MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

COVERSHEET

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Some information has been withheld for the reason of confidential advice to Government.

In Confidence

Office of the Associate Minister for Energy

Cabinet Economic Policy Committee

Release of the Review of the Engine Fuel Specifications Regulations 2011 Discussion Document

Proposal

1 This paper seeks Cabinet's agreement to release a public discussion document on the Government's review of the *Engine Fuel Specifications Regulations 2011*.

Relation to government priorities

2 It is important to ensure that New Zealand's engine fuel specifications are aligned with international standards and keep up with improvements in fuel and engine technology.

3 Improvements to fuel and engine technology are often targeted at reducing noxious emissions and particulate matter. Updating fuel specifications broadly aligns with the Government's commitments to fostering economic growth and efficiency.

Executive Summary

4 The *Engine Fuel Specifications Regulations 2011* (the **Regulations**) set the parameters for the quality of marine fuel oils, petrol, diesel, ethanol, biodiesel, and blends of these fuels, that are sold or supplied to the public in New Zealand.

5 The Regulations need to be reviewed periodically to ensure they keep up with innovations in the fuel and vehicle technology sectors. The last time that the Regulations were reviewed was in 2016/17.

6 I seek approval to release the attached discussion document, which outlines a number of proposals to update our engine fuels specifications. The feedback received from consultation will inform final advice to update the Regulations.

7 Two proposals are likely to attract the most feedback. These are:

7.1 Reducing the maximum limit for aromatics in petrol from 45 per cent to 35 per cent. High aromatic levels in fuel are linked to onboard diagnostic failures in engines and potentially early failures for emissions related hardware. Aromatics also increase noxious emissions that harm human health. This proposal may increase the price for premium petrol products (0.2 to 0.5 cents per litre for 95 RON[1] petrol and about 3 cents per litre for 98 RON petrol). This is because it is more expensive to produce high octane fuels without the use of aromatics. The cost implications will be tested during consultation.

[1] Research Octane Number, also known as octane rating.

7.2 Introducing a New Zealand specification covering renewable diesel (otherwise known as Hydrotreated Vegetable Oils or HVO) and other paraffinic diesels, based on the specification used in the European Union. Renewable diesel has the advantage of being compatible with existing fuel infrastructure and is becoming increasingly popular overseas. Fuel importers here have expressed an interest in importing renewable diesel, but it is not specifically covered by the Regulations.

Background

8 Europe has common standards for fuel and engine specifications. The most current is Euro 6, which was introduced in 2015. Euro 7 is expected to be introduced in the EU next year. However, New Zealand currently allows vehicles to enter the fleet that meet the outdated Euro 5 vehicle standard.[2] New Zealand also recognises equivalent vehicle standards from Japan and America.

9 From July 2027, new vehicles that are imported into New Zealand must meet a Euro 6d vehicle standard. Used vehicles have until July 2028 to meet the standard.[3] Heavy vehicles must also meet a separate Euro 6c standard from November 2025.

10 The proposals in this paper would align New Zealand's fuel specifications with Euro 6 vehicle standards, so that suitable fuel for these vehicles is available from the time that they are required to be imported (July 2027/28).

Analysis

11 In completing this review, officials have sought to advance the following objectives:

11.1 protect consumers by ensuring fuel is fit-for-purpose

11.2 reduce noxious emissions

11.3 keep pace with international vehicle emission standards

11.4 facilitate the adoption of lower-emissions fuel

11.5 enable New Zealand to source fuels from a diverse range of refineries at competitive prices.

Key Proposals

Reducing the maximum limit for aromatics in petrol

12 Aromatics are used in the refining process to increase petrol's octane rating. However, high aromatic levels can lead to onboard diagnostic failures, and potentially early failures and warranty issues for emissions critical hardware. Combusting aromatics can also lead to carcinogenic benzene being formed in exhaust gases.

13 New Zealand's fuel specifications set a maximum aromatic limit of 45 per cent. This is high by international standards – 85 per cent of light vehicles are sold in countries

[2] Europe introduced the Euro 5 standard in 2009. It was replaced with Euro 6 in 2014.
[3] *Land Transport: Vehicle Exhaust Emissions Rule 2007.*

that have a maximum petrol aromatics content of 35 per cent. Even within New Zealand, aromatic levels for all grades fall below this 45 per cent maximum limit on average. Premium 98 fuel, which has the highest-octane level available for retail sale, had an average aromatic level of 34.8 per cent in 2022-23.

14 About 75 per cent of petrol consumed in New Zealand is regular grade (91 RON), and 25 per cent is premium grade (95 and 98 RON). We do not have a breakdown between 95 RON and 98 RON, but 98 RON is likely to constitute four per cent of the petrol market (typically, 98 is required by high performance vehicles).

15 Reducing the maximum limit for aromatics to 35 per cent would 'lock in' a standard that is largely already being met by most of the petrol sold in New Zealand (91 and 95 RON). It would also align this fuel specification with Euro 6d engine/emission designs and avoid potential damage to vehicles with the latest engine technologies caused by incompatible fuel.

16 However, setting a maximum limit at 35 per cent may increase prices as some premium fuel batches may still be slightly above this proposed 35 per cent maximum level.[4] Other octane enhancers (which can be more expensive than aromatics) would be needed to bring these batches into compliance with the proposed 35% aromatics limit. Accordingly, officials have estimated a potential increase of 0.2 to 0.5 cents per litre for 95 RON petrol and about 3 cents per litre for 98 RON petrol but will test this during consultation.

17 While reducing the maximum limit to 35 per cent for all grades is my preferred option, I will also be consulting on higher maximum limits for aromatics, including allowing up to 40 per cent for premium 98 fuel. Allowing higher aromatic levels would minimise costs to consumers but increases the risks of damage to new vehicles that use these premium fuels, and increase the prevalence of emissions that are harmful to human health.

18 I also propose to consult on allowing for a longer lead in time for any changes to the maximum aromatic level. There are fewer refineries that can supply premium petrol that can meet the 35 per cent aromatics maximum limit, but sourcing constraints are expected to ease over time as other markets in the region (such as Australia) move to upgrade their refineries, and align their fuel specifications with Euro 6 or similar.

Introducing a silver strip corrosion test for active sulphur

19 Active sulphur in fuel can degrade certain engine components, and in particular can corrode electronic components, and cause fuel gauges to become inaccurate. Ultimately, this can cause vehicles to stall.[5]

20 The Regulations currently require a copper strip corrosion test for petrol but not a silver strip corrosion test. Both tests can identify sulphur compounds, but only the

[4] Approximately 21 per cent of 95 RON and 29.8 per cent of 98 RON samples tested between 2022 and 2023 were over the proposed 35 per cent aromatics limit. All tested 91 RON samples were under 35 per cent.
[5] In late 2017, active sulphur in fuel caused vehicles to run out of fuel, even though fuel gauges showed fuel was remaining. Around 1000 vehicles were affected and the average cost to repair was $600 dollars per vehicle. This cost was reimbursed by fuel companies.

silver strip corrosion test can detect active sulphur. I will consult on requiring a silver strip corrosion test.

Allow petrol to be used as an ethanol denaturant, without the 10ppm sulphur requirement

21 Ethanol is denatured (made unfit for human consumption) by blending it with another product or chemical. Fuel importers usually do this to avoid paying additional excise duty on alcohol.

22 The current regulations state that ethanol must be denatured with unleaded petrol. The denaturant must also have 10 parts per million (**ppm**) or less of sulphur.

23 Our ethanol regulations are more stringent than other jurisdictions, particularly Australia. This makes it problematic if ethanol is imported from Australia as it must be denatured here to meet requirements.

24 I propose to consult on relaxing the New Zealand sulphur requirement for ethanol denaturants. Limiting sulphur in the denaturant has a minimal effect on the total sulphur level in the final fuel product. As long as the final denatured ethanol is less than 10 ppm sulphur and is denatured with petrol, the denaturant itself should not have to be less than 10 ppm of sulphur.

Introducing a petrol density specification of 720 – 755 kg/m³

25 Fuel density is the mass of fuel per unit volume. Density is determined by both the quality of crude oil used to produce the fuel and the refining process. The New Zealand specification does not currently have a density specification for petrol.

26 I propose to consult to introduce a petrol density range to the specifications of 720-775 kg/m³, which would bring the specification into line with Euro 6 Standards. It would also protect consumers, since fuel may be consumed more quickly than expected if the density of petrol falls below 720 kg/m³.

27 The proposed density range is already in line with import standards set by the fuel industry.

Reducing the allowable density of diesel and biodiesel

28 The Regulations have a maximum diesel density specification of 850 kg/m³. This density can be relaxed to an 854 kg/m³ maximum when blended with seven per cent biodiesels.

29 New Zealand diesel is very low in sulphur (10 ppm), which makes it less dense than diesel in jurisdictions that allow higher rates of sulphur.

30 The European diesel specification (EN590) has a maximum specification of 845 kg/m³, which cannot be relaxed if it is blended with biodiesel. As I want to bring New Zealand's fuel specifications in line with the European standards, I propose consulting on reducing our diesel density, including when it is blended with biodiesel, to a maximum of 845 kg/m³.

Reducing PAH limit from 11 per cent to eight per cent

31 Polycyclic aromatic hydrocarbons (**PAH**) are hydrocarbons that can be found in natural sources, such as crude oil and bitumen, or produced from combustion processes. However, PAH in exhaust fumes can irritate eyes and lungs and are potentially carcinogenic and mutagenic.

32 New Zealand's current specification for PAH is set at a maximum allowable limit of 11 per cent of the total volume of fuel. The current European standard is eight per cent. I propose to consult on lowering the maximum allowable PAH content in diesel to eight per cent, so that it is in line with the European specification.

33 As MBIE's testing from 2018 to 2022 found that the PAH content in diesel was routinely below four per cent, I do not expect this proposal to be controversial.

Reducing Filter Blocking Tendency from 2.5 to 2.0

34 Fuel filters screen out any contamination in fuel. If the filters are clogged, fuel cannot circulate properly, causing serious engine operation problems.

35 Fuel with a higher Filter Blocking Tendency (**FBT**) is more likely to block engine filters. The FBT ranges from 1.00 (perfectly clean) to greater than 3, which can cause serious problems in diesel engines.

36 The current regulations have a FBT specification of a maximum of 2.5. I propose to consult on reducing the FBT specification to 2.0, bringing our FBT specification in line with Australia.

37 I do not expect any opposition to this proposal. Fuel quality monitoring data shows that the FBT of diesel supplied in New Zealand is typically well below the maximum limit that is proposed.

Introducing a renewable diesel specification

38 New Zealand's fuel specifications allow for a blend of up to seven per cent of biodiesel with fossil diesel. However, there is no separate specification for renewable diesel. The use of renewable diesel produces fewer greenhouse gases, noxious emissions (carbon monoxide and hydrocarbons) and soot, in comparison to fossil diesel.

39 Renewable diesel is a "drop-in" fuel chemically similar to fossil diesel but has a much lower density, and therefore a lower energy content. However, commercial customers cannot use a 100 per cent renewable diesel because renewable diesel does not fully meet the definition of diesel or biodiesel in the current fuel specifications.

40 The discussion document will seek feedback on a proposal that, for retail sale of renewable diesel, the diesel/renewable diesel blends must meet the density specification for diesel. This would ensure that consumers purchasing fuel from retailers would obtain similar levels of energy from diesel/renewable diesel blends

and petroleum diesel. The density specification would also allow for retailers to blend renewable diesel to a reasonably high level, up to 25 per cent.[6]

41 For non-retail sale of renewable diesel, I propose to consult on introducing a specification for renewable diesel sold in neat form. As part of this, I propose to allow any renewable diesel blends to be exempt from the diesel density specification that applies to retail sale. This would also allow fuel wholesalers and their customers to negotiate commercial agreements to procure blends with very high renewable diesel content.

42 European specification, EN15940, would be used as the basis for a New Zealand specification covering renewable diesel.

Reviewing the Excise and Excise-equivalent Duties Table

43 I also propose to consult on whether the New Zealand Customs Service (Customs) should review the Excise and Excise Equivalent Duties Table (the Table) to align with terminologies for fuel products in the *Engine Fuel Specifications Regulations* where possible. The Table and Regulations should be harmonised to provide clarity about how legal requirements, such as those relating to the petroleum or engine fuel monitoring levy, apply to different fuel products imported and supplied to New Zealand. If any review of the Table results in a decision to amend it, then amendments will also need to be made by Order in Council to the Working Tariff Document (under the *Tariff Act 1988*).

Indicative timeline

44 Subject to Cabinet's decision, I propose to release this discussion document in February 2025. Stakeholders will have six weeks to submit on the proposals.

45 I propose a report back to Cabinet with final policy proposals in mid-2025.

Cost-of-living Implications

46 There are no immediate cost-of-living implications from consulting on proposed changes to the *Engine Fuel Specification Regulations*. However, reducing aromatic levels to a maximum of 35 per cent may result in a small price increase for premium petrol products (0.2 to 0.5 cents per litre for 95 and about 3 cents per litre for 98). This is because some premium fuel batches may still be slightly above this proposed 35 per cent minimum level, and other octane enhancers (which can be more expensive than aromatics) would be needed to bring these batches into compliance with the proposed 35 per cent aromatics limit. I will also seek feedback on options that do not reduce the aromatic level as much, lessening costs to consumers.

Financial Implications

47 Confidential advice to Government

[6] As mentioned earlier, the maximum blend rate for biodiesel is seven per cent, by comparison. Because renewable diesel is so chemically similar to fossil diesel, a higher blend rate can be achieved, without making the final fuel product 'off spec'.

Confidential advice to Government

Legislative Implications

48 This paper does not require any changes to legislation, but subsequent decisions following consultation will require changes to secondary legislation. Options proposed in the discussion document will require amendments to the *Engine Fuel Specifications Regulations 2011*.

Impact Analysis

Regulatory Impact Statement

49 The Ministry of Regulation's Regulatory Impact Analysis team has determined that this proposal is exempt from the requirement to provide a Regulatory Impact Statement on the grounds that it has no or only minor impacts on businesses, individuals, and not-for-profit entities.

Climate Implications of Policy Assessment

50 The proposal to introduce a specification for renewable diesel may slightly reduce greenhouse gas emissions. The rest of the proposals focus on reducing other toxic emissions and particulate matter.

51 Following consultation, officials will determine whether a full Climate Implications of Policy Assessment (**CIPA**) is needed as part of final policy decisions.

Population Implications

52 The proposal to lower the aromatics limit for 98 RON fuel from 45 per cent to 35 per cent could result in a 3 cents per litre increase to the price of this fuel. This would in particular affect owners of high performance vehicles (eg BMW X3, Ferrari and Bentley) that require 98 RON fuel.

Human Rights

53 The proposals in this paper are consistent with the *New Zealand Bill of Rights Act 1990* and the *Human Rights Act 1993*.

Consultation

54 Other Government agencies have been consulted including the Ministry of Transport, Ministry for the Environment, the New Zealand Customs Service, NZ Transport Agency Waka Kotahi, the New Zealand Defence Force, the Energy Efficiency and Conservation Authority, and Maritime New Zealand.

Communications

55 Subject to Cabinet's agreement, I intend to release a media statement announcing public consultation on the review of the *Engine Fuel Specifications Regulations 2011* in February 2025.

Proactive Release

56 I propose to proactively release this Cabinet paper subject to any necessary redactions. This will be done within 30 business days following confirmation of Cabinet's decisions.

Recommendations

The Associate Minister for Energy recommends that the Committee:

1 **Note** that the *Engine Fuel Specification Regulations* 2011 sets standards for engine fuel quality in New Zealand, but that these Regulations are out of date, and risk damage to new vehicles that require cleaner fuel to operate.

2 **Note** the attached discussion document: Review of the *Engine Fuel Specifications Regulations 2011.*

3 **Note** that one of the proposals in the discussion document is to reduce the maximum allowable aromatic levels of petrol, which would reduce the risks of engine damage and noxious emissions but may increase the price of premium petrol (0.2 to 0.5 cents per litre for 95, and about 3 cents per litre for 98).

4 **Note** that the discussion document also proposes a new specification for renewable diesel.

5 **Approve** the release of the discussion document: Review of the *Engine Fuel Specifications Regulations 2011.*

6 **Authorise** the Associate Minister for Energy to make minor amendments and refinements to the discussion document before it is released.

7 **Invite** the Associate Minister for Energy to report back to the Cabinet Economic Policy Committee on the outcome of the consultation and on final proposals in mid-2025.

Authorised for lodgement

Hon Shane Jones

Associate Minister for Energy

Appendices

Appendix One: Discussion Document: *Review of the Engine Fuel Specifications Regulations 2011*

Appendix Two: Summary of proposed changes

Appendix Two: Summary of Proposals

Petrol

- Reduce the maximum limit for aromatics in petrol from 45 per cent to 35 per cent
- Introduce a silver strip corrosion test for active sulphur
- Relax the 10 ppm maximum allowable sulphur level for ethanol denaturants
- Introduce a fuel density specification of 720-775 kg/m³
- Amend the definition of petrol to reflect a boiling point of 210 ºC
- Amend the silver strip test standard in Schedule 1A to ASTM D7667/D7671
- Change the ethanol range in fuel ethanol by lowering the range starting from '70 per cent to 85 per cent' to '51 per cent to 83 per cent' as in ASTM D5798

Diesel/biodiesel

- Reduce the allowable density of diesel to 845 kg/m³ (from 850 kg/m³) and reduce the allowable density of FAME in a similar fashion
- Reduce PAH limit from 11 per cent to 8 per cent
- Reduce Filter blocking tendency from 2.5 to 2.0
- Introduce a renewable diesel specification
- Replace the maximum limit for diesel's total contamination of 24 mg/kg with 20 mg/l in Schedule 2
- Add an appearance test and remove the colour test for both diesel and FAME
- Revise Regulations 5 to reflect a biodiesel blending limit of up to 7 per cent.
- Clarify the distinction between Regulation 15 ('Requirements relating to diesel sold by non-retail sale') and Regulation 17A ('Requirements relating to marine fuel oil sold by non-retail sale').

Implementation of the Fuel Quality Monitoring Programme

- Revise Regulation 4 so that it is focused on exemptions for engine fuels which are meant for internal combustion engines.
- Revise Regulation 5 to clarify that the definition of 'engine fuel' includes marine fuel oil.
- Update Regulation 21 so that it does not refer to a specific year of issue for ISO standard 9001, and so that it instead refers to a requirement for accreditation to ISO 9001, ISO17020 or ISO 17025.
- Update Regulation 21 so that it refers to accreditation for an organisation or agency, rather than an individual person or employee.
- Review and update Custom's Excise and Excise Equivalent Duties Table to align with terminologies for fuel products used in the Engine Fuel Specifications Regulations where possible.