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Department of Infrastructure, Transport,
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To whom it may concern,

Climateworks Centre submission on *Future Made in Australia: Unlocking Australia's low carbon liquid fuel opportunity*

Climateworks Centre welcomes the opportunity to respond to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts' (DITRDCA) consultation on the opportunity presented by low carbon liquid fuels (LCLFs).

Climateworks bridges the gap between research and climate action, operating as an independent not-for-profit within Monash University. We develop specialist knowledge to accelerate emissions reduction, in line with the global 1.5 degrees Celsius temperature goal, across Australia, Southeast Asia and the Pacific.

Climateworks acknowledges the important role that LCLFs may have in decarbonising certain activities in transport and industry sub-sectors. Our recommendations would ensure that a framework for LCLF deployment prioritises highest-value use cases and does not limit electrification or more efficient and cost-effective decarbonisation technologies. This framework would also consider and define the circumstances under which LCLF production – especially biofuels – will achieve the optimal use of land, energy and other constrained resources.

The recommendations in this submission would help unlock the opportunity presented by LCLFs in an appropriate way and support the objective of establishing Australia as a renewable energy superpower. Climateworks will be pleased to provide further analysis or to partake in meetings where additional information is required.

Climateworks decarbonisation pathways and analysis of LCLFs

In 2023, Climateworks published least-cost emissions reduction pathways for Australia. On a least-cost pathway to limiting warming to 1.5 degrees, Australia would achieve a 68 per cent reduction below 2005 emissions levels by 2030 and net zero before 2040. Australia can reach net zero more than a decade sooner than its current 2050 commitment.

Climateworks' economy-wide modelling shows that LCLFs have a limited but important role in decarbonising certain activities in transport and industry. Under both our 1.5°C and well-below-2°C pathways, LCLFs would make up 16 per cent of total transport energy usage in 2050, with the bulk of uptake in aviation.

In our 1.5°C scenario, sustainable aviation fuel (SAF) use begins from 2026, making up 39 per cent of aviation fuel demand by 2030. By 2050, SAFs would make up 64 per cent of aviation fuel demand.

In our 1.5°C scenario, road transport is primarily decarbonised by electrification, with hydrogen also playing a role. On this least-cost pathway LCLFs play a very small role in the late 2040s.

In domestic maritime shipping, LCLFs would make up 8 per cent of fuel demand by 2030, 86 per cent by 2040 and 88 per cent by 2050.

Recommendations on the LCLFs Opportunity

Recommendation 1: Utilise LCLFs in areas of highest-value within the transport and heavy industry sectors, ensuring LCLFs do not 'lock out' more economically efficient emissions reduction technologies and levers.

Policies that remove supply and demand constraints on LCLFs and promote new production may have an important role in reducing emissions from certain transport and heavy industry activities. However, it is important that they do not undermine or displace approaches that have greater decarbonisation potential and are more economically effective in the long term. Climateworks recommends any role for LCLFs be defined by an integrated assessment of emissions abatement potential and cost compared to alternatives for the relevant sector. Alternatives include accelerating zero-emissions vehicle uptake, shifting transport to other lower-carbon modes, and improving transport efficiencies other than by fuel switching.

Furthermore, to ensure best use of government funds in the support of LCLFs, two criteria will be important: (1) the emissions intensity of production - with assurance consistent with the Future Made in Australia Net Zero Transformation Stream; and (2) the optimal role of LCLFs in relation to least-cost emissions reduction pathways. An assurance scheme for LCLFs will benefit from aligning with international schemes such as the International Sustainability and Carbon Certification (ISCC 2024).

Recommendation 1.1: Prioritise aviation when considering the role for LCLFs in the transport sector, and ensure LCLF usage elsewhere does not undermine more economically efficient approaches to transport decarbonisation.

In most circumstances, zero-emissions vehicles and mode shifts (such as moving more freight via rail), will be the most economically efficient approaches to decarbonising the transport sector. LCLFs present an alternative where those options are not viable, as is the case in the aviation sector. Policies that build demand for LCLFs may delay the uptake of zero-emissions vehicles and mode shift, jeopardising the transport sector's ability to decarbonise in line with the Paris Agreement. This is presently a risk in the road freight sector.

Recommendation 1.2: Government action to support fuel switching will be most effective if it prioritises electrification and use of renewable hydrogen in industry and considers the role of LCLF where alternatives are not viable and there are mid- to long-term emissions reduction benefits.

LCLF can be included as part of a short-term pathway to immediately switch away from diesel to rapidly reduce emissions prior to full electrification. LCLFs are expected to remain a limited resource. Climateworks analysis suggests that other sectors, notably aviation, present a higher value use for LCLF as part of decarbonising the economy. Electrification and hydrogen are the most efficient alternatives to diesel in heavy industry; however, LCLFs present an alternative where their use is not technically viable.

Industry has expressed interest in using LCLF as an energy source; the Electric Mine Consortium found that interest in LCLF to power electrically-driven heavy mobile equipment over the next 5–10 years has increased dramatically, although still lags behind batteries, hybrids, diesel and trolley systems (Electric Mine Consortium 2024). This may be a response to the short-term challenge of limited availability of mining-appropriate electric vehicles.

In Climateworks' 1.5°C aligned least-cost pathway, LCLFs do not present a viable long-term solution for decarbonising mines. Electrification –and the use of hydrogen where electrifying is not economical –are the most effective and efficient options. Australian Industry Energy Transition Initiative (Australian Industry ETI) found a potential role for LCLFs in heavy haulage but did not recommend pursuing this option, emphasising electrification and hydrogen as the better solutions (Climateworks Centre and Climate-KIC Australia 2023). The Australian Industry ETI's least-cost pathway modelling for five major supply chains found that, in the long-term, electrification and hydrogen solutions will likely be more cost-effective and appropriate for economy-wide net zero action than advanced LCLFs. LCLFs may be appropriate transition fuels only where they will not reduce the economic or technical viability of future electrification or hydrogen fuels.

LCLFs could theoretically be deployed today, but some industry feedback suggests that producing and supplying LCLFs to sites would require new infrastructure. This could result in either locking in higher levels of emissions or stranded assets should the site electrify in the future, when LCLF use is no longer most appropriate.

Recommendation 2: Incorporate environmental obligations into government LCLF investment and assurance frameworks.

Including environmental obligations in government LCLF investment and assurance frameworks could help avoid negative ecological outcomes. Biomass production for these fuels can lead to deforestation, impacting land-based sequestration potential and existing carbon stocks. This is especially critical given the significant amount of land-based carbon sequestration, including environmental plantings, required to stay within the bounds of the Paris Agreement temperature goals and the Global Biodiversity Framework (Climateworks Centre 2023).[1] Government action that supports LCLFs can incorporate measures to ensure unintended consequences are avoided - such as significant land-use change or negative impacts on land with high carbon stock (Chiaramonti et al. 2021).

Thank you for taking the time to consider our submission. We would welcome an opportunity to brief your team to provide further details about insights from our work.

Yours sincerely,

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[1] In order to analyse this complex interplay between agricultural production, climate mitigation, biodiversity, and water use, we have developed the upgraded 'Land Use Trade Offs (LUTO2)' model. We welcome the opportunity to brief government on how LUTO2 can be used to analyse biomass availability and its implications.

References

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Climateworks Centre and Climate-KIC Australia (2023) *Pathways to industrial decarbonisation: Positioning Australian industry to prosper in a net zero global economy*. Australian Industry Energy Transitions Initiative, Phase 3, Climateworks Centre.

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