

CONFIDENTIAL

25 July 2022

SUBMISSION ON THE CAPACITY MECHANISM HIGH-LEVEL DESIGN PAPER

Thank you for the opportunity to comment on the Energy Security Board's high-level design paper for the proposed establishment of a capacity mechanism.

1. Executive Summary

LMS Energy (LMS) is Australia's leading landfill biogas-to-energy company. Distributed biogas-to-energy generation is unique in its ability to provide synchronous, baseload and dispatchable renewable electricity

LMS strongly supports:

- the proposal to establish a capacity mechanism, in which providers of capacity are paid to have their capacity available during certain periods, as a necessary element in helping manage the significant complexities and operational challenges faced as we transition to an energy system with net zero emissions,
- the proposed **inclusion of existing distributed renewable generation activities** (located within the distribution networks) within the mechanism to preserve their competitiveness within the market,
- the proposed inclusion of new generation activities within the mechanism, and
- the intent that the mechanism largely has technological neutrality to facilitate new activities that may support our energy system in future.

LMS offers information about its operations and the landfill biogas-to-energy industry together and the reasons for its support of some proposed parts of the capacity mechanism to help assist with the further design of this mechanism.

2. LMS Energy and the landfill biogas-to-energy industry**2.1 Who is LMS Energy?**

LMS is **100% Australian owned** and owns/operates **60 biogas facilities** across Australia, New Zealand and the USA (depicted over the page). LMS is **Australia's most experienced biogas company**, with LMS' founders having operated for 40 years in the waste and bioenergy sectors. LMS currently directly employs around 210 people.

LMS' projects capture biogas arising from the breakdown of organic waste and use it to generate synchronous renewable electricity. It has around **81MW baseload renewable capacity** and generates around **600GWhs of renewable energy** annually, with estimated biogas reserves of around 200PJ to 2040. LMS also operates 6 solar farms.

Through these projects, LMS is **Australia's largest carbon emissions reducer**, responsible for around 15% of all issued Australian Carbon Credit Units¹. LMS' projects **save release of around 4.5 million tonnes of CO₂-e annually** and, **to date, have prevented a total of around 48 million tonnes of carbon** from entering the earth's atmosphere².

¹ CER's Emission Reduction Fund Register (accessed on 26/8/2021).

² Further information is available at www.lmsenergy.com.au.

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2.2 The landfill biogas-to-energy industry

In total, landfill biogas-to-energy generation operations within the NEM contributes approximately **120MW** of distributed, synchronous generating capacity to:

- Generate more than **1,000GWhs of baseload renewable electricity per year (50% of all bioenergy is generated from biogas in Australia)**, the equivalent of powering **166,000** homes each day,
- **Abate over 6 million tonnes of CO2-e per year (30% of Australia’s total emissions reductions)**, and
- **Support regional development**, with approximately **40%** of bioenergy facilities located in regional areas, supporting local communities with employment and royalty payments from revenue generation.

2.3 The nature and characterisation of landfill biogas-to-energy projects

Landfill biogas-to-energy projects are a unique, renewable bioenergy resource that can assist under the capacity mechanism. These projects generate electricity through the collection and destruction of biogas arising from the natural breakdown of organic wastes in landfills, thereby significantly reducing emissions from methane, a potent greenhouse gas.

Landfill biogas-to-energy brings significant energy system benefits, including:

- Producing **baseload, flexible and dispatchable renewable electricity**,
- Contributing to **stabilising our electricity grids, firming renewables and displacing fossil fuel**.

LMS has 27 biogas-to-energy power stations located in the NEM, with many sites having multiple generators. These synchronous generators increase local system strength and help maintain stable voltages. LMS power stations are also designed to allow the power station to ride through short-term disturbances while remaining connected to the network.



Wollert (VIC) Bioenergy Facility (7.7MW)

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3. Capacity market mechanism

LMS strongly endorses the establishment of a capacity market mechanism. It believes that the market signals it could produce would enable the transparent valuation of firming generation. The inclusion of biogas-to-energy generation in this mechanism will provide further competition into the proposed capacity market and drive positive outcomes for system reliability and customers.

LMS operates its generators in the NEM as a ‘**Small Generator Aggregator**’ (SGA). Its generation portfolio is **predominantly classified by the AEMC as ‘Distributed Generation’** (not DER).

From a Distributed Generation standpoint, a **capacity market could provide the right market signals and incentives to continue investment in Distributed Generation assets such as biogas-to-energy**. This would provide **greater flexibility to the market operator and distribution networks** to manage the grid and networks effectively and efficiently.

4. Inclusion of existing distributed power stations in the capacity market

As observed by the ESB, existing capacity includes various forms of renewable energy. With biogas-to-energy being a significant existing, distributed source of renewable energy and facing a variety of market challenges, **LMS Energy strongly supports the inclusion of existing distributed renewable energy facilities as well as new facilities in the capacity mechanism**.

Landfill biogas-to-energy faces many of the energy system complexities and uncertainties highlighted in the paper. In particular, it is being affected by:

- highly volatile and generally declining electricity prices, with increasingly frequent, severe negative pricing events,
- compromised grid stability, leading to network outages and an increase in the frequency of interventions, and
- expectations of significant future declines in Large-scale Generation Certificate (LGC) prices.

Unlike solar and wind, biogas-to-energy generators require significant ongoing capital investment to maintain generation. This investment is required to maintain consistent gas extraction to allow for continuous conversion to electricity. The gas extraction infrastructure installed at landfill sites requires constant maintenance and redrilling to ensure a constant supply of gas. Biogas is also a particularly contaminated fuel source and wears engines. Accordingly, the reciprocating engines require a heavy maintenance schedule, with significant periodic capital expenditure required to ensure the safe and efficient operation of these engines.

These **pricing and investment circumstances pose a significant risk to the continued operation of generators** in the absence of being able to participate in system security mechanisms, including the proposed capacity mechanism. Excluding these types of distributed generators would significantly decrease their competitiveness, resulting in power station closures.

With more than 120MW of biogas generating capacity installed across the NEM, there is a significant ability for these generators to provide capacity. **The ability to participate in the capacity mechanism will preserve market competitiveness and help ensure that this generation and system services offered continue to be able to be realised.**

5. Opportunities for further distributed landfill biogas-to-energy

Successfully incorporating biogas-to-energy in the capacity mechanism will help provide the necessary incentive for continued investment into this form of Distributed Generation, with its ability to provide critical services directly to distribution networks in the NEM.

A prime example is the potential for biogas-to-energy power stations to be constructed at landfill sites which currently flare biogas instead of generating renewable electricity. In the face of declining electricity and LGC prices, **new market pricing signals are required to incentivise such investment**. With the appropriate market signals, there is **significant potential for additional distributed synchronous generation (250MWs+) to be developed**. As many of these potential sites are located in regional areas of the NEM, this will support grid stabilising services in difficult parts of the network.

Furthermore, the ESB's capacity mechanism **will promote the development and use of biogas storage**, adding further flexibility to the grid. Low pressure biogas storage is one of the cheapest and most easily deployed forms of energy storage available.³ This solution is currently not widespread due to restrictions on biogas-to-energy generators' ability to participate in relevant markets.

6. Allowing for additional technologies

LMS supports the capacity mechanism being technically neutral to cater for additional and emerging technologies.

By way of example, biogas can be generated from the breakdown of organic wastes in contained structures rather than in landfill – this is known as anaerobic digestion. LMS Energy and others are keen to use suitable organic wastes to support a circular economy – cycling the energy, heat and nutrients that this matter contains to help grow our food as well as contributing to our energy system. As supportive policy settings develop, it can be expected that this sector will grow rapidly. The biogas produced from anaerobic digestion could be used in new engines at new locations and at LMS' existing engines, with both offering the same system benefits as landfill biogas-to-energy if able to participate in the capacity mechanism.

The opportunity exists for biogas-to-energy to be a key player in Australia's energy transition, enhancing energy security and helping Australia further reduce its emissions. We thank you for considering our submission and LMS would be happy to discuss any aspect or any further queries as may be helpful. Please feel welcome to contact Patrick Lim, Group Manager – Carbon and Energy by email patrick.lim@lms.com.au or mobile 0427 104 870 or myself by email tiana.nairn@lms.com.au or mobile 0427 087 452.

Yours sincerely



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³ ARENA (2018) Comparison of dispatchable renewable electricity options. Report prepared by ITP Energised Group: According to the ARENA (2018) review of disputable renewable energy options, *anaerobic digestion systems operating on zero cost waste and operating at 50% or more capacity factor (were) the cheapest dispatchable renewable generating option considered.*

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