Biomethane Opportunities to Decarbonise Australian Industry

Converting waste into grid-injectable biomethane

Prepared for: Energy Networks Australia

July 2025

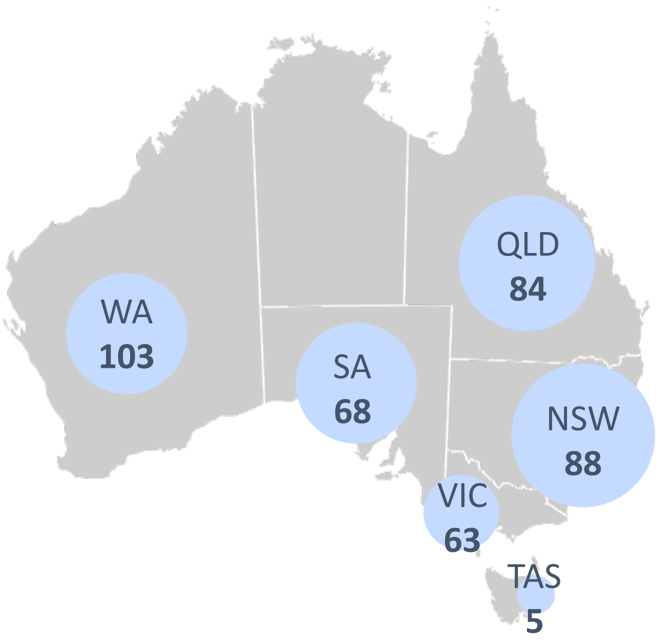
Key Messages

1. Approximately 400 PJ p.a. of biomethane is recoverable today, offering a new gas source for Australia's decarbonisation targets.
2. Feedstocks suitable for biomethane are already present in today's waste streams. Their recovery can be scaled up for biomethane production.
3. Biomethane can be distributed through the existing gas networks, solidifying its central position in the energy system
4. The first 50 PJ p.a. of biomethane can be brought to market at between 10 and 27 A$/GJ.
5. Further policy support is required to bring biomethane costs down and enable market development, and increase supply potential.
6. On the East coast, the technical biomethane potential represents 96% of current gas consumption.

Approximately 400 PJ p.a. of biomethane is recoverable today, offering a new gas source for Australia's decarbonisation targets

- As Australia accelerates its energy transition, biomethane is increasingly recognised as essential to decarbonising sectors where electrification is not practical or cost-effective.
- Globally, biomethane is a well-established decarbonisation lever, adopted across Europe, North America, and parts of Asia. Its success lies in its ability to divert waste, reduce emissions, and integrate seamlessly with existing gas infrastructure, making it an immediately deployable decarbonisation solution.
- Adopting biomethane offers a clear route to decarbonise gas, enhance fuel security, and drive regional development, leveraging established technologies which are already successful globally.
- As interest grows, questions arise from policymakers, industry, and the public:
  - How much biomethane could realistically contribute to Australia's decarbonisation goals?
  - Are suitable feedstocks available for biomethane production in Australia?
  - How can biomethane be integrated into the current energy system?
  - What is needed to make biomethane cost-competitive and commercially viable?
- This report, prepared by Blunomy in partnership with ENA, clarifies these critical questions to provide a common understanding of the feedstock landscape.

Australia's recoverable biomethane potential by State, PJ p.a.[1]



Notes: [1] Recoverable biomethane potential, excludes Northern Territory as no data is available

Feedstocks suitable for biomethane are already present in today's waste streams. Their recovery can be scaled up for biomethane production.

- *Food organics* ✓
- *Garden organics* ✓
- *Cereal residue* ✓
- *Non-Cereal residue* ✓
- *Sugarcane vinasse* ✓
- *Livestock residue* ✓
- *Horticulture residue* ✓

Australia already has a diverse range of feedstocks well-suited to anaerobic digestion (AD) making biomethane a technically mature, low-risk solution.

Food organics, garden organics, cereal residues, non-cereal residues, sugarcane vinasse, livestock residues, and horticulture residues, are considered scalable pathways as they divert waste, are digestible with existing technology and don't compete directly with food production.

If feedstock demand grows, for example through sectors like cogeneration and low-carbon fuels, they may benefit from the biomethane supply chains already in place.

Biomethane can be distributed through the existing gas networks, solidifying its central position in the energy system

As policy, markets and technology evolve, biomethane is set to become a cornerstone of Australia's bioenergy future, not just as a fuel, but as a critical input across emerging energy pathways.

New technologies create new value

Innovations such as Power-to-Liquid use bioCO_2 captured during biomethane production to generate low-carbon liquid fuels (LCLF). Biomethane itself can also be used directly as a feedstock in LCLF production, broadening its strategic role.

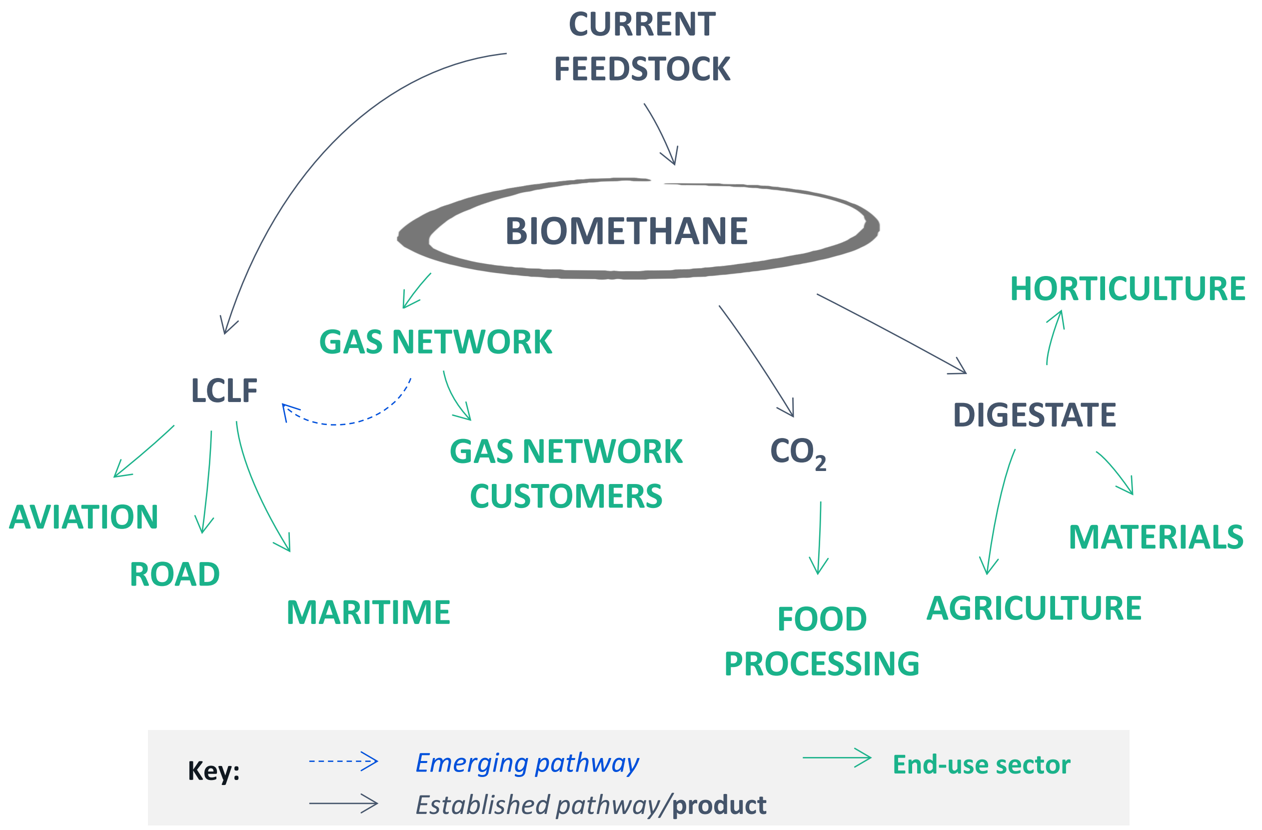
As these technologies mature, biomethane's contribution to Australia's circular, low-carbon economy will grow.

System-wide and societal benefits

Biomethane contributes far beyond decarbonisation:

- Improves waste management by capturing value from organic waste
- Enhances fuel security through domestic energy production
- Provides valuable byproducts for use in agriculture, energy, and industrial processes
- Integrates with existing gas networks, enabling cost-effective and rapid deployment

Biofuel feedstock synergy

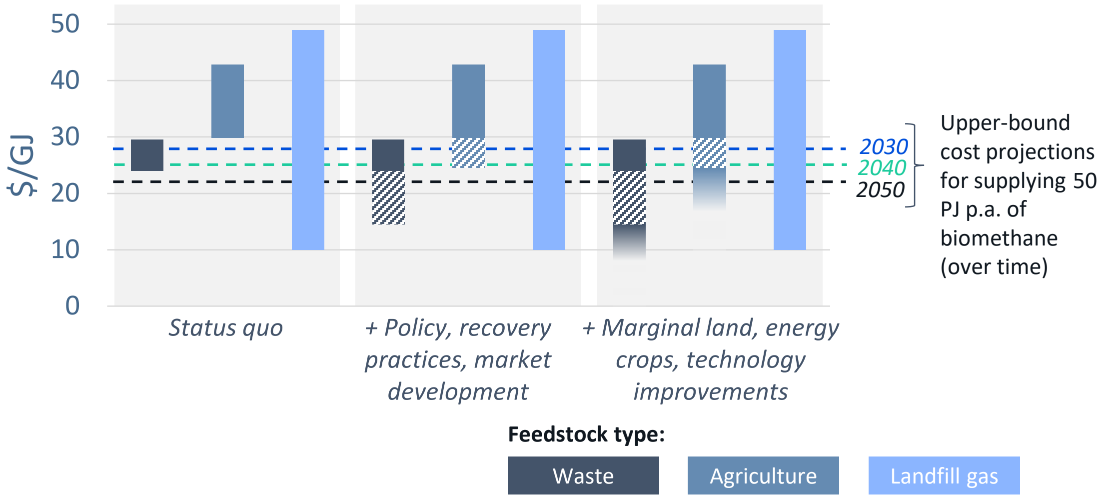


Further policy support is required to bring biomethane costs down and enable market development and increase supply potential

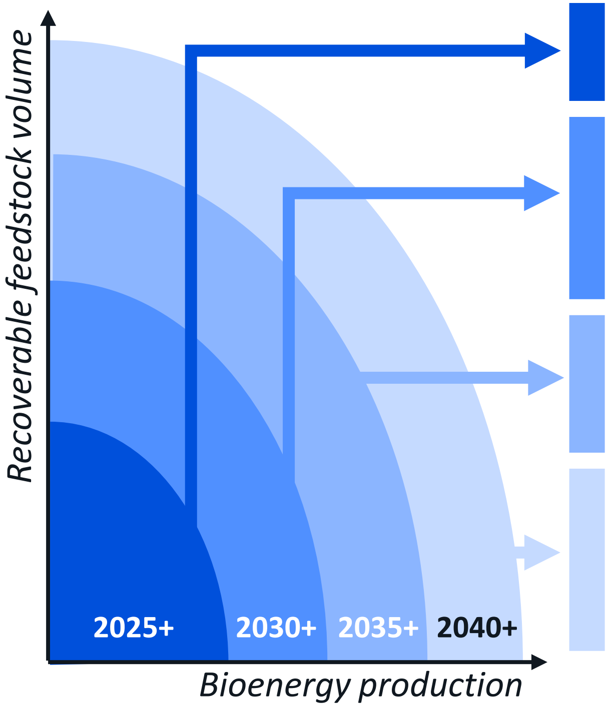
Policy can play a key role in making more of Australia's biomethane potential recoverable now.

- The biomethane market in Australia remains in its early stages, with many opportunities to kick-start market development.
- Policy can act as a key catalyst in this evolution by unlocking more of the technical potential (i.e., enabling better feedstock recovery, and supporting project development through regulatory, financial, and market-based instruments).
- In doing so, incentives to lower biomethane production costs could help lay the groundwork for a functioning market.

Biomethane production costs, by feedstock type, A$/GJ



Over time, the existing bioresource potential will expand as new crops are introduced, technologies advance and marginal land becomes available.



Policy support and incentives increase feedstock recovery.

Oily feedstock could be diverted away from export markets toward domestic production of LCLF.

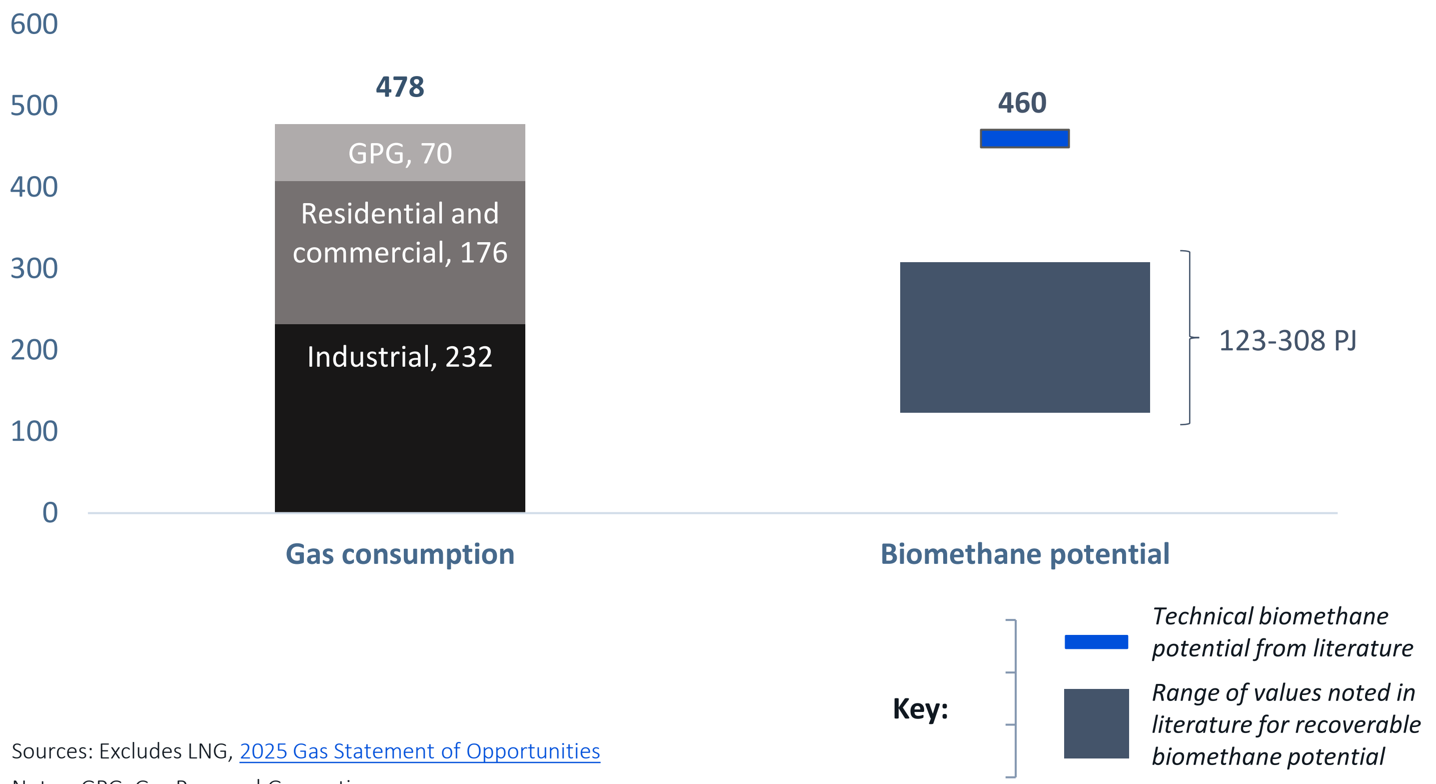
New energy crops could be cultivated to serve distinct bioenergy pathways.

Marginal land offers additional opportunity to grow bioenergy crops without competing with food production.

On the East Coast, the technical biomethane potential represents ~96% of gas consumption

The East Coast (NSW, VIC, SA, TAS, QLD) consumes ~478 PJ p.a., driven by the industrial, residential and commercial sectors.

Fossil gas consumption by sector vs. technical biomethane potential across the East Coast, PJ p.a.



Sources: Excludes LNG, 2025 Gas Statement of Opportunities

Notes: GPG: Gas Powered Generation

Key insights:

- The **East Coast states** (i.e., New South Wales, Victoria, South Australia, Tasmania, and Queensland), collectively **consume ~478 PJ of gas annually,** with demand concentrated in the industrial sector (~232 PJ p.a.), residential and commercial users (~176 PJ p.a.), and gas-powered generation (~70 PJ p.a.).
- Across those states, **the technical potential for biomethane production** is estimated to be equivalent to **~96% of current fossil gas consumption**, or around 460 petajoules (PJ) per year. This figure represents the potential from all biomass that can be converted into biomethane via current technologies.
- The **recoverable biomethane potential**, estimated between 123 and 308 PJ per year, reflects current technical, economic, and logistical constraints. Even at the lower end, this represents more **than a quarter of the East Coast’s fossil gas demand.**

Contents

As biomethane gains global momentum, this report explores Australia's present and future feedstock opportunities for its production

Biomethane is a flexible and proven emissions-reduction solution, particularly where electrification is not practical, cost-effective, or desirable. With mature, commercially viable technologies already driving widespread global adoption, demand internationally is expected to grow by 15% annually over the next decade (based on today's policy settings)[2].

Recent studies[1] confirm that Australia has significant untapped potential. With abundant bioresources and strong agricultural foundations, it is well placed to position biomethane as a key part of its broader decarbonisation strategy. This report aims to clarify the opportunity for biomethane in Australia and the feedstocks that can support development of the sector.

This report addresses key uncertainties by:

Clarifying the current feedstock landscape

- Estimating Australia's maximum biomethane production from current feedstocks, based on recent findings of feedstock availability and distribution across States.

Assessing current feedstock supply chains

- Identifying current feedstock uses and likely near-term allocations based on technology and commercial maturity, and exploring areas of competition and synergy among feedstocks end uses.

Shaping a forward-looking vision

- Examining how policy, technological advances and new feedstocks may reshape the feedstock pool, reduce production costs, and promote joint biomethane and LCLF development.

Sources: [1] Australia's Bioenergy Roadmap, Biogas Opportunities for Australia, and Biomethane Potential in AGIG's Network Catchment and Associated Benefits; [2] IEA, *Biogas and biomethane outlook to 2050*, 2025

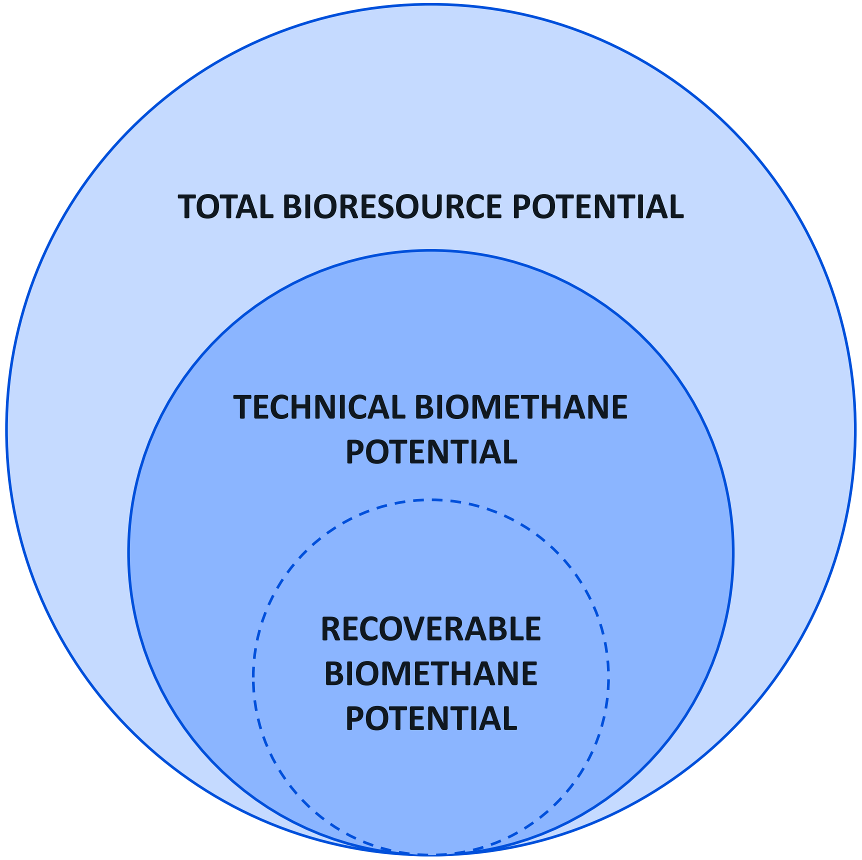
1

Australia’s biomethane potential

There is a distinction between the bioresource potential and biomethane potential

Due to varying definitions across public reports, this analysis aims to clarify terminology around biomethane potential, highlighting that only a portion of total biomass can be practically converted into biomethane:

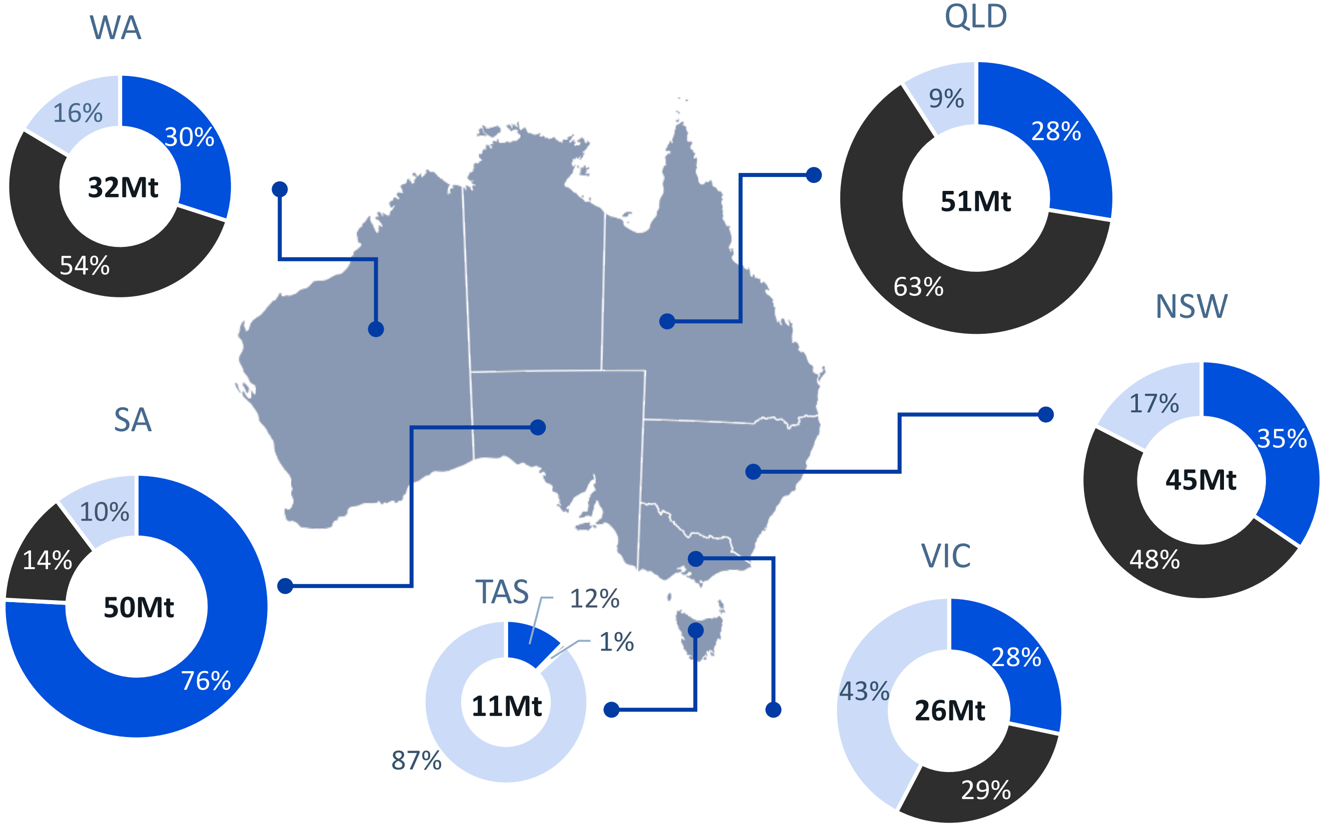
- **TOTAL BIORESOURCE POTENTIAL**
  The full volume of organic material that could, in theory, be used for bioenergy including all biomass, regardless of suitability or accessibility.
- **TECHNICAL BIOMETHANE POTENTIAL**
  The portion of total biomass that is **technically suitable** for conversion into biomethane via current technologies.
- **RECOVERABLE BIOMETHANE POTENTIAL**
  The portion that is **technically suitable and practically accessible, at a reasonable cost,** influenced by policy settings, recovery practices, and market development.



Australia's ~215 Mt of bioresources p.a. represents ~2,300 PJ p.a. of bioenergy

Australia possesses abundant agricultural, forestry, and waste resources that can be transformed into energy.

Breakdown of Australia's gross bioresources, Mt p.a.[1,2]



Key insights:

- The **total bioresource potential** reflects the total volume of feedstock available in Australia, **not** the amount that can realistically be converted into usable bioenergy (biogas, biomethane and biofuels).
- In practice, only a portion of this resource is **technically and commercially accessible** due to factors such as collection and transport challenges, low energy density and dispersed supply, resource quality, competing uses (e.g., food), and supply chain costs.
- Nevertheless, the potential to generate energy from these resources is significant and could play a key role in meeting Australia's energy needs.

Key - Bioresource potential:

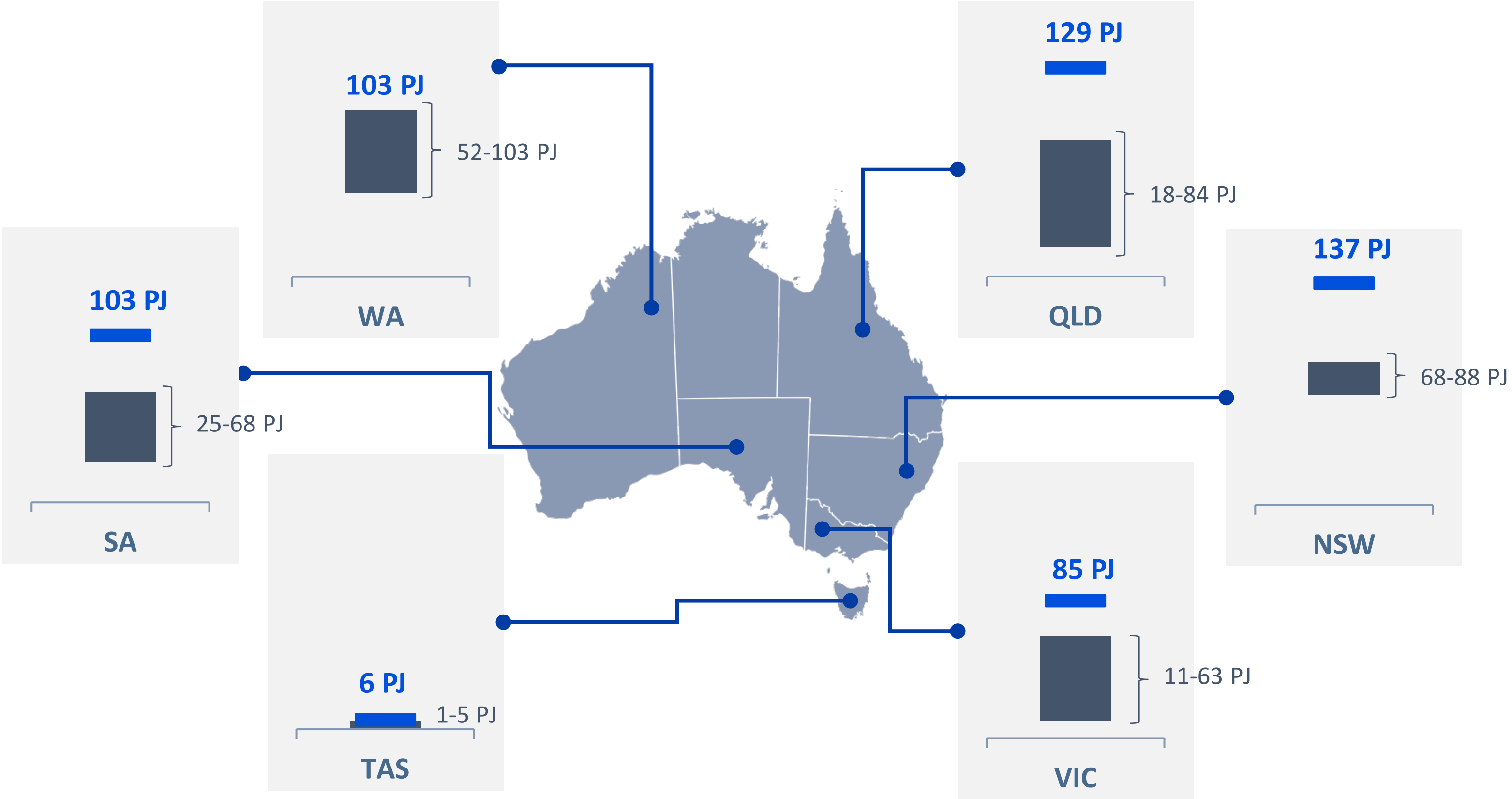
- Waste
- Agriculture
- Forestry

Notes: [1] Additionally, landfill gas potential in each state represents: NSW: ~3.7 PJ, QLD: ~2.5 PJ, SA: ~0.5PJ, TAS: ~0.3 PJ, VIC: ~3.5 PJ, WA: ~1.2 PJ. [2] Excluding Northern Territory due to lack of available data. **Sources:** Australian Biomass for Bioenergy Assessment, 2021; ABARES, 2024; National Waste Reporting Tool, 2023; Blunomy analysis; CSIRO, SAF Roadmap, 2023

Most studies focus on recoverable biomethane potential, with limited analysis of technical potential that could be unlocked

Australia's natural gas consumption is estimated at ~913 PJ p.a.[2].

Technical and recoverable biomethane potential by State[1], p.a.

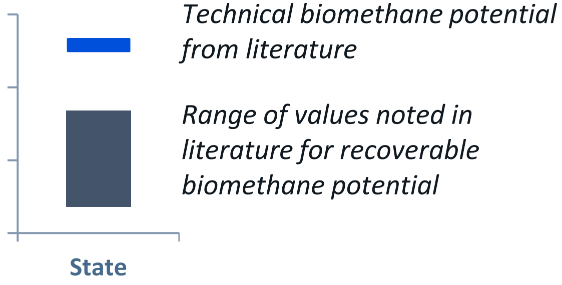


Most reports to date have focused on **recoverable** biomethane potential, with limited public data available on **technical** potential.

However, across the studies reviewed, recoverable estimates consistently fall below technical upper bounds, indicating **misalignment** on maximum potential.

The range in the recoverable figures reflects different **real-world assumptions**, like market, policy, and technical factors, that drive **variation in recovery rates** rather than conflicting findings.

Key:



Notes: A detailed breakdown of the biomethane potential by State can be found in Appendix. Northern Territory is excluded due to lack of available data. WA does not have a technical value available that is consistent with the recoverable values reported in literature. Sources: [1] Biomethane estimates sourced from past reports (See Bibliography section for full list of reports reviewed); [2] Natural gas consumption estimated for eastern and western gas markets, from AEMO's GSOO reports, excluding LNG.

2 Feedstock supply chain

Mapping feedstock sources and streams to their technically suitable bioenergy pathways helps identify those best suited for biomethane

While there is significant bioresource potential overall, not all feedstocks are suitable for every type of fuel or biomethane production. It is therefore essential to distinguish between feedstocks with well-established, uncontested conversion pathways and those with multiple possible bioenergy applications.

By mapping feedstocks by source, stream, and bioenergy pathway, this analysis identifies which feedstocks may become more valuable due to their flexibility across multiple uses and where competition between end-uses may emerge. These points of competition are key to understanding trade-offs and system constraints.

It is important to note that the mapping focuses solely on technical suitability and does not account for market dynamics or policy incentives, which will ultimately influence feedstock allocation. It reflects current technological maturity across bioenergy pathways, excluding emerging developments such as new crops, biomethane-to-SAF conversion, and pre-commercial technologies.

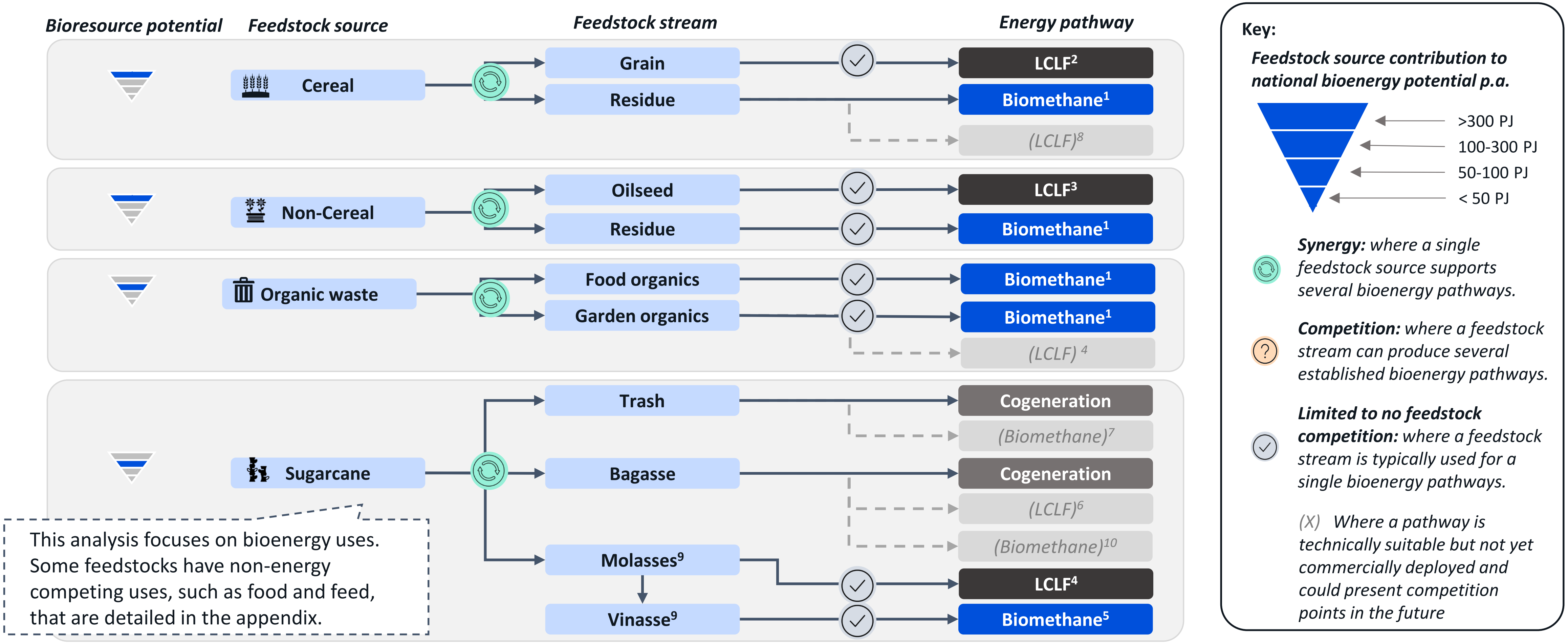
The findings highlight that Australia already has a diverse range of feedstocks well-suited to anaerobic digestion (AD) making biomethane a technically mature, low-risk solution.

Cereal residues, non-cereal residues, sugarcane vinasse, livestock manure, horticultural waste, food and garden organics are considered scalable pathways as they divert waste, are digestible with existing technology and don't compete directly with food production.

However, as feedstock demand grows, and technology progresses, there may be future competition for some feedstocks with LCLF.

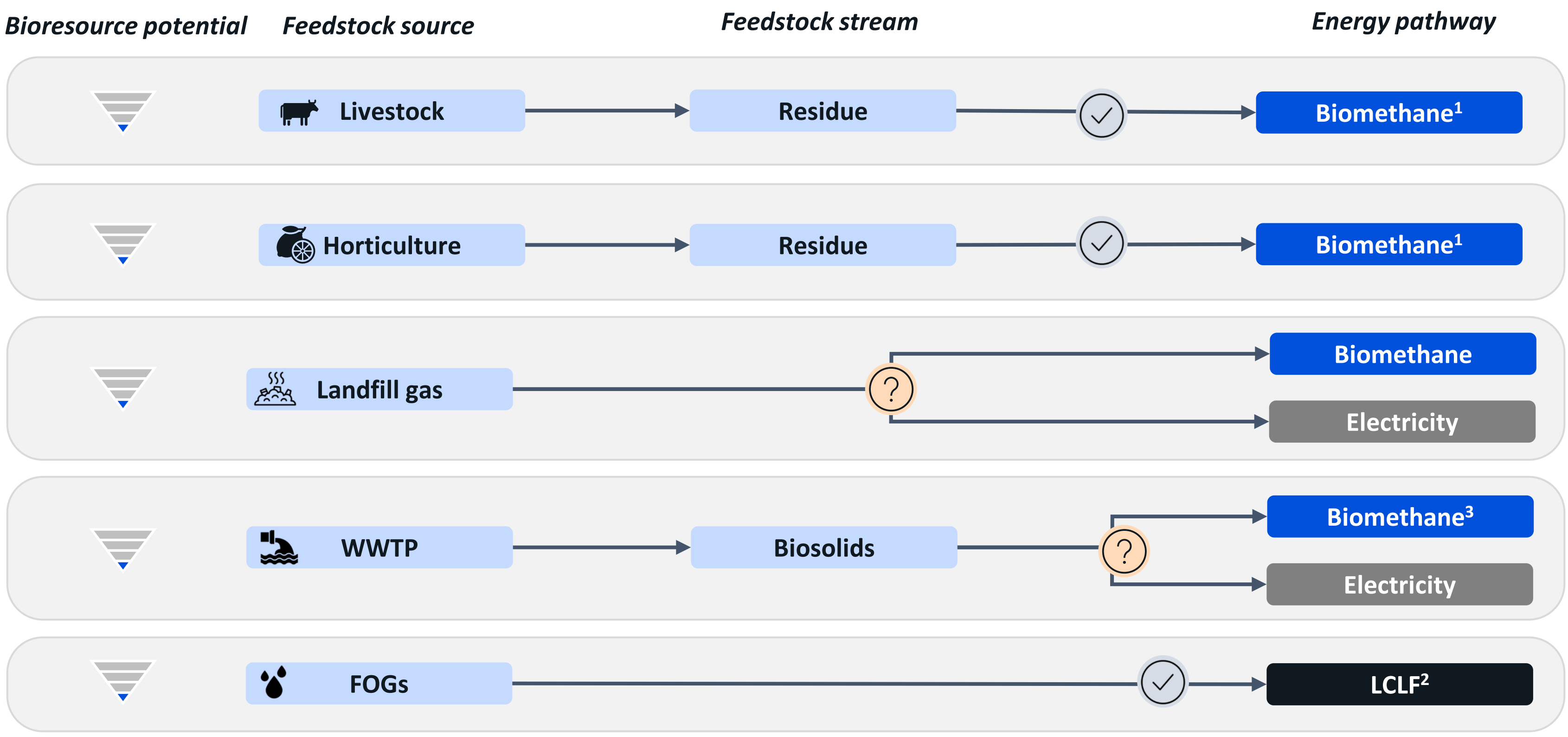
- *Food organics* ✓
- *Non-Cereal residue* ✓
- *Horticulture residue* ✓
- *Garden organics* ✓
- *Sugarcane vinasse* ✓
- *Cereal residue* ✓
- *Livestock residue* ✓

The feedstocks (cereal, non-cereal, organic waste, sugarcane) with highest yield potential are currently synergistic between biomethane and LCLF



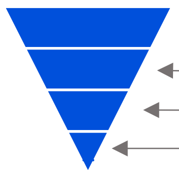
Notes: [1] e.g., BRIE Bioenergy project, GRDF, 2024; [2] E.g., Manildra Shoalhaven facility produces ethanol from wheat starch.[3] e.g., Singapore Refinery, Neste, 2025 [4] e.g., Wilmar's Sarina refinery in Queensland; [5] E.g., Raizen, Brasil; [6] E.g., Licella's Project Swift aims to develop a biorefinery using hydrothermal liquefaction technology to convert sugarcane residues into SAF; [7] E.g., Toyota is developing a pilot project for biomethane production from sugarcane waste (via AD) in Brazil.; [8] E.g., SAFFiRE Renewables' Kansas Biofuel Pilot Plant is using corn stover to produce SAF via ATJ [9] Molasses is often fermented to ethanol, and the resulting vinasse (distillery wastewater) is co-digested with other residues to produce biomethane (e.g., Raizen). [10] International Sugar Association, 2023;

Landfill and wastewater biogas have competing end-uses and are typically shared between biomethane production and electricity generation



Key:

Feedstock source contribution to national bioenergy potential p.a.



Synergy: *where a single feedstock source supports several bioenergy pathways.*

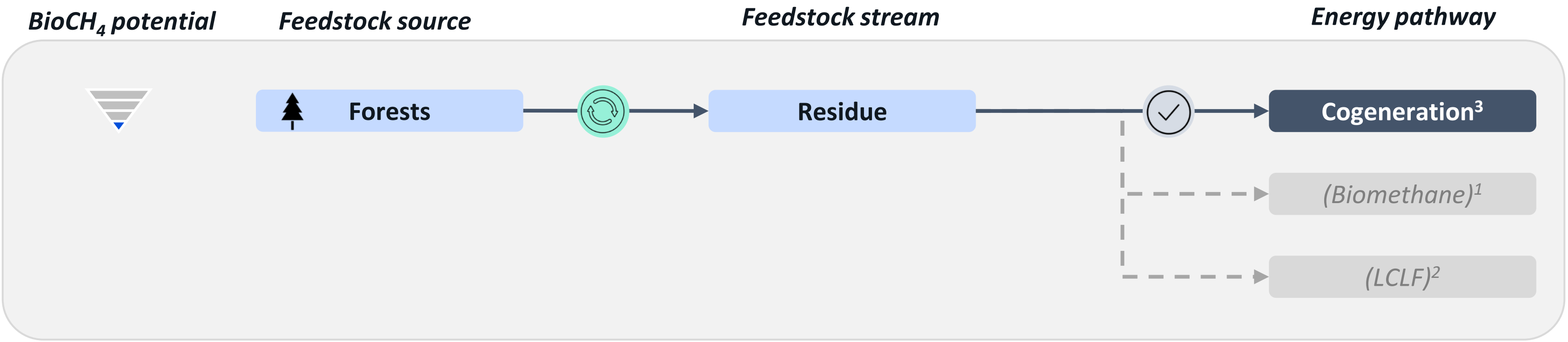
Competition: *where a feedstock stream can produce several established bioenergy pathways.*

Limited to no feedstock competition: *where a feedstock stream is typically used for a single bioenergy pathways.*

(X) Where a pathway is technically suitable but not yet commercially deployed and could present competition points in the future

Notes: [1] e.g., Suez/Engie CVO Lille Project, GRDF, 2024; [2] e.g., Singapore Refinery, Neste, 2025; [3] e.g., Malabar biomethane facility Jemena, 2025; [4] E.g., Velocys can use lignocellulosic and residual waste for SAF production through gasification + FT.

Forest residue is currently being used for cogeneration, with future opportunities for both biomethane and LCLF

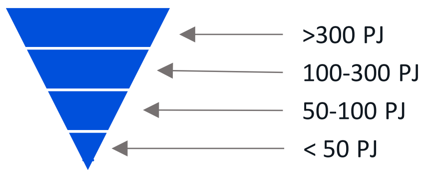


Most studies either exclude forestry residues or assign them a 0% recovery rate, reflecting the assumption that they are unsuitable for biomethane production in current pathways. However, emerging technologies are being developed to produce biomethane and LCLF from forestry residues.

For example, Swindon Advanced Biofuels, based in the United Kingdom, is developing the first commercial gasification demonstrator for biomethane injection using wood waste as the feedstock[1].

Key:

Feedstock source contribution to national bioenergy potential p.a.



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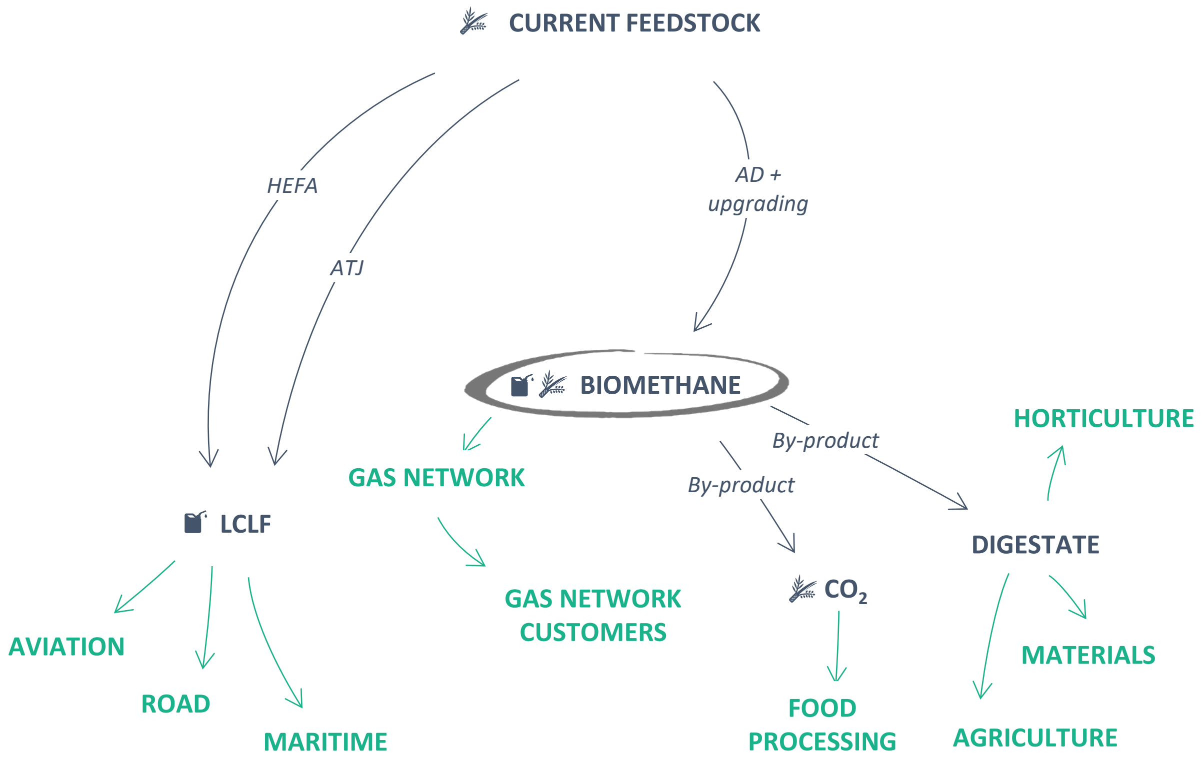
Notes: [1] GRDF, 2024; [2] E.g., Project Speedbird uses Nova Pangaea's technology to convert agricultural waste and wood residue feedstocks into ethanol and SAF. [3] E.g., OneFortyOne Jubilee sawmill will turn wood waste into electricity (in South Australia).

3

Maximising value of existing gas networks

As both a fuel and feedstock, biomethane will play a pivotal role in scaling the LCLF industry and expanding bioenergy pathways

This view reflects existing technologies and proven routes where biomethane can play a central role.



Notes: AD: Anaerobic digestion; ATJ: Alcohol to Jet HEFA: Hydroprocessed Esters and Fatty Acids; FT: Fischer Tropsch; ATR: Autothermal Reforming

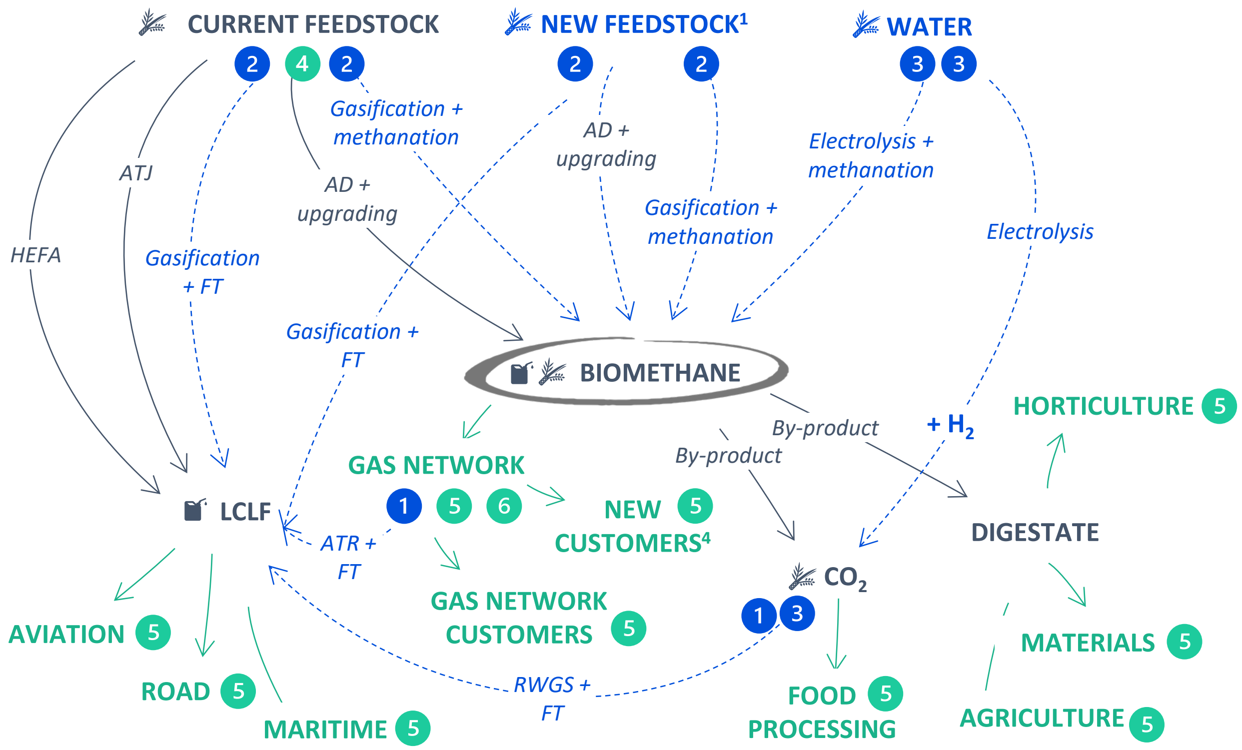
Key: Bioenergy; Feedstock; → End-use sector; → *Established pathway*/**product**

Gas networks can unlock diverse routes to decarbonisation by supplying biomethane to both current gas users and the LCLF sector.

- As previously noted, the current pool of feedstocks shows distinct allocations toward either biomethane production or low-carbon liquid fuels (LCLF).
- Today, biomethane benefits from the advantage of direct distribution through existing gas networks, allowing it to reach current gas consumers efficiently without requiring significant new infrastructure.
- As such, leveraging the dual pathways of direct biomethane distribution and its conversion into LCLFs presents a strategic opportunity to maximise the value of available feedstocks, optimise existing infrastructure, and accelerate decarbonisation across multiple sectors.

Future advances in technology and feedstock supply will unlock pathways supporting the joint development of biomethane and LCLF

Biomethane serves as a key enabler across all bioenergy pathways while also providing broader societal benefits beyond energy supply.



EMERGING TECHNOLOGIES UNLOCK NEW BIOENERGY PATHWAYS

1. **Biomethane serves as a feedstock for LCLF production**, positioning it as a key enabler for decarbonising all sectors beyond its traditional use in power and heat. This process exists using natural gas as feedstock[2].
2. **Gasification enables the use of a wider pool of feedstock** (*i.e., woody, lignocellulosic*) for producing both LCLF and biomethane[3].
3. **Emerging power-to-X (PtX) technologies use renewable electricity, water and CO_2** to generate LCLF or biomethane, creating synergies with the current biomass feedstock pool (*i.e., bioCO_2 as a biomethane byproduct*)

BIOMETHANE DELIVERS SOCIETAL AND SYSTEM-LEVEL BENEFITS

4. **Biomethane enhances waste management outcomes** by converting organic waste streams into renewable energy, thereby reducing landfill use, lowering methane emissions, and supporting circular economy practices.
5. **Biomethane offers benefits across all sectors** (*e.g., residential, commercial, industrial, transport, agricultural*) either as a direct energy source, a feedstock for LCLF, or through valuable byproducts from its production process (*e.g., digestate, CO_2*) that serve both energy and non-energy applications
6. **Biomethane is compatible with existing gas infrastructure,** allowing rapid deployment and cost-effective transport from feedstock sources to end users

Notes: AD: Anaerobic digestion; ATJ: Alcohol to Jet, P2X: Power to Grid, PtL: Power to Liquid; HEFA: Hydroprocessed Esters and Fatty Acids; RWGS: Reverse Water Gas Shift; FT: Fischer Tropsch; ATR: Autothermal Reforming[1] i.e., energy crops, novel crops, and crops grown on marginal land. [2] Shell, GtL [3] Potential from gasification is not accounted for in the potential presented on p. 10; [4] e.g., data centres, distributed power generation

Key: Bioenergy; Feedstock; *Emerging pathway/**product***; *Established pathway/**product***; End-use sector

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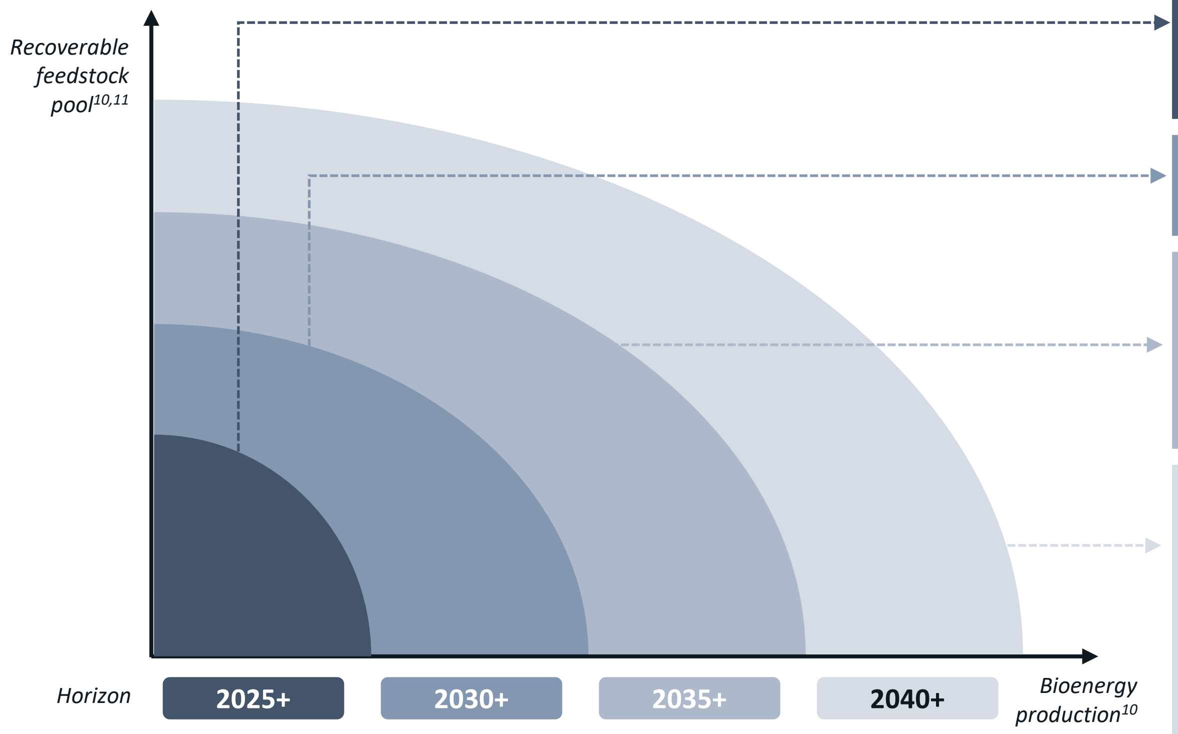
4

Starting the market

As policy, market and technology evolve over time, more feedstock will become accessible for biomethane and LCLF production

The evolution of policy and technology to advance biomethane and LCLF will likely unfold over distinct timeframes, ranging from readily implementable short-term opportunities to more advanced, longer-term innovations.



HORIZON 2025+

Policy support and incentives increase feedstock recovery

- Agricultural and organic residues will be increasingly diverted toward biomethane production.
- In more restricted contexts, such as where AD facilities are not within economic reach, residues may be used for LCLF.
- Fats, oils and greases (e.g., used cooking oil, tallow) will be prioritised for LCLF pathways under targeted conditions.

HORIZON 2030+

Oily feedstock (e.g., canola, tallow) could be diverted away from export markets toward domestic production of LCLF.

HORIZON 2035+

New crops could be cultivated to serve distinct bioenergy pathways.

- Expansion of oilseed cultivation (i.e., more canola acreage, introduction of non-food oil crops like carinata[1]) for LCLF production (via HEFA)
- Fast-growing, non-woody crops (e.g., *switchgrass*, *Napier grass*, or other cover crops)[3] for biomethane (via AD) and LCLF production (via gasification, ATJ)

HORIZON 2040+[5]

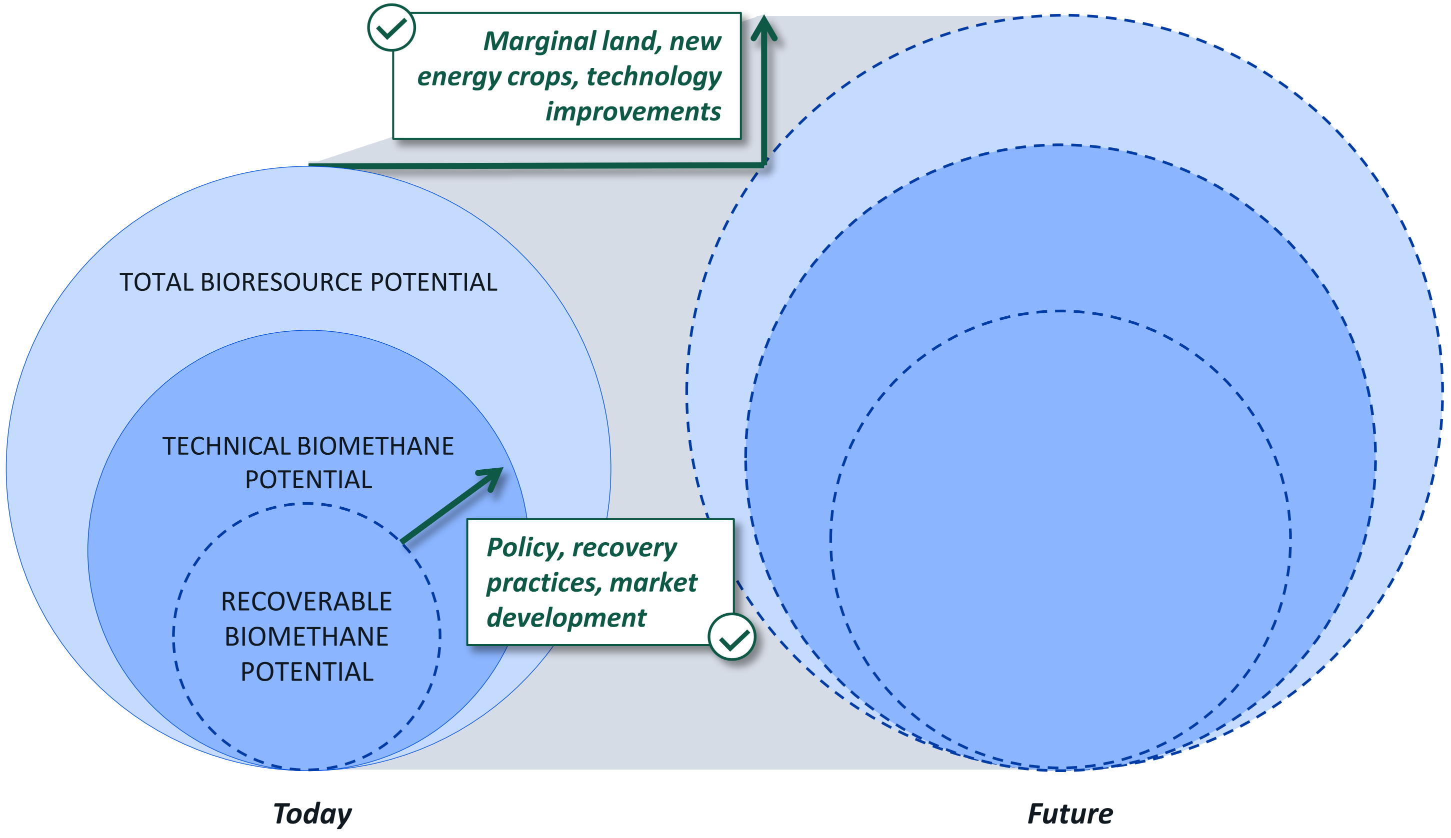
Marginal land presents an opportunity for bioenergy crop (i.e., new and existing) cultivation without competing with food production.

- Certain advanced feedstock crops (e.g., fast-growing grasses, oilseeds) could be grown on lower-quality or underutilised land.
  - Non-food sugary crops (e.g., *blue agave, sweet sorghum*)[4] for LCLF (grain via ATJ) and biomethane (residues via AD) production
  - Short-rotation woody biomass[2,4] for biomethane and LCLF production[6]
- Technology progress enables to increase oil content of oilseed crops[1] for LCLF

Notes: [1] AgRenew, *Australian Renewable Fuels Week*, 2025 [2] CSIRO, 2025; [3] Biome Energy Group, 2025 [4] Bioenergy Australia, 2021 [5] There is currently no fixed timeline for the cultivation of marginal land. While 2040 is provided here as a potential horizon, progress will ultimately depend on policy, market, and infrastructure development. [6] Via gasification and in some cases, AD.[7] AD: anaerobic digestion [8] ATJ: Alcohol to Jet [9] LCLF: low carbon liquid fuels [10] For illustrative purposes only – not indicative of actual volumes. [11] All feedstock types shown in Section 2, and more as new feedstocks emerge over time.

Policy can play a key role in making more of Australia's biomethane potential recoverable

The current view of recoverable and technical biomethane potential is dynamic, with policy actions capable of unlocking greater volumes.



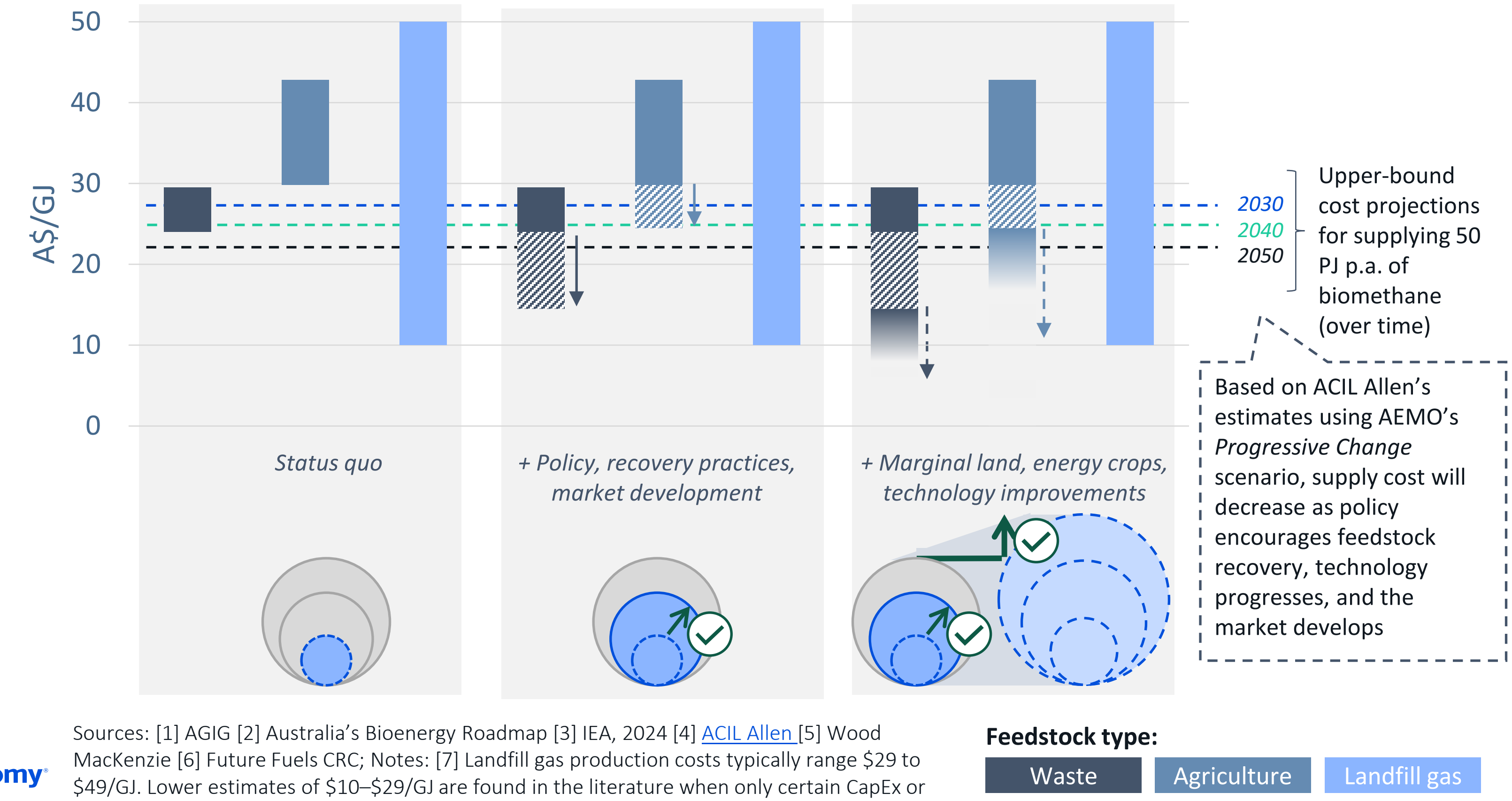
Key insights:

- The biomethane market in Australia remains in its early stages, with many opportunities to **kick-start market development.**
- As of today, **policy** can act as a key catalyst in this evolution by unlocking more of the **technical potential** (i.e., enabling better feedstock recovery, and supporting project development through regulatory, financial, and market-based instruments). In doing so, it can lay the groundwork for a functioning biomethane market.
- Over time, Australia's bioresource potential will grow with ongoing developments in **technology** and **land use**, reshaping the status quo. These advances will enable access to a broader range of feedstocks and **increase the share of bioresources that can be viably recovered** and converted into biomethane.

Expanding the recoverable biomethane potential will push production costs down

Access to more feedstock reduces biomethane production costs by enabling economies of scale and improving efficiencies.

Biomethane production costs, by feedstock type, A$/GJ [1, 2, 3, 4, 5, 6, 7, 8]



Sources: [1] AGIG [2] Australia's Bioenergy Roadmap [3] IEA, 2024 [4] ACIL Allen [5] Wood MacKenzie [6] Future Fuels CRC; Notes: [7] Landfill gas production costs typically range $29 to $49/GJ. Lower estimates of $10–$29/GJ are found in the literature when only certain CapEx or incremental/marginal costs are considered (ACIL Allen). [8] Values have been adjusted for inflation.

Key insights:

- The **cost of producing biomethane varies widely across projects** due to differences in scale, feedstock availability, infrastructure, local policy settings, and commercial arrangements, making it difficult to define a single representative cost value; this analysis therefore presents **indicative cost ranges** based on publicly available sources.
- Currently, biomethane's production cost ranges from **AUD $10 to $50 per GJ**, depending on feedstock type. Policy support, improved feedstock recovery, and market development can **lower production costs,** making more biomethane **commercially viable.**
- Different volumes of biomethane are expected to become available at **varying price points, decreasing over time as policy and markets evolve.** The first 50 PJ of annual supply could be delivered at:
  - 10 to 27 $/GJ in 2030
  - 10 to 25 $/GJ in 2040
  - 10 to 23 $/GJ in 2050

5

Conclusion

Biomethane offers Australia a scalable decarbonisation pathway, enabling system-wide synergies across the energy value chain (1/2)

1 Biomethane today can support Australia's 2030 and 2035 decarbonisation targets

Biomethane can play a key role in supporting Australia's decarbonisation goals by providing an immediate, low-emissions alternative to fossil gas using existing infrastructure. There are ~400 PJ of recoverable biomethane potential today that can be used towards those objectives.

It also enhances waste management outcomes by converting organic waste streams into renewable energy, thereby reducing landfill use, lowering methane emissions, and supporting circular economy practices.

2 Many existing feedstocks are well-suited for biomethane, and can be scaled up now

A review of current bioresource potential in Australia indicates that volumes are significant, offering a strong foundation for both biomethane and LCLF production.

3 Biomethane is a "drop-in" fuel that can be distributed through existing gas networks

Today, biomethane benefits from the advantage of direct distribution through existing gas networks, allowing it to reach current gas network customers efficiently without requiring significant new infrastructure.

As new feedstocks become available, gas networks can also supply biomethane to new demands such as LCLF and power generation.

This allows for its rapid deployment and cost-effective transport from feedstock sources to end users.

Biomethane offers Australia a scalable decarbonisation pathway, enabling system-wide synergies across the energy value chain (2/2)

4 Biomethane plays a complementary role in the scale-up of LCLF.

The production of biomethane is complementary to LCLF pathways, offering synergies through shared infrastructure, co-products, and even serving as a direct feedstock input in some low-carbon fuel processes.

These interactions strengthen the broader renewable fuel supply chain and enhance system-wide sustainability and efficiency.

5 There are opportunities to increase the technical feedstock potential.

Feedstock supply is not static, it can expand significantly through technical innovation, targeted policy support, and the use of marginal land.

- Oily feedstocks (e.g., canola, tallow) could shift from exports to local LCLF production.
- New crops may be cultivated for specific bioenergy uses.
- Marginal land offers space for bioenergy crops without competing with food.

6 Policy support will reduce costs and enable market development.

Policy support for biomethane development and better feedstock access will result in lower production costs, making more biomethane commercially viable.

Advances in waste collection, processing technologies, and resource management, alongside enabling regulations, can unlock greater volumes of usable feedstock, improving both the economic and environmental viability of biomethane and fuel pathways.

6

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7

Appendix

Many feedstocks have established applications in industries such as food, feed and exports

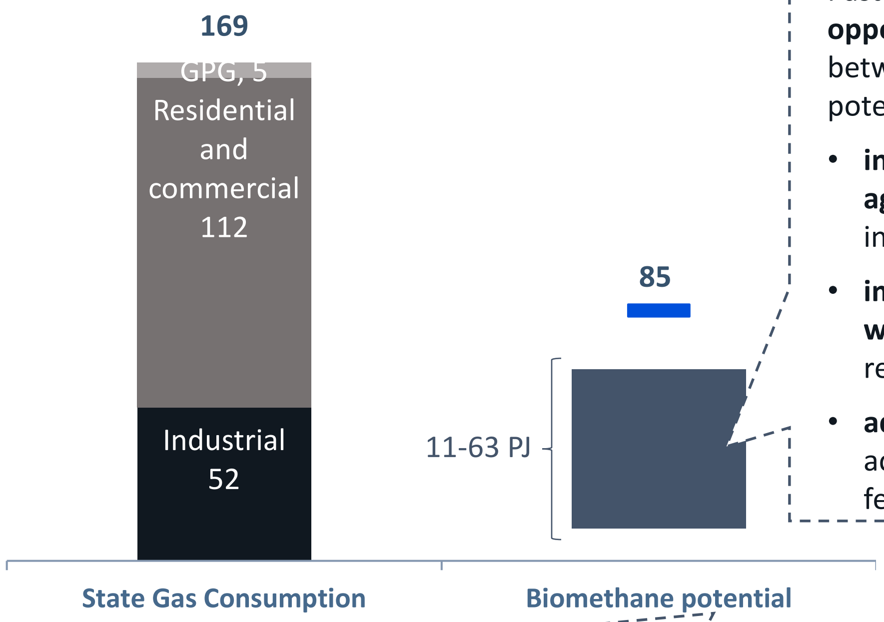
Feedstock source	Feedstock stream	Competing uses (other than bioenergy)
Cereal	Grain	Food
	Residue	Retention on ground, animal bedding, animal feed
Non-Cereal	Oilseed	Food, exports for biofuel production abroad
	Residue	Retention on ground, animal bedding, animal feed
Sugarcane	Trash	Retention on ground, composting, animal bedding, animal feed
	Bagasse	Materials(e.g., food packaging, tableware), pulp and paper
	Molasses	Animal feed, food applications (e.g., spirits, yeast industries), fertiliser[1]
	Vinasse	Animal feed, fertiliser[1]
Livestock	Residue	Fertiliser[1]
Horticulture	Residue	Composting, mulch, animal feed
Organic waste	Food organics	Landfill, composting
	Garden organics	Landfill, composting
Landfill gas		Flaring
WWTP	Biosolids	Land application, soil conditioning
Fats, oils and grease		Exports for biofuel production abroad, animal feed
Forestry	Residue	Landscaping market, animal bedding, materials

Notes: [1] Fertiliser doesn't directly compete with current practices, as AD produces digestates which can be returned to the same land (i.e., used as fertilizer) where the feedstock is sourced.

Agricultural crop residues and livestock residues drive VIC's recoverable biomethane potential

VIC's technical biomethane potential represents ~50% of the State's gas consumption.

Biomethane potential vs. 2025 fossil gas consumption, PJ p.a



Past studies have identified **opportunities** to bridge the gap between **recoverable** and **technical** potential, such as:

- **increasing the collection of agricultural residues** (e.g., through incentives)
- **improving the diversion of organic waste** from landfill (e.g., through regulation)
- **advancing technology** to accommodate a wider range of feedstocks (e.g., forestry residues)

The recoverable potential is generally assessed from the ABBA[2] dataset. For Victoria, there were data anomalies in the dataset that are being addressed and could result in a higher resource potential[1].

Key:

- *Technical biomethane potential from literature* (blue line)
- *Range of values noted in literature for recoverable biomethane potential* (dark box)

Key insights:

Across the literature, there is broad consensus on the feedstock composition and its contribution to the State's biomethane potential.

Agricultural crop residue (e.g., cereal and non-cereal residue) is the **primary source of recoverable biomethane potential** in Victoria.

Livestock residue (e.g., manure) is the second largest contributor to VIC's biomethane potential.

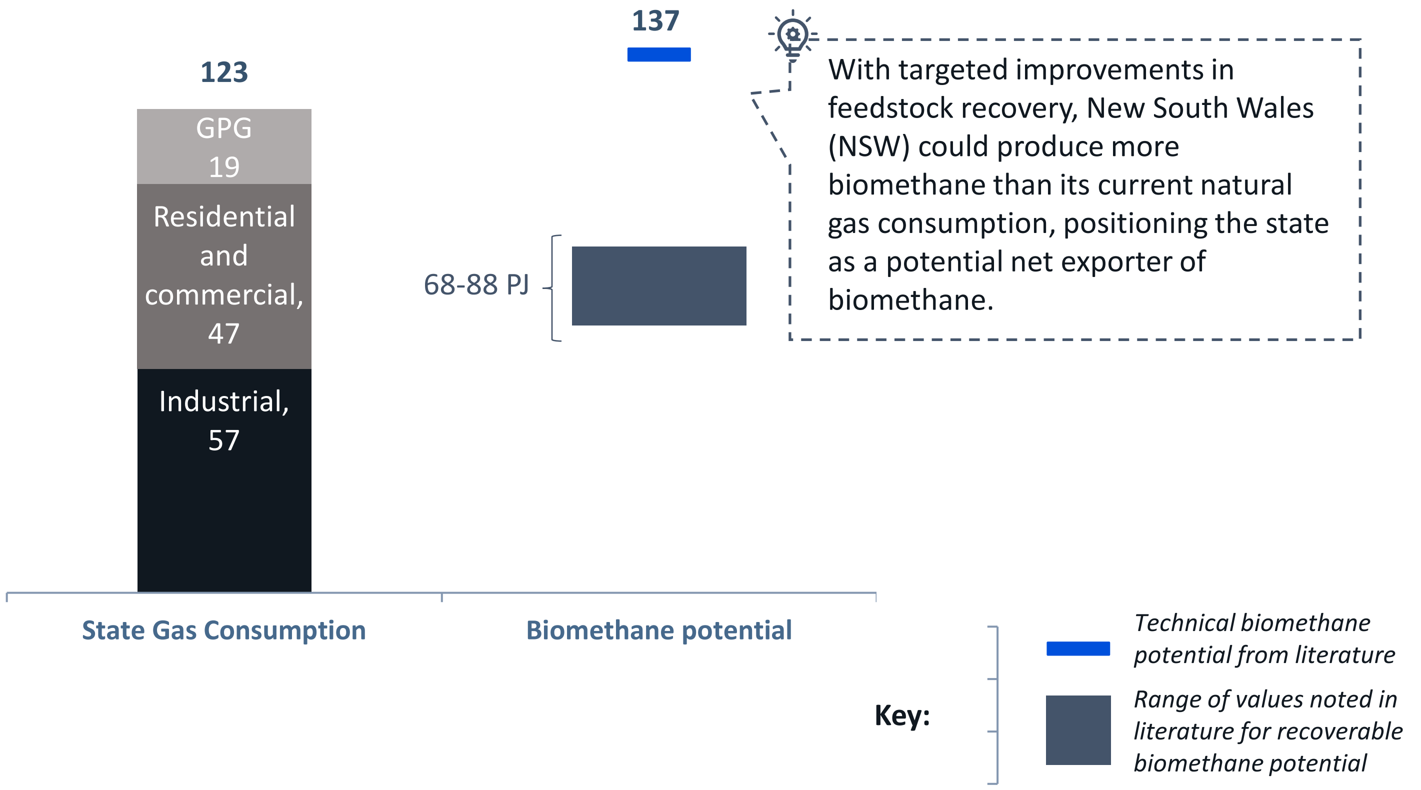
Organic waste is also consistently highlighted as a critical feedstock for biomethane production in Victoria.

Source: Gas Statement of Opportunities, AEMO, 2024; Notes: [1] As mentioned in the ABBA final report – as part of its data continuity plan, ABBA is "working with a consultant to correct the LGA level data anomalies, provide an update of prioritised biomass datasets and upgrade the Victorian biomass estimates model and manual."; [2] ABBA: Australian Biomass for Bioenergy Assessment

Cereal, non-cereal, and livestock residues drive NSW's recoverable biomethane potential

NSW's technical biomethane potential represents ~111% of the State's gas consumption.

Biomethane potential vs. 2025 fossil gas consumption, PJ p.a



With targeted improvements in feedstock recovery, New South Wales (NSW) could produce more biomethane than its current natural gas consumption, positioning the state as a potential net exporter of biomethane.

Key insights:

Across the literature, there is broad consensus on the feedstock composition and its contribution to the State's biomethane potential.

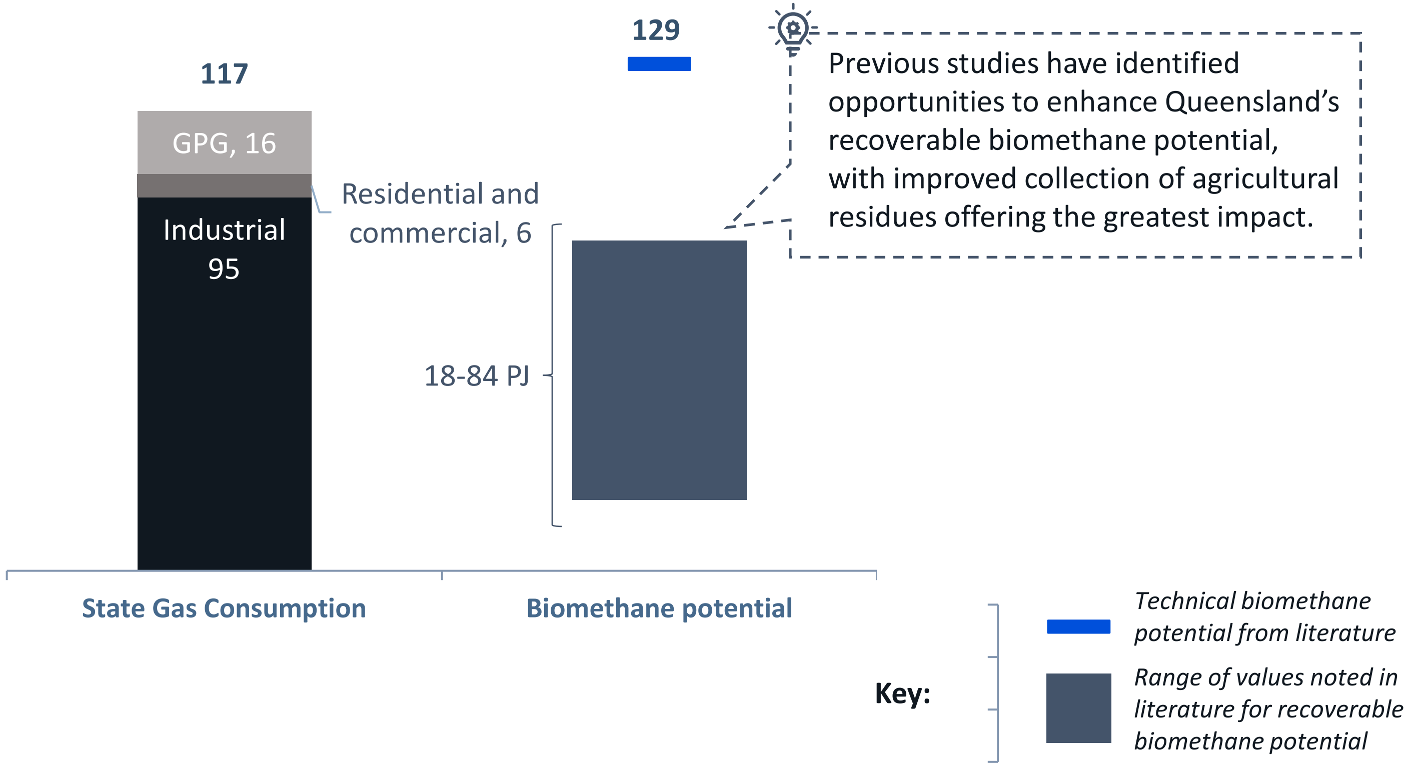
- **Most of NSW's biomethane potential originates from its expansive cropping industry,** which produces agricultural residues from both cereal and non-cereal crops.
- **Livestock residues** make up the second most critical feedstock to NSW's recoverable biogas production.
- **NSW is also home to several major urban centres that generate significant volumes of food and organic waste,** further enhancing the State's biomethane production potential.

Sources: Gas Statement of Opportunities, AEMO, 2024;

Sugarcane residues and livestock residues drive QLD's recoverable biomethane potential

QLD's technical biomethane potential represents ~111% of the State's gas consumption.

Biomethane potential vs. 2025 fossil gas consumption, PJ p.a[1]



Key insights:

Across the literature, there is broad consensus on the feedstock composition and its contribution to the State's biomethane potential.

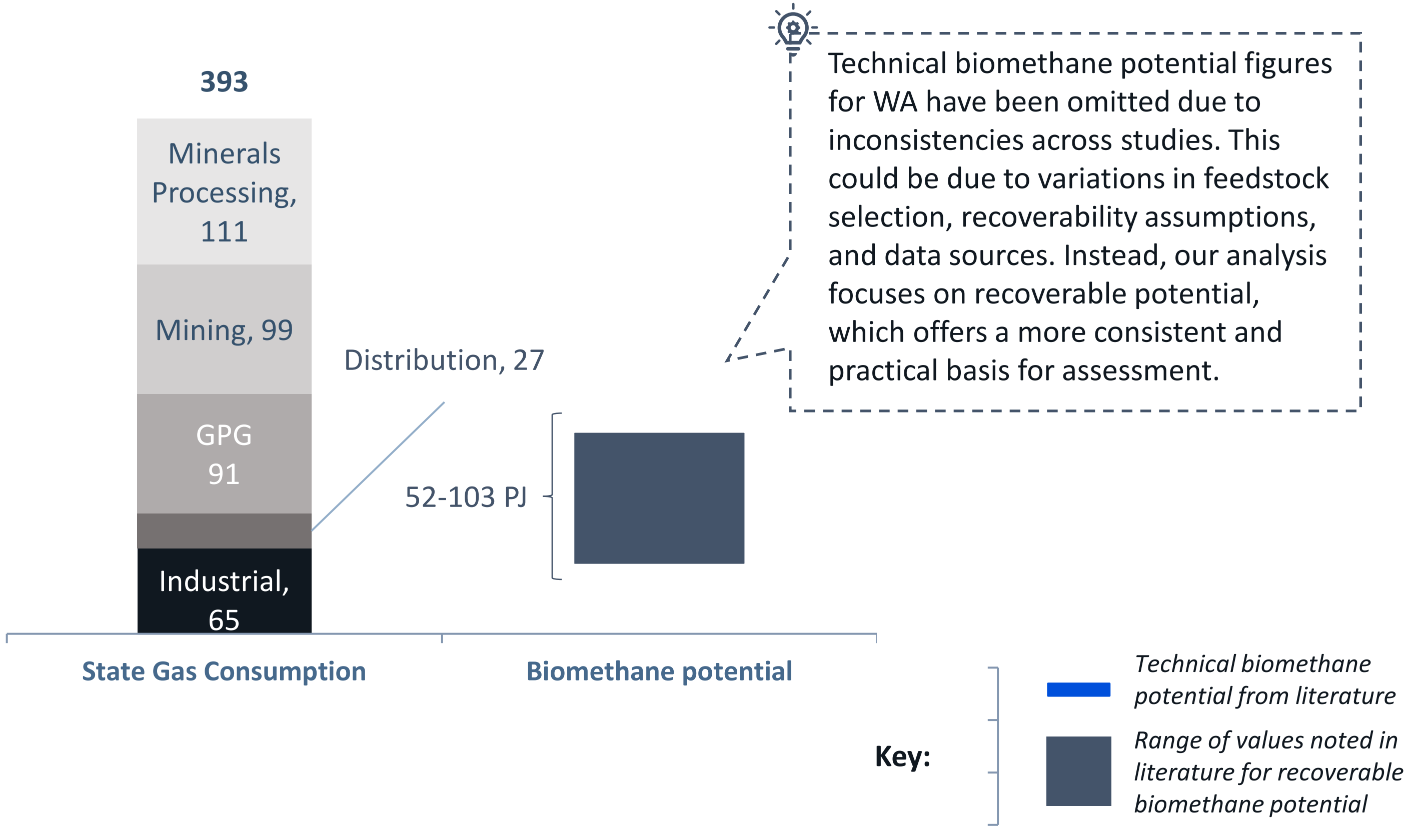
- **The majority of QLD's biomethane potential originates from agricultural waste,** particularly from sugarcane production which produces sugarcane trash, bagasse and vinasse.
- **Livestock residues (e.g., manure) are considered the second largest contributor to QLD's biomethane potential.**

Sources: [1] Excludes LNG, Gas Statement of Opportunities, AEMO, 2024; [2] Blunomy and AGIG, 2024

Cereal/non-cereal residues and organic waste drive WA's recoverable biomethane potential

WA's upper recoverable biomethane potential represents ~26% of State gas consumption.

Biomethane potential vs. 2024 domestic gas consumption, PJ p.a[1]



Key insights:

Across the literature, there is broad consensus on the feedstock composition and its contribution to the State's biomethane potential.

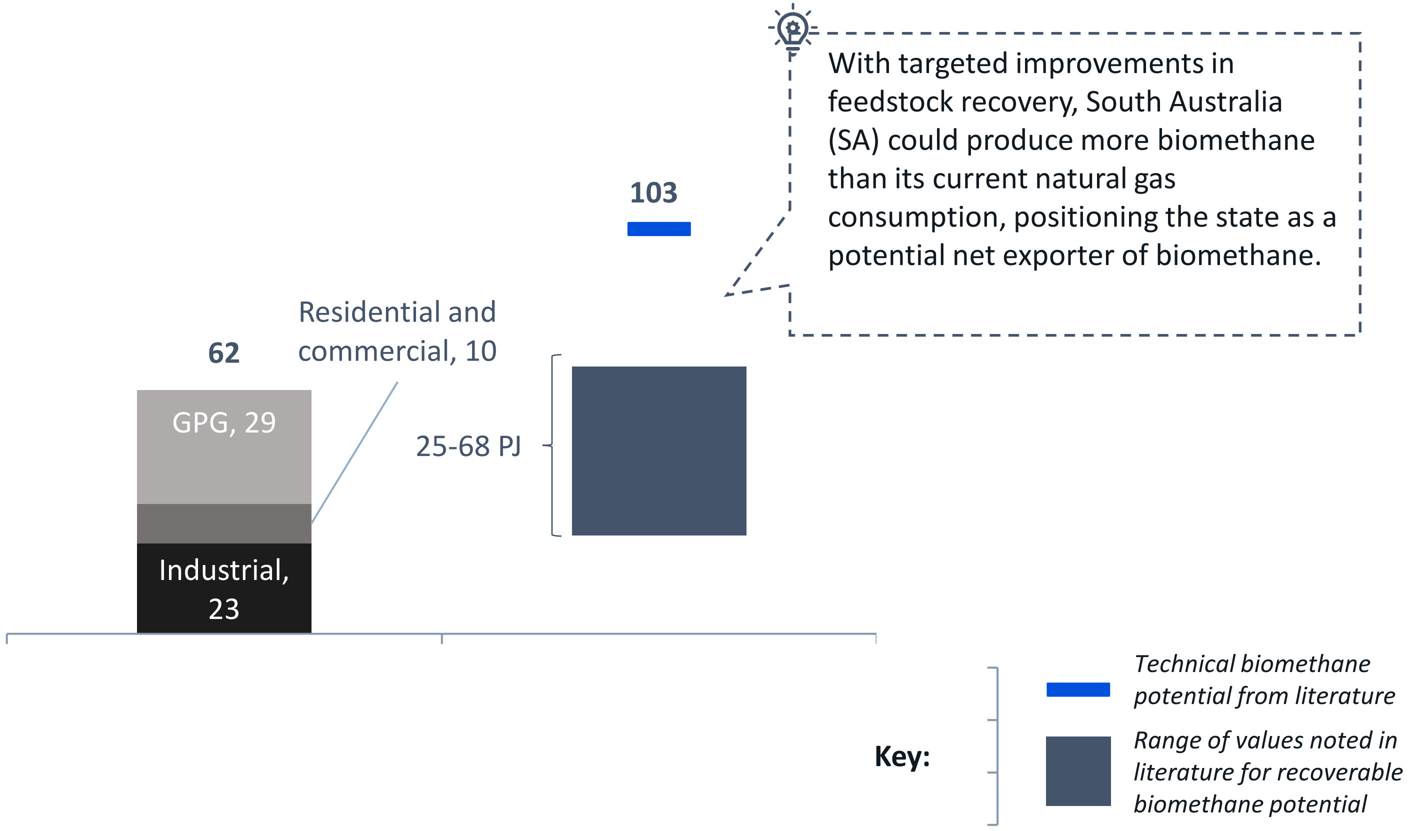
- **The majority of WA's biomethane potential originates from the cropping sector,** which produces cereal and non-cereal crop residues (e.g., straw and chaff from wheat, barley, canola) in large volumes.
- **WA also generates significant volumes of organic waste** which further enhance the State's recoverable biomethane potential

Sources: [1] Excludes LNG, WA GSOO, Figure 8, AEMO, 2024

Agricultural residues and C&I organic waste drive SA's recoverable biomethane potential

SA's technical biomethane potential represents ~66% of State gas consumption.

Biomethane potential vs. fossil gas consumption, PJ p.a[1]



Key insights:

Across the literature, there is broad consensus on the feedstock composition and its contribution to the State's biomethane potential.

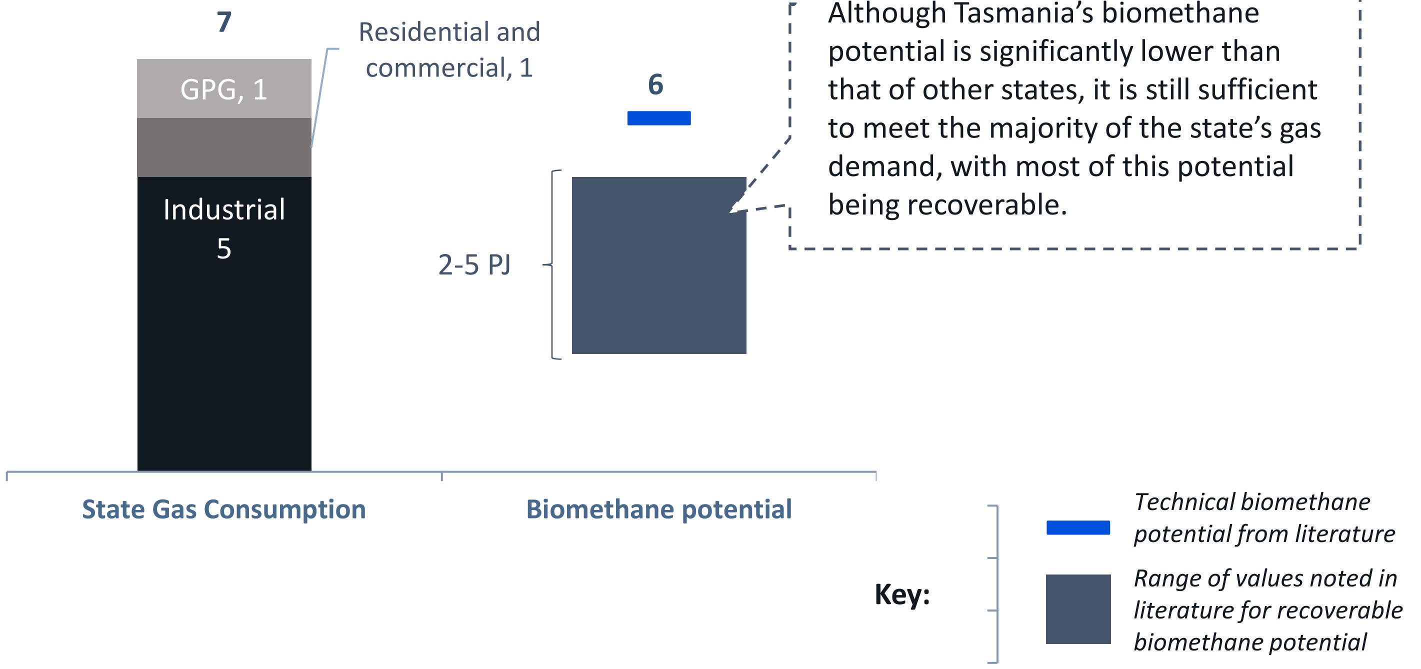
- **The majority of SA's biomethane potential originates from the agricultural waste, particularly from broadacre cropping,** which produces residues such as straw and chaff.
- **Livestock industries also produce large volumes of waste** such as livestock manure.
- **Organic waste** particularly from C&I is also a key contributor to SA's recoverable biomethane potential.

Sources: [1] Excludes LNG, Gas Statement of Opportunities, AEMO, 2024

Cereal, non-cereal and livestock residues drive TAS's recoverable biomethane potential

TAS's technical biomethane potential represents ~86% of State gas consumption.

Biomethane potential vs. 2025 fossil gas consumption, PJ p.a[1]



Although Tasmania's biomethane potential is significantly lower than that of other states, it is still sufficient to meet the majority of the state's gas demand, with most of this potential being recoverable.

Key insights:

Across the literature, there is broad consensus on the feedstock composition and its contribution to the State's biomethane potential.

In Tasmania, the primary source of recoverable biomethane potential is agricultural crop residue, including both cereal and non-cereal types.

Livestock waste, such as manure, is the second largest contributor.

Sources: [1] Excludes LNG, Gas Statement of Opportunities, AEMO, 2024

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