Regulatory Impact Statement: Regulations to enable the implementation and administration of the Sustainable Biofuels Obligation

Coversheet

Purpose of Document	
Decision sought:	Analysis produced for the purpose of informing final Cabinet decisions on the design of regulations to support the implementation and administration of the Sustainable Biofuels Obligation.
Advising agencies:	The Ministry of Business, Innovation and Employment, and the Ministry of Transport.
Proposing Ministers:	The Minister of Energy and Resources and the Minister of Transport.
Date finalised:	08/08/22

Problem Definition

A regulatory regime will need to be developed to enable the implementation and administration of the Sustainable Biofuels Obligation (the Obligation). The regulations will set out how the Obligation will be calculated and how to ensure the sustainability of biofuels, however:

1) There is no agreed methodology for calculating the emissions intensity of biofuels, which is a key input in determining the GHG emissions reductions achieved under the Obligation.
2) There are no agreed methodologies or processes to ensure biofuels used in New Zealand meet the sustainability criteria agreed by Cabinet in 2021.[1]

This Regulatory Impact Statement will be split into two parts to explore possible approaches to address these two problems.

Executive Summary

Background

Cabinet agreed to the final policy design of the Obligation in October 2021, which is to come into effect on 1 April 2023.

[1] https://www.mbie.govt.nz/dmsdocument/18369-sustainable-biofuels-mandate-final-policy-design-minute-of-decision-proactiverelease-pdf

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The Obligation requires importers or producers of liquid transport fossil fuels, excluding aviation fuels to reduce the greenhouse gas (GHG) emissions intensity of those fuels by a set percentage each year by supplying biofuels (in blended or in neat form).

The required emissions percentages for the first three years are 1.2, 2.4 and 3.5 percent respectively. Provisional targets will be set for 2026 and beyond, increasing up to 9.0 percent by 2035. The Environmental Protection Authority will be the regulator of the obligation.

A regulatory regime is required to support the implementation and administration of the obligation. This includes:

1) A methodology for calculating the GHG emissions intensity obligation, based on lifecycle emissions analysis.
2) Rules to define and apply the sustainability criteria to determine the eligibility of different biofuels, and the selection of international sustainability certification schemes.

More information, including previous regulatory impact analysis on the design of a sustainable biofuels obligation', can be found here: https://www.mbie.govt.nz/have-your-say/increasing-the-use-of-sustainable-biofuels-in-aotearoa-new-zealand/

Preferred options

Calculating the obligation

Setting default values at a conservative estimate of the emissions intensity of any given biofuel will provide an incentive for biofuel suppliers to undertake an assessment of the actual emissions intensity of their supply chain. Biofuel suppliers who can reduce emissions through their supply chain are rewarded with greater emissions savings from their final product, increasing the economic value of their fuel under a GHG based obligation.

The flexibility that this option provides between the use of actual and default values means that potential impacts on energy costs and security can be effectively mitigated. For example, the inclusion of default values allows for flexibility to new biofuel feedstocks, or changes of supply routes, or production inputs when there are disruptions to biofuels supply chains.

This option mirrors the European Union's Renewable Energy Directive II, obligated parties, biofuels producers, and international sustainability certification schemes are familiar with its approach. This option was widely supported by submitters.

The sustainability of biofuels

The majority of biofuels used to meet the obligation following its implementation will be sourced from global markets. Using existing international sustainability schemes will therefore enable obligated parties to easily identify and procure sustainable biofuels for importation. The International Sustainability and Carbon Certification scheme and Roundtable on Sustainable Biomaterials are the largest, most globally recognised international sustainability certification schemes, each with robust and independent governance. Because of the significant risks associated with the indirect impacts of biofuel feedstock production, certification alone is unlikely to ensure the sustainability and emissions reduction potential of biofuels.

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Additional measures including a ban on high-ILUC[2] feedstocks and a cap on food and feed-based biofuels should be taken if the obligation is to achieve its intended outcome of reducing GHG emissions through the use of sustainable biofuels.

These measures would however reduce the total availability of biofuels by classifying certain biofuels as ineligible under the obligation. This could increase the cost of procuring certain biofuels and would reduce the flexibility of the supply chain. These costs are expected to predominantly impact biodiesel and renewable diesel as palm and soybean are used as feedstocks for these biofuels. However, it is unclear how obligated parties would choose to spread the additional costs across their total fuel supply.

Limitations and Constraints on Analysis

The scope of feasible options has been limited by Cabinet's policy decisions on the design of the Sustainable Biofuels Obligation. Cabinet minute [ENV-21-MIN-0058] refers[3]. Non-regulatory options do not align with Cabinet's policy decisions.

There are significant uncertainties regarding assessments of the impacts of different options on fuel prices. Due to the large amount of assumptions we have had to make, quantifying the impacts is subject to a high degree of uncertainty and can create misleading perceptions on the magnitude of the impacts. This uncertainty has been magnified by the significant price volatility energy and biomass feedstocks we have seen in 2022.

A range of scenarios have been tested to quantify the potential impacts of the Obligation. Quantified assumptions include:

Cost of carbon	From $75t/CO2e in 2023 to $100t/CO2e in 2025
Fossil fuel prices	Low: Reflecting a crude oil price of around USD 50/bbl, which is similar to the level through 2015-2017 Mid: Reflecting a crude oil price of around USD 80/bbl, which is similar to where the price was in 2018, or in the later part of 2021 High: Reflecting a crude oil price of around USD 110/bbl, which is similar to where the price was between 2011-2014 and this year (on average).
HVO – renewable diesel prices	1.5 to 3 times more expensive than diesel, the multiplier is higher when the price of diesel is lower.
Ethanol prices	Assumed to be on parity with petrol prices at around 110/bbl, based on market analysis, the relative price of ethanol become cheaper as petrol becomes more expensive and visa versa

[2] High-ILUC referrers to feedstocks that have a high risk of creating indirect land use change emissions. Two feedstocks, palm and soybean, have been shown to drive significant deforestation and an increase in net emissions through indirect land use change.

[3] https://www.mbie.govt.nz/dmsdocument/18369-sustainable-biofuels-mandate-final-policy-design-minute-of-decision-proactiverelease-pdf

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The short timeframe to develop the advice in this regulatory impact analysis, and to introduce the Sustainable Biofuels Obligation by 1 April 2023, has been a significant constraint on the analysis. Because of this timeframe, options to develop new methodologies or tools to assess the emissions intensity of biofuels or standards and schemes to evaluate the sustainability of biofuels have not been considered. Instead, the proposals rely heavily on existing methods that have been developed internationally. One of the limitations to this is that New Zealand specific for measuring and ensuring substitutability of our domestic biomass feedstocks for biofuels has not been closely examined.

Responsible Manager(s) (completed by relevant manager)
Osmond Borthwick *Manager* *Energy Markets Policy* *The Ministry of Business, Innovation and Employment*

Quality Assurance (completed by QA panel)	
Reviewing Agency:	The Ministry of Business, Innovation and Employment
Panel Assessment & Comment:	MBIE's Regulatory Impact Analysis Review Panel has reviewed the attached Impact Statement prepared by MBIE. The panel considers that the information and analysis summarised in the Impact Statement meets the criteria necessary for Ministers to make informed decisions on the proposals in this paper.

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Section 1: Diagnosing the policy problem

What is the context behind the policy problem and how is the status quo expected to develop?

The Emissions Reduction Plan and meeting the Emissions Budgets

1. New Zealand has set a legislated target, in the Climate Change Response Act 2002, to transition to a net zero GHG emissions economy (excluding biogenic methane) by 2050. New Zealand also has a climate commitment under the Paris Agreement to reduce GHG emissions by 30 per cent below 2005 levels by 2030.

2. All demonstrated pathways to achieving our 2050 goal in the Climate Change Commission's advice require a rapid decarbonisation of the transport sector. The New Zealand Emissions Trading Scheme (NZ ETS) is the primary mechanism for pricing emissions, but with price control settings it is insufficient on its own to drive the changes needed in the transport sector.

3. To meet the net zero GHG emissions target, the Government must set emissions budgets and an emissions reduction plan (ERP) that will set out policies and strategies for meeting the emissions budgets. In May 2022, the Government set the first three emissions budgets (2022–2025, 2026–2030, 2031–2035), and published the ERP.

The Sustainable Biofuels Obligation

4. As part of the Government's ERP, Cabinet agreed to the final policy design of the Sustainable Biofuels Obligation (the obligation) in November 2021. More information, including Cabinet's decision on the final design of the obligation and previous regulatory impact analysis' can be found here: https://www.mbie.govt.nz/have-your-say/increasing-the-use-of-sustainable-biofuels-in-aotearoa-new-zealand/

5. The obligation requires importers or producers of liquid transport fossil fuels, excluding aviation fuels to reduce the greenhouse gas (GHG) emissions intensity of those fuels by a set percentage each year by supplying biofuels (in blended or in neat form). The obligation is to come into effect on 1 April 2023.

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

Year	Target
2024	2.4%
2025	3.5%
2026	4.1%
2027	4.4%
2028	4.7%
2029	5%
2030	5.3%
2031	5.8%
2032	6.6%
2033	7.4%

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2034	8.2%
2035	9%

7. The obligation makes a significant contribution to the quantified emissions reductions set out in the Government's Emissions Reduction Plan (ERP)[4]. Within the first emissions budget period (2022 – 2025), the obligation is expected to result in a reduction of around 1 MtCO2e, with reductions of approximately 3 MtCO2e and 4.4 MtCO2e for the second (2026 – 2030) and third (2031 – 2025) emissions budget periods respectively.

Regulations to support the implementation and administration of the Sustainable Biofuels Obligation

8. The obligation will require regulations to set out detailed matters for the implementation and the administration of the policy. Cabinet agreed in late 2021 that the regulations should cover:

    a. how the obligated parties must calculate whether they have met the required emission intensity reduction;

    b. a methodology for the lifecycle assessment of GHG emissions factors of biofuels;

    c. a standard lifecycle GHG emissions factor for liquid fossil fuels.

    d. a method to determine whether a biofuel meets the sustainability criteria;

    e. the sustainability certification scheme or schemes that must be used to both certify whether biofuels meet the sustainability criteria, and to evaluate the life cycle emissions intensity of biofuels[5].

9. In May 2022, Cabinet agreed to consult on the discussion document *The Sustainable Biofuels Obligation: proposals for regulations*[6]. This discussion document put forth proposals to address each of the considerations covered above. Consultation occurred from 3 June 2022 to 1 July 2022.

10. This regulatory impact statement will be split into two parts:

    a. The calculation of the obligation. This includes how the obligated parties must calculate whether they have met the required emissions intensity reduction; a methodology for the lifecycle assessment of GHG emissions factors of biofuels; and a standard lifecycle GHG emissions factor for liquid fossil fuels.

    b. The sustainability criteria: This includes rules to define and apply the sustainability criteria to determine the eligibility of different biofuels, and the selection of international sustainability certification schemes.

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[4] https://environment.govt.nz/assets/publications/Aotearoa-New-Zealands-first-emissions-reduction-plan.pdf

[5] These life cycle emissions intensity factors will differ from the emissions factors set under the New Zealand Emissions Trading System (NZ ETS), which only includes domestic emissions from the production and combustion of fossil fuels.

[6] https://www.mbie.govt.nz/dmsdocument/21273-the-sustainable-biofuels-obligation-proposals-for-regulations-pdf

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Part 1 - The calculation of the Obligation

Section 1.1 - What is the policy problem or opportunity?

11. There is no agreed methodology for calculating the emissions intensity of biofuels, which is a key input in determining the GHG emissions reductions achieved under the obligation. Internationally, a range of methodologies have been developed to estimate the emissions intensity of biofuels each approach has its own complexity, compliance costs and credibility regarding the estimated GHG emissions benefits. New Zealand will need to adopt one of these methodologies or develop its own approach to enable the operation of its GHG emissions-based obligation.

12. Cabinet has agreed that the 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. Obligated parties have flexibility in determining where and what types of biofuels to deploy, providing they met the requisite sustainability criteria.

13. 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.

14. Cabinet agreed that the GHG emissions intensity of each fuel must be obtained from a lifecycle assessment (LCA) which covers each part of the production and supply chain (from raw material to end product). Using a LCA is critical for ensuring the deployment of biofuels results in a decrease in net GHG emissions. It does this by accounting for the GHG emissions impacts of biofuels production that occur throughout the supply chain and offshore.

Determining the emissions intensity factors of biofuels

15. Biofuel is a generic term for fuels that can be produced from or are made up of a renewable material of biological origin. Often, they are substitutes or partial substitutes for fossil or mineral fuels.

16. Biofuels can be produced from a wide variety of feedstocks, each with different cultivation or collection methods, refining and processing emissions, and transport and distribution requirements. Each part of the biofuels supply chain and the feedstock used can impact GHG emissions, including through sequestration and storage. Lifecyle emissions of biofuels can vary significantly and in some cases lifecycle GHG emissions from certain biofuels can exceed that of liquid fossil fuel.

17. Determining the lifecycle emissions intensity of each biofuel that could be used to meet the obligation on a lifecycle basis will be a critical to ensure the policy achieves its aims of reducing GHG emissions.

18. LCA is a methodological approach that aims to quantify GHG emissions across all of the stages of a product's lifecycle. For biofuels, this lifecycle covers both farm-to-pump (or well-to-tank) and pump-to-wheel (or tank-to-wheel) emissions.

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19. Many LCA studies of biofuels have been published, and the results tend to vary widely, even for the same feedstocks with similar conversion processes and fuel products.[7] A number of factors contribute to the wide range of results including that bio-based systems are naturally variable, variations in input data and the quality of this data, and methodological choices.

20. Emissions from the transport and distribution and refining and processing components of the supply chain are well understood. In the literature however, there is a lack of consensus on how to estimate indirect emissions from indirect land use change and the use of wastes and residues as feedstock for biofuels when these products already have other productive uses.

What do stakeholders think about the problem?

21. The obligated parties are any entity or person who imports or refines liquid fossil fuel for use in New Zealand's Transport Sector. In 2022, this is limited to BP, Gull, Mobil, Z Energy and Tasman Oil Services. The wider fuel sector such as fuel distributers and retailers, fuel users (including private vehicle owners, freight operators, airlines and shipping companies), international biofuels producers such as Neste, interest groups (such as AA, the Motor Trade Association and the BusinessNZ Energy Council) are also key stakeholders.

Summary of July 2021 consultation on the discussion document Increasing the use of sustainable biofuels in Aotearoa New Zealand[8]

22. This consultation was focused on the high-level policy design of the Sustainable Biofuel Obligation.

23. There were mostly positive views about introducing a greater role for biofuels in decarbonising transport. Many stakeholders acknowledged that biofuels will play an important role in decarbonising transport, particularly for the hard-to-abate areas of shipping, aviation, and heavy freight (and some thought that there should have been progress in this area earlier). Some stakeholders, including some fuel suppliers and peak bodies, thought that there should be more flexibility to reduce emissions in transport, and that the Obligation removes their choice in achieving the objective.

24. There was strong support for the Obligation to be based around GHG emissions reductions, rather than a volume-based target or one based on particular blend levels. Stakeholders submitted that this focused the Obligation around the desired target (emissions reductions), and that it allows the most efficient solutions to emerge. Some noted that it would require stringency around the measurement of lifecycle emissions, to ensure that they are properly taking into account all components of a fuel's emissions.

Summary of June 2022 consultation on the discussion document - The Sustainable Biofuels Obligation: proposals for regulations. [9]

25. This consultation was focused on the design of regulations to support the implementation and administration of the Sustainable Biofuels Obligation. It contained

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[7] (Cherubini et al., 2009; Chum et al., 2011; Rocha et al., 2014; Garcia et al., 2020).

[8] https://www.mbie.govt.nz/have-your-say/increasing-the-use-of-sustainable-biofuels-in-aotearoa-new-zealand/

[9] https://www.mbie.govt.nz/dmsdocument/21273-the-sustainable-biofuels-obligation-proposals-for-regulations-pdf

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detailed methodologies and definitions developed in alignment with Cabinet's agreement on the high-level design of the obligation.

26. The consultation document set out a proposal that the lifecycle GHG emissions of biofuels are calculated as the sum of the disaggregated emissions of each biofuels supply chain component.

27. Nearly all submitters supported the proposal in the consultation document to use either the European Union Renewable Energy Directive II (RED II) default values and actual values (if estimated under a standard methodology), or a combination of both for different parts of the supply chain. Many submitters noted that the RED II is an internationally accepted and recognised system.

28. Some submitters noted that the use of actual values will incentivise the use of biofuels which provide the greatest emissions reductions and encourage biofuels producers to improve the emissions efficiency of their supply chain.

29. Most submitters thought that an in-house GHG emissions model is not warranted for biofuels imported into New Zealand. Several commented that any benefit from doing so (such as increased accuracy) would be marginal and substantially outweighed by the cost and time of doing so, and the additional compliance costs for the biofuel supply chain.

What objectives are sought in relation to the policy problem?

30. The primary purpose of the Obligation is to reduce GHG emissions. More detailed objectives on the design of the obligation as agreed by Cabinet are to:

    a) Set the scope of the Obligation to encourage the use of biofuels that will result in emissions reductions, including from the hard-to-abate transport sectors such as heavy trucking.

    b) Set the targets to manage the balance between emissions reductions and the cost to obligated parties and the wider economy.

    c) Ensure emissions reductions from the biofuels used to meet the Obligation are credible, and that wider social and environmental impacts of biofuels supply chains are managed.

31. The primary purpose of the regulatory regime is to enable the implementation and operation of the Obligation and give effect to Cabinet's agreed design of the Obligation.

32. Ensuring that any selected methodology for calculating the emissions intensity of biofuels, is robust and delivers genuine GHG emissions reductions is the key objective. The selected methodology should support efficiency improvements in the biofuels supply chains while allowing some flexibility to respond to changing supply dynamics.

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Section 1.2: Deciding upon an option to address the policy problem

What criteria will be used to compare options to the status quo?

33. For the regulatory regime we will assess the following criteria for the different elements of the proposal:

    a. Credibility of GHG emissions reductions and sustainability of biofuels
    b. Impact on energy costs and energy equity
    c. Flexibility of the biofuels supply chain
    d. Difficulty of implementation,
    e. Administration costs and complexity
    f. Compliance costs

34. The key criterion for assessing options will be ensuring the credibility of GHG emissions reduction and sustainability of biofuels. This criterion will be triple weighted in the multi-criteria analysis to account for this.

35. Due to the expected magnitude of the Obligations impacts, energy costs and equity and the flexibility of the biofuels supply chain will also be significant criteria and impacts on these criteria should be minimised where possible. These criteria will be double weighted in the multi-criteria analysis.

36. Difficulty of implementation, administration costs and complexity, and compliance costs are all important considerations, however as the expected impact of these criteria on the total cost of the obligation is relatively small, they are given lower weighting in the multi-criteria analysis. In addition, the criterion on energy costs is expected to incorporate some of the impact of additional compliance costs, as fuel wholesalers will likely pass through any additional costs. The weighting of these criteria will not be modified in the multi-criteria analysis.

37. Achieving credible GHG emissions reductions from sustainable biofuels is likely to reduce the availability of biofuels that can be used. This could have implications for energy costs and equity, security of supply, and increasing compliance costs and complexity in the regulatory regime. This tension between credible emissions reductions and sustainability, and the other criteria is one of the key trade offs that will be considered. The preferred option should manage this trade off by ensuring GHG emissions reductions are credible, and biofuels are sustainable, while impacts on the other criteria should be minimised to the extent that they do not undermine the key criteria or objectives.

Alignment with Cabinet's agreed design of the Obligation

38. The scope of feasible options has been limited by Cabinet's policy decisions on the design of the Obligation. Cabinet minute [ENV-21-MIN-0058] refers[10]. Non-regulatory options do not align with Cabinet's policy decisions. The key decisions for the design of a regulatory regime for the Obligation include:

[10] https://www.mbie.govt.nz/dmsdocument/18369-sustainable-biofuels-mandate-final-policy-design-minute-of-decision-proactiverelease-pdf

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- **agreed** to proceed with an Obligation based on GHG emissions reductions, which would require obligated fuel suppliers to reduce the total GHG emissions of the fuels they sell by a set percentage each year through the supply of biofuels.
- **agreed** that the Obligation apply to all liquid fossil fuel for transport produced in, or imported into, New Zealand (excluding aviation fuels).
- **agreed** that the obligated parties will be any entity that imports into, or produces in, New Zealand liquid fossil fuels for transport.

39. Previous policy decision on a methodology for calculating the GHG emissions intensity obligation include:

- **agreed** that the regulations may prescribe further detail about how the required emission reduction target must be calculated.
- **agreed** that the GHG emissions of each biofuel must be obtained from a life cycle assessment which covers each part of the production and supply chain (from raw material to end product).
- **agreed** that the regulations will prescribe a detailed methodology for the life cycle assessment of GHG emissions factors of biofuels.
- **agreed** that the regulations will prescribe a standard GHG emissions factor for each fossil fuel.

What options are being considered?

40. Within Cabinet's agreed design of the Obligation, there are a limited scope of options to consider for calculating the obligated annual percentage emissions reduction. Experience from the implementation and operation of similar policies in the European Union, the United States, and California has been considered in the development of the criteria and the identification of options.

41. Options such as developing a custom GHG emissions intensity methodology and database for New Zealand have been ruled out given the inability for their completion by 1 April 2023. A New Zealand-specific GHG emissions would have some benefit by accounting for unique domestic characteristics, such as distance from biofuel markets and land use change. However, these changes are unlikely to be materially different from what can be observed in the EU or the USA. As a result, there is greater benefit in adopting and building on international approaches.

Part one - Calculating the annual percentage emissions reduction

42. The approach to calculating an obligated parties' progress towards meeting the mandated targets in a simplified form would be:

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

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.

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43. An example calculation is attached as Annex one.

44. To determine $E_{Supplied}$ and $E_{fossil\ fuels,}$ the regulations will need to set out how the following values are determined:

    a. the emissions intensity of each type of fuel (kilograms of carbon dioxide equivalent per megajoule)

    b. The energy content of each type of fuel (megajoules per litre)

45. The energy content of each type of fuel will be set out in regulations and will mirror the values contained in Annex III of the European Union's Renewable Energy Directive II (RED II).[11] Analysis testing the validity of using EU values in New Zealand has shown that there are minimal differences between the energy content of fuels used in Europe and fuels used in New Zealand.[12]

46. Determining the lifecycle emissions intensity of a qualifying biofuel used to meet the Obligation will be critical to ensure the policy meets its primary objective of GHG emissions reduction. There are multiple ways that emissions intensity values for biofuels could be determined.

Option One/counterfactual – set default emissions intensity values in regulation

47. 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 annual percentage emissions reduction. Disaggregated default values (DDVs) provide default values for each component of the supply chain – feedstock production and cultivation; processing units and refining; and transport and distribution.

48. Default values and 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.

49. This option proposes that the default values and the DDVs expressed in the European Union RED II are used to enable the Obligation to be operational from 1 April 2023. Work has been undertaken to ensure RED II values are appropriate for use in New Zealand (i.e. potential supply chains are similar).

50. Providing DDVs in the regulations would enable greater flexibility in biofuel supply chains by enabling the use of biofuels that have not undertaken a complete lifecycle emissions analysis for each component of the supply chain.

Option Two – allow the use of individual (or 'actual') emissions intensity values

51. 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 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.

52. Individual emissions intensity pathways or calculations for a component of a biofuel's supply chain pathway are enabled under the European Union's RED II and the California Low Carbon Fuel Standard.

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[11] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32018L2001&from=EN#d1e32-147-1

[12] https://www.mbie.govt.nz/dmsdocument/22485-emissions-intensity-calculations-for-the-biofuels-mandate-pdf

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53. To enable the use of actual values, we propose that a lifecycle GHG emissions analysis would be undertaken according to the following methodology:

$$E = e_{ec} + e_i + e_p + e_{td} + e_u - e_{sca} - e_{ccs} - e_{ccr}$$

Where:

E *= total emissions from the use of fuel*

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

54. Detailed methodologies for disaggregated components of a biofuel's supply chain would follow the methodologies outlined in Annex V of the European Union's RED II.

55. A biofuel's supply chain and production process would need to be audited and certified. Obligated parties would be required to submit the necessary input information and calculations to approved sustainability schemes, such as the International Sustainability and Carbon Certification (ISCC) or the Roundtable of Sustainable Biofuels (RSB), to verify the pathway.

56. Certification bodies which are endorsed by the approved sustainability schemes would verify that the lifecycle assessment methodology had been followed, and the accuracy of calculations used. They would also verify the accuracy of input information, cross checking against similar processes, and undertake third-party onsite audits where required.

Option Three – allow both default emissions intensity values and actual values

57. Obligated parties could also use a mixture of actual values and default values for the calculation of a biofuel's lifecycle emissions intensity. Under this option, both Option One and Option Two would be introduced as mutually compatible.

58. Utilising both actual values and default values would increase supply chain flexibility and improve market access, which could result I more affordable biofuels and greater security of supply. As default values are set more conservatively, having both options would permit the use of default values where necessary, while incentivising biofuels producers and obligated parties to obtain actual (and often lower) emissions intensity figures (through measuring and auditing of their supply chains).

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How do the options compare to the status quo/counterfactual?

Calculating the obligation

	Option One – Set default emissions intensity factors in regulation	Option Two – Use actual emissions intensity factors	Option 3 – Use both default emissions intensity factors and actual emissions intensity factors
Credibility of GHG emissions reductions	0	+++ +++ An LCA verified and audited by one of the international sustainability certification schemes would be required for the supply chain of any biofuel used to meet the obligation. This will increase both the accuracy and the credibility of the GHG emissions reductions delivered through the obligation.	++++ Default values will be a conservative estimate of a given biofuels lifecycle emissions to minimise the risk of over estimating GHG emissions benefits. This would encourage biofuels producers and consumers to measure an account for actual emissions intensity pathways of their biofuel as it will likely deliver additional GHG benefits over the default values. However, a small portion of biofuels that use default values could be overestimating their benefit.
Energy costs and equity	0	- - As determining actual values for entire biofuels supply chains will cost both money and time, this could increase the cost of biofuels available to be used in the obligation. It is assumed obligated parties will pass on any additional compliance costs to consumers. In addition, only allowing biofuels that have a completed a full LCA would limit the supply of eligible biofuels, likely increasing the cost of meeting the obligation.	- The inclusion of both actual and default values does not reduce the supply of eligible biofuels as fuel suppliers can opt into using default values. Determining actual values will add compliance costs, however it is likely that these additional costs will be offset by the increased GHG benefits.
Flexibility of the biofuels supply chain	0	- - Determining actual values for entire biofuels supply chains will cost both money and time. As a result, this approach could reduce the flexibility of biofuel supply chains in which biofuel feedstocks can be vulnerable to a wide range of impacts.	0 The inclusion of default values allows for flexibility to new biofuel feedstocks, or changes of supply routes, or production inputs when there are disruptions to biofuels supply chains.
Difficulty of implementation,	0	- As determining actual values for entire biofuels supply chains will cost both money and time, this could increase the difficulty of implementing the obligation by 1 April 2023.	0 determining actual values for entire biofuels supply chains will cost both money and time, however the ability to use default value enables obligated parties to begin importing biofuels by 1 April 2023

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Administration costs and complexity	0	0 This option is not expected to significantly impact Government administration costs or complexity	- This option will add minor administration costs and some additional complexity to the regime. The Regulator will be required to check whether actual values or default values have been used to calculate a party's compliance under the Obligation. Any actual values will need to be matched with the associated certification.
Compliance costs	0	0 As determining actual values for entire biofuels supply chains will cost both money and time, this could increase the cost of biofuels available to be used in the obligation. This is given a zero rating however as the additional compliance costs are assumed to be passed on to fuel consumers. This additional cost has been included in the impacts on energy costs and equity criterion.	0 Determining actual values for entire biofuels supply chains will cost both money and time, however default values could be utilised instead to offset this cost.
Overall assessment	0	0 This option would increase both the accuracy and the credibility of the GHG emissions reductions delivered through the obligation. However, requiring the complete supply chain of a biofuel to be monitored and measured could be costly and would take time. This could significantly reduce the quantity of certified biofuels available for obligated parties to use.	++ The flexibility that this option provides means that potential impacts on the use of actual values on energy costs and security can be effectively mitigated. In addition, it encourages the use and production of biofuels with the lowest lifecycle GHG emissions.

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Part 2 – evaluation and application of the sustainability criteria

Section 2.1: What is the policy problem or opportunity?

59. To enable the implementation and administration of the obligation, the regulations will need to specify detailed methodologies or processes to ensure biofuels used in New Zealand meet the agreed sustainability criteria. It will be important that a robust process for ensuring that biofuels used in the obligation met the sustainability criteria is developed. To do this, Cabinet has agreed that international sustainability certification schemes[13] will play a role in certifying the sustainability of biofuels used under the Obligation. This recognises that many of the feedstocks and biofuels used to meet the Obligation will be cultivated, collected and produced overseas, particularly in the early years of the Obligation's operation.

60. This RIS assesses the suitability of sustainability schemes against the sustainability criteria and whether additional regulatory measures are necessary to address the sustainability challenges of biofuels and their feedstocks. The regulations will set sustainability schemes can be used to certify biofuels for use in New Zealand. Schemes will be selected based on their effectiveness at addressing the sustainability criteria, their robustness, transparency and integrity. Where sustainability schemes do not adequately address the sustainability criteria, additional regulatory measure could be taken to limit or exclude problematic feedstocks.

61. The high-level sustainability criteria as agreed by Cabinet are:

    a. Biodiversity: feedstocks should not be obtained from land or raw material that has a high biodiversity value.

    b. Impact on carbon stocks: avoiding 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: biofuels crops should not negatively affect water quality or significantly restrict its availability in an area.

    e. Use of waste: it will be important that the Obligation supports the principles of the waste hierarchy and does not create perverse incentives such as increasing the production of waste.

[13] An international sustainability certification 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.

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Biodiversity, impacts on carbon stocks, and water quality and availability

62. The challenges of biodiversity decline, climate change and human well-being are closely connected, and a failure to jointly address the dual crises of climate change and biodiversity decline can compromise people's quality of life.[14]

63. The criteria of biodiversity, impacts on carbon stocks and water quality and availability are tied directly to the land use impact of biofuels. Negative impacts from biofuels production typically arise in regions where there is significant competition for space/productive land. When land use impacts are not effectively managed, the expansion of biofuels production can result in significant GHG emissions, direct habitat loss and the loss of biodiversity.

64. When biofuel crops expand onto high carbon stock land this can create a significant GHG emissions impact that outweighs the climate benefit of producing biofuel. High carbon stock land includes native or old growth forests, canopy forests, wetlands and peatlands among others. Biofuels that are produced from existing agricultural land, marginal land or degraded/unused land avoid this issue.

65. Intensive biofuels crop production can also negatively affect biodiversity and ecosystems, including in adjacent land, freshwater and marine ecosystems through fertiliser use or pesticides, or by increasing agricultural water withdrawals.

66. Monitoring the expansion of biofuel crops and their impact will be critical to help inform future decision-making processes that could consider the potential conflict between the expansion of biofuels crops and its impacts on biodiversity, carbon stocks and water quality and availability.

Indirect land use change

67. Feedstock production for biofuels has often taken place on cropland that was previously used for agriculture, to grow food or feed. Since this agricultural production is still necessary, biofuel production can lead to the extension of agricultural land into non-crop land, possibly including areas with high carbon stock, such as forests, wetlands and peatlands. This process is known as indirect land use change (ILUC). As it may cause the release of carbon dioxide, ILUC poses a risk to the GHG emissions savings that result from biofuels.

68. 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 difficult to observe and therefore meaningfully quantify.

69. 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.[15] 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 ILUC emissions estimates into the lifecycle GHG emissions is unlikely to be an effective or accurate approach to mitigating the risk of these additional emissions.

70. Indirect land use change impacts not only the net GHG emissions from biofuels production, but also other sustainability criteria such as impacts on biodiversity.

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[14] https://ipbes.net/sites/default/files/2021-06/2021_IPCC-IPBES_scientific_outcome_20210612.pdf

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Additional measures to mitigate the risk of biofuels creating LUC impacts in other markets (i.e. ILUC) may be required to address this.

71. Advanced biofuels (non-food-based biofuels such as cellulosic ethanol) provide a solution to the challenge of land-use impacts that must be considered when using biofuels derived from 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**.**

Food and feed security *- feedstocks should not adversely impact food and feed security.*

72. 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.

73. Increased biofuels production could impact food and feed markets in multiple ways. The most direct potential impact is on the food availability 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.

74. Biofuels production can also impact food accessibility 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.

Not all biofuels impact food security

75. Biofuels production can support local agricultural production when risks concerning indirect land use change and food security are adequately managed. 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.

76. Food and feed security has strong links to the issue of indirect land use change covered below.

Use of waste*: it will be important that the Obligation supports the principles of the waste hierarchy and does not create perverse incentives such as increasing the production of waste.*

77. The Ministry for the Environment released a consultation document ‘Taking responsibility for our waste’ in October 2021. The document spoke about the need to

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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).

78. 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. 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.

79. As demand for biofuels increases the economic value of waste as a feedstock for biofuels could increase. This is particularly likely if crop-based biofuels are phased out due to concerns around land use change or food security, and the market for advanced biofuels such as those derived from lignocellulosic biomass is not yet established at scale. There is a risk that as the economic value of waste increases so do incentives to increase the production of waste, therefore countering the principles of the waste hierarchy. There is also a risk of emerging fraudulent waste products, such as virgin cooking oil being relabelled as used cooking oil as it could reach a higher price as a biofuel's feedstock. [16]

80. Defining what is a waste, residue or co-product will be an important step for supporting principles of the waste hierarchy and will need to be included in the regulatory scheme. Depending on how a waste-based feedstock is defined will impact how if upstream emissions are incorporated into the LCA, and if other sustainability criteria should apply to the feedstock.

What do stakeholders think about the problem?

Summary of July 2021 consultation on the discussion document Increasing the use of sustainable biofuels in Aotearoa New Zealand[17]

81. Almost all stakeholders thought that the sustainability of biofuels, and the credibility of emissions reductions, was important. Most thought that using an international scheme to certify sustainability and emissions reductions, as was proposed, was appropriate, while others thought that the compliance costs would be high and some raised the potential for fraud. Fuel wholesalers raised the need for standardisation. A couple of stakeholders thought that New Zealand needed to set its own sustainability standard, and some thought that domestically produced biofuels should be exempt from such schemes (as an incentive).

[16] https://www.transportenvironment.org/discover/uks-imports-dubious-used-cooking-oil-set-rise-fuelling-deforestation/

[17] https://www.mbie.govt.nz/have-your-say/increasing-the-use-of-sustainable-biofuels-in-aotearoa-new-zealand/

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Summary of June 2022 consultation on the discussion document - The Sustainable Biofuels Obligation: proposals for regulations.

82. The consultation document proposed that feedstocks or biofuels certified under the International Sustainability and Carbon Certification (ISCC) 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.

83. Most submitters supported the concept of using international sustainability certification schemes to evaluate whether imported fuels comply with the sustainability criteria and their traceability through the supply chain. There was also broad support for the ISCC and RSB schemes specifically. A few submitters noted that the Government needed to consider how to deal with changes to the schemes, including allowing obligated parties time to respond if they are affected.

Indirect land use change and risks to food security

84. Most submitters agreed that feedstocks which have been observed to cause high levels of indirect land use change should not be accepted under the obligation and agreed that the threshold for which feedstocks should be excluded (palm and soybean) had been set at the right level.

85. There was also very strong support for a cap on food and feed-based feedstocks. However, several submitters also thought that feedstocks which would otherwise be excluded should be permitted if they can be certified to have a low risk of causing indirect land use change.

86. There were mixed views on the benefit of requiring all biofuels to have certification showing they are considered at 'low risk' of indirect land use change. Some considered it an important safeguard against indirect land use change, while others considered it an extra compliance burden.

87. There was strong support for not including indirect land use change emissions in the life-cycle GHG emissions analysis, due to the inherent uncertainty in the economic modelling.

Wastes and residues

88. There was strong support for the proposal to require biofuels derived from any of the waste streams to be certified against the relevant ISCC or RSB standard and to allocate upstream GHG emissions to products, co-products, residues and wastes according to their share of the energy content.

89. One submitter commented that the high value of waste feedstocks (due to low attribution of production emissions under the life cycle analysis) has resulted in demand exceeding supply. As a result, there is some evidence to suggest that virgin vegetable oil has been falsely labelled as biodiesel produced from used cooking oil. They suggested a cap on used cooking oil and tallow to prevent fraudulent imports.

Section 2.2: Deciding upon an option to address the policy problem

90. Previous policy decisions on ensuring that only sustainable biofuels are used to fulfil the Obligation include:

- **agreed** that the Sustainable Biofuels Obligation Bill (the Bill) will provide for high-level sustainability criteria including:

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- **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 availability in an area;
- **the risk of indirect land use change:** feedstocks should not be associated with a high risk of indirect land use change;
- **use of waste**: it will be important that the Obligation supports the principles of the waste hierarchy;

- **agreed** that the detailed methodologies for determining whether a biofuel meets the sustainability criteria will be included in the regulations;
- **agreed** that obligated parties must use international sustainability certification schemes to certify that feedstocks and biofuels meet the sustainability criteria and to evaluate the life cycle emissions of biofuels;
- **agreed** that the sustainability certification scheme or schemes to be used will be prescribed in regulations.

What options are being considered?

91. For the regulatory regime we will assess the following criteria for the different elements of the proposal:
    a. Credibility of GHG emissions reductions and sustainability of biofuels
    b. Impact on energy costs and energy equity
    c. Impact on the flexibility of the biofuels supply chain
    d. Difficulty of implementation (including time required to develop)
    e. Government administration costs and complexity
    f. Compliance costs

92. Further detail on the weighting of this criteria and the trade offs is covered in Section 1.2.

Evaluation of international sustainability certification schemes against the sustainability criteria

93. 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.

94. 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

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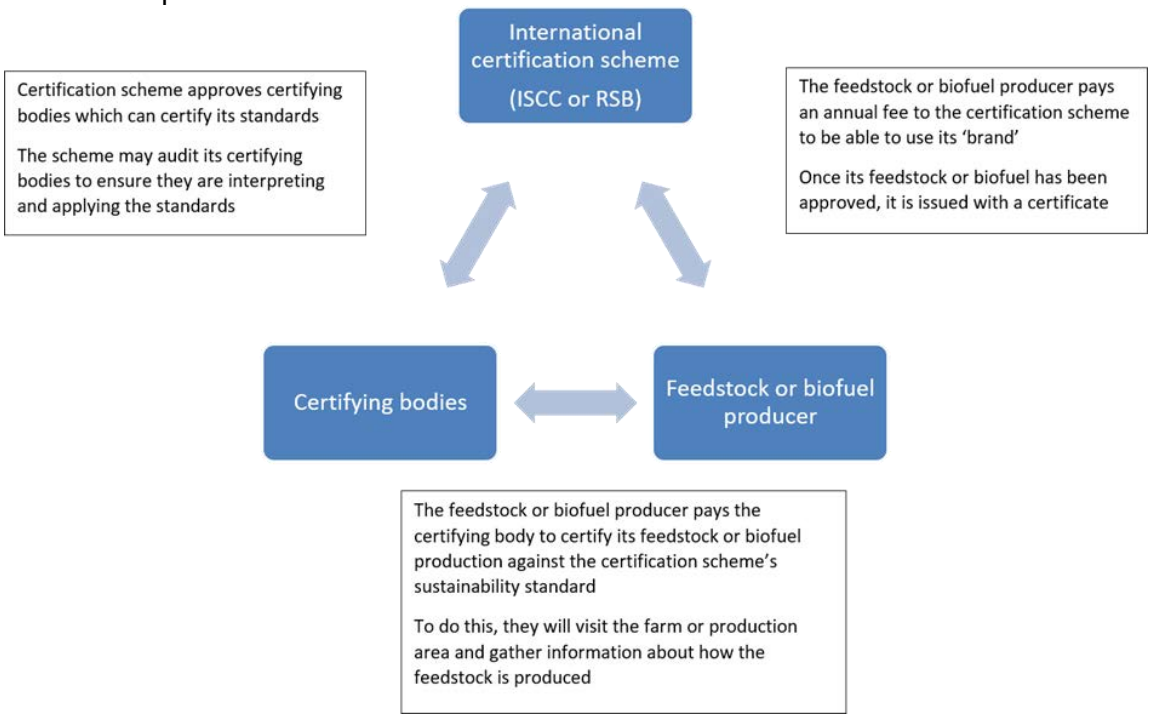
operation, the feedstocks it assesses, as well as its governance and processes for maintaining integrity, including transparency and auditing.

95. Officials 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. Such 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. 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.

96. The feedstock or biofuel producer will pay the certifying body to certify its feedstock or biofuel production against the international certification scheme's standard. 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 certification scheme.

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



Counterfactual - no action / verification of sustainability criteria

98. Under this option, biofuels would be considered to have met the sustainability criteria without needing to meet any verification requirements. We note this would not align with Cabinet's agreed design of the Obligation as outlined in section 2.1.

Option One – Biofuels certified by the ISSC Plus standard and/or the RSB are considered to have met the sustainability criteria

99. Under this option, biofuels that have been certified by the International Sustainability and Carbon Certification Plus standard and/or the Roundtable on Sustainable Biofuels standard are considered to have met the sustainability criteria.

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100. 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's (EU's) RED II. Both have been approved by the European Commission to be able to certify biofuels for their compliance with the EU's RED II standard.

101. The EU's RED II, and its corresponding international certification schemes, has evolved over the last 15 years as biofuels production has scaled up globally and its impacts on the environment and local communities has been observed. Continual monitoring of the impacts of biofuels production on the sustainability criteria and the improvement of the schemes mitigate these impacts will be important.

Option Two – Additional requirements are introduced to reduce the risk of indirect land use change emissions, and negative impacts of global food and feed security

102. This option would expand on option one. All biofuels used under the Obligation would still need to be certified by either the ISSC Plus standard or the RSB. However, additional rules would be introduced in the regulations to reduce the risk of indirect land use change (ILUC) and negative impacts to global food and feed security.

103. Failure to address the risk of ILUC caused by certain feedstocks could result in a net GHG emissions increase from the Obligation and broader adverse environmental and social impacts. This option adds the following regulatory measures on top of the sustainability certification identified in option one:

- Ban high ILUC risk feedstocks – i.e. palm and soybean.
- Place a cap on the total amount of food and feed-based biofuels that could be used to meet the Obligation.

104. Banning the use of feedstocks (palm oil and soy) would eliminate the use of biofuels that have been shown to have caused significant ILUC emissions historically. It is now broadly recognised that these two feedstocks have contributed to significant deforestation in Southeast Asia and South America, partially driven by growing demand for biofuels.

105. Food- and feed-based biofuels have been shown to be the predominant driver of ILUC emissions due to demand from biofuels leading to the displacement of crops that would have been supplied to food and feed markets. Placing a cap on the amount of food and feed-based biofuels that can be used to meet the Obligation would reduce the likelihood of ILUC occurring from its implementation. This however would reduce the total supply of available biofuels that could be used to meet the obligation, likely placing upwards pressure on prices.

Food and feed security

106. Certification standards exist under the ISCC and the RSB to measure food security. 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 Food Security Index is developed annually.

107. The ISCC and the RSB may have a robust methodology for accessing the impact of biofuel/feedstock production at a local level, however this analysis is significantly limited by its geographic scope. Food commodities and crops are regionally and globally traded commodities, being unable to accurately assess the regional or global impact of a biofuel on food security.

108. In addition, 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

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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 or rigid processes are unlikely to be an effective in an emerging food crisis.

109. 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, banning the use of high-ILUC feedstocks would mitigate this displacement.

110. A 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.

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The sustainability criteria

	Counterfactual – no action / verification of sustainability criteria	Option One – Biofuels certified by the ISSC Plus standard and/or the RSB are considered to have met the sustainability criteria	Option Two – Biofuels certified by the ISSC Plus standard and/or the RSB and additional requirements are included for addressing the risk of ILUC, impacts of food security
Credibility of GHG emissions reductions and the sustainability of biofuels	0	+++ There is confidence that this approach accounts for the direct GHG impact of biofuels production, however the indirect impacts occurred by the use of certain biofuels, such as palm-based, could increase net GHG emissions. The ISCC and the RSB have a robust methodology for accessing the direct impact of biofuel/feedstock production on biodiversity, carbon stocks, water quality and availability and local food security impacts. However, indirect impacts from crop-based feedstocks and waste feedstocks are not addressed	+++ +++ There is confidence that this approach accounts for the direct GHG impact of biofuels production, it accounts for some of the risk of indirect emissions by restricting feedstocks that have been shown to cause significant land use change and clearance of high carbon stock land. The ISCC and the RSB have a robust methodology for accessing the direct impact of biofuel/feedstock production on biodiversity, carbon stocks, water quality and availability and local food security impacts. Restricting certain feedstocks and placing a cap on food and feed biofuels will reduce the likelihood the obligation drives indirect land use change.
Energy costs and equity	0	- The ISCC and RSB are widely used and established sustainability certification schemes. Using them is unlikely to substantially reduce the available supply of biofuels and increase the cost of biofuels.	- - Restricting certain feedstocks (palm and soy) is likely to increase the cost of biodiesel and renewable diesel that can be used to meet the obligation. This could increase the price of blended diesel in 2023 by 0.25 – 1 cent.
Impact on the flexibility of the biofuels supply chain	0	0 The ISCC and RSB are widely used and established sustainability certification schemes. Using them is unlikely to reduce the available supply of biofuels, therefore supporting security of supply	- Restricting certain feedstocks and placing a cap on food and feed biofuels will reduce the supply of biofuels that can be used to meet the obligation. This could decrease the flexibility and security of the biofuels supply chain.
Difficulty of implementation,	0	0 The ISCC and RSB are widely used and established sustainability certification schemes. Using them will help support the 1 April 2023 implementation date.	0 The ISCC and RSB are widely used and established sustainability certification schemes. The additional requirements are simple to introduce and monitor. Using them will help support the 1 April 2023 implementation date.

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administration costs and complexity	0	- Additional administration costs are required to check biofuels used to meet the obligation are certified. These costs are minor in contrast to the impacts of the other criteria.	- Additional administration costs are required to check biofuels used to meet the obligation are certified, that high-ILUC feedstocks are not being used, and that the cap on food and feed-based biofuels is not being breached. These costs are minor in contrast to the impacts of the other criteria.
Compliance costs	0	0 The ISCC and RSB are widely used and established sustainability certification schemes. Using them is unlikely to reduce the add any significant compliance costs to existing biofuels suppliers	0 The ISCC and RSB are widely used and established sustainability certification schemes, however restricting certain feedstocks (palm and soy) is likely to increase the cost of procuring biodiesel and renewable diesel. This has been given a zero rating as the compliance cost are assumed to be passed on to fuel consumers and therefore have been captured in the impact of energy costs criteria
Overall assessment	0	+ This approach is preferable to the status quo as it provides some assurance that biofuels used to meet the obligation are sustainable. There are minor additional costs for regarding the administration of the regime.	++ This approach is preferable to the status quo as it provides good assurance that biofuels used to meet the obligation are sustainable and GHG emissions reductions are credible. This option would reduce the total available supply of biofuels that could be used to meet the obligation, likely increasing the cost of procuring biofuels. There are minor additional costs for regarding the administration of the regime.

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Section 3 - What option is likely to best address the problem

111. The preferred options should ensure that GHG emissions reductions are credible and that biofuels are sustainable while minimising the impacts such as energy costs and flexibility of the biofuels supply chain. This section of the RIS will combine part one – calculating the obligation and part two - evaluation and application of the sustainability criteria to discuss our preferred option.

112. For calculating the obligation, Option Three - use both default values and actual values is the preferred option. The multi-criteria analysis for this is outlined on page 14 -15.

113. For evaluation and application of the sustainability criteria, Option Two - additional requirements are included for addressing the risk of ILUC and impacts of food security is the preferred option. The multi-criteria analysis for this is outlined on the page above.

114. These options provide aim to provide a balance that ensures the GHG emissions reductions achieved under the obligation are credible, while maintaining flexibility for obligated parties to minimise the cost of meeting the obligation and enabling them to respond to changes or shocks to their supply chains.

Calculating the obligation

115. Setting default values at a conservative estimate of the emissions intensity of any given biofuel will provide an incentive for biofuel suppliers to undertake an assessment of the actual emissions intensity of their supply chain. Biofuel suppliers who can reduce emissions through their supply chain are rewarded with greater emissions savings from their final product, increasing the economic value of their fuel under a GHG based obligation.

116. The flexibility that this option provides between the use of actual and default values means that potential impacts on energy costs and security can be effectively mitigated. For example, the inclusion of default values allows for flexibility to new biofuel feedstocks, or changes of supply routes, or production inputs when there are disruptions to biofuels supply chains.

117. This option mirrors the European Union's Renewable Energy Directive II, obligated parties, biofuels producers, and international sustainability certification schemes are familiar with its approach. This option was widely supported by submitters.

Applying the sustainability criteria

118. The majority of biofuels used to meet the Obligation following its implementation will be sourced from global markets given New Zealand's extremely limited domestic production. Using existing international sustainability schemes will therefore enable obligated parties to easily identify and procure sustainable biofuels for importation. The ISCC and RSB are the largest, most globally recognised international sustainability certification schemes, each with robust and independent governance.

119. However, given the significant risks associated with the indirect impacts of biofuel feedstock production, certification alone is unlikely to ensure the sustainability and emissions reduction potential of biofuels.

120. Additional measures, including a ban on high-ILUC feedstocks and a cap on food and feed-based biofuels, should be taken if the Obligation is to achieve its primary objective – reducing GHG emissions through the use of sustainable biofuels.

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121. These measures would, however, reduce the total availability of biofuels by classifying certain biofuels as ineligible under the Obligation. This could increase the cost of procuring certain biofuels and would reduce supply chain flexibility. These costs are expected to predominantly impact biodiesel and renewable diesel as palm and soybean are used as feedstocks for these biofuels. However, it is unclear how obligated parties would choose to spread the additional costs across their total fuel supply.

122. The marginal abatement cost of introducing these additional measures would be $122/tCO2e compared to $91/tCO2e if no additional action was taken (exclusive of infrastructure costs, such as biofuels blending and storage facilities).

3.1 - What are the marginal costs and benefits of the preferred option for calculating the obligation and applying the sustainability criteria?

Affected groups *(identify)*	**Comment** *nature of cost or benefit (eg, ongoing, one-off), evidence and assumption (eg, compliance rates), risks.*	**Impact** *$m present value where appropriate, for monetised impacts; high, medium or low for non-monetised impacts.*	**Evidence Certainty** *High, medium, or low, and explain reasoning in comment column.*
Additional costs of the preferred option compared to taking no action			
Regulated groups	Small to no additional costs for the regulator to access biofuels certified under the ISSC-Plus or RSB standards. Additional costs to determine the actual value of a biofuels supply chain are expected to be offset by the GHG benefits of using an actual value over a default value.	Low cost to the regulated parties, assuming they pass costs of compliance on to fuel consumers.	Medium
Regulators	Additional costs for the administration of the obligation. This includes the cost of auditing the annual reports, training and hiring staff ect.	$1.5 million per year for administering and monitoring the obligation.	High

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Others (eg, wider govt, consumers, etc.)	Additional costs of about 1 cents per litre of diesel from limiting access to high ILUC feedstocks and introducing a cap on food and feed-based biofuels. Ethanol prices, of which food crops are a major feedstock, are unlikely to be significantly impacted as it can be utilised up to the petrol blend-wall under the cap. Additional costs to obligated parties are assumed to be spread across the fuel supply and passed on to consumers.	The net present cost of the total Obligation out to the end of 2025 is estimated to be between $350m to $450m depending on whether or not ethanol use is maximised and the relative price of biofuels to fossil fuels. Cost of additional measures to limit high-ILUC and cap food and feed-based feedstocks in 2023, 2024 and 2025 NPV = -$83.4m	Low-medium
Total monetised costs	There is a large degree of confidence in the direction of the impact but a high degree of uncertainty in the magnitude of the impact.	The preferred options could add about $30m per year to the cost of the Obligation. The net present cost of the total Obligation out to the end of 2025 is estimated to be between $360m to $460m depending on whether or not ethanol use is maximised and the relative price of biofuels to fossil fuels.	*Low-medium*
Non-monetised costs	Additional complexity in the regulatory regime could make it challenging for small scale importers/producers of transport fuels to comply	*Low*	*Medium*
Additional benefits of the preferred option compared to taking no action			
Regulated groups	Credible and genuine emissions reductions through the deployment of biofuels. This will help fuel companies and their consumers meet their sustainability and emissions targets. Benefits parties who are also regulated under the Climate Related Financial Disclosures regime by showing investors they are taking action to reduce emissions.	About 1 million tonnes of carbon dioxide will be abated by the five regulated parties over 2023, 2024 and 2025 if the targets are met. Assuming a carbon price of $75 in 2023, $87.50 in 2024, $100 in 2025, and a discount rate of 5%. Then NPV = $237.2m	*Medium*

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Regulators	Contributes to the Government's Emissions Reduction Plan and climate commitments.	1Mt CO2e in the first emissions budget.	Medium
Others (eg, wider govt, consumers, etc.)	Meeting the emissions budgets would support widespread long-term benefits by mitigating the worst impacts of climate change. Provides a platform to support domestic production of biofuels from local feedstocks in the medium to long-term.	High	Medium
Total monetised benefits	The monetised costs of the policy will exceed the monetised benefits as the obligation is driving a higher cost of abatement than the NZ-ETS. The cost impacts are expected to fall predominantly on fuel consumers users than across the whole economy. It is also important to note that if higher cost of abatement policies such as the obligation were not utilised to meet the emissions budgets the NZ-ETS would need to be significantly higher to achieve the budgets.	Based on the value of emissions reductions from the NZ-ETS, the NPV out to end of 2025 = $237.2m The NZ-ETS may not reflect the true social cost of carbon, literature suggests that this could be anywhere from $50/tCOe to upwards of $1000/tCO2e	Medium
Non-monetised benefits	The benefit of meeting the emissions budgets or New Zealand's climate commitments has not been factored into this analysis. This is a significant limitation when comparing the costs and benefits of the Sustainable Biofuels Obligation. Sustainability criteria and additional regulatory measure reduce the risk of adverse environmental and social impacts caused by increased biofuels production. Allowing actual values promotes the use and development of biofuels that deliver the	*High*	*High*

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	highest GHG emissions benefits.		

Section 4: Delivering an option

4.1 - How will the new arrangements be implemented?

123. The new arrangements will need to be introduced through regulation.

124. The Environmental Protection Authority, together with the Ministry of Business, Innovation and Employment and Te Manatū Waka, will be responsible for implementing the obligation. This will include:

    a. developing the information technology to record and monitor compliance by obligated parties.
    b. providing guidance to obligated parties on annual reporting.
    c. confirming the amount of biofuels that must be supplied by obligated parties.

4.2 - What are the implementation risks?

The implementation risks and how they can be mitigated are as follows:

125. The EPA will monitor what values are being used to calculate the obligation and identify when default values are being widely used for a biofuel, or a given part of its supply chain. This would suggest that the default value could be overestimating its potential benefit.

Integrity of biofuels emissions abatement and sustainability certification

126. There is a risk that the lifecycle emissions of the biofuels sold by fuel suppliers are higher than claimed or the environmental integrity of the biofuels sold is questioned. This risk can be mitigated by ensuring the sustainability scheme certifiers selected under the regulations have robust monitoring, recording, auditing and governance processes. The initial schemes, the ISCC plus standard and the RSB standard, are widely recognised as the best practice sustainability certification schemes and are expected to continually improve their standards as best practice evolves.

127. The EPA will monitor what values are being used to calculate the obligation and identify when default values are being widely used for a biofuel, or a given part of its supply chain. This would suggest that the default value could be overestimating its potential benefit.

Indirect land use change and food security

128. The preferred option is expected to mitigate the major risks caused by indirect land use change (ILUC) and the adverse impact of biofuels on food security. ILUC caused by biofuels used in the obligation is however, still a risk.

129. Notably the high-ILUC risk feedstocks (palm and soybean) have been identified based on historical observations of land use change, as such the ban is reactive rather than proactive. If significant crop, say maize, sees significant expansion onto high-carbon stock land occurred in the coming years, maize could then also be defined as high-ILUC.

130. The cap on food and feed-based biofuels mitigates this risk by limiting the amount of crop expansion that could be attributed to the obligation. In addition, a ban on the historically high-ILUC feedstocks sends a strong signal to biofuel producers that they need to consider and manage the sustainability impacts of their feedstocks. Monitoring

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what feedstocks are being used to produce biofuels, and where the expansion of such feedstocks occur will be important for responding to emerging ILUC and food security risks.

Risk of higher than anticipated compliance costs

131. There is a risk that the cost of complying with the Obligation could be higher than anticipated. For example, the costs associated with certification of greenhouse gas emissions and achievement of sustainability criteria could be higher than expected.

132. In 2024/25 the Minister of Energy and Resources will review the targets under the Obligation for the next emissions budget period (2026 – 2030). One of the considerations in this review is whether the targets are achieving the right balance between achieving the required emissions reductions to meet New Zealand's climate change commitments and managing the economic costs of the Obligation. If compliance costs are significantly higher than expected, future targets under the Obligation could be reduced.

Enforcement

133. There is a risk that obligated parties do not comply with meeting the targets or breach the additional restrictions, such as the cap on food and feed-based biofuels. This risk will be mitigated by the penalties and enforcement clauses in the legislation. For example, for every tonne of carbon dioxide missed under the obligation, a fuel wholesaler will need to pay $300/tCO2e in 2023, and $800/tCO2e from 2024 onwards. Obligated parties will have to submit audited reports to the EPA that will outline the type of biofuels they have used, the emissions intensity factors, and the certification standards they have met.

4.3 - How will the new arrangements be monitored, evaluated, and reviewed?

Monitoring

134. Obligated parties, namely fuel suppliers, must submit independently audited annual reports to the regulator, the Environmental Protection Authority (EPA). These annual reports will set out the emissions reductions they have achieved through the supply of biofuels relative to the mandated percentages.

135. Obligated parties will be required to show how they have calculated whether they have met the targets under the obligation. To check this calculation the following information will be reported to the EPA:

    a. Volume of fuel by product;

    b. The emissions intensity of each product (using either default or actual values or a combination of disaggregated values).

136. An example of the calculation is provided as Annex One.

137. The EPA will create a database for recording the information from these annual returns, such as the number of biofuels supplied by obligated parties and the volume of emissions reduction traded between obligated parties. This database will have some similarities to the Emissions Trading Register for the New Zealand Emissions Trading Scheme (ETS). Each year the EPA will verify and publicly report, at a high level, the performance of the obligated parties in meeting the target emissions reduction.

138. The EPA will check that biofuels used under the obligation have been certified by one of the sustainability certification schemes listed in the regulation – initially the ISCC

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plus standard and the RSB standard. The EPA will also check that feedstocks excluded in the regulations have not been used, and that the cap on food and feed-based biofuels has not been breached. The volumes of fuel reported by the obligated parties will be cross checked with Custom's excise and duties data, and the ETS.

139. MBIE will also continue to monitor fuel price movements regularly and may undertake fuel market studies should there be significant concern over fuel price increases following the introduction of the obligation. MBIE will also continue to liaise with the fuel sector regarding fuel security issues periodically and when fuel supply issues arise.

When and how will the new arrangements be reviewed?

140. The emissions intensity reduction targets under obligation for 2023, 2024 and 2025 are to be set in legislation. The Minister must in 2024 review and set the emissions intensity reduction targets for 2026 - 2030. In conducting this review the minister must:

    a. Consult such persons the Minister considers appropriate

    b. Have regard to the following considerations:

        i. The extent to which the targets that will apply to each year are consistent with the scale of emissions intensity reductions needed from domestic transport (excluding aviation) to achieve the 2050 emissions reduction target, and the emissions budgets;

        ii. The extent to which the targets that will apply help to facilitate the supply of advanced biofuels into the New Zealand market and support domestic production;

        iii. The extent to which any likely increase in fuel prices as a result of the targets can be absorbed by the economy without undue detriment to economic activity;

        iv. The extent to which the targets allow sufficient time to develop infrastructure and reduce the risk of stranded assets;

        v. The extent to which measures are in place to address any distributional impacts arising from fuel price rises; and

        vi. The extent to which the targets recognise the limits of New Zealand's light and heavy road fleets in the use of conventional biofuels, taking into account the limit to the amount of particular biofuels which can be blended with fossil fuels.

141. This review will serve to assess whether the high-level targets under the obligation have been appropriately set. The key consideration will be how the GHG emissions reductions achieved by the obligation are balanced against the economic costs, driven by higher fuel prices.

142. In addition to this, the Ministry of Business, Innovation and Employment and Te Manatū Waka will review the Obligation after it has been in effect for two years to:

- Evaluate the GHG emission reductions achieved as a result of the obligation, including the costs of abatement.
- Identify how fuel suppliers have decided to meet the obligation, including what types of biofuels have been deployed, at what blend level, and where in the economy. This should include identifying what infrastructure has been built to met the obligation.
- Determine whether the obligation should be expanded to include other fuels such as electricity and hydrogen.

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- Determine whether the food and feed-cap and whether it needs to be adjusted based on the observed impacts of biofuel production on food security.
- Determine whether additional feedstocks have seen significant expansion on to high-carbon stock land and should be defined as high ILUC risk.
- Review emerging advanced biofuels (i.e. woody biofuels) and whether these are adequately covered by the selected sustainability certification schemes.
- Review whether the principles of the waste hierarchy are being applied/managed for waste-based biofuels and their feedstocks.
- Review the penalty levels to see if they are still appropriate by assessing the cost of non-compliance vs the cost of meeting the Obligation.

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