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# Waste

Investing in energy and resource efficiency



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## List of acronyms

3Rs	Reduce, Reuse and Recycle	MLF	Multilateral Fund for the Implementation of the Montreal Protocol
ADB	Asian Development Bank		
BAU	Business-as-usual		
BIR	Bureau of International Recycling	MRF	Material Recycling Facility
C&D	Construction and Demolition	MSW	Municipal Solid Waste
CBO	Community-based organisation	NGO	Non-governmental organisation
CDM	Clean Development Mechanism	NIMBY	Not in my back yard
CE	Circular economy	NRDC	Natural Resource Defense Council
CEIT	Countries with economies in transition	ODS	Ozone depleting substance
CER	Certified Emission Reductions	OEA	Waste and Resources Action Programme
CO <sub>2</sub>	Carbon dioxide		
DBOT	Develop, Build, Operate and Transfer	OECD	Organisation for Economic Co-operation and Development
DfD	Design for Disassembly		
DfE	Design for Environment	OHS	Occupational Health and Safety
EAWAG	Swiss Federal Institute of Aquatic Science and Technology	PAYT	Pay-as-you-throw
		PFI	Private Finance Initiative
EEA	European Environment Agency	PPP	Public-private partnership
EoLV	End-of-life Vehicles	RCRA	Resource Conservation and Recovery Act
EPA	United States Environmental Protection Agency		
		RDF	Refuse Derived Fuel
EPR	Extended Producer Responsibility	RMB	Renminbi, currency in People's Republic of China
EU	European Union		
E-waste	Electronic waste	ROI	Return on investment
FFTC	Food and Fertilizer Technology Center	SCRAP	School and Community Reuse Action Project
CER	Certified Emissions Reductions		
GDP	Gross Domestic Product	StEP	Solving the e-waste Problem
GHG	Greenhouse gas	SO <sub>2</sub>	Sulfur dioxide
GIS	Geographic Information System	TEAP	Technology and Economic Assessment Panel of the Montreal Protocol
GMS	Greater Mekong sub-region		
GPS	Geographic Positioning System	THB	Thai Baht, currency in Thailand
HDPE	High Density Polyethylene	UNCTAD	United Nations Conference on Trade and Development
HSWA	Federal Hazardous and Solid Waste Amendments (USA)		
		UNDP	United Nations Development Programme
ICC	International Coastal Cleanup	UNEP	United Nations Environment Programme
IFC	International Finance Corporation		
ILO	International Labour Organization	UNFCCC	United Nations Framework Convention on Climate Change
ILSR	Institute of Local Self Reliance		
IPCC	Intergovernmental Panel on Climate Change	UNU	United Nations University
		USGS	United States Geological Survey
ISWM	Integrated Solid Waste Management	VBWF	Volume Based Waste Fee
LDCs	Least Developed Countries	WEEE	Waste Electrical and Electronic Equipment Directive
LDPE	Low Density Polyethylene		
MBT	Mechanical and biological treatment	WtE	Waste to Energy
MEA	Multilateral Environmental Agreement		
MIS	Management Information System		

# Key messages

**1. The increasing volume and complexity of waste associated with economic growth are posing serious risks to ecosystems and human health.** Every year, an estimated 11.2 billion tonnes of solid waste are collected worldwide and decay of the organic proportion of solid waste is contributing to about 5 per cent of global Greenhouse Gas (GHG) emissions. Of all the waste streams, waste from electrical and electronic equipment containing new and complex hazardous substances presents the fastest-growing challenge in both developed and developing countries.

**2. The growth of the waste market, increasing resource scarcity and the availability of new technologies are offering opportunities for greening the waste sector.** The global waste market, from collection to recycling, is estimated at US\$ 410 billion a year, not including the sizable informal segment in developing countries. Recycling is likely to grow steadily and form a vital component of greener waste management systems, which will provide decent employment. While currently only 25 per cent of waste is recovered or recycled, under the green investment scenario modelled in the Green Economy Report (GER), the amount of waste destined for landfills would be considerably reduced. These gains, implying the development and expansion of new market opportunities, would be achieved through the doubling of the recycling rate of industrial waste (an increase from 7 to 15 per cent), near full recycling of e-waste (from a current estimated level of 15 per cent), and an increase of about 3.5 times over the current recycling rate of Municipal Solid Waste – the principal source of recycled materials, from 10 to 34 per cent. Furthermore, by 2050, effectively all organic waste would be composted or recovered for energy, compared with 70 per cent under a business-as-usual (BAU) scenario.

**3. There is no one-size-fits-all when it comes to greening the waste sector, but there are commonalities.** Most of the waste management related standards are national or local; however, as a common feature, greening the waste sector includes, in the first instance, minimisation of waste. Where waste cannot be avoided, recovery of materials and energy from waste, as well as remanufacturing and recycling waste into usable products should be the second option. The overall goal is to establish a global circular economy in which material use and waste generation is minimised, any unavoidable waste is recycled or remanufactured, and any remaining waste is treated in a manner least harmful to the environment and human health, or even in a way which generates new value such as energy recovered from waste.

**4. Investing in greening the waste sector can generate multiple economic and environmental benefits.** Recycling leads to substantial resource savings. For example, for every tonne of paper recycled, 17 trees and 50 per cent of water can be saved. By recycling each tonne of aluminium, the following resource savings could be accrued: 1.3 tonne of bauxite residues, 15 m<sup>3</sup> of cooling water, 0.86 m<sup>3</sup> of process water and 37 barrels of oil. These are in addition to the avoidance of 2 tonnes of CO<sub>2</sub> and 11 kg of SO<sub>2</sub> released. In terms of new products, the Waste to Energy (WtE) market was already

estimated at US\$ 19.9 billion in 2008 and projected to grow by 30 per cent by 2014. In terms of climate benefits, between 20 to 30 per cent of projected landfill methane emissions for 2030 can be reduced at negative cost and 30 to 50 per cent at costs of less than US\$ 20/tCO<sub>2</sub>-eq/yr.

**5. Recycling creates more jobs than it replaces.** Recycling is one of the most important sectors in terms of employment creation and currently employs 12 million people in just three countries - Brazil, China and the United States. Sorting and processing recyclables alone sustain ten times more jobs than land filling or incineration on a per tonne basis. Estimations made in the context of this report suggest that with an average of US\$ 152 billion invested in waste collection as part of an overall green investment strategy over the period 2011 to 2050, global employment in waste collection activities by 2050 will be 10 per cent higher in a green economy scenario than projections under BAU. While higher rates of recycling may reduce employment opportunities in extraction of virgin materials and related activities, the overall net employment appears to be positive.

**6. Improving labour conditions in the waste sector is imperative.** The activities of collecting, processing and redistributing recyclables are usually done by workers with few possibilities outside the sector. Thus, despite the potentially significant contribution to employment creation, not all of the recycling and waste management related jobs can be considered green jobs. To be green jobs they also need to match the requirements of decent work, including the aspects of child labour, occupational health and safety, social protection and freedom of association.

**7. Greening of the waste sector requires financing, economic incentives, policy and regulatory measures and institutional arrangements.** Improved waste management and avoided environmental and health costs can help reduce the financial pressure on governments. Private sector participation can also significantly reduce the costs, as well as enhance service delivery. Micro-financing, other innovative financing mechanisms and international development assistance may, in addition, be tapped to support operational costs for waste treatment. A range of economic instruments can serve as incentives to green the sector (such as taxes and fees on waste, recycling credit and other forms of subsidies). Their use could be combined with policies and regulations such as targets for the minimisation, reuse, recycling and displacement of virgin materials in products; regulations relevant to the waste management market; and land-use policies and planning and regulations to set minimum safety standards that protect labour.

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