

KEY GOALS AND OPPORTUNITIES

KEY SHORT-TERM GOALS

- Sort waste for composting and recycling
- Separate and divert waste, and implement recycling and composting programs
- Improve and establish additional waste infrastructure

A 2011 waste composition study found that 50 percent of Amman's solid waste is organic, 16 percent is plastic, 7 percent is cardboard, and 8 percent is paper. A large portion of these waste types can be removed from a landfill using recycling, reuse and composting methods. This provides an important opportunity to use existing technologies, such as composting, the capture of biogas, and recycling. Such production and consumption shifts can lead to immediate, beneficial results.

Ultimately, Amman will work on moving toward a zero-waste framework. However, in the short-term, implementing existing technologies can reduce waste and improve waste management. The GAM has complete control over the waste sector and plays a key role in issuing licenses for waste collection companies and granting regulatory approval for the establishment of waste processing facilities.

The GAM concluded a municipal solid waste management strategic planning study in 2012 for the 2012-2022 time horizon. The study defined

CASE STUDY AL GHABAWI LANDFILL WITH GAS CAPTURE

CHALLENGE • Safe, Most landfills are not covered or adequately treated in the country, and sorting of recyclable materials or organic waste is not practiced.

SOLUTION • The Al Ghabawi landfill was established in 2003. It was the country's first and still only engineered safe and lined landfill with methane gas capture. It was also the first municipal carbon finance partnership in the Middle East.

To date, three cells have been filled and safely capped and methane gas is being extracted, a fourth cell is filled and will be capped and connected to the biogas system shortly. Donors continue to fund development of the project to build additional cells and cap the filled ones. The site receives around 4,300 tons per day and 1,548,000 ton/yr in 2018.

Currently, the captured landfill gas produced is flared off, as there has been a delay in approval for the grid connection. Once connected, the gas will fuel the electricity needs of Al Ghabawi and the remainder will be set back to the national grid. In 2019, the current cells will produce 4.8 MW per hour. The production of methane gas in the new cells will compensate for the depreciation in cells 1-3, thereby ensuring a constant flow of gas.

BENEFITS • Benefits include reduced environmental pollution and litter, protection of ground water from contamination, lower operating costs for Amman, as well as a reduction in local air pollution.

plans for equipment renewal; the phased introduction of waste separation at the source; improvements to the transfer network; land fill gas recovery; and public-private partnership (PPP) options. It also identified a need for additional transfer stations in the western district of Amman

because one of the existing transfer stations now transfers 90 percent of the waste to the landfill. The city will build on this strategic plan to propose actions that will create a transformation in waste reduction and management in Amman.

BENEFITS

Improving the way Amman sorts, collects and disposes of waste will reduce air pollution from waste transportation and waste processing sites. It will also provide a source of low carbon energy for exploitation, increase jobs in the sector and protect

the local environment from pollutants. These actions will improve the appearance and quality of life in the city by reducing litter and providing cleaner public spaces.

PARTNERS AND STAKEHOLDERS

The waste sector includes all three tiers of government, from the national government, where waste plans and goals are set, to the provincial and local authorities where the building and operating of waste infrastructure and waste collection and

processing facilities are done. Amman is responsible for a large portion of waste management actions. However, establishing policies and regulations will require close coordination with the national government.



ACTIONS FOR REDUCING WASTE AND IMPROVING WASTE MANAGEMENT

ACTIVITY	TIMEFRAME	VOLUME OF EMISSIONS REDUCED	SUSTAINABILITY BENEFITS
Develop and implement a waste management framework that sets targets for reducing waste, with zero waste as a vision.	● Short	Unknown	Awareness raising
Development of waste transfer sites in the northern and western parts of Amman	● Short	Medium	Reduced local air pollution, and lower operating costs
Implement waste sorting	● Short/ Pilot projects in progress	Medium	Reduced exposure to toxins from untreated waste, and an increase in job opportunities
Recyclable waste collection Recyclable / re-usable item drop-off sites	● Short	Medium	Reduced exposure to toxins from untreated waste, and an increase in job opportunities
Implement anaerobic digestion site for organic waste	● Long	High	Reduced exposure to toxins from untreated waste, increased job opportunities, and energy source provided to the city
Collect organic waste	● Medium	High	Reduced exposure to toxins from untreated waste, improved job opportunities, and energy source provided to the city
New fleet and equipment for solid waste operations	● Short	Medium	Reduced local air pollution, and lower operating costs for the city
Build a maintenance workshop for the existing waste fleet based at the Ghabawi landfill to ensure that the fleet is running efficiently	● Short	Low	Reduced operating costs, and increased job opportunities
Complete design, building and operation of the Bio Gas system in Cell number 4 of the Al-Ghabawi landfill and connect it to the current operations	● Short	High	Reduced operating costs, reduced local air pollution, and increased provision of renewable energy

WATER AND WASTE WATER SOURCING, TREATMENT, AND PROTECTION OF WATER



Highest Emitter:
TREATMENT OF
WASTEWATER

CHALLENGES

The Hashemite Kingdom of Jordan suffers from severe water scarcity and is one of the top four most arid countries in the world. The scarcity of water is a key constraint to growth and development. Available water resources per capita are falling. At the same time, water demand is increasing. Indeed, the water shortage is drastically increasing due to economic and population growth. To control water consumption, water is now delivered only once a week to citizens and businesses. It is then placed in storage tanks. Municipal water use (including in the GAM) is currently being met primarily through the use of groundwater sources. If supply remains constant, per capita domestic consumption is projected to fall to 90 cubic meters per person per year by 2025. This would place the country in the category of having an absolute water shortage that could constrain economic growth and potentially endanger public health (Hashemite Kingdom of Jordan 2014).

Water supply, pumping and delivery are the responsibility of the national government of Jordan, specifically the Ministry of Water and Irrigation. The treatment of waste water in Amman is also the responsibility of the national

government. Importantly, both water supply and waste water treatment are under pressure from the growing refugee crisis and influx of refugees.

POTABLE WATER

Groundwater levels have dramatically declined showing that groundwater use is unsustainable. Despite significant improvements in water-supply infrastructure, a critical and serious supply-demand imbalance remains. From 2011 to 2015 there was a 40% increase in demand for water (Hashemite Kingdom of Jordan 2013). As the country is impacted by climate change, precipitation will potentially decrease, exacerbating the existing problems.

STORM WATER

Whereas overall precipitation is decreasing, there has been an increase in severe storms that cause rapid heavy rainfall. As a result, areas in Amman are frequently affected by flash floods. In 2015, a 30-minute heavy rainfall event caused a severe flash flood in Amman, leading to loss of life, damaged properties, flooded streets, and people trapped in their cars and homes. Thus, the effective management of storm water is one of the main priorities of the Resilience Strategy.

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- Encourage and incentivize rainwater harvesting for residential and commercial buildings
- Implement water saving measures and water recycling or rainwater harvesting in municipal buildings
- Develop green infrastructure to capture and treat storm water in public spaces.

The Hashemite Kingdom of Jordan has developed a comprehensive water strategy entitled "Water for Life" for 2008-2022. The Strategy was updated in 2012. It focuses on effective water demand management and water supply operations, as well as institutional reform. Amman can contribute to this by reducing water consumption and managing storm water through the management of its own operations. It can also contribute through the enabling of green building and support for green infrastructure sectors.

Emissions from the water sector are not a factor in Amman's inventory. However, reducing water usage and effectively managing waste and storm water are key to the city's future health and to managing emission reductions. In this regard, the efficient use of water in buildings will lower water consumption, thereby decreasing the amount of energy needed to treat, transport and supply water to Amman.

CASE STUDY GREEN INFRASTRUCTURE IN EAST AMMAN

CHALLENGE • Communities in East Amman lack access to open space and greenery. Deteriorated streets and sidewalks have affected the social cohesion of the neighborhood and cut services to residents. In some areas, there has been exposure to hazards, such as flooding and soil pollution.

SOLUTION • Pilot areas in East Amman have been selected to showcase green urban design and infrastructure. The two projects, one called "Improving living conditions in disadvantaged areas of Amman" and the second called "Cash for Work" are being financed by GIZ and will add green space, rehabilitate sidewalks and stairs and use green infrastructure to improve drainage. Communities will also be involved in the design and planning of the space to ensure that it meets their needs.

BENEFITS • Benefits include improved access to transportation, improved walkability, access to public green spaces, improved stormwater drainage, reduced flooding, preservation of biodiversity, soil stabilization and reduction of pollutants.