Report finds Energy from Waste (EfW) viable in Queensland

China’s ban on the importation of recycled waste has escalated Australia’s War on Waste, with households, policy makers and engineers looking to find real solutions to our growing landfill problem.

Single-use plastic bags are banned, #BYOcoffee is cool and now a new report has found Energy from Waste (EfW) to be a viable solution for reducing landfill in Queensland.

Commissioned by the Local Government Association of Queensland, the Viability Assessment of an Energy from Waste Industry in Queensland (Report) aimed to identify if EfW solutions can help reduce the 5.4 million tonnes of waste disposed to landfill in Queensland each year.

As the lead author of the report, I believe there is no doubt that EfW is rapidly being recognised within the state as an opportunity to, not only address the issues relating to waste management, but also the ongoing issues with electricity.
supplies for regional and remote areas.

EfW is well established in many other countries, including those in Europe, United Kingdom, Asia and North America, with proven track records of 20 years plus. In those countries EfW technologies are rapidly evolving to include smaller and scalable options, resulting in significant improvement on landfill practices.

The Report aimed to analyse the future viability of select, proven and safe EfW technologies and the conditions in which more advanced forms of EfW (for example anaerobic digestion, refuse derived fuel, refuse derived fuel with power plant and gasification) may be expected to develop.

Queensland is a geographically large state with fairly low population densities comparatively. We can learn a lot from how other countries are using EfW technologies, but what works in Sweden may not work in Brisbane. And what works in Brisbane may not work in Birdsville.

**Given this our research focused on three key questions:**

- Are proven EfW technology options currently available that are viable in Queensland?
- What are the key factors that are most likely to influence the viability of EfW and reduce reliance on landfills as a waste management strategy?
- What proven EfW technologies are sufficiently scalable and diverse to provide solutions across all Queensland regions?

Findings we presented in the report were derived from a high-level financial model which evaluated the performance of a range of EfW technologies, as a function of a range of input factors including technology costs, recyclables revenues, feedstock composition, landfill standards, electricity revenues and landfill levy charges.

By testing the projected relative costs of EfW technologies as these parameters changed, the model identified the key factors that may support an EfW industry. It should be noted that the assessment didn’t try to determine waste management costs with a degree of accuracy that can be relied upon for investment decisions or policy change, as future market conditions are inherently uncertain.

The model used a Levelised Cost of Electricity (LCOE), expected feedstocks and other factors as a reference point for viability assessment, with consideration given to waste transport distances, general waste flows and a cash flow calculation algorithm for capex and opex.

Councils were also categorised into broad sectors to enable identification of the ‘most viable’ EfW technology based on its waste characteristics. The Model then computed the cash flow of the different EfW options for a period of 15 years starting from 2025.

Cash flow was then discounted back to the base year using a Weighted Average Cost of Capital
(WACC) and divided by the net present value of the general waste for that period of time. The result is the Dynamic Generation Cost (DGC), which is the average cost per tonne of waste discounted to the base year. The DGC was then used to compare and rank the different options for each variable tested.

Waste management in Queensland, like other parts of Australia, is categorised into household and commercial, with household waste managed by Local Governments and commercial entities choosing their waste services providers according to differing criteria.

Last year 5.4 million tonnes of waste generated in Queensland was disposed to landfill, representing a huge loss of valuable materials and energy to the Queensland economy.

Technologies evaluated as part of the report are shown in Table ES1. Their relative capacities to reduce landfill volumes and contribute to energy supply are also shown.

Although a recognised EfW technology, Land Fill Gas (LFG) capture does not reduce landfill volumes and was therefore not considered a key component of a zero waste to landfill strategy. Its inclusion in the modelling and report findings was for comparison purposes only to demonstrate the relative effects of policy and other variable changes on the EfW technologies examined.

Further, Mass Burn incineration was not considered based on what we are seeing in best practice environments and will policy makers want to create behaviour and an industry that is indiscriminate and discourages waste recovery?
EfW viability outcomes were based on regional clustering of Local Government Areas, with relative rankings of technologies that may present the most advantageous outcome to that area.

**Policy and investment is vital in supporting the viability of EfW technologies.**

Across Queensland, one size does not fit all. EfW technologies need to be appropriately scaled and positioned to achieve efficiency and support viability.

The primary investment and policy levers appear to be landfill levy, CSO (electricity) subsidy levels, supporting feedstock volumes and composition and landfill standards.

Anaerobic digestion, a technology that replicates the anaerobic decay process that occurs in landfills under carefully controlled conditions, was found to be the most financially viable EfW technology across the state.

Under more favourable conditions, more advanced technologies such as Refuse Derived Fuel Production with a Power Plant become more economically viable for larger volumes of waste.

A network of suitable technologies and appropriate transfer mechanisms will be required to maximise EfW viability and landfill volume reduction.

Notably, AD has the least effectiveness in reducing waste to landfill while RDFPP has the highest effectiveness in reducing waste to landfill. AD requires large scale segregation of organic waste, contingent on significant changes in waste collection services and waste producer behaviour.

The assessment of an EfW industry in Queensland is subject to a vast number of variables that are complex and require significant further work to improve and quantify levels of certainty and evaluation of EfW in the Queensland context.

Consultation and detailed assessment will also be required with respect to public acceptance including utilising the available technology to effectively respond to and manage environmental, social and governance implications.

**Local Governments across Queensland recognise that current waste management practices are unsustainable.**

An EfW solution is a viable option to support zero waste to landfill, but further detailed analysis and assessment is required to realise the benefits of an EfW industry in Queensland.

Peak in collaboration with the LGAQ are planning and delivering a zero-waste study tour through Europe UK and USA to further investigate zero waste economies utilising energy from waste technologies. Please contact Peak Services on (07) 3000 2148 or hello@wearepeak.com.au for more information.