COP15&COP/MOP5 Side Event
"Co-benefits of Climate Change and Sustainable Development in Developing Countries

Promoting CDM Projects with Co-benefits
- through experiences of CDM Feasibility Study Programme -

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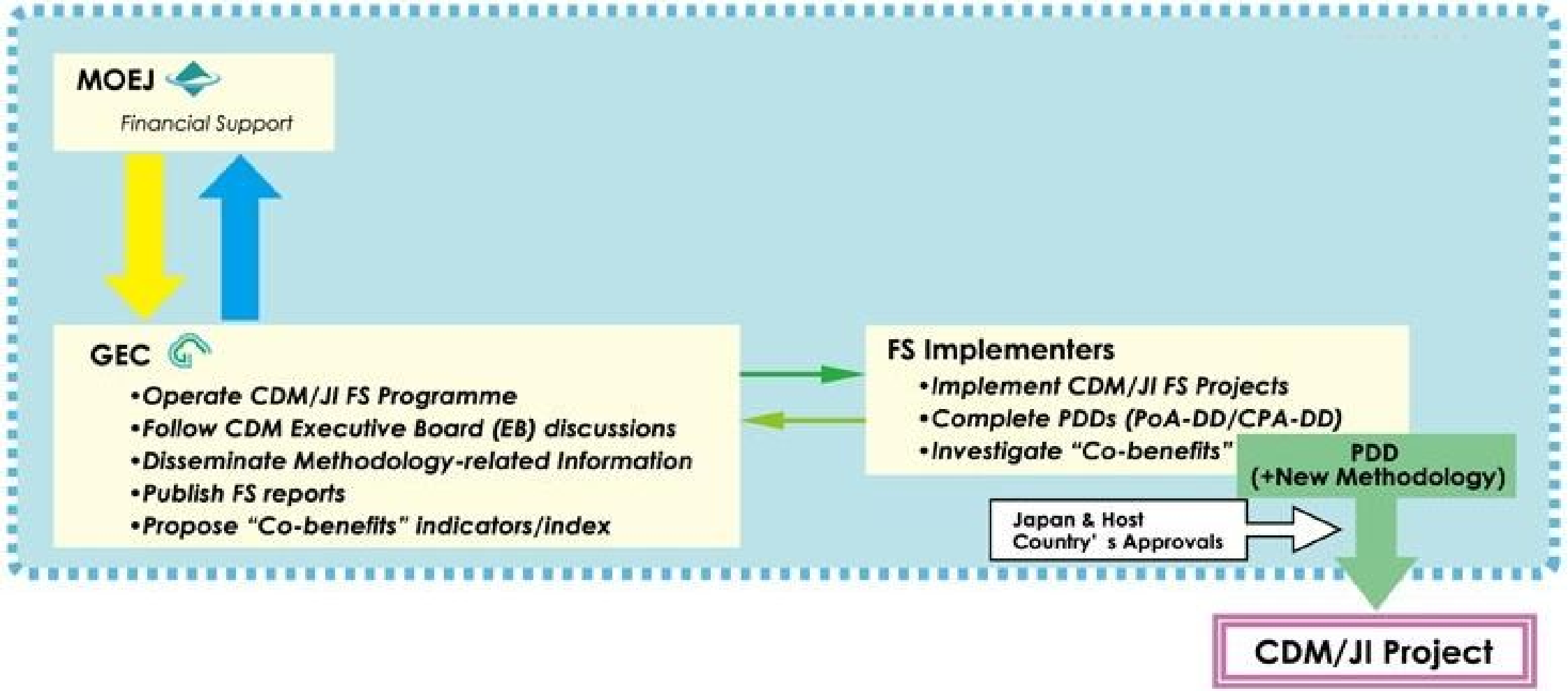
Activities of GEC

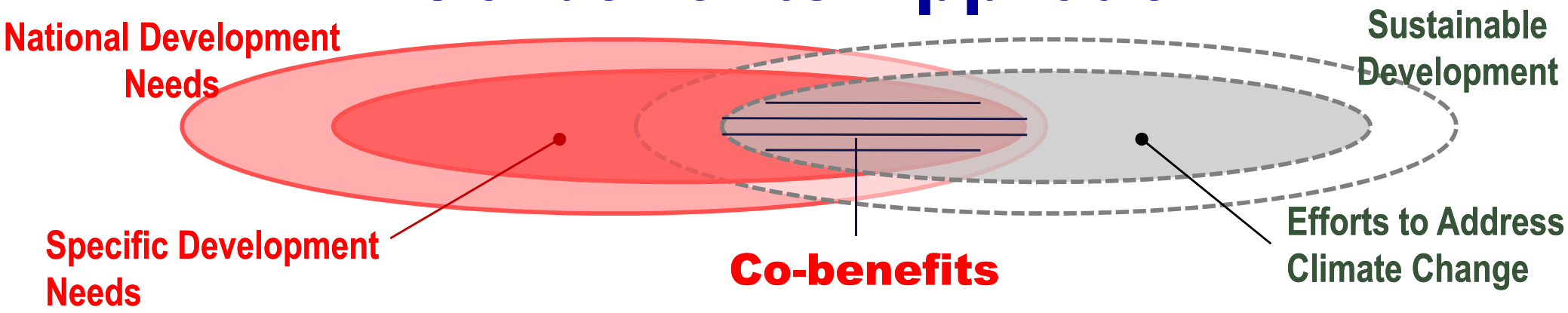
- **Primary mission:**
  Support UNEP International Environmental Technology Centre (IETC) in the field of urban environmental management in developing countries
  Osaka City Government is supporting IETC's activities through GEC

- **Activity related to climate change issues and CDM/JI**
  - **CDM/JI Feasibility Study (FS) Programme**, under the commission of the Ministry of the Environment, Japan
    - Support Japanese private entities in undertaking feasibility studies for promising CDM/JI projects
    - Expected achievements: completed PDDs, and new methodologies (if applicable)
  - Networking local medium- and small-scale private companies to stimulate updated information/knowledge exchange in the network
  - Public awareness raising through symposia and event exhibitions

CDM/JI Feasibility Study Programme



Co-benefits Approach



Co-benefits Approach: initiatives that make it possible to fulfill the needs of a developing country at the same time as implementing climate change countermeasures and CDM projects.

Examples of Co-benefits Action Areas

Action Areas	Project Examples	Environmental Improvement Benefits	Climate Mitigation Benefits
Air Quality Management	Improvement of combustion efficiency	Air pollutants (SOx, NOx, and dust) reduction	CO2 reduction
	Fuel Switching		
	Transportation		
Wastewater Treatment	Prevention of methane emission from sludge	Improvement of water quality	CH4 reduction
Waste Management	Segregating & composting of MSW	Proper treatment of waste	
	Utilization of biomass waste as energy	Reduction of waste amount	

CDM/JI Feasibility Study Programme 2008
Assessment of "Co-benefits":

- Draft of PDDs for 23 projects
- **Quantitative Evaluations** of environmental improvement effects were carried out in some studies
- Proposals for "Integrated 'Co-benefits' Indicator" were also made in a few studies

(=Integration of GHG mitigation & environmental Improvement)

CDM/JI Feasibility Study Programme 2008
Waste Management（12studies）

NEPAL
- ◆Biogas Plant Introducing Program

China
- ◆Methane Emissions Avoidance at landfill site
- ◆Organic WasteTreatment & Methane Power Generation

Thailand
- ◆Programmatic CDM for Ethanol Production Using Cassava Pulp
- ◆Effective Utilization of the Biogas at the Swine Farms
- ◆Biomass Electric Generation System by the Phosphoric Acid Fuel Cell

Viet Num
- ◆Biogas Power Generation from Urban Solid Waste
- ◆Wastewater Treatment and Energy Recovery at Starch Processing Plant

Malaysia
- ◆Power Generation with Waste Material and Recovered Gas from Palm Oil Mill
- ◆Palm Oil Mill Effluent (POME) Treatment

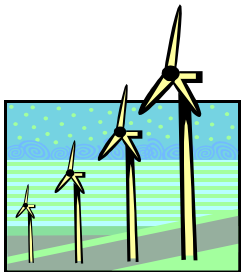
Singapore
- ◆Sewage Sludge Incineration

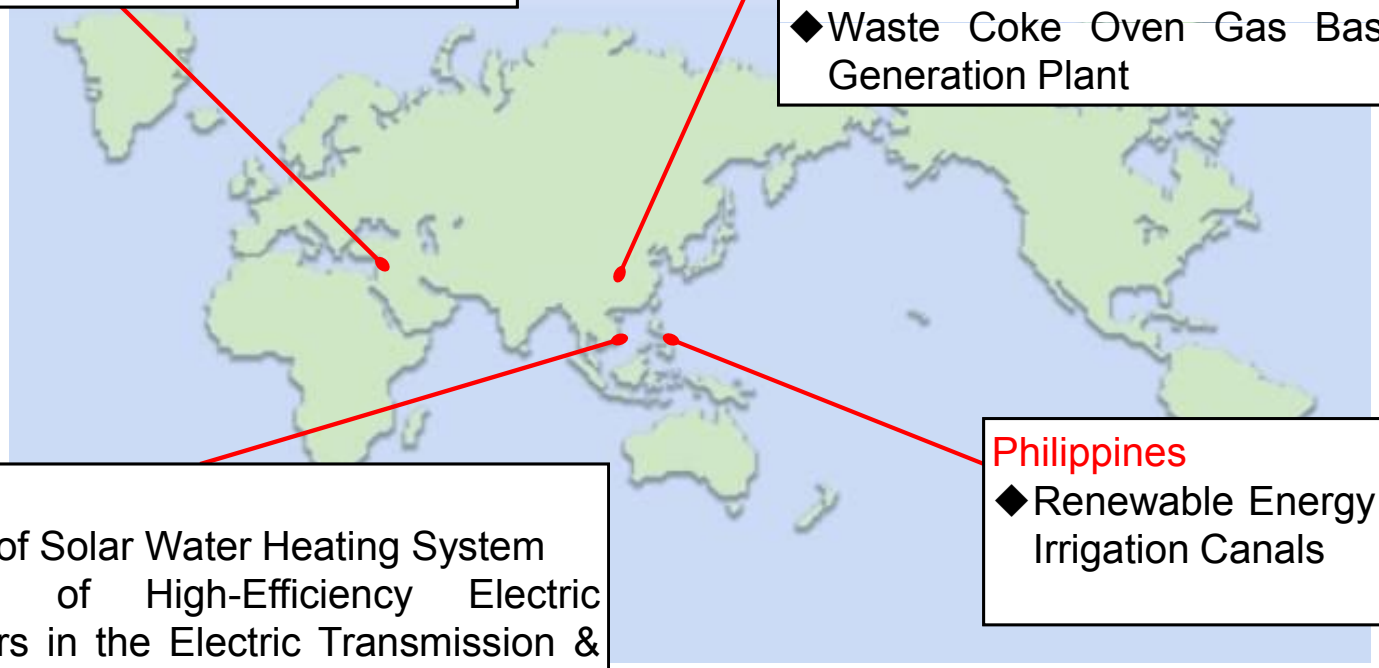
Indonesia
- ◆Mechanical Biological Treatment (MBT) (Composting)

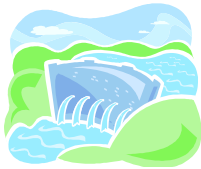
CDM/JI Feasibility Study Programme 2008
Energy Efficiency, Renewable Energy, Waste Gas Utilization（7studies）

Syria
- ◆Energy Utilization of Ammonia Plant Tail Gas

China
- ◆Waste Electricity Utilization at a Locomotive Plant
- ◆Direct Reduction Iron Production by Utilizing Coke Oven Gas
- ◆Waste Coke Oven Gas Based Electricity Generation Plant



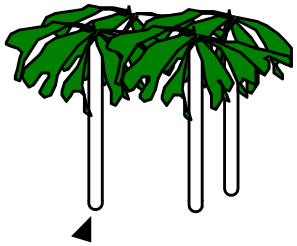




Viet Num
- ◆Installation of Solar Water Heating System
- ◆Introduction of High-Efficiency Electric Transformers in the Electric Transmission & Distribution Grid

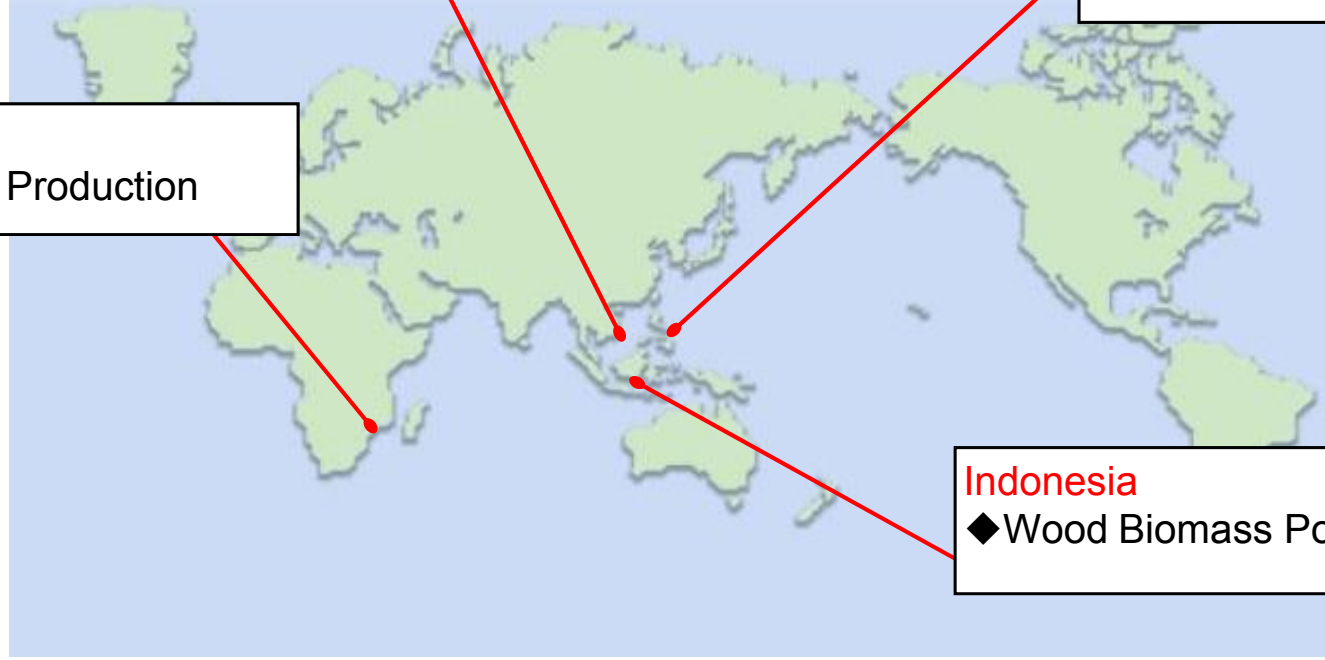
Philippines
- ◆Renewable Energy Generation Utilizing Irrigation Canals

CDM/JI Feasibility Study Programme 2008
Biomass Unitization（4studies）



Cambodia
◆Jatropha Biofuel and Power Generation Project

Philippines
◆Rice Husk-based Power Generation



Mozambique
◆Jatropha Bio-Diesel Production

Indonesia
◆Wood Biomass Power Generation

Quantitative Evaluation of Environmental Improvement (1)

Air Quality Magagement

Woody Biomass-based Power Generation (Indonesia)

- Replacing existing boilers to a new co-generation facilities with dust collectors

⇒ Concentration of dust emission: **910mg/m³ (max)** → **120mg/m³**

Power Generation Fuel Switching from crude oil to Jatropha Oil (Cambodia)

- Heavy petro-oil with 2% sulfur included, Jatropha with sulfur free

⇒ SOx emission will be reduced to **1/25**

Coke-Oven Gas-based Power Generation (China)

- Coke-oven gas (COG) utilisation project, with the installation of desulfurization equipment

⇒ **97t/year of SO2 emission to be reduced,** compared to flaring.
⇒ **1,062t/year of SO2** emission to be reduced, saving the use of local electric grid supplied from coal-fired power plant.

Quantitative Evaluation of Environmental Improvement (2)
Water Quality Management

Methane Emissions Avoidance from Landfill Site by Making Aerobic Environment (China)

- Avoid methane emissions from final landfill site, by injecting air and water inside to create aerobic condition

⇒ COD loading amount: **300t/year → 80t/year**
(* estimated from data of leachate COD and local precipitation)

Palm Oil Mill Effluent (POME) Treatment with Flocculation Agents (Malaysia)

- Avoid methane emissions from POME, by solidifying organic materials in POME with the addition of flocculation agents

⇒ COD to be reduced : 1,400mg/L → **670mg/L**
⇒ COD loading amount: 210t/year → **100t/year**

Quantitative Evaluation of Environmental Improvement (3)

Waste Management

Sewage Sludge Incineration to avoid methane emission (Singapore)

⇒ **Amount of sewage sludge to be landfilled: 639t/day → 73t/day (89% reduced)**

Solid Waste Mechanical Biological Treatment (Composting) (Indonesia: Programmatic CDM)

In the case of 300t of waste are disposed a day
⇒Reduction of landfill amount: **300t/day → 29t/day (90% reduced)**
(if segregated plastics and produced composts to be recycled)
⇒Reduction of landfill amount: **300t/day → 114t/day (62% reduced)**
(if segregated plastics recovered, and produced composts used for cover soil at landfill site)

Rice Husk-based Power Generation (Philippines)

⇒ **39,270t/year** of rice husk not to be landfilled

Proposal of *Co-benefits Integrated Indicator*

COG Utilisation for Direct Reduction Iron Production (China)

- "Life-cycle impact assessment method based on endpoint modeling" (LIME), developed by National Institute of Advanced Industrial Science & Technology of Japan in 2003, was applied to calculate "internalization of external environment cost" for the project.
- Based on the concept of "Willingness to Pay", SO2 and NO2 reduction as well as GHG reduction are converted into the value of money.

Mitigation of environmental external cost by this project

	Maximum emission of environmental burden (t/year)	Conversion factor (JPY/t)	External environmental cost (thousand JPY/year)
SO2	124	1,070	133
NO2	165	181	30
CO2	111,114	1.62	180

* The values of conversion factor are derived from conditions in Japan.
* Positive effects to mitigate air pollution through this project could be more highly evaluated.

Challenges for Evaluation of "Co-benefits" effects

- How to grasp current practice at local level
  = Difficult to set up "Co-benefits" baseline scenario
- How to evaluate odor, noise, groundwater contamination, quantitatively.

- How to establish objective criteria for the basis of "Co-benefits" Integrated Indicators
- In the future, additional financial profits from both GHG reduction and "Co-benefits" effect

  ⇒Mobilising further private investment to climate change mitigation projects (such as CDM projects)

  ⇒Further research/study is required

Manual for Quantitative Evaluation of the Co-Benefits Approach to Climate Change Projects

- Background: necessity to establish 'quantitative evaluation methods' to determine how much climate change mitigation projects can contribute to other benefits in terms of environmental improvement
- **"Manual for Quantitative Evaluation of the Co-Benefits Approach to Climate Change Projects (Ver. 1.0)"** was published in June 2009.
  - Applicable to Co-benefits-type CDM projects

➔ Access to http://www.kyomecha.org/cobene/e/tools.html

- FS 2008: Quantitative evaluation of "Co-benefits" without the Manual

➔ **FS 2009:**

- ◆**Evaluation of "Co-benefits" based on the Manual**
- ◆**Proposal on "Co-benefits" Integrated Indicators**
- ◆**Feed back for update/revision of the Manual based on the Concrete projects.**

Thank you very much for your attention!

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