Regulatory Impact Statement

Review of the Engine Fuel Specifications Regulations 2011

Agency Disclosure Statement

This Regulatory Impact Statement has been prepared by the Ministry of Business, Innovation and Employment. It provides an analysis of options to refine the existing Engine Fuel Specifications Regulations 2011.

A formal cost/benefit analysis has not been undertaken but costs and benefits are outlined qualitatively, and where possible quantitatively, in this RIS. It is difficult to estimate, in quantitative terms, the impact on vehicles of some of the proposed changes to fuel specifications, for example the proposed increase in biodiesel blend limits in diesel.

The Regulations and their predecessors have been in place since 1989. Changes to only some specification parameters are being considered at this time and the majority of the specifications will remain unchanged. No change to the underlying concept of the Regulations is proposed.

Only those changes that require a RIS have been analysed. Minor and technical amendments have not been analysed. A list of all changes is provided in Appendix 1. The broader review included the following changes that were considered not significant:

a) The establishment of an E85 standard known as flex-fuel (i.e. up to 85 per cent ethanol and minimum 15 per cent petrol). This both supports Government policy to enable biofuel uptake and clarifies the Regulations with regard to five service stations that currently sell E85 for motor racing

b) Drafting improvements (technical/legal clarification) to the way pool averages for aromatics in petrol are defined and measured

c) Increasing the minimum oxidation stability requirement in biodiesel from six hours to eight hours in line with the European fuel standard and vehicle manufacturer guidelines, and

d) The replacement of a number of test methods to reflect industry best practice.

Jamie Kerr June 2016

Executive summary

1. The Ministry of Business, Innovation and Employment (MBIE) is responsible for the administration of the Engine Fuel Specifications Regulations 2011 (Regulations). The Regulations provide comprehensive fuel specifications for petrol, petrol/ethanol blends, diesel, biodiesel and diesel/biodiesel blends.

2. The Regulations set out minimum standards affecting the performance of fuel, enabling consumers to purchase petrol and diesel to a quality standard appropriate for New Zealand's vehicle fleet and climatic conditions. They also include provisions limiting components that could be harmful to the environment or public health.

3. The current specifications are primarily the result of a major review undertaken in 2001/02 of the then Petroleum Products Specifications Regulations 1998. The outcomes of this review and a subsequent review of sulphur levels were implemented between 2002 and 2009. Biofuels were added to the specifications in 2008 so "engine fuel" replaced "petroleum products" in the name of the Regulations to reflect their broader scope. The most recent review of the Regulations was undertaken in 2011. Amendments were made to relax unnecessarily constraining fuel parameters, reflect technological advancements, align with overseas specifications, and help future proof the regime.

4. Issues identified with the current specifications are that there are some areas which:

    a. Allow for harmful emissions, that can lead to environmental and public health costs

    b. are too inflexible and prescriptive, resulting in a reduced supply pool from which imports can be drawn causing there higher costs to consumers. International precedent suggests there is room for the relaxation of some parameters, which may allow additional innovation in fuel supply

    c. lack clarity in some areas, resulting in instances where the Regulations have not been complied with as intended, with public health outcomes being worse than they otherwise would be, and

    d. are out of date and need to reflect technology improvements, notably with regard to prescribed test methods.

5. The following four proposed specifications are the significant changes proposed by the review and are MBIE's preferred options:

    a. reducing sulphur levels in petrol from 50 mg/kg to 10 mg/kg by 1 July 2018

    b. introduction of a total oxygen limit on petrol

    c. allowance of up to 3 per cent volume methanol to be blended into petrol, and

    d. increasing the biodiesel blend limit in diesel from 5 per cent volume to 7 per cent volume.

6. There are also a range of minor technical changes to align specification with changes in technology and international best practice. These relate to test methods, the calculation of pool averages of total aromatics in petrol, and the introduction of a new standard for petrol blended with ethanol with more than 70 per cent and not more than 85 per cent ethanol (referred to as E85). These changes do not meet require a regulatory impact analysis so are not considered in this RIS.

7. A discussion document was released in September 2015 and 14 submissions were received from fuel and motor industry stakeholders. Further, targeted engagement occurred with submitters on an issue-by-issue basis following this.

8. Following discussions between officials and stakeholders after the consultation period had closed, agreement was reached on the technical matters that related to test methods, the calculation of pool averages, and E85. These changes will keep the Regulations in line with current the state of technology.

9. Stakeholder agreement was not reached on all four specifications of significance. However, MBIE is confident that the four proposed specifications provide a net benefit to consumers relative to the status quo, providing scope for improved environmental and public health outcomes from reduced harmful vehicle emissions, greater diversity of supply, and, overall, reduced costs to consumers.

Status quo

10. The Regulations provide comprehensive fuel specifications for petrol, petrol/ethanol blends, diesel, biodiesel, and diesel/biodiesel blends. They set out minimum standards that affect the performance of fuel, enabling consumers to buy petrol and diesel to a quality standard appropriate for New Zealand's vehicle fleet and climatic conditions. The minimum standards also limit components that could be harmful to the environment or public health. The regulations apply to all road transport fuel sold in New Zealand.

11. The Regulations are made pursuant to section 35(1)(c) of the Energy (Fuels, Levies and References) Act 1989, which provide that the Governor-General may from time to time, by Order in Council, make regulations for all or any of the following purposes:

    Prescribing standards or specifications (including environmental or sustainability standards or specifications) to which engine fuel or refined petroleum products of the class or classes specified in the regulations must conform when supplied in New Zealand.

12. The current specifications are mainly the result of a major review carried out in 2001/02 of the then Regulations (the Petroleum Products Specifications Regulations 1998). The outcomes of that review and of a subsequent review of sulphur levels were implemented between 2002 and 2009. In 2008, biofuels were added to the specifications and the Regulations were renamed the 'Engine Fuel Specifications Regulations' to reflect their broader scope. The Regulations were amended last in 2011 to relax unnecessarily restrictive fuel parameters, to reflect technological advances, to align New Zealand with overseas specifications, and to future-proof the regime.

Objectives

13. The public policy objectives of engine fuel specifications are to:

    a) improve environmental and public health outcomes by reducing harmful vehicle emissions and improving air quality

    b) enable new cleaner vehicle technologies

    c) provide an adequate level of consumer protection by ensuring that fuel that is 'fit for purpose' can be supplied to consumers, and

d) provide as much flexibility as possible to fuel suppliers within minimum environmental, public health and consumer protection constraints (also referred to as an "open specification"). This flexibility will help achieve one or several of the following outcomes:

- enhanced security of supply and minimisation of competitive distortions as fuel can be sourced from a wider range of refineries
- minimisation of costs to consumers as the premium paid by fuel suppliers relative to the international benchmark is likely to be lower if there is a wider potential supply pool, and
- promote the Government's objectives around biofuels uptake where this is technically and commercially viable. Increased sales of biofuels can help contribute to the Government's broader greenhouse gas emission abatement goals.

14. In principle, officials favour an "open specification" that minimises competitive distortions and incremental costs to consumers. The Regulations set the minimum parameters needed to achieve the desired objectives. However, the risk appetite between stakeholder groups as to what is acceptable varies and judgement calls are required to balance each of the objectives described above.

Problem definition

15. The Regulations need to be regularly reviewed to keep in step with international developments in vehicle technology and fuel supply. Key problems identified with the current Regulations are that there are some areas which:

    a. allow harmful emissions, leading to environmental and public health costs

    b. are too inflexible and prescriptive, resulting in a reduced supply pool from which imports can be drawn and higher costs to consumers. International precedent suggests room for the relaxation of some parameters, which may allow additional innovation in fuel supply

    c. lack clarity, resulting in instances where the Regulations have not been complied with as intended, with public health outcomes being worse than they otherwise would be, and

    d. are out of date and need to reflect technology improvements, notably with regard to prescribed test methods.

16. The two issues identified in paragraph 15(c) and (d) above relate to parameters considered to be minor and technical in nature. The parameters affected are cited in Appendix 1.

17. The specific status quo and problem definition associated with each change is discussed in detail below in the regulatory impact analysis for each proposed specification considered significant.

Regulatory Impact Analysis

Proposed changes

18. There are four proposed changes to the Regulations, which are considered significant and for which the costs, benefits and risks are assessed individually. They include the:

    a) reduction in sulphur limits in petrol from 50 mg/kg to 10 mg/kg by 1 July 2018. The proposal aims to lock in the public health and environmental benefits of lowered harmful air emissions that were achieved for the first time, on average, in 2015, but which could rise again given the currently higher regulated limit. Any rise in sulphur levels in petrol sold in the market would have flow on costs in terms of premature adult mortalities, hospital admissions and restricted human activity time

    b) introduction of total oxygen content limits of 2.7 per cent mass for petrol/ethanol blends containing up to 5.0 per cent ethanol volume, and 3.7 per cent mass for petrol/ethanol blends containing up to 10 per cent ethanol volume, as a universal measure to restrain the presence of oxygenates in petrol blends. This measure aims to increase flexibility to fuel suppliers and potentially reduce costs to consumers

    c) allowance of methanol as a permissible oxygenate. This measure will potentially improve environmental and public health outcomes through reduced emissions, enhance security of supply by adding diversity of supply, and lower costs to consumers, and

    d) increase in biodiesel blends limits in diesel from the current maximum of 5 per cent biodiesel by volume to 7 per cent by volume. This measure supports Government policy, as articulated in the New Zealand Energy Strategy, to enable biofuel uptake where this is technically viable.

19. There are a range of changes, which relate to updating test methods, clarifying definitions and introducing a new standard for petrol blended with up to 85 per cent volume ethanol. They are considered technical changes and are not discussed in this Regulatory Impact Analysis. A summary of all proposed changes is provided in Appendix 1.

20. This RIS assesses the options against the criteria (that is, their ability to make improvement toward the relevant fuel specification objectives). The following scale is used:

    ✓✓ An option fully meets the objective (significant improvement on status quo)

    ✓ An option somewhat meets the objective (small improvement on status quo)

    - No change to the status quo

    X An option does not meet the objective (or is a deterioration on the status quo)

21. The objective of providing an adequate level of consumer protection by ensuring that fuel that is “fit for purpose” can be supplied to consumers, has been weighted more heavily than the other objectives. Explanatory text is also used in the table and in the conclusions.

Change One: Reducing the maximum allowable level of sulphur in petrol

Status quo and problem definition

22. Sulphur occurs naturally in crude oils. It must be reduced to an acceptable level during the refining process as it promotes corrosion and affects the performance of vehicle control equipment, thus reducing fuel efficiency. Ultra-low sulphur petrol is recommended for the newest most efficient vehicles. When burnt, sulphur in petrol also produces harmful air emissions.

23. In order to improve air quality and encourage the uptake of the newest, most efficient vehicles, New Zealand has been progressively reducing sulphur levels since 2001/02. The limit in New Zealand has been reduced in increments, from 500 mg/kg in 2002, to 50 mg/kg on 1 January 2008. A sulphur limit of 500 mg/kg had existed in New Zealand from 1989 to 2002. Prior to that, sulphur limits had been set by agreement between the government, the oil industry and vehicle manufacturers. The move from 50 mg/kg to 10 mg/kg, known as ultra-low sulphur or sulphur free petrol, is the last step in this transition and has been signalled from as early as the 2001 review of the Regulations.

24. There is no minimum level for sulphur in the Regulations and so there are no legal barriers to stop suppliers from voluntarily supplying petrol with a lower sulphur limit than regulated. Evidence suggests this is what has occurred in practice: the weighted average sulphur content of a representative sample of petrol sold in New Zealand has progressively reduced in recent years with an average 7.9 mg/kg in 2014/15. Of these samples, only a small number had recorded sulphur levels above 20 mg/kg.[1]

25. Modelled results undertaken for this review concluded that reducing sulphur levels from 50 mg/kg to 10 mg/kg would result in a decrease of 183.7 kilo tonnes of carbon monoxide through to 2030, 7,688 kilo tonnes of carbon dioxide, 22.5 kilo tonnes of volatile organic compounds, 26.8 kilo tonnes of oxides of nitrogen and 0.353 kilo tonnes of particulate matter.[2]

26. However, so long as the regulated maximum sulphur limit remains at 50 mg/kg there is no certainty that the public health and environmental benefits that have already occurred as a result of the market effectively moving to 10 mg/kg will continue. As other markets across the Asia-Pacific region move to 10 mg/kg sulphur petrol, there may be a risk over time that New Zealand is used as a market to offload lower quality 50 mg/kg sulphur petrol. The risk of "backsliding" also affects the encouragement that 10 mg/kg sulphur petrol can provide for the further uptake of the most efficient Euro 5/6 vehicle technology.

Options and impact analysis

27. Options relate to the timing of reducing sulphur levels. There are no options around intermediate sulphur levels or a different sulphur level to 10 mg/kg. An option to provide an intermediate step of 30 mg/kg before moving to 10 mg/kg was initially

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[1] MBIE Trading Standards Fuel Quality Monitoring Programme testing 2015.

[2] Air quality impact of low sulphur petrol model: Dr Gerda Kuschel, available at: http://www.mbie.govt.nz/info-services/sectors-industries/energy/liquid-fuel-market/reviewing-aspects-of-the-engine-fuel-specifications-regulations-2011.

considered but it was rejected as impracticable by fuel suppliers as petrol with a sulphur content of 30 mg/kg is not an internationally recognised petrol grade.

Option 1: Status quo (Sulphur maximum of 50 mg/kg)

28. The status quo position of a sulphur limit of 50 mg/kg results in no additional cost to consumers, no impact on security of supply and minimal impact on incentives for vehicle manufacturers to provide Euro 5/6 vehicles. As at the end of 2014, there were over 91,000 light petrol vehicles that were Euro 5/6 compliant. As noted, the market has progressively moved to supply petrol which is well below the regulated maximum and already, on average, meets the proposed new limit of 10 mg/kg.

29. The principal arguments against the status quo relate to the risk of backsliding to the current regulated maximum limit and the general consensus across all stakeholders was that a move to 10 mg/kg was a logical outcome at some point.

30. All of the petrol produced at New Zealand's sole refinery at Marsden Point is 10 mg/kg compliant. In 2015, 62 per cent of the country's petrol demand was met by Refining NZ, up from 57 per cent in 2014. This is set to increase further to 65 per cent following completion of a major investment project to replace the platformer with a continuous catalyst reformer, which was launched in March 2016. Given the refinery's processing arrangements with the three major oil suppliers (Z Energy/Chevron, BP and ExxonMobil), it is typically more economic to meet New Zealand's petrol demand from the refinery in the first instance before meeting the balance in demand via imports. This means that in future, approximately 35 per cent of the country's petrol demand will be sourced from imports. Even if all of this import balance were to be entirely 50 mg/kg, this would result in a maximum average sulphur level across all of New Zealand's petrol demand of 24 mg/kg (0.65 x 10 + 0.35 x 50). This is a worst case scenario and unlikely to be the case in practice.

31. Many of the refineries from which imports are sourced from are located in South Korea, Japan or Singapore and are already at, or will be in the next few years, 10 mg/kg compliant. The main concern would be if petrol imports were to recommence on a regular basis from Australia. The Australian refineries cannot meet 10 mg/kg petrol without significant investment. While Australia is now a significant importer of oil products itself, officials are aware that the expansion plans of one Australian refinery depend partly on its ability to export petrol to New Zealand.

32. While there is some risk of back sliding the overall risk is likely to be moderate.

Option 2: Reduction to 10 mg/kg from 1 July 2017

33. The discussion document proposed a reduction in sulphur levels in petrol to 10 mg/kg by 1 July 2017. All submitters with the exception of ExxonMobil agreed with a move to 10 mg/kg at some point, with fuel suppliers generally arguing for a further delay in implementation to reflect security of supply and cost concerns.

34. Security of supply concerns arise from the fact that at present only Japan, South Korea and Taiwan require 10 mg/kg petrol. China (2017/18), Singapore (2017), and Vietnam (2021) have confirmed plans to move to 10 ppm petrol, while India proposes to move to this level by 2020. Elsewhere, the United Arab Emirates (2015), Saudi Arabia (2016), Kuwait (2018) and the United States (2017) all have confirmed moves to 10 mg/kg petrol.

35. MBIE engaged Stratas Advisors, to carry out a stocktake of current and future supply of 10 mg/kg petrol in the Asia-Pacific region. Based on a detailed refinery-by-refinery

analysis and supply/demand forecast, Stratas concluded that there would be total export capability in the Asia-Pacific region of 55 thousand barrels per day (tb/d) in 2017, rising to 110 tb/d in 2020 and to 445 tb/d in 2030. Based on New Zealand's demand levels for 2015, this leaves an import requirement of approximately 19 tb/d. MBIE's reference forecast sees a gradual decline in petrol demand from 2015 to 2040 as a result of ongoing efficiency improvements in an already very mature market.

36. The conclusion from this analysis is that there will be more than enough export capacity of 10 mg/kg petrol by 1 July 2017 to meet New Zealand's import requirements. Some submitters felt this conclusion was overly optimistic as it assumes that countries will move to 10 mg/kg petrol when they say they will. Officials consider the original analysis undertaken by Stratas Advisors to be sound but we acknowledge the need for caution.

37. In terms of costs to consumers, MBIE commissioned Hale & Twomey as part of the review to provide estimates. Hale & Twomey estimated that the cost impact of moving from 50 ppm to 10 ppm petrol would be around 35 to 50 US cents per barrel, with the low end of that cost range more closely aligned with high-octane petrol and the high end more closely aligned to lower-octane petrol. Based on total petrol demand for 2014, Hale & Twomey estimate that the total cost to New Zealand consumers would be between $7.8 and $17.3 million, or between 0.26 and 0.57 cents per litre.

38. The cost estimates provided by Hale & Twomey relate to the estimated incremental cost of production to refiners of producing petrol with a sulphur limit of 10 mg/kg relative to petrol with a sulphur limit of 50 mg/kg. The estimates do not reflect any forecast on how the market may pass on the extent of higher refining costs for 10 mg/kg petrol relative to 50 mg/kg, either for New Zealand refined or imported petrol. Some submitters argued that the additional cost of the measure might be up to US$2 per barrel. Using a low US$/NZ$ exchange rate, the total additional cost to consumers could be up to $68.6 million. At a current US$/NZ$ exchange rate of 0.66 and an additional cost of US$0.5 per barrel (the upper range estimated by the consultants), the total additional cost to consumers would be $14.3 million per annum, or 0.57 cents per litre of petrol sold. The full range of potential incremental costs to consumers is set out in the table below.

Potential incremental cost to consumers of moving to 10 mg/kg petrol (NZ cents per litre)

	US$ per barrel											
	0.35	0.50	0.65	0.80	0.95	1.10	1.25	1.40	1.55	1.70	1.85	2.00
US$/NZ$												
0.5	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	1.9	2.1	2.3	2.5
0.55	0.4	0.6	0.7	0.9	1.1	1.3	1.4	1.6	1.8	1.9	2.1	2.3
0.6	0.4	0.5	0.7	0.8	1.0	1.2	1.3	1.5	1.6	1.8	1.9	2.1
0.65	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.6	1.8	1.9
0.7	0.3	0.4	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8
0.75	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.2	1.3	1.4	1.6	1.7
0.8	0.3	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2	1.3	1.5	1.6
0.85	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4	1.5

Potential incremental cost to consumers of moving to 10 mg/kg petrol (Million NZ$)

	US$ per barrel											
	0.35	0.50	0.65	0.80	0.95	1.10	1.25	1.40	1.55	1.70	1.85	2.00
US$/NZ$												
0.5	13.7	19.6	25.5	31.3	37.2	43.1	49.0	54.8	60.7	66.6	72.5	78.4
0.55	12.5	17.8	23.1	28.5	33.8	39.2	44.5	49.9	55.2	60.5	65.9	71.2
0.6	11.4	16.3	21.2	26.1	31.0	35.9	40.8	45.7	50.6	55.5	60.4	65.3
0.65	10.5	15.1	19.6	24.1	28.6	33.1	37.7	42.2	46.7	51.2	55.8	60.3
0.7	9.8	14.0	18.2	22.4	26.6	30.8	35.0	39.2	43.4	47.6	51.8	56.0
0.75	9.1	13.1	17.0	20.9	24.8	28.7	32.6	36.6	40.5	44.4	48.3	52.2
0.8	8.6	12.2	15.9	19.6	23.3	26.9	30.6	34.3	38.0	41.6	45.3	49.0
0.85	8.1	11.5	15.0	18.4	21.9	25.3	28.8	32.3	35.7	39.2	42.6	46.1

39. This quality premium is expected to reduce over time as additional supply of 10 ppm petrol enters the market. While the reduction in sulphur content in diesel in the Asia Pacific region is not directly comparable with the reduction in sulphur content in petrol it is useful to compare the price trends seen for diesel. The price spread between 50ppm sulphur diesel and 10 ppm sulphur diesel benchmark prices has reduced from 50 US cents to 24 US cents per barrel, with an average spread of 40 US cents per barrel observed, over the last six years.

40. Overall, the proposed reduction in sulphur levels in petrol from 50 mg/kg to 10 mg/kg by 1 July 2017 would result in no risk of backsliding, thereby locking in the social benefits already achieved, but would come at the expense of a slightly reduced pool of refiners from which New Zealand can import petrol from, particularly in the short term, and slightly higher costs to consumers. The risks are considered tolerable and manageable.

Option 3: Implementation of a reduction to 10 mg/kg delayed to 1 July 2018 (Preferred option)

41. This option is the same as the one described above but with a further one year delay until implementation. Fuel suppliers had argued for a delay in implementation from the 1 July 2017 timeline proposed in the discussion document, with 1 July 2018 to 1 July 2020 provided as alternative options. The purpose of the delay in implementation is to mitigate the potential risks around security of supply and cost to consumers described above.

42. MBIE acknowledges the potential risks outlined by fuel suppliers and consider a one year delay to that initially proposed to be a reasonable compromise. This option avoids any risk of backsliding, it provides a long lead-time for fuel suppliers to organise alternative supply arrangements if required, and it further mitigates the risks around security of supply and additional costs to consumers.

Summary of options analysis

	Objective a) Improve environmental and public health outcomes by reducing harmful vehicle emissions and improving air quality	**Objective b) Enable new cleaner vehicle technologies**	**Objective c) Provide an adequate level of consumer protection by ensuring that fuel that is "fit for purpose" can be supplied to consumers**	**Objective d) Provide as much flexibility as possible to fuel suppliers within minimum environmental, public health and consumer protection constraints (to enhance security, minimise costs to consumers and promote uptake of biofuels)**
Option 1: 50 mg/kg (no change)	-	-	-	-
Option 2: Reduction to 10mg/kg by 1 July 2017	✓ Provides certainty that there will be no backsliding and that benefits already achieved will be locked in.	✓ Provides certainty to vehicle manufacturers that all fuel sold in the market (not just the average of all fuel sold) will meet 10 mg/kg.	✓ Very modest improvement for vehicle owners of Euro 5/6 vehicles by providing certainty that there will be no backsliding from the ultra-low sulphur petrol currently sold into the market. The current regulated limit is fine for Euro 5/6 vehicles but does not provide the optimal efficiency.	X Reduced pool of refiners from which supply can be sourced. Overall, the risks are considered moderate but there will be some increased costs to consumers. Under the Ministry's base case estimates, these increased costs would amount to $14.3 million per annum, with the expectation that these costs would decline over time.
Preferred Option Option 3: Reduction to 10 mg/kg by 1 July 2018	✓ As above.	✓ As above.	✓ As above.	✓ A one year delay on the initial proposal will alleviate the security of supply and cost concerns as refineries in the region progressively move to supply 10 mg/kg petrol.

Conclusion

43. Overall, MBIE considers it appropriate to move to 10 mg/kg petrol to lock in the public health and environmental benefits that have already been achieved, to encourage greater uptake of vehicles meeting the Euro 5/6 emissions standards, and to reflect the general consensus amongst stakeholders, including representatives of consumer groups, that moving to 10 mg/kg petrol is a desirable and logical fuel specification. The proposal to delay implementation to 1 July 2018 will help mitigate the security of supply concerns raised by fuel suppliers.

44. MBIE acknowledges that the environmental benefits have generally already been achieved through the sale of petrol which already, on average, meets this higher standard. The move to 10 ppm will come at some additional cost to consumers however, as discussed above the cost is likely to decrease overtime.

Change two: The introduction of total oxygen content limit

Status quo and problem definition

45. The total oxygen content refers to the total mass of oxygen contained in all oxygenates blended into petrol. Oxygenates are organic compounds containing carbon, oxygen and hydrogen. The most common oxygenates are alcohols (such as methanol, ethanol, butanol) and ethers (such as methyl tertiary butyl ether (MTBE), ethyl tert-butyl ether (ETBE) and tert-amyl methyl ether (TAME)).

46. Oxygenates can be added to petrol as a blending component and to increase octane. Added to petrol, oxygenates promote better and cleaner burning of the fuel in engines, thereby reducing toxic tailpipe emissions, particularly carbon monoxide. Oxygenates also dilute or displace harmful petrol components such as aromatics and sulphur as well as optimize the oxidation during combustion. The quantum of these potential environmental benefits have not been modelled given the wide range of different oxygenates potentially available.

47. These benefits need to be balanced against the risks of increasing the fuel's vapour pressure and significantly modifying the volatility and distillation characteristics, resulting in increases in evaporative emissions. Volatility and distillation parameters need to be set carefully as they are critical to engine performance, particularly starting.

48. The Regulations currently place a limit of 1 per cent m/m for 'other oxygenates' and 10 per cent maximum volume for ethanol. There is no limit for total oxygen.

49. Consistent with the principle of an "open specification", a total oxygen limit would provide the necessary consumer protection around engine performance while providing flexibility to fuel suppliers as to which, if any, oxygenates they choose to blend into petrol. New Zealand has no such specification for total oxygen and, in this regard, our specifications for oxygen are tighter than any other jurisdiction that New Zealand compares itself against. This means that fuel suppliers have a relatively small pool of refiners from which they can source petrol to supply New Zealand.

50. Estimating what the increased costs to consumers are from the current Regulations is difficult. All petrol sold in New Zealand is priced at a premium to the internationally traded benchmark petrol price in Singapore. This premium in 2015 is estimated at

US$3 per barrel (NZ 2.56 cents per litre). The Ministry does not know the exact proportion of this premium that can be ascribed to New Zealand's specification limit for oxygenates but considers that it is likely to be reasonably significant (possibly one-third). If it were to be one-third, this would represent approximately $26 million in additional costs to consumers (0.0256 / 3 x 3.023 billion litres of petrol sold in 2014).

Options and impact analysis

Option 1: Status quo (no parameter for total oxygen)

51. The status quo position was supported by the AA, MIA, and Z Energy on the basis that they were comfortable with ethanol being the only permissible oxygenate. The remaining seven submitters who responded on this parameter supported the introduction of a parameter for total oxygen.

52. MBIE considers the absence of a parameter on total oxygen to be unjustifiably different from every other jurisdiction that New Zealand compares itself against and that this is overly restrictive, potentially resulting in increased costs to consumers.

Option Two: 2.7 per cent mass for petrol blends with a maximum ethanol content of 5.0 per cent, and 3.7 per cent mass for petrol blends with a maximum ethanol content of 10.0 per cent. Petrol blends with ethanol include mono-alcohols and ethers with a final boiling point no higher than 210^{0}C (proposal in the discussion document and preferred option)

53. This option is consistent with the total oxygen limit prescribed in the European standard and is what was proposed in the discussion document. Six of the ten submitters who responded on this parameter supported this proposal.

54. MBIE considers that introducing a total oxygen limit in line with the European standard will provide the necessary consumer protection while providing fuel suppliers with additional flexibility. This remains our preferred option.

Option Three: 2.7 per cent mass for petrol blends with a maximum ethanol content of 5.0 per cent, and 3.9 per cent mass for petrol blends with a maximum ethanol content of 10.0 per cent. Petrol blends with ethanol include mono-alcohols and ethers with a final boiling point no higher than 210^{0}C

55. This option is consistent with the Australian standard and was recommended by BP as an alternative to the option above. No other submitter supported this proposal. The standard applied in Europe where there is a total oxygen limit of 3.7 per cent mass, is consistent with petrol with an ethanol content of 10.0 per cent. The Australian standard differs from the European standard by effectively adding in a contingency for undesirable components such as the maximum allowable limit of MTBE or tertiary butyl alcohol (TBA). MBIE considers that consumer protection is best met by requiring fuel suppliers to factor in any other undesirable components within the maximum proposed 3.7 per cent total oxygen limit.

Summary of options analysis

	Objective a) Improve environmental and public health outcomes by reducing harmful vehicle emissions and improving air quality	**Objective b) Enable new cleaner vehicle technologies**	**Objective c) Provide an adequate level of consumer protection by ensuring that fuel that is "fit for purpose" can be supplied to consumers**	**Objective d) Provide as much flexibility as possible to fuel suppliers within minimum environmental, public health and consumer protection constraints (to enhance security, minimise costs to consumers and promote uptake of biofuels)**
Option 1: No total oxygen limit, but 1 per cent mass limit for other oxygenates and 10 per cent volume limit for ethanol.	-	-	-	-
Option 2 (preferred): Total oxygen limit of 2.7 per cent mass for petrol blends with a maximum ethanol content of 5.0 per cent, and 3.7 per cent mass for petrol blends with a maximum ethanol content of 10.0 per cent. Petrol blends with ethanol include mono-alcohols and ethers with a final boiling point no higher than 210^0C.	✓ Lifting the amount of other oxygenates that can be sold will reduce harmful air emissions.	- The proposal is not an enabler of new vehicle technology. No difference to the status quo.	- No material change to consumer protection.	✓ Primary reason for this proposal is it provides fuel suppliers with more flexibility and potentially reduces costs to consumers.
Option 3: Total oxygen limit of 2.7 per cent mass for petrol blends with a maximum ethanol content of 5.0 per cent, and 3.9 per cent mass for petrol blends with a maximum ethanol content of 10.0 per cent. Petrol blends with ethanol include mono-alcohols and ethers with a final boiling point no higher than 210^0C.	✓ Same as above.	- Same as above.	X Unlikely to result in any significant reduction in consumer protection but nevertheless this proposal would offer less consumer protection than the preferred option.	✓✓ Provides slightly more flexibility to fuel suppliers than Options 1 or 2.

Conclusion

56. Overall, MBIE is comfortable with the proposal to add a new parameter for total oxygen along the same lines as that set out in the European standard. When considered alongside the individual oxygenate parameters discussed below, there will be a very similar level of consumer protection as there is currently but with the advantage that fuel suppliers will have more flexibility, thereby potentially reducing costs to consumers. The proposal is broadly consistent with the approach taken in Europe, Australia, Japan, the United States and recommended by the Worldwide Fuel Charter. It is also consistent with the majority of submissions received on this point.

Change Three: The allowance of methanol as a permissible oxygenate

Status quo and problem definition

57. The Regulations currently limit methanol and all other oxygenates other than ethanol to a maximum level of 1 per cent mass. This is particularly restrictive when compared to the fuel standards that apply in Australia, Europe and the United States. The options below seek to help address the problem identified in paragraph 15(b) – namely that the Regulations are too prescriptive in some areas, resulting in a reduced supply pool from which imports can be drawn and higher costs to consumers.

58. Methanol is an oxygenate and blended in petrol to enhance octane. The potential benefits of methanol petrol blending include improved environmental outcomes from reduced emissions (such as particulate matter, greenhouse gas emissions, volatile organic compounds, carbon monoxide, total hydrocarbons, oxides of nitrogen), greater energy diversity and security of supply (methanol is produced in New Zealand and can displace imports) and lower costs to consumers (approximately $15 million based on 2014 figures). Carbon dioxide emissions from methanol, when factoring in a 15 per cent thermal efficiency gain, are approximately two per cent lower than for pure petrol. The potential reductions of other harmful air emissions from blending petrol with methanol have not been modelled.

59. However, the use of methanol is not supported by vehicle manufacturers on the basis that it is argued, although without clear evidence, that it is an aggressive fuel that increases wear on engine components, it reduces the service lives of injectors, increases the risk of phase separation[3] and it can adversely affect an engine's starting performance.

[3] Phase Separation describes what happens to petrol containing methanol when water is present. When petrol containing even small amounts of methanol comes in contact with water, either liquid or in the form of humidity; the methanol will pick-up and absorb some or all of that water. When it reaches a saturation point the methanol and water will phase separate, actually coming out of solution and forming two or three distinct layers of petrol, methanol and water in the tank. When this happens serious engine problems can occur.

Options and impact analysis

Option 1: Status quo (1 per cent v/v limit)

60. The status quo position was supported by the Automobile Association, the Motor Industry Association, Chevron and Z Energy. Vehicle manufacturers do not support petrol blended with methanol. While permissible, petrol blended with methanol is not sold in significant volumes in Europe or the United States, and not at all in Australia. China is the only market where a significant volume of petrol blended with methanol is sold.

Option Two: Methanol content of 3 per cent volume limit with restrictions (Preferred option)

61. The discussion document proposed setting a 3 per cent volume limit on methanol blended with petrol, consistent with the European standard. This proposal was supported by all of the international groups (ACFA, EFOA, the Methanol Institute), Methanex, the IMVIA, and Gull.

62. The risk of corrosion on engine components can be mitigated through the use of corrosion inhibitors (as is required for ethanol petrol blends). The risk around phase separation can be addressed through a requirement to blend methanol with co-solvents (such as ethanol), while waivers around the vapour pressure requirements (as are provided for in ethanol petrol blends) can address the cold start performance concerns. The actual impact on service injector lives is unknown.

63. As with ethanol, all petrol blends with a methanol content greater than 1 per cent would need to be labelled (section 18(3) of the Regulation). If petrol contains ethanol or methanol greater than 1 per cent by volume, the seller of the petrol must ensure that the dispensing pump or container is clearly marked to display the maximum percentage by volume of ethanol or methanol that the petrol contains (which must be no greater than the limit set out in Schedule 1); and the words “May not be suitable for all vehicles/engines. Check with the manufacturer before use.”

Option 3: Methanol content capped by the total oxygen limit (effectively 5 per cent volume) with restrictions

64. This option is similar to the Australian approach where there is no explicit limit on methanol but the limit is set under the broader total oxygen limit cap. It is the approach that would be undertaken if there was simply a total oxygen limit described in Option 2 but without a specific oxygenate limit for methanol. Under the proposal, a total oxygen limit of 3.7 per cent mass equates to a methanol limit of approximately 5 per cent volume, and a 3 per cent volume of ethanol used as a co-solvent. The same consumer safeguards around the requirement to use a corrosion inhibitor and co-solvents would apply, as too would the labelling requirements and the waivers around the volatility and distillation parameters.

65. This approach is consistent with the “open specification” approach that MBIE favours. However, as petrol blended with methanol would be new in New Zealand and in light of the stated opposition of consumer representatives and vehicle manufacturers, MBIE is not comfortable recommending a methanol limit above the allowable limit prescribed in Europe at this stage.

Summary of options analysis

	Objective a) Improve environmental and public health outcomes by reducing harmful vehicle emissions and improving air quality	Objective b) Enable new cleaner vehicle technologies	Objective c) Provide an adequate level of consumer protection by ensuring that fuel that is "fit for purpose" can be supplied to consumers	Objective d) Provide as much flexibility as possible to fuel suppliers within minimum environmental, public health and consumer protection constraints (to enhance security, minimise costs to consumers and promote uptake of biofuels)
Option 1: Status quo 1 per cent volume maximum under the parameter "other oxygenates"	-	-	-	-
Option 2: methanol content of 3 per cent volume maximum The methanol component of any blend of petrol and methanol must contain a corrosion inhibitor. Co-solvent must be added. Vapour pressure waivers to be provided along the same lines as those provided for petrol blended with ethanol.	✓ Offers some reductions in particulate matter, greenhouse gas emissions, volatile organic compounds, carbon monoxide, total hydrocarbons, oxides of nitrogen relative to the status quo.	- Not an enabler of new vehicle technology.	- The proposed protections are designed to offer consumers the same level of consumer protection they currently have.	✓ The proposal has some benefits in terms of greater flexibility to fuel suppliers, greater diversity, energy security and reduced costs to consumers.

Option 3: methanol content capped effectively at 5 per cent volume maximum through the total oxygen limit of 3.7 per cent mass The methanol component of any blend of petrol and methanol must contain a corrosion inhibitor. Co-solvent must be added. Vapour pressure waivers to be provided along the same lines as those provided for petrol blended	✓✓ Offers greater reductions in particulate matter, greenhouse gas emissions, volatile organic compounds, carbon monoxide, total hydrocarbons, oxides of nitrogen relative to the preferred option.	- Not an enabler of new vehicle technology.	X The proposal is likely to offer sufficient consumer protection but there is a greater degree of uncertainty surrounding this. It goes further than what is provided for in the European standard and while it is similar to the permissible limits in Australia, there is no methanol blended with petrol that is actually sold in Australia.	✓✓ The proposal offers more benefits in terms of greater flexibility to fuel suppliers, greater diversity, energy security and reduced costs to consumers relative to the status quo or the preferred option.

Conclusion

66. Overall, MBIE prefers introducing a 3 per cent volume limit for methanol. MBIE considers the risks to vehicle operability to be both manageable and tolerable, while there is potential upside to consumers in terms of reduced costs and enhanced environmental and public health benefits. MBIE notes that there is no obligation on any fuel supplier to sell methanol petrol blends should a fuel supplier have any vehicle operability concerns.

Change Four: Increasing biodiesel blends limits in diesel from 5 per cent to 7 per cent

Status quo and problem definition

67. The current specification allows biodiesel to be blended into diesel up to a maximum of 5 per cent by volume. This limit was set in 2008 on the basis of what was considered internationally to be the maximum amount of biodiesel that could be blended into diesel without causing potential vehicle operability concerns. This may now be too restrictive given that other jurisdictions against which New Zealand compares itself specify a 7 per cent volume limit. The options below seek to help address the problems identified in paragraph 15(a) and 15(b) – namely that the Regulations allow for harmful emissions, that can lead to environmental and public health costs, and are too prescriptive in some areas.

68. Specifically, Europe moved in 2009 to lift its biodiesel blend limit in diesel to 7 per cent by volume. This occurred after the European Commission satisfied itself that the vehicle operability concerns that had been raised were manageable. In July 2013, the European Commission reiterated its view that "up to B7 there are no significant engine issues or impact on pollutant emissions."[4] The European Standard is considered the primary benchmark against which New Zealand compares itself. B7 blends complying with the European Standard have also been endorsed by diesel fuel injection equipment manufacturers and for all Toyota vehicles sold in Europe[5].

69. The principal benefits from biodiesel relate to improved environmental and public health outcomes by reducing harmful vehicle emissions and improving air quality because it replaces the use of fuels which produce greater harmful emissions. Specifically, biodiesel generally reduces carbon monoxide (CO), Hydrocarbons (HC), and particulate matter (PM) emissions, but increases oxides of nitrogen (NOx) emissions.

70. As part of its broader aim of reducing energy-related greenhouse gas emissions, the Government supports policies that increase the use of biofuels where this is commercially viable and has no negative impacts on fuel quality or vehicle operability.

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[4] CE Delft. 2013. Bringing Biofuels on the Market: Options to increase EU blending biofuels beyond current blending limits. Page 181. Available at: http://ec.europa.eu/energy/sites/ener/filies/documents/2013_11_brining biofuels on the market.pdf

[5] Toyota. 'Our stance on Biofuels.' Available at www.toyota.eu/green_technologies/Pages/biofuels.aspx

This policy is articulated in the New Zealand Energy Strategy as a mechanism to reduce greenhouse gas emissions. New Zealand now has two biodiesel suppliers.

Options and impact analysis

Option 1: Status quo (5 per cent volume limit)

71. The current limit is supported by the AA and the MIA on the basis that any higher level raises vehicle operability concerns.

Option Two: 7 per cent volume limit (Preferred option)

72. The discussion document proposed a 7 per cent volume limit on biodiesel blended into diesel, in line with the European standard. Each of the four oil companies either supported the proposal or, in the case of Gull, did not oppose it.

73. The potential reductions in greenhouse gas emissions from this proposal are relatively modest at 112 kt CO2-e. This represents 0.35 per cent of total energy sector emissions in 2013.

74. Unlike ethanol blended in petrol, there are no labelling requirements on biodiesel blended in diesel up to the current limit of 5 per cent volume. This means that consumers may not necessarily know that the diesel they are consuming has biodiesel blended into it or not. While MBIE does not consider the vehicle operability concerns raised by vehicle manufacturers for biodiesel blends up to 7 per cent volume to be significant, the introduction of a labelling requirement (along the same lines as that required for ethanol blended in petrol) for blends above 5 per cent by volume is consistent with the expectations of major stakeholder groups. In this way consumers are able to check with their vehicle manufacturers should they have any concerns.

Option 3: 10 per cent volume limit

75. Another option is to increase biodiesel blend limits to 10 per cent. This option is not endorsed as Europe is still investigating the feasibility of this proposal for its own vehicle fleet and it is understood that vehicle operability concerns increase significantly for blends above 7 per cent volume.

Summary of options analysis

	Objective a) Improve environmental and public health outcomes by reducing harmful vehicle emissions and improving air quality	Objective b) Enable new cleaner vehicle technologies	Objective c) Provide an adequate level of consumer protection by ensuring that fuel that is "fit for purpose" can be supplied to consumers	Objective d) Provide as much flexibility as possible to fuel suppliers within minimum environmental, public health and consumer protection constraints (to enhance security, minimise costs to consumers and promote uptake of biofuels)
Option 1: Status quo **5 per cent volume limit** (no labelling requirements)	-	-	-	-
Option 2: **7 per cent volume limit with labelling requirement above 5 per cent**	✓ Increased scope to reduce harmful emissions of carbon monoxide, hydrocarbons and particulate matter.	- No change relative to status quo. New vehicles can operate just as well on 5 per cent biodiesel blends as they can on 7 per cent blends.	- Little material change to consumer protection.	✓✓ Offers more flexibility to fuel suppliers than the status quo.

Option 3 **10 per cent volume limit with labelling requirement above 5 per cent**	✓✓ Has the most scope of the three options to reduce harmful emissions of carbon monoxide, hydrocarbons and particulate matter.	- No change relative to status quo. New vehicles can operate just as well on 5 per cent biodiesel blends as they can on 7 per cent blends.	X 10 per cent blends are not endorsed in any major jurisdiction that New Zealand compares itself against (United States, Australia, Japan, the European Union) and are not endorsed by vehicle manufacturers. The European Union has concluded that 10 per cent blends materially increase the risks to consumers compared to 7 per cent blends.	✓✓ Offers the most flexibility to fuel suppliers of the three options analysed.

Conclusion

76. The proposal to lift biodiesel blend limits to 7 per cent alongside the introduction of labelling requirements for biodiesel blends above 5 per cent volume is preferred. MBIE considers the vehicle operability concerns to be both tolerable and manageable, while allowing increased biodiesel blend limits offers the potential for improved environmental and public health outcomes and reduced greenhouse gas emissions.

Implementation Plan

77. Once the Regulations have been amended, all fuel sold in New Zealand will be required to meet the new prescribed limits with the exception of the proposal to reduce sulphur limits in petrol which will be delayed until 1 July 2018. There are no further implementation costs to Government.

78. Fuel suppliers are familiar with the Regulations and have their own internal standards and procedures, which are typically tighter than the prescribed limits set out in Regulations. Each of the fuel suppliers have been informed throughout the policy development of the proposals being put forward on the basis of a "no surprises" approach. Implementation and compliance costs associated with the proposed amendments are expected to be minimal.

79. Compliance with the Regulations is enforced by Trading Standards, a business unit within MBIE. Trading Standards maintains and administers the Fuel Quality Monitoring Programme. This programme involves the testing of fuel samples from dispenser nozzles at the point of sale and responding to consumer and trader complaints and enquiries.

80. It is proposed that the Regulations are reissued rather than amended. The proposed changes to the specifications would apply from the time the new regulations come into force, which is intended to be in late 2016.

Consultation

81. A discussion document titled "Reviewing Aspects of the Engine Fuel Specifications Regulations 2011" outlining specific proposed changes to the specifications was publicly released in September 2015 on MBIE's website. A total of 14 submissions were received in October 2015 from fuel suppliers, motor industry participants and representatives of other stakeholders. Further targeted engagement occurred with submitters on an issue-by-issue basis following this.

82. Pursuant to New Zealand's requirements under the World Trade Organisation Agreement on Technical Barriers to Trade, MBIE notified the World Trade Organisation and allowed six weeks for the international community to comment. No comments were received.

Monitoring, evaluation and review

83. The Trading Standards team in the Consumer Protection and Standards Branch of MBIE is responsible for fuel monitoring. Samples of fuel are collected from outlets and tested for key properties specified in the Regulations. A statistically-based plan is used to determine sample collection and approximately 400 samples are taken per annum,

mainly from service stations. Samples are also collected to allow for niche fuels and minor players, such as biodiesel producers, and samples are collected where information provided indicates there may be non-compliance. The existing approach to monitoring compliance will continue following the proposed changes to the Regulations.

84. The Regulations are regularly reviewed in order to keep them current with industry best practice. The last time they were reviewed was in 2011 and prior to that they were amended in 2008. MBIE would expect that the Regulations would be formally reviewed again in 2019 or 2020. An evaluation will be undertaken of the current review just before then so as to inform the subsequent review.

Appendix 1: summary of changes[6]

Petrol (Schedule 1)

1. Reduce the maximum sulphur level from 50 mg/kg to 10 mg/kg from 1 July 2018;
2. Introduce a total oxygen limit of 2.7 per cent mass for petrol blends with a maximum ethanol content of 5.0 per cent, and 3.7 per cent mass for petrol with a maximum ethanol content of 10.0 per cent. Petrol blends with ethanol include mono-alcohols and ethers with a final boiling point no higher than 210^0C.
3. Remove the current parameter of 1 per cent volume for other oxygenates.
4. Retain a parameter of 1 per cent volume for methyl tertiary butyl ether.
5. Introduce a new parameter of 3 per cent volume for methanol. The following stipulations for petrol blended with methanol would also be introduced:
    - 5.1 The methanol component of any blend of petrol and methanol must contain a corrosion inhibitor;
    - 5.2 Co-solvent must be added;
    - 5.3 The flexible volatility index maximum allowed for regular and premium grade petrol blended with more than 1 per cent and not more than 3 per cent volume methanol is: 115.0 summer; 120.0 autumn and spring; 130.0 winter. Petrol that complies with the previous season's quality, and that is stored in a filling-station tank to which fewer than 3 deliveries of petrol have been made since 6 weeks before the beginning of the season, is regarded as complying with this specification for up to 6 weeks after the beginning of the season; and
    - 5.4 The maximum vapour pressure allowed for regular and premium grade petrol blended with more than 1 per cent and not more than 3 per cent methanol is Auckland and Northland: 72 kPa summer; 87 kPa autumn and spring; 97 kPa winter; rest of North Island: 77 kPa summer; 87 kPa autumn and spring; 97 kPa winter; South Island: 82 kPa summer; 92 kPa autumn and spring; 102 kPa winter. Petrol that complies with the previous season's quality, and that is stored in a filling-station tank to which fewer than 3 deliveries of petrol have been made since 6 weeks before the beginning of the season, is regarded as complying with this specification for up to 6 weeks after the beginning of the season.
    - 5.5 If petrol contains methanol greater than 1 per cent by volume, the seller of the petrol must ensure that the dispensing pump or container is clearly marked to display –
        - 5.5.1 The maximum percentage by volume of methanol that the petrol contains (which must be no greater than the limit set out in Schedule 1 of the Regulations); and
        - 5.5.2 The words "May not be suitable for all vehicles/engines. Check with the manufacturer before use."
6. Clarify the calculation of "pool average" for aromatics to ensure that in each period of six months the sum of debits and credits must not be negative.

[6] Includes minor and technical changes not subject to RIA in this RIS.

Diesel (Schedule 2)

7. Increase the maximum limit of fatty acid methyl esters (biodiesel) in diesel to 7 per cent volume; and

   7.1 If diesel contains fatty acid methyl esters greater than 5 per cent by volume, the seller of the diesel must ensure that the dispensing pump or container is clearly marked to display –

      7.1.1 The maximum percentage by volume of fatty acid methyl esters that the diesel contains (which must be no greater than the limit set out in Schedule 2 of the Regulations); and

      7.1.2 The words “May not be suitable for all vehicles/engines. Check with the manufacturer before use.”

8. Amend footnote 7 in Schedule 2 to read “For diesel blended with more than 5 per cent and not more than 7 per cent volume fatty acid methyl esters, the density maximum is 854 kg/m^3”

Biodiesel (Schedule 3)

9. Increase the minimum oxidation stability in biodiesel in Schedule 3 from six hours to eight hours.

Ethanol (Schedule 4)

10. Reduce maximum sulphur level to 10 mg/kg by 1 July 2018; and

11. Increase the maximum methanol level to 1.0 per cent.

Test methods

12. ASTM D5059 to be prescribed as an additional test method for lead in petrol;

13. BS EN 16136 to be prescribed as an additional test method for manganese in petrol;

14. ASTM D6839 to be prescribed as an additional test method for olefins in petrol;

15. ASTM D6217 to replace the existing test method IP 440 for total contamination in diesel with a footnote in Schedule 2 that:

   15.1 The test methods EN 12662 and ASTM D7321 could be applied for biodiesel blends of up to 7 per cent depending on CEN and other reviews outcome; and

   15.2 Provides the quote “further investigation into total contamination test method to improve precision, particularly in the presence of FAME, is being carried out by CEN.”

16. EN 12662 to replace the existing test method IP 440 for total contamination in biodiesel with a footnote reference that reads: "The test method developed for diesel fuel may show analytical problems when applied to FAME. Until a revised version of EN 12662 is developed to address the FAME issue EN 12662:2008 should be used. A more suitable test method is under development by CEN."

17. ASTM D4052 to be prescribed as an additional test method for density in biodiesel;

18. EN 15751 to be prescribed as an additional test method for oxidation stability in biodiesel;

19. EN ISO 10370 for carbon residue (on 10 per cent distillation residue) to be removed;

20. EN 16294 to be prescribed as an additional test method for phosphorous in biodiesel;
21. EN 14538 to be prescribed as an additional test method for group 1 metals (Na + K) in biodiesel; and
22. EN 15489 to be prescribed as an additional test method for water in ethanol.

E85 (new Schedule)

23. Introduce a new Schedule for petrol blended with more than 70 per cent and not more than 85 per cent ethanol with the following specifications:
24. Acidity (as acetic acid) - 0.006 per cent m/m maximum to be tested using ASTM D1613;
25. Copper strip corrosion (3 hours at 50^{o}C) - No. 1 maximum to be tested using ASTM D130;
26. Ethanol - 70-85 per cent v/v to be tested using ASTM D5501;
27. Inorganic chloride - 1 mg/kg maximum to be tested using ASTM D7319 or ASTM D7328;
28. Methanol – 1.0 per cent v/v maximum to be tested using ASTM D5501;
29. pHe - 6.5-9.0 to be tested using ASTM D6423;
30. Silver strip corrosion - Class 1 maximum to be tested using ASTM D130;
31. Solvent washed gum - 5 mg/100 mL maximum to be tested using ASTM D381;
32. Sulphur - 50 mg/kg maximum up to 31 December 2017 and then 10 mg/kg maximum from 1 July 2018 to be tested using ASTM D5453 or IP 497;
33. Vapour pressure (DVPE) - for regular and premium grade petrol blended with more than 70 per cent and less than 85 per cent volume ethanol, the minimum vapour pressure allowed is 38 kPa and the maximum vapour pressure allowed is: Auckland and Northland: 62 kPa summer; 70 kPa autumn and spring; 80 kPa winter; rest of North Island: 65 kPa summer; 75 kPa autumn and spring; 80 kPa winter; South Island: 70 kPa summer; 80 kPa autumn and spring; 85 kPa winter to be tested using ASTM D5191
34. Water - 1.0 per cent m/m maximum to be tested using ASTM E203 or EN 15489.