



TOP WASTE-TO-ENERGY PROJECTS IN THE MIDDLE EAST

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The Gulf region produces around 150 million tonnes of waste annually, with only 5% of it being recycled and vast quantities going to municipal dumps and landfill or, worse, being illegally dumped at unauthorised sites.¹ This is a growing problem too, since the rapid urban expansion of ME countries means that their annual waste production rates are also on the rise. For example, the UAE is expected to produce around 27% more solid waste by 2017; an additional 6.6 million to 8.4 million tonnes, making 29 million tonnes in all.² Even smaller ME nations still have big waste problems, as Oman produces around 1.8 million tonnes annually, a figure that has risen by 25% over the last decade due in large part to its growing population.³

This waste is usually left to rot or burned in a manner that heavily contributes to air pollution. In order to address a problem that is causing such environmental damage while also eating into available land space, the respective Middle Eastern governments are set to radically change the way in which they manage waste by converting it to energy in specially designated facilities supported by cutting-edge technological innovations.⁴



ORGANIC

PAPER

PLASTIC

GLASS



METAL

E-WASTE

MIXED

PLEASE RECYCLE

The market of waste-to-energy (WTE) is growing at an unprecedented rate, with the global industry expected to grow from \$19 billion in 2012 to at least \$29.2 billion by 2022.⁵ With ME governments looking to alter their waste management approach in order to dispose of waste in a more sustainable manner while also creating green energy, the region is a prime WTE investment hotspot.

Future WTE projects in the Middle East

Dhofar WTE Facility

Location: Oman

Project Investment: Approximately \$600-\$700 million

Key Stakeholders: Be’ah

Project Initiation date: April 2015

Estimated Project Completion: TBC (Project is at feasibility stage)

Project Details: Oman’s solid waste management capabilities have traditionally been poor due to a lack of investment which has led to a paucity of well-equipped collection and disposal facilities. The problem is further exacerbated by

¹ Oman Daily Observer, 1.8 m tonnes of waste generated per year, 19/03/2016

² Khaleej Times, UAE waste to increase by over 27% by 2017, 25/10/2015

³ Oman Daily Observer, 1.8 m tonnes of waste generated per year, 19/03/2016

⁴ MIT Technology Review, Garbage in the Arab World, 08/10/2015

⁵ TAQA, Waste to Energy, 2013

limited land availability, meaning that many of Oman's 350 landfills and dumpsites are close to residential areas, causing further environmental issues. To make matters worse, unauthorised dumping is a recurring problem across the country.⁶

In order to greatly improve its solid waste management capacity, government-owned Oman Environmental Services Holding Company (Be'ah) has begun feasibility studies with a view to initiate the Sultanate's first WTE project. Once complete, the Dhofar plant will be able to supply sufficient energy to the proposed South Al Batinah desalination plant via Reverse Osmosis technology. Thanks to the conversion of solid waste to energy, the plant could produce 73 million cubic metres of potable water annually, which is around 30% of Oman's total installed desalination capacity.⁷

"As a result of the utilisation of waste for energy generation, we will be spending less on developing and maintaining landfills, reducing CO2 emissions, providing economic alternatives to natural gas as a fuel source, saving the subsidy that the government allocates on natural gas use, and tackling the issue of potable water capacity. Thus, many challenges and problems can be addressed through this project."

– Mohammed Sulaiman Al Harthy, executive vice president, Corporate Strategic Development

If the South Al Batinah plant is a success, Be'ah will consider

implementing another, smaller plant in Sharqiya that can handle between 500-1000 tonnes of solid waste per day.⁸

Kabd WTE Project

Location: Kuwait

Project Investment: \$1.5 billion

Key Stakeholders: Partnerships Technical Bureau (PTB)

Project Initiation date: 17 November, 2013

Estimated Project Completion: TBA, preferred bidder will be announced Q3 2016

Project Details: Kuwait produced 2.1 million tonnes of solid waste in 2015 and is expected to produce 2.75 million tonnes by 2025. With only three operating landfill sites, the rising flow of solid waste is becoming increasingly difficult to manage.

In response to this significant and growing issue, the Kuwaiti Government has tasked PTB with developing a construction agenda for a one million tonne capacity WTE plant that will be able to address up to 50% of the country's municipal solid waste.⁹

Once complete, the plant will be

⁶ EcoMENA, *Solid Waste Management in Oman*, 03/04/2016

⁷ Oman Observer, *Oman mulls first-ever Waste-to-Energy project*, 29/04/2015

⁸ Trade Arabia, *Oman to set up first waste-to-energy project*, 30/04/2015

⁹ PTB, *Building Kuwait's first waste to energy plant*, October 2014

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“We affirm our commitment to achieve our ambitions and objectives to make Sharjah the first city in the Middle East to benefit from 100% waste diversion. To achieve the ambitions and goals of the company, we are using cutting-edge technology to recycle all types of waste in Be’ah’s Waste Management Center (WMC) which today includes vital units such as waste-to-energy converting facilities, organic fertiliser facilities, and advanced metal recycling facilities.”

Salim bin Mohammed Al Owais, Chairman, Be’ah



able to produce 650 Gigawatt hours per year as part of a design, build, operate, finance and transfer structure.

Sajja 80MW WTE Project

Location: Sajja, Sharjah

Project Investment: \$505 million¹⁰

Key Stakeholders: Sharjah Environment Company (Be’ah), Chinook Sciences

Project Initiation date: May 2014

Estimated Project Completion: TBA, construction due to start in 2016

Project Details: Be’ah currently collects around 2.3 million tonnes of waste from nearly 1 million households in Sharjah annually, with 70% of all waste being diverted to landfill. However, the ambitious Sajja thermal-based WTE facility will enable Be’ah to achieve 100% diversion from the landfill once it is completed.¹¹

The WTE system at the plant will use a combination of the gasification and pyrolysis systems to produce gas as fuel, as well as heat to turn water into steam, which will run the turbines to generate electricity. This will enable Sharjah to convert 400,000 tonnes of its solid waste into 80MW of clean energy every year.

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Dubai Municipality 60MW Plant

Location: Al Warsan 2, Dubai

Project Investment: Dhs 2 billion

Key Stakeholders: Dubai Municipality

Project Initiation date: June 2016

Estimated Project Completion: 2020

Project Details: Dubai aims to be the leading emirate in the UAE to achieve the highest rate of solid waste-to-energy management while also reducing landfill waste by 75 per cent over the next five years.¹² Construction has already begun and once the first phase of operations begins by 2020, the plant will be able to convert 2,000 metric tonnes

¹⁰ Utilities-me, Sharjah awards \$500mn waste to energy contract, 25/05/2014

¹¹ Gulf News, Sharjah Waste-to-Energy plant to divert all waste from landfill, 20/01/2016

¹² The National, Dubai building Dh2 billion facility for waste-to-energy generation, 21/06/2016

of municipal solid waste per day to produce 60 megawatts of power.¹³

“The GCC states rank among the highest per-capita producers of municipal solid waste in the world with the majority of waste dumped in landfills using valuable land and resulting in quantified environmental damage. Recycling in the GCC is currently ad hoc but there is huge scope for recycling and WTE across the region.” – Mhairi Main Garcia, Director, Clean Energy Business Council, Dubai

Qatar Domestic Solid Waste Management Centre

Location: Near Mesaieed, Qatar

Project Investment: \$1.7 billion

Key Stakeholders: Keppel Integrated Engineering (KIE)

Project Initiation date: Early 2007

Project Completion: June 2012

Project Details: At the time of writing, Qatar is the only Gulf region country to have a fully completed and operational large-scale WTE facility, though its neighbours will soon be catching up. The Qatar Domestic Solid Waste Management Centre is a preview of what environmentally sustainable waste management in the Middle East will look like.

The centre is capable of processing

2,300 tonnes of solid waste every day which, at the time of completion, was sufficient to handle the rubbish generated by all Qatari households across the entire country.¹⁴

TAQA Mussaffah 100 MW Facility

Location: Near Mussaffah, Abu Dhabi

Project Investment: \$859 million

Key Stakeholders: TAQA, Ramboll

Project Initiation date: Feb 2013

Estimated Project Completion: Project on hold

Project Details: The Abu Dhabi National Energy Company, TAQA, has developed a facility near the sea port in Mussaffah that has an annual capacity of 1 million tonnes of solid waste which can be converted into 100 MW of energy, sufficient to power around 20,000 Abu Dhabi homes.¹⁵

“Overall, the project size is around 200 metres by 500 metres. That, of course, includes the roads to access the plant and the bunkers to store the waste before it’s burnt. But when this facility comes online it will operate 24/7 and 365 days a year.”

Ed Atkinson, Former Head of Waste-to-Energy, TAQA

¹³ Gulf News, Dubai to get waste-to-energy plant by 2020, 20/06/2016

¹⁴ ABC Carbon, Singapore brings Waste to Energy expertise to Qatar, 30/06/2012

¹⁵ The News Hub, MENAs environment under pressure, worldwide industrialists at its bedside, 08/06/2016



“Landfilling of waste is no longer the economically sound process that it used to be a few years ago. Gate fees have risen considerably, leading market participants to explore competitive solutions. Waste-to-energy plants provide waste treatment solutions which shift from limited recycling value to recycling with energy recovery. Successful operation of such plants relies on internal waste-to-energy plant economies, understanding of local conditions and also on an innovative business model. The market’s future prospects highlight the need for increased collaboration among stakeholders to complement each other’s expertise and knowledge base in tapping future growth opportunities.”

Monika Chruciak, Research Analyst Environmental & Building Technologies, Frost & Sullivan



by more than 1.5 million tonnes per year, while also helping Abu Dhabi reach its ambitious 80% landfill diversion target.¹⁶

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Greener waste disposal for cleaner energy across the Middle East

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Following the good example made

by Qatar, the rest of the Gulf region states are already starting to develop WTE capabilities of their own. Admittedly, some countries are taking a more tentative approach by building pilot projects with a view to expanding their capabilities at a later date if the first implementations go smoothly. However, WTE is already on the map in the Middle East due to the more ambitious investments currently being made in the UAE, Oman, Kuwait and elsewhere. With this initial flurry of projects nearing completion and beginning operations, the growth potential for the region is now significant as ME governments aim to reach their landfill diversion quotas of between 50-100%, varying from country to country.

Not only is there plenty of room to expand and even more waste to manage, many ME nations also remain relatively inexperienced in WTE, making them prime investment and business development opportunities for WTE technology and solutions providers. Companies that are able to effectively prepare and guide ME WTE project developers through the process of bringing their initial facilities online will be extremely well placed to secure additional business throughout the region.

¹⁶ Ramboll, Waste to Energy Facility in Abu Dhabi, UAE, 2016

¹⁷ Utilities-ME, Waste-to-energy opportunities in the Middle East, 20/01/2014

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