

Clean energy and the opportunity for waste

How can Australia convert increasing volumes of commercial, industrial and residential waste into clean energy, cutting both emissions and landfill?





Supporting waste opportunities

Better waste management is a central element in Australia's transition to a low emissions economy, with the potential to reduce emissions by cutting landfill volumes while generating reliable clean energy.

The CEFC is working with investors, industry and government to accelerate investment in large-scale recycling and energy from waste initiatives, such as Perth's East Rockingham Waste to Energy (ERWtE) facility. Benefiting from well-established global technologies, this investment reflects the principles of the waste hierarchy, in encouraging recycling and energy recovery.

Sustainability targets

Deliver a cost-effective waste treatment solution, processing some 300,000 tonnes of residual waste a year

2

29MW of reliable generation capacity for Western Australian South West Interconnected System, enough to power more than 36,000 homes

3

Reduce annual emissions by more than 300,000 tonnes of CO2e, the equivalent of taking 64,000 cars off the road

4

Achieve a 96 per cent diversion of residual waste from landfill.

The investment

The CEFC invested \$57.5 million in the \$511 million East Rockingham Waste to Energy facility, a state-of-the-art energy from waste project. The CEFC subordinated debt position helped the complex project to achieve financial close.

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Energy from waste is a great example of technology that addresses more than one challenge, using our rising waste levels to provide a new source of clean dispatchable energy, improving the reliability and security of the electricity grid, an important priority for the CEFC."

Ian Learmonth CEO, CEFC

Landmark project targets twin challenges

The East Rockingham Waste to Energy (ERWtE) facility addresses the twin challenges of increasing the supply of cleaner energy and reducing landfill volumes. Both are central to Australia's transition to a low emissions economy.

Located in the Rockingham Industry Zone to the south of Perth, the ERWtE will be capable of treating around a quarter of the city's residual municipal solid waste and commercial and industrial waste.

The waste will be converted into enough renewable energy each year to power more than 36,000 homes. In addition, an estimated 72,000 tonnes of 'bottom ash' will be recovered each year, for use in road bases and construction.

The measures are expected to deliver an annual reduction in carbon emissions of more than 300,000 tonnes per year, the equivalent of taking almost 64,000 cars off the road.

The ERWtE is expected to have an economic life of more than 40 years, supporting an estimated 300 jobs during construction and up to 50 fulltime jobs once operational.

The facility, which benefits from \$18 million in Australian Renewable Energy Agency grant funding, is expected to be operational in 2023.

\$511m energy from waste project

\$57.5m

First 'waste arising' contract to be banked in Australia



96% less waste into landfill

~300,000 tonnes

waste processing each year



baseload energy





Australia's waste profile

The amount of waste generated per person in Australia fell by 10 per cent in the decade to 2016-17, with the recovery rate (including recycling and energy from waste) increasing from 50 per cent to 58 per cent over the same period.

Despite this, waste generation overall continues to rise, driven by growing population levels.

Australians generate some 2.7 tonnes of waste per person per year – with the combined 67 million tonnes of waste driving some two per cent of national greenhouse gas emissions.

Australia's 2018 National Waste Policy estimates a hypothetical five per cent improvement in the efficient use of materials across the economy could benefit gross domestic product by as much as \$24 billion – with 9.2 jobs created for every 10,000 tonnes of waste recycled.

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The Australian waste-toenergy sector provides excellent commercial potential in the long-term. The problem of dealing with everyday waste is a global challenge, with more than 2 billion tonnes of municipal solid waste generated each year."

Mohamed Jameel Al Ramahi Masdar

Australian waste flows

32.7MT

commercial and industrial waste

20.4MT

construction and demolition waste

13.8M7

municipal solid waste

Source: 2018 National Waste Policy: less waste more resources, Commonwealth of Australia 2018.

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Innovative technology

The ERWtE will use proprietary moving grate combustion technology developed and supplied by Swiss cleantech leader HZI.

While new to Australia, the HZI technology has a proven track record in Europe, Japan and the US, with HZI technology installed in more than 600 projects worldwide.

The grate combustion technology is specifically designed for the thermal treatment of residual municipal solid waste.

When operational, the HZI technology will also see the ERWtE will recover an estimated 72,000 tonnes of 'bottom ash' for use in road bases and construction.

Under an agreement with Resource Recovery Solutions, the bottom ash will be blended with recycled construction and demolition waste products. The Perth-based company has the capacity to process and recycle around a third of all the surplus construction and demolition materials generated in Perth each year.

Innovative finance

The CEFC investment was pivotal in ensuring the ERWtE reached financial close by the end of 2019 to meet project deadlines.

The CEFC finance:

- Helped catalyse more than \$450 million of external investment and grant funding into Australia's emerging EfW sector
- Supported the entrance of John Laing and Masdar as new strategic equity investors in the Australian EfW sector
- Played an innovative role in the capital structure by providing the first subordinated debt facility for an EfW project in Australia
- Demonstrated that a partly-merchant EfW facility with waste arising contracts can be financed, building confidence for future developers
- Supported the Western Australian Government ambition to develop an EfW industry and divert waste from landfill.

The East Rockingham Waste to Energy financing was awarded Asia Pacific Waste Deal of the Year at the 2019 IJGlobal Awards.

Innovative contracting

The ERWtE project is the first to reach financial close having secured waste supply agreements on an exclusive 'waste arising' basis, an innovative commercial structure which supports long-term waste management, including waste minimisation, recycling and recovery.

The 20-year exclusive contracts with Perth's Eastern Metropolitan Regional Council (EMRC) and the City of Cockburn cover residual waste - which is the waste that remains after all strategies of reducing, reusing and recycling have taken place.

Under the 'waste arising' contracts, the councils only pay for the ERWtE capacity they use, providing them with flexibility to meet ambitious waste reduction targets without overcommitting waste volumes to the project.

Importantly, there will be no penalty for councils which successfully implement landfill waste reduction schemes and therefore reduce their waste supply to the facility.

In addition, French waste management company SUEZ will supply up to 65,000 tonnes of commercial and industrial residual waste each year under a 10-year contract.

This is a win for the environment and represents real value for money for ratepayers who will be protected from the rising cost of landfill, particularly through the State's landfill levy."

Enzo Gullotti

New Energy Corporation Chairman



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Waste

A project of firsts

The ERWtE was co-developed by Hitachi Zosen Inova AG (HZI), New Energy Corporation and the Tribe Infrastructure Group. It includes new strategic equity investment in the Australian EfW sector from John Laing and Masdar Tribe Energy.

Acciona, a global leader in sustainable solutions for infrastructure, renewable energy and water treatment projects, and HZI have been appointed to design and construct the facility.

Suez and HZI, which operate a combined 180 EfW facilities globally, will operate the facility under a 20-year operations and maintenance agreement. Suez will also support the project by supplying it with commercial and industrial waste.

The ERWtE has signed an eight-year Power Purchase Agreement (PPA) with a single industrial offtaker for 90 per cent of its power output, making it the first Australian largescale EfW project to contract a PPA.

The balance of the electricity generated may be sold to waste supply customers, including SUEZ and the councils, or be sold into the WA electricity market.

Benefits for Perth residents

The Eastern Metropolitan Regional Council provides services in waste management, resource recovery, environmental management and regional development, working with its six member councils, industry, government agencies and other stakeholders.

It operates across a combined area of 2,100 square kilometres, about one-third of Perth's metropolitan area.

In committing to a 20-year waste supply agreement with ERWtE, the EMRC has secured long-term price certainty for waste disposal, protecting ratepayers against rising landfill levies and inevitable closure of exhausted landfill facilities.



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CEFC investment considerations

Energy from waste projects are typically large-scale and complex, requiring proven technology, experienced investors and integrated supply contracts.

While these projects are relatively new in Australia, their growing importance in other markets provides confidence they are achievable. The CEFC works with companies to turn urban and industrial waste into new energy sources and valuable products, creating an important revenue stream while also reducing landfill gas emissions.

Key investment considerations include:

1

Commercially proven technology, with reference facilities using the same or similar feedstock at a similar scale

2

The proportion of waste volumes and gate fees that are contracted

3

The proportion and price of energy offtake arrangements, achieved through power purchase or other agreements

4

The inclusion of waste management solutions for non-energy related outputs (e.g. bottom ash)

5

The scale and experience of equity participants

6

Contractual arrangements across both engineering, procurement and construction (EPC) and operations and maintenance (O&M), including price and timing arrangements, experience with similar projects and balance sheet strength.



About the CEFC

The CEFC has a unique mission to accelerate investment in Australia's transition to net zero emissions. We invest to lead the market, operating with commercial rigour to address some of Australia's toughest emissions challenges. We're working with our coinvestors across renewable energy generation and energy storage, as well as agriculture, infrastructure, property, transport and waste. Through the Advancing Hydrogen Fund, we're supporting the growth of a clean, innovative, safe and competitive hydrogen industry. And as Australia's largest dedicated cleantech investor, we continue to back cleantech entrepreneurs through the Clean Energy Innovation Fund. With \$10 billion to invest on behalf of the Australian Government, we work to deliver a positive return for taxpayers across our portfolio.