



IEA Bioenergy  
Technology Collaboration Programme

## Summary Series

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# Opportunities and Priorities for a Low-Carbon Liquid Fuel Industry in Australia

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Full report available at: <https://www.csiro.au/-/media/Missions/TNZ/Opportunities-and-priorities-for-a-Low-Carbon-Liquid-Fuel-Industry.pdf>

## Overview

As Australia transitions toward net zero emissions, the country faces both challenges and opportunities in decarbonising hard-to-abate sectors such as transport, aviation, and mining. The global shift towards Low-Carbon Liquid Fuels (LCLFs) presents an opportunity for Australia to leverage its abundant biomass resources and renewable energy potential. The report outlines key areas for development, barriers to industry growth, and policy considerations that can support a sustainable LCLF industry.

## KEY FINDINGS

- Australia could achieve over 33 MtCO<sub>2</sub>-e per year in emissions abatement by 2035 through LCLF production.
- Developing a domestic LCLF industry could contribute between AUD \$6 billion to \$12 billion annually in economic benefits.
- The feedstock supply base includes agricultural and forestry residues, emerging biomass sources, and green hydrogen integration.
- LCLFs are a drop-in solution that can replace fossil fuels without requiring major infrastructure changes.

## FEEDSTOCK POTENTIAL AND REGIONAL OPPORTUNITIES

The report identifies several biomass sources, including:

- Existing feedstocks: Canola, used cooking oil, tallow, and municipal solid waste.

- Emerging sources: Short rotation tree crops, agricultural residues, lignocellulosic biomass, and energy cane.
- Future potential: Algae, power-to-liquids (PtL), and genetically modified bioenergy crops.

### Estimated Biomass and Liquid Fuel Production Potential

The following table provides an estimate of Australia's potential biomass and liquid fuel production capacity, highlighting the significant role of emerging and future feedstocks in meeting national decarbonisation goals.

**Table 1: Estimated potential biomass and liquid fuel production**

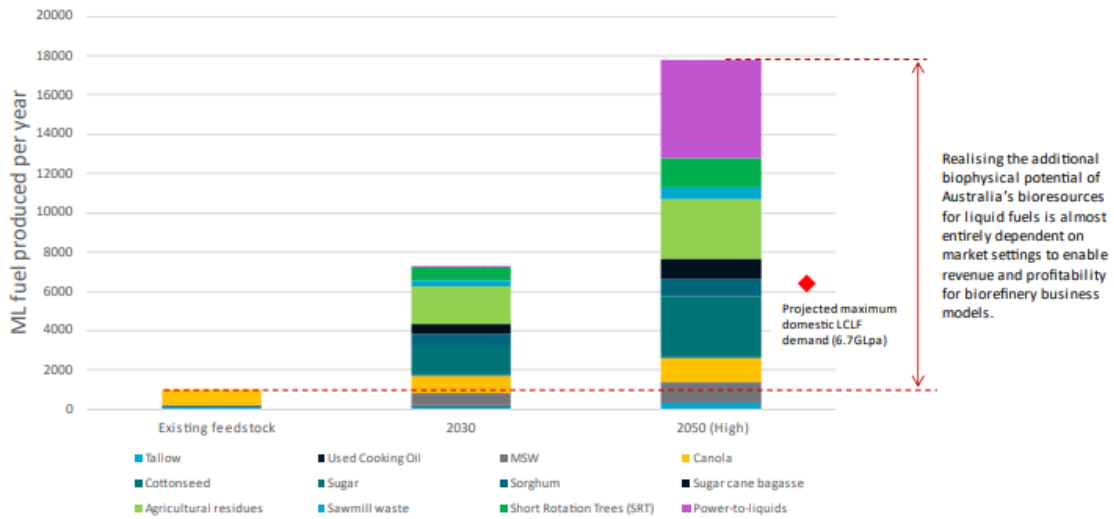
Feedstock category	Feedstock type	Production pathway (conversion efficiency)	2030				2050			
			Estimated annual feedstock production volume (Mtpa)	Estimated annual LCLF production volumes (MLpa)	% of domestic LCLF demand met	Abatement potential (MtCO <sub>2</sub> -e)	Estimated annual feedstock production volume (Mtpa)	Estimated annual LCLF production volumes (MLpa)	% of domestic LCLF demand met (high)	Abatement potential (MtCO <sub>2</sub> -e)
			LOW				HIGH			
<b>Carbohydrates</b>										
	Sugar cane bagasse	GFT (10%)	10	505	10	1.20	20	1010	19	2.40
	Sugar	ATJ (60%)	5	1516	29	3.71	10	3031	56	7.41
	Sorghum	ATJ (60%)	2	606	12	1.48	3	909	17	2.22
<b>Waste</b>										
	Tallow	HEFA (60%)	0.5	152	3	0.38	1	303	6	0.76
	Used cooking oil (UCO)	HEFA (60%)	0.1	30	1	0.08	0.3	91	2	0.24
	MSW	GFT (10%)	13	657	13	2.02	20	1010	19	3.10
<b>Lignocellulosic</b>										
	Agricultural residues	GFT (10%)	37	1869	36	5.58	60	3031	56	9.05
	Sawmill waste	GFT (10%)	6	303	6	0.90	12	606	11	1.80
	Short Rotation Trees (SRT)	GFT (10%)	14	707	14	1.81	30	1516	28	3.87
<b>Oilseeds</b>										
	Canola	HEFA (60%)	7	849	16	1.41	10	1212	22	2.02
	Cottonseed	HEFA (60%)	1	45	1	0.08	2	91	2	0.15
<b>Power-to-liquids</b>				3				5000*	92	+4750*
<b>Total (estimated)</b>			<b>96</b>	<b>7243</b>	<b>141</b>	<b>19</b>	<b>168</b>	<b>17812</b>	<b>327</b>	<b>33</b>

*Note: Production volumes and abatement potential from Power-to-Liquids pathways are highly dependent on technology development and incentives.*

### Potential for LCLF Production by Feedstock Type

The following chart illustrates the potential contribution of different feedstocks to Australia's low-carbon liquid fuel production, emphasizing the importance of both existing and emerging resources.

**Chart 1: Potential for LCLF production volumes by different feedstocks**



Several regional opportunities for biofuel production are highlighted:

- Fitzroy Catchment (QLD): High biomass production potential for bio-oil conversion.
- Green Triangle (VIC & SA): Established forestry industry suitable for lignocellulosic biofuel production.
- Western Australia: Agroforestry with mallee eucalypts can provide sustainable feedstocks and co-benefits like carbon sequestration.

## CHALLENGES AND BARRIERS

Key challenges hindering industry growth include:

- High production costs compared to fossil fuels.
- Market access barriers, such as certification requirements (CORSA, ISCC, RSB).
- Infrastructure limitations for feedstock transport and refining.
- Competing land use for food production, forestry, and biodiversity conservation.

## POLICY AND INDUSTRY SUPPORT

To enable industry growth, the report recommends:

- Targeted investment in new technologies and pilot projects.
- Incentives for feedstock diversification and sustainable farming practices.
- Blending mandates for certified low carbon liquid fuels in hard to electrify transport subsectors.
- Integration with green hydrogen to improve fuel yield and efficiency.
- Stronger policy frameworks aligned with international markets.

## Conclusion

Australia stands at a pivotal moment to establish a sovereign LCLF industry that enhances energy security, drives regional economic growth, and contributes to global decarbonisation. Strategic investment in feedstock development, refining technologies, and supportive policy mechanisms will be key to realising this opportunity.