

# A Treasureful Of Waste

## Could The Future Of Clean Energy In The UAE Lie In Everyday Waste?



Beeh Waste Management Complex, Sharjah

**T**urning garbage into energy is big business – the global industry for Waste-to-Energy (WTE) technologies is forecasted to reach at least US\$29.2 billion (AED107.3bn) by 2020, and up to US\$80.6 billion (AED 296bn) under the optimistic scenario, according to cleantech market intelligence company Pike Research.

Traditionally, converting municipal solid waste – trash from households, streets and public gardens – to energy has relied on a process called incineration. This old method of WTE production generally entails burning

waste to boil water, which then powers steam generators that make electric energy and heat to be used in homes, businesses and industries.

Burning waste to create electricity, however, is damaging to the environment and polluting to the atmosphere. In the 1980s, pollutants from incinerators were found to be a major cause of acid rain and toxic to plants, in addition to having various health effects on humans.

Today, we can produce energy from waste in much safer and cleaner methods, without direct combustion

or burning. Modern WTE technologies can also produce more electric power from the same amount of fuel than would be possible by direct combustion.

### Sharjah: A regional model

Nearly 2,200 WTE plants are currently operating worldwide, based on estimates from Research and Markets, but only one of them is in the Middle East – in Qatar.

This will not be the case for long however, as Abu Dhabi, Dubai and Sharjah are all gearing up for their



first WTE plants. The first to come on-line will be an 86-megawatt (MW) WTE plant in Sharjah, undertaken by environmental and waste management company Bee'ah and scheduled for completion in 2016.

'Bee'ah's vision is to transform Sharjah into the first city in the Middle East to achieve zero-waste-to-landfill

provide a sustainable environment for future generations'."

According to Faris, the plant will be capable of processing 400,000 tonnes of waste annually and generating more than 80 MW per hour, enough to power more than 150,000 homes every year. The first phase will have a

waste recycling facility, a tyre recycling facility, an electronic waste dismantling and processing centre, and a medical waste facility.

'Our Tyre Recycling Facility uses a modern cryogenic process to recycle 9,000 used tyres every day. The tyres are converted to crumb rubber, which can be used for different applications,



Bee'ah Waste Management Complex, Sharjah

status. This has led to an agreement with Chinook Sciences to design, build and manage a waste-to-energy gasification plant that is the largest not only in the Middle East, but also anywhere in the world, within the waste recycling facilities of Bee'ah," said Najib Faris, the company's managing director of new business development and communication.

'The AED1.3 billion joint cooperation agreement with Chinook Sciences is in line with the vision of His Highness Sheikh Dr Sultan bin Muhammad Al Qasimi, Member of the Supreme Council and Ruler of Sharjah, 'to

capacity of 240,000 tonnes of waste, generating 32MW annually, while the second phase will have a capacity of 160,000 tonnes, pushing the total output generation to over 54MW annually.

Bee'ah's responsibility is enormous – the company receives all of the waste of Sharjah, the UAE's third-largest emirate, and its Waste Management Centre is the largest facility for material recovery in the Middle East and the third largest in the world. Stretching over 3.75 square kilometres, this impressive complex houses a construction and demolition

such as running tracks, grass-surfaced and stadium playing areas, miniature golf courses, and artificial turf infill. And our Construction and Demolition Waste Recycling Facility is one of the busiest facilities in the region given the rate of construction and demolition currently being undertaken in the UAE," highlighted Faris.

Altogether, the amount of garbage being processed at Bee'ah's facilities exceeds 1,000 tonnes of general waste every day, of which around 67% is being diverted from the landfill and recycled. As such, Bee'ah's progress to date has enabled Sharjah to become a



leading regional benchmark in waste management.

### Abu Dhabi's mega facility

Abu Dhabi is also moving into this lucrative market with one of the biggest WTE facilities in the world, to be built near the Mussafah Sea Port. The project is being jointly developed by Abu Dhabi National Energy Company (TAQA) and the Centre of Waste Management (Tadweer) with an investment of \$850 million (AED3.1bn). It will receive approximately 1,000,000 tonnes of municipal solid waste a year and convert it into 100MW of power.

"Our proposed plant would be up and running by 2017, generating enough power for 20,000 households in Abu Dhabi as well as cutting greenhouse gases," Dr. Saif Al Sayari, executive officer and head of TAQA's Energy Solutions said.

"In fact, it is expected to reduce CO2 emissions by more than one million tonnes per year. That is taking into account the emissions that would be released if this waste was buried in a landfill site, transportation to the



Beeah Waste Management Complex, Sharjah

dumps, and the size of the plant if it was powered by fossil fuels."

Data from the Statistics Centre of Abu Dhabi (SCAD) shows that the emirate generated around 9.8 million tons of non-hazardous waste in 2014.

Although the amount is significantly lower than that generated in 2013 – 11.9 million tonnes – the population is continuously growing, which means municipal waste is likely to multiply.

Between 2013 and 2014 alone, Abu Dhabi's population grew from 2.5 million to 2.6 million, an increase of four percent.

### Biodiesel: the future diesel?

Indeed, the emirate is facing an uphill battle with waste generation, particularly with the amounts of food that residents and restaurants tend to discard. And here too, a potential treasure lies.



Tyres Are Being Recycled Into Rubber For Use In Running Tracks And Golf Courses

Biodiesel, for example, can be derived from used cooking oil, including palm oil, soybean, rapeseed, sunflower and castor oil. This low-emission alternative to traditional diesel virtually eliminates the emission and odour problems associated with fossil-based fuel and can have significantly lower carbon emissions per mile travelled. When produced to the appropriate standards, it can be introduced to existing diesel engines without any need for engine modification.

Clearly, there is a strong business case for the development of local biodiesel industries – strong enough to have prompted Tadweer and Masdar Institute of Science and Technology to join hands on improving the process of biodiesel production. The two institutions will be assisted by Australia's Laboratory for Turbulence Research in Aerospace and Combustion.

"Abu Dhabi produces an estimated 20 kg per capita Waste Cooking Oil (WCO) annually. Processing and reusing WCO as fuel is an environmentally friendly and efficient energy solution that can contribute up to five percent of sustainable energy needs by 2020," said Eng. Faris Al Munaiei, Projects & Facilities Department Director at Tadweer.



Dr. Fred Moavenzadeh, President, Masdar Institute, and H.E. Eisa Al Qubaisi, GM, Tadweer

### Dubai's WTE plan revived

Meanwhile, Dubai, with its population of about 4 million, also needs to plan for an expected growth in waste generation. After cancelling a WTE project in 2012, Dubai Municipality recently invited competent firms to prequalify for the construction of a new WTE facility, to be located at the industrial neighbourhood of Warsan.

The plant will have the capacity to treat 2,000 tonnes of waste per day, which is more than a quarter of Dubai's daily generated waste of 7,000 tonnes. Valued at AED2.1 billion, it will be financed by Dubai Government and implemented with private sector

participation. According to Hussain Ali Lootah, Director-General of Dubai Municipality, the project is nearing tendering stage and will be completed by 2021.

Globally renowned for its futuristic vision, the UAE is once again setting a regional benchmark as it progresses towards diverting as much waste as possible from its landfills. Most importantly, the initiatives fall in line with the country's national strategic plan – Vision 2021.

- Heba Hashem

### UAE Vision 2021: National Key Performance Indicators – Sustainable Environment & Infrastructure

Indicator	Definition	Source	2012 Results	2021 Targets	Key Sponsor
<b>Percentage of treated waste of total waste generated</b>	This indicator measures the percentage of treated waste out of the total generated solid municipal waste using various treatment methods (recycling, incineration, waste-to-energy, chemical treatment, reuse, except for the landfill).	Ministry of Environment and Water in Coordination with National Bureau of Statistics	32.1%	75%	Ministry of Environment and Water

Source: Vision2021.ae