

2.2: Environmental Services

SECTOR OVERVIEW

The growth of Kuwait's environmental services sector is expected to be driven by the long term requirement of safeguarding Kuwait's natural environment and limited land resources, the fast-growing population, the environmental needs of the thriving oil and gas sector and an emerging industrial sector.

The Government is undertaking a series of projects to address the current situation of under-capacity in critical segments such as sanitation and waste management.

Planned BOT municipal solid waste treatment facility - Kabd
Expected land area for the facility

500,000 sq. m

Umm Al Hayman Waste Water Treatment Plant – Expected to commence operations by 2019

Capacity (cm/d)

500,000 to 700,000

SOLID WASTE MANAGEMENT

The KAPP is seeking to develop a solid waste treatment project at Kabd area of Kuwait on a PPP basis. The project will be awarded as a 30 year long term contract from the Kuwait Municipality. The plant is expected to have a capacity to treat approximately 50% of total municipal solid waste produced in Kuwait.

PRIMARY SEWAGE TREATMENT

The current capacity constraints are proposed to be addressed through a combination of capacity expansions and initiation of new projects. These projects are expected to increase Kuwait's sewage handling capacity from the existing 947,300 cm/d to approximately 1,500,000 cm/d. Most of these projects are proposed to be undertaken through the PPP route.

WASTE RECYCLING

Waste recycling as a concept is relatively new in Kuwait with only a few active players. Most of the solid waste is currently disposed off at landfill sites which are facing capacity and environmental issues.

EFFLUENT SLUDGE TREATMENT

Sludge treatment involves treatment of oil or industrial effluents. Kuwait's oil and gas exploration industry provides significant opportunities for oil sludge treatment. Recent directives by the Kuwait Environment Public Authority (KEPA) have directed focus towards treatment of industrial effluents increasing the demand for environmental remedial services.

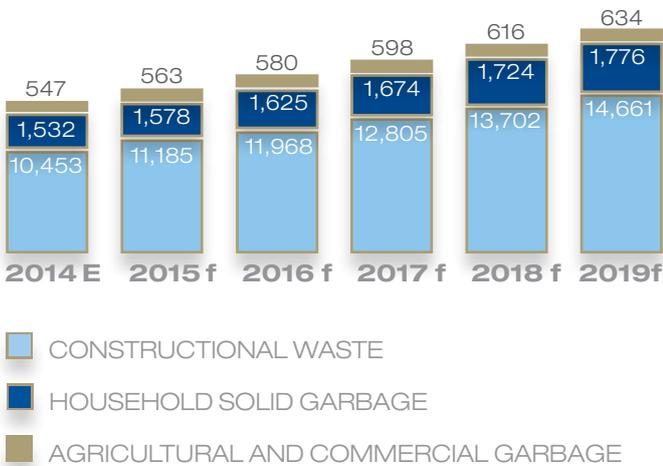
Implementation of stricter environmental regulations and the need to address current under-capacity situation in key segments is expected to drive the growth of environmental services sector in Kuwait.

2.2.1: Solid Waste Management

OPPORTUNITY OVERVIEW

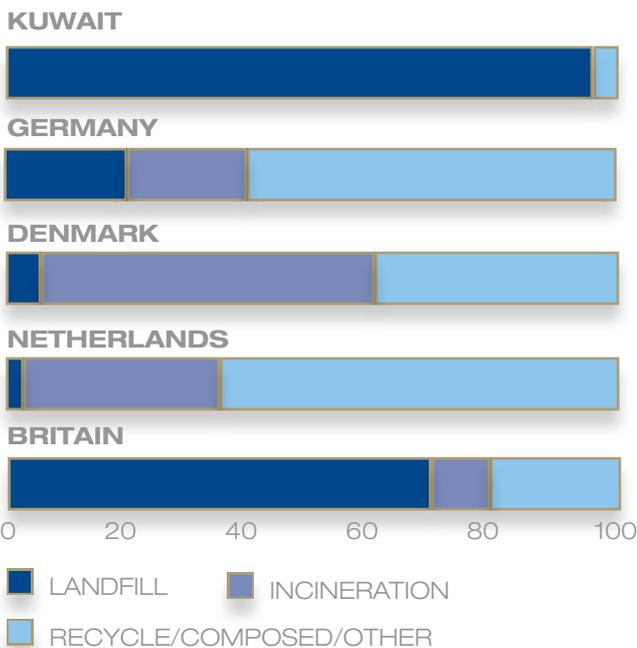
Kuwait's solid municipal waste generation of 1.4 kg/day per capita is among the highest in the GCC region. Factors such as strong growth in the energy sector, growing construction activities, increasing population and rapid urbanization are expected to drive annual solid waste generation from an estimated 12.5 Mn tonnes in 2014 to more than 17.1 Mn tonnes by 2019.

Municipal waste estimates, 2014-2019, ('000 tonnes)



- In comparison to European countries, landfills remain the dominant method of solid waste disposal in Kuwait, driving the need for additional waste management facilities.
- The Kuwait Government is seeking to involve private sector in the area of solid waste treatment with a view to bring in international expertise and private sector efficiencies.
- The KEPA and the Kuwait Municipality are taking initiatives towards strict compliance with environmental regulations. This is expected to encourage better management of solid waste, moving away from the past practice of dumping untreated waste at landfill sites.

Kuwait vs. other developed markets, waste disposal method



By 2019, Kuwait is expected to generate 14.6 Mn tonnes of inorganic waste per annum, primarily comprising of construction waste. Organic waste, consisting of household solid garbage and agricultural waste is expected to constitute another 1.8 Mn tonnes per annum. Opportunities exist for establishing solid waste treatment facilities as well as for remediation of accumulated waste at existing landfills.



2.2.2: Primary Sewage Treatment

OPPORTUNITY OVERVIEW

Kuwait is primarily served by five major wastewater treatment plants (WWTP) located at Al Jahra, Sulaibiya, Kabd, Al Riqqa and Umm Al Hayman areas. In 2014, the total design capacity of these five major plants was 947,000 cm/d, servicing over 98% of the population. In addition, there are three small-scale plants at Khiran, Wafra and Failaka.

Kuwait's per capita consumption of fresh water reached nearly 38,000 imperial gallons (IG) in 2013 and is estimated to reach approximately 45,000 IG by 2015. High levels of water consumption contribute to a corresponding increase in generation of wastewater, thereby creating demand for additional treatment capacity. The Government has earlier successfully utilized the BOT model for WWTP projects at Sulaibiya, Jahra and Kabd while the Umm Al Hayman WWTP project has been floated under the PPP route through the KAPP.

Considerable capacity expansion is planned for the plants at Sulaibiya and Umm Al Hayman. By 2016, the older plants at Al Riqqa, Al Jahra and Al Khiran are planned to be decommissioned. The treatment capacity will have increased by nearly 60% to 1.5 million cm/d with private developers set to control over 80% of the capacity by 2016.

Waste Water Treatment Plants	Expansion and development plans	Planned capacity (cm/d)
Sulaibiya	425,000	600,000
Umm Al Hayman	27,000	500,000 to 700,000
Kabd	250,000	250,000
Al Riqqa	180,000	-
Al Jahra	65,000	-
Al Khiran	300	-
Total	947,300	Approx 1,500,000

- In the absence of natural lakes or perennial rivers and limited rainfall, Kuwait has only three sources of water-ground water, desalination and water reuse. Fresh groundwater is limited to two reservoirs (Rawdatain and Umm Al Aish) having estimated reserves of 40 billion gallons.
- Desalination, an expensive practice, is not environmentally friendly and contributes to wastewater discharges that affects the quality of coastal water and marine life. Wastewater reuse is seen as a means to address issues with both environmental pollution and water resource deficit.

The market size of sewage treatment plants is expected to reach 1.5 Mn cm/d per day, with all three plants (Sulaibiya, Umm Al Hayman and Kabd) being operated by the private sector. The Government is preparing a new Sanitary Master Plan project that seeks to define the strategy for expanding Kuwait's wastewater network and treatment facilities for the next 35 years.

There exists a sizeable opportunity for international firms to participate in the PPP process and carry out design, construction, operation and maintenance activities for the WWTPs.



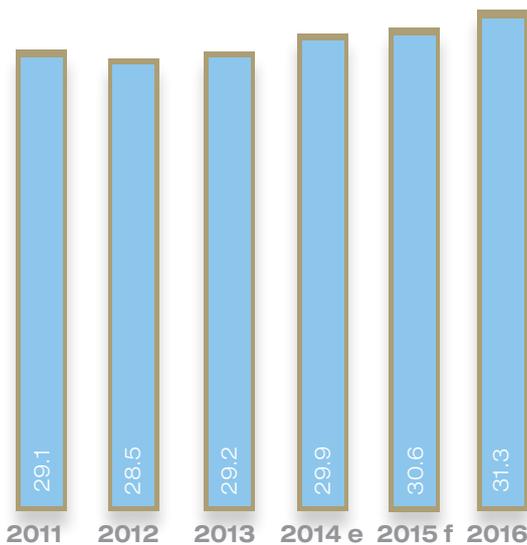
2.2.3: Oil and Effluent Sludge Treatment

OPPORTUNITY OVERVIEW

Kuwait’s oil production levels are expected to increase from 2.9 Mn barrels per day (bpd) in 2014 to 3.5 Mn bpd in 2021. The considerable amount of oil sludge generated as part of the oil extraction process has traditionally been deposited in large sludge pits. Separately, there are around 114 square kilometers of oil wells that were created as a result of oil spills from damage caused to oil wells by the retreating Iraqi army in 1991. The Kuwait Oil Company is undertaking pilot projects to explore technologies for prevention of environmental contamination and potential for recovery of oil.

The growth of the manufacturing sector is leading to increased generation of industrial effluents which used to be discharged into public sewer systems without treatment. With the Government tightening regulations on adequate treatment of effluents prior to discharge, there are opportunities for specialist service providers.

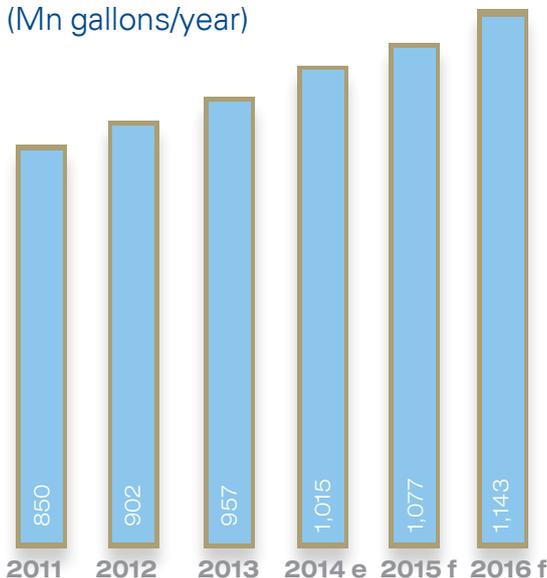
Oil sludge estimates, 2011-2016, (Mn bbl/year)



- With the growth in industrial and petrochemical sectors, the amount of effluent generated is expected to increase considerably resulting in a corresponding increase in demand for effluent treatment facilities.
- Further emergence of low cost new technologies for recovering crude oil from oil sludge provides additional stimulus to the demand for sludge treatment.
- Increased regulatory and public scrutiny combined with heightened awareness of corporate social responsibility towards conservation of the environment are driving the demand for treatment of sludge and effluents.

Kuwait’s plan to increase oil production capacity to nearly 4 Mn barrels per day (bbl/day) by 2030, will lead to generation of approximately 36 Mn bbl/day of oil sludge would be generated per year. With the treatment of this oil sludge there is a potential to recover around 16 Mn bbl/day of reusable crude oil.

f Effluent estimates, 2011-2016, (Mn gallons/year)



The rising industrial effluent volumes are expected to reach approximately 1,143 Mn gallons by 2016. There is an opportunity for international specialists to bring in comprehensive technology solutions to address these issues in Kuwait.

Source: Annual statistical bulletin, 2012 OPEC and Flottweg separation technology, technical document, KPMG Analysis

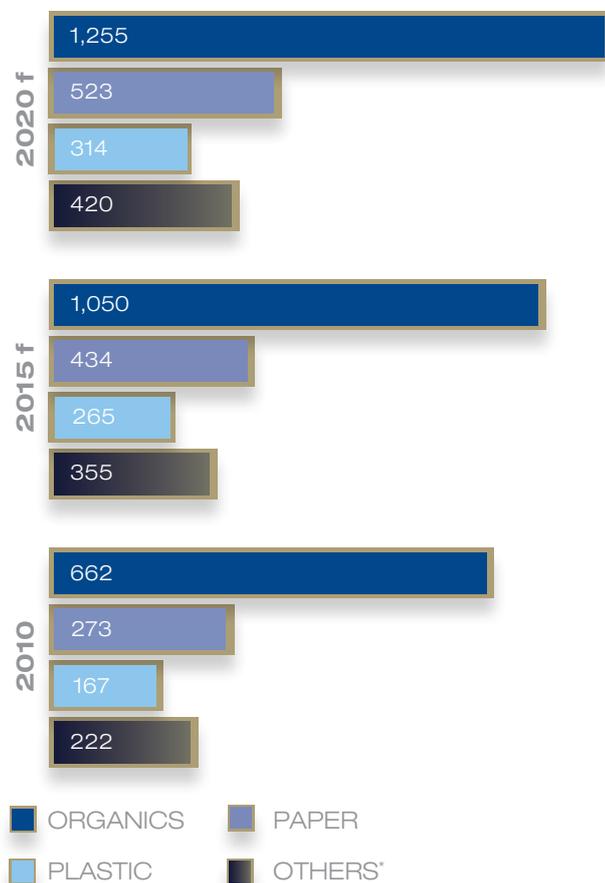
2.2.4: Waste Recycling

OPPORTUNITY OVERVIEW

Kuwait produces over 32,000 tons of total solid waste per day of which only 6,700 tons (21%) is being recycled and used to produce various types of reusable products such as scrap plastic products, flakes, and other scrap materials. The remaining solid waste is disposed at landfill sites, creating potential public health and environmental issues.

Construction waste is the major contributor to solid waste in the country, accounting for 81.3% of total solid waste produced between 2009–2013. Construction waste typically comprises metals, plastics, wood and other materials.

Forecasted Municipal Solid Waste Production By Type, 2010-2020 - '000 tonnes



- Municipal solid waste comprises the second largest source of solid waste in the country. Generation of municipal solid waste is expected to reach over 2.5 million tonnes in 2020 as compared with 2.1 million tons in 2015 on account of growth in population. Organic waste is the second largest component of municipal solid waste, followed by paper and plastic.
- Environmental regulations controlling disposal of waste are expected to drive demand for additional waste recycling facilities.
- While some high value components of waste such as metals have attracted interest from recycling companies, there is a need to establish facilities to address recycling of complex components such as plastic and lower value components such as fibers, wood, glass and paper.
- Lower manufacturing and energy costs for recycled materials are also driving demand for waste recycling.

The size of the domestic waste recycling market is estimated at over USD 350 Mn in annual revenues. Most of the existing waste recycling companies in Kuwait are privately owned. There is significant potential for introducing technological expertise and experience in enhancing Kuwait's ability to recycle waste.

*Note: Others include Metals, Glass, Fibers, Wood and Plastic

Source: Life Cycle Assessment (LCA) of Municipal Solid Waste Management in the State of Kuwait