Converting Waste Plastics into A Resource

Assessment Guidelines

United Nations Environment Programme

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(revised version)

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Preface

Economic growth and changing consumption and production patterns are resulting into rapid increase in generation of waste plastics in the world. The world's annual consumption of plastic materials has increased from around 5 million tonnes in the 1950s to nearly 100 million tonnes; thus, 20 times more plastic is produced today than 50 years ago. This implies that on one hand, more resources are being used to meet the increased demand of plastic, and on the other hand, more plastic waste is being generated. In Asia and the Pacific, as well as many other developing regions, plastic consumption has increased much more than the world average due to rapid urbanization and economic development.

Due to the increase in generation, waste plastics are becoming a major stream in solid waste. After food waste and paper waste, plastic waste is the third major constitute at municipal and industrial waste in cities. Even the cities with low economic growth have started producing more plastic waste due to increased use of plastic packaging, plastic shopping bags, PET bottles and other goods/appliances using plastic as the major component.

This increase has turned into a major challenge for local authorities, responsible for solid waste management and sanitation. Due to lack of integrated solid waste management, most of the plastic waste is neither collected properly nor disposed of in appropriate manner to avoid its negative impacts on environment and public health and waste plastics are causing littering and choking of sewerage system. Due to extremely long periods required for natural decomposition, waste plastic is often the most visible component in waste dumps and open landfills.

Plastic waste recycling can provide an opportunity to collect and dispose of plastic waste in the most environmental friendly way and it can be converted into a resource. In most of the situations, plastic waste recycling could also be economically viable, as it generates resources, which are in high demand. Plastic waste recycling also has a great potential for resource conservation and GHG emissions reduction, such as producing fuel from plastic waste. This resource conservation goal is very important for most of the national and local governments, where rapid industrialization and economic development is putting a lot of pressure on natural resources. Some of the developed countries have already established commercial level resource recovery from waste plastics. Therefore, having a "latecomer's advantage," developing countries can learn from these experiences and technologies available to them.

UNEP has developed a programme on integrated solid waste management to support capacity building and technology transfer and under which a set of guidelines on development of ISWM Plan (four volumes available on line: http://www.unep.or.jp/ietc/spc/activities/activity_capacity-bldg.asp) have been prepared.

Recognizing the importance of particular waste streams and to build the capacity for the design and implementation of projects on the conversion of waste into material/resource source, UNEP has also developed guidelines for the characterization and quantification of specific types of waste, the assessment of waste management systems and compendiums of technologies for various types of wastes.

This document pertains to the methodology for waste plastics characterization and quantification (mainly for conversion into resource/fuel) and the assessment of current waste management system including the identification of gaps therein. It is aimed to raise awareness and assist policy – makers and managers on the collection and analysis of data to generate a baseline on waste plastics to further develop viable business propositions for converting waste plastics into fuels and to identify, assess and select Environmental Sound Technologies (EST) suitable for local conditions.

This document can also be of interest to other interested parties/organizations that aim at supporting decision-makers. They may be:

- consultants working on urban services, recycling, or waste management;
- representatives or staff of other local stakeholders including community groups, NGOs, and the private sector;
- entrepreneurs wishing to expand or strengthen their solid waste portfolios;
- academicians and scholars in urban environmental management;
- the press, especially when seeking background materials;
- donors interested in supporting future waste management activities; and
- local experts interested in using or replicating the results.

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Part II: Assessment of Current Waste Plastics Management Systems

8. Waste Plastics Management System / Practices

Annexure

Acronyms

ABS	Acrylonitrile Butadiene Styrene
BOT	Build-Operate-Transfer
BFR	Brominated Flame Retardants
C&D	Construction & Demolition
CIWMB	Californian Integrated Waste Management Board
CL	Confidence Level
CV	Calorific Value
CRV	Californian Redemption Value
DTIE	Division of Technology, Industry and Economics
ESTs	Environmentally Sound Technologies
E-Waste	Electronic Waste
HDPE	High Density Polyethylene
HIPS	High Impact Polystyrene
IETC	International Environmental Technology Centre
ISWM	Integrated Solid Waste Management
LDPE	Low Density Polyethylene
LLDPE	Linear Low Density Polyethylene
MC	Moisture Content
MSDS	Material Safety Data Sheet
MSW	Municipal Solid Waste
NGOs	Non-governmental Organizations
OECD	Organisation for Economic Co-operation and Development
PA	Polyamides
PC	Polycarbonates
PE	Polyethylene
PES	Polyester
PET	Polyethylene Terephthalate
PP	Polypropylene
PPVC	Plasticized Polyvinyl-Chloride
PRC	People's Republic of China
PS	Polystyrene
PSP	Private Sector Participation
PU	Polyurethanes