ISAP2012

Development of Smart Communities in Asian Cities アジア都市のスマートコミュニティの普及と課題

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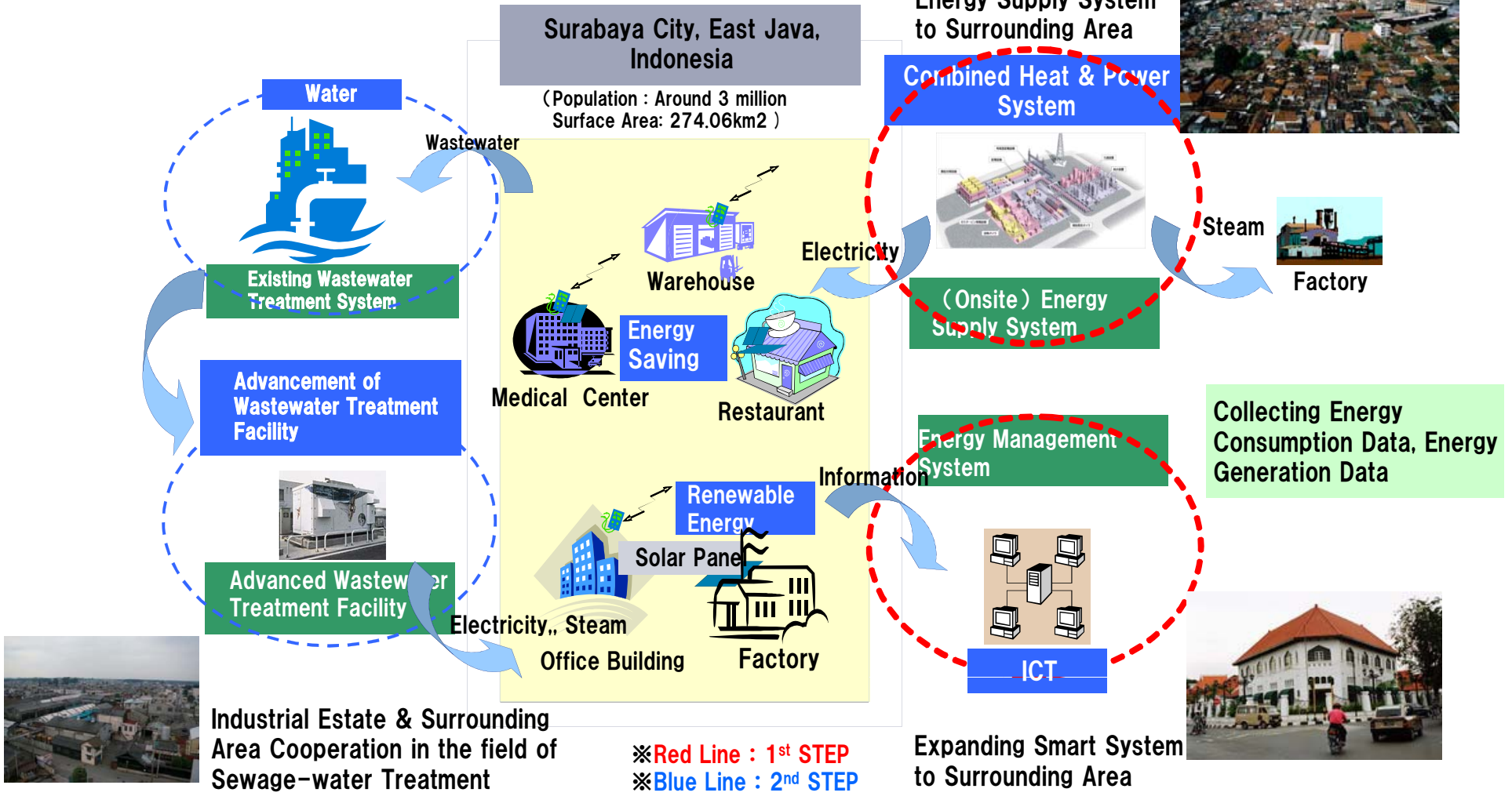
NTT Data Institute of Management Consulting, Inc.
Socio & Eco Strategic Consulting Sector

NTT DATA

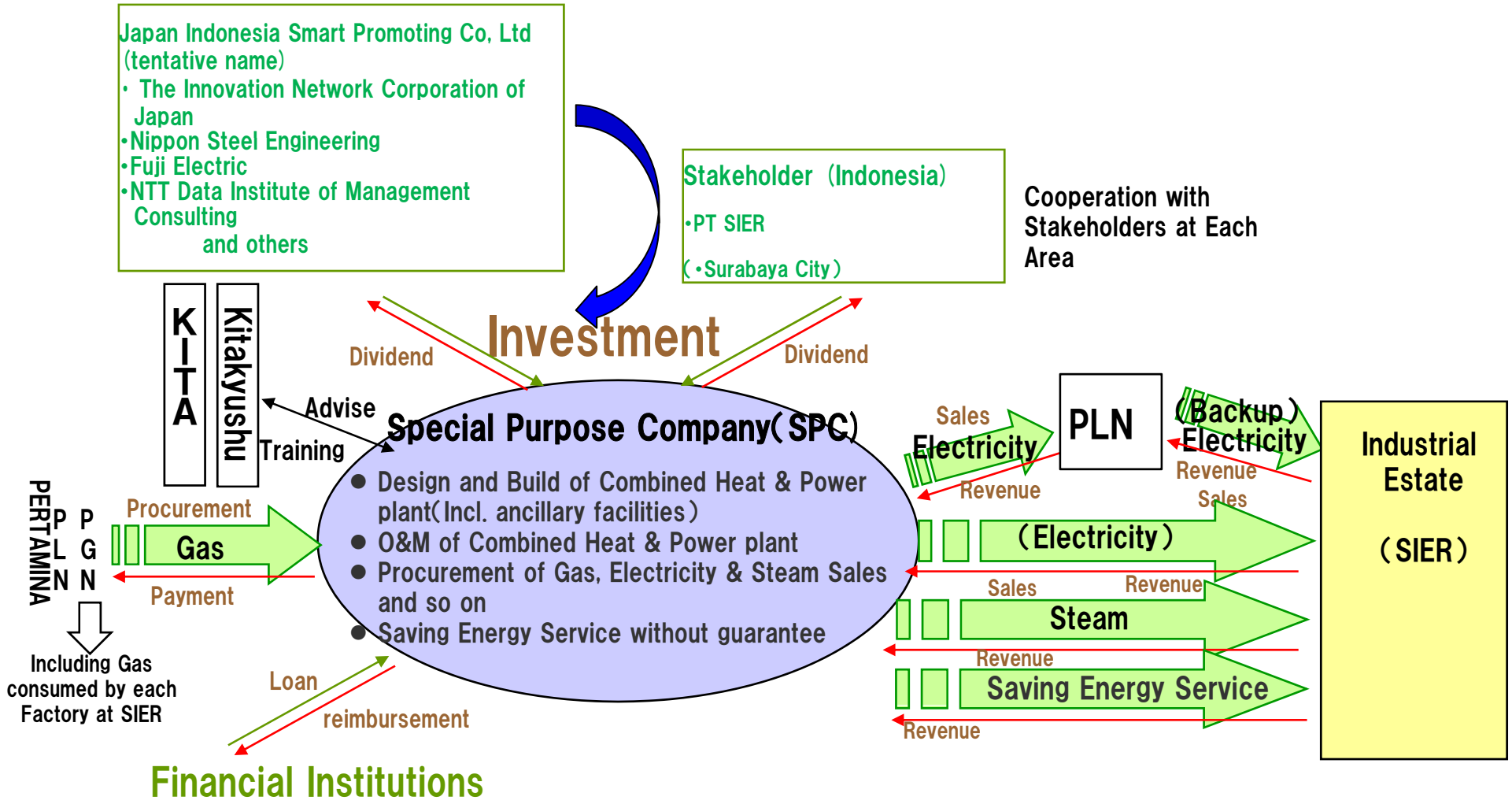
1. Outline of Project in Surabaya
インドネシア・スラバヤ市におけるプロジェクト概要

- Starting from Introduction of Low-carbon Technology at Industrial Estate & Advancement of Infrastructure such as Wastewater Treatment. Next, Realizing Low-carbon Community & Smart Community in Surrounding Area
- Finally, Smart Community as Whole City

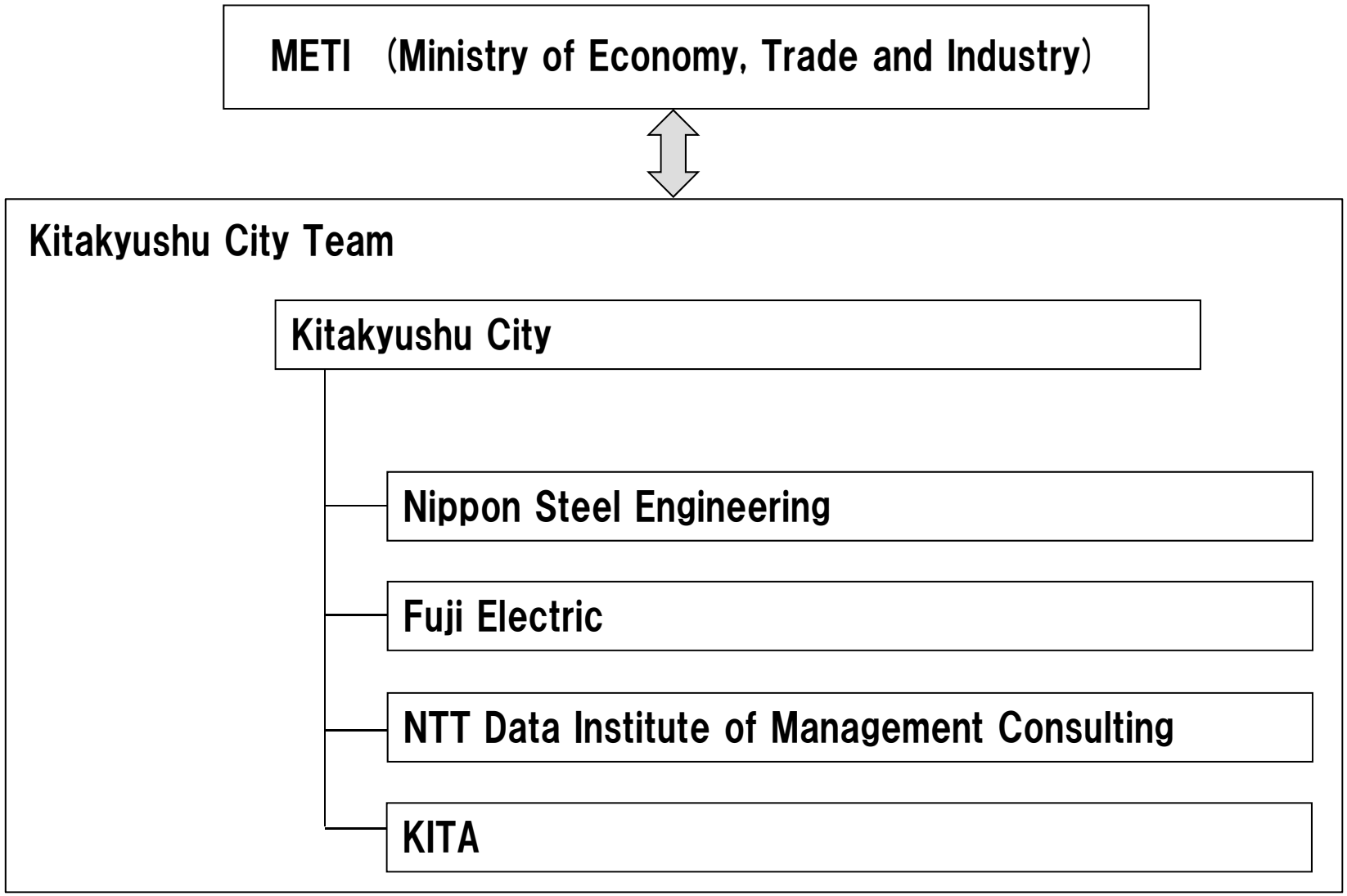


2. Assumed Expansion of Business by Private Sector
想定している民間企業のビジネスとその拡大イメージ

◆ Establishment of Investment Company in Japan, which invest & arrange financial matter in Indonesia.



3. Implementation Structure　実行体制



4. Study Item 調査項目

Item	Method
（１）Current Situation Survey of Energy Demand & Energy Policy in Indonesia	Research of Existing Documents and Data Base
（２）Current Situation Survey of Energy Demand & Energy Policy in Surabaya	Research of Existing Documents, Field Survey, Discussion among those concerned
（３）Business Environment Survey of Combined Heat & Power System in Indonesia	Research of Existing Documents, Field Survey, Discussion among those concerned
（４）Study of Problems & Solutions for Driving the Introduction of Combined Heat & Power System	Field Survey, Discussion among those concerned
（５）Feasibility Study to introduce Combined Heat & Power System and Energy Saving at SIER	Field Survey, Discussion among those concerned
（６）Pre-study of Advancement of Wastewater Treatment System	Field Survey, Discussion among those concerned
（７）Research of Existing Study and Preparation of Master Plan	Field Survey, Discussion among those concerned

5. Lesson Learned　活動に当たってのポイント

①Needs Oriented Approach
（Example)Existence of Thermal/Steam Needs，from Steam Procurement by each Factory to Network Procurement

②Consortia Approach
-Aggregation of Strength of Member Company
-Internal & External Coordination

③Participation from Planning Phase（the Beginning ）
-Role of Consultant
-Role of（Local）Government /（Example）Establishing Relationship through non-profit activities such as Training & Education of Human Resources, Grass-root activities

④Understanding Local Legal & Institutional System
-Electricity Regulation
-Energy Regulation
-Public Procurement Procedure

⑤Flexible Alliance with Local Public Organization and Local Private Companies
-Win-Win
-Ecosystem

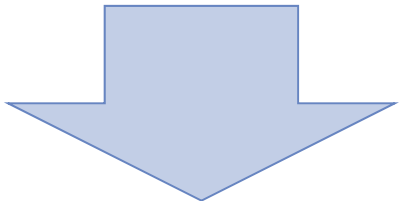
⑥Localization
-Understanding Language & Culture

6. Example of Trial Calculation / CO2 Reduction (Surabaya)
CO2排出量削減効果の試算例

$$BE_y = CSO_y * (H_{steam} - H_{water}) / 1{,}000{,}000 / e_b * CEF_{NG} * FCO_{NG} * 44 / 12 / 1{,}000 + CEO_y * EF_{elec}$$

$$PE_y = PEC_{NG,y} * NCV_{NG,y} / 10^9 * CEF_{NG} * FCO_{NG} * 44 / 12$$

Parameters		Unit	Number
CSO_y	Quantity of Steam by Co-Generation	kg/year	146,700,000
H_{steam}	Enthalpy of Steam by Co-Generation	kJ/kg	2,794.53
H_{water}	Enthalpy ofinput water to Co-Generation	kJ/kg	336.5
e_b	Efficiency of Existing Boiler	-	0.92
CEF_{NG}	CO2 Emission Coefficientof Natural Gas incineration	tC/TJ	15.3
FCO_{NG}	Oxidation Coefficientof Natural Gas	tC/TJ	0.995
CEO_y	Electricity by Co-generation	MWh/year	55188
EF_{elec}	CO2 Emission Coefficient of Grid Power	tCO2/MWh	0.891



28,857tCO2/year

7. Quantification of CO2 Emission Reduction ～2 type of methods～ CO2排出量削減効果の定量化手法~2つの手法~

◆2 Type of Methods exist for quantification of GHG emission. One is Inventory method and the other is Project Method. It is necessary to consider which method will be used, based on the objective of Quantification and the characteristics of Methods.

Method		Regulation, Rule			Characteristics
		Global level	Country Level	Municipality Level	
Inventory	Central Government	GHGs Inventory			• holistic evaluation using municipality's statistics, invoice data of each company • imprecise • Risk of non data • Impossible to calculate detailed breakdown
	Local Government	Bilan Carbone ICLEI	Manual for New Action Plan		
	Organization (Company)	EU-ETS GHG Protocol	JVETS		
Project		CDM	Domestic Credit Mechanism J-VER	Emission Trading System at Tokyo Metropolitan Government	• Precise • Difficult to apply for vast range

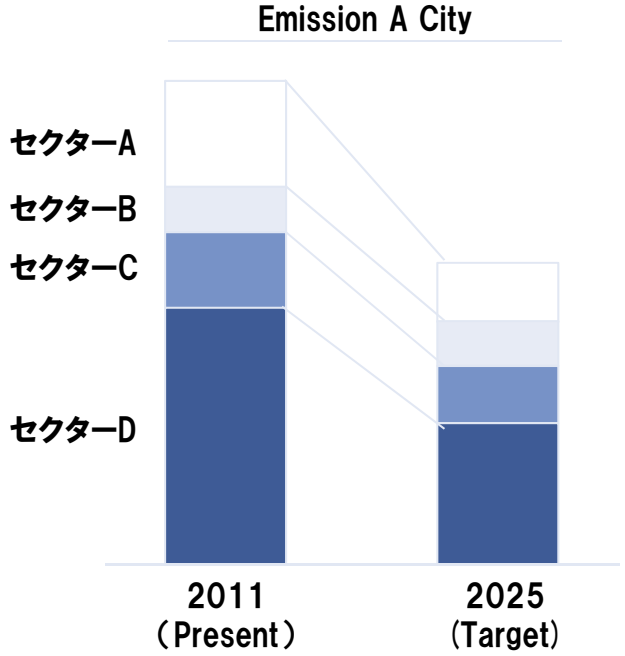
8. Characteristics of Inventory Method
インベントリー方式の特徴

◆It is possible for municipalities (or companies) to prioritize the program and to understand macro trend of GHG emission reduction.

Merit of GHG Emission Reduction

- Prioritize Sector for GHGs emission reduction
- Quantification of Effect of Action
- Rousing Interest in GHGs Emission Countermeasures
- International Appeal as an Advanced Municipality
- Increase of Accountability as Municipality

Example / Prioritization of Sector



As a result of quantification, foujd out Emission from Sector D is large.

＊ Comparison with other city as benchmark is necessary

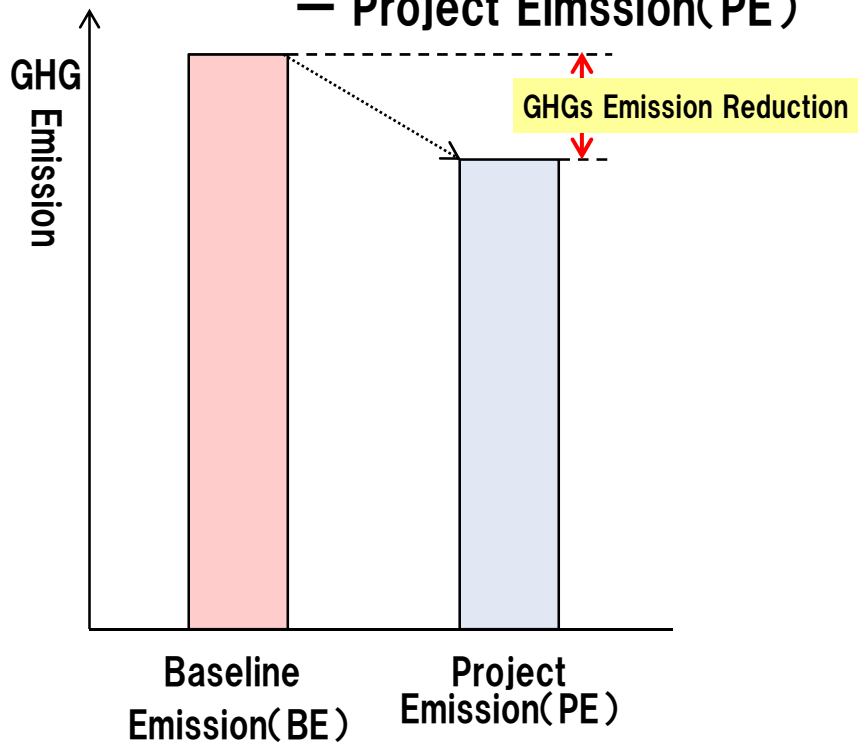
9. Characteristics of Project Method プロジェクト方式

◆The amount of GHGs emission reduction with MRV (Measurement, Reporting and Verification) could be used as Credit and/or Appeal

Necessity of MRV

- Merit of Disclosing Quantity of Emission Reduction
  - ✓ Appeal
  - ✓ Credit
  - ✓ One of the Input for Attainment of Each Company's target

- GHGs Emission Reduction
  = Baseline Emission (BE)
  − Project Eimssion(PE)



10. Example of Trial Calculation / CO2 Reduction (Putrajaya) ①
プトラジャにおけるCO2排出量削減効果の試算例①　~アクションプラン~

◆Policy 5 Moving Putrajaya towards Green City

5.2 Application of green technology, infrastructure and practices in city planning and management
5.3 Adopting Sustainable Building Practices
5.4 Establish model green community committed to reduction of carbon footprint

Action 3 Cutting-Edge Sustainable Buildings

3-1 Eco friendly Building Materials & Energy Efficient Labeling for Equipment & Appliances
3-2 Building Energy Management System (BEMS)
3-3 Eco friendly Building Materials
3-4 To integrate Recycling facilities in building design
3-5 Impose Building Rating System to all Buildings

Action 4 Low-carbon Lifestyle

4-1 Energy Efficient Appliances in Homes
4-2 HEMS (Home Energy Management System)
4-4 To integrate Recycling facilities in High rise residential building designs

Action 5 More & More Renewable Energy

5-1 Photovoltaic power generation and utilization
5-2 Alternative fuel source from Solar assisted power generation
5-3 Explore possibilities of utilizing Solar Thermal
5-4 Biomass production & utilization
5-5 Research & Development for RE for Local consumption

Action 7 Cooler Urban Structure and Building

7-3 Reflection of Solar Radiation
7-4 Building

Action 8 Community and individual action to reduce urban temperature

8-1 To Reduce Artificial Heat exhaust
8-4 Human parameters (Behavior change)

Action 12 Green Incentives and Capacity Building

12-5 Tax Incentives for Energy Efficiency

（出所：「ＮＥＤＯ報告書　国際エネルギー消費効率化等技術・システム実証事業　～基礎事業 マレーシアにおけるグリーンタウンシップ構想実現のための基礎調査～」）（平成24年3月）

10. Example of Trial Calculation / CO2 Reduction (Putrajaya) ②
プトラジャにおけるCO2排出量削減効果の試算例②

Countermeasure	Category	Emission Reduction (Contribution ratio)
Introduction of energy-efficient appliances	Facilities	556.1 kt-CO_2 (69%)
	District Cooling	
BEMS / Building insulation / Energy saving behavior	Management System	200.6 kt-CO_2 (25%)
	Residences	
	Human Behavior	
Photovoltaic power generation	Photovoltaic Power Generation	50.3 kt-CO_2 (6%)
Others	Other Renewable Energy	-

（出所：「ＮＥＤＯ報告書　国際エネルギー消費効率化等技術・システム実証事業　～基礎事業 マレーシアにおけるグリーンタウンシップ構想実現のための基礎調査～」）（平成24年3月）