

Kitchen food waste:

Could it help to keep the lights on in the future?

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Last winter brought unprecedented energy events, highlighting the critical need for flexible thermal electricity generation to supplement our highly renewable generation capacity.

Traditionally, hydropower and natural gas have been key components of New Zealand's energy mix, helping to meet fluctuating demand and seasonal variations.

However, more frequent periods of reduced rainfall have led to significantly lower water levels in hydro lakes, while declining natural gas supplies limit the capacity of these traditional sources to adjust electricity production as needed.

New Zealand needs the capacity to store energy for times when unpredictable weather events do not align with electricity demand.

Supply flexibility is the ability for a generator to adjust electricity output when needed. Supporting short-term capacity such as winter mornings and evenings backing up supply of renewable generation when the wind does not blow or the sun does not shine.

Gaseous biofuels, such as biogas and biomethane, could provide a renewable, sustainable, domestic option to maintain flexible generation.

Coupled with increased wind and solar generation, small gaseous biofuel peaker plants have the potential to replace fossil fuels in thermal generation, offering a clean alternative in



providing a reliable energy source during periods of energy shortage.

Gaseous biofuels are derived from organic waste materials, such as household food wastes, organic industrial waste, wastewater treatment plants and agricultural residues.

Despite the potential advantages of gaseous biofuels, production capacity in New Zealand is limited.

There is currently little policy support or government direction, which limits access to feedstocks.

This is compounded by a lack of awareness about the opportunities gaseous biofuels present.

Market uncertainty has hindered collaboration between stakeholders and prevents development of a clear shared vision for the industry's future in New Zealand.

In the short term there are challenges in scaling-up biogas production facilities and the sector is currently unable to meet demand for consistent and large-scale supply.

The key is to unlock opportunities such as from agriculture waste and wastewater treatment, to enable gaseous biofuels to contribute towards enhancing energy security and reducing carbon emissions.

What is needed to unlock the gaseous biofuels opportunity?

New Zealand can draw ideas from other countries where biofuel production and adoption has grown.

The UK, Germany, and Sweden have accelerated biomethane production through implementing government incentives, such as feed-in tariffs and tax credits, to make production more economically viable.

Underpinning this strategy is a commitment to divert organic waste from landfills.

Investment in infrastructure, like biogas plants and gas grid connections, have been crucial in countries like Denmark and the Netherlands.



Left: Integrating solar, biogas and crop residues to produce firm electricity.

Above: Separation of organic kitchen waste improves the production of biogas.

Right: Wind needs a controllable resource such as biogas to provide steady electricity.



These nations also diversify feedstocks, using agricultural waste, food scraps, and organic waste.

Public-private partnerships, as seen in the Netherlands, have helped reduce risk and pool resources for large-scale projects.

Additionally, countries like Sweden invest in research to improve production technologies and integrate biomethane into the natural gas market, boosting its adoption.

These approaches can serve as a model for New Zealand to accelerate gaseous biofuels production.

As New Zealand continues to transition to a low-carbon economy and seeks to maintain energy security and resilience, the role of gaseous biofuels should not be overlooked.

With the right policies and investments, gaseous biofuels could play an important role in supporting a renewable and sustainable energy future.