The Sustainable Biofuels Obligation: proposals for regulations

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
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The Sustainable Biofuels Obligation (the Obligation) is one of the many actions taken in response to Parliament's declaration of a climate change emergency. It will support the Government's commitment to transition to a clean, green and carbon-neutral New Zealand, as outlined in Our Manifesto to Keep New Zealand Moving. The Obligation will be a key part of how the first emissions Reduction Plan and how the emissions budgets and the net-zero carbon 2050 target will be met.

Contents

Section 1 - Introduction

The Sustainable Biofuels Obligation (the Obligation) will be one of the many actions taken in response to Parliament's declaration of a climate change emergency and aligns with the Government's focus on intergenerational wellbeing as set out in the 2020 Speech from the Throne.

It will support the Government's commitment to transition to a clean, green and carbon-neutral New Zealand, as outlined in Our Manifesto to Keep New Zealand Moving. In particular, the mandate will help to:

- ensure a just transition to a zero carbon and climate-resilient economy and society, which also optimises economic development opportunities;
- continue to support New Zealand's freight network to become more sustainable and efficient; and
- as part of the COVID-19 economic recovery, reshape New Zealand's energy system to be more renewable, affordable and secure, while creating new jobs and developing the high-skill workforce our future economy requires to thrive.

In July 2021, the Government consulted[1] on the preferred design of the Obligation. 63 submissions were received and analysed. In December 2021, Cabinet agreed to the final policy design of the Obligation[2] which is summarised below.

This document seeks your feedback on the methodologies and definitions needed to implement the Obligation and its sustainability criteria.

The design of the Sustainable Biofuels Obligation as agreed by Cabinet

The Obligation will require fuel suppliers[3] to reduce the emissions intensity of their fuel supply by a set percentage every year by deploying liquid biofuels. Biofuels used to meet the Obligation will need to be assessed using a lifecycle emissions analysis to determine their GHG emissions intensity. Details on the methodology for calculating the emissions intensity of biofuels are covered in section 1 of this document.

The Obligation will come into force from 1 April 2023 and will apply to all transport fuels used in New Zealand, except for aviation fuels. An aviation-based obligation will be developed over a longer timeframe.

[1] Increasing the Use of Biofuels in Transport: Consultation Paper on the Sustainable Biofuels Mandate https://www.mbie.govt.nz/dmsdocument/15020-increasing-the-use-of-biofuels-in-transport-consultation-paper-on-the-sustainable-biofuels-mandate-pdf

[2] Sustainable Biofuels Mandate: final policy design https://www.mbie.govt.nz/dmsdocument/18366-sustainable-biofuels-mandate-final-policy-design-proactiverelease-pdf

[3] For the purpose of this document, fuel suppliers are defined as any entity that imports into New Zealand or produces liquid fossil fuels for transport.

The emissions intensity reduction targets

The targets to 2025 are set, and provisional targets out to 2035 have been agreed. They are:

Year	**GHG Emissions Intensity Reduction Target**
2023	1.2%
2024	2.4%
2025	3.5%
Provisional Targets	
2026	3.8%
2027	4.1%
2028	4.4%
2029	4.7%
2030	5.0%
2031	5.8%
2032	6.6%
2033	7.4%
2034	8.2%
2035	9.0%

Table 1: Emissions intensity reduction targets under the Sustainable Biofuels Obligation

Provisional targets for 2026 – 2030 and 2031 – 2035 will be confirmed by Cabinet in 2024 and 2029 respectively, based on the recommendation of the Minister of Energy and Resources. In making this recommendation the Minister will need to carry out an assessment of the following considerations:

- they are consistent with the scale of emissions reductions needed from transport to achieve the emissions budgets for 2026 – 2030 and 2031 – 2035 and to reach net zero-carbon emissions by 2050;
- they help to facilitate the supply of advanced biofuels (fuels that can be manufactured from various types of non-food or animal feed feedstocks[4]) into the New Zealand market and support domestic production;
- New Zealand can be confident that the volume of biofuels needed to meet the targets can be sourced without the sustainability criteria being breached;
- the target's trajectory allows fuel suppliers and domestic biofuel producers a reasonable period of time in which to have the requisite biofuels infrastructure in place;
- any resultant increase in fuel prices as a result of the targets can be absorbed by the economy without undue detriment to economic activity, and measures are in place to address any distributional impacts arising from fuel price rises;

[4] Feedstock is defined as the raw material to supply or fuel the creation of a good such as biofuel or cattle feed.

- the targets recognise the limits of New Zealand's light and heavy road fleets in the use of conventional biofuels, taking into account the blend walls.[5]

Ensuring that only sustainable biofuels are used to fulfil the obligation

Only biofuels that are sustainable will be allowed to be used to meet the obligation. Cabinet has agreed the following high-level sustainability criteria will apply to all biofuels used to meet the Obligation:

- **Biodiversity:** feedstocks should not have a significant adverse effect on biodiversity;
- **Impact on carbon stocks**: feedstocks should not lead to deforestation of native forests, canopy forests or the destruction of wetlands or peatland to plant biofuel crops. The impact of biofuel crops on soil carbon should also be considered;
- **Food and feed security**: feedstocks should not adversely impact food and feed security;
- **Water quality and availability**: Biofuels crops should not negatively affect water quality or significantly restrict its ability in an area;
- **Use of waste**: it will be important that the obligation supports the principles of the waste hierarchy;
- **The risk of indirect land use change**: feedstocks should not be associated with a high risk of indirect land use change.

This discussion document explores this sustainability criteria in more detail.

Implementation of the Sustainable Biofuel Obligation

The Environmental Protection Authority (EPA) will be the regulatory for the obligation. The EPA's role will be to:

- verify that biofuels supplied under the obligation comply with the sustainability criteria;
- verify that obligated parties are meeting the GHG emission reduction targets;
- administer the flexibility mechanisms; and
- carry out compliance and enforcement.

Biofuels and fuels containing biofuel blends will continue to need to be compliant with the relevant requirements prescribed in the Engine Fuel Specifications Regulations 2011 (discussed in section 3). Trading Standards within the Ministry of Business Innovation and Employment is the regulator responsible for monitoring fuel quality and for enforcing compliance with these regulations.

[5] The blend wall refers to the amount of biofuel that is permitted to blend with liquid fossil fuels under the Engine Fuel Specifications Regulations.

WHAT THIS DISCUSSION DOCUMENT COVERS

This discussion document will support the development of regulations to enact the Obligation. It is split into three sections. Each section expands on the final policy design of the Obligation as agreed by Cabinet by providing further detail on how the Obligation will be implemented in practice. The sections are:

Calculating the Obligation

- The formula used in the Obligation
- Determining the emissions intensity of biofuels
- Determining the emissions intensity of fossil fuels
- The process and verification of GHG emissions intensity factors.

The sustainability criteria

- Why are sustainability criteria needed?
- International sustainability certification schemes will be used to certify the sustainability of biofuels
- Land use change caused by biofuels production
- Biofuels and food security
- Use of waste and classification of feedstocks

Other considerations

- Interaction with the Fuel Industry Act and regulations
- Engine Fuel Specifications Regulations review
- Labelling at the pump: Emissions reductions

Section 2 - Calculating the obligation

The Sustainable Biofuels Obligation will provide a single annual GHG emissions intensity reduction target for all liquid transport fuels (excluding aviation fuels) that obligated parties would have to meet. Wholesale fuel suppliers would have flexibility in determining where and what types of biofuels to deploy, providing they met the requisite sustainability criteria (see section 3).

The approach we are proposing obligated parties would use to calculate the Obligation's targets is based on the methodology used by the European Union for its Renewable Energy Directive II[6].

2.1 METHODOLOGY FOR CALCULATING THE OBLIGATION

Each year a fuel supplier would have to demonstrate that the percentage emissions reduction it achieved, across its fuels, is at least equal to, or higher than, the required percentage. The targets in the Obligation are emissions intensity reduction targets.

The emissions intensity reduction target would be calculated by comparing the annual emissions of its fuel supply (fossil and biofuels) against the hypothetical emissions, if all its fuel supplied had been fossil fuels.

To make this comparison, the energy content (MJ) of the actual liquid fuel supply and the hypothetical fuel supply (all fossil fuels) must be equal.

In other words, the approach to calculation in a simplified form would be:

$$\textbf{Reduction} = \frac{\text{Emissions if all supplier's fuels were fossil – Emissions of supplier's fuel blends (biofuels + fossil fuels)}}{\text{Emissions if all supplier's fuels were fossil}}$$

That is;

$$Emissions\ intensity\ reduction = 100 \times \frac{E_{fossil\ fuels} - E_{supplied}}{E_{fossil\ fuels}}$$

Where:

$E_{fossil\ fuel}$ = the emissions in tonnes of carbon dioxide equivalent if all the supplier's fuels were fossil fuels.

$E_{Supplied}$ = the emissions in tonnes of carbon dioxide equivalent of the supplier's actual fuel supply, including fossil fuels and biofuel blends.

An example of this calculation is provided as Annex One.

Lifecycle emissions intensity factors

To implement the Sustainable Biofuels Obligation, a lifecycle emissions intensity[7] will need to be derived for each grade/type of fuel used in New Zealand, including liquid fossil fuels and every biofuel used in New Zealand to meet the obligation. The emissions intensity of liquid fuels will be expressed in kilograms of CO_2 equivalent per MJ of fuel ($kgCO_2e/MJ$).

Life cycle emissions analysis covers each part of the production and supply chain from raw material to end product (often referred to as from 'well to wheel' for fossil fuels, or 'field to wheel' for

[6] European Union Renewable Energy Directive II

[7] A fuel's GHG emissions intensity (or emissions factor) is a measure of the GHG emissions generated per unit of energy contained in the fuel (e.g. $kgCO_2e/MJ$). This can be specified further as "carbon intensity", or the measure of the carbon dioxide (CO_{2e}) emissions per unit of energy contained in the fuel.

biofuels). This is important because a significant proportion of the emissions resulting from the biofuels supply chain could occur outside New Zealand.

It is important to note that these lifecycle intensity values will differ from the emissions factors used in the New Zealand Emissions Trading Scheme (NZ-ETS) which only include domestic emissions from the production and combustion of fossil fuels. Biofuels are assumed to have an emissions factor of zero under the NZ-ETS. This is based on multiple assumptions, including that biofuels come from sustainable biological sources, and emissions from the combustion of biofuels are completely offset by carbon sequestration in the cultivation of biological feedstocks.

2.2 DETERMINING THE EMISSIONS INTENSITY OF BIOFUELS

The lifecycle GHG emissions from the production and use of biofuels will be calculated as the sum of the disaggregated emissions of each component of the supply chain, including feedstock production.

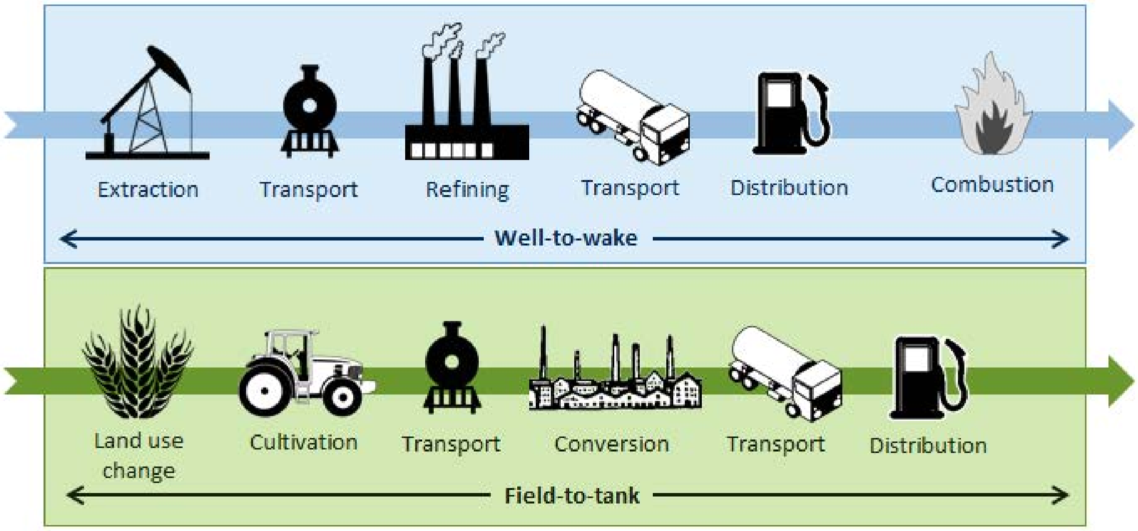


Figure 1: Lifecycle GHG emissions analysis diagram – Source: International Civil Aviation Organisation

This can be represented by the equation:

$$E = e_{ec} + e_{l} + e_{p} + e_{td} + e_{u} - e_{sca} - e_{ccs} - e_{ccr}$$

Where:

E = total emissions from the use of fuel

- $\mathbf{e_{ec}}$ = emissions from the extraction or cultivation of raw materials
- $\mathbf{e_{l}}$ = annualised emissions from carbon stock changes caused by land-use change.
- $\mathbf{e_{p}}$ = emissions from processing
- $\mathbf{e_{td}}$ = emissions from transport and distribution
- $\mathbf{e_{u}}$ = emissions from the fuel's combustion
- $\mathbf{e_{sca}}$ = emissions savings from soil carbon accumulation via improved agricultural management
- $\mathbf{e_{ccs}}$ = emissions savings from CO_2 capture and geological storage
- $\mathbf{e_{ccr}}$ = emissions savings from CO_2 capture and replacement

Each e_{xy} value for each biofuel type, such as ethanol produced from sugarbeet, will need to be determined to understand the emissions intensity impact of all biofuels used to meet the sustainable biofuels obligation. There are multiple options available to determine the emissions intensity factor of a biofuel, and the disaggregated emissions of each component of the supply chain. These options are discussed below and are not mutually exclusive i.e different options could be used for different components of the supply chain.

Default emissions intensity values

Default emissions intensity values would enable fuel suppliers to use a default value for the emissions intensity of a given biofuel for the purpose of calculating their obligation. Disaggregated default values (DDVs) provide default values for each component of the supply chain. Providing DDVs in the regulations would enable greater flexibility in biofuel supply chains by allowing the use of biofuels that have not undertaken a complete lifecycle emissions analysis for each component of the supply chain.

DDVs should be conservative emissions reductions estimates so that potential emissions reductions are not overstated, especially when considering that emissions from indirect land use change are not factored into the raw material production values. Options for addressing the risk of indirect land use change are covered in Section 3 of this discussion document.

DDVs would need to be determined for each of the following elements in the supply chain of a given biofuel:

- *Feedstock production and cultivation* ($e_{ec} + e_i - e_{sca}$)**:** The emissions caused by the extraction and cultivation of raw materials and from carbon stock changes caused by land-use change, minus the sequestered carbon accumulation from soil and from CO_2 capture and replacement. Throughout this paper we will refer to both direct and indirect land use change emissions. [8] Emissions from feedstocks derived from waste, residues and co-products from existing supply chains will be treated differently dependent on their classification. This is covered further below in Section 3 under the treatment of waste.
- *Processing units and refining (*$e_p - e_{ccs} - e_{ccr}$): The emissions caused by both processing the feedstocks and producing biofuels, minus the emissions captured from carbon capture and storage and carbon capture and replacement.
- *Transportation and distribution* (e_{td}): The emissions caused by transport from both extraction to refinery, refinery to import terminal, and import terminal to distributors.
- *Emissions from combustion* (e_u): The emissions caused by the combustion of the fuel in an engine (i.e. using the fuel in a car).

We propose that the DDVs expressed in the European Union Renewable Energy Directive II (RED II) are used to enable the obligation to be operational from 1 April 2023, with the exception of emissions from transport and distribution (e_{td}). DDVs for transport and distribution would need to be updated to reflect New Zealand's location, and therefore the likely emissions resulting from a fuel's transport to New Zealand and distribution within our borders.

Individual emissions intensity values

Allowing for the use of individual emissions intensity values (often referred to as 'actual values') for biofuels would enable fuel suppliers to determine and use the actual emissions intensity of a biofuel

[8] Direct land use change emissions arise from changes in carbon stocks in soils and biomass when a given piece of land is converted away from its natural state towards productive uses (i.e natural grasslands to agricultural production) leading to direct GHG emissions. Direct land use change emissions will be accounted for in this equation. Indirect land use change emissions arise when the production of biofuels displaces the production of land-based products elsewhere, either directly or via changes in crop prices, leading to indirect GHG emissions. Options for accounting for this are described in Section 3.

they deploy to meet the obligation. This option would provide greater confidence in the emissions reduction potential of a biofuel and would incentivise the use of biofuels that deliver the greatest emissions reductions. Individual emissions intensity pathway or calculations for a component of the pathway are enabled under the European Union's Renewable Energy Directive II and the California Low Carbon Fuel Standard. Public lifecycle emissions analysis tools for the Renewable Energy Directive II are available online.[9]

Obligated parties could also use a mixture of actual values and DDVs for the calculation of the lifecycle emissions intensity of a biofuel.

To be able to use an actual value in its obligation calculations, we propose that a lifecycle greenhouse gas emissions analysis would be undertaken according to a set methodology. The supply chain and production process of the biofuel would need to be audited and certified. Obligated parties would be required to submit the necessary input information and calculations to sustainability schemes, such as the International Sustainability and Carbon Certification or the Roundtable of Sustainable Biofuels,[10] to verify the pathway.

The certification bodies which are endorsed by the sustainability schemes would check that the methodology had been followed, and that calculations are correct. They would also check the accuracy of input information, cross checking against similar processes, and undertaking third party onsite audits where required.

The EPA would hold a database of the relevant information to monitor the actual values and ensure the process is robust and transparent. Section 3 contains more detail about the role of sustainability schemes and certification bodies.

MBIE and the EPA will undertake periodic reviews of the certification bodies to assess whether they are continuing to align with international best practice.

Developing an in-house GHG emissions model

Alternatively, New Zealand could look to develop an inhouse model similar to the California Low Carbon Fuel Standard's GREET model.[11] This would enable obligated parties to input the required information for each component of the given biofuels supply chain to determine the actual values. The advantages of this option are that the model could be adjusted to reflect New Zealand's unique characteristics, such as its location, and the scope and boundaries of the lifecycle GHG emissions analysis. Further, eligible biofuels under the Obligation could be restricted to those that use actual values that have been run through the model. This could increase the accuracy and transparency of the process to obtain the emissions intensity factor.

However, this approach would likely be very resource intensive as it would require the EPA to verify the input information, including hiring third party auditors to undertake audits in international jurisdictions. It is also important to note that such a model would likely take time to develop, and it is unlikely that it will be operational by 1 April 2023, when the obligation will come into effect.

2.3 DETERMINING THE EMISSIONS INTENSITY OF FOSSIL FUELS

We propose that a single default life cycle emissions intensity factor is provided in the regulation for all liquid fossil fuels (E_{FF}) to be used in the calculation of the obligation. This would prevent the use of actual values for the emissions intensity of liquid fossil fuels, as the purpose of the obligation is to

[9] Public lifecycle emissions analysis tools - BioGrace (EU): https://www.biograce.net/

[10] Guidance on the calculation of actual values under the RED II is provided by the certification bodies and can be found on their website.

[11] https://ww2.arb.ca.gov/resources/documents/lcfs-life-cycle-analysis-models-and-documentation

reduce GHG emissions through the deployment of biofuels, not to incentivise efficiency improvements in the liquid fossil fuels supply chain.

Using one emissions intensity factor for all liquid fossil fuels would prevent any changes in the supply and mix of liquid fossil fuels from changing the overall GHG emissions intensity reduction target that is set by the obligation. It also simplifies the calculation. The emissions intensity factor would be on an energy basis (measured in $kgCO_2$-e/MJ).

Determining a default emissions intensity factor for all liquid fossil fuels will be derived from the average mix of liquid fossil fuels supplied in New Zealand over the past five years. The emissions intensity of each type of liquid fossil fuel used to calculate the default emissions intensity factor will be based on a lifecycle GHG emissions assessment.

PLEASE TELL US WHAT YOU THINK:

1) Do you agree with the proposal to allow the use of default values from the European Union's Renewable Energy Directive or actual values verified under sustainability schemes?
2) Apart from transport and distribution emissions, should we allow actual values that have been verified under the European Union's Renewable Energy Directive or the California Low Carbon Fuels Standard to be used? If not, why?
3) Do you see value in developing a New Zealand-specific and inhouse GHG emissions model, similar to the GREET model? If not, why? If so, who should pay for the model's development and upgrading? Why?
4) Do you agree with the proposal to use a default emissions factor that would apply to all fossil fuels? If not, why?
5) Should we only allow biofuels that deliver a greater than 50 per cent emissions reduction, compared to fossil fuels, to be eligible for meeting the obligation? If not, why?

Section 3 – Sustainability criteria

3.1 WHY ARE SUSTAINABILITY CRITERIA NEEDED?

Internationally, there have been examples of biofuels that have had a detrimental impact, including deforestation, loss of biodiversity, food insecurity, and in some cases even a net increase in GHG emissions when compared to fossil fuels.

Defining effective and workable sustainability criteria for biofuels is therefore critical to the success of the Obligation. These criteria should be effective in ensuring that the cultivation and production of biofuels and feedstocks occurs without any adverse environmental or social impacts, and that any greenhouse gas reduction benefits are genuine. Upholding these criteria will require transparent auditing practices and clear traceability along the supply chain.

What are the high-level sustainability criteria that will govern biofuels used under the Obligation?

In November 2021, Cabinet agreed to a set of six sustainability criteria which will govern the eligibility of biofuels that can be used to meet a fuel supplier's annual emissions reduction under the Obligation. These criteria will be set out in the primary legislation.

In developing these criteria, we have tried to ensure that the requirements are proportionate to the risks posed by biofuels feedstocks and are implementable.

The sustainability criteria that were agreed by Cabinet in November 2021 cover:

a) **biodiversity:** feedstocks should not have a significant adverse effect on biodiversity.

b) **impact on carbon stocks:** feedstocks should not lead to deforestation of native forests, canopy forests, or the destruction of wetlands or peatland to plant biofuel crops. The impact of biofuel crops on soil carbon should also be considered.

c) **food and feed security:** feedstocks should not adversely impact food and feed security.

d) **water quality and availability**: feedstocks should not negatively affect water quality or significantly restrict its availability in an area.

e) **the risk of indirect land use change**: feedstocks should not be associated with a high risk of indirect land use change.

f) **use of waste**: feedstocks should be consistent with the principles of the waste hierarchy.

Cabinet has agreed that the sustainability criteria will apply equally regardless of whether biofuels are cultivated or processed in or outside of New Zealand.

We propose that feedstocks or biofuels certified under the International Sustainability and Carbon Certification (ISCC) ISCC-PLUS standard and the Roundtable on Sustainable Biomaterials (RSB) can be considered to have met the Obligation's sustainability criteria on biodiversity, impact on carbon stocks and water quality and availability.

We propose additional options for assessing whether biofuels meet the criteria relating to food and feed security, waste and indirect land use change. These are described below.

3.2 INTERNATIONAL SUSTAINABILITY CERTIFICATION SCHEMES WILL BE USED TO CERTIFY THE SUSTAINABILITY OF BIOFUELS

Cabinet has agreed that international sustainability certification schemes will play a role in certifying the sustainability of biofuels under the Obligation. This recognises that many of the feedstocks and biofuels used to meet the mandate will be cultivated, collected and produced overseas, particularly in the early years of the Obligation's operation.

An **international sustainability certification scheme** (or sustainability scheme) is an organisation that certifies the compliance of biofuels with set sustainability criteria and other regulations, such as biodiversity and impact on carbon stocks. Such schemes may operate only in a particular market or for a particular feedstock, such as soybeans or corn. Alternatively, they might have broad global market coverage involving a diverse array of feedstocks.

There are many schemes that have been established to certify the sustainability of biofuels.

Each scheme typically publishes its own **sustainability scheme standard**. Many of the schemes have based their standards on the European Union Renewable Energy Directive (RED II) and its predecessors – meaning the scheme's standard will include the sustainability requirements of RED II, as well as other requirements.

Obligated parties will be able to certify the sustainability of their biofuels through either the International Sustainability and Carbon Certification (ISCC) or the Roundtable on Sustainable Biofuels (RSB)

We propose that feedstocks or biofuels certified under the International Sustainability and Carbon Certification (ISCC) ISCC-PLUS standard and the Roundtable on Sustainable Biomaterials (RSB) can be considered to have met the Obligation's sustainability criteria on biodiversity, impact on carbon stocks and water quality and availability.

The ISCC and RSB are two of the largest international certification schemes applicable to all feedstocks in any location. Both of their standards are derived from the European Union Renewable Energy Directive (RED II) but also address broader matters than the RED II. Both have been approved by the European Commission to be able to certify biofuels for their compliance with the RED II.

In determining which schemes obligated parties can use to certify the sustainability of their biofuels, we have assessed existing international certification schemes against the Obligation's high-level sustainability criteria. Given the key role these schemes will play, it is important that fuel suppliers, the public and the Government can have confidence in their robustness, transparency, and integrity.

Our assessment also involved analysing those international certification schemes approved by the European Union to assess the sustainability of biofuels and their feedstocks under RED II. This analysis required identifying a scheme's area of operation, the feedstocks it assesses, as well as its governance and processes for maintaining integrity, including transparency and auditing.

We have also consulted with several certification scheme bodies, as well as other jurisdictions with similar low-carbon fuels or biofuels mandates which utilise international sustainability certification schemes. Annex Two sets out more detail on how international sustainability certification schemes certify the sustainability of biofuels.

How will domestic sustainability concerns be addressed through international sustainability certification schemes?

Although typically based on the European Union's RED II, sustainability scheme standards also require all legal requirements in the country of origin or processing to be met. For example, if crops were to be cultivated in New Zealand for the production of biofuels, they would also be subject to

PLEASE TELL US WHAT YOU THINK:

6) Do you agree with the way that we propose to assess compliance with the sustainability criteria in legislation?
7) Are there any other international sustainability certification schemes that you think should be included?

the Resource Management Act 1991 (or its successor, the proposed Natural and Built Environment Bill), and the requirements of regional and district plans. Regional and district plans are influenced by national policy, such as the National Policy Statement on Freshwater Management and the National Environmental Standards on Plantation Forestry. A National Policy Statement on Indigenous Biodiversity, to address the decline of rare ecosystems and threats to indigenous biodiversity (particularly on private land) is currently under development by the Ministry for the Environment and the Department of Conservation.

3.2 LAND USE CHANGE CAUSED BY BIOFUELS PRODUCTION

Strong concerns have been raised regarding the potentially large land requirements for biomass production associated with some types of biofuels, such as conventional biofuels like ethanol and biodiesel derived from crop feedstocks. This demand is often additional to land used to meet the increasing demand on food and feed crops driven by a growing world population. Land use change and its associated emissions[12] is one of the major concerns about the emissions mitigation potential of conventional biofuels.

Land use change that results in a net carbon loss will create a carbon debt that can be addressed through the cultivation of new crops which sequester carbon over time. Depending on the type of land use change and the biofuel crops planted, the payback time of this carbon debt varies substantially. When considering the urgency in the need to tackle climate change, land should not be converted to accommodate the production of feedstocks for biofuels if its carbon debt cannot be addressed within a reasonable period. It is important to note that the production of many feedstocks, such as those from increased crop yields, would not create a carbon debt.

Direct land use change emissions will be accounted for in the lifecycle GHG emissions analysis used to prescribe an emissions intensity factor for each type of biofuel, as described in section 2. Land use change impacts could also partially be addressed through other criteria including biodiversity and food security.

Addressing the risk of indirect land use change

Historically, indirect land use change has happened when pasture or agricultural land previously used for food and feed markets is diverted to the production of biofuels. The food and feed demand will still need to be satisfied, and this can only be done through increasing the yields of current food production, substitution away from land-intensive food production, or by converting non-agricultural land into production elsewhere (i.e indirect land use change). In the latter case, this can increase GHG emissions, especially if it affects land with high carbon stocks such as old growth forests, wetlands, and peatland.

Attempting to account for indirect land use change emissions in the emissions intensity factor of any given biofuel is very challenging because indirect land use change is very difficult to observe and therefore meaningfully quantify. Academic literature suggests that economic models and lifecycle analysis methodologies that account for indirect land use change emissions have made marginal improvements over the last few decades. However, these approaches still fail to reduce the uncertainty in determining emissions factors and the results are heavily determined by the input assumptions. Attempting to incorporate indirect land use change emissions estimates into the lifecycle GHG emissions methodologies (as described in section 2) is unlikely to be an effective or accurate approach to mitigating the risk of these additional emissions. As a result, we propose additional approaches for mitigating this risk.

[12] Land use change emissions occur when land is converted away from high-carbon stock land, to low such as clearing forest to make way for farms,

Options for addressing indirect land use change emissions and impacts

We have identified two options for addressing the risk of indirect land use change and its impacts. A failure to address the risk of indirect land use change emissions could result in a net GHG emissions increase from the Sustainable Biofuels Obligation.

Both options would reduce the total availability of biofuels to obligated parties by classifying certain biofuels as ineligible under the Obligation and could increase the cost of available biofuels in the short term. As the carbon price increases in the medium- to long-term, advanced biofuels (such as cellulosic biofuels derived from woody biomass) that are not associated with land use change risks are expected to become more price competitive with fossil fuels.

The options are unlikely to significantly impact the achievability of the targets until about 2030. The achievability of the targets beyond 2030, however, will partially depend on the range, quantity and price of advanced biofuels available by this time. The maturity of the advanced biofuels market will be a consideration in the review of the provisional targets prior to setting the final target levels.

Option 1*: Set a cap on the maximum amount of food and feed-based biofuels, and ban feedstocks that have historically resulted in significant indirect land use change emissions*

Setting a cap on the amount of food and feed-based biofuels would limit the risk of indirect land use change from any potential expansion of food and feed-based biofuels that could be driven by the Obligation. This option also encourages the use of food and feed-based biofuels that deliver the highest emissions reductions per unit of energy delivered. This cap could be ramped down over time, however further analysis is needed to determine the percentage the cap should be set at and how quickly this would need to ramp down over time.

Some feedstocks including palm oil, soybean and, in some cases, corn have been observed to create significant indirect land use change emissions which can be attributed to an increase in biofuels production from these feedstocks.[13] Limiting or preventing the use of feedstocks that carry the highest risk of creating significant indirect land use emissions can help to mitigate the worst potential risks from indirect land use change.

One way to define high-indirect land use change risk feedstocks is to modify the definition that the European Union uses for those crops for which the share of observed expansion onto high carbon stock land is greater than 5 percent according to the shares listed in the Annex to the European Commission Delegated Regulation on high- and low-indirect land use change-risk biofuel feedstocks. The EU has set the threshold for high-indirect land use change risk feedstocks as crops for which the share of observed expansion onto high carbon stock land is greater than 10 percent. We have adjusted this to 5 percent to exclude the feedstocks at the greatest risk of causing indirect land use change from the obligation.

The marginal cost for abatement of this option is \$112/tCO_2-e, increasing from 91 \$/tCO2e if no action is taken to limit indirect land use change. Assuming a carbon price of \$100/tCO2-e in 2025, biofuels could cost 6.5 to 11 cents per litre more than fossil fuels. This estimate is inclusive of infrastructure costs, which could range from 2 to 6 cents per litre.

Bioethanol blended petrol costs are unlikely to be impacted directly by this option. This is because the high-indirect land use change risk feedstocks that would be excluded from the Obligation are predominantly feedstocks for biodiesel and renewable diesel. Obligated parties may choose however to spread their compliance costs, including those from increased biofuel costs, across their petrol and diesel sales.

[13] https://www.transportenvironment.org/scientific-publications/

A cap on food-and feed-based biofuels would limit the amount of ethanol that could be used to meet the Obligation. As a result, the Obligation would be skewed towards deploying biofuels into the diesel supply. Emissions reductions would predominantly come from the heavy vehicle fleet and the marine sector. In the long run, this could better complement efforts to electrify the light vehicle fleet.

Option 2: *Require all biofuels to have certification showing they are considered at "low risk" of causing indirect land use change.*

International certification bodies, including the RSB and the ISCC, have developed low indirect land use change risk modules for companies to use on a voluntary basis. These modules recognise three approaches for demonstrating biofuels have a low risk of creating indirect land use change emissions: whether the feedstocks are a result of crop yield increases; the use of marginal or unused land to cultivate feedstocks[14]; and the use of waste/residues as a feedstock. If biofuels are produced from feedstocks that fall into any of these three categories, they can be certified as low risk of indirect land use change. These should be defined as:

- *Crop yield increases:* feedstock producers can demonstrate that additional biomass for biofuel/biomaterial was produced through an increase in yield compared to a reference point (noting annual yield fluctuations should be taken into account), without any additional land conversion. Yield increases should be driven by means of improved agricultural practices, investments in equipment, and knowledge transfers, beyond that which would have occurred in the absence of demand for biofuels.
- *Unused/degraded land*: feedstock producers can demonstrate that biomass for biofuel/biomaterial was produced on land that was not previously cultivated or was not considered arable land (a reference date of 2008 is used in the Renewable Energy Directive II).
- Use of waste/residues: biofuels producers can demonstrate that raw material used for biofuel/biomaterial is derived from waste or residues of existing supply chains (e.g. food production, wood processing etc.) and do not require dedicated production out of arable lands.

Requiring all biofuels to have certification showing they are considered low risk of causing indirect land use change would reduce the risk of causing indirect land use change emissions. As we note above however, indirect land use change is difficult to observe, measure and estimate. Due to this, low indirect land use change risk certification may not comprehensively address the risk of indirect land use change emissions occurring because of the Obligation. This option would add additional compliance costs and could reduce the total available supply of biofuels that could be used to meet the Obligation. We estimate that these costs would be comparatively smaller than option 1 discussed above.

Land use change in Aotearoa

Land use change in Aotearoa in recent years is different to what has occurred in many other parts of the world. Land use change that has occurred internationally as a consequence of the production of biofuels has typically involved an expansion of agricultural land to replace food or feed displaced by those biofuel crops. The expansion of agricultural land may have occurred onto high-carbon stock or high biodiversity land. The focus of the options covered in this section is to mitigate the risk of this happening internationally, especially as in the initial years most of the biofuels to meet the obligation are likely to be imports.

[14] 'Marginal land' is defined in the EU as "low carbon stock land that was not in use for agriculture or any other activity in Jan 2008 or land that, for a significant period of time, has either been significantly salinated or presented significantly low organic matter content and has been severely eroded."

Domestically, afforestation of agricultural land has been a significant factor for land use change as has the expansion of dairy production. The sustainability criteria do not address the domestic context directly. This will be primarily considered through other policy settings such as the Emissions Trading Scheme, One Billion Trees Programme, and the Resource Management Act. As a domestic biofuel market is established over the medium to long term, the sustainability criteria will need to be assessed to ensure alignment with domestic policy settings.

3.3 BIOFUELS AND FOOD SECURITY

PLEASE TELL US WHAT YOU THINK:

8) Do you agree with our assessment that indirect land use change emissions should not be included in the lifecycle GHG emissions analysis, due to the inherent uncertainty in the economic modelling that is required to do this?
9) What is your preferred option, or combination of options, for addressing the risk of indirect land use change caused by additional biofuels production?
10) Do you think these options will adequately address the risk of indirect land use change? If not, why?
11) If not, what alternatives would you suggest?

Cabinet has agreed that feedstocks used to produce biofuels should not adversely impact food security. [15]

Global food security faces numerous challenges in the coming decades that are likely to be driven predominantly by environmental degradation, climate change and population growth. Other risks to food security could be heightened by the effects of climate change, such as loss of access to fresh water and agricultural diseases, or geopolitical tensions. It is important that the production and expansion of biofuels does not compound these challenges or heighten risks to food security.

Increased biofuels production could impact food and feed markets in multiple ways. The most direct potential impact is on the food availability[16] both locally and globally. If crops that would have otherwise gone to food and feed markets are diverted to biofuels production, due to higher energy prices or greater demand, this would reduce the physical supply of food, particularly in countries or regions that are considered to be food insecure. The supply shortage can be addressed in time through further land conversion to food and feed crops or through improved crop yields. However, the expansion of crop land would compound competing pressures for land use especially given the significant role afforestation will play in climate mitigation and adaption pathways. This effectively places a hard limit on the amount of land that can be converted for crop production.

Biofuels production can also impact food accessibility[17] by influencing the price farmers receive for food and feed crops. In the 2008 world food price crisis, rising crop prices driven by a combination of droughts, rising oil and fertiliser prices, and increasing biofuels demand severely limited the accessibility of food especially to poorer countries and people. The impact of biofuels demand on the price is widely debated in the literature.

While food security is an intuitive concept, measuring and monitoring food security is challenging. Proxy indicators of hunger are often used as an indication of global food security, while the Global

[15] According to the United Nations' Committee on World Food Security, food security is defined as meaning that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life.
[16] Food availability is about ensuring the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports
[17] Food accessibility is about ensuring food that is available is also able to be attained or afforded.

Food Security Index is developed annually. Gathering the information to develop these indicators can be time-intensive, while food crises can often evolve rapidly whether as a result of extreme weather events, natural disasters, or conflict. Food price indices alone are not accurate indicators of food security as they do not show who and how many people actually suffer from hunger or malnutrition due to food insecurity. As a result, policy measures to protect food security that rely on these indicators are unlikely to be an effective in an emerging food crisis.

Not all biofuels would impact food security

However, biofuels production can support local agricultural production when risks concerning indirect land use change and food security are adequately managed.[18] Increased revenue from biofuels production can enable food producers to maintain and invest in their operations. Increased crop yields can be driven by efficiency improvements on farm, enabling more to be produced using the same inputs, and crop yields that are additional to food and feed demand can be sustainably used as feedstocks for biofuels.

Advanced biofuels (non food-based biofuels such as cellulosic ethanol) provide a solution to the challenge of food security that must be considered when using biofuels derived from food crops. Feedstocks derived from waste, residues, co-products, or bioresources that do not exacerbate competition for land will avoid both the risk of impacting food security and indirect land use change. As the global demand for biofuels increases in the coming decade, it will become increasingly important that this demand is from advanced biofuels, and not those derived from crops that would otherwise be bound for food and feed markets.

We have identified two options to ensure that biofuels are not adversely impacting food security. These options are not mutually exclusive.

Option 1*: Require all biofuels produced from food-based feedstocks to be certified against the Food Security Standard or an equivalent standard.*

There are specific standards for examining the possible impacts on food security, such as the Food Security Standard, which can be incorporated into the ISCC and RSB's sustainability certification scheme standards. This could be added as an additional requirement for biofuels on top of the sustainability scheme standards.

This standard is based on a local or regional assessment of the impacts of biofuel production on food security. The standard ensures that crops dedicated to biofuels production do not have a negative impact on food security in their region, and that they enhance food security to directly affected households in their locality. However, food and feed crops are globally traded commodities, and this standard does not fully account for the impact biofuels could have on global food security. For example, a farmer in Australia may supply their crops to both food and biofuels markets without impacting Australian food security. However, the Australian crops being diverted to biofuels production would not be available for export to any potential food insecure regions.

Assessing biofuels against the Food Security Standard would help mitigate the risk reducing food security because of biofuels production, particularly at a local or regional level in food insecure regions. However, challenges remain in the ability of the standard to account for and mitigate global food security risks or respond to emerging food crises in an effective or timely manner. It will be important for the standard to continue to improve over time. Ongoing monitoring and analysis will be essential to improve food security standards, build synergies between food and energy needs and equitably meet growing demands for both food and energy.

[18] K.L Kline et. Al (2017); Reconciling food security and bioenergy: priorities for action; https://onlinelibrary.wiley.com/doi/epdf/10.1111/gcbb.12366

Option 2: *Rely on the options outlined to address indirect land use change (ILUC) to mitigate any indirect impacts on food security (discussed in section 3.3).*

Food security is strongly linked to land use change and the sustainability criterion on indirect land use change (ILUC). ILUC has historically resulted from the displacement of crops to food and feed markets going to biofuels markets. The options discussed in Section 3.3 would help to mitigate the risk that biofuels production could displace crops from food and feed markets.

A sinking cap on food and feed-based biofuels would provide the most certainty that biofuels demand driven by the Obligation would not exacerbate food security concerns. This would signal to industry the need to meet future obligations predominantly through waste-based and advanced biofuels. Further analysis on at what percentage of biofuels supply the cap should be set at and how quickly this would need to ramp down would need to be undertaken to enable this.=

PLEASE TELL US WHAT YOU THINK:

12) What is your preferred option, or combination of options, for addressing the risk of the biofuels obligation adversely impacting food security and why?

3.4 USE OF WASTE AND CLASSIFICATION OF FEEDSTOCKS

Cabinet agreed that feedstocks should be consistent with the principles of the waste hierarchy.

Under the Obligation, only biofuels (i.e. fuels derived from biological matter or biomass) are eligible. Fuels derived from fossil carbon wastes or mixed biological and non-biological wastes would not be eligible, including recycled carbon fuels (RCF) or renewable fuels of non-biological origin (RFNBO).

Cabinet has agreed that the biofuels obligation be reviewed after it has been in operation for two years to determine, amongst other issues, whether it should be expanded to include other low-emissions and renewable fuels, such as hydrogen and electricity. This will also include RCF and RFNBO. For RCF, there are some sources of recycled carbon that may align with government priorities (in terms of making use of a carbon source which would otherwise contribute to GHG emissions), while others are likely to be less so; for example, turning waste plastics into fuels releases the carbon into the atmosphere, while also creating a continuing demand for waste plastics.

The waste hierarchy

The Ministry for the Environment released a consultation document 'Taking responsibility for our waste' in October 2021[19]. The document spoke about the need to move away from a linear economy towards a circular economy. A linear economy is one that relies heavily on extracting natural resources at scale and promotes continuous consumption and replacement over keeping products in use (take, make, waste). In contrast, a circular economy is focused on the principles of designing out waste and pollution, keeping materials and products in use, and regenerating natural systems (make, use, return).

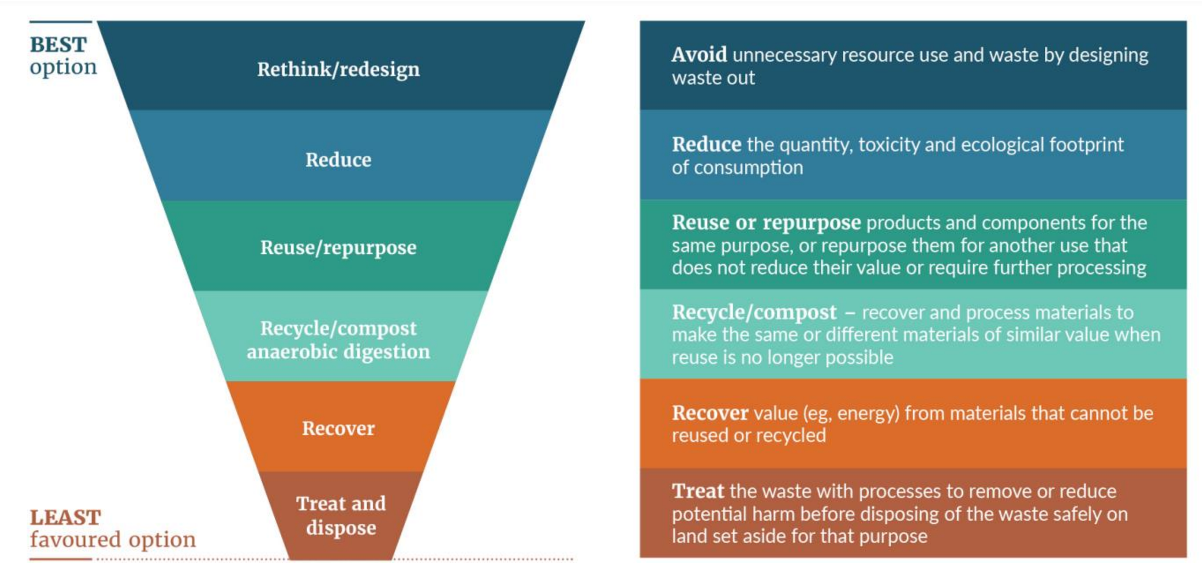
How we make, manage, use and dispose of waste could play a key role in how we move towards a more circular economy. The waste hierarchy is used as a tool to explain the complexities of reducing, managing and utilising waste (see figure 2 below).

[19] https://consult.environment.govt.nz/waste/taking-responsibility-for-our-waste/supporting_documents/wastestrategyandlegislationconsultationdocument.pdf

Recovering value (energy) from materials that cannot be reused or recycled is towards the bottom end of the hierarchy (i.e a less desirable option from a waste management perspective). However, where there are wastes or residues which would otherwise have little economic value, or would otherwise be landfilled with the possibility for GHG emissions to leak out, there is a valid case for waste to energy applications.

Ensuring the use and expansion of biofuels does not adversely impact the principles of the waste hierarchy is something that will need to be considered and reviewed as the targets under the Obligation increase. Increased revenues from waste streams could create incentives for industries to produce more waste, especially if the price they can receive for their primary product is comparatively low when compared to the price of biofuels.

Figure 1: the waste hierarchy



The classification of waste, residues or coproducts

Classifying a feedstock, such as whether it is a waste or a residue, is important because it has implications for how the biofuel will be treated in the life cycle analysis, and whether upstream GHG emissions will be allocated to it. We propose to carry over the classifications from the Renewable Energy Directive II.

Waste is “any substance or object which the holder discards or intends or is required to discard”. It excludes “substances that have been intentionally modified or contaminated in order to meet this definition”. Under the Obligation, only fuels derived from biological waste would be eligible.

Residue means “a substance that is not the end product that a production process directly seeks to produce; it is not a primary aim of the production process, and the process has not been deliberately modified to produce it”.

A co-product is different from a residue, as it is one of multiple products which are the primary aim of the production process. In many cases a production process results in other materials not being the (single) primary aim of the process, but which are still of significant economic value for the producer.

The different classification definitions are summarised in the table below, along with their proposed treatment in regard to GHG emissions and sustainability criteria.

Table 2 – waste, residues and co-products

Classification	GHG emissions	Sustainability criteria
Waste (biological wastes only)	Considered to have zero GHG emissions at the collection point	Not required to meet sustainability criteria
Residue – processing	Considered to have zero GHG emissions at the collection point	Not required to meet sustainability criteria
Residue – agriculture, aquaculture, fisheries and forestry	Considered to have zero GHG emissions at the collection point	Required to meet sustainability criteria
Co-product	Attributed upstream GHG emissions from the beginning of the supply chain (proportionate to its share of the product stream)	Required to meet sustainability criteria

Residues are dealt with differently, depending on whether they are generated or collected during processing, or at the point of production (for agriculture, aquaculture, forestry and fishing residues).

If feedstock collection points meet the relevant ISCC or RSB standards, they can be considered to be compliant with this sustainability criterion. There needs to be a strong emphasis on auditing the authenticity of wastes and residues in particular. In the ISCC and RSB standards, the level of oversight applied is based on an assessment of the risk of fraud or mislabelling. This takes into account different factors, including where the waste is collected from, and an evaluation of whether the amount and type of waste is realistic for the nature of the operation. It will be important to continue to monitor potential risks to the authenticity of feedstocks and biofuels.

The EPA would have a role in determining the status of a feedstock as a product, co-product, residue or waste. It would assess this based on information provided by or on behalf of the obligated party (usually by one of the approved sustainability certification schemes). This would also extend to verifying whether it is derived from a biological source.

How emissions will be allocated between co-products

There are different methods for the allocation of emissions between co-products: it can be done according to energy, mass or economic value. The EU prefers the energy allocation method, as it is "easy to apply, is predictable over time, minimises counter-productive incentives and produces results that are generally comparable with those produced by the substitution method." In this context, the substitution method involves identifying the products that are being replaced (or substituted) by the co-products in question and quantifying the GHG emissions associated with those products. The avoided GHG emissions are then credited to the product which is the subject of the life-cycle analysis. We propose that emissions are allocated between co-products based on energy content.

We propose that residues or co-products which are derived from a primary product which is excluded or limited from the Obligation through other sustainability criteria should also be excluded or limited. This will avoid creating an indirect demand for feedstocks that, for example, are at high risk of leading to indirect land use change (discussed in Section 3.3).

Displacement emissions from the use of waste feedstocks

Used cooking oil and tallow have been two of the most common waste feedstocks for biofuels production. While they are not purposefully produced for biofuels production, in the absence of biofuels production, they could have valuable market uses in sectors like fertiliser, animal feed, and oleochemicals. Displacement emissions are the indirect emissions from producing and utilizing a replacement feedstock when an economically valuable feedstock is removed from the market to produce biofuel. For example, when tallow is used to produce biodiesel or renewable diesel, an alternative must be produced for use in manufacturing soap and animal feed.

Although the market effects of displacement fall outside the scope of direct production system boundaries for life cycle analysis (described in section 2), assessing the possible implications could improve the understanding of the GHG emissions implications of diverting these materials to biofuel production. It could also assist with identifying high- and low-risk feedstocks.

However, there is no clear consensus on how to include displacement within policy in a consistent way. Because of this, we do not propose to include consideration of displacement emissions in the regulations at this time. However, we will continue to monitor international best practice on addressing displacement emissions, and if a viable methodology emerges this could be included in the regulations in the review of the biofuels obligation two years after it comes into effect.

PLEASE TELL US WHAT YOU THINK:

13) Do you agree with our proposed approach to require biofuels derived from any of the waste streams to be certified against the relevant ISCC EU standard or RSB standard? If not, why?
14) Do you agree with our proposed approach to for allocating GHG emissions to products, co-products, residues and wastes according to Table 1, based on energy content? If not, why?
15) Do you agree that feedstocks that are classified as agriculture, aquaculture, fisheries or forestry residues or co-products would need to meet the sustainability criteria? If not, why?
16) Do you agree with our proposal to exclude or limit residues or co-products that may be excluded or limited under the other criteria (such as the ILUC options)? If not, why?

Section 4 - Other considerations for the implementation of the obligation

4.1 INTERACTION WITH THE FUEL INDUSTRY ACT AND REGULATIONS

The Fuel Industry Act 2020 was introduced to promote greater competition fuel markets, following the Commerce Commission fuel market study.

The Fuel Industry Act introduced a terminal gate pricing regime, which requires wholesale suppliers to post a daily terminal gate price which they must supply if requested by a reseller to (unless there are reasonable grounds to refuse supply). The Fuel Industry Regulations 2021 excludes diesel and petrol that contain more than one percent biofuel by volume from the terminal gate pricing requirement (biofuel blends will be subject to the other parts of the Fuel Industry Act based on the current regulations). The purpose of the terminal gate pricing regime is to increase transparency of wholesale pricing, and to provide a source of fuel supply for potential entrants to retail fuel markets on a nationwide basis. Therefore, the intent behind the exclusion is to focus the terminal gate pricing requirement on the fuels that new entrants require access to, in order to be able to make a competitive service offering.

Once the biofuels obligation takes effect, the composition of fuels supplied to the market will change. In the first year, for example, when the emissions reduction target is 1.5 percent, there could be 34 million litres of ethanol and 8 million litres of biodiesel, compared to an overall fuel volume of 615 million litres of petrol and 370 million litres of diesel.[20] Although the biofuel will not be uniformly blended throughout fuel, it is likely that a significant proportion of the fuel supply will have a greater proportion of biofuels than 1 percent, particularly as the emission reduction percentage ramps up over time.

Because of this, situations could arise where:

- Resellers could request high volumes of fuels with less than one percent biofuel under the terminal gate regime. This could create a situation where the fuel wholesaler struggles to meet the required emission reduction percentage, especially as it increases;
- As the emissions reduction percentage increases the terminal gate pricing regime could become less effective at providing a transparent wholesale fuel price. This may limit resellers' ability to switch suppliers or multisource fuel, as wholesale suppliers may have different biofuel profiles, which not be suitable for the reseller's product offering.

However, it is unclear how significant these risks will be when the biofuels obligation comes into effect. We have heard anecdotally that, to date, only a few transactions have occurred under the terminal gate pricing regime. It is also uncertain whether resellers have incentives to request fuels with less than one percent biofuel at the terminal gate, especially if wholesale suppliers offer biofuel blends as a substitute at a competitive price.

Nevertheless, we have identified two options that could mitigate the potential risks.

- Removing the one percent biofuels exclusion from the terminal gate pricing regime; or
- Adding specified biofuel blends as a separate category of fuel to the terminal gate pricing regime.

However, removing the one percent biofuels exclusion could make it difficult for resellers to compare terminal gate prices, and adding biofuel blends to the terminal gate pricing regime could impose costs on wholesale suppliers, as some blending of fuels currently takes place after it has been drawn from a bulk storage facility.

[20] Based on the example provided in Annex One for Company A, not actual estimates of the fuel mix.

Therefore, we do not propose progressing these options. Instead, we propose monitoring the effect of the obligation on competition through the information disclosure regulations. This might require amendments to the information disclosure requirements.

PLEASE TELL US WHAT YOU THINK:

17) Do you agree with the risks outlined above? If you do, do you agree with the proposed approach?

4.2 ENGINE FUEL SPECIFICATIONS REGULATIONS REVIEW

The Engine Fuel Specifications Regulations 2011 prescribe the specifications for petrol–ethanol and diesel–biodiesel blends, including the maximum percentage by volume for blends sold by retail sale. The regulations also stipulate the labelling requirements relating to retail containers and fuel pumps.

The Ministry of Business, Innovation and Employment is reviewing the regulations during 2022 to look at, among other things, whether advanced biofuels should have specifications, and whether the current maximum percentages for blends are still appropriate. MBIE will consult on proposals for change to the regulations later in 2022.

4.3 LABELLING AT THE PUMP: EMISSIONS REDUCTIONS

The Engine Fuel Specifications Regulations cover the labelling requirements relating to retail containers and fuel pumps. MBIE and the Ministry of Transport have considered whether there should be additional regulations to prescribe the labelling emissions reductions associated with a particular biofuel blend. While there could be some benefit from consumers having more information about the emissions of fuel they are purchasing, it would introduce a significant degree of complexity as different biofuels have different emission reduction potential, and fuel suppliers may not consistently supply the same biofuel. Fuel sellers could make claims about the emissions reduction potential of biofuel blends they are selling on their own websites.

Annex One: Example calculation

$$Emissions\ intensity\ reduction = 100 \times \frac{E_{fossil\ fuels} - E_{supplied}}{E_{fossil\ fuels}}$$

Where:

$E_{fossil\ fuel}$ = the emissions in tonnes of carbon dioxide equivalent if all the supplier's fuels were fossil fuels;

$E_{Supplied}$ = the emissions in tonnes of carbon dioxide equivalent of the supplier's actual fuel supply, including fossil fuels and biofuel blends; and

the energy content (MJ) of $E_{fossil\ fuel}$ and $E_{Supplied}$ must be equal.

Step one: Calculating $E_{Supplied}$

The following values for each type of fuel will be standardised in regulation:

- Energy content per litre (MJ/L)
- Emissions factors (kgCO_2-e/MJ)[21]

The following values will need to be provided by obligated parties:

- Volume (L), for both blended and unblended volumes.

To determine the total emissions from Company A's fuel supply, emissions from each type of fuel supplied will need to be determined. This includes both blended fuels (i.e. ethanol blended petrol) and unblended fuels (i.e. mineral petrol or drop-in renewable diesel). Emissions (tCO_2e) can be derived from volume (l), energy content (MJ/L), emissions factors (kgCO2-e/MJ).

For example, Company A deploys 300 million litres of mineral petrol. To determine the emissions from this:

1) Volume (litres) × Energy content per litre (MJ/L) = energy content of fuel supplied (MJ)
300,000,000L × 33MJ/L = 9,900,000,000 MJ
2) Energy content of fuel supplied × Emission factors ÷ 1000 = Actual emissions, tonnes CO_2-e
9,900,000,000 MJ × 0.1020 ÷ 1000 = 1,009,800 tCO_2-e

For blended fuels, both energy content and emissions factors will be determined in accordance with the blend percentage. For example, for 9.8% ethanol blended with mineral petrol:

Energy content per litre = $MJ/L_{ethanol} \times 0.098 + MJ/L_{min\_petrol} \times (1-0.098)$

Emissions factor = $kgCO_2\text{-}e/MJ_{ethanol} \times 0.098 + kgCO2\text{-}e/MJ_{min\_petrol} \times (1-0.098)$

The following table show company A's fuel mix:

Fuel supplied - Company A					
Fuels	**Volume, litres (L)**	**Energy content per litre, (MJ/L)**	**Energy content, megajoules (MJ)** MJ = MJ/L X L	**Emission factors[22], kg CO_2-e/MJ**	**Actual emissions, tonnes CO_2-e**

[21] Note in section 2.2 we have proposed that the use of certified actual values can be used to determine the emissions intensity of a given biofuel.
[22] Note this example does not reflect the energy content per litre volume or the emissions intensity factors that will be set in the regulations

					tCO_2-e = MJ X kg CO2-e/MJ ÷ 1000
Mineral petrol (no blending)	300,000,000	33	9,900,000,000	0.0985	975,150
Mineral diesel (no blending)	200,000,000	38	7,600,000,000	0.0985	748,600
Ethanol blended petrol, 9.8%	350,000,000	31.726	11,104,100,000	0.0997	1,070,773
Biodiesel (FAME) blended diesel, 4.5%	180,000,000	37.955	6,831,900,000	0.0928	656,908
Total	1,030,000,000		35,436,000,000		3,451,431

Unblended fuel supplied					
Fuels	**Volume, litres (L)**	**Energy content per litre, MJ/L**	**Energy content, MJ**	**Emission factors, kg CO_2-e/megajoule**	**Actual emissions, tonnes CO_2-e**
Mineral petrol	615,700,000	33	20,318,100,000	0.0985	2,001,333
Mineral diesel	371,900,000	38	14,132,200,000	0.0985	1,392,022
Ethanol	34,300,000	20	686,000,000	0.065	44,590
Biodiesel	8,100,000	37	299,700,000	0.045	13,487
	1,030,000,000		35,436,000,000		3,451,431

$E_{Supplied}$ = 3,473,082 tCO_2-e

Energy content = 35,436,000,000 MJ

Step 2: Calculating $E_{fossil\ fuel}$

$E_{fossil\ fuel}$ = 35,436,000,000MJ × 0.0985 kg CO_2-e/MJ ÷ 1000
= 3,490,446tCO_2-e

Fuels	**Volume, million litres**	**Energy content, megajoules/litre**	**Energy content, megajoules**	**Emission factors, kg CO2-e/MJ**	**Emissions if all fossil, tonnes CO2-e**
Mineral petrol (no blending)	636,487,880	33	21,004,100,000	0.0985	2,068,904
Mineral diesel (no blending)	379,786,842	38	14,431,900,000	0.0985	1,421,542
Total	1,016		35,436,000,000		3,490,446

Step 3: calculation of emissions intensity reduction

$$Emissions\ intensity\ reduction = 100 \times \frac{E_{fossil\ fuels} - E_{supplied}}{E_{fossil\ fuels}}$$

$$100 \times \frac{3{,}490{,}446 - 3{,}451{,}431}{3{,}490{,}446} = 1.118\%$$

Step 4: comparison against the target

The target under the obligation = 1.2%

Company A has achieved an emissions intensity reduction of 1.12%

The short fall in emissions reductions is:

Emissions reductions achieved by Company A through the deployment of biofuels = 39,015tCO_2

Emissions reductions Company A needed to meet a 1.2% emissions reduction target, holding energy content constant (MJ) = 41,885 tCO_2

Shortfall in emissions reductions = 2,870tCO_2e

Annex Two: Further detail on sustainability certification schemes

How do the ISCC and RSB certify the sustainability of biofuels in practice?

The ISCC and RSB sustainability certification schemes are supported by 'certifying bodies', which are independent third parties who assess biofuels and feedstock production facilities (along the supply chain) against the relevant sustainability criteria. In the case of the Obligation, the ISCC and RSB will use the six sustainability criteria as agreed to by Cabinet.

Both the ISCC and the RSB approve the certifying bodies which can certify their sustainability scheme standards. The ISCC and the RSB may also audit their respective certifying bodies to ensure sufficient interpretation and application of their sustainability scheme standards.

The feedstock or biofuel producer will pay the certifying body to certify its feedstock or biofuel production against the international certification scheme's standard, either the ISCC or the RSB. To do this, the certifying body will visit the farm or production area and gather information about how the feedstock or biofuel is produced. Once its feedstock or biofuel is approved, the producer is issued with a certificate from the ISCC or the RSB certification scheme.

The diagram below sets out the roles involved with the proposed sustainability certification process: