

Energy from waste in Australia: a state-by- state update

A Market Report by the
Clean Energy Finance Corporation

November 2016



About the Clean Energy Finance Corporation

The Clean Energy Finance Corporation invests, applying commercial rigour, to increase the flow of finance into the clean energy sector.

Our mission is to accelerate Australia's transformation towards a more competitive economy in a carbon constrained world, by acting as a catalyst to increase investment in emissions reduction.

We do this through an investment strategy focused on cleaner power solutions, including large and small-scale solar, wind and bioenergy; and a better built environment, with investments to drive more energy efficient property, vehicles, infrastructure and industry.

The CEFC also invests with co-financiers to develop new sources of capital for the clean energy sector, including climate bonds, equity funds, aggregation facilities and other financial solutions.

The CEFC operates under the *Clean Energy Finance Corporation Act 2012*.

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The reviewers bear no responsibility for any remaining errors.

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Energy from waste in Australia: a state-by-state update

1. Facilities that turn urban waste into electricity are a major investment opportunity in the Australian energy from waste sector

With around 23 million tonnes of urban waste sent to landfill around the country each year, there is a significant opportunity for energy from waste to play a role in generating renewable energy and diverting waste from landfill.

Energy from waste projects can produce reliable baseload electricity that is eligible for support under Australia's large-scale renewable energy target.

The CEFC's 2015 [Bioenergy and energy from waste](#) Market Report identified up to \$3.3 billion of potential investment in urban energy from waste to 2020.

Our 2015 Market Report found that generating electricity and heat from waste resources can be cost competitive with other new-build energy generation in terms of capital expenditure, but the technologies are not yet widely deployed in Australia.

2. New South Wales, Western Australia, Victoria, South Australia and the Australian Capital Territory are showing leadership with supportive policy settings for energy from waste investment

State landfill levies are necessary to make energy from waste projects economically viable. An important source of revenue for energy from waste projects is charging for receiving waste. Scope to charge for receiving waste depends on the costs of other disposal alternatives.

States that do not charge landfill levies or do not have sector-specific policies or guidelines for energy from waste projects provide a less supportive environment for energy from waste investment.

Landfill levies can be an effective way of pricing the environmental and social externalities of landfill and ensuring that waste with recoverable value is not sent to landfill.

Projects in New South Wales and Western Australia valued at a total of more than \$1.5 billion have been announced. South Australia and Victoria have less project activity.

3. The CEFC can support project developers, waste companies and councils who are looking for finance for energy from waste projects

Projects can take advantage of improving project economics, proven technology and CEFC financing to contribute to Australia's clean energy and help councils meet waste diversion targets.

The CEFC has provided a cornerstone investment of up to \$100 million to the [Australian Bioenergy Fund](#), an equity fund for bioenergy and energy from waste managed by [Foresight Group](#), an experienced developer with 31 energy from waste projects valued at more than £900 million.

Waste companies, project developers and councils can explore opportunities with the CEFC to recover additional value from waste through energy from waste projects.

1. Recovering energy from urban waste

Facilities that turn urban waste into electricity are a major investment opportunity in the Australian energy from waste sector

With around 23 million tonnes of urban waste sent to landfill around the country each year, there is a significant opportunity for energy from waste to play a role in generating renewable energy and diverting waste from landfill.

What is energy from waste?

Energy from waste involves recovering a useful resource from what would otherwise be waste material. Energy recovery usually involves collecting and using heat generated through controlled combustion (by thermal treatment, pyrolysis or gasification) of waste material. Recovered heat can be used for electricity generation.

A range of different urban waste streams offer the potential for generating electricity and heat: food and garden organics, waste wood and timber, wastewater and residual waste are all potential feedstocks for energy from waste projects.

In our 2015 Market Report [*Bioenergy and energy from waste*](#) we identified an opportunity for up to \$5 billion of new investment between now and 2020 in Australia in the bioenergy and energy from waste sector.

In this report we focus on **energy from urban waste**. We use the term **urban waste** to refer to municipal solid waste (MSW), commercial and industrial (C&I) waste, construction and demolition (C&D) waste. It does not include agricultural or forestry waste. This report focuses on **medium and large-scale combustion projects** and does not include smaller projects involving food waste or anaerobic digestion.

The energy from waste and bioenergy investment opportunity to 2020

\$3.5-\$5.0 billion for around **800 MW** of new generation capacity, including:

\$2.2-\$3.3 billion for energy from urban waste

\$0.7-\$1.1 billion for energy from food processing and animal waste and

\$450-\$650 million for energy for export from plantation forest residues

potentially avoiding more than **9 million tonnes of CO₂e emissions** each year

Source: CEFC 2015 Market Report

Energy from waste plays an important role in the urban waste hierarchy, making better use of waste that would otherwise be sent to landfill.

Where does energy from waste sit in the waste hierarchy?

State governments often specify a hierarchy for waste management (from most to least preferable):

- Avoid and reduce** waste
- Reuse** waste
- Recycle** waste
- Recover energy from waste**
- Treat** waste
- Dispose** of waste

Source: New South Wales EPA

Energy from urban waste is widely used in other countries

Energy from waste is used in many advanced economies, including France, the United Kingdom, the United States, Germany, Japan and Switzerland.

In **Paris**, the Isséane energy from waste plant is located at Issy-les-Moulineaux, 6 km from the Eiffel Tower. The €600 million facility was opened in 2007 and processes 460,000 tonnes of waste each year. It generates 52 MW of electricity and provides energy for a district heating system that serves 80,000 households. It was designed to blend into the surrounding urban architecture and does not generate any plume from the stack. The waste receiving area and the combustion system are underground, producing no noise or odour emissions.

In **London**, the South-East London Combined Heat and Power (SELCHP) plant has been recovering energy from waste for more than 20 years. It supplies energy for 48,000 households. In the United Kingdom, energy from waste projects driven by local authorities and private sector proponents have been developed across the country to handle millions of tonnes of urban waste each year.

An air quality report found that measured pollution near the SELCHP facility in London was low compared to other monitoring sites around London, and concluded that there was no significant impact of the SELCHP facility on the air quality in its vicinity.

There are 71 energy from waste plants in the **United States**, with a total generation capacity of 2,300 MW. Energy from waste plants contributed around 0.4% of total US electricity generation in 2015. Around 11% of US municipal solid waste is treated in energy from waste plants.

Energy from waste can make a meaningful contribution in Australia

While the amount of waste diverted from landfill has generally increased in recent years, there is relatively little energy recovered from urban waste in Australia other than in cement kilns, where some waste such as process-engineered fuels, oil and tyres are used as supplementary fuels.

Historically, energy from waste has faced a number of hurdles in Australia, including low landfill levies, plentiful low-value land available for landfills, a lack of supportive state government policies and a lack of community acceptance.

With increasing state landfill levies and a growing awareness of the role that energy from waste can play in a comprehensive resource management strategy, energy from waste can make a meaningful contribution to Australia's energy mix and reduce the environmental and social costs of landfill.

Energy from waste could meet 2 per cent of Australia's electricity demand

Waste sector consultants MRA Consulting Group estimate that energy from waste using feasible waste streams could generate baseload electricity equivalent to 2 per cent of Australia's electricity needs.

Energy from waste facilities can help to avoid fossil-fuel combustion for electricity generation and deliver positive environmental outcomes.

It can play a role in meeting targets for renewable energy, providing baseload power, reducing emissions, meeting local energy needs and recovering value from waste that would otherwise go to landfill.

2. Energy from waste policies: state by state

New South Wales, Western Australia, Victoria, South Australia and the Australian Capital Territory are showing leadership with supportive policy settings for energy from waste investment

This section profiles energy from waste policies and landfill levies in those states.

New South Wales

The New South Wales EPA's [energy from waste policy statement](#) (2015) specifies a list of energy from waste fuels that are automatically eligible for approval, including biomass from agriculture, forestry residues, landfill gas and source-separated green waste.

Energy recovery facilities that use other waste or waste-derived materials must meet additional criteria. Specifically, they must:

- ensure that they use only residual waste from a **genuine resource recovery operation**
- **capture at least 25% of the thermal energy** as electricity
- use **current international best practice emissions controls**, monitoring and management
- use proven and well-understood technologies.

The 2016-17 [waste levy](#) in New South Wales is \$135.70 per tonne for metropolitan areas – the highest level in the country – and \$78.20 per tonne in regional areas. Rates rise with the consumer price index.

The NSW EPA is considering applications from several energy from waste projects.

Source: CEFC, NSW Government

Western Australia

The Western Australian Waste Authority has issued a [Waste to Energy Position Statement](#) saying that with appropriate regulation, careful matching of technology to waste inputs and community consultation, energy from waste projects using best-practice technology can meet community expectations.

Western Australia's [landfill levy](#) is \$50 per tonne of inert waste, rising to \$60 in 2017-17 and \$70 in 2018-19.

Several major projects are under development in Perth and regional centres.

Source: CEFC, WA Government

Victoria

EPA Victoria's 2013 [Energy from waste guideline](#) says that the Victorian Government welcomes investments in energy from waste. The guideline says that energy from waste should be considered for residual waste and other wastes where energy recovery provides the best practical environmental outcome.

Victoria's [landfill levy](#) is 4.45 [fee units](#) (equivalent to \$62.03 in 2016-17), rising with periodic increases in fee units.

Source: CEFC, Victorian Government

South Australia

South Australia published [an interim consultation paper on waste to energy](#) and a [Waste to Energy Background Paper](#) in 2013 and is currently developing an energy from waste policy.

The consultation paper supports energy from waste projects in the state, saying that South Australia is recognised internationally for its leadership in renewable energy and resource recovery, and energy from waste brings these together to provide new opportunities for the state.

South Australia's [waste levy](#) for 2016-17 is \$76 per tonne for metropolitan Adelaide and \$38 for other areas. These levies are set to rise, with the levy on metropolitan solid waste increasing to \$103 per tonne in 2019-20.

Source: CEFC, South Australian Government

Australian Capital Territory

The Australian Capital Territory is undertaking a [Waste Feasibility Study in 2017](#) to investigate opportunities to generate additional energy from waste

The ACT's [landfill fee](#) for 2016-17 for commercial and industrial waste is \$146.20 per tonne.

Source: CEFC, Australian Capital Territory Government

Underpricing landfill can see recoverable value lost

Levies can be an effective way of pricing the environmental and social externalities of landfill and ensuring that waste with recoverable value is not sent to landfill.

Landfill is estimated to cost up to \$120 per tonne once post-closure remediation and replacement costs are taken into account. States without levies are not recovering these costs from landfill users.

Inconsistent waste levies affect incentives for energy from waste investment

Cross-border differences in waste levies can lead to highly inefficient outcomes. There have been widely reported instances of waste being transported by truck or train to a jurisdiction without a waste levy.

Inconsistent waste levies may reduce the incentive to invest in energy from waste projects.

Energy from waste projects need reliable waste volumes

Large and secure waste streams are also highly relevant. Larger councils or groups of councils are more likely to have the significant urban waste volumes needed to supply an energy from waste facility.

Air quality and emissions management is critical

Air quality and management of emissions is critically important for human health and community acceptance of energy from waste facilities in urban settings.

State-of-the-art emissions controls ensure that local air quality is not affected by energy from waste facility emissions.

Projects worth more than \$1.5 billion have been announced in Australia

Large energy from waste projects in New South Wales and Western Australia have been announced and are at various stages of development.

Energy from waste projects create jobs

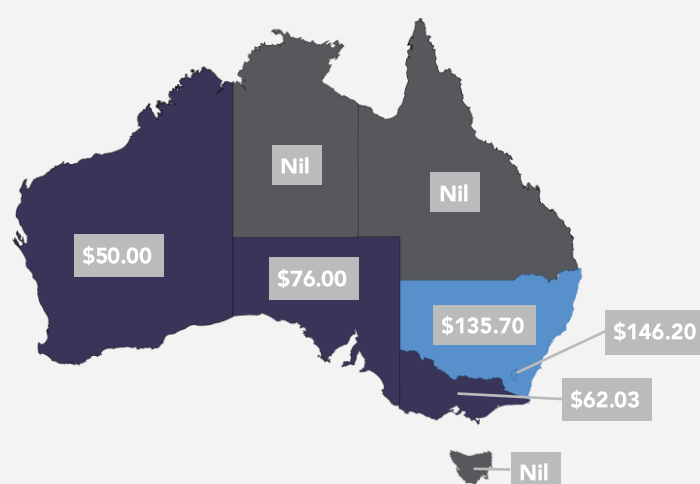
Energy from waste projects create jobs in environmental monitoring, development design, commissioning and procurement, manufacturing, installation, project management, transport and delivery as well as in operations and maintenance.

Announced major energy from waste projects

Project	Reported cost (\$m)	Waste capacity (1,000 tonnes per year)
New Energy Port Hedland, WA	150	100
New Energy East Rockingham, WA	180	225
Phoenix Energy Kwinana, WA	400	400
EMRC Resource Recovery Facility Perth, WA	NA	150
Dial-a-Dump Eastern Creek, NSW	700	1,300
Omega Energy Hunter Resource & Energy Recovery Facility, Weston, NSW	NA	150
Boral Berrima, NSW	NA	100

Source: MRA Consulting, company websites, news sources, CEFC

Energy from waste policy supports: waste levies by state



Levies on metropolitan inert commercial and industrial waste, 2016-17, by state

ACT publishes landfill fees only

Source: State and territory government websites

3. CEFC finance is available for energy from waste projects

The CEFC can support project developers, waste companies and councils who are looking for finance for energy from waste projects

Project developers can take advantage of favourable project economics, proven technology and CEFC financing to develop energy recovery projects.

The CEFC has provided a cornerstone investment of up to \$100 million to the [Australian Bioenergy Fund](#), an equity fund for bioenergy and energy from waste managed by [Foresight Group](#), an experienced developer with 31 energy from waste projects valued at more than £900 million.

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How to access CEFC finance for energy from waste

To explore financing, please get in touch with our specialist energy from waste and bioenergy investment team led by Henry Anning.

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