UNEP-DTIE-IETC Project on:

Converting Waste Plastics into Diesel Fuel:

Resource Conservation and GHG Emissions Reduction

(Waste Plastics Recycling in Developing Countries through Environmentally Sound Technologies - EST)

Supported by: Ministry of Foreign Affairs
Government of Japan

United Nations Environment Programme
Division of Technology, Industry and Economics
International Environmental Technology Centre

Objective

To establish the basis for the development and implementation of waste plastics recycling with the application of Environmentally sound technologies (EST) to promote resource conservation and green house gases (GHG)

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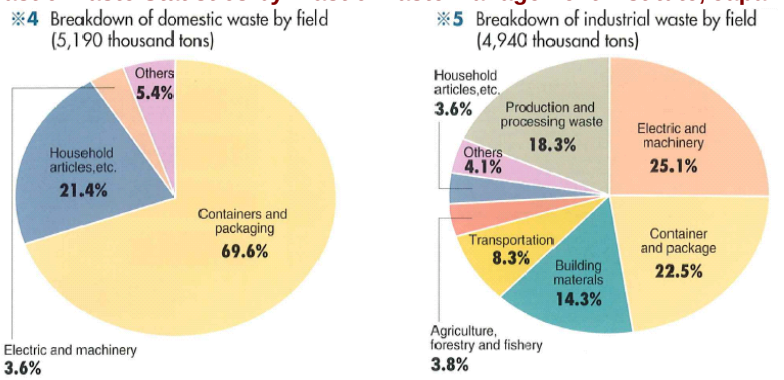
Background & Rationale

The world's annual consumption of plastic materials has increased from around 5 million tonnes in the 1950s to nearly 100 million tonnes in 2000.

Plastic Waste Statistics by Plastic Waste Management Institute, Japan



Technology Transfer

Waste plastics recycling is one of the most established recycling activities in economically developed countries

Japan is one of the most advanced countries in waste plastics recycling

The technology support from developed countries can help developing countries to develop and implement waste plastics management and recycling system in line with local conditions

Project Activities

1A. Preparation of guidelines on waste plastics assessment and waste plastics management

1B. Identification of the cities in developing countries in Asia – Pacific region as partner cities

1C. Quantification & characterization of waste plastics in selected cities

1D. Assessment of management system of waste plastics in selected cities

2A. Identification of appropriate technologies for waste plastics recycling

2B. Assessment of technologies, including GHG emission reduction, for final selection

3A. Training on data collection & assessment for baseline

3B. Training on identification and operation of technologies

3C. Awareness raising for national and local governments

4. Pilot project on waste plastics recycling in selected cities

5. Dissemination in other countries/cities

Assessment of Waste Plastics & Management Practices

Preparation of guidelines on waste plastics assessment (quantification and characterization)

Capacity building for data collection and analysis for waste plastics quantification and characterization - in selected cities

Preparation of guidelines on waste plastics management (collection, treatment, recycling, and disposal)

Capacity building for assessment of prevailing waste plastics management system - in selected cities

Field assessment for waste plastics quantification and characterization and prevailing management system - in selected cities

Baseline report on waste plastics quantification and characterization and its prevailing management system - in selected cities

Identification & Assessment of Technologies

International workshop for exploration of environmentally sound technologies (EST) for converting waste plastics into a resource/fuel

Identification and assessment of potential technologies for pilot projects in the selected cities, including assessment of GHG emissions reduction

Training Programmes in Asia & Pacific

1. Generic guidelines for baseline assessment (waste plastics quantification and characterization)
2. Generic guidelines for waste plastics management (collection, treatment, recycling and disposal)
3. Generic guidelines for identification of technologies
4. Generic guidelines for operation & maintenance
5. National Awareness & Training Workshops in Asia and Pacific

Pilot Project on Waste Plastics Recycling & Dissemination

Project design and supervision

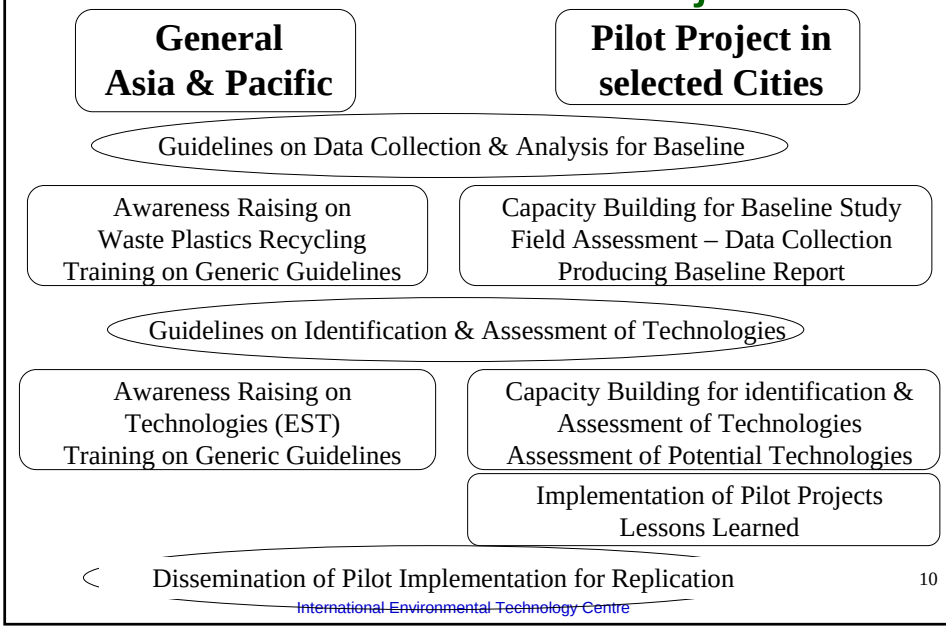
Equipment, infrastructure (installation and commissioning)

Operation and maintenance training

Report on the experiences gained

Dissemination of the report and training materials through workshops

Flow Chart of the Project



Phase I (2008-09)

Activity	Oct-Dec 2008	Jan-Mar 2009	Apr-Jun 2009	Jul-Sep 2009
1.1 Development of compendium of environmentally sound technologies in collaboration with private sector and research institutes	■	■		
1.2 International workshop for review of compendium and further exploration of environmentally sound technologies (EST) for converting plastic waste into fuel			■	
1.3 Web-based publication of compendium of technologies for wider circulation				■
2.1 Development of guidelines for data collection for waste plastics		■		
2.2 Development of guidelines for assessment of current management practices		■		
3.1 Selection of the cities for pilot capacity building and demonstration projects	■			
3.2 Capacity building in selected cities/countries for data collection and analysis			■	■
3.3 Capacity building for assessment of prevailing waste plastics management system/practices in selected cities/countries			■	■
4.1 Baseline reports with future projections on quantification and characterization of waste plastics in selected cities			■	
4.2 Baseline reports on waste plastics management system/practices in selected cities			■	
5.1 Identification of EST for converting plastic waste into fuel for selected cities				■
5.2 Assessment of resource conservation and GHG emission reduction benefits of identified technologies for selected cities				■
5.3 Based on identified EST, designing demonstration projects for selected cities				■

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Outputs

1. Generic guidelines on data collection & analysis for developing baseline report on waste plastics data and its prevailing management practices
2. Compendium of technologies to convert waste plastics into fuel
3. Generic guidelines on identification and assessment of technologies for implementation
4. Baseline studies in selected cities
5. Pilot projects on plastic waste recycling in selected cities
6. Intensive capacity building in selected cities
7. Awareness and capacity in developing countries on plastic waste recycling including data collection, identification of technologies and implementation of the projects

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Partnerships

No.	Activity	Partners
1	Generic guidelines on data collection & analysis for developing baseline report on waste plastics data and its prevailing management practices	UNEP Research and Professional Institutions (RPI)
2	Compendium of technologies to convert waste plastics into fuel	UNEP Research and Professional Institutions (RPI)
3	Generic guidelines on identification and assessment of technologies for implementation	UNEP Research and Professional Institutions (RPI)
4	Baseline studies about 2 cities	UNEP, RPI Governments
5	Pilot projects on plastic waste recycling in 2 cities	UNEP, RPI Governments
6	Intensive capacity building in 2 cities	UNEP, RPI Governments
7	Awareness and capacity in developing countries on plastic waste recycling	UNEP, RPI Governments

Selection of Countries/Cities

The countries are identified based on the two major criteria:

- Sufficient amount of waste generation
- Demand for alternative fuel to make business model feasible for converting waste plastics into fuel

Some of the countries, with rapid economic growth patterns, such as Indonesia and Malaysia do not have high demand for alternative fuel. Hence, India, Philippines and Thailand were short-listed due to generation of waste plastics as a result of prosperity and tourism as well as due to demand for alternative energy in small towns or industrial clusters due to lack of sufficient energy infrastructure and supply.

Selected Cities:

India:	Agra & Fareedabad
Philippines:	Cebu & Mandaue
Thailand:	Bangkok & Chiang Mai

Guidelines

Characterization & Quantification

- Setting the Boundaries
- Waste Plastics in Mix Waste: Procedures for Data Collection and Analysis & Working Example and Data Presentation
- Municipal Waste: Designing Survey & Waste Plastics in Municipal Waste
- Industrial Solid Waste: Waste Stream due to Production Process & Waste Stream due to other Activities
- WEEE / E-waste: Plastic Substances in WEEE / E-waste & WEEE / E-waste Inventory

Waste Plastics Management System / Practices

- Assessment of Waste Plastic Management System
- Policies & Institutions
- Financing Mechanisms
- Technology
- Stakeholders' Roles and Responsibilities
- Compiling Information on Waste Plastics Management

Compendium

Draft Compendium is compiled

Based on the outputs from this workshop, the final draft will be produced

Next Steps

Compendium of Technologies will be edited and formatted before uploading it on the website as an e-publication for dissemination. The process is in line with the planned timeline and it is expected to be completed by end of September 2009

Primary Data and Training Materials: Based on the draft assessment methodology, local experts in India, Philippines and Thailand have started the identification of cities and subsequently, the collection of primary data for these cities. Primary data for 2 cities in each of these three countries and training materials would be ready as per the schedule – End of September 2009

Thank You…