

# Executive summary

## ***Waste is a valuable resource and an untapped opportunity***

A waste crisis is emerging in the Asia–Pacific region, stoked by escalating quantities of waste, on the one hand, and poor regulation and management, on the other. Urban populations and economies are expanding, and with increasing numbers of people earning and spending more, consumption and waste are rising. The World Bank estimates that the generation of waste per day in the Asia–Pacific region will more than double, from 1 million tonnes in 2012 to around 2.5 million tonnes, by 2025. Such rates of waste generation are difficult to manage, and in countries where regulation is already weak, this challenge is a serious one. This is particularly the case in towns and cities in low- and middle-income countries, which tend to lack know-how, resources and economies of scale for safely handling waste.

Within this waste crisis, however, is a considerable and largely untapped opportunity. A major portion (tending to range between 50 and 65 per cent) of the solid waste generated in low- and middle-income cities is organic. This waste, which includes food scraps and garden waste, can be recycled into compost or transformed into biogas and used as an energy source. In addition, recyclable inorganic materials, like paper, plastic and glass, make up 26–33 per cent of the solid waste in these countries. Overall, around 90 per cent of solid waste in these cities can be recycled—which represents a massive opportunity for waste recovery.

In effect, waste is being wasted. By dumping, burning or landfilling, the value of both organic and inorganic waste is lost. Recycling these materials allows municipalities, communities and businesses to capture and retain this value. But creating a recycling culture requires changes in perception: waste, especially organic waste, must be seen as a resource and an opportunity.

## ***Integrated resource recovery centres: An inexpensive solution with many benefits***

The integrated resource recovery centre (IRRC) is a small-scale, decentralized, community-based waste-to-resource model that uses simple techniques to capture the value of waste. IRRCs are inexpensive to build and relatively straightforward to operate because they require no or little mechanization. They can transform organic waste into compost or biogas; they can also process faecal

sludge into compost. IRRCs can produce refuse-derived fuel and other waste-based products, and they can process recyclable inorganic materials. All of these outputs have a potential market value as a resource.

An IRRC creates a range of economic, social and environmental benefits for municipalities, communities, businesses and national governments while managing a waste problem. As for the many economic benefits, by diverting waste from landfill sites, an IRRC can save a municipality substantial expenditure on transport costs, extend the life of existing landfills, reduce government spending on chemical fertilizer subsidies and improve the yield of crops. The scope of social benefits includes the generation of green jobs for low-income groups, improved living conditions and improved community understanding of critical environmental issues. Additionally, the IRRC model generates such environmental benefits as reduced pollution, improved soil fertility through the application of compost and increased management of methane emissions (a harmful greenhouse gas).

***Waste-to-resource initiatives require government commitment, strong partnerships, financial sustainability and behaviour change***

Successful waste-to-resource initiatives (including an IRRC) depend upon four requisites. First, government commitment to the initiative is imperative. Such commitment may come from the municipal, provincial and/or national governments and is necessary for financial, technical and policy support. Second, cost-recovery is vital if a waste-to-resource facility is to provide long-term and sustainable benefits to a city. Cost-recovery should derive, to the extent possible, from the sale of the resources recovered from waste, such as compost or recyclable materials. Facility managers, however, must also seek out additional sources of revenue, typically through waste collection and tipping (or gate) fees, government subsidy and other forms of financial support. Third, source separation of waste is critical because it permits the acquisition of good-quality, clean and uncontaminated organic and inorganic materials. This involves the separation of waste at its origin (such as households and businesses), its collection and its transportation to the plant. Finally, stakeholder engagement is critical because waste-to-resource initiatives rely upon the proactive contribution of a range of actors, stretching from groups of informal workers to national government agencies. Different stakeholders have access to different types of resources, such as expert knowledge, community trust, political legitimacy or informal sector connections, and must be engaged accordingly.

## ***Successful waste-to-resource initiatives are built on the bedrock of partnership***

Partnerships are essential for sustainable waste-to-resource initiatives. Such initiatives tend to be multisectoral and multifaceted, requiring simultaneous action from government bodies, community groups, households, businesses and individuals. Important lessons regarding partnerships include:

- **Partnerships need to be based on trust and a shared vision.** Strong partnerships evolve around a core of mutual interests and common vision. This requires partners to identify their related needs and understand how the waste-to-resource initiative will return shared benefits.
- **Partnerships across different spheres of government are needed.** Of the many partnerships that waste-to-resource initiatives rely upon, those with the local, provincial and national governments are the most critical.
- **Partnership arrangements should align with local conditions and specific needs.** Local conditions greatly affect the capacity, characteristics and performance of waste-to-resource initiatives. Each city has a unique profile of actors, challenges, drivers of change and institutional and policy set-ups.
- **Different partners can contribute resources to the initiative.** Because different stakeholders can access, control and deploy different types of resources, complementarity needs to be considered early in an initiative's setting-up process.

## ***Successful waste-to-resource initiatives improve awareness and change behaviour***

For waste-to-resource initiatives to foster change among different stakeholders, it is essential to create as much awareness of its necessity and benefits as possible. It is through information sharing and government and community outreach that the required changes in behaviour are achieved. Important lessons include:

- **Changes in mind sets and perceptions are essential.** Successful waste-to-resource initiatives engender and depend upon a comprehensive and sustained change in the public's perception of waste as a resource. Such a change is difficult but vital to achieve.

- **Changing behaviour takes time, patience and sustained engagement.** To achieve behaviour change, waste-to-resource managers need to focus on educational community outreach and delivering awareness-raising and capacity-building campaigns to households, markets and commercial units. This is not easy, and results are not seen overnight. With persistence, good results can be achieved.
- **Source separation begins with changing individual actions.** Waste separation at source involves households, markets, hotels, restaurants and other producers of waste dividing their waste into various components, such as organic waste and recyclable inorganic material. This process begins with individual actions and builds from there.
- **New behaviour needs to be supported by appropriate infrastructure.** The commitment of households, markets and commercial units to separate their waste is lost if they perceive that their efforts are in vain. Waste collection infrastructure, including bins and containers, as well as waste transportation systems need to be aligned with the goal of waste separation.
- **Informal sector engagement helps to achieve broad community change.** The informal sector has an integral role in waste collection and recycling in many cities in low- and middle-income countries. Engaging this sector to support waste separation at source and having a broader programme of waste recovery can generate multiple benefits, especially in terms of community change.

***Successful waste-to-resource initiatives rely on sound facility management and operational performance***

Careful management of waste-to-resource facilities and keen attention to operational performance are vital for success. Facility managers need to adopt a range of good practices if sound, sustainable initiatives are to be achieved.

Important lessons in management and operations include:

- **A business plan, job descriptions and careful accounting are fundamental.** Waste-to-resource facilities should operate as a business to the fullest extent possible. Such an approach greatly facilitates cost-recovery, thereby allowing the facility to maintain its operations over the long term.

- **Key performance indicators need to be established and monitored.** Good management requires the monitoring of operations, which is dependent on systematic data collection. Such data should include the amount and type of waste received at the facility, the amount of waste rejected (and why), the amount of compost or biogas produced and the time it took, and the amount of biogas and recyclables sold.
- **Diversifying revenue sources builds financial resilience.** To be sustainable over the long term, waste-to-resource initiatives must develop a robust portfolio of revenue sources. Given the size of sales of compost and recyclable materials and the fluid, often unpredictable conditions and context in many cities, diversification of revenue sources greatly increases the financial resilience of operations.
- **Collection and tipping fees are usually required to achieve cost-recovery.** Waste-to-resource facilities that achieve operational cost-recovery usually do so by increasing the revenue derived from collection and tipping (also called gate) fees.
- **Improving quality helps to open markets.** Revenues increase when waste-to-resource facilities improve the quality of their products. This is true for compost products and recyclables. Recyclables need to be cleaned, compacted, sometimes shredded and packaged. In many cities, a market already exists for recyclables.

### ***Successful waste-to-resource initiatives can be replicated and scaled up***

Supportive policy and an enabling regulatory and market environment are helpful for the replication and wider scaling up of waste-to-resource initiatives. Important lessons for creating such an enabling environment include:

- **Scaling up is a long-term goal requiring shifts in policy and behaviour.** The most important precondition for scaling up waste-to-resource operations is a readiness for change. Scaling up means that more and more communities, businesses and government bodies will be engaged and expected to adopt new practices.
- **Scaling up should be incremental and modular.** The IRRC is a small-scale, decentralized waste-to-resource model usually servicing a specific ward, commune or community. It is thus based in and reliant upon the community it serves. To expand the waste-to-resource initiative to other communities

within a city, new IRRCs can be built. In this way, expansion can be modular (community-by-community, city-by-city) and incremental.

- **Engaging markets can support the sale of biogas, compost and other products.** In some countries, chemical fertilizer and commercial gases are subsidized heavily by the national government. Reducing the retail price of these products through subsidy, however, tends to exert downward pressure on compost and biogas prices. As a result, to foster compost and biogas sales, existing policies on fertilizer and gas subsidy should be reviewed.
- **Policy change is best achieved following a successful pilot project.** To encourage policy change, policymakers should draw on successful piloted waste-to-resource initiatives. Findings, lessons and documented experiences from the field are particularly useful and help to ensure that new or revised policies are in line with local conditions and realities and thus foster sustainable replication and scaling up.
- **National programmes and financing are especially useful for replication.** Progress and efficacy in replicating waste-to-resource initiatives are greatly enhanced when the initiative is supported through national programmes. In particular, incorporating or transforming a waste-to-resource initiative into a national programme tends to mobilize useful national policy and financing.
- **International climate change financing can be leveraged for replication.** Because waste-to-resource initiatives reduce the emission of methane, a harmful greenhouse gas, they can be considered climate change mitigation projects. Thus, they are eligible to receive financing from international climate change mitigation mechanisms, such as nationally appropriate mitigation actions (NAMAs).

## ***Structure of this report***

This report is divided into three parts.

Part I—Out of the Waste Crisis—highlights the challenges and opportunities for improving municipal solid waste management in developing countries in the Asia–Pacific region and the benefits of adopting a waste-to-resource approach. It presents key data for understanding the scale of the challenge and the opportunity. It also introduces the IRRC model, developed by Waste Concern and promoted by ESCAP across the region as a method for capitalizing on the opportunity through waste recycling and recovery. Part I also discusses the many benefits and essential requisites for successful waste-to-resource initiatives.

Part II—Lessons Learned—presents important findings gathered over six years of experience within the ESCAP regional programme on pro-poor and sustainable solid waste management in secondary cities and small towns. These lessons are divided into four themes: (i) partnerships (ii) awareness raising and behaviour change (iii) managing and operating an IRRC, and (iv) creating an enabling environment for replication and scaling up. Each of the four sections concludes with a series of recommendations for policymakers and governments at the local and national levels. It is hoped that these recommendations will provide guidance on how to facilitate and manage pro-poor and sustainable waste-to-resource initiatives.

Part III—City Profiles—encompasses fact sheets of the eight cities where the ESCAP regional programme established an IRRC or waste-to-resource initiatives more generally: Kushtia (Bangladesh), Battambang and Kampot (Cambodia), Islamabad (Pakistan), Matale and Ratnapura (Sri Lanka) and Kon Tum and Quy Nhon (Viet Nam). All of these are secondary cities or small towns, with the exception of Islamabad, which is a large capital city. Each fact sheet includes an overview of the city and outlines the waste-to-resource initiative that was implemented, the results and the impacts.