
Infrastructure for Sustainable Industrial Wastes Recovery in Malaysia

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Introduction

- Manufacturing industry important for Malaysia's economic growth for the past three decades.
- Contribution to Malaysia GDP grows from 13.9% in 1970 to 31.9% of overall GDP in the year 2000 (Malaysia, 2006).
- Industrial activity generates huge amount of wastes.
- The existing management systems in Malaysia for industrial wastes prioritize end-of-pipe approach, promotes the use of treatment and disposal method, rather than recovery.
- Creating many environmental problems such as landfill pollution, increasing land demand for disposals, and illegal dumping

The Need for Industrial Waste Recovery

- To ensure industrial sustainability.
 - Technology available and demand to recover industrial waste for other uses increasing.
 - Industry able to reduce manufacturing process costs, increase efficiency of resources utilization, promotes environmental friendly product design and reduce impacts on the environment and human health.
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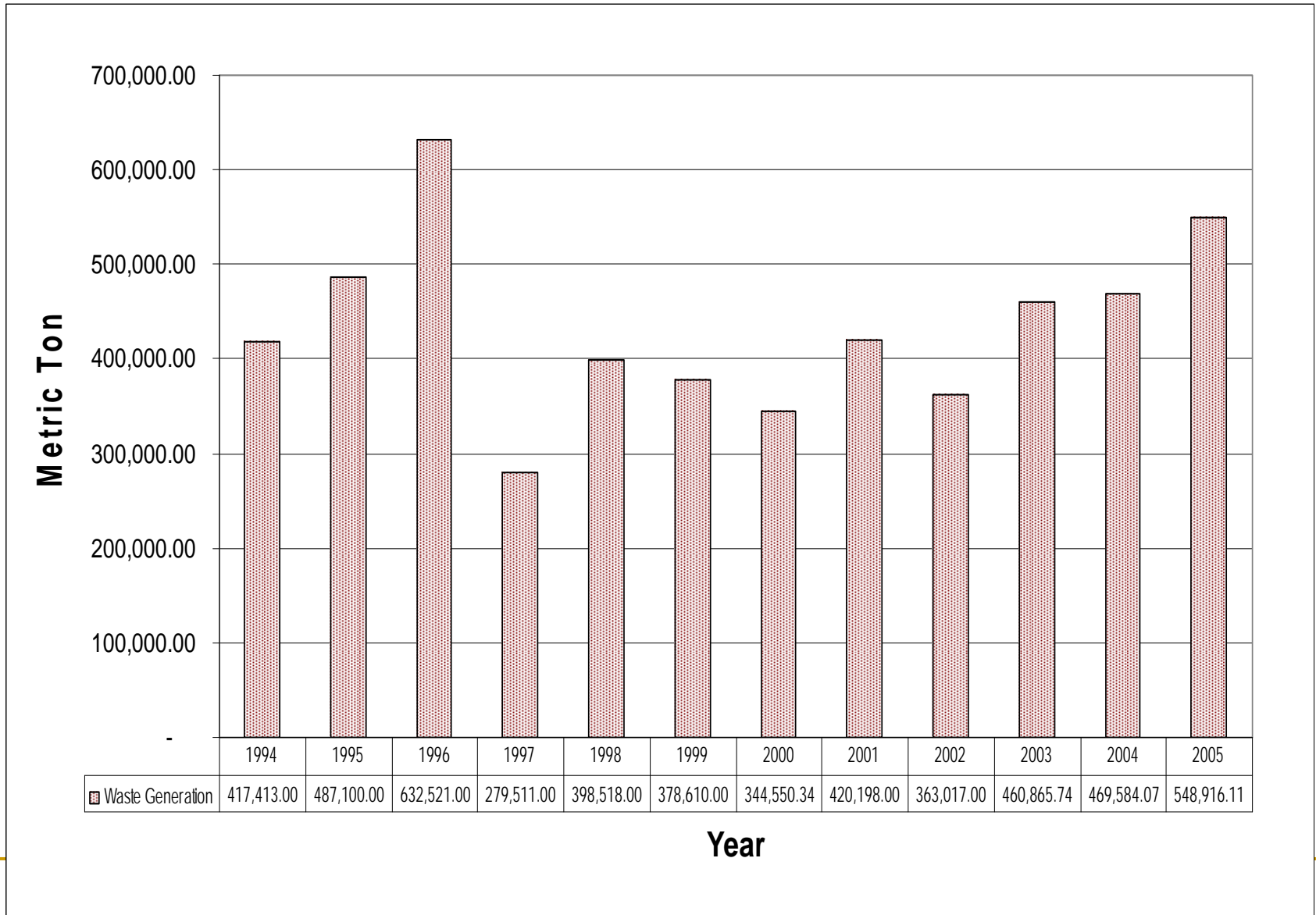
The Need for Industrial Waste Recovery

- Industrial waste recovery an emerging economic activity.
 - Recovery of industrial solid wastes, such as plastic, steel, paper and glass has become an important support industry.
 - Industrial waste recovery provides alternative resources and reduces dependency on natural resource such as oil for plastic.
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Industrial Waste Generation and Recovery Trends

- Solid waste generation in Malaysia increased from 16,200 tonnes per day in 2001 to 19,100 tonnes in 2005 or an average of 0.8 kilogram per capita per day (Malaysia, 2006).
 - Industries in Malaysia contribute 30% of solid wastes and wastes generation increased at 4% annually.
 - Estimated industrial solid wastes generation increased from 7,721.58 ton/day in 1994 to 11,519.24 ton/day in 2005.
 - Hazardous waste generation varied in the period 1994 to 2005. 417,413 metric tons of waste generated in 1994 and increased to 632,521 metric tons in 1996, later reduced to 548,916 metric tons in 2005 (DoE, 1995, 2003, 2006).
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Toxic and Hazardous Waste Generation Malaysia 1994 - 2005



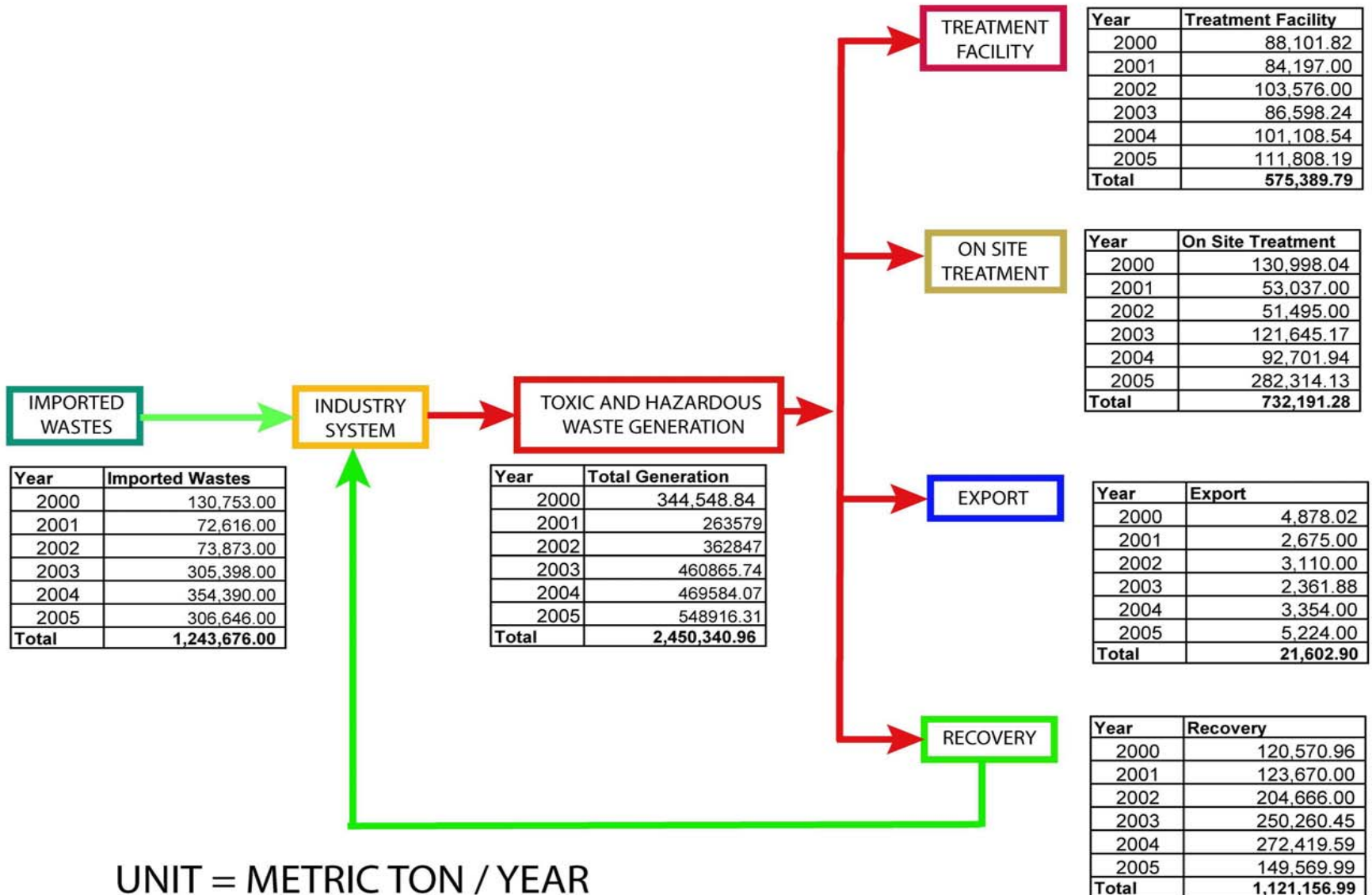
Industrial Waste Generation and Recovery Trends

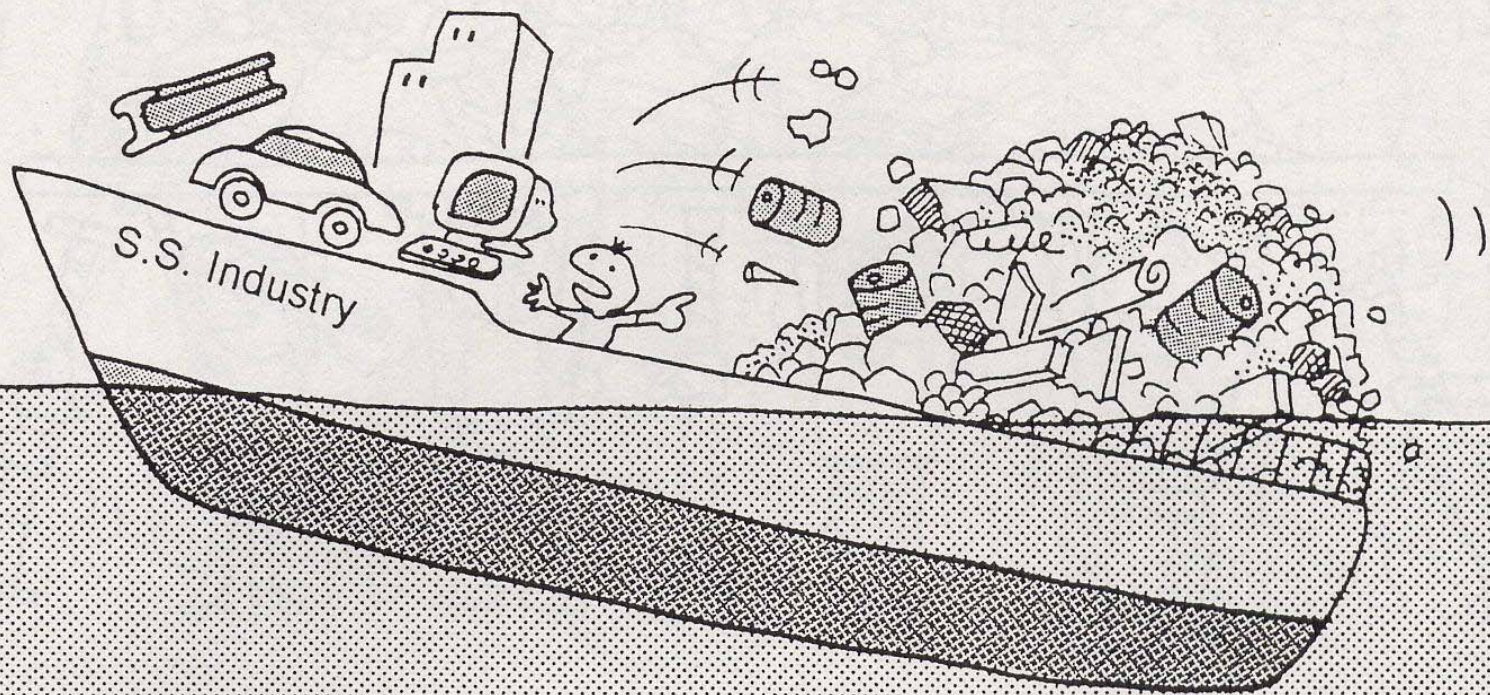
- In 2004, 55 industrial solid wastes recyclers licensed by the Ministry of Housing and Local Government Malaysia.
- Hazardous wastes, 122 recyclers were licensed by the Department of Environment Malaysia in 2006 to recover the wastes.
- Estimation - 70% of total industrial solid wastes generated were recovered.
 - industrial solid wastes recovered 5,405.1 ton/day in 1994, and increased to 8,063.47 ton/day in 2005.
- Approximately 45.75% of hazardous wastes have been recovered from total wastes generation from 2000 to 2005.
- Increasing trend of wastes recovery observed, from 35% in 2000 to 58% in 2004.
- Between year 2000 to 2005, 1.12 million metric ton of industrial hazardous waste have been recovered.
- Using estimated value of RM 4,000 per metric ton, estimated value of industrial hazardous waste recovery within this period is RM 4.48 billion.
- The total value of industrial hazardous waste recovery cycle between year 2000 to 2005 in Malaysia which includes importation of this waste is estimated at RM 9.46 billion (3.4 million metric ton).

Industrial Solid Waste Recovery

Type of Manufacturing Industry	Type of Waste Recovered
Electrical and Electronics	Paper, box, glass, scrap metal, wood, plastic, sludge, domestic waste, copper, aluminum, cast iron and steel
Mineral, concrete and ceramic	paper, carton box, glass, wood, plastic, concrete waste, metal and drum
Metal engineering	metal (copper, iron, aluminum) paper, carton box, glass, wood and plastic
Food and Beverages	paper, carton box and plastic
Pharmaceuticals	paper, carton box and glass
Paper, packaging and labeling	plastic and paper shreds
Chemicals	paper, carton box, glass, woods, plastic, metal (zinc, nickel, chromate, alodine)
Rubber	Paper, carton box, plastic, hydroxide metal sludge, vulcanized rubber waste, jute
Textiles	textile waste

Fate of industrial hazardous waste in Malaysia from 2000 to 2005





High Moon

"Hey, if you don't do something we're all going under!"

The Issue

- Infrastructure for industrial waste recovery is not fully established.
 - Weaknesses in many sectors such as legislation, governance, technology, physical system, economic and human resource.
 - Infrastructures are important to ensure that industrial waste recovery done in sustainable manner.
 - Able to minimize impact to the environment and human health.
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Infrastructure for Sustainable Industrial Waste Recovery

- The infrastructures required divided into three sectors;
 - the governance,
 - the physical
 - the economic infrastructures.
 - The governance infrastructure
 - provides the infrastructure for good management to minimize impacts on the environment and human health.
 - Governance infrastructure for managing industrial waste recovery in Malaysia has provided a good foundation that is based on legislation.
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Infrastructure for Sustainable Industrial Waste Recovery

Agency	Legislations	Scope
<p>Ministry of Natural Resources and Environment Department of Environment (DoE) Enforcement measures are shared with: Ministry of Trade and Industry Ministry of Agriculture with the support of Department of Agriculture Department of Fisheries</p>	<p>Environmental Quality Act 1974 (from this Act there are at least 5 Regulations that can be linked directly and nine indirectly)</p>	<p>Prevention, abatement and control of pollution Regulation to recover wastes and resources under EQA 1974 Part IV Regulations provided for industrial activities such as: Crude Palm Oil Raw Natural Rubber Scheduled Wastes, Treatment and Disposal Facilities Marine Pollution Use of controlled substances in soap, synthetic and other cleaning agents</p>
<p>Ministry of Housing and Local Government Department of National Solid Waste Management Department of Local Government</p>	<p>Solid Waste Management and Public Cleansing 2007. Local Government Act 1976 and local governments by laws. Street, Drainage and Building Act, 1974 and Town and Country Planning Act.</p>	<p>The National Strategic Plan for Solid Waste Management emphasizes waste recovery.</p>
<p>Ministry of Agriculture</p>	<p>Pesticides Act 1974</p>	<p>Control of pesticides for use, sale and import of, and production</p>
<p>Ministry of Home Affairs Department of Royal Customs and Excise</p>	<p>Control of Supplies Act 1961 Environmental Quality Act 1974 Pesticides Act 1974</p>	<p>Control and rationing of controlled articles / items Control of import and export</p>
<p>Ministry of Human Resource Development</p>	<p>Occupational Safety and Health</p>	<p>Health, safety and welfare of workers</p>

Infrastructure for Sustainable Industrial Waste Recovery

- The physical infrastructure important for recovery activities by the wastes generator, the transporter and the recycler.
- The existing infrastructures supporting industrial wastes recovery: transportation system, recovery centres, treatment centres and landfill.
- Monitoring of industrial waste recovery differ between Industrial solid wastes and industrial hazardous wastes recovery
 - Industrial solid wastes recovery lack of environmental concern, recycling centres/ facilities available run as a junk yard.
 - In comparison, hazardous waste recovery facilities and its collection system are monitored by the Department of Environment (DoE).
 - Hazardous wastes recovery is controlled and done in environmentally friendly approach.
- The critical issues of physical infrastructure:
 - supports system for the collection of wastes, modern and environment friendly recycling facilities and human resources.
- Technology development and application is required to improve capability of the physical infrastructure.

Infrastructure for Sustainable Industrial Waste Recovery

- The financial and economic infrastructure includes mechanisms and tools to ensure efficient wastes recovery activities.
- Important to ensure that industrial wastes recovery is economically viable and providing increasingly high quality services.
- The mechanisms and tools choose should be institutionalize into policy options and management regime for resource conservation.

Economic Tools	Financial Tools
<ul style="list-style-type: none">■ Market incentives■ Labour levy■ Tax reduction for cleaner production■ “Polluters pay” principle■ Market promotion for environmental friendly products	<ul style="list-style-type: none">■ Deposit and refunds system■ Rebate mechanisms for purchasing cleaner technology or equipment■ Low insurance premium for environmental friendly industry and products promoting waste recovery■ Finance or loans to produce cleaner products■ Finance or loan for waste recovery and recycling of waste as a resource

Conclusion

- Good infrastructures in place ensure sustainable industrial waste recovery.
 - Recovery wastes as resources help to minimize impact of waste to the environment and create alternative source for industry
 - Provides jobs and business opportunities.
 - Establishing infrastructure require full commitment of all key stakeholders.
 - Political will and business commitment promote establishment and effectiveness of infrastructure especially the governance, the economy and technology development.
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