali



Gunakan material lokal



KESEHATAN DAN  
KENYAMANAN DALAM RUANG



Kenyamanan visual, suhu  
udara, dan kebisingan









## GREENSHIP Neighborhood

Assesment for neighborhood and district scale

Can be use for housing, CBD, industrial district, either for small scale or large scale

Assesment available for design stage and existing stage

Download at [http://www.abcdindonesia.org/greenship/rating-tools/download/cat\\_view/4-greenship/38-greenship-neighborhood](http://www.abcdindonesia.org/greenship/rating-tools/download/cat_view/4-greenship/38-greenship-neighborhood)

## GREENSHIP Neighborhood

- Land Ecological Enhancement
- Movement and Connectivity
- Water Management and Conservation
- Solid Waste and Material
- Community Wellbeing Strategy
- Building and Energy
- Innovation and Future Development



Terima Kasih

**GREEN BUILDING COUNCIL INDONESIA**

Jl. RC Veteran No. 3A/1 Pesanggrahan  
Bintaro Jakarta Selatan  
+62 21 734 3077  
[info@gbcindonesia.org](mailto:info@gbcindonesia.org)

**f GREEN BUILDING COUNCIL INDONESIA**

**@GBCINDONESIA**

**GBC INDONESIA**

**GBC INDONESIA**



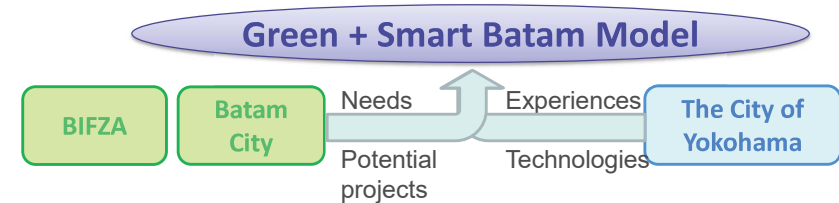
# Objectives: city-to-city collaboration

- Our project aims to
  - promote JCM project formulation
  - support Green City Programme of Batam
- “Best available solutions for Batam” needs to be considered through collaboration.

## Project for Development of Low-carbon City through City-to-City Collaboration between Batam and Yokohama

Support of Green City Policy of Batam by Introduction of Smart LED Street Lighting System and Green Buildings

January 30, 2018  
SAITO Tetsuya  
Nippon Koei Co., Ltd.



January 30, 2018 Batam-Yokohama City-to-City Collaboration

NIPPON KOEI  
2

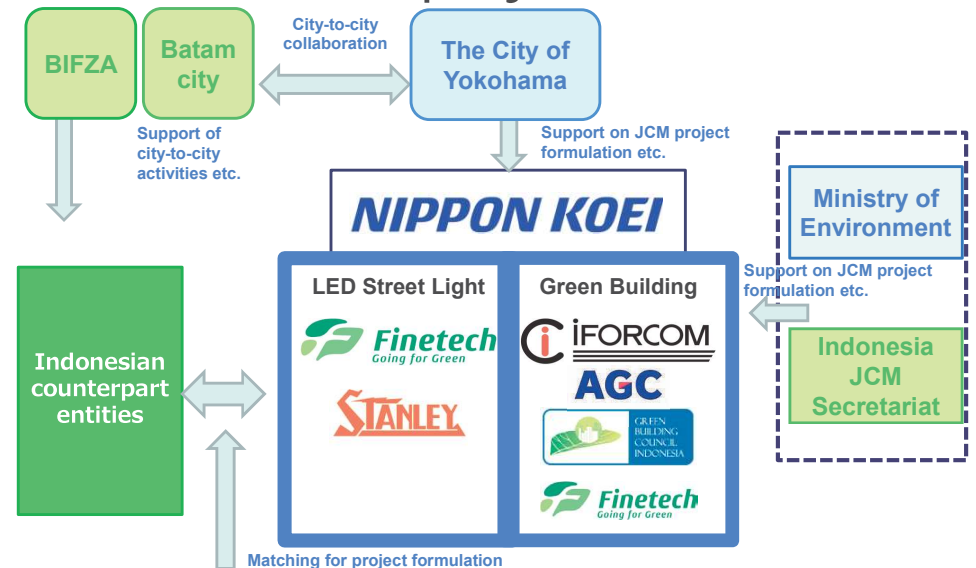
## 6 pillars for city-to-city collaboration

1 Background

Sector under city to city collaboration (6 pillars)	2015 City to city collaboration	2016 City to city collaboration	2017 City to city collaboration	2018 City to city collaboration	Future
<b>Green Planning</b>	Initiation of city to city collaboration Information collection on needs of Batam and discussion on collaboration framework	Deepen of city to city collaboration Development of project map : 6 pillars of city to city collaboration for Batam's future vision as green city	Implementation of project under collaboration at planning scheme Target setting for low carbon society - standardization of green building - Support of development of water management MP	Energy saving policy making and implementation of core project Support of monitoring for target achievement and study of land use plan	Expansion to other cities as Batam-Yokohama model Support of development a plan for climate change mitigation and adaptation
<b>Green Water</b>	Judge dehydrating FS		METI Water management FS	Water treatment project	Sewerage FS & project Desalination of seawater FS & project
<b>Green Waste</b>	Spent bleaching earth treatment and bio-fuel production FS	Thermal Desorption Unit FS (Industrial waste management)	METI Thermal Desorption Unit project (proposed/not selected) Sustainability Evaluation: Waste Management METI Spent bleaching earth treatment FS	Spent bleaching earth treatment project	
<b>Green Industry</b>			Solar PV system in industrial park (proposed/not selected)	JCM Smart LED street light with PV project	Eco industrial park FS Eco industrial park project
<b>Green Building</b>	Airport energy saving FS	Hotel energy saving FS Ferry terminal FS Hospital energy saving FS	Airport energy saving project (proposed/withdrawn)	Green building (hotel) project (to be promoted by B to B) Green building (ferry terminal) project (to be promoted by B to B)	
<b>Green Transportation</b>			MOE Green building FS (office building and shopping mall) MOE Smart LED street light FS	JCM Green building (shopping mall) project BRT/smart transport FS	BRT project LRT project

## Structure of the project

1 Background



January 30, 2018 Batam-Yokohama City-to-City Collaboration

NIPPON KOEI  
4

# Targets and Approach for FY2017

“toward sustainable extension for all Batam”

## Green Transportation

- Smart LED street light Project in Nagoya / Industrial Parks / Ports



## Green Planning

- Standardization of Smart LED street lighting system

## Green Building

- Green Building Project for shopping mall / office building / residential building



## Green Planning

- Drafting Mayor's regulation for Green Building
- Setting target to increase green buildings in Batam

January 30, 2018

Batam-Yokohama City-to-City Collaboration

NIPPON KOEI

5

# Achievement (Smart LED+PV)

4 Achievements

## Green Transportation

- Smart LED street light Project in Nagoya / Industrial Parks / Ports



- **Smart LED street light and PV Project in Industrial Park**



## Green Planning

- Standardization of Smart LED street lighting system



- Communicating with Japanese expert organization which is **starting standardization in the central level** in Indonesia
- Compiling the learnings in (1) **port application** and (2) **highway application.**

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# Major events

Month	Milestone
Oct, 2017	Kick-off meeting in Batam
Nov, 2017	Field works in Batam
Dec, 2017	Site tour in Japan for water management sector Field works in Batam
Jan, 2018	Final workshop in Batam



↑ Kick-off Seminar  
(Oct 2017)

Discussion with  
Industrial Park  
↓ (Nov 2017)



↑ Courtesy Call  
at Yokohama  
(Dec 2017)

Final Workshop  
↓ (Jan 2018)



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# F/S Result (Smart LED+PV)

4 Achievements

Items	Description
Project Title	Smart LED street lighting and PV Project in Industrial Park
Japanese side	Finetech Co., Ltd.
Indonesian side	One of the biggest industrial parks in Batam
Leading low-carbon technologies	- LED street light with smart control - PV with sun-tracking system
Potential emission reduction	Approx. 2,080 tCO2/year (LED 1,120 +PV 960)

LED Street Lighting



AEMS Smart Monitoring  
& Controlling System



Roof-top & Ground Area for PV



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# Achievement (Green Building)

4 Achievements

## Green Building



## Green Planning

- Green Building Project for shopping mall / office building / residential building



- **Green Building Project for shopping mall**

- Drafting Mayor's regulation for Green Building
- Setting target to increase green buildings in Batam



- **Initial draft items for the regulation** is prepared
- **Launch forum** to discuss green building regulation in Batam (in Feb 2018)
- Sharing **Yokohama's experiences and know-how**

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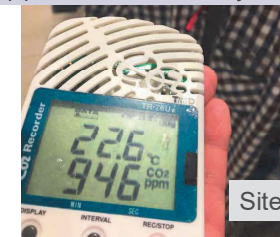
# F/S Result (Green Building)

4 Achievements

Items	Description
Project Title	Energy Saving for Air-conditioning Utility System in Shopping Mall by High-efficiency Control Equipment
Japanese side	iForcom Co., Ltd.
Indonesian side	One of the biggest shopping malls in Batam
Leading low-carbon technologies	- Monitoring and visualization system - Equipment and operational improvement
Potential emission reduction	Approx. 1,150 tCO2/year



Site survey: Chiller



Site survey: Ambient air

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5 Future

# Way Forward

Sector under city to city collaboration (6 pillars)	2015 City to city collaboration	2016 City to city collaboration	2017 City to city collaboration	2018 City to city collaboration	Future
<b>Green Planning</b>	Initiation of city to city collaboration Information collection on needs of Batam side and discussion on collaboration framework	Deepen of city to city collaboration Development of project map : 6 pillars of city to city collaboration for Batam's future vision as green city	Implementation of project under collaboration at planning scheme Target setting for low carbon society - standardization of green building - Support of development of water management MP	Energy saving policy making and implementation of core project Support of monitoring for target achievement and study of land use plan	Expansion to other cities as Batam-Yokohama model Support of development a plan for climate change mitigation and adaptation
<b>Green Water</b>	Sludge dehydrating FS		METI Water management FS		Water treatment project Sewerage FS & project Desalination of seawater FS & project
<b>Green Waste</b>	Spent bleaching earth treatment and bio-fuel production FS	Thermal Desorption Unit FS (Industrial waste management)	Thermal Desorption Unit project (proposed/not selected) Sustainability Evaluation: Waste Management Spent bleaching earth treatment FS		
<b>Green Industry</b>			Solar PV system in industrial park (proposed/not selected)	JCM Smart LED street light with PV project	
<b>Green Building</b>	Airport energy saving FS	Hotel energy saving FS Ferry terminal FS Hospital energy saving FS	Airport energy saving project (proposed/withdrawn) Green building FS (Office building and Shopping mall) Smart LED street light FS	Green building (hotel) project (to be promoted by B to B) Green building (ferry terminal) project (to be promoted by B to B) JCM Green building (shopping mall) project	
<b>Green Transportation</b>				BRT/smart transport FS	BRT project LRT project

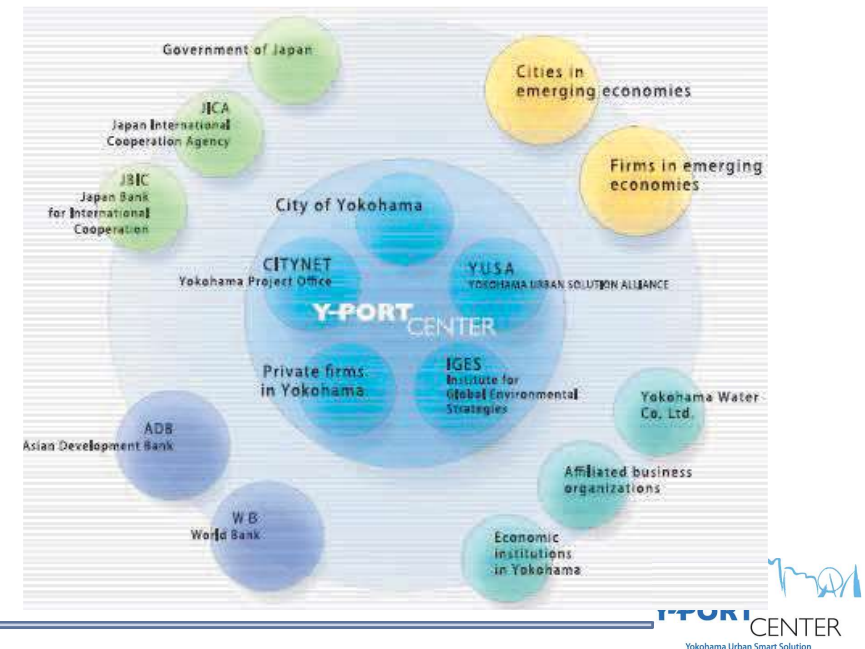
January

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## Yokohama's Initiatives for the Promotion of International Technical Cooperation



## Y-PORT CENTER – Knowledge hub for smart city management



## Y-PORT CENTER – Knowledge hub for smart city management

### Reinforcement of Y-PORT Center, opened in 2015, as a platform for Y-PORT project

[Issues indicated by private companies, March 2016]

- Reinforcement of personnel specialized in exporting infrastructure development
- Securing personnel to provide consistent support for long-term infrastructure business development
- Providing flexible and dynamic support for project development

#### [Measures for reinforcement]

##### #1 Opening Y-PORT Center Public-Private Partnership Office in July 2017

##### #2 Supporting overseas infrastructure business development by specialized-personnel, from October 2017

Locating personnel specialized in exporting infrastructure development through outsourcing at the Y-PORT Center Public-Private Partnership Office

##### #3 Consistent support from planning to developing business, from July 2017

Relocating 5 city-employees to support exporting infrastructure development to the Y-PORT Center Public-Private Partnership Office

## YUSA: YOKOHAMA URBAN SOLUTION ALLIANCE

Private sector alliance established in July 2017 mainly by Yokohama-based companies to develop more infrastructure business and to cope with urban issues in the emerging economies, in accordance with the reinforcement of Y-PORT Center by the City of Yokohama

### Establishing YUSA, not to lose business opportunities

#### ➤ Feature of YUSA 1: Pack of private companies

- To provide solution as a package for urban issues in the emerging economies by various companies with various technologies

#### ➤ Feature of YUSA 2: Private sector alliance with legal personality

- To be an independent subject to make contracts with various partners such as overseas cities, companies, and international donors

#### ➤ Feature of YUSA 3: Sharing basic ideas on exporting infrastructure business development with the City of Yokohama

- To make it easy to understand the reason to collaborate with the City of Yokohama, by sharing basic ideas of Y-PORT project to cope with urban issues in emerging economies and to provide infrastructure business opportunities, and also by signing MoU for collaboration with the City of Yokohama



## YUSA (YOKOHAMA URBAN SOLUTION ALLIANCE)

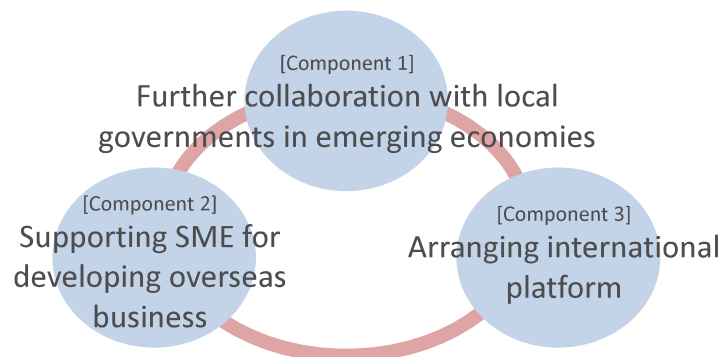
*Yokohama Urban Solution Alliance*



- In July 2017, YUSA and the City of Yokohama signed an MoU to collaborate for developing Y-PORT project by utilizing each strength
- In August 2017, YUSA located in Y-PORT Center Public-Private Partnership Office
- Number of members as of December 2017:
  - Member: 10
  - Associate member: 12
  - Supporting member: 3



## Future development



[Key words]

- Stronger consulting services  
Interactive innovation by figuring out needs on development through communication from the first planning phase
- Working further in line with national policy
- Further collaboration with MDB



## Collaboration with private companies in Thailand #1


## Collaboration between AMATA and YUSA

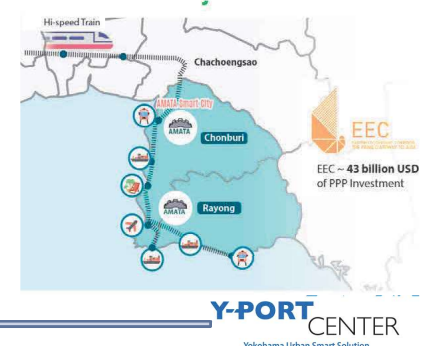
Ministry of Energy Thailand and AMATA started collaboration for Eastern Economic Corridor initiative

- **Request from Ministry of Energy:** converting industrial estate into smart one
  - **Request from AMATA :** converting AMATA Nakorn into smart city, mainly by smart infrastructure, and introducing state-of-the-art technologies from Yokohama-based companies to build smart cities for expansion in Vietnam, Myanmar Lao and Cambodia
- 
- Signing ceremony  
by YUSA and AMATA in Bangkok  
January, 2018



### <Future Development>

- ✓ Sharing experience and expertise on smart city by City of Yokohama through YUSA
    - Study by YUSA: finding needs and site visit
    - Holding seminars to share suggestion from YUSA and vision of AMATA
  - ✓ Aiming to develop concrete projects from FY2018 on, and taking disseminating smart technologies and infrastructure technologies to other ASEAN countries into account in the long term
- 
- The map illustrates the Eastern Economic Corridor (EEC) in Thailand, a strategic area for investment. It shows the route from Bangkok to Chachoengsao, Chonburi, and Rayong. The EEC is highlighted in orange, and the map includes icons for various infrastructure projects such as roads, bridges, and ports. The text on the map indicates that the EEC is a key area for investment, with a total of approximately 43 billion USD in PPP investment.



## Future development

**[Component 1] Further collaboration with local governments in emerging economies**

- Developing firm mutual trust with local government through long-term collaboration
- Not sectorial but integrated interactive dialog, such as the Danang Urban Development Forum

**[Component 2] Supporting SME for developing overseas business**

- Intensive and continuous support for companies for project development such as business seminar, business matching, feasibility studies and pilot projects
- Developing “Solution Package” integrated with each companies’ technologies
- Exporting appropriate products and technologies by picking up developing needs precisely

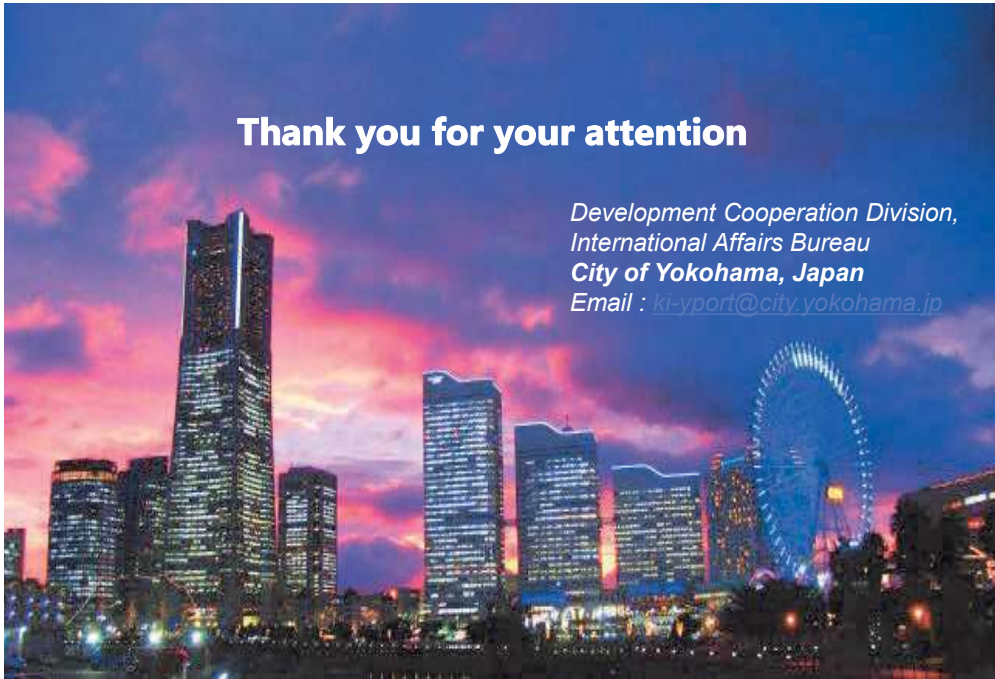
### [Component 3] Arranging international platform

- Developing knowledge-platform by collaboration with WB and ADB, such as expansion of Asia Smart City Conference
- Inviting international conferences to Yokohama, and participation to major international conferences such as COP23 and WUF9
- Encouraging international organization to relocate in Yokohama



**Thank you for your attention**

*Development Cooperation Division,  
International Affairs Bureau  
**City of Yokohama, Japan**  
Email : [ki-yport@city.yokohama.jp](mailto:ki-yport@city.yokohama.jp)*







## Batam Indonesia Free Zone Authority (BIFZA)

### Seminar:

City-to-City Collaboration Projects for Low Carbon City Development in Asia



Japan, January 30<sup>th</sup> 2018  
Hirakawacho, Chiyoda-ku, Tokyo

## Presentation Outline:



BIFZA

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## FORTHCOMING INFRASTRUCTURE PROJECTS



BATU AMPAR CARGO PORTS



TANJUNG SAUH TRANSHIPMENT  
CONTAINER PORT



SEKUPANG CARGO PORT



TOLL ROADS (Phase 1)



BATAM LIGHT RAIL TRANSIT



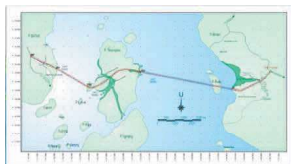
TERMINAL 2  
HANG NADIM AIRPORT



CARGO TERMINAL OF HANG  
NADIM AIRPORT BATAM



BATAM WWTP (Phase 2)



BATAM – BINTAN BRIDGE

BIFZA



INTEGRATED SERVICE UNIT

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## Vision/Strategy/Master Plan for Low Carbon City (or Green City) Development

## What does BIFZA have?



## Vision/Strategy/Master Plan for Low Carbon City (or Green City) Development:



The development planning of public transportation: Batam Light Rail Transit (LRT)

The improvement planning of dams maintenance in Batam in order to maintain water supply continuity

The Implementation of Green Building Concept in BIFZA's New Hospital Building

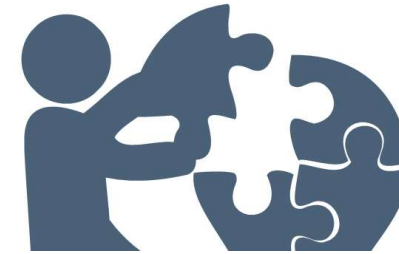
The Development of Sewerage System In Batam Island

Development planning of Hazardous Waste Treatment Area



## Measures/Actions Taken for Low Carbon City Development

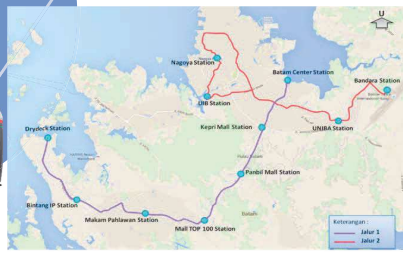
### What does BIFZA plan?



## The Development Planning Of Public Transportation: Batam Light Rail Transit (LRT)

All of the feasibility study phases already done

Current state: looking for investors to implement



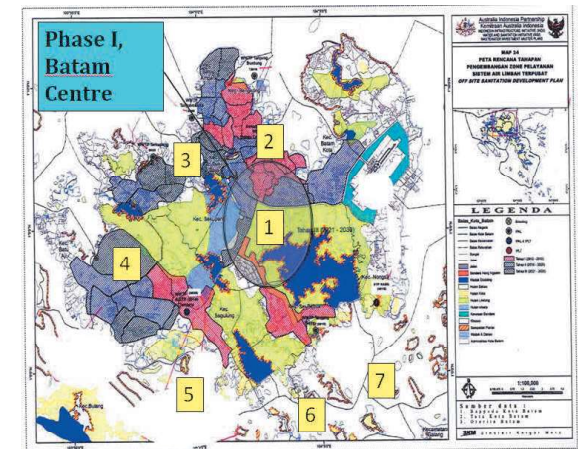
BIFZA



## The Development of Sewerage System In Batam Island

- 7 locations of WWTP in Batam:

1. BATAM CENTRE
2. Bengkong
3. Tanjung Uma
4. Sekupang
5. Tembesi
6. Telaga Punggur, dan
7. Kabil

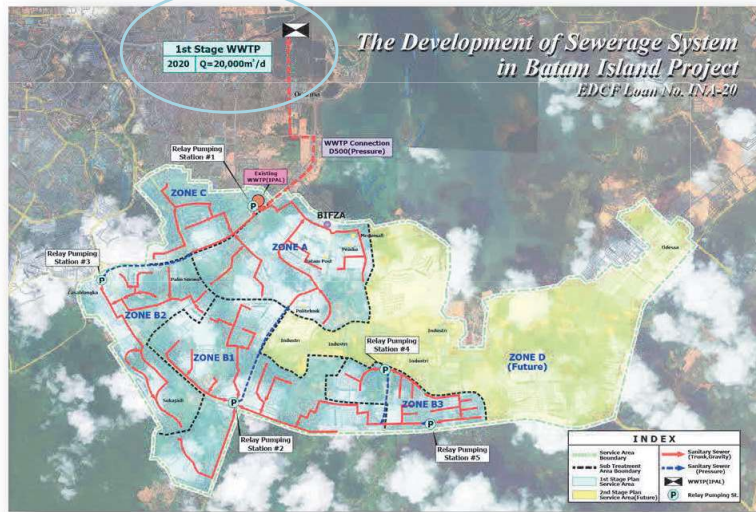


BIFZA

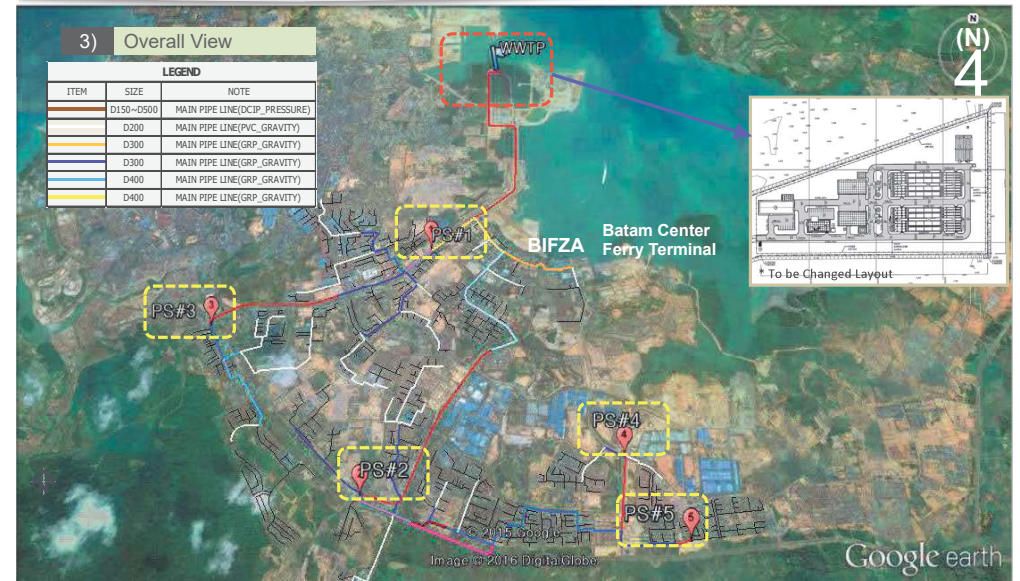




# THE DEVELOPMENT OF SEWERAGE SYSTEM IN BATAM ISLAND PHASE I



## THE DEVELOPMENT OF SEWERAGE SYSTEM IN BATAM ISLAND PHASE I



## The Improvement Planning of Dams Maintenance In Batam

- Purpose: in order to maintain water supply continuity
- Development and Procurement Plans :



**Sediment Trap Development** ; is a water structure that serves to precipitate incoming sediments with the aim of collecting and removing sand and mud particles.

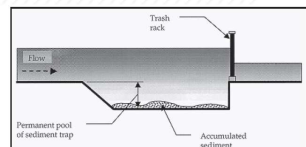
Installation of **Trash Rack**; is one of the water buildings made of steel plate where its function is to filter garbage / debris carried by the flow of water to keep the channel / reservoir clean from waste.

Application of **Ecotech Garden Technology (EGA)**; one of the solutions to eliminate pollutants from the exhausts of Gray Water, and there is the possibility of a septic tank containing pollutants (BOD, COD, N, P, K Detergent) and Odor.

**Floating Barriers** Installation; Floating is made for containment and control of debris, plants and floating particles. Perfect for calm and moving water areas, this blast features top flotation, impermeable rack and lower beam to successfully control and hold the goods.

**Procurement of Harvester (water hyacinth cleaner)**; cleaning water hyacinth scattered in Duriangkang Reservoir by using water hyacinth cleaning machine.

Control and Control of Illegal Buildings in Catchment Area (DTA) Duriangkang Reservoir.



Alternative Tanaman Air yang Ditanamkan pada Ecotech Garden. Alternatif tanaman air untuk ditanamkan pada EGA, adalah :



## 10 OF LOCATIONS PLANNING FOR SEDIMENT TRAP & TRASH RACK (STTR) IN ONE OF BATAM'S DAM (DURIANGKANG DAM)





## Development Planning of Hazardous Waste Treatment Area

Consist of 2 phase of development planning:



BIFZA

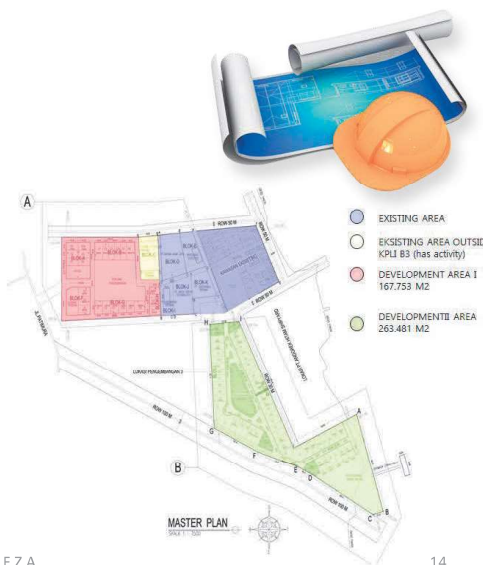
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## Development Planning of Hazardous Waste Treatment Area

Consist of 2 phase of development planning:



BIFZA



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## The Implementation of Green Building Concept in BIFZA's New Hospital Building

- What has the new hospital building already have?
  - ✓ Sewage Treatment Plant (STP)
  - ✓ Recycling water from waste water
  - ✓ Using façade material for reduce heat
- What does the new hospital want to develop?
  - ☐ Utilization of inverter technology for air conditioner system
  - ☐ Utilization of LED lamp in hospital building
  - ☐ Utilization of PV system for street light energy source



BIFZA

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## How The City-To-City Collaboration Project Contributes To Your City's Development

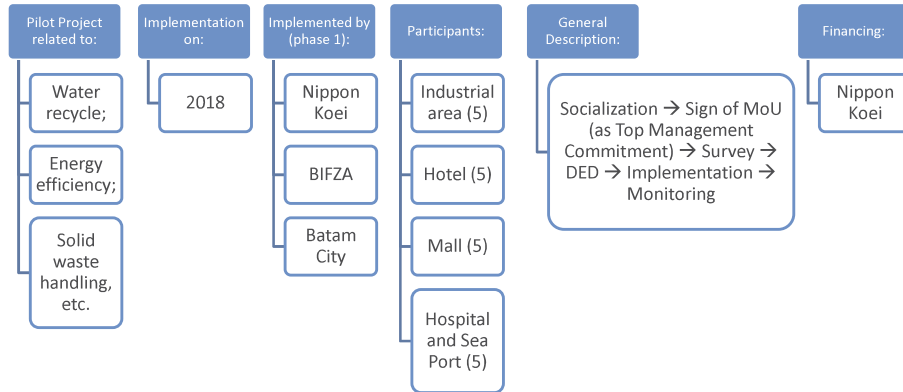
## What does BIFZA hope?







## PILOT PROJECT PLANNING



BIFZA

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# Thank You



BIFZA

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## City-to-City Collaboration

### Toward Smart and Green Island of Batam



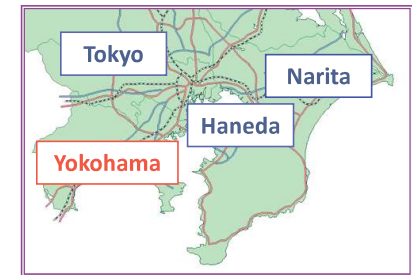
Development Cooperation Division, International Affairs Bureau  
City of Yokohama

1

## Overview of Yokohama City



- International port city  
Opening of port of Yokohama in 1859
- Population: approx. 3.7 million  
Largest city in Japan
- GDP: approx. 12.7 trillion JPY  
(approx. 107 billion USD)
- 21 minutes from Haneda Airport (Tokyo)

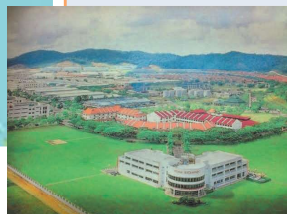


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## Introduction of Batam City



- Population: 1.2 million
- Industry Oriented Island as a Free Trade Zone operated by the Batam Indonesia Free Zone Authority (BIFZA)
- More than Twenty Industrial zones where Japanese enterprises locate their factories.
- Essential needs for efficient waste supply, water /solid waste management, energy management, public transportation system in order to accommodate increasing population



3

## City to City Collaboration in Batam

Letter of Intent on Technical Cooperation for Sustainable Urban Development Signed with the City of Batam, on 27th May, 2015 for 3 years



**To be renewed by March 2018 toward becoming a tripartite partnership among Batam City, BIFZA, and Yokohama**

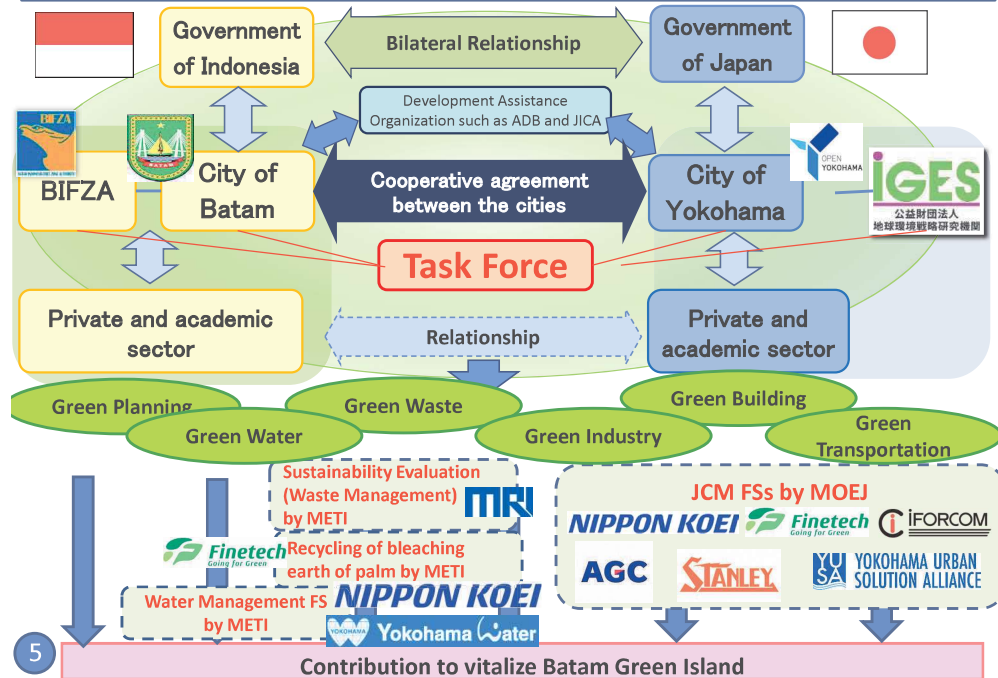
### Contents of Agreement

1. The City of Yokohama will offer technical advice in promoting the eco-city development of the City of Batam.
2. **The Parties will encourage participation of the private sector and academic organizations.**
3. The Parties will take action to obtain cooperation of the governments of both countries and international organizations.
4. The Parties will mutually provide information essential to implementing the above collaboration effectively.

4



## Framework of City-to-City Collaboration with Batam in this Year



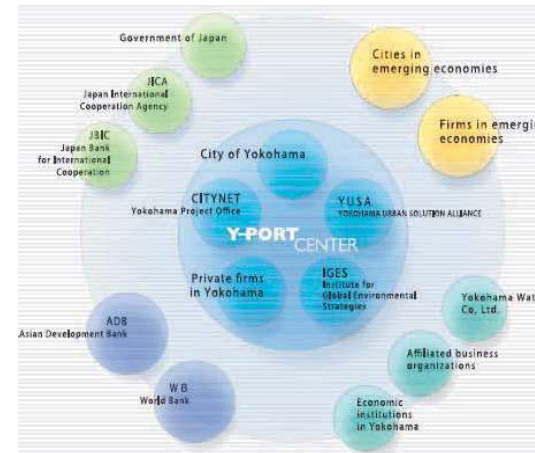
## Y-PORT CENTER – Knowledge hub for smart city management

Please visit our web site:

<http://www.city.yokohama.lg.jp/kokusai/yport/en/>

Development Cooperation Division,  
International Affairs Bureau  
City of Yokohama, Japan  
Email : [ki-yport@city.yokohama.jp](mailto:ki-yport@city.yokohama.jp)

Yokohama Urban Solution Alliance



Thank you for your attention

## Assessment Items of Green Building Regulations in Indonesia

Phase	INDONESIA		JAKARTA	BANDUNG		BATAM(Proposal)
	Categories of Targets	Sub-Categories	New Building	New Building / Extention		New Building
				5000+(m2)	5000-(m2)	2000+(m3)
Planning	1. Site Management	a. Orientation of building b. Site processing including accessibility/circulation c. Management of contaminated land of hazardous and toxic materials (B3) d. Green open space e. Pedestrian lane f. Management of treadmill g. Parking lots h. Outdoor lighting system i. Construction of building	1-e.g. Supporting facilities (pedestrian facilities, bicycle parking area & toilet) 3-a. Spatial plan requirements (designing of indoor and outdoor landscape, designing for rain water storage system)	1-d. Green Open Space establishment (yard and DHB) 1-e.g. Supporting facilities procurement (pedestrian, bicycle parking area & toilet)	1-d. Green Open Space establishment (yard and DHB)	1-a. Green open space 1-b. Pedestrian walk
	2. Energy efficiency	a. Building envelope b. Ventilation system c. Air conditioning system d. Lighting system e. Indoor transportation system f. Electricity system	2. Building cover system (OTTV 45 watt/m2) 2-b. Ventilation system (mechanical, if natural is unavailable) 2-c. Air conditioning system (temperature 25°C, relative humidity 60%, with sensor) 2-d. Lighting system (natural as well as mechanical with photoelectric sensor if natural cannot meet the illumination standards 2-e. Indoor transportation system (considering utilization load and time, lift designing by traffic management system) 2-f. Electricity system (designing for energy-saving equipment and consideration on voltage unbalance and power factor as well as Building Management System/BMS application)	2. Building cover system (OTTV 45 watt/m2) 2. Spreadsheet calculator to calculate sun radiation factor 2-c. Air conditioning system (temperature 25°C, with sensor) 2-d. Lighting system (natural lighting optimizing with photoelectric sensor/timer) 2-e. Indoor transportation system (escalator with automatic control, lift with velocity 60m/minute) 2-f. Electricity system (sub-meter installation)	2 Building cover system (OTTV 45 watt/m2) 2-c. Air conditioning system 2-d. Lighting system (15% of NDJ/WWR value, use energy-saving lightbulb such as LED, CFL, T5 fluorescent, others with 75 lumen/watt)	2-a. Building cover system (OTTV 45 watt/m2) 2-b. Air conditioning system 2-c. Lighting system (use of energy-saving lightbulb such as LED, CFL, T5 fluorescent, others with 75 lumen/watt, and natural lighting) 2-d. Conducting energy saving assessment 2-e. Application of energy management system 2-f. Preparation of energy management plan / manual
	3. Efficiency of water use	a. Water sources b. Water use c. Water-saving sanitary system	3-b. Designing for water use (sub water meter for PDAM water and/or ground water as well as for recycling water) 3-c. Designing for water-saving sanitary equipment	3-a. Planning for water sources (PDAM, ground water, rainwater harvesting, recycling water) 3-b. Planning for water utilization 3-c. Planning for water-saving sanitary equipment	3-a. Planning for absorbing pond and well 3-c. Utilization of water-saving sanitary equipment	3-a. Planning for water sources (rainwater harvesting and recycling water) 3-b. Planning for water utilization 3-c. Planning for water-saving sanitary equipment 3-d. Planning of Water recycling
	4. Indoor air quality	a. Banning smoking b. Controlling CO2 and CO c. Controlling the use of a freezer	4-b.c. Considering rate of indoor air circulation and input of fresh air, with CO2 monitor as well as non-CFC material utilization	2-b. Mechanical ventilation system (if natural is unavailable) 4-b. Control of CO2 at certain spaces (monitoring device with alarm & mechanical ventilation) 4-b. Control of CO at closed parking area (monitoring device with alarm & mechanical ventilation) 4-c. Utilization of refrigerator air system (non CFC material)	2-b. Mechanical ventilation system (if natural is unavailable)	4-a. Control of CO2 at certain spaces (monitoring device with alarm & mechanical ventilation) 4-b. Control of CO at closed parking area (monitoring device with alarm & mechanical ventilation) 4-c. VOC monitoring 4-d. Noise
	5. Environmentally friendly materials	a. Controlling the use of hazardous materials b. The use of certified environmentally friendly materials (Eco-labelling)				5-a. The use of certified environmentally friendly materials (Eco-labelling) 5-b. The use of recycled material 5-c. The use of durable materials in tropical climate (considering lifecycle cost) 5-d. Ease of maintenance
	6. Waste management	a. Application of the principles of the 3R b. Implementation of waste management system c. Application of waste recording system		6-b. Solid waste and garbage management (treatment plant)	6-b. Solid waste and garbage management (treatment plant)	6-b. 3R concept (especially segregation of Solid waste)
	7. Wastewater management	a. Provision of solid waste and liquid waste management facilities prior to dumping into city sewer b. Recycled water from wastewater (gray water)	6-b. 7. Management of liquid and solid wastes (treatment plant, piping system)	7. Planning for liquid waste management		
	Non-mentioned in Indonesian Law			2.3. SPB/BMS (building with floor coverage > 10,000 m2 and have central cooler and include supervision and control toward water and energy consumption)		7-a Innovative technology (Innovation (Bonus)) 7-b.ZEB (Net Zero Emission Building) (Innovation (Bonus)) 8-a. Monitoring (Operation) 8-b. Maintenance (Operation)
Construction	8. Green construction process	a. application of green construction implementation method b. optimization of equipment usage c. implementation of waste management d. application of water conservation to the construction implementation e. application of energy conservation to the implementation of construction	8-c. hazardous waste management (absorber, waste sorting) 8-d. water conservation management (water reservoir, dewatering)			
	9. Practices of green behavior	a. Implementation of Health and Safety Management System (SMK3) b. application of eco-friendly behavior.	9-a.b. working and environmental safety and healthy (washing bay, noise control, sanitary facilities, absorbing well, sump pit)			
	10. Green supply chain	a. use of construction materials b. selection of suppliers and / or sub-contractors c. energy conservation				