

Submission
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INQUIRY INTO 'ENERGY FROM WASTE' TECHNOLOGY

Organisation: Clean Energy Finance Corporation

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SUBMISSION TO THE NEW SOUTH WALES INQUIRY INTO ENERGY FROM WASTE

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1.1 EXECUTIVE SUMMARY

The Clean Energy Finance Corporation has identified up to 800MW of new bioenergy and energy from waste generation capacity, valued at between \$3.5 billion and \$5 billion, which could be developed in Australia by 2020. This could avoid more than 9 million tonnes of carbon emissions annually. New South Wales is a prime destination for this new investment due to the population and therefore waste volume, market conditions, a strong regulatory framework and robust State Government energy from waste policy.

Energy from waste plays an important role in the urban waste hierarchy, making better use of waste that would otherwise be sent to landfill. The technology has been successfully deployed quite widely internationally and the CEFC sees potential for NSW to become an Australian leader in deploying proven technology in this area. Energy from waste has the potential to make a meaningful contribution to NSW's energy mix and reduce the environmental and social costs of landfill.

1.2 ABOUT THE CEFC

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

The CEFC has already committed over \$200 million in bioenergy and energy from waste projects alongside more than \$500 million of private sector investment. CEFC investments include projects for energy from animal waste, food manufacturing waste, landfill gas, waste coal mine gas, commercial and industrial waste, and municipal solid waste. The CEFC's pipeline includes almost \$2 billion in potential additional bioenergy and energy from waste projects, including projects to produce wood pellets, to convert sugarcane waste to electricity or ethanol, to build biofuels plants, to process organic waste to reduce emissions, and to convert municipal solid waste, commercial and industrial waste, and animal waste to energy.

The CEFC has released two key market reports that explain more about the potential for bioenergy and energy from waste in Australia: [Energy from waste in Australia: a state-by-state update 2016](#) and [The Australian bioenergy and energy from waste market 2015](#).

2.1 OVERALL POTENTIAL FOR ENERGY FROM WASTE IN NSW

The energy from waste market is under-developed in NSW but has considerable potential. Technologies are readily available to reduce, capture and reuse emissions from waste. These technologies have a long track-record of cost-effectively reducing emissions and waste and generating reliable renewable energy around the world. However, these technologies are not widely deployed in NSW or anywhere Australia.

There are ~23 bioenergy/energy from waste power stations in NSW according to the Australian Energy Market Operator (AEMO), however the majority of these are very small, with a nameplate capacity of less than 10MW. The combined capacity of all stations is only ~250MW and covers bagasse, landfill methane, landfill gas and waste coal mine gas. In order to meet climate targets and replace ageing, inefficient, retiring electricity generation, new energy generation capacity is needed. There has been strong uptake of wind and solar technologies over the past decade, however energy from waste is a relatively untapped market, ripe for further investment.

Landfill levies are an effective way of pricing the environmental and social externalities of landfill and ensuring that waste with recoverable value is not sent to landfill. State landfill levies are necessary to make energy from waste projects economically viable as they provide an important source of revenue for a project. NSW's comparatively high landfill fees therefore provide a strong incentive to deploy energy from waste technology.

NSW has the largest population of any of the states with forecasts showing population growth will remain strong for decades to come, bringing an associated increase in waste production. Other factors present in NSW such as: higher population density in metropolitan areas; higher cost of land and its relative scarcity, contributing to its higher landfill gate fees; as well as the existence of a robust State Government policy and regulatory framework make NSW a prime destination for investment in energy from waste, particularly in relation to urban waste.

NSW's intensive livestock and food processing industries also represent a good opportunity for energy from waste due to the readily available feedstock from process waste, high electricity prices and demand for on-site electricity, heat, or steam.

2.2 BENEFITS OF USING ENERGY FROM WASTE TECHNOLOGY IN NSW

With the appropriate regulatory framework, energy from waste has the potential to provide a range of social, economic and environmental benefits. It can help avoid fossil-fuel combustion for electricity while providing a clean source of renewable energy. Importantly, it provides firm¹ generation capacity which can complement variable renewables and provide ancillary services to the electricity market. The ability of energy from waste to provide firm generation capacity will become increasingly valuable as coal-fired power stations retire and the penetration of wind and solar PV increases. [EnergyAustralia](#) is looking to convert part of its coal-fired Mount Piper Power Station near Lithgow into a purpose-built boiler that would run on waste.

Energy from waste can help improve recycling rates, reduce landfill, and improve local environmental outcomes (see [Arc 21](#) for more information). Reducing waste from landfill helps reduce methane, a greenhouse gas which is emitted from decomposing waste. Methane is 25 times more potent than carbon dioxide and contributes to climate change. Projects can also create jobs in environmental monitoring, development, design, commissioning, procurement, manufacturing, installation, project management, transport and delivery as well as operations and maintenance.

2.3 TECHNOLOGIES AVAILABLE

URBAN WASTE

Urban waste refers to municipal solid waste, commercial and industrial waste and construction and demolition waste. Of the nearly 50 million tonnes of urban waste generated in Australia each year, more than half is recycled and around 20 million tonnes ends up in landfill. Only around 1 million tonnes is diverted for energy or advanced waste treatment.

Energy from waste involves recovering a useful resource from what would otherwise be waste material.

¹ Firm generation capacity is the amount of energy available for production or transmission which can be guaranteed to be available at a given time and is not dependent on factors like weather.

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 just some of the potential feedstocks. Energy from urban waste is widely used internationally, including in France, the UK, US, Germany, Japan and Switzerland but the market is untapped in Australia. The CEFC estimates a potential investment opportunity in urban energy from waste of between \$2.2 billion and \$3.3 billion Australia wide, with the greatest potential being in NSW, given the high levy and gate fees, population density, cost of land and regulatory environment.

ENERGY FROM AGRICULTURAL WASTE AND FOOD PROCESSING

The Australian agriculture sector has produced electricity and heat from waste biomass for more than 100 years. Today, the sugar industry has 480 MW of installed capacity generating electricity from post-processing sugarcane residue. Organic waste from poultry farms, cattle feedlots, piggeries, dairy farms and abattoirs is a biomass resource that is well suited to anaerobic digestion.

In the past decade, organic waste at large livestock production and food processing facilities has been increasingly treated using anaerobic digestion to generate biogas for on-site heat and power generation. But many opportunities in small and medium plants in rural and regional NSW are yet to be taken up.

Readily available feedstock from animal waste, higher electricity prices and demand for on-site electricity, heat or steam make anaerobic digesters a viable investment. Generating electricity and heat from agricultural waste can encourage investment in rural and regional industries, reduce on-farm electricity, waste and gas costs, diversify farming income and reduce electricity infrastructure costs.

The CEFC estimates an investment opportunity in energy from food processing and animal waste of between \$0.7- \$1.1 billion Australia wide, with significant untapped potential in NSW where there are almost 40,000 farms (more than any other state) and a large cattle, poultry, and pig industry.

2.4 WHERE OPPORTUNITIES ARE LOCATED

Opportunities for energy from animal waste are largely focused in regional NSW where most farms or agricultural processors are located. Urban waste opportunities tend to be closer to Sydney and other metropolitan areas such as the Illawarra, Hunter and Central and North Coast regions. These areas already host the most and largest landfills. As expected metropolitan landfill levy rates are higher than in regional NSW (\$135.70 per tonne versus \$78.20) and available land for landfill is more limited.

2.5 REGULATORY FRAMEWORK

Air quality and management of emissions is critically important for human health and community acceptance of energy from waste facilities, particularly in populated areas. To be successful, a new project needs a combination of both the right economics and the right Government policy. That is why growth in the sector must be underpinned by a strong regulatory framework.

The NSW Government has developed a robust policy on energy from waste. The policy sets high thresholds for any new project to ensure waste is not diverted from recycling; that public health and safety is protected and to minimise the risks to local communities. Importantly, the NSW Environment Protection Agency (EPA) energy from waste policy states that a project must use current international best practice emissions controls, monitoring and management as well as proven and well-understood technologies. The EPA's continued, close involvement in the development and monitoring of any new project will be important to the success of the industry and to ensuring new projects gain community support.

2.6 CEFC CASE STUDIES

The CEFC uses finance to promote the uptake of small and large-scale energy from waste projects. The CEFC has recently announced its first energy from waste project in NSW with ResourceCo and sees huge potential to deploy this technology further in NSW and nationally. The CEFC are currently in discussion with a range of project proponents with potential bioenergy and energy from waste projects based in NSW.

[ResourceCo](#): is installing energy from waste facilities at Wetherill Park in Sydney that will transform non-recyclable waste streams into Processed Engineered Fuel



[Landfill Gas Industries](#): installed 6 MW of capacity using biogas-fired generators at six landfill sites across Queensland.



[Energy Developments Limited](#) has used CEFC finance for new projects in landfill gas as well as the expansion of a plant at Moranbah, Queensland which captures waste coal-mine gas and turns it into electricity, saving some 50Mt CO₂ over its lifetime.



[Darling Downs Fresh Eggs](#): in Queensland is using chicken manure and other organic waste from its egg production business to generate power and save more than \$250,000 a year. Heat from the biogas generator will be captured and used to warm chicken rearing sheds and heat the water for the grading floor.



[JBS](#): installed a plant in Queensland that captures biogas from meat production and uses it to power its boilers



[Richgro](#): installed a 2MW biogas plant in Western Australia to process organic waste from its garden product business

