Trash to treasure

New Energy may relieve the Pilbara of its mounting mining and construction waste by using it as feedstock for electricity, writes **Marjon Lopez**.

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The Pilbara is playing host to a cluster of vibrant mining and resources projects. With this causing an increasing strain on waste infrastructure and power supplies, it now also seems the perfect place to house a waste-to-energy plant.

At least, that is the reasoning of Australian company New Energy, which is looking to build a $180 million waste-to-energy plant in the region.

"We think the Pilbara is an excellent location for a waste-to-energy plant, mainly because the waste infrastructure in the Pilbara is incredibly poor," New Energy general manager Jason Pugh told *Contractor.*

"They're still utilising landfills for disposal of waste and the volume of waste has grown significantly in the past year with the resources boom … so this infrastructure is desperately needed."

In 2011-12, about 670,000 tonnes of waste was generated across the Pilbara, with more than 375,000t coming from the construction and demolition (C&D) stream, according to a report produced by Talis Consultants and commissioned by the West Australian Waste Authority.

Titled *Waste Data Study for the Pilbara Region and Shire of Broome*, the report found that, based on a high-growth scenario, waste generation could leap to 1.53 million tonnes by 2035.

"In addition to that, there is a shortfall in energy and there is currently no renewable energy available on the northwest interconnecting system, so for us it is an ideal location for our first plant," Pugh said.

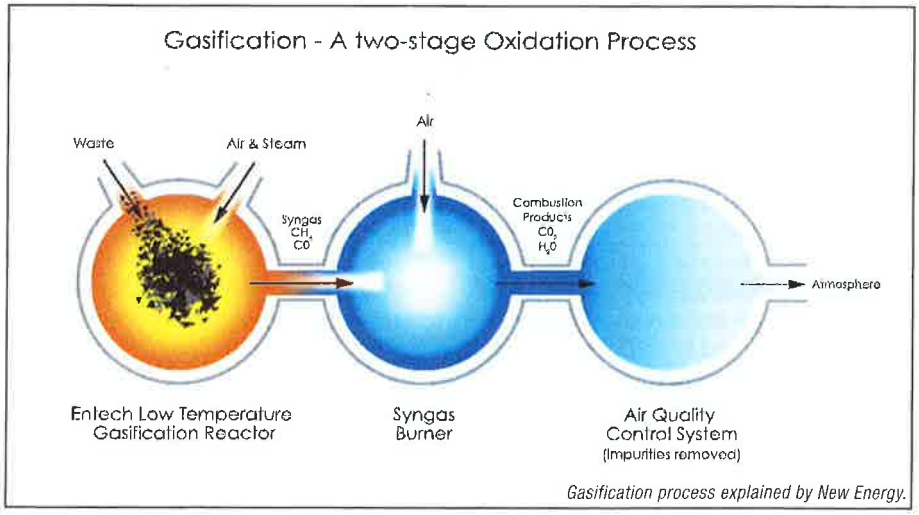
With final environmental approvals in hand, the company is set to build its 72MW thermal plant in the Boodarie Industrial Estate of Port Hedland.

It is expected to divert up to 130,000t of carbon-containing waste from landfill each year.

The plant will produce two commodities: recycled building materials and enough renewable energy to power up to 21,000 homes.

It will accommodate a materials-recovery facility and an energy-recovery system.

Contrary to the most common incineration techniques, the system will utilise Entech – the globally proven, Australian low-temperature gasification technology – which, instead of burning the waste, will slow-cook it to extract its organic materials into a synthetic gas ▶



Gasification process explained by New Energy.

(syngas) before burning this to release energy.

This process is designed to provide a cleaner gas than incineration produces.

"Essentially, we cook the waste in a thermal environment between 600C and 850C for between 16 and 24 hours," Pugh said.

"That leads to an oxygen-starved environment where we get a gas forming that is essentially carbon-monoxide, methane and short-chain hydrocarbons.

"That gas then rises in the main gasification chamber and then we fire it, just like natural gas, in the secondary syngas burner.

"At that stage, we release all the heat energy from the waste and we then go to the steam cycle.

"That powers a boiler and we have a steam turbine on the floor to create electricity."

Pugh said that energy would then be recovered from municipal solid waste and materials including plastic bags and wrapping, textiles, contaminated cardboard, timber packaging from construction and demolition projects, as well as problematic waste such as used tyres.

Items such as glass, ferrous and non-ferrous metals, concrete, bricks, sand and aggregates would also be recycled.

The process is expected to create 4-6% residual ash, which Pugh said would go to a landfill facility.

"In the future, that product could be re-used, but we'd be undertaking a couple of years of chemical analysis on that ash to make sure that it's safe to be re-used before we embarked on that," he said.

Through a combination of proven technology – Entech has 46 plants in operation overseas – and the security of environmental approvals, New Energy's next challenge in ensuring the success of its first Australian plant will be to secure contracts with industry and councils.

While no contracts were confirmed at the time of interview, Pugh said he was confident the plant would appeal to various parties in the Pilbara.

An artist's impression of New Energy's waste-to-energy facility in the Pilbara.

"We're working on financial clause activities at the moment by securing waste contracts and looking for power purchase agreements for the power we are producing," he said.

"When we speak to the large mining companies there, they want to do something better ... they're very motivated to behave sustainably." – New Energy general manager Jason Pugh

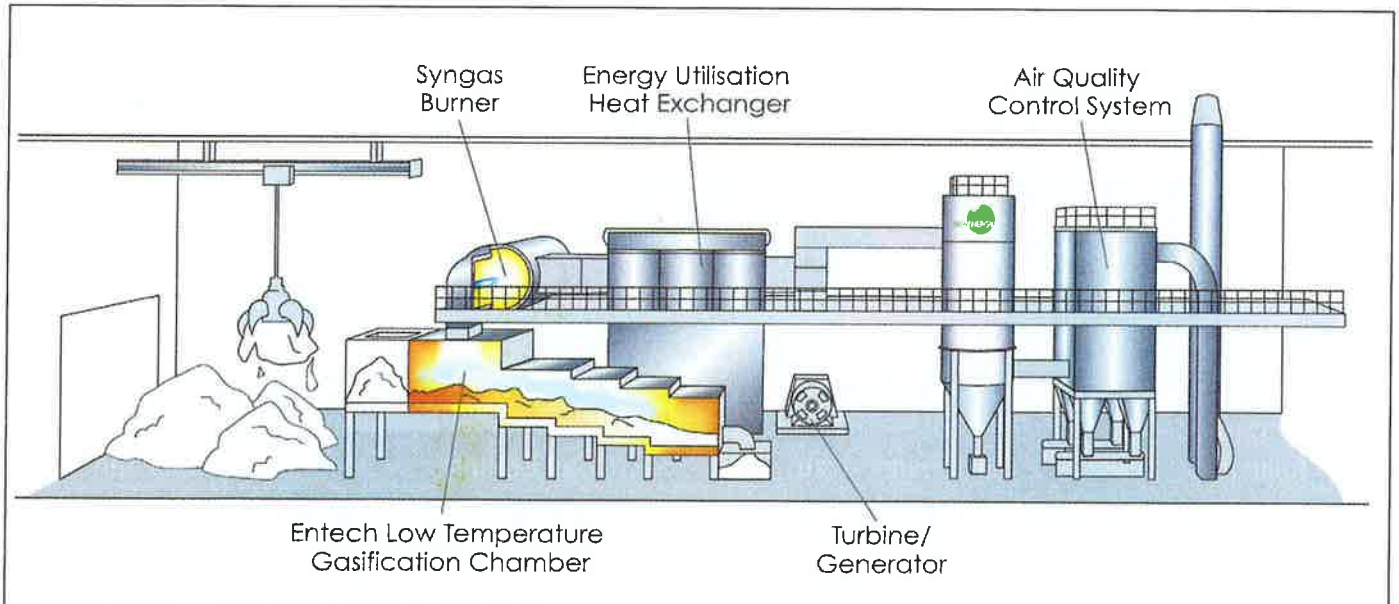
"When we speak to the large mining companies there, they want to do something better ... they're very motivated to behave sustainably."

Pugh said New Energy would make it easier for companies and councils to switch behaviours by offering similar rates to current Perth landfill prices.

"It's important that we don't impact too much on their operating costs because it's a [low] cost operating environment at the moment," he said.

"But we believe that we can be fairly competitive in that regard.

"So we'd be extremely disappointed if they



Schematic of New Energy's Entech technology to be used in the Pilbara.

didn't take that opportunity and they continued doing what they're currently doing there."

Although it is still early days, disappointment seems unlikely to hit New Energy any time soon.

The company already has the support of the Town of Port Hedland and the Pilbara Development Commission – a catalyst for regional growth and development in the region.

In a letter to New Energy CEO David Sneddon, PDC chief executive Ken King threw his support behind the plant.

"The PDC supports the New Energy proposal and is keen to work with government, industry and the private sector to explore energy solutions that will alleviate the rising demand for power in the Pilbara," King wrote.

"The New Energy project offers diversification with clean-power options, using a range of waste that will also support other benefits to the region."

Port Hedland mayor Kelly Howlett also welcomed the project.

"Council is pleased to be working with innovative businesses such as New Energy to develop sustainable methods of managing our waste," Howlett said.

"The proposal aims to dramatically reduce the amount of waste disposed of at the South Hedland landfill and transform that waste into renewable energy."

Pugh said New Energy was in negotiations with state-owned company Horizon Power to feed the produced energy into the northwest interconnecting system.

In regard to construction, he said the company had received fantastic interest from global engineering, procurement and construction companies.

"We have nine Tier 1 EPCs currently vying for that job," he said.

Construction of the plant is expected to start by the middle of next year, with completion slated for the third quarter of 2015. C