Social Monitoring System in Bogor

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BOGOR CITY

11,850 HECTARES

46,98% BUILT AREA

176 PRECIPITATION DAYS

26^0 C TEMP AVERAGE

POPULATION

1.004.831

3,87% GROWTH

Economic Growth

6,15%

Bogor City Development Policy 2015 - 2019

Vision : "Make Bogor a comfortable city, faithful and transparent"

1. Be a smart city and insightful information and communication technology
2. Be a healthy and prosperous city
3. ***Be a sustainable city***
4. Be as service city is oriented on the tourism industry and the creative industries
5. Embody a clean and transparent government
6. Strengthen the role of religious morality and humanity to realize the civil society

Development for innovative technology on MRV in Indonesia

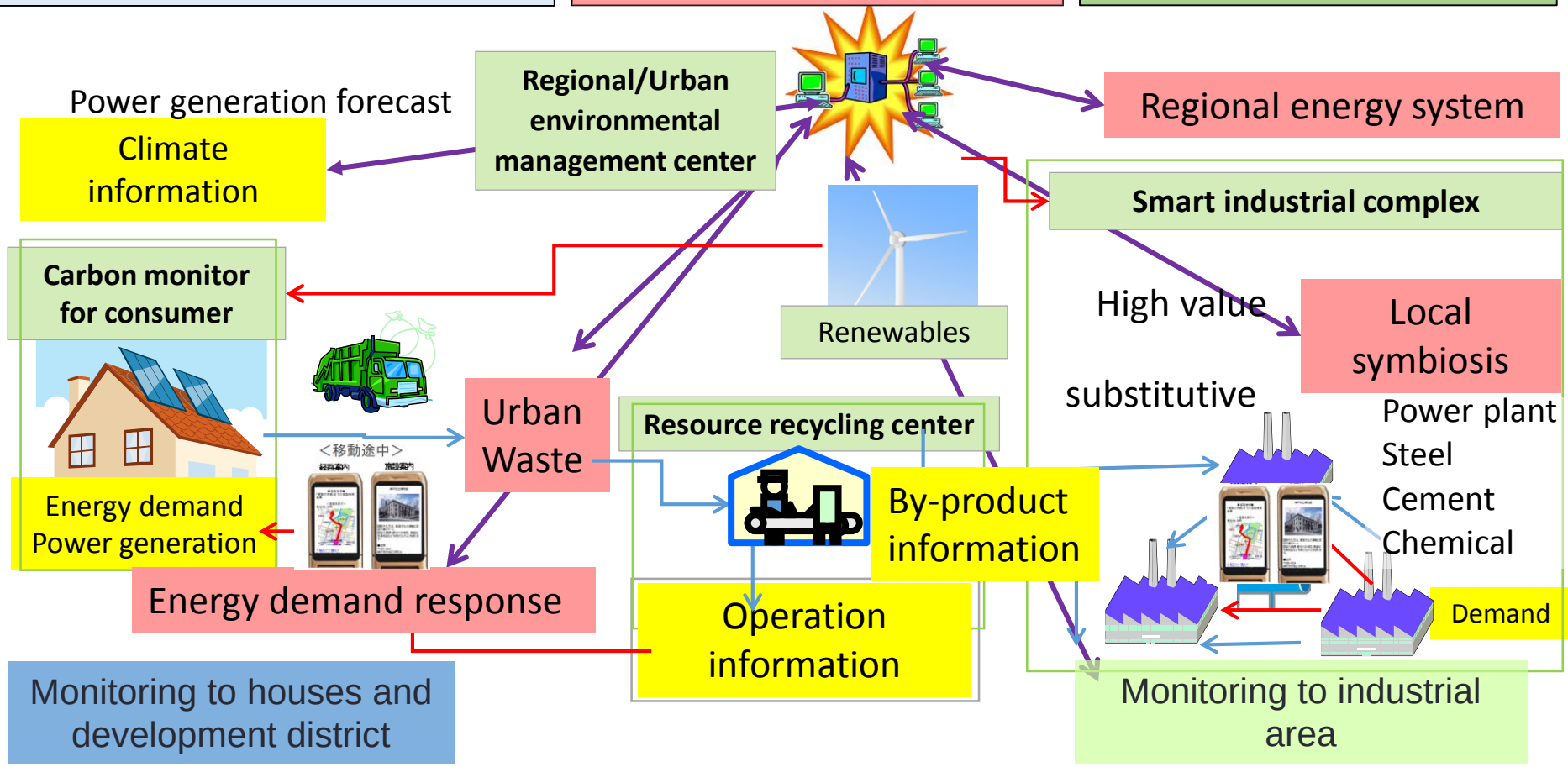
Development of monitoring system for eco-city IPB（FY2014～FY2019）

Smart ICT network will promote and complement the synergetic network functions among stakeholders

Low carbon monitoring system for neighborhoods and campus

Integrated information network for CO_2 emissions

CO_2 monitoring system for industrial parks



Objectives and Benefit of Social Monitoring

Objective of Social Monitoring

- make aware the local people on their energy consumption behavior using real-time visualization of energy consumption pattern.
- help motivate the society to adopt innovative technologies that can reduce energy consumption and provide effective energy management.

Benefit of Social Monitoring

Using the analyzed monitored data at both spatial and temporal high resolution scale we can;

- identify optimum solutions for individual cases in reducing energy consumption and cost.
- provide quantitative values for policy level action in reducing energy consumption.
- verify the effect of the policy and make improvements to develop science based policy actions.

Implementation Structure of the Research Project

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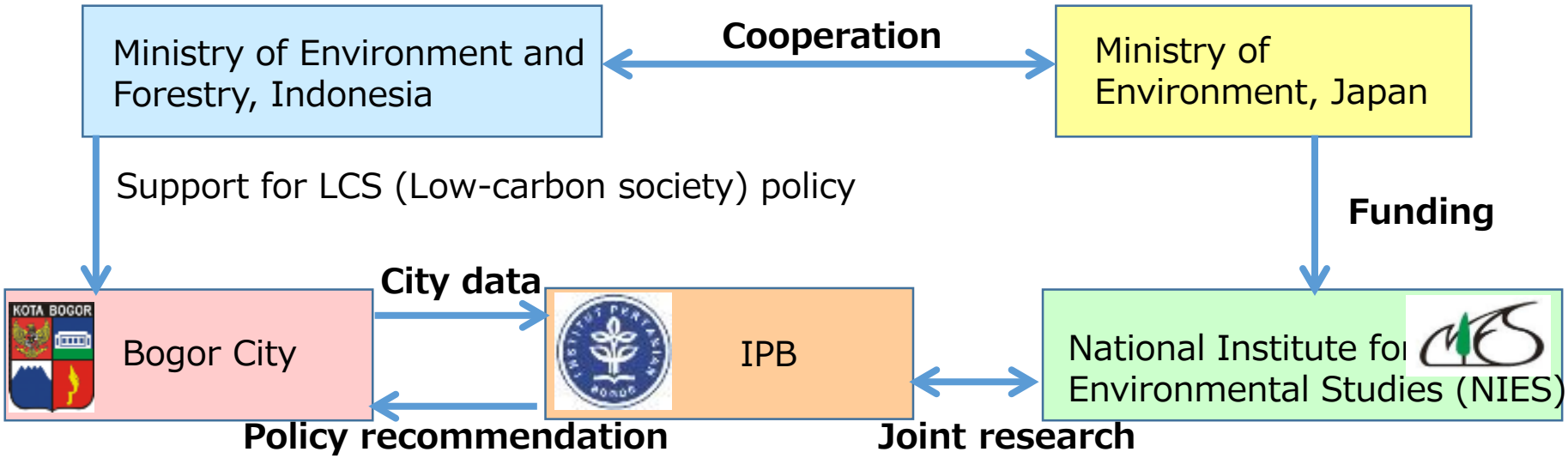


- Cooperation for energy monitoring
- Cooperation for LCS scenario analysis
- Implementation of eco-city policy

- Coordination with Bogor City
- Data collection for spatial database system
- Behavioral analysis
- Policy recommendation

- Implementation of energy monitoring (supported by Fujitsu / other companies)
- Recommendation of countermeasures
- Scenario setting and model development for LCS scenario in Bogor City

Support companies

Fujitsu

Fuji Electric

Framework for Social Monitoring System

1. Visualization of electricity consumption.
2. Supporting demand side management of urban energy consumption for promoting a low carbon society.

1 Field Survey

Research on Monitoring Sites

Selecting Measuring Points

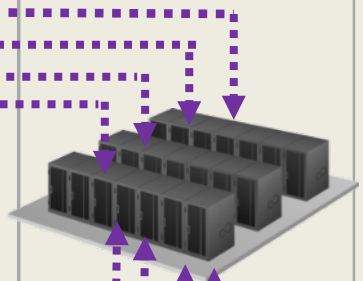
Survey Production Lines

2 Installation and Monitoring Energy Data

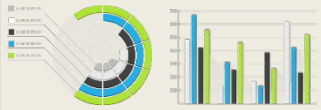
Installation

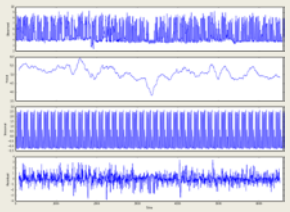
Energy Meters

3 Collecting Energy and Social Data

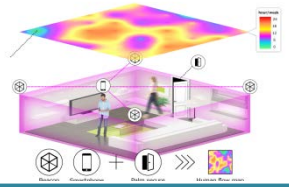


4 Analysis of Collected Data





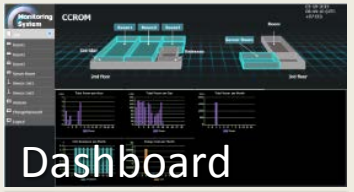
Human Activity



Integrative Analysis of Multi-Sectoral Data

5 Promoting Low Carbon Activities/Behavior

Visualization



Data access approach

Growth of Social Monitoring in Bogor City

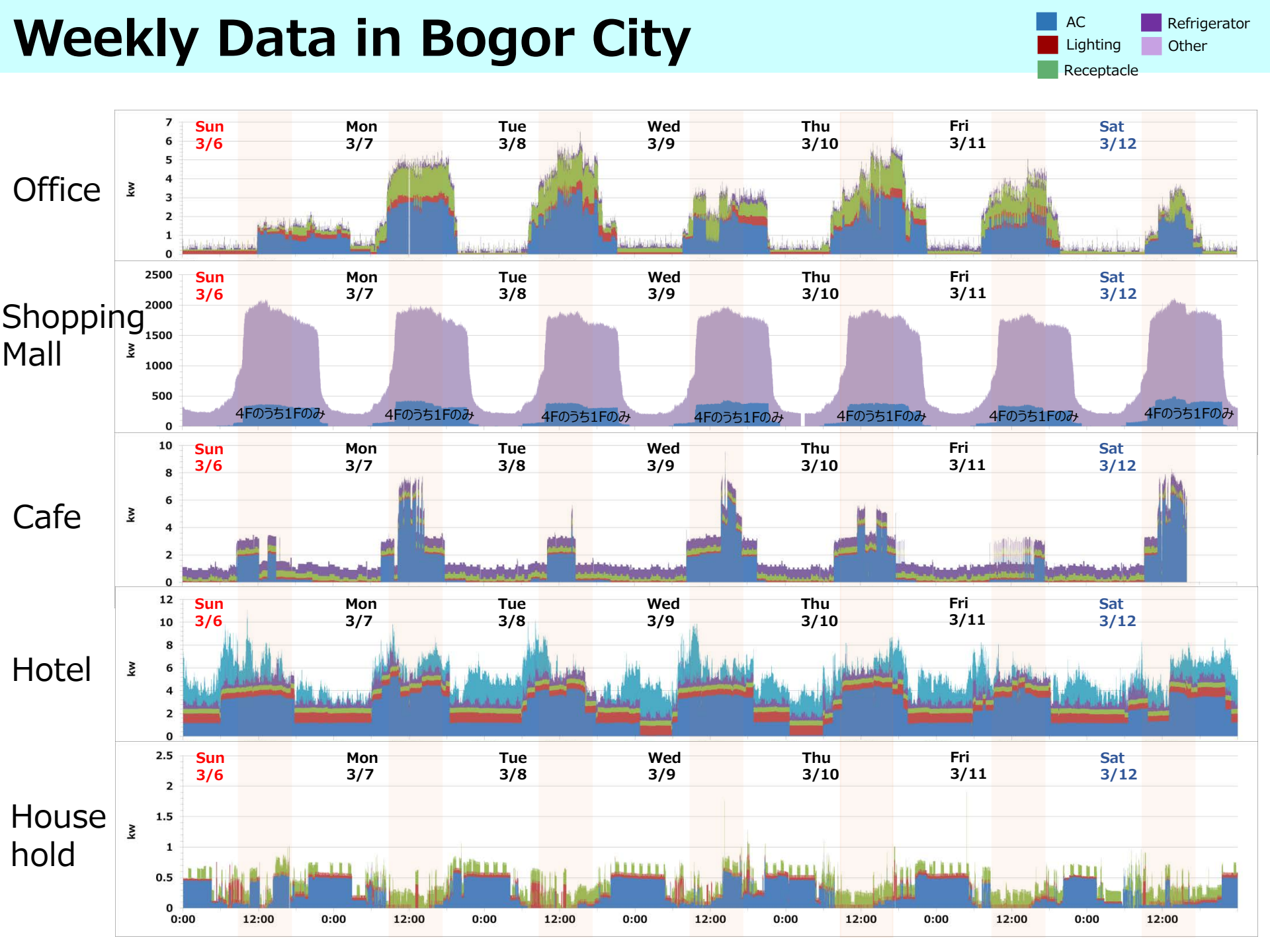
2015 (1st Year of the Project)

Sector	Number of facilities	Number of Points
Office Building	2	64
Households	4	27
Commercial Area	2 (café/ hotel)	23

2016 (2nd Year of the Project)

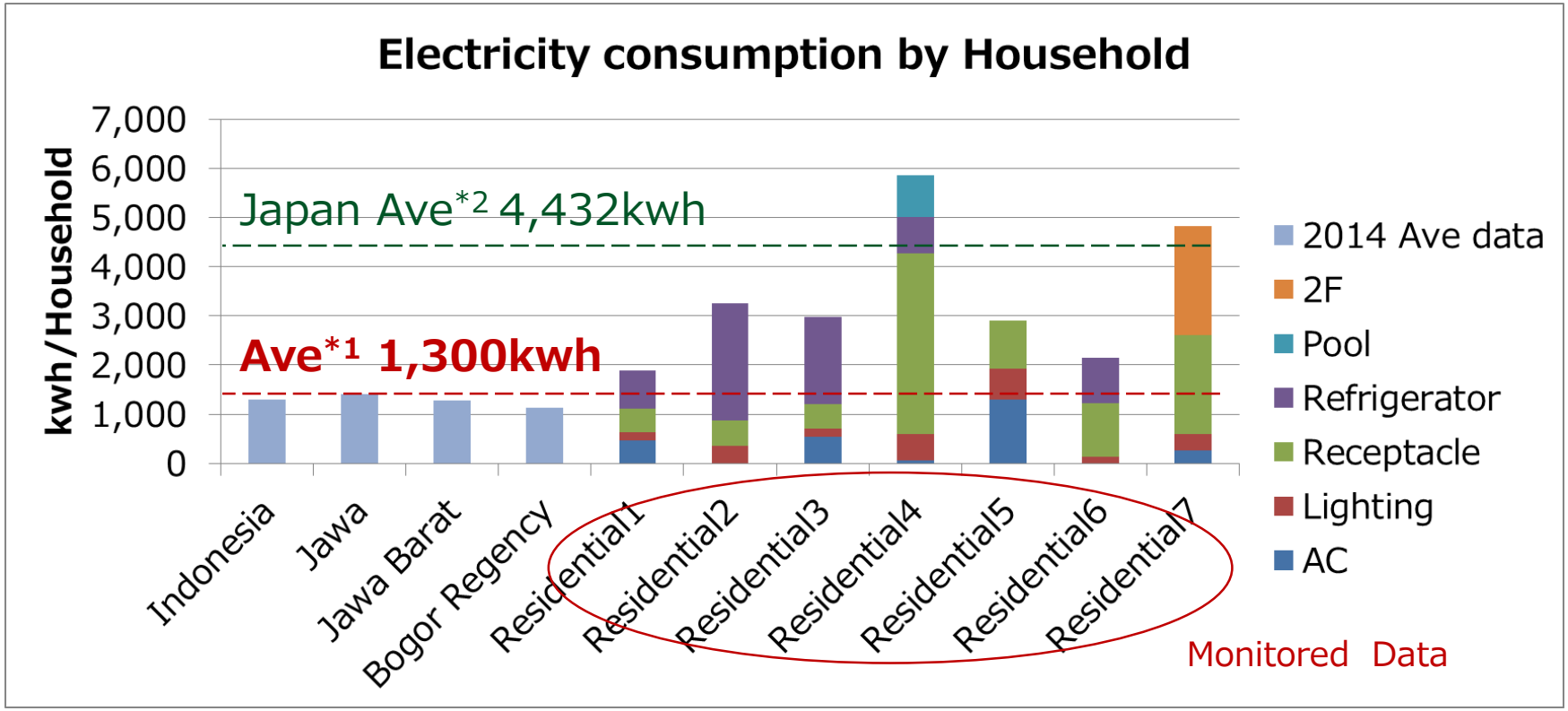
Sector	Number of facilities	Number of Points
Government building	3	30
Household	3	10
Shopping Mall	1	10

Weekly Data in Bogor City



Diagnosis of Electricity Profile in Households

Household Profile in Bogor City

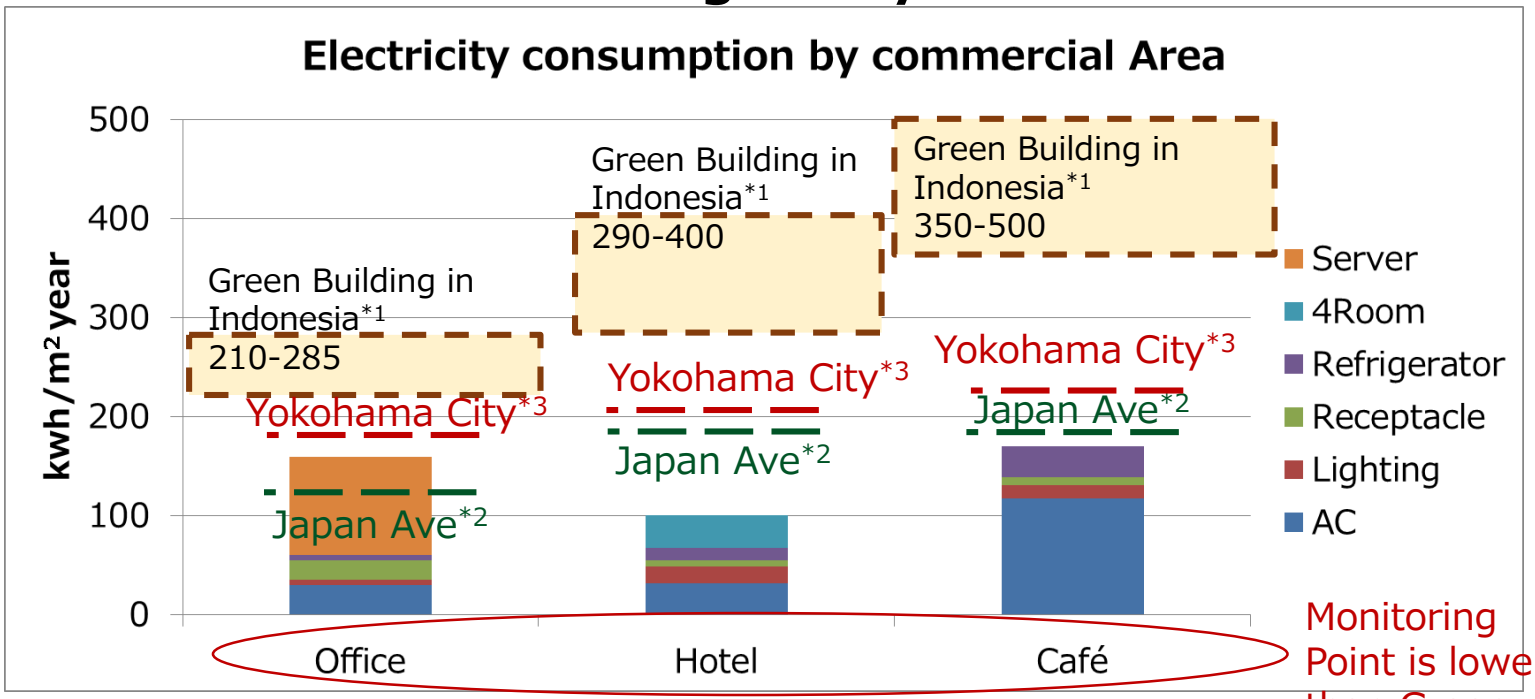


In an average, a household in Indonesia constitute of 4 people, within a 73m^2 area, with a consumption of 1300kwh/year per Household. The end-use Electricity profile is 11%(AC), 10%(Lighting), 39%(Receptacle)

*1: Source: Statistic PLN
*2 Source: Agency for Natural Resources and Energy Japan

Diagnostics of Electricity Profile in Commercial area

Commercial area Profile in Bogor City

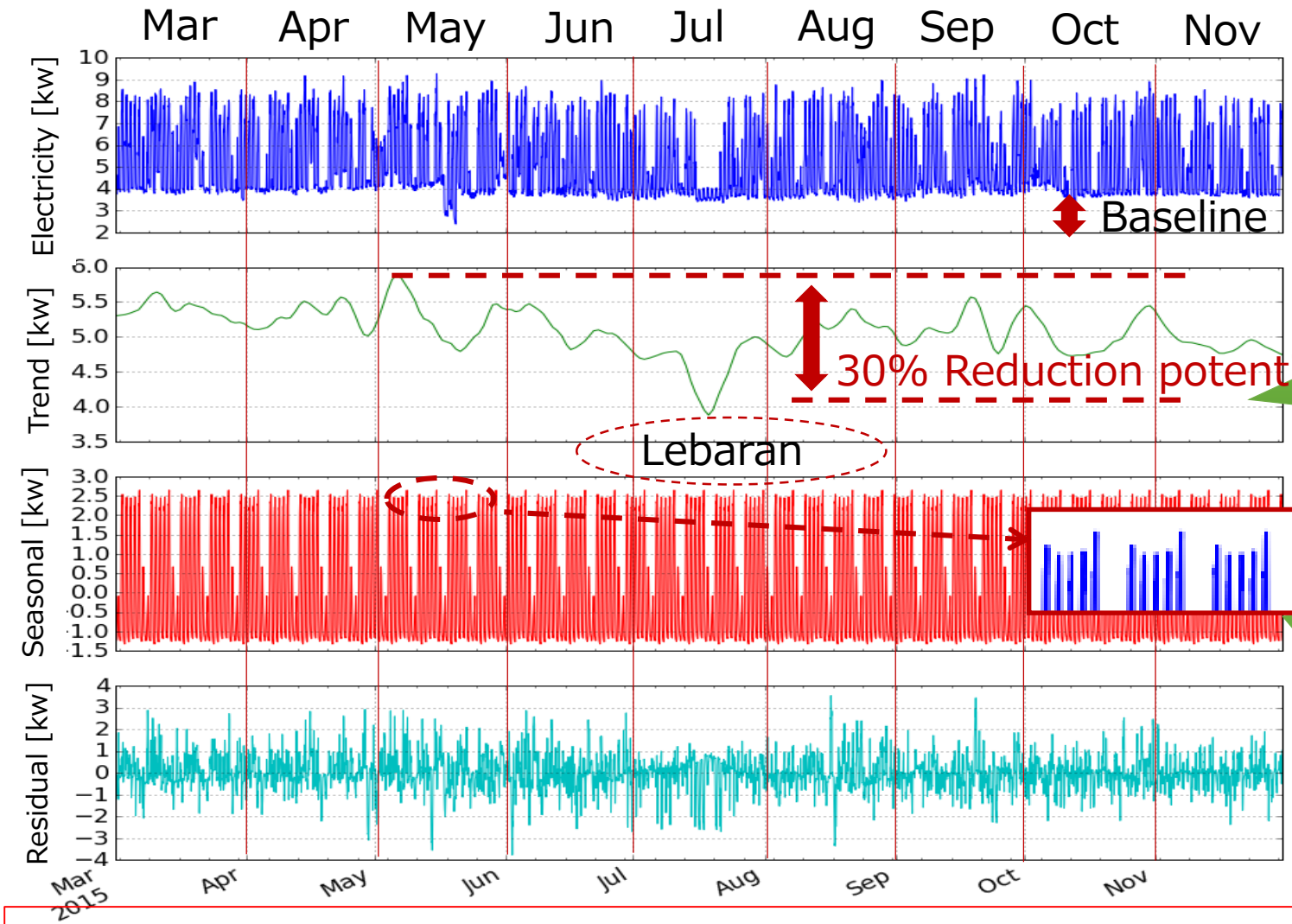


Monitored Commercial Area consumes Electricity lower than Green Building Index in Indonesia (*Better* than Green Building).
The usage rate of the air conditioner is high (End Use).

*1 Indonesian Experience in Assessing Green Building Performance
*2 Building energy consumption investigation report in Japan
*3 平成24年度「エキサイトよこはま22」まちづくりガイドライン等検討業務
横浜駅周辺の電力需要

Time series analysis in Office Building case

Monitor data every one hour from March to November :kw unit



Server Electricity consumption

No Seasonal variation of electricity consumption

Electricity consumption is increasing on business day

The reduction potential of about 30% can be expected by improving equipment and thermal insulation performance

Traffic monitoring plan

Goal: Eco-friendly and More Comfortable City

Data Oriented
Innovation Center

Phase1

Visualize traffic congestion

Visualize traffic congestion and travel time data
by using several smart phones as GPS sensor on vehicle.

<Sensing>

App.

Smartphone App.

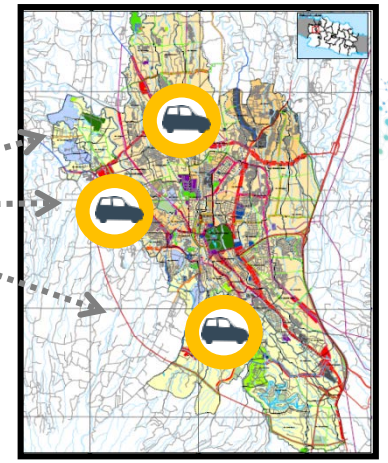
Smartphone
(**Android 4.x**)

<Target Vehicle>

・Public Bus (**TransPakuan**)

The target: 20 vehicles (samplings)

<Collection and output>



・Positioning info.
・Time and speed

<View>

Traffic data with GHG info.

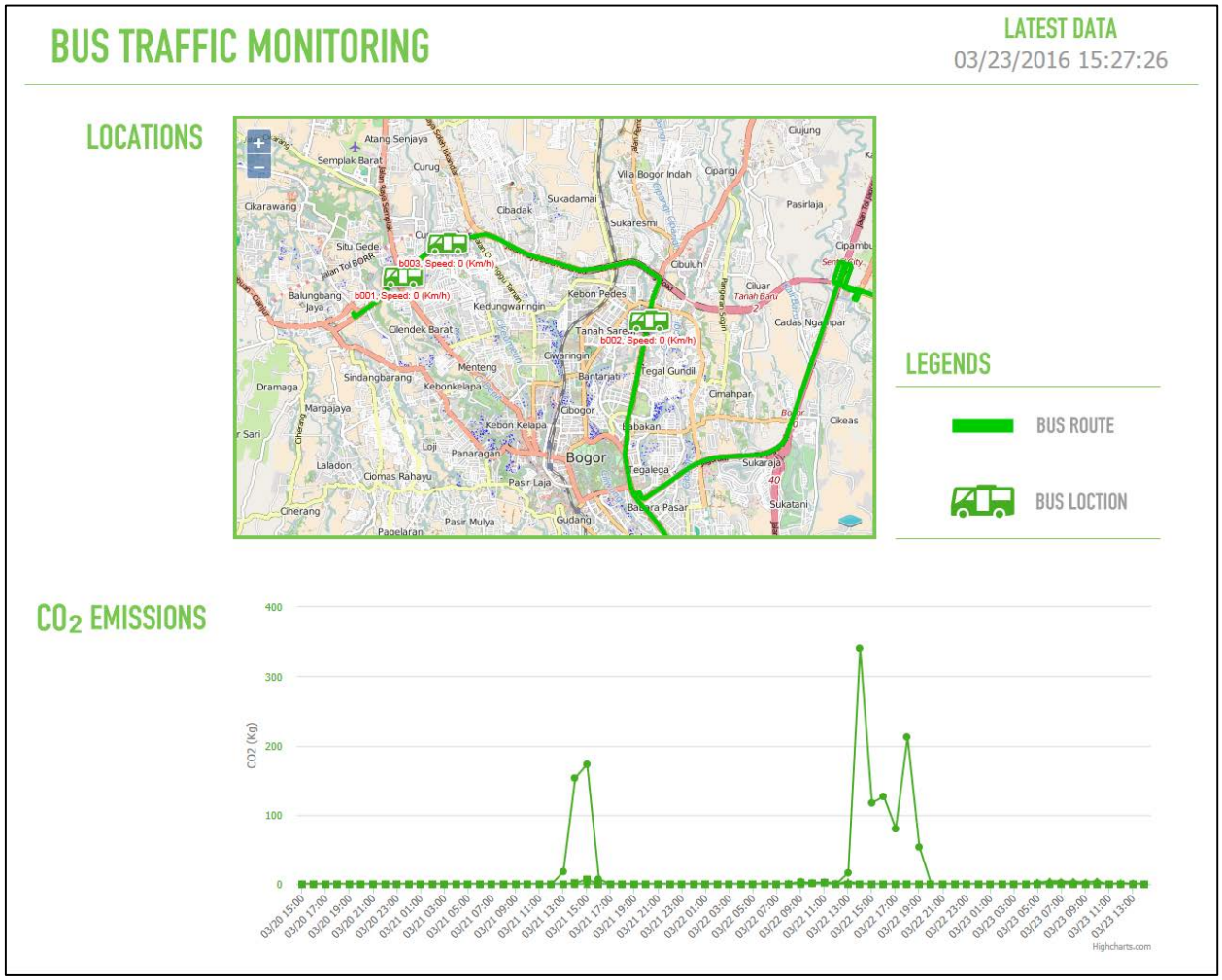
Phase2 : Calculate traffic volume
With CCTV

Phase3 : Suggest Environ impact in traffic congestion
With environment sensor

Traffic Monitoring software for Green Room

Access to https://www.eco-sems.org/bgr/traffic/ (Need the User-ID/Password)

- The Bus location is shown on the map as the **Real time** data.
- The CO2 emission is shown as a trend graph (the latest 3 days)

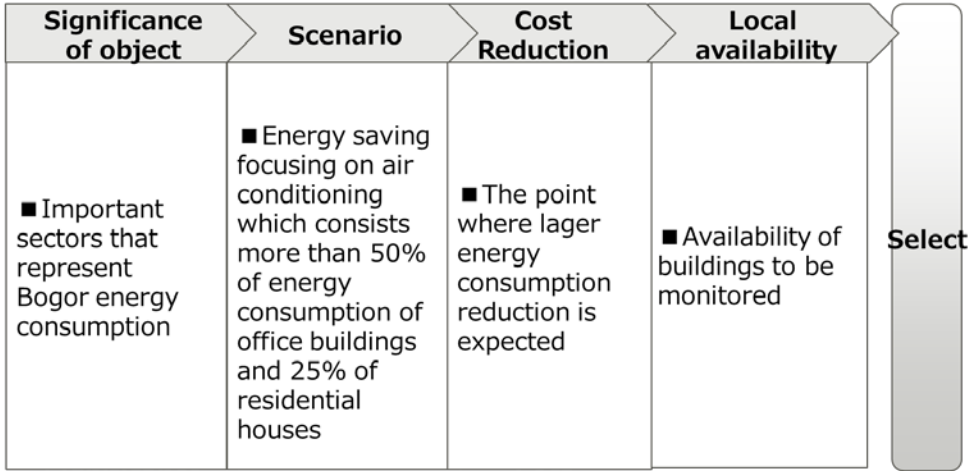


The Bus location info. area

The CO2 emission trend graph area

Current Status of Social Monitoring in Bogor City

- **Total 189 Monitoring points are running in Bogor City.**
- **Major energy consumption sectors has been covered.**



Household

	Detached house	Apartment
Single	Electricity consumption is small	Electricity consumption is small
Family	*V*	Electricity consumption is small

Commercial

	Small	Medium	Large
Office	*V*	*V*	*V*
Government	*V*	*V*	
Shop		*V*	*V*
Restaurant		*V*	
Hotel		*V*	
School		?	*V*
Hospital		*?*	

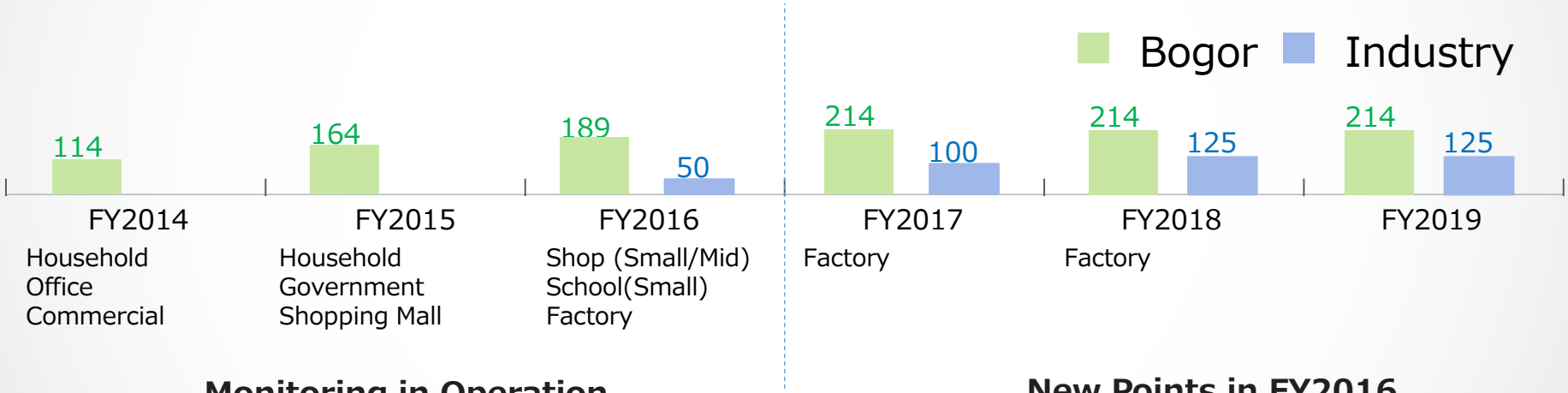
- **Bogor city monitoring shifts its phase to 1) designing strategies for GHG and energy reduction actions and 2) making strategic plans for localization of the monitoring system**

Future Plan of Eco-city monitoring

Monitoring Data Oriented Innovation

Step 1 Initial Setup → Step 2 Evaluation of Low Carbon Action by Monitoring and its Improvement → Step 3 Expand Society Monitoring System to Asia

Total Installation of Eco-city Monitoring System



Monitoring in Operation

City	Category	Monitoring Points
Bogor	Household	37 Points
	Office	64 Points
	Commercial Shopping Mall	23 Points 10 Points
	Government	30 Points

New Points in FY2016

City	Category	Monitoring Points
Bogor	Shop School	About 15 Points*
Jakarta	Factory	About 15 Points*

Localized Data and Scenario Modeling

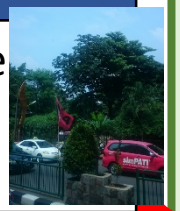
- Conventionally, local scenarios are developed with limited statistical data and “default” parameters from national or international information.
- This approach combines monitoring of local activity and modeling so that we can propose the most suitable Mitigation Scenario and Action Plans for the Bogor city

Statistical information

Current environmental initiative

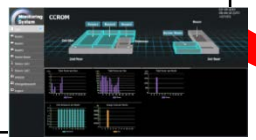
Transport Monitoring

- Transport structure
- Vehicle speed
- Fuel efficiency etc.

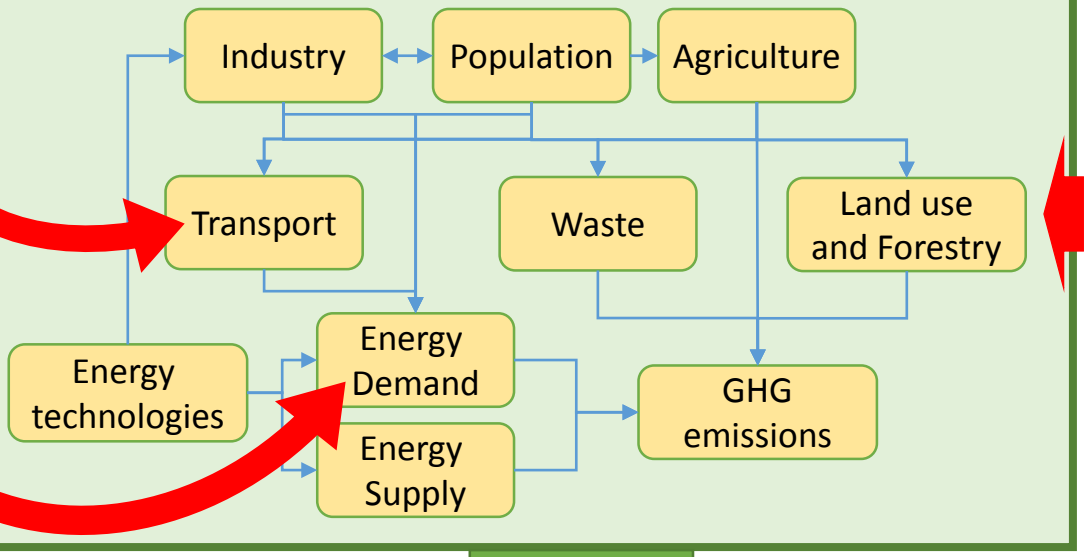


Energy Monitoring

- Current and future energy consumption pattern
- Energy saving potential

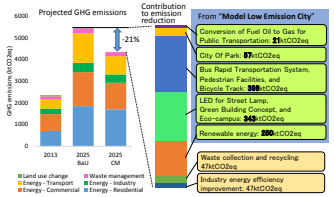


The model to project future scenarios: ExSS/LCS



Bogor City Development Policy

Locally suitable mitigation scenarios



Mitigation potential in 2030

Actions to introduce the measures in 2030

Roadmap and investment towards 2030

Thank You