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SUSTAINABILITY OF ENERGY SUPPLY AND RESOURCES IN NSW

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Submission to the Inquiry into the Sustainability of energy supply and resources in NSW

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Overview

There is an opportunity to implement and apply proven technology to produce renewable methane from organic material, including waste, crop residues or even energy crops, and inject into the gas network to supply NSW gas consumers with reliable and locally produced renewable gas.

Currently, NSW imports approximately 97% of its gas from interstate and is subject to price volatility and supply shortages as a result of demand for LNG exports. However, there is a near term opportunity to complement existing gas supplies with renewable gas from biomethane. The benefits for NSW include:

- Creates a circular economy and retains value in NSW;
- Supports local jobs and investment particularly agricultural regions;
- Reduces greenhouse gas emissions on energy network by producing net carbon zero gas;
- Reduce greenhouse gas emissions of farming and food processing industries (destruction of methane and capture carbon dioxide);
- Reduces landfill and potential impact of contaminated ground water;
- Reduces particulate emissions (compared to waste-to-power);
- Captures nutrients (digestate) which can be used as fertilisers (offsetting high energy cost of synthetic fertilisers);

The advantage of utilising the NSW gas network is that this:

- Leverages the existing gas network infrastructure to reduce cost of development;
- Allows regional producers get immediate access to 1.4M customers across the state for their gas (and associated ‘Green Gas’ credits);
- Has a large storage potential that ensures that the energy can be used when it is needed rather than when it is produced;
- Reduces the energy lost in transmission compared to electricity;
- Is a dispatchable long term storage that enables variable renewable electricity;
- A support for variable renewable electricity, the hydrogen economy and export

NSW Government can play an important role in supporting the development of this industry, including but not limited to:

- Supporting regional biomethane feasibility and feedstock studies;
- NSW Government offtake of net carbon zero green gas, any gas demand connected to the distribution network (eg CNG, hospitals, etc)
- Land, zoning, approval support for biomethane projects;
- Incentives and support for initial projects ;
- In-kind assistance to identify and reduce regulatory barriers;
- EPA endorsement and sanction of process
- Assistance and support for the certification and treatment of grid injected biomethane

1. About Jemena

Jemena Gas Networks, owned by Jemena, at 23,800km is Australia's largest gas distribution network, was established in 1837 and delivers gas to more than 1.4 million homes, businesses and industrial customers in New South Wales. Jemena operates under the philosophy that safe, reliable and affordable energy is essential to the health, happiness and prosperity of the broader community.

Jemena is currently working with a number of organisations and potential projects to develop the Renewable Gas opportunity in NSW and is looking forward to working with the Committee on Environment and Planning to support and accelerate its development to ensure the sustainability and reliability of energy in NSW to the benefit of regional and urban communities. These organisations include BioEnergy Australia of which Jemena is a major member and contributed to their submission to this inquiry and the Future Fuels CRC of which Jemena has representation on the Board, the Research Advisory Committee as well as 3 research programs. An example of a regional organisation that Jemena is working with and would benefit from support based on this inquiry is CLEAN Cowra Inc, they have separately submitted a letter of support for our inquiry response.

Jemena welcomes further collaboration and discussion on this important issue. Please feel free to contact us using the details above.

2. Biomethane (a renewable gas)

Biomethane is a biogas that has been upgraded to be equivalent to Natural Gas. Biogas is generally produced through the digestion of organic material in the absence of light and oxygen (anerobic). This process occurs naturally in an anerobic environment such as underground in a landfill or a mound of waste in a field (where it is release to the atmosphere if not captured) or in a specially built digestor/lagoon. When it is captured it can be upgraded to Biomethane, which involves the removal of CO2 (~38%) (and other contaminants) from this Biogas through any number of established processes (such as membranes or water scrubbing), this CO2 can be utilised for industrial purposes, fed into greenhouses to enhance plant growth or potentially stored to make Biomethane carbon negative. The Biomethane can then injected be into the gas grid to offset existing gas use for any number of applications including heating, electricity production, transport (CNG) or industrial purposes. A certification or Guarantee of Origin system is being developed, similar to GreenPower for electricity, that will allow any of the customers for these applications to access carbon neutral gas.

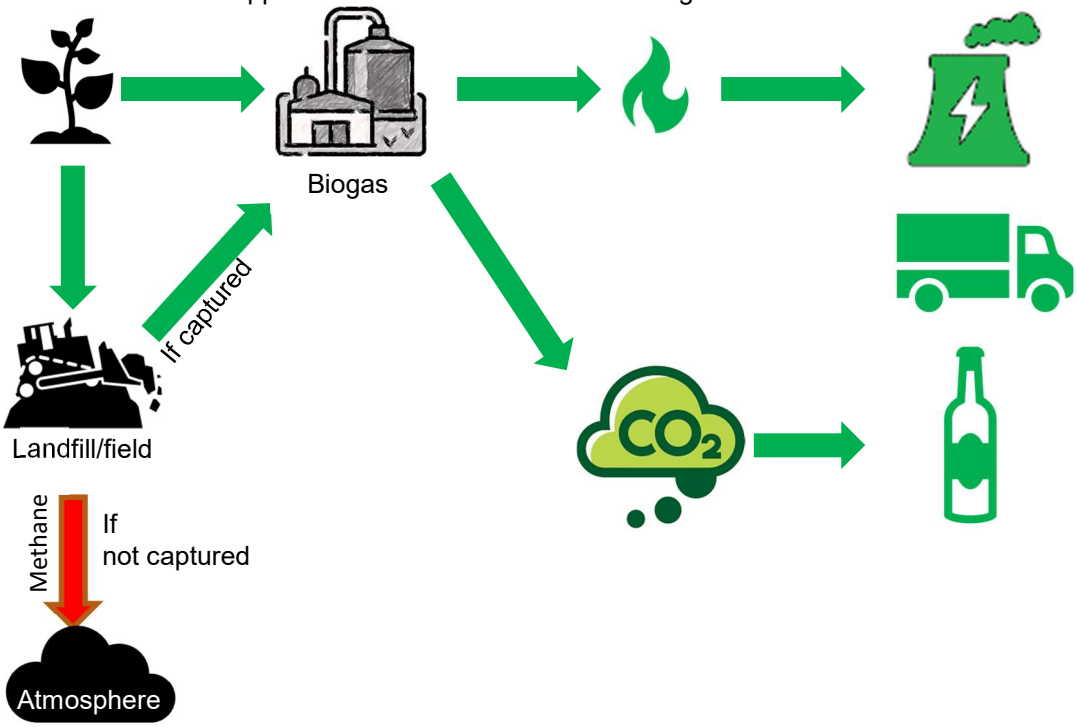

Figure 1 - Biomethane production, capture and use

3. Proven benefits and technology

NSW has the opportunity to leverage decades of international development of the production and processing of biomethane from waste. In 2017 there were 540 operating biomethane plants in Europe producing 68 PJ/yr (European Biogas Association, 2018) which is equivalent to greater than 80% of entire NSW gas annual demand and is projected to produce 650 – 1371 PJ/yr in 2030 (8 – 17x NSW Gas demand) by 2030 (Stern, 2019). A variety of methods of managing and encouraging the Biomethane market have been implemented across Europe, this provides a proven framework to shape the NSW Biomethane industry and spill over benefits including:

1. Established and modularised technology – technology has been implemented across a range of applications, has significantly reduced in cost and modularised to allow quick deployment.

2. Established regulations and incentives – incentives for Biomethane in Europe have varied from incentivising the end use in transport to a ‘feed in’ tariff to project support, as these have been in place for a number of years NSW can learn from these in crafting the industry.

3. Delivering positive externalities and capability – a Biomethane industry has developed in Germany for over a decade, while in France and Italy they have over the last few years implemented mechanisms to accelerate based on the advantages they see from Germany. The industry skills required to be developed and the benefits they provide has been well developed, as well as the experience in their rapid development.

4. Benefits to NSW regional communities

Biogas and Biomethane enable economic development through energy export, develop transferable skills and reduce their reliance on fertiliser. This has been demonstrated in Europe where Biomethane has created long term sustainable jobs and businesses. This is because a significant portion of the employment and economic activity generated as part of a bioenergy sector remains in the regional communities, the feedstock (fuel) is created by local farmers, it is transported by local people and the plants are operated in the communities. In fact, 4.2 jobs ongoing direct and 2.1 ongoing indirect jobs are estimated to be created per MWe of capacity (DKM Economic Consultants, 2012) and a majority of the construction costs are labour and local equipment (such as biodigester, civil and piping). In comparison a typical solar farm requires minimal operations staff, such as the 56 MW Moree Solar Farm requires 5 employees to operate (0.09 direct ongoing jobs per MWe of capacity) (ARENA, 2019) and a majority of its construction costs are imported solar panels (60%) (The Australian PV Association, 2011).

5. Utilising waste and capturing nutrients

Rather than extracting value from organic wastes in the form of energy the digestion process actually increases the value of the waste when it is processed because the digestion of crop residues and farm wastes actually makes the nutrients more available to plants. This has the following benefits:

1. Enhancing availability of nutrients – resulting in a strong increase in crop growth (Möller & Müller, 2012)
2. Offsetting industrial fertilisers – reducing demand for imports and limiting soil and water pollution (Eyl-Massega & Mathieu, 2019)
3. Capturing carbon and energy – that would normally be released in the field
4. Enhance water security – capturing and utilising wastewater

In comparison to Biofuels, Biogas and Biomethane production primarily utilises waste. Nevertheless, if energy crops are utilised for Biogas and Biomethane they actually produce between three and four times more transportation fuel (Bauer, 2015), significantly improving the utilisation of land.

6. Supporting variable renewable electricity and energy exports

Currently, there are significant network constraints to the growth of the renewable electricity industry, the requirements for development of projects, especially in remote parts of the grid, are increasing and existing projects are being curtailed. There are significant opportunities for the growth in variable renewable electricity in regional areas, however in order to take advantage of these opportunities it must be balanced with stable and long term dispatchable storage which is provided by the existing gas network.

Furthermore, NSW significant energy renewable resources can be captured as hydrogen when there is excess capacity (balancing the grid) and specifically for hydrogen export. Hydrogen represents a significant opportunity that could be worth $1.7 billion and provide 2,800 jobs by 2030, as outlined by the Chief Scientist and supported by the COAG Energy Council. The gas network in the short term provides a support for projects by providing a supplementary sink and revenue stream and potentially in the long term as a low cost and high capacity route to the domestic and export market.

7. References

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