The Superpower Institute

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2025 Cleaner Fuels Program Consultation

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About The Superpower Institute

The Superpower Institute's (TSI's) mission is to help Australia seize the extraordinary economic opportunities of the post-carbon world.

A net zero Australian economy will reduce global emissions by just over 1 per cent. But if Australia successfully seizes the economic advantage in exporting zero emissions goods, this can create an opportunity for full employment with rising incomes for a growing population sustained over more than a generation, and reduce global emissions by up to 10 per cent.

Renowned economist Ross Garnaut and economic public policy expert Rod Sims have joined forces through The Superpower Institute, to focus on practical research and policy to unlock this opportunity. The Institute specialises in the policy settings and market incentives needed to make Australia an economic superpower and provides practical knowledge to governments and industry to realise this opportunity.

TSI works across the building blocks of the superpower economy including: renewable energy, green hydrogen, land carbon and minerals processing; the potential zero carbon export products including green fuels, green iron and green aluminium; and the enablers of this economy including economic and fiscal policy, trade policy and regional development.

https://www.superpowerinstitute.com.au/.

Introduction

The Superpower Institute (TSI) welcomes the opportunity to contribute to the Australian Government's Cleaner Fuels Program (CFP) Consultation. We strongly support the program's objectives to catalyse domestic production, accelerate decarbonisation in hard-to-electrify sectors, create new job and economic opportunities, and improve Australia's liquid fuel security.

As outlined in TSI's submission to the 2024 Low Carbon Liquid Fuels consultation process and in recent reports by CSIRO and the CEFC, Australia has a number of sources of comparative advantage including a large land mass, abundant renewable resources, large and diverse feedstocks, competitive agricultural and forestry industries, and world-class science.

These advantages position us to build an internationally competitive, socially trusted Low Carbon Liquid Fuel (LCLF) industry—that strengthens our economy and global influence in the net zero era. These industries are central to onshore high-value manufacturing aligned with Future Made in Australia (FMIA) to help secure Australia's economic prosperity and security.

TSI analysis shows LCLF, as part of the Australian Superpower trade, could reduce global emissions by between 1.1% and 1.9% by 2050. Total Australian LCLF export revenue could reach $187 billion per annum on today's level of production, or $357 billion on forecast 2060 levels of production.[1]

Our submission covers 6 topics (with responses to questions in Appendix 1):

1. Market failures inhibiting development of LCLF industries
2. Eligible fuels
3. Supporting commercial projects
4. Sustainability needs to be a focus
5. Appropriate certification of fuels
6. Broader supporting policy

The CFP is intended to catalyse LCLF production in Australia and deploy capital at a commercial scale. The Government may attract investment by addressing market failures with the CFP, but it will fail to catalyse production without broader policy architecture and a demand measure.

[1] The Superpower Institute, *The New Energy Trade*, 2024.

1. Market failures

A market-led approach is required to realise economic potential. This requires government action to correct market failures so that Australia can become a Superpower of the low-carbon world economy. Government policy will be critical to address these three market failures.

1. Implementing a carbon price or other policies to simulate the effect of a carbon price.

2. Supporting innovation where positive knowledge spillovers exist.

3. Government contribution towards essential shared infrastructure.

TSI has identified a fourth area in which government action is needed:

4. Diplomacy to make the case that Australia's green exports can contribute to our trade partners' industrial and decarbonisation needs.

1. Carbon pricing

A carbon price incentivises investment in lower carbon products by closing the gap between the production costs of fossil-fuel and green-based production. Combustion of conventional fuels creates carbon emissions which, absent a carbon price, imposes negative externalities (costs) on society. These costs are not reflected in the price of these fuels, nor the products and services in which they are inputs (e.g. travel, transportation, delivery of final products to consumers). This distorts the market and creates an inefficient advantage for fossil-fuel based products.

A carbon price addresses this by ensuring fossil fuels face the costs of the negative externality. With a carbon price, green versions of the product can therefore compete with a 'green premium' in place. An alternative is a production tax credit which would also address the market distortion created by the missing carbon price.

2. Innovation spillovers

Developing the LCLF industry in Australia will require costly and risky innovations which will generate broad benefits. This 'innovation spillover' is a positive externality which should be properly incentivised by the

government through channels such as the Cleaner Fuels Program, FMIA Innovation Fund, National Reconstruction Fund (NRF), ARENA and the Clean Energy Finance Corporation (CEFC) to assist the first-movers of new technologies and projects.

3. Critical infrastructure

Government investment in critical infrastructure will be essential to unlock opportunities in Australia. Investments in common user infrastructure to underpin the development of bioenergy industries will not be provided at optimal scale if funded by a single commercial entity. The infrastructure required is a natural monopoly in nature, and having the infrastructure in place ahead of demand is critical to incentivise the investment in production. There is therefore a role for the government in funding and building this infrastructure.

4. Diplomacy

Finally, the government has a diplomatic role in advocating for action to price carbon internationally and to persuade our trade partners of the opportunity presented by LCLF production in Australia. Australian-produced LCLFs can be both a secure and sustainable source of fuel as well as a meaningful contributor to decarbonisation for our trade partners. This is hugely important to the Australian national interest.

Nations with strong demand policies such as those within Europe (e.g. Germany) and geographically closer countries with small land masses but high populations and considerable transport demand such as Singapore, Japan and South Korea, would be excellent places for Australia to develop strong diplomatic trade relationships with to supply LCLFs once Australia has met its own domestic demand.

The Australian government should seek to understand how to best maximise trade of LCLFs with these countries as well as bunkering needs for goods from our closest neighbours in south-east and east Asia.

Research by The Superpower Institute puts the economic opportunity from domestic production of green shipping fuels to meet its own demand and export low carbon goods to other nations is huge at around $43 billion per annum in total revenue. Australia has the capacity and natural strategic

advantages to achieve this scale in an equitable and sustainable way. This can make important contributions to both the national security and the economic development arms of Future Made in Australia.

Together with other green export opportunities, LCLFs can underpin prosperity in Australia for decades to come and make a significant contribution to global carbon emissions reduction.

2. Eligible fuels

The program should be pathway and technology agnostic, focusing on driving outcomes and open to all LCLFs that meet the eligibility criteria. Eligibility should be shaped so the CFP supports fuels that (1) genuinely reduce emissions, (2) align with Australia's comparative advantages, and (3) build sustainable domestic capacity through multiple projects.

LCLF should be prioritised for sectors that are genuinely hard to electrify and have limited alternative decarbonisation options. Aviation and shipping are high-priority uses, given the lack of near-term alternatives, and support for projects that serve these sectors should be given priority.

For road transport (including mining and long haul), electrification is the most efficient decarbonisation pathway. Given the energy efficiency of electrification and increasing energy density of batteries, electric trucks of all sizes will soon be cost competitive on a lifecycle basis. However, in the short to medium term TSI acknowledges that the life of road transport assets means there will be a long tail of diesel use.

Prioritisation should be framed around the relative decarbonisation needs and strategic importance of the various LCLF sectors (e.g. aviation, shipping, heavy freight, mining), rather than elevating a single fuel type in isolation which might result in higher costs and weaker access to finance and feedstock, despite its legitimate use case.

However, investing in more refined fuels (e.g. SAF for aviation) will in effect bring on an amount of Renewable Diesel (RD) to supply land transport, mining, agriculture and defence, as all the main drop in production pathways (HEFA, FT, AtJ, Co-processing) will typically produce RD as a co-product. The same would not necessarily be true in reverse.

Finally, both sustainable aviation fuel and green shipping fuels are selling into international markets. These markets are underpinned by demand policy in other jurisdictions and large companies that are investing in decarbonisation solutions. As such, these products are more likely to attract foreign investment, in addition to a price premium. This price premium strengthens the case for support for these fuel types.

Recommendation: Support provided under the Cleaner Fuels Program should prioritise SAF and Green Shipping Fuels

3. Supporting commercial projects

As noted above, the LCLF industry in Australia will require support to overcome several market failures. The CFP is well placed to address the lack of carbon pricing and to reward innovation spillovers.

The emissions that come from the combustion of fossil liquid fuels create negative effects and consequences for nature and society that are not reflected in the cost of producing these fuels. In the absence of pricing the negative externalities, a production credit which would also address the market distortion created by the missing carbon price.

'Innovation spillovers' are the positive externalities which follow costly and risky investments that generate broad benefits. These benefits include technology learnings, supply chain development, workforce upskilling, derisking finance and market formation. The government should incentivise these investments and recognise the benefits to the broader industry through the CFP, as well as the FMIA Innovation Fund, NRF, ARENA and CEFC.

TSI recognises that, at this time, the CFP is a fixed funding pool with a set of objectives to maximise the impact of these funds. With that in mind, we note the importance of designing the form of support mechanism carefully to balance competing considerations. These include the need to support a range of projects, to diversify risk and to have a large enough impact to make particular projects commercially viable.

On balance, we recommend the Government should structure the CFP as a **contract for difference,** where the Government pays the difference between a project's costs and an appropriate reference price, with payments varying depending on costs and market conditions. This design recognises the variety of pathways, feedstocks and end uses that this program could cover. It also allows for variation in the profile of funds, so support can be optimised and risks and upsides shared.

The challenge with the design of the fund is that $1.1 billion over 10 years is not enough to establish production at a commercial scale in isolation. Using rough numbers, a production credit of $0.75/L (less than half the cost gap to fossil fuels) would support 150 million litres a year over 10 years of production, barely covering the production of a small "commercial-scale" facility. In absence of other policies, LCLF producers will struggle to find offtakers willing to pay this premium.

A contract for difference can provide more flexibility in support for projects. However, the Government will also need to develop demand-based measures or raise revenue to increase funding for the policy to a suitable level (see point 6).

The Government should also consider providing part of the funding as capital grants, depending on the proponent's needs. Capital grants can be a more appropriate vehicle for addressing the innovation market failure described above.

In the meantime, the Government should bolster the CFP with a suite of finance tools available through its Special Investment Vehicles, including concessional debt, equity co-investment, guarantees and capital grants for first-of-a-kind facilities. If ARENA is administering this program given their involvement in the consultation, they should coordinate with the CEFC to provide debt, equity and credit enhancements for large LCLF projects. The

Government should also re-make ACCU methods for LCLF fuel use[23] and feedstock cultivation[4] to provide additional income sources along the supply chain.

This would also fall into the National Reconstruction Fund's remit to support domestic manufacturing, value-add and supply-chain capability through equity and quasi-equity investments. Further, in support of their fuel security policy aims, Defence should provide offtake agreements through the Defence Energy Transition Office (DETO). Finally, the Government needs to ensure there is a credible product certification scheme to unlock Australian exports (see point 5).

Recommendation: Structure the CFP as a contract for difference, and make use of broader Government supports to maximise value.

4. Sustainability is the Key Merit Criteria

All the merit criteria are worthy and well targeted but the criteria that is unique to LCLF (beyond other green industries) is the focus on land use and sustainability. Any product that uses biomass needs to be developed sustainably and in line with community expectations.

Some "low-carbon" fuels are higher-emitting than fossil fuels if they drive expansion of oilseeds or sugar crops into high-carbon landscapes. Land use change emissions for some crop-based biofuels are large enough to offset, or even exceed, the direct greenhouse gas savings relative to fossil fuels, creating a "carbon debt" that can take decades to centuries to repay.

Properly valuing soil carbon accumulation encourages sustainable land management practices such as cover cropping, diversified rotations and agroforestry that improve productivity, drought resilience and biodiversity alongside emissions reductions.

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[2] Land and sea transport method https://www.dcceew.gov.au/climate-change/emissions-reduction/accu-scheme/methods-closed/land-and-sea-transport

[3] Aviation method https://www.dcceew.gov.au/climate-change/emissions-reduction/accu-scheme/methods-closed/aviation

[4] Afforestation/Reforestation methods https://cer.gov.au/schemes/australian-carbon-credit-unit-scheme/accu-scheme-methods/reforestation-and-afforestation-method-closed

Australia's certification scheme may not account for land use emissions and it won't consider sustainability (see point 5). This risks inadvertent negative environmental and social outcomes. While Australia has some protections in existing environmental legislation, a Review[5] from the Royal Society linked biofuel land-use change not only to higher GHGs but also to soil degradation, water stress and ecosystem decline including:

- Biodiversity and native vegetation (deforestation, habitat fragmentation).
- Soil health and water (erosion, nutrient depletion, altered hydrology).
- Food security concerns (land competition, food price pressures).

There are international examples, in particular the California Low Carbon Fuel Standard, where the initial policy settings did not adequately assess the emissions associated with certain fuels (in particular LNG) and locked in investment which will mean decades of counter-productive use.

Of most concern in Australia, is that, contrary to many other places in the world, water availability is the limiting factor in plant growth. Caution must be placed particularly on how we manage our water resources to maintain natural resources and existing access to water in other industries, and meet the needs of new biomass feedstocks.

In the Australia context, especially if the Government is considering further demand side policy, it is vitally important that the conditions of these policies are right from the beginning to avoid locking in unsustainable production.

Conversely, prioritising feedstocks that are either wastes or have useful co-benefits will not only provide the greatest emissions reduction benefits but also maximise their economic value. As such, in considering support for different fuel types and projects, greater weighting should be considered for these projects, as per the ARENA LCA Guidelines.

Recommendation: Highlight sustainability criteria, and give extra weighting to projects with sustainability accreditation (e.g. ISCC)

[5] https://royalsocietypublishing.org/rspa/article/476/2243/20200351/80990/Environmental-sustainability-of-biofuels-a

5. Appropriate Certification of Fuels

The Australian Product Guarantee of Origin (PGO) scheme is being positioned as the core framework to quantify lifecycle emissions intensity of LCLF. Its treatment of land-sector emissions from feedstocks will determine whether Australian fuels are genuinely low-carbon – and whether they are recognised as such in key export markets.

The value of having an Australia-based certification scheme is threefold: 1) credibly and consistently certifying emissions embodied in otherwise hard to validate products, 2) recognising the unique circumstances of Australian biomass and fuel production which can be a source of competitive advantage, and 3) unlocking international markets with a scheme that can integrate with international frameworks. As currently designed, the GO scheme does not comprehensively fulfill these objectives for LCLF.

The main issue is misalignment with international schemes (EU RED III, LCFS, ISCC, RSB, CORSIA) by excluding land use emissions with neither Direct Land Use Change (DLUC) default calculation or a means to address Indirect Land Use Change (ILUC). Left unaddressed, this would limit both export opportunities for Australian producers, protection for high carbon ecosystems and social licence risk that could devalue our LCLFs.

The design misses an opportunity to increase agricultural productivity and value by incentivising second generation feedstocks. Perversely, it would disincentivise cover/break crops, waste feedstocks and marginal land use, minimising abatement benefits and encouraging production of fuels that will not be recognised under international frameworks.

Failing to represent the emissions associated with land use change would limit the effectiveness of the GO scheme, and may act as a barrier rather than enabler of the industry. Excluding LUC would not accurately capture Australia's advantage in both agricultural productivity and available land, which would otherwise make investment attractive.

Recommendation: The Product Guarantee of Origin (PGO) for low carbon liquid fuels (LCLFs) should:

1. **Include regional feedstock default carbon intensity (CI) emission factors for direct land use change (DLUC) emissions.**
2. **Include risk-based criteria (for example with reference to the ISCC methodology) to address indirect land use change (ILUC) emissions.**
3. **Measure and include default emission savings from soil carbon accumulation for Australian LCLF pathways.**
4. **Provide the option for Fuel Producers to undertake a life cycle assessment (LCA) to generate a project-specific CI for their fuels.**
5. **Enable Producers to attest for the land sector DLUC emissions data on behalf of their upstream suppliers, *OR***
6. ***If 5 is not preferred*, amend the Act[6] to include Feedstock Aggregators as Registered GO Participants, so they can submit auditable data.**

6. Broader supporting policy

The Cleaner Fuels Program is a promising expansion of the Government's existing support for low carbon fuels. However, the program is clearly not enough to sustain the industry on its own, outside of a few projects.

As such, the Government will need to either implement an accompanying demand side mechanism or implement a policy to raise revenue to allow for a larger support package. Further, existing policies need to be tweaked to align with the Government emissions objectives for clean fuels.

The most effective policy to support the CFP's impact would be to introduce a carbon price.[7] Carbon pricing would incentivise investment in lower carbon products by closing some of the gap between fossil and non-fossil

[6] the Renewable Energy (Guarantee of Origin Scheme) Act 2024

[7] TSI will publish a report recommending a form of carbon price in late January 2026.

liquid fuels and provide the revenue to fund the policies to support the uptake of LCLFs.

It would also reflect the costs of carbon emissions and address the inefficient advantage fossil-fuel based products currently experience. A carbon price addresses this advantage by ensuring fossil fuels face the costs of their negative externalities. With a carbon price, green versions of the product can therefore compete with a 'green premium' in place.

In addition to a carbon price, the Government should introduce a market based mechanism to drive demand and send a clear signal to investors. As noted in the eligible fuels section, the priority should be to bring on production of aviation and shipping fuels. As such, the Government should implement a carbon intensity standard for aviation fuel to create demand and provide the investment certainty needed to crowd in private investment and stand up complex supply chains.

To further manage these supply chains, any scheme should include the capacity to trade carbon credits to meet obligations. This should also be extended out to a book and claim scheme, which would enable entities to purchase abatement for their scope 3 emissions.

There are also existing policies the Government should reform. The first should be to remake the ACCU methods *(detailed in point 3)* to allow LCLF production another source of income and allow LCLF abatement to be accounted for in existing decarbonisation policies.

The Government should also remove or reform the Fuel Tax Credit, which currently acts as a disincentive to decarbonise activities that currently use diesel fuel. This reform would align with the policy logic of introducing a carbon price, as outlined above. Analysis by Climate Energy Finance has shown the Fuel Tax Credit is the equivalent of $140/tCO2e carbon subsidy[8].

The final reform would be to condition the Fuel Security Services Payment on a transition LCLF production, or make the funding hypothecated for this payment available to be LCLF production support.

[8] https://climateenergyfinance.org/wp-content/uploads/2025/08/CEF_Transition-Tax-Incentive-Report-FINAL_20August2025.pdf

Recommendations: The Government should implement a carbon price, a demand side mechanism for transport emissions, and adjust existing policies to align with the Government's objectives

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Appendix 1: Answers to specified questions

1. Eligible Fuels

Question 1.1: *Which LCLF should be eligible under the program and why?*

The program should be pathway and technology agnostic, focusing on driving outcomes and open to all LCLFs that meet the eligibility criteria. Eligibility should be shaped so the CFP supports fuels that (1) genuinely reduce emissions, (2) align with Australia's comparative advantages, and (3) build sustainable domestic capacity through multiple projects.

Question 1.2: *Should certain types of LCLF be prioritised over others?*

a. *Should LCLF suitable for particular sectors or uses be prioritised? For example, should sustainable aviation fuel be prioritised over renewable diesel?*

LCLF should be prioritised for sectors that are genuinely hard to electrify and have limited alternative decarbonisation options. Aviation and shipping are clearly high-priority uses, given the lack of viable near-term alternatives and Australia's reliance on air and sea connectivity for tourism and trade. These two sectors also have well recognised sectoral decarbonisation pathways and global policies driving demand including CORSIA, ReFuelEU and the IMO Net Zero Framework.

b. *Should LCLF for certain sectors or uses be de-prioritised due to other viable decarbonisation pathways?*

Other sectors should not necessarily be de-prioritised as production of Renewable Diesel is complementary to SAF as a co-product of several production pathways and provides a fuel security benefit for Australia.

However, for road transport (including mining and long haul), electrification is the most efficient decarbonisation pathway. Electrification is approximately three times more energy efficient compared to the production of LCLF, due to more direct conversion of renewable energy to the drivetrain and reduced losses in the conversion steps. Therefore, where feasible, electrification is the cheapest and best solution. Electric trucks of all sizes will soon be cost competitive on a lifecycle basis.

However, in the short to medium term TSI acknowledges that the life of road transport assets means there will be a long tail of diesel use. Policy makers

should consider technology roadmaps. As battery density improves over time, electrification will be increasingly attractive for ground-based transport including long distance trucking and mining, but the fleet will take a long time to turnover, and so will require some abatement from diesel.

c. *What market impacts are anticipated by influencing prioritisation of particular fuel types?*

The prioritised sector, e.g. aviation will see:

- Stronger investment signals and bankability.
- Faster scale-up.
- Incentivised infrastructure investment.
- Feedstock competition and price effects.

Sectors and fuel types that are not prioritised may remain stuck at pilot scale, facing higher costs and weaker access to finance and feedstock. Prioritisation should be framed around the relative decarbonisation needs and strategic importance of the various LCLF sectors (e.g. aviation, shipping, heavy freight, mining), rather than elevating a single fuel type in isolation.

However, investing in more refined fuels (e.g. SAF for aviation) will in effect bring on an amount of RD to supply land transport, mining, agriculture and defence, as all the main drop in production pathways (HEFA, FT, AtJ, Co-processing) will typically produce RD as a co-product. The same would not necessarily be true in reverse.

2. Type of Production Support

Question 2.1: *Should the production credit be a fixed amount per litre of production, or a variable amount that depends on the market price of LCLF?*

a. *Are there any potential benefits, risks or constraints considering the two different production credit options?*

Contract for Difference

Potential benefits:

- Alignment and calibration to market conditions.
- The government and producers share price risk.
- Better fit once there's real market price discovery.

Potential risks:

- Uncertain reference price definition as there is no single, liquid "international LCLF price" but various markets and fuel types.
- Complexity and administrative burden with continuous collection of market data, index calculation, certified sales and prices vs the index.

Fixed Production Support

Potential benefits:

- Simple to administer and understand.
- Clear investment guidance and very bankable
- Government can cap volumes or total budget per round

Potential risks:

- Over- or under-compensation over time.
- Weak link to actual market conditions.
- Hard to fit right subsidy across fuel uses, feedstocks and production pathways

b. What outcomes do you think can be delivered with the available funding?

With $1.1 billion funding, a fixed production credit of $0.75/L (less than half the cost gap) would support 1.5 billion litres of SAF, or 150 million litres over 10 years of production.

Considering two examples of LCLF projects under development: Project Ulysses, by Jet Zero, in Queensland is aiming to produce around 115 million litres of SAF, and Portland Renewable Fuels, by HAMR, in Victoria is targeting around 380 million litres of green methanol in Victoria. Therefore, the current $1.1 billion could support 1 to 2 commercial projects for up to 10 years of production.

More projects could be supported with lower levels of funding, if this program was supported by a demand side mechanism. Rather than the Government trying to subsidise a few facilities until they are competitive, a mechanism to support demand, such as a carbon intensity fuel standard or SAF mandate, would reduce the risk of investing in projects, reducing the level of production support required to make a project competitive.

Additionally, the Government should institute a carbon pricing scheme to ensure fossil fuels face the costs of the negative externality. It would close the gap between fossil and non-fossil liquid fuels, and increase the fiscal space for more support.

c. *What type of mechanism provides the greatest investment certainty or level of bankability to projects?*

A simple, legislated $/L uplift for 10+ years is easy for banks to model and trust, which might be better suited to a thin, early market. But given the fixed funding pool

Contract for Difference with a credible reference price is best for bankability because it locks in a known total price per litre which means that lenders can underwrite a very stable revenue stream.

However, it relies on setting a strike price. Since there is currently no robust, transparent "international LCLF price" for most pathways, an unstable or contested reference index could introduce basis risk, which could reduce bankability.

d. *How can this support be structured to prevent substantial upside to producers?*

To prevent windfall profits while maintaining investment certainty, the Government should introduce CfDs that taper as market prices rise or costs fall, with clear caps on eligible volumes and robust transparency requirements. Alternatively support can be delivered through competitively auctioned, price-responsive production credits, so producers bid the minimum credit they need or support could be capped by volume limits, such as annual eligible litres per project.

e. *How do you consider pricing for LCLF will be set over the short-medium term and longer term? Will pricing be matched to a premium on equivalent fossil fuel or price of imported LCLF or be on a carbon abatement basis?*

LCLF prices are anchored by the underlying cost of feedstock and energy. In the short to medium term, volatility in those inputs will mainly be reflected in the size of the premium required over fossil fuels and the level of public support needed to make projects bankable.

Over time, as markets and policy frameworks mature, comparative advantage in LCLF will sit with regions and pathways that can access

low-cost, sustainable feedstocks and low-carbon energy, driving down both the absolute fuel price and the implied cost of emissions abatement.

To accelerate the progression of LCLF pricing based on the carbon abatement value of each pathway (measured on a lifecycle basis), the Government should implement a Carbon Intensity Fuel Standard. This would progressively penalise fossil fuels through carbon pricing or performance standards.

Question 2.2: *To deliver the policy intent of the Program while maximising the value for taxpayers, do you agree that projects with the lowest cost should be prioritised under the Program, with the cost being measured either as per unit of LCLF produced or as per unit of carbon emissions abated?*

Projects with the lowest levelised cost will be the most competitive as they are the most likely to progress to FID and begin production in the near term. The Government should definitely measure this by the cost per unit of carbon abated.

However, the Cleaner Fuels policy should also recognise the risk of lock-in, and support feedstocks and technology with larger scale-up potential and the potential for lower costs in the longer term.

Question 2.3: *Should the production credit be linked to the quantum of LCLF produced, or the carbon emissions saving potential of the fuel?*

The support provided (be it a production credit or contract for difference) should be linked to the carbon emissions saving as measured on a lifecycle basis, including direct land use change. This design links the credit to the intended outcome of reduced emissions, rewards best practise producers and reflects how customers value the product.

Question 2.4: *What are your views on the cost to deploy LCLF domestically compared to internationally? Is there a local premium for domestic production?*

In the near term, the cost to deploy LCLFs produced in Australia is likely to be higher than both fossil fuels and imported LCLFs from larger, more mature overseas refineries, particularly where those producers benefit from substantial foreign subsidies.

This implies a 'local premium' will be required if Australia wishes to develop sovereign LCLF production capability rather than exporting feedstocks and importing refined fuels. The CFP could reasonably attempt to close this gap.

Closing this cost premium can be justified by fuel security, regional value-add and stronger sustainability control but should be delivered through competitive, time-bound, CI-based production incentives that drive costs down over time.

However, if the CFP just closes the local premium cost gap, there will be no market formation in Australia, as there is little incentive to purchase it.

Question 2.5: *Should the total value of production credits be capped for each project? If yes, what should the capped amount be and why?*

The objective of the Cleaner Fuels Program is to catalyse the domestic industry, which relies on projects achieving commercial success.

There's a balance between providing sufficient support to ensure viability for first movers and spreading support across multiple facilities and pathways. While a reasonable design could limit any single project to about 30% of the total program envelope, there is a real risk that explicit caps would mean no projects proceed.

If the Government wanted to retain some flexibility they could publish guidance that they are aiming to support 2-3 projects, rather than setting hard caps. This could provide enough support for bankable, at-scale projects, while avoiding excessive concentration of public support in a single facility.

Question 2.6: *Should production be focused on domestic supply only or should export also be permitted? What impact could restrictions have for projects or the market?*

Production should not be limited to domestic supply only. Export should be permitted to enable projects to reach scale, diversify offtake risk and position Australia as a clean fuel exporter. At least in the short term, there is no incentive for domestic users to buy the fuel, so exporting could make more commercial sense.

However, government support (e.g. production credits) should be contingent on clear domestic benefits – such as long-term offtake agreements with Australian users or a minimum share of production offered into the domestic market – to ensure we do not simply export low-carbon molecules while continuing to import the bulk of our fuel needs.

Overly tight export restrictions would likely reduce project bankability and slow industry growth, while a balanced approach can deliver both fuel security and export opportunity.

Question 2.7: *Is there a role for combined production support with capital grants for first-of-a-kind facilities?*

Yes. For first-of-a-kind facilities there is a strong role for combined support that includes both capital grants (or concessional finance) and production credits. Capital support helps overcome higher upfront cost and technology risk of FOAK plants and enables them to reach efficient scale.

To manage fiscal risk and avoid over-compensation, capital grants should be limited to clearly defined FOAK or early-of-a-kind projects, capped as a share of eligible capex, and delivered alongside competitively awarded production credits that are sufficient for Nth-of-a-kind plants to proceed without additional capital subsidies

A means to reduce risk and costs is to target government support at the earlier Pre-feasibility, Feasibility and FEED stages of project development. The lower cost of this support enables the government to fund a range of projects, whereas the CapEx can be financed by mechanisms other than government capital grants, e.g. concessional debt from the CEFC. That said, this sort of funding could be done by the innovation fund.

Question 2.8: *What other types of funding or concessional finance could support LCLF projects (e.g. funding from CEFC and NRF)?*

Yes. In addition to production support, LCLF projects should be able to access a suite of complementary finance tools, including concessional senior and subordinated debt, equity co-investment, guarantees and capital grants for first-of-a-kind facilities.

The CEFC can play a leading role as a clean-energy financier in providing debt, equity and credit enhancements for large LCLF projects, while the National Reconstruction Fund can support domestic manufacturing, value-add and supply-chain capability through equity and quasi-equity investments in priority areas such as transport, renewables and low-emissions technologies, and agriculture and forestry.

ARENA and similar grant programs can continue to fund early-stage and high-risk innovation. Together, these mechanisms can crowd in private capital and reduce the level of production credit required per litre.

Question 2.9: *Is any other support required across the supply chain to enable domestic production of LCLF?*

Yes. In addition to a production credit, targeted support is needed along the LCLF supply chain – from feedstock mapping and long-term supply arrangements, through regional aggregation and logistics infrastructure, to blending, storage and certification at ports and airports.

Demand-side measures (mandates, book-and-claim frameworks), robust lifecycle sustainability standards, and concessional finance from CEFC/NRF for enabling infrastructure will all be critical to de-risk private investment and ensure domestic production can connect to domestic users at scale

A key area is Government investment in critical infrastructure that will be essential to unlock opportunities in Australia. Investments in common user infrastructure to underpin the development of bioenergy industries will not be provided at optimal scale if funded by a single commercial entity.

The infrastructure required is a natural monopoly in nature, and having the infrastructure in place ahead of demand is critical to incentivise the investment in production. There is therefore a role for the government in funding and building this infrastructure.

Areas producing high quality feedstocks that could become processing hubs will often be located outside the existing footprint of processing, electricity or transport networks, necessitating additional investment in this infrastructure to connect the two resources.

Infrastructure to support collection and processing of biomass feedstocks will enable processing to be conducted in regions of highly-productive agriculture and forestry operations such as Queensland, Victoria's Green Triangle Region, Tasmania's Bell Bay region and south-western WA.

For long term, secure biomass feedstocks, there is a need for R&D funding to support the development of new and emerging feedstock opportunities from genetic selection, laboratory and field trials, piloting of commercial plots and feedstock management.

Diplomacy is also needed to accelerate Australia's leadership in feedstock production, using knowledge sharing and exchange partnerships with established countries to access technical expertise. The CSIRO-Singapore ASLET programme is one example of a mutually beneficial partnership which has accelerated capacity building and technical knowledge exchange for LCLF development, particularly in the area of fuel processing.

Bilateral international partnerships in trade and investment can accelerate development of green industries, such as the green shipping and iron ore corridor between Singapore and WA. Variations on these policy incentives include port-side reduction fees for participating countries and bilateral subsidisation schemes for fuel development. Enabling support can include developing port and airport infrastructure suitable to the handling and storage of LCLFs guided by bilaterally beneficial fuels and co-investment.

Electricity transmission and hydrogen transport and storage infrastructure are important and need to provide access for multiple suppliers and users of electricity and hydrogen, including green fuels production.

Question 2.10: *What lessons can Australia learn from other jurisdictions that have already implemented LCLF production support measures?*

Both Brazil and the US leveraged their large agricultural bases with decades of government support mechanisms including tax incentives, subsidies for infrastructure and capital grants for new facilities. There has been high support for LCLFs in the EU in recent years. The EU has developed mandates for biofuels under the Renewable Energy Directive I,II and III. These mandates are ramping up over time and are supported by regional and country-specific policy support, tailored to comparative advantages in agriculture, forestry and industrial capacity.

Global biofuel policies teach us that this industry can be operationalised at speed with enough government support, avoiding their policy mistakes. Without costing carbon, the market is affected by fluctuations in price changes in oil on a global market, affected by global disruptions in trade and geopolitics.

International experience (US 45Z, California LCFS, EU ReFuelEU and the UK SAF mandate) shows that successful LCLF schemes combine long-term, carbon intensity-based production support with clear demand mandates,

competitive allocation, and robust sustainability rules. The success in all these jurisdictions, is due to several layers of support of increasing sophistication that build the supply chain to eventually target abatement.

Key lessons are the need for policy stability and legal certainty, competitive tenders to avoid windfall profits, strong lifecycle and land use change accounting, and parallel investment in certification and infrastructure.

Australia should also differentiate first-of-a-kind projects (which warrant capital support plus production credits) from later 'standard' plants, and avoid over-restrictive feedstock-specific rules that have created problems in other jurisdictions.

3. Fuel Production

Question 3.1: *Considering this objective, what production pathways should be focused on or prioritised?*

Given the Program's objectives, production incentives should prioritise drop-in LCLF pathways that (i) use Australian wastes, residues and sustainable energy crops to produce SAF, renewable diesel and marine fuels via mature routes such as HEFA/HVO and emerging routes such as AtJ, gasification methanol synthesis and FT; and (ii) strategically support early e-fuel projects that leverage Australia's renewable and green hydrogen advantage.

Within these pathways, support should be allocated on a lifecycle carbon-intensity and community-benefit basis, favouring projects that decarbonise hard-to-electrify sectors, create regional and First Nations economic opportunities, and materially improve sovereign fuel security

a. *Should priority be given to projects that use more-established production pathways (e.g. HEFA and HVO) than nascent production pathways that may present a higher level of technology risk?*

Priority should be given to projects using more-established production pathways, such as HEFA and HVO or even ATJ, where technology risk is lower and commercial-scale production can be achieved quickly. This is important to meet the Program's primary objective of establishing domestic, bankable LCLF production and crowding in private investment.

However, this priority should not be exclusive. A dedicated stream or allocation should also support higher-risk, nascent pathways (for example lignocellulosic, residue-based and e-fuel routes) that offer greater long-term emissions reduction potential and align with Australia's comparative advantages in biomass and renewable energy.

In practice, this suggests a two-track approach: a main production support track for mature pathways, and a FOAK/innovation track where capital support is combined with production credits to de-risk emerging technologies.

b. *How can nascent production pathways compete with more-established production pathways (e.g. HEFA and HVO)?*

On a purely cost-per-litre basis, nascent pathways cannot yet compete with mature routes such as HEFA/HVO. To avoid locking in a single pathway while still achieving early domestic volumes, the Program should use separate competitive tracks and budget allocations for 'commercial' and 'advanced/FOAK' pathways.

Advanced pathways should be able to access a combination of capital support and higher, carbon intensity-differentiated production credits, alongside longer-tenor offtake or revenue-certainty mechanisms, so that technologies based on residues, lignocellulosic biomass and e-fuels can reach commercial scale rather than being permanently outcompeted by established HEFA projects.

c. *What minimum stage of project development (and evidence) should be expected by projects under the program?*

Minimum eligibility should require projects to be at an advanced pre-FID stage, with a clearly defined technology pathway and plant design, identified and controllable site, a credible feedstock and logistics strategy, evidence of serious offtake engagement (for example non-binding term sheets or letters of intent), an initial financial model and financing strategy, and a realistic schedule to FID and commissioning.

Projects that have commenced or committed funding to FEED, and have more advanced feedstock and offtake agreements, should be scored more favourably, as they are more likely to reach commercial operation within the Program timeframe.

Question 3.2: *Should there be a minimum facility size to be eligible?*

Yes, however minimum facility size should be pathway-specific. To ensure the Program supports genuine commercial-scale deployment, mature pathways (such as HEFA and HVO) should meet a minimum scale of approximately 50 million litres per year.

For first-of-a-kind and emerging pathways (such as lignocellulosic FT, pyrolysis/HTL and e-fuels), a lower minimum scale—on the order of 10 million litres per year—should apply to avoid excluding advanced technologies that are essential for long-term scalability and alignment with Australia's feedstock and renewable energy advantages.

This tiered approach ensures the Program supports commercial outcomes without unintentionally eliminating innovation pathways that contribute to regional development, First Nations participation and future sovereign capability.

Question 3.3: *Should LCLF be required to meet a carbon intensity threshold (% carbon intensity reduction compared to fossil equivalent) to be eligible for the program? If yes, what would be a reasonable threshold, and how should that threshold be calculated and verified? If not, why not?*

Yes. LCLF should be required to meet a minimum lifecycle carbon-intensity reduction compared to the fossil equivalent to be eligible for support. This ensures the Program delivers genuine emissions reductions, is better aligned with international schemes, and avoids subsidising fuels with marginal or uncertain climate benefits.

There is currently a broad range of carbon intensity thresholds for aviation, with CORSIA requiring only a minimum 10% emissions reduction, and the EU RED III requiring a 65% reduction on the fossil baseline.

A reasonable threshold is a minimum 53% reduction relative to the standard fossil comparator on an energy-based, well-to-wake basis. This threshold is achievable for projects using sustainable feedstocks.

The Program should apply CI-based differentiation, so fuels with deeper emissions reductions receive proportionally greater support.

CI should be calculated using a national LCA methodology aligned with CORSIA/RED III and integrated into the evolving Guarantee of Origin

framework. Project-specific LCAs should be independently verified, with periodic updates based on actual feedstock use, energy inputs and operational data.

a. *If the production incentive is based on carbon emissions reduced, rather than volume of LCLF produced (see Question 2.3), is a minimum carbon intensity threshold still needed as part of the eligibility criteria?*

Yes. Even if the production incentive is paid on a carbon-abatement basis (e.g. $/tCO$_2$e reduced rather than $/L), a minimum lifecycle carbon-intensity threshold should still apply as an eligibility criterion.

A threshold acts as a clear integrity screen: it prevents public funds flowing to fuels that deliver only marginal or uncertain emissions benefits once land-use change and other factors are included, reduces reliance on finely balanced LCA assumptions, and aligns the Program with international schemes such as EU RED III, which also use minimum CI thresholds.

Above this floor, the incentive can then scale with actual tonnes of emissions avoided, ensuring that deeper-decarbonisation pathways are rewarded more strongly while maintaining a robust definition of "low-carbon liquid fuel" for the purposes of the Program.

b. *Should Indirect Land Use Change be included in the method for determining carbon intensity, for the purpose of the Program?*

Yes. Indirect land use change (ILUC) should be included in the carbon intensity methodology for alignment with international schemes such as CORSIA and EU RED III, which treat land-use change as a core component of lifecycle assessment.

ILUC is not easy to quantify as it requires complex modelling to account for market dynamics, so a risk based approach such as that followed by the EU RED III might be the most practical way to balance environmental integrity with administrative practicality and gives investors clarity on how land-use impacts will affect eligibility and incentive levels.

This risk based approach disqualifies high-risk ILUC feedstock from high-carbon-stock or high-biodiversity land. Low-ILUC-risk feedstocks may be certified if they meet stringent additionality criteria.

c. *Should any feedstocks be prioritised or otherwise considered out of scope?*

Consideration should be given to making government support contingent on locally sourced feedstocks, rather than imports, to drive the domestic industry and value add for regional communities.

In terms of feedstock categories e.g. oils, carbohydrates, wastes and residues etc, a robust sustainability framework is sufficient to enable the market to decide on the most appropriate feedstocks.

Question 3.4: *Other than carbon intensity, should any other sustainability criteria be included?*

Yes. While lifecycle carbon intensity should be the primary eligibility and incentive metric, additional sustainability criteria are needed to ensure the Program delivers genuine long-term benefits and maintains social licence.

Projects should meet minimum standards on land use and biodiversity e.g. no conversion of high-carbon or high-biodiversity areas, water and soil health, feedstock sourcing consistent with the waste hierarchy and robust traceability.

These requirements should be aligned with Australia's emerging Guarantee of Origin framework and the Community Benefit Principles, and verified through transparent reporting and independent certification, so that public funding supports fuels that are not only low-carbon, but also environmentally and socially responsible

Question 3.5: *Which international and domestic sustainability schemes should be allowed to verify sustainability claims?*

Sustainability claims for the purposes of the Program should only be verified by robust, independently audited schemes that apply full lifecycle assessment, land-use and social safeguards, and chain-of-custody rules.

Internationally, this should include Sustainability Certification Schemes approved under ICAO's CORSIA (e.g. ISCC CORSIA, RSB CORSIA) for aviation fuels, and voluntary schemes formally recognised under the EU Renewable Energy Directive (RED III) (e.g. ISCC EU, RSB, REDcert, SURE-EU) for relevant biofuel and RFNBO pathways.

Domestically, the Australian Guarantee of Origin (GO) Scheme should serve as the primary framework for emissions and sustainability accounting for LCLF, with sustainability certificates from recognised international schemes

accepted where they can be transparently mapped into the GO framework. This approach maintains high environmental and social integrity, ensures consistency with key export markets and CORSIA, and avoids proliferation of weak or overlapping standards

4. Other Policy Considerations

Question 4.1: *What are your views on the aforementioned factors affecting the merit of a proposal?*

All five merit factors are relevant, but they play different roles.

- Carbon emissions reduction should be the primary factor, as LCLF is fundamentally a climate policy.
- Sustainability should function as a gatekeeper to ensure environmental integrity and social licence. TSI is most concerned about this criteria, as detailed above.
- Economic and fuel-security benefits are central to bipartisan support, building a durable domestic industry and delivering regional and First Nations outcomes.
- Supporting an efficient market is important for ensuring that funded projects are FID-ready and catalytic for future projects.

Question 4.2: *Recipients under the Program will need to deliver benefits according to the Community Benefit Principles under the Future Made in Australia Act (see Appendix D). How do you consider the Community Benefit Principles in relation to LCLF projects? Are there specific Community Benefit Principles that are more or less relevant?*

The most relevant Community Benefit Principles relate to safe, secure jobs, skills and inclusion, local and First Nations community outcomes, and strengthening domestic industrial capability and supply chains. This is because LCLF projects are long-lived regional industrial assets that directly shape employment, land use and regional economies.

Transparency and fair tax practices are also important, but operate more as baseline expectations for all proponents.

First Nations benefit sharing models, such as in the NSW Government First Nations Guidelines for the Electricity Infrastructure roadmap[9], with minimum requirements for ownership and engagement of first nations peoples, are a

[9] https://www.energy.nsw.gov.au/nsw-plans-and-progress/major-state-projects/electricity-infrastructure-roadmap/first-nations

good standard for new green industry development. The following guidelines are as follows:

Proponents are required to prepare an Industry and Aboriginal Participation Plan that would detail how one, or a combination, of the following minimum requirements, would be delivered:

- *at least 1.5% of the contract value to be subcontracted to Aboriginal-owned businesses*
- *at least 1.5% of the contract's Australian-based workforce (FTE) that directly contributes to the contract to be Aboriginal or Torres Strait Islander peoples*
- *at least 1.5% of the contract value to be applied to the cost of education, training or capacity building for Aboriginal staff or businesses directly contributing to the contract*

Question 4.3: *How will overseas policy developments interact with domestic policy settings to support projects reaching final investment decisions? For example, LCLF demand-side targets or mandates, and international frameworks such as the International Civil Aviation Organisation long-term global aspirational goal for international aviation (LTAG) of net-zero carbon emissions by 2050.*

Overseas policy developments such as binding SAF mandates in Europe and and the IMO's Net Zero Framework are critical in shaping the demand and price environment for LCLF. At this point, the demand is for Australian feedstocks, rather than value-add fuels.

These measures create a structural, long-term requirement for low-carbon fuels and associated certificates, which in turn underpins airlines and shipping companies willingness to enter long-term offtake agreements.

A supportive domestic policy framework under the Cleaner Fuels Program, combined with interoperable certification that aligns with CORSIA and key trading partners through Australia's Guarantee of Origin scheme is essential to maximise market access and investment certainty to leverage these global signals to support final investment decisions in Australian projects.

Question 4.4: *In addition to production support, what other measures are considered critical to achieve final investment decisions for projects? What are their key features?*

In addition to production support, final investment decisions will depend on a suite of complementary measures that reduce revenue, capital and implementation risk.

These include long-term offtake frameworks (potentially underpinned by price-stabilisation tools such as CfDs or floors), interoperable certificate and book-and-claim systems, and domestic demand signals such as SAF/LCLF mandates.

FOAK projects will require capital grants and concessional finance (debt, equity and guarantees) from institutions such as CEFC and NRF, alongside funding for enabling infrastructure at ports, terminals and airports.

A robust certification and LCA framework integrated with the Guarantee of Origin scheme, streamlined but rigorous planning and environmental approvals, and explicit support for community and First Nations engagement are also critical.

Question 4.5: *What are the intersecting policies you expect need to be considered to unlock a domestic LCLF production industry?*

Unlocking a domestic LCLF industry will require coherent settings across multiple intersecting policy areas. In addition to targeted production support, key interactions include:

- national climate and emissions frameworks; sectoral transport and aviation policies (including SAF targets);
- the National Bioenergy Feedstock Strategy and related land, water and biodiversity policies;
- the broader Future Made in Australia investment architecture (CEFC, NRF, innovation funds and tax settings);
- the new Guarantee of Origin scheme;
- energy and hydrogen policy which determines access to low-cost, low-carbon power and hydrogen;
- fuel security policy (DETO and FSSP);
- the fuel tax credit;
- infrastructure planning at ports and airports;
- Community Benefit and First Nations policies.

For investors, what matters is that these frameworks are consistent, durable and mutually reinforcing, so that a single project can rely on a stable set of rules for feedstocks, certification, demand and finance over the life of the asset.

Question 4.6: *Is there any other feedback you would like to provide that isn't covered by questions above?*

Ideally, the LCLF policy framework should aim to support around 5 LCLF hubs reaching commercial scale by the 2030s, to catalyse a domestic industry that can substantially meet Australia's domestic needs, reduce emissions and materially improve liquid fuel security.

Spreading the funding geographically across the states which have various regional advantages in second generation feedstocks - for example forestry residue, agricultural residue, canola and pongamia oilseeds, and ligno-cellulosic energy crops - would avoid feedstock lock in and deliver meaningful emissions reductions in hard to abate sectors while establishing domestic skills, standards, supply chains and infrastructure for future scale-up.

Feedstock potential[10] is high enough to support significantly more production if demand, capital and sustainability settings are aligned. To achieve production at this scale in the absence of demand regulation, however, would require either further rounds of the Cleaner Fuel Program, or a broad-based support mechanism (such as a tax credit).

[10] O'Sullivan, C.A., Mishra, A., Mueller, S., Nadeem, H., & Flentje, W. (2025). Opportunities and priorities for a Low Carbon Liquid Fuel Industry in Australia. CSIRO