

CABINET PAPER PROACTIVE RELEASE COVERSHEET

Minister	Hon Nanaia Mahuta	Portfolio	Associate Environment
Name of package	Approval to consult for proposed amendments to the National Environmental Standards for Air Quality	Date of release (intended publish date)	June 2020

List of documents intended for proactive release		
Date	Title	Author
3 February 2020	<i>National Environmental Standards for Air Quality: Particulate Matter and Mercury Emissions: Release of Discussion Document</i>	<i>Office of the Associate Environment Minister</i>
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In Confidence

Office of the Associate Minister for the Environment

Chair, Cabinet Environment Committee

Approval to release discussion document – Proposed amendments to National Environmental Standards for Air Quality: Particulate matter and mercury emissions

Proposal

1. I am seeking Cabinet approval to release a discussion document on amendments to the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ) to bring them in line with up-to-date science on the health impacts of poor air quality, improve air quality, and enable ratification of the Minamata Convention on Mercury. The discussion document and Regulatory Impact Statement are attached.

Executive summary

2. Air quality continues to be a significant human health issue in New Zealand and also has climate change implications.
3. Air quality is strongly influenced by particulate matter, which is typically measured in terms of PM₁₀, and the subset of smaller particles known as PM_{2.5}. New Zealand is unusual, compared to many countries, in that the primary cause of particulate matter pollution is home heating in winter months. This is followed by vehicle emissions, agricultural burning, industrial combustion, and road dust. As a result of the dominance of home heating as a source, 75 percent of our PM₁₀ is the smaller PM_{2.5}.
4. In 2018 the estimated health effects attributable to PM_{2.5} were 646 premature adult deaths, 215 cardiac hospital admissions, 422 respiratory hospital admissions, and 1.6 million restricted activity days.¹ These health effects create burdens on our health system, the economy, and society as a whole.
5. Our current regulations - the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ) – currently only target PM₁₀. Although the NESAQ have been successful at driving improvements in air quality, including significant gains in some places, there are still parts of the country where the current standards are exceeded. From 2014-16, 35 of 69 air quality monitoring sites exceeded the NESAQ standard for daily PM₁₀. In towns such as Alexandra, Arrowtown and Cromwell, the standards were exceeded over 40 times in 2014.²
6. A similar picture exists when looking at exceedances of international guidelines for PM_{2.5}. From 2014-16, 17 of 25 monitoring sites were higher than the World Health

¹ National Institute of Water & Atmospheric Research (NIWA). 2019. *PM_{2.5} in New Zealand: Modelling the current (2018) levels of fine particulate air pollution*. Prepared for the Ministry for the Environment.

² Ministry for the Environment and Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

Organization guideline for daily PM_{2.5}. In 2017, all 14 sites for which we have information, had at least one day that was higher than the guideline. Blenheim had 72 exceedances that year.³

7. There is no safe level of particulate matter pollution, so it is important to keep making improvements.
8. New Zealand is one of the few developed countries without PM_{2.5} standards. Research shows that PM_{2.5} is more damaging to people's health than larger particles.
9. In the short term, I propose introducing a regulatory package to amend the NESAQ, with a focus on regulating ambient PM_{2.5} and more stringent solid-fuel burner standards. In the longer term, other activities need to be considered to complement this regulatory package. These include looking at vehicle emissions, industrial emissions, and non-regulatory actions to improve user operation of solid-fuel burners.
10. The expected health benefits from initial regulatory changes will be a reduction in respiratory and cardiovascular disease, premature death, and other health effects that result from exposure to particulate matter. The total estimated benefits of these avoided health costs are \$820.2 million over 10 years.
11. Most currently available wood burners already meet the proposed new emission standard. However, coal burners and open fires would not be compliant, resulting in a restricted range of options available for consumers.
12. We need to balance air quality improvements with the need for warm and dry homes. This balance can be assisted by existing Government programmes such as Warmer Kiwi Homes, Winter Energy Payments, and the Residential Tenancies (Healthy Homes Standards) Regulations, as well as councils' own programmes which support transition to more efficient home heating choices.
13. Other options have been considered such as compulsory replacement of non-compliant burners when properties are sold, applying the standards to all properties (not just those in urban areas), and prohibiting unsuitable fuels. These options would accelerate the reduction of air pollution, but concentrate the costs over a shorter period and impact all communities, not just those at risk.
14. Restricting the ability of councils to make more stringent rules was also considered. This would limit the ability of local communities to manage their own outcomes, and to be effective, would require national policies stringent enough to guarantee appropriate outcomes in all areas.
15. The proposals achieve a balance between appropriate national policies and targeted local solutions, while retaining the option of extending the proposals later if deemed necessary.
16. Additional standards are required to control mercury emissions so we can meet our international obligations under the Minamata Convention on Mercury. Amending the NESAQ is the most effective option as it uses an existing instrument rather than creating new legislation.

³ Ministry for the Environment and Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

Background and context

Air quality is a significant human health issue in New Zealand

17. Poor air quality associated with exposure to particulate matter (particles in the air that are small enough to be inhaled) causes significant human health impacts in New Zealand.
18. Exposure to particulate matter can have health impacts such as shortness of breath, coughing, chest pain, and disease such as heart attack and stroke, and premature death from cardiovascular and respiratory problems. It can cause lung cancer and exacerbate asthma and emphysema. Studies point to possible links with diabetes due to an increase in inflammation.⁴
19. People with pre-existing heart or lung disease, young children and the elderly are the most likely to suffer adverse health effects from exposure to particulate matter. Particulate matter has been associated with premature birth, low birth weight, and infant bronchiolitis. It has also been associated with respiratory infections, asthma, and reduced lung growth in young children.⁵

Smaller particulate matter has the highest health risk

20. Particulate matter is often classified according to its size. PM₁₀ has a diameter of 10 micrometres (µm) or less. PM_{2.5} has a diameter of less than 2.5µm and is, therefore, a subset of smaller particles within the PM₁₀ range. In general, the smaller the particle, the greater the impact on human health, as smaller particles can penetrate more deeply into the human body. Fine particles (PM_{2.5} and smaller) are now recognised as having the highest health risk and are mainly created by human activities.⁶
21. In 2018, the estimated health outcomes attributable to PM_{2.5} were 646 premature adult deaths, 215 cardiac hospital admissions, 422 respiratory hospital admissions, and 1.6 million restricted activity days.⁷ These health impacts create burdens on our health system, the economy, and society as a whole.
22. The social costs associated with human-made air pollution in New Zealand have been estimated at \$4.28 billion per year.⁸

Air quality has other implications

23. In addition to the impacts on human health, particulate matter can also impact on natural ecosystems and biodiversity, agriculture, visibility, recreation, and cultural

4 World Health Organization. 2013. *Review of evidence on health aspects of air pollution – REVIHAAP Project* cited in Ministry for the Environment & Stats NZ. 2018. *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

5 United States Environmental Protection Agency. 2009. *Integrated Science Assessment for Particulate Matter*, and World Health Organization. 2013. *Review of evidence on health aspects of air pollution – REVIHAAP Project* cited in Ministry for the Environment & Stats NZ. 2018. *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

6 World Health Organization. 2013. *Review of evidence on health aspects of air pollution – REVIHAAP Project*.

7 National Institute of Water & Atmospheric Research (NIWA). 2019. *PM_{2.5} in New Zealand: Modelling the current (2018) levels of fine particulate air pollution*. Prepared for the Ministry for the Environment.

8 Kushel, G, Metcalfe, J, Wilton, E, Guira, J, Hales, S, Rokfe, K, & Woodward, A (2012). *Updated Health and Air Pollution in New Zealand Study*. Report prepared for Health Research Council of New Zealand, Ministry of Transport, Ministry for the Environment and New Zealand Transport Agency.

values. Data are lacking in New Zealand for these types of impacts, but they have been studied overseas.

24. There are also climate change implications related to particulate matter. PM_{2.5} in the form of black carbon (soot) is very good at absorbing sunlight. In the atmosphere, its overall effect is to warm the climate. Black carbon generally comes from vehicle emissions (especially from diesel engines), burning solid fuels (wood or coal) for home heating, or agricultural burn-offs.⁹

New Zealand is unusual in that home heating is our largest source of particulate matter

25. Our air quality is good in most places and at most times of the year. However, during winter, certain places have spikes in air pollution from particulate matter. The biggest driver of this is emissions from home heating, with domestic burners contributing 56 percent of the social costs of human-made air pollution.¹⁰ This makes us unusual when compared with other countries. In 2015, home heating emissions contributed 25 percent of annual PM₁₀ and 33 percent of PM_{2.5} emissions.¹¹
26. Because of the dominance of home heating sources, most of our particulate matter pollution comprises the smaller PM_{2.5}. In 2015, PM_{2.5} made 75 percent of all particulate matter emissions.¹²

The impacts of home heating emissions are very localised

27. Those at most risk of exposure to particulate matter from domestic solid-fuel burners are households in neighbourhoods comprising older homes with older burners. They are in areas, for example Arrowtown, Timaru and Rotorua, where temperatures are low in winter, local topography and climate interact to create inversion layers¹³ and limit the dispersal of air pollution, and where wood and coal are readily available. In areas such as these, we need to balance air quality improvements with the need for warm, dry homes.

Particulate matter pollution is regulated by national environmental standards that currently focus on PM₁₀

28. In New Zealand, particulate matter pollution is regulated by the NESAQ.¹⁴ The NESAQ are regulations made under section 43 of the Resource Management Act 1991.

⁹ Ministry for the Environment and Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

¹⁰ Kushel, G, Metcalfe, J, Wilton, E, Guira, J, Hales, S, Rokfe, K, & Woodward, A (2012). *Updated Health and Air Pollution in New Zealand Study*. Report prepared for Health Research Council of New Zealand, Ministry of Transport, Ministry for the Environment and New Zealand Transport Agency.

¹¹ Ministry for the Environment and Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

¹² Ministry for the Environment and Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

¹³ An inversion layer occurs when a layer of cool air close to the ground is covered by a layer of warmer air which acts as a lid, trapping pollutants and allowing them to build up.

¹⁴ The full legal name is the Resource Management (National Environmental Standards for Air Quality) Regulations 2004.

29. The NESAQ were introduced in 2004 and were last amended in 2011. They regulate particulate matter pollution through a series of inter-linked standards that target PM₁₀. In summary, the current NESAQ comprise:

- 29.1. a daily average ambient air quality standard for PM₁₀ of 50 micrograms per cubic metre (µm/m³)
- 29.2. a maximum number of times that the standard can be exceeded in a 12 month period
- 29.3. a requirement for councils to identify and monitor areas where air quality is likely, or known, to breach the standard
- 29.4. emissions and thermal efficiency standards for newly installed wood burners installed in properties less than two hectares in size
- 29.5. a ban on discharges from newly installed domestic solid fuel open fires in areas where the standard has been breached
- 29.6. a requirement for councils to decline resource consent applications for significant emissions in polluted areas, unless the discharges will be offset
- 29.7. the ability for councils to introduce more stringent provisions through rules and bylaws.

30. PM_{2.5} is not directly regulated currently.

31. While our air quality has improved over time as a result of the NESAQ, including significant gains in some places, there are still parts of the country where the current standards are exceeded. From 2014-16, 35 of 69 air quality monitoring sites exceeded the NESAQ standard for daily PM₁₀. In towns such as Alexandra, Arrowtown and Cromwell, the standards were exceeded over 40 times in 2014.¹⁵

Targeting PM₁₀ captures natural sources of particulate matter

32. Monitoring and regulating only PM₁₀ captures natural sources of particulate matter, such as sea salt and pollen. This means that the regulations are capturing sources of pollution that councils have no control over. Adding PM_{2.5} as the main regulatory tool would create a more effective regulation as PM_{2.5} excludes these larger, naturally occurring particles.

Extending the standards to PM_{2.5} is necessary to improve human health

33. Research shows that PM_{2.5} is more hazardous to people's health than the larger particles that, along with PM_{2.5}, make up PM₁₀. Coarse particles can cause health issues, but where these larger particles generally get filtered out in the nose, throat and upper airways, the smaller PM_{2.5} particles can get deep into the lungs, and then into the bloodstream.

34. While our air quality has improved over time as a result of the NESAQ, it is necessary to extend the standards to PM_{2.5} to really focus on improvements to human health. Notably, New Zealand is one of the few developed countries without a national standard for PM_{2.5}.

¹⁵ Ministry for the Environment and Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

35. From 2014-16, 17 of 25 monitoring sites were higher than the World Health Organization guideline for daily PM_{2.5}. In 2017, all 14 sites for which we have information had at least one day that was higher than the guideline. Blenheim had 72 exceedances that year.¹⁶

I propose to consult on amendments to the NESAQ to address these issues

36. I am proposing to consult on a package of amendments that will:

- 36.1. introduce PM_{2.5} as the primary regulatory tool to manage ambient particulate matter and better target controllable sources of air pollution
- 36.2. make the burner emissions standard more stringent and expand them to cover all types of domestic solid-fuel burners on properties smaller than two hectares
- 36.3. regulate certain activities using mercury.

37. The key changes are discussed below. A description of the amendments compared with the current standards is included as Appendix 1. More details can also be found in the attached discussion document.

Introducing PM_{2.5} as the primary regulatory tool

38. A daily standard and an annual standard for ambient (outdoor) PM_{2.5} are proposed. The proposed daily average standard of 25 µg/m³ (allowing no more than three exceedances in a 12 month period) and the proposed annual average standard of 10 µg/m³ are both in line with current World Health Organization (WHO) guidelines.

39. The PM₁₀ standard would be retained but with the mitigation requirements for breaches reduced to public notification. Determining when an airshed is deemed polluted, requiring resource consent applications for significant discharges to be declined or offset, and prohibiting open fires would instead be triggered by a breach of the new PM_{2.5} standards, rather than PM₁₀.

40. Regional councils and unitary authorities would be required to monitor PM_{2.5}, and to continue monitoring PM₁₀, in areas where the standard is likely, or known, to be exceeded.

41. Retaining the PM₁₀ standard provides an important health indicator for exposure to coarse particulate matter such as road dust. The WHO guidelines for PM₁₀ are still under review so it would be premature to discontinue monitoring PM₁₀ for the time being.

42. The new standards will encourage regional councils and unitary authorities to consider all sources of PM_{2.5} in their regions. Depending on local emissions profiles, I anticipate that most councils will focus their efforts on reducing PM_{2.5} emissions from home heating sources. Some councils will need to work closely with relevant road controlling authorities to address transport emissions as the main source of PM_{2.5} in their regions.

¹⁶ Ministry for the Environment and Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*. Wellington: Ministry for the Environment.

Making burner emissions standard more stringent

43. The amendments would introduce a lower emissions standard for all new domestic solid fuel burners to emit 1.0 grams of particles per kilogram of fuel (g/kg) from the current 1.5g/kg.
44. The standards would be extended to cover all types of new domestic solid fuel burners, including wood, coal, pellet and multi-fuel burners, burners used for cooking and water heating, and open fires. Properties over two hectares in size will remain excluded from the burner standards.
45. The amended burner emissions standards would motivate more households to choose cleaner forms of home heating (such as heat pumps or low emissions burners), but they would not compel anyone to transition before they are ready. The standards will only have an effect when a household needs to replace an existing domestic burner at the end of its useful life, wants to replace a burner before the end of its life, or needs to install a new, fixed heat source. A transitional period would be included to allow manufacturers, importers and purchasers time to adjust.

New coal burners and open fires

46. This proposed broadening of the burner standards would effectively prohibit the installation of new coal burners and new open fires in urban areas. There are no types of these burners currently on the market that would meet the emissions standard.
47. I anticipate this proposal will attract particular attention in those parts of New Zealand that have ready access to coal as a fuel source, for example the West Coast and Southland. However, the impact of this proposal is mitigated by allowing existing burners and open fires to continue operating.
48. Some councils are making more stringent local rules to phase out domestic coal emissions. For example, Southland is prohibiting coal as a fuel for home heating, and phasing it out as a cooking fuel by 2022.
49. Under the current NESAQ no new open fires are allowed in an airshed that has previously breached the PM₁₀ standard. The proposed new burner standards would not apply on properties larger than two hectares. Open fires would still be allowed to be installed on properties over two hectares, unless prohibited by a breach of the PM standard or otherwise restricted by local rules. Open fires may also be installed in trade premises such as restaurants, unless otherwise restricted by local rules.

Amendments to implement the Minamata Convention on Mercury

50. Amendments to the NESAQ are also required to implement the Minamata Convention on Mercury. These are discussed in paragraphs 73 to 82.

Costs and benefits

Benefits include reductions in health effects

51. The proposed amendments are expected to generate a reduction in both the short- and long-term health effects of fine particulate matter as a result of a nationwide decrease in air pollution.
52. This is expected to generate benefits in terms of avoided health costs. A cost benefit analysis of the proposals showed that health benefits will include a reduction in premature deaths, respiratory and cardiac hospitalisations, and the days people (including carers, family and whanau) are restricted from usual activities. A total of 468 premature deaths attributable to PM_{2.5} exposure are expected to be prevented over the next ten years.¹⁷
53. The total estimated health benefits (avoided health costs) are \$820.2 million over 10 years.

Main cost is limited choice when replacing solid-fuel burners

54. As a result of the proposed amendments, households would have a more limited choice when replacing or installing new solid-fuel burners. The cost would be any additional cost between a non-compliant and a compliant model. Over 90 percent of current authorised burners¹⁸ would meet the new standard. Large retail chain stores already include models in their lowest price bracket that would be compliant. The proposals would not force homeowners to replace their burners.
55. Reducing the standard will encourage manufacturers of solid-fuel burners to continue to innovate and design burners that produce fewer emissions.
56. Household with access to cheap or free coal are also likely to be more impacted than others because no currently available coal burners can meet the proposed or current emissions standard. Note that these impacts would only occur if someone decided to replace their current burner with a new one. Existing burners would not be required to meet the new emissions standards. Likewise, no new open fires would be permitted as those currently available do not meet the proposed new standard.
57. Reducing the choice of replacement burners and fuel type can disproportionately impact low income households. Some households cannot afford to heat their homes with other sources of energy. Discouraging the use of domestic solid-fuel burners without support for the use of alternative energy sources for heat can increase the risk of illnesses associated with low indoor temperatures, dampness and mouldy homes. These include toxic reactions, allergies, respiratory conditions, and gastroenteritis.

Costs to councils

58. The proposed amendments will result in some costs to regional councils and unitary authorities. These include purchasing new equipment that can monitor

17 Market Economics. 2019. *Air Quality Cost-Benefit Analysis – update: Review of the National Environmental Standards for Air Quality – Policy Options*. Prepared for the Ministry for the Environment.

18 The Ministry for the Environment website lists wood and pellet burners that are authorised under the NESAQ.

PM_{2.5} where councils do not already have such equipment. Other costs relate to updating plans and public education.

Existing Government and local government programmes can moderate costs to households

59. We can assist in moderating these impacts with existing Government programmes that assist households in moving to cleaner heating sources. This will help to balance air quality gains and consequent improved health outcomes, while not unduly exposing New Zealanders to other health impacts associated with cold homes. Council programmes are also available in some parts of the country.
60. The Warmer Kiwi Homes programme began in July 2019 and provides grants for insulation and efficient heaters to low-income homeowners. The programme promotes the installation of heat pumps and low-emissions burners as relatively low-cost heat sources that can produce low levels of air pollution when used correctly.
61. The Residential Tenancies (Healthy Homes Standards) Regulations 2019 include standards for heating, insulation, ventilation, moisture ingress and drainage, and draught stopping. The regulations came into effect in July 2019. They supplement the NESAQ by ensuring that rental properties are warm, dry and more energy efficient, which means less fuel will need to be burnt and fewer particulate matter emissions.
62. As a key provider of housing across the country, Kāinga Ora already install a model of ultra-low emissions burner with emissions much lower than the proposed new standard.

Other options have been considered

RIS considered other options for addressing particulate matter

63. A Regulatory Impact Statement (RIS) for the proposed amendments relating to particulate matter has been prepared. This RIS is attached as Appendix 3. The RIS considered five options:
 - 63.1. Option 1 - status quo
 - 63.2. Option 2 – minimal regulation. A daily standard for PM_{2.5} is introduced along with a significant non-regulatory package to incentivise behaviour change for buying, operating and replacing domestic solid fuel burners. Councils continue to be able to establish more stringent rules than provisions in the NESAQ.
 - 63.3. Option 3 – increased regulation. This is the preferred option and is described in more detail in paragraphs 36-49.
 - 63.4. Option 4 – strong regulation. Retain the daily standard for PM₁₀ and introduce both a daily and annual standard for PM_{2.5}. Impose lower emissions standards for new burners, with more stringent standards in polluted areas. Prohibit unsuitable fuels and require the replacement of non-compliant burners when properties are sold. For national consistency, no new rules that are more stringent than the NESAQ can be established

by councils. However, existing rules that are more stringent can be retained.

- 63.5. Option 5 – stringent regulation. Retain the daily standard for PM₁₀, introduce an annual PM₁₀ standard, and introduce a daily and annual PM_{2.5} standard. Impose stringent emissions standards in all areas, not just in polluted areas. Prohibit unsuitable fuels and require the replacement of non-compliant burners when properties are sold. No local variation in rules allowed - councils cannot establish rules that are more stringent, and existing rules must be removed.
64. Option 3 is the preferred approach, as it provides a balance between appropriate national policies and targeted local solutions. It adopts the critical health indicators for particulate matter, lowers emissions standards, and investigates further non-regulatory options to influence behaviour change.
65. More lenient options would result in reductions in health effects but over a longer period of time. The more stringent options would restrict councils' ability to effect change in particular areas, concentrate the costs of compliance over a shorter period, and impact all communities, not just those with the worst air quality.

Cost benefit analysis – a positive cost benefit ratio

66. A preliminary cost benefit analysis (CBA) has been prepared to inform the RIS on particulate matter standards. The CBA concludes that the benefits outweigh the costs. The final evaluation of impacts and benefits will be informed by public consultation and further analysis.
67. The overall result is a national cost benefit ratio of 8.4¹⁹, meaning for every \$1 spent there would be an estimated \$8.40 of benefits in the form of cost savings.
68. As mentioned above a nationwide reduction in air pollution from particulate matter generates benefits in terms of avoided health costs. The total estimated benefits of these avoided health costs are \$820.2 million over 10 years.
69. The costs of the proposed amendments include the costs to central and local government of implementing the amendments. Private costs are those incurred by communities to comply with new and amended provisions of the NESAQ (refer to paragraphs 54-58).
70. These costs have been estimated at \$97.7 million over the next ten years.
71. The CBA shows that the highest private costs per household are in the Auckland region, but it is also the region that would experience the greatest health savings.
72. In our larger towns and cities, such as Auckland, vehicle emissions contribute a large portion of the PM_{2.5} emissions. It is likely that additional policy responses (not just the proposed focus on domestic burners) may be required in order to reduce exposure to PM_{2.5} in these areas.

¹⁹ Two different valuation methods were used in the CBA to calculate the value of the cost of premature mortality. These were the value of statistical life (VOSL) and the value of life years lost (VLYL) methods. This cost benefit ratio was calculated using the VOSL method. Under a VLYL approach the ratio increases to 14.00.

The Minamata Convention on Mercury also requires amendments to the NESAQ

Background and context

73. In 2013, New Zealand signed the Minamata Convention on Mercury [CAB Min (13)33/6 refers]. This is a global treaty to protect human health and the environment from the adverse effects of mercury. It was agreed in January 2013, and 114 countries have ratified the Convention. New Zealand has not yet ratified the Convention and this poses a risk to our international reputation on environmental issues.

Necessary to control emissions of mercury

74. Amendments to the NESAQ are necessary to control industrial emissions of mercury to air in New Zealand. These changes will ensure that New Zealand has implemented its obligations under the Minamata Convention on Mercury. Two amendments are proposed:

75. The first amendment will introduce new standards to prohibit the use of mercury in certain listed processes. None of these processes currently take place in New Zealand and are unlikely to as technology has improved, and mercury is no longer required. The manufacturing processes are production of chlor-alkali, acetaldehyde, vinyl chloride monomer, sodium or potassium methylate or ethylate, and polyurethane using mercury-containing catalysts.

76. The other set of amendments is to incorporate international best available techniques and best environmental practice guidance that decision-makers must take into account when making planning or consenting decisions on discharges of mercury from certain activities. These activities include the operation of coal-fired power plants, coal-fired industrial boilers, smelting and roasting processes used in the production of non-ferrous metals, waste incineration facilities, and cement clinker production facilities. Existing sources and small boilers would not be affected.

Other options considered to implement the Minamata Convention

77. A second RIS was prepared in relation to the impacts of implementing the Minamata Convention on Mercury. This RIS is attached as Appendix 4. Note that the RIS covers additional actions to ratify the Convention, not just those that relate to the NESAQ. These additional actions will be progressed separately.

78. In order to comply with the Convention, all of its obligations need to be implemented. New Zealand incorporates its international treaty obligations through domestic legislation. Where treaty obligations cannot be performed under existing domestic legislation, legislative changes will be required. Therefore only options that included primary or secondary legislative changes were considered. Three options were identified:

78.1. Option 1 - a package of regulation, including amending an order under the Imports Exports (Restrictions) Act 1988, creating regulations under the Waste Minimisation Act 2008 (WMA), and amending the NESAQ

78.2. Option 2 - as above, but creating a new National Environmental Standard on Mercury

78.3. Option 3 - a new Bill to address mercury and enact the Convention's obligations.

79. Option 1 is the preferred approach because it will be effective in meeting the Convention's obligations, it reflects the low immediate risk posed by mercury in New Zealand, and will be the most cost effective option as it uses secondary regulation and existing instruments.

Impacts and benefits – new regulations for mercury

80. None of the Minamata Convention on Mercury Annex B manufacturing processes are carried out in New Zealand. They have been replaced by newer technology that does not use mercury. Regulations prohibiting the use of mercury in these processes will have no impact on industry.

81. The proposed new mercury emissions regulations will have a minimal impact because they will only apply to new or substantially modified sources. In New Zealand we do not operate many of these types of industries (with the exception of coal-fired industrial boilers). It is unlikely there will be many of these types of discharges. In any event, a discharge consent under the RMA would be required and the matters covered in international best practice could be considered under that process.

82. More details about the impacts of new regulations for mercury are included in Appendix 2 to the attached discussion document.

Other aspects of the NESAQ are not proposed to be changed

83. These amendments are significant in their own right but do not cover all aspects of the current NESAQ. For example, the proposals do not specifically address actions for controlling emissions from vehicles (which can contribute a high proportion of particulate matter in our larger towns and cities). The scope of the proposals does not include consideration of the effects of particulate matter on indoor air quality, or other gases regulated by the NESAQ, such as sulphur dioxide, nitrogen dioxide, and ozone.

84. I propose to set the direction for further work on these issues by instructing officials to develop a forward work programme to improve air quality.

Monitoring and evaluation of the NESAQ

85. In addition to these amendments, I also intend to improve monitoring and evaluation of the NESAQ. I propose that Cabinet directs the relevant Minister to evaluate the NESAQ within three years of these amendments becoming operative. The purpose of the evaluation would be to assess the:

- 85.1. efficiency and effectiveness of the NESAQ in achieving the purpose of the RMA
- 85.2. effect of the NESAQ on ambient air quality in New Zealand
- 85.3. alignment of the NESAQ with current scientific understanding and international recommendations.

Amending the standards is just one piece of the puzzle

86. In addition to the proposed amendments to the NESAQ, I propose directing my officials to investigate non-regulatory options to influence individuals' decisions around outdoor burning and consumer decisions around buying, operating and replacing domestic solid fuel burners. These may include measures to discourage people from burning wet wood, treated timber, plastic (and other toxic fuels), or modifying the factory settings or fittings on a burner that results in higher emissions. Future work may also include investigating regulatory and non-regulatory tools in relation to burning plastic.

Alignment with proposals for a National Policy Statement on Urban Development

87. The Government has recently consulted on proposals for a National Policy Statement on Urban Development (NPS-UD).

88. Urban development is closely linked with managing air quality, as most air pollution occurs in urban environments. One of the purposes of the NPS-UD is to ensure that growth is strategically planned. Strategic planning and land use can influence communities' level of exposure to air pollution, and the type of contaminants communities are exposed to. This will be a particular issue for policy proposals that encourage intensification along major transport corridors.

Public engagement is the next step

The engagement process will accord with the RMA

89. I propose to use an alternative process for engagement as allowed by section 46A(3)(b) of the RMA.

90. I intend to release a discussion document for public consultation following Cabinet approval, and engage directly with iwi authorities and key stakeholders during March and April 2020. The submissions period will close on 24 April 2020. I am satisfied that this period of time gives those notified "adequate time and opportunity to make a submission" as required by section 46A(4)(b) of the RMA.

Key stakeholders will be the focus of engagement

91. Officials and I will engage directly with our treaty partners through a series of hui in March-April 2020.

92. The main stakeholders targeted by the engagement are:

- regional councils and unitary authorities
- home heating industry providers, manufacturers and retailers
- general public who burn solid-fuel for home heating
- industries that plan to emit significant discharges of PM_{2.5}
- industries covered by the mercury-related provisions.

93. My officials intend to begin conversations with key stakeholders, in particular regional councils, immediately after Cabinet approval. Stakeholder meetings will be scheduled for March-April 2020.

International trade obligations

94. In making new regulations around solid-fuel burners, we must also consider New Zealand's international trade obligations. These require us to not discriminate against foreign products or between foreign producers. Any mandatory requirement also needs to be fulfilling a legitimate objective (such as the protection of human health and safety), and not creating an unnecessary obstacle to trade.
95. To be consistent with our international trade obligations, I intend that the proposed measure is notified to the World Trade Organisation's Technical Barriers to Trade Committee. The 60 day consultation period will happen concurrent to public consultation.
96. When developing transitional provisions for new regulations, we will also need to provide at least a six month period between approval of the final regulations and when they come into force. This is to allow time for producers in exporting countries to adjust.

Departmental consultation

97. The following agencies have been provided this Cabinet paper and the draft discussion document and their comments have been incorporated where received: Ministry of Health, Ministry of Business, Innovation and Employment, Ministry of Housing and Urban Development, Kāinga Ora, Ministry of Transport, Ministry of Social Development, Te Puni Kōkiri, Energy Efficiency and Conservation Authority, Treasury, Department of Conservation, Ministry of Primary Industries, New Zealand Transport Agency, Department of Internal Affairs, Environmental Protection Authority, Ministry of Foreign Affairs and Trade, and the Office for Māori Crown Relations – Te Arawhiti.
98. The Department of Prime Minister and Cabinet has been informed.
99. Officials have consulted with the Ministry of Health (MoH). MoH has advised that it supports the mercury related proposals, as well as the proposal to introduce an annual and a daily PM_{2.5} standard and retain the PM₁₀ standard. It recommends the addition of a PM₁₀ annual standard into the package, and a preference to wait to make changes until after the review of the WHO guidelines are published in late 2020. I do not support this timeframe as it would delay amendments to the NESAQ unnecessarily. Any further changes to the NESAQ as a result of the WHO guidelines review can be pursued in the forward work programme I have requested from my officials.
100. In terms of implementing the Minamata Convention on Mercury, MoH proposed adding crematoria to the list of mercury-related activities requiring mandatory consideration of international best practice. Crematoria are not specified in the Convention as a significant mercury producer. I recommend a focus on core commitments at this stage.
101. Officials have also consulted with Te Puni Kōkiri (TPK). TPK has asked for more detail to be provided on the impact of these proposals on Māori, particularly those who live in polluted airsheds and/or may be already experiencing financial barriers to heating their homes, marae and papakāinga. I intend to use the consultation, as

well as further work by my officials, to develop a more complete picture of impacts on Māori and will report back when further Cabinet decisions are sought.

Financial implications

102. There are no direct financial implications associated with this paper.

Legislative implications

103. There are no immediate legislative implications from this paper.

104. Information obtained in response to the discussion document will be used to inform policy proposals that would result in amendments to the Resource Management (National Environmental Standards for Air Quality) Regulations 2004.

Regulatory impact analysis

105. Two separate Regulatory Impact Statements (RISs) have been undertaken. One for the proposed amendments relating to particulate matter and solid-fuel burners and one for the mercury-related provisions. Both are attached to this paper.

106. The Ministry's regulatory impact assessment panel is currently reviewing the RIS for amendments relating to particulate matter and solid-fuel burners (Appendix 3).

107. The Ministry's regulatory impact assessment panel have reviewed the RIS for amendments relating to mercury (Appendix 4) and consider that it meets the quality assurance criteria.

Human rights, gender and disability implications

108. This paper is consistent with the Human Rights Act 1993.

109. There are no gender implications for this paper.

110. There are no disability implications for this paper.

Publicity and proactive release

111. I propose a press release immediately following Cabinet approval.

112. As discussed above, I propose to release the discussion document for public consultation following Cabinet approval, with submissions closing on 24 April 2020. Direct engagement with iwi authorities and key stakeholders will happen during March and April 2020. This will be minimum of seven weeks of public consultation.

113. I also propose to proactively release this Cabinet paper and the Regulatory Impact Statements at the same time as the discussion document. The documents will be redacted as appropriate under the Official Information Act 1982.

114. The discussion document will also be notified to the World Trade Organization when the consultation commences. New Zealand could be asked questions about

the proposed emission standards for solid-fuel burners at the WTO Technical Barriers to Trade Committee.

115. I confirm that the Minister for the Environment agrees that I can lodge this paper under my delegation as Associate Minister for the Environment.

Proactively Released

Recommendations

The Associate Minister for the Environment recommends that the Committee:

1. **note** that amendments to the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ) are proposed to take into account current scientific findings about the health impacts of particulate matter and to better target controllable sources of air pollution
2. **note** that the proposed package of amendments to the NESAQ include:
 - 2.1. introducing PM_{2.5} standards as the primary regulatory tool to manage particulate matter
 - 2.2. making the domestic solid-fuel burner emissions standard more stringent and expand them to cover all types of burners
 - 2.3. regulating certain activities using mercury
3. **note** that amendments to the NESAQ are proposed in order for New Zealand to implement the Minamata Convention on Mercury
4. **note** that New Zealand is one of the few developed countries with no air quality standard for PM_{2.5}
5. **note** that public consultation on the proposed amendments is proposed for March and April 2020, for a minimum of eight weeks
6. **agree** to release the discussion document and Regulatory Impact Statements for the purposes of public consultation
7. **authorise** the Associate Minister for the Environment (Hon Nanaia Mahuta) to make any final minor or technical changes to the discussion document prior to release
8. **note** that in August 2020, I intend to report back to Cabinet with policy proposals amended as a result of consultation and seeking approval to issue drafting instructions
9. **direct** the Minister for the Environment, within three years of these amendments coming into force, to review the NESAQ to assess:
 - 9.1. the efficiency and effectiveness of the NESAQ in achieving the purpose of the RMA
 - 9.2. the effect of the NESAQ on air quality in New Zealand
 - 9.3. the alignment of the NESAQ with current scientific understanding and international recommendations

Authorised for lodgement.

Hon Nanaia Mahuta

Associate Minister for the Environment

Appendix 1.

Summary of proposals compared with current standards

		Current NESAQ provisions	Proposed provisions
e matterParticulate	PM _{2.5}	None	Daily average PM _{2.5} standard - 25 µg/m ³ (three or fewer exceedances allowed in a 12 month period) Annual average PM _{2.5} standard - 10 µg/m ³ Monitoring required in all airsheds Publicly notify breaches Replace PM ₁₀ with PM _{2.5} for 'offset' and open fire provisions
	PM ₁₀	Daily PM ₁₀ standard - 50µg/m ³ One or fewer exceedances of daily PM ₁₀ allowed from 1 September 2020	PM ₁₀ standard retained Monitoring requirements retained Publicly notify breaches
	'Offset' discharges in polluted airsheds	'Polluted' if daily PM ₁₀ standard breached in previous five years Polluted until PM ₁₀ standard not breached in previous five years New resource consent applications that will increase PM ₁₀ by more than 2.5µg/m ³ must be declined unless discharges will be offset elsewhere in airshed	Reflect change from PM ₁₀ to PM _{2.5} standard 'Polluted' if either daily or annual PM _{2.5} standards breached, where possible averaged over the previous five years Polluted until neither PM _{2.5} standard has been breached in previous five years PM ₁₀ standard used where airshed does not yet have adequate meaningful PM _{2.5} data Decline all new consent applications to discharge PM _{2.5} in a polluted airshed, unless offset within the same airshed
burners Solid fuel	Emissions standard for burners	No more than 1.5g/kg	No more than 1.0g/kg Specify updated and/or appropriate methods for measuring
	Thermal efficiency standard for burners	No less than 65%	No less than 65% (no change) Specify updated and/or appropriate methods for calculating
	Application of standard for burners	Applies to new wood burners	Applies to all newly installed domestic solid-fuel burners including open fires, wood, coal, pellet and multi-fuel burners, cookers, and water boilers
		Applies only to properties of less than two hectares	Applies only to properties of less than two hectares (no change)
Solid-fuel burning open fires prohibited	Prohibit discharges indefinitely from newly installed solid-fuel open fires when PM ₁₀ standard is breached	Reflect change from PM ₁₀ standard to PM _{2.5} standards Applies indefinitely when either daily or annual PM _{2.5} standard is breached	

Monitoring	Monitoring methods	Specified in Schedule 2 Various Australian/New Zealand standards, and United States Code of Federal Regulations for monitoring PM ₁₀	Specify updated and appropriate methods for monitoring PM ₁₀ and PM _{2.5} in Schedule 2
Mercury	Use of mercury in industrial processes	None	Prohibit use of mercury in certain industrial processes specified in Annex B of the Minamata Convention
	Emissions that may contain mercury	None	Incorporate by reference international best practice guidelines for emissions sources specified in Annex D of the Minamata Convention

Proactively Released

Appendix 2.

Discussion document – Proposed amendments to the National Environmental Standards for Air Quality: Particulate matter and mercury emissions

Proactively Released

Appendix 3.

Regulatory Impact Statement – Proposed amendments to the National Environmental Standards for Air Quality

Proactively Released

Appendix 4.

Regulatory Impact Statement – Ratification of the Minamata Convention on Mercury

Proactively Released



Ministry for the
Environment
Manatū Mō Te Taiao

**Proposed amendments to the
National Environmental Standards
for Air Quality: particulate matter
and mercury emissions**

Discussion document

Version: 4 February 2020

New Zealand Government

Disclaimer

The opinions and options contained in this document are for consultation purposes only and do not reflect final Government policy. Please seek specific legal advice from a qualified professional person before undertaking any action based on the contents of this publication. The contents of this discussion document must not be construed as legal advice.

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Message from the Minister

Purea nei e koe i ngā hau ā Tāwhirimātea

Let yourself be purified in the winds of Tāwhirimātea

Our relationship to air is intrinsic to our livelihood. The quality of our air has a direct relationship to the wellbeing of our people and our ecosystems. As such, we must find ways to enhance, safeguard and manage the impact of development, industry and population growth on the resource we too often take for granted – the air that we breathe.

We can do more to monitor the impacts of our day-to-day activities as a society on the health of our environment and our people. I want to recognise the important role of regional councils, our scientists, researchers and specialist technicians who are committed to monitoring and evaluating these activities to inform our behaviours and industry practices and guide policy setting.

In Aotearoa New Zealand, we are lucky our air quality is generally good most of the time. However, in winter, some of us live in polluted environments where poor air quality is affecting our health. The numbers are not good. Research shows that exposure to PM_{2.5} (fine airborne particles) can be associated with over 600 premature adult deaths per year and 1.6 million days where activities are restricted.

As more people move into our urban centres, our transport behaviours and industry practices can also impact air quality. As our climate changes, it is more important than ever to be diligent as the prevalence of fires and disasters can have a localised and harmful impact for communities.

It is important to treat clean air as a taonga. While we can continue to improve our practices and behaviours, we must collectively do more to restore and preserve its quality.

In New Zealand, the National Environmental Standards (NES) for Air Quality are a key tool for managing air quality. The standards were introduced in 2004 to set a guaranteed minimum level of health protection for all New Zealanders. In the 16 years since then, we have seen improvements in air quality in many urban areas in New Zealand. We have gained a better understanding of air contaminants and their effects on human health. Wood burner technology has also become much more efficient.

The focus of this consultation is threefold. First, to ensure the NES reflects up-to-date research on the health effects of particulate matter, specifically the role of PM_{2.5}. Second, to propose amendments to further reduce the impacts of household solid-fuel burners. Finally, to enable us to meet our international obligations in relation to mercury emissions to air.

I invite you to have your say so we can continue to improve air quality in New Zealand.

Rire Rire Hau Pai Mārire!

Hon Nanaia Mahuta
Associate Minister for the Environment

Executive summary

The Government is consulting on proposed amendments to some provisions of the National Environmental Standards on Air Quality (NESAQ). This discussion document sets out the proposals and calls for submissions from interested parties.

In New Zealand, air pollution from particulate matter can affect human health. Exposure to particulate matter, particularly fine particles (PM_{2.5}), can cause disease and premature death from respiratory and cardiovascular causes, and exacerbate asthma and emphysema. These particles are mainly created by human activities. In New Zealand, the main source of PM_{2.5} is burning wood and coal for home heating during winter.

The NESAQ currently regulate particulate matter but with a focus on PM₁₀, which includes the finer PM_{2.5} particles, as well as other coarser material. Some of these coarser particles come from natural sources, over which we have no control.

The Government is proposing changes to the NESAQ to take into account improved scientific understanding and evidence about the health impacts of particulate matter and to better target controllable sources of air pollution.

We need to balance our approach to improving air quality with not unduly exposing New Zealanders to other health effects of cold homes. Government programmes, such as Warmer Kiwi Homes, supports communities to move to less-polluting forms of home heating.

The ambient outdoor air quality standards in the NESAQ are just one aspect of improving air pollution. Changing behaviour, educating people about the impacts of certain actions, and promoting good practice for using solid-fuel burners would form part of an integrated approach to reducing air pollution.

New Zealand signed the Minamata Convention on Mercury in 2013. One of the three key steps we need to take to ratify the Convention is to set controls on emissions to air from mercury. This requires amendments to the NESAQ that will:

- prohibit the use of mercury in certain listed industrial processes
- incorporate international best practice guidance that decision-makers must consider for listed mercury emissions sources.

Table 1 sets out all the proposed amendments to the NESAQ.

Submissions on the proposals close on **24 April 2020**. We will prepare a summary of the submissions and recommend changes. We will then seek agreement from ministers to the changes and to subsequently approve the amendments.

Table 1: Overview of proposed amendments to the NESAQ

Proposed amendments	
Particulate matter	
PM _{2.5}	<p>Daily average PM_{2.5} standard – 25 µg/m³ (three or fewer exceedances allowed in a 12-month period)</p> <p>Annual average PM_{2.5} standard – 10 µg/m³</p> <p>Monitoring required in all airsheds</p> <p>Publicly notify breaches</p> <p>Replace PM₁₀ with PM_{2.5} for 'offset' and open fires provisions</p>
PM ₁₀	<p>PM₁₀ standard retained</p> <p>Publicly notify breaches</p>
'Offset' discharges in polluted airsheds	<p>Reflect change from PM₁₀ standard to PM_{2.5} standards</p> <p>'Polluted' if either daily or annual PM_{2.5} standard is breached, averaged where possible over previous five years</p> <p>Meaningful data required to calculate average exceedances</p> <p>PM₁₀ standard used where airshed does not have adequate meaningful PM_{2.5} data</p> <p>Decline new applications for consent to discharge PM_{2.5} in a polluted airshed, unless offset within the same airshed</p>
Solid-fuel burners	
Emissions standards for burners	<p>No more than 1.0g/kg</p> <p>Updated and/or appropriate methods for measuring</p>
Thermal efficiency standard for burners	<p>No less than 65 per cent (retained)</p> <p>Updated and/or appropriate methods for calculating</p>
Application of standard for burners	<p>Applies to all newly installed domestic burners including: open fires, wood, coal, pellet and multi-fuel burners, space heaters, cookers, water boilers on properties less than two hectares in size</p>
Solid-fuel burning open fires prohibited	<p>Reflect change from PM₁₀ standard to PM_{2.5} standards</p> <p>Applies indefinitely when either daily or annual PM_{2.5} standard is breached</p>
Monitoring	
Monitoring methods	<p>Updated and/or appropriate methods for monitoring PM</p>
Mercury	
Use of mercury in industrial processes	<p>Prohibit use of mercury in industrial processes specified in Annex B of the Minamata Convention</p>
Emissions that may contain mercury	<p>Incorporate by reference international best practice guidelines for emissions sources specified in Annex D of the Minamata Convention</p>

* A NESAQ airshed is a defined geographic area for air quality management which extends upwards from ground level, with no upper limit.

Introduction and context

This document proposes:

- amendments to the standards for ambient particulate matter and burner design in the current National Environmental Standards for Air Quality (NESAQ)
- new standards for mercury emissions to air.

Other aspects of the NESAQ are not part of this consultation.

Air as taonga

Air, like all other natural resources, is considered by Māori to be a taonga – an invaluable treasure – which has been gifted by their tipuna (ancestors) for the benefit and use of descendants. This gift imposes a responsibility on us as kaitiaki (guardians) to ensure we maintain good air quality now and for future generations.

Health effects of air pollution

Air pollution has been described as the biggest environmental risk to human health globally.

Exposure to moderate to low concentrations of air pollutants may not be immediately obvious but can be dangerous to our health. Serious adverse health effects can occur after short-term (acute) exposure to air pollutants. However, the most important impacts at a population level are associated with the cumulative effects of long-term (chronic) exposure.

Chronic exposure can result in premature deaths, hospital admissions, sick days and restricted-activity days. This puts a burden on the health system, the economy, carers, whānau and society as a whole. Air pollution has other impacts, including:

- damaging natural ecosystems, biodiversity and crops
- limiting our enjoyment of outdoor facilities and scenic areas
- harming cultural values and quality of life.

Impact of particulate matter pollution

The most significant health impacts from poor air quality are associated with exposure to airborne particles, or particulate matter (Health Effects Institute, 2018).

At the less-severe end, breathing PM can cause mild and reversible effects, such as shortness of breath, coughing or chest pain. At the other end of the scale, there is strong evidence that exposure to PM is the source of much more severe effects. It can cause diseases such as heart attack and stroke, and premature death from cardiovascular and respiratory causes. It can also cause lung cancer and exacerbate asthma and emphysema. Recent studies point to an increase in inflammation due to PM as possible causes of diabetes and atherosclerosis.

What is particulate matter?

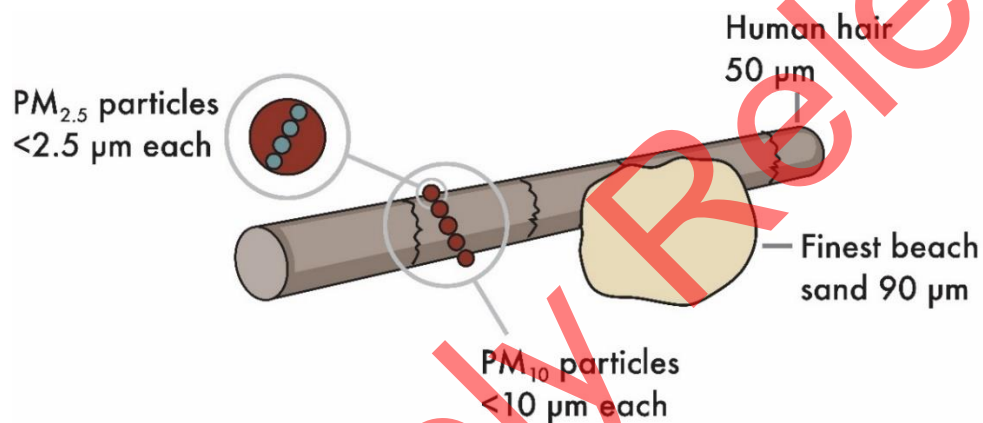
Particulate matter (PM) is a collective term for solid and liquid particles suspended in the air and small enough to be inhaled. PM varies greatly in structure and chemical composition, depending on where it comes from. It also varies in the harm it can cause.

PM comes from human activities and natural sources. It is often classified according to its size because size determines how PM interacts with the environment and human body.

- PM₁₀ has a diameter of 10 micrometres (µm) or less.
- PM_{2.5} has a diameter of less than 2.5µm and is a subset of the PM₁₀ range.
- Ultrafine particles are even smaller (less than 0.1µm or 25 times smaller than PM_{2.5}).

Figure 1 shows these relative sizes.

Figure 1: Relative sizes of particulate matter



Modelling of the health effects from exposure to human-generated PM₁₀ for all of New Zealand in 2016 (Kuschel et al. 2012) estimated there were:

- 27 premature adult deaths per 100,000 people
- 5 cardiac hospital admissions per 100,000 people
- 9 respiratory hospital admissions per 100,000 people
- 31,800 restricted activity days per 100,000 people.

In 2018, the estimated health outcomes attributable to PM_{2.5} in New Zealand were 646 premature adult deaths, 215 cardiac hospital admissions, 422 respiratory hospital admissions, and 1.6 million restricted activity days (NIWA, 2019).

People with pre-existing heart or lung disease, young children, and the elderly are the most likely to suffer adverse health effects. Exposure can be especially serious for the very young. PM has been associated with premature birth, low birth weight and infant bronchiolitis. Research has also shown associations between PM exposure and respiratory infections, asthma, and reduced lung growth in young children.

These effects depend on factors which include:

- the size of the particles
- the amount of particles

- the length of time exposed to the particles
- their composition
- individual susceptibility.

However, there is insufficient evidence to differentiate which of these parameters are more specifically related to certain health outcomes.

The smaller the particle, the greater the health impact

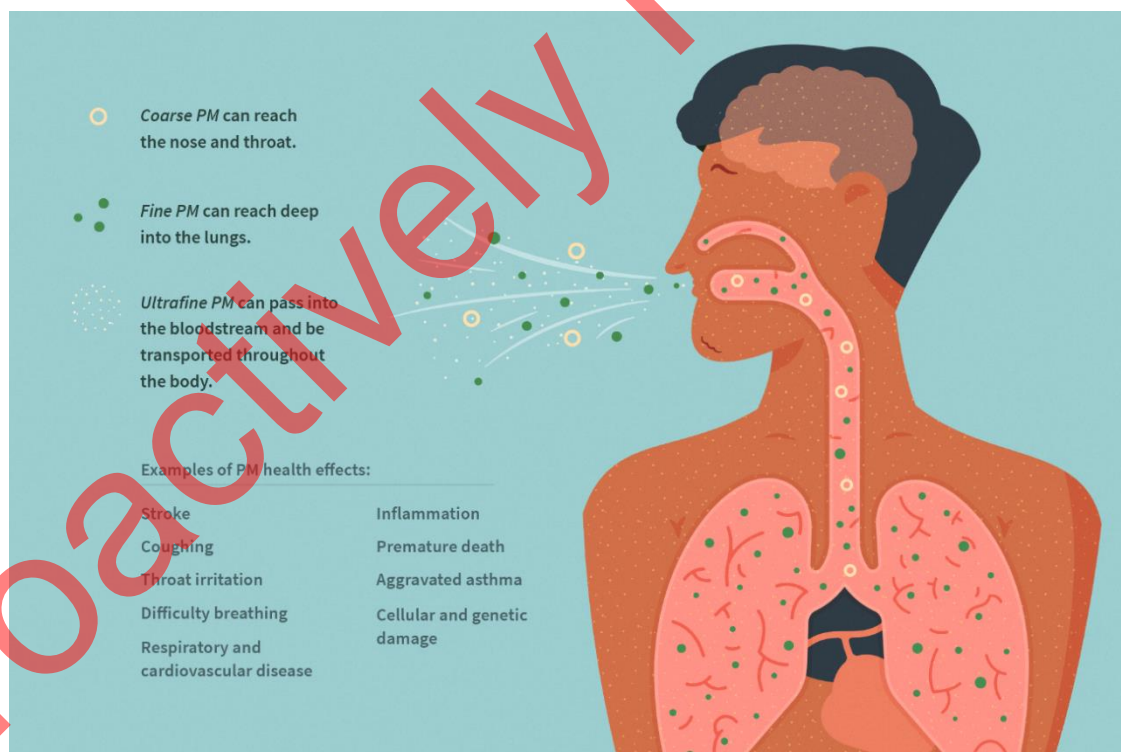
Different sizes of particulate matter can result in differing health effects. This is because they reach different parts of the respiratory tract, come from diverse sources and can interact partly through different biological mechanisms.

Larger, coarse PM (2.5-10µm) generally deposits in the nose, throat and upper airways.

Fine PM (2.5µm and smaller) deposits deep in the lungs. These particles are recognised as having the highest health risk and are mainly produced by human activities (Ministry for the Environment and Stats NZ, 2018, p22).

Ultrafine particles (0.1µm and smaller) are small enough to cross from the lungs into the blood and circulate throughout the body.

Figure 2: The impact of particulate matter on the human body



Source: Ministry for the Environment and Stats NZ (2018), p23

Amount and length of exposure

The amount (concentration) of PM and length of time someone is exposed to it contributes to the health consequences.

Higher concentrations of PM lead to a higher risk of damage to health. Physiological changes can occur within hours of exposure to high concentrations. These changes can be associated with premature death and illness immediately after exposure and in the following days.

There is strong evidence for effects from **long-term exposure** (years) to fine PM and this evidence continues to build (Ministry for the Environment and Stats NZ, 2018, p24). The risk of premature death from heart and lung disease are higher for long-term exposure.

Short-term exposure can also have a significant impact, even in people with no pre-existing health issues. Some symptoms such as coughing are reversible, but repeated exposure can cause chronic inflammation, leading to respiratory and cardiovascular disease. Short-term exposure to fine PM can even cause premature death in vulnerable people.

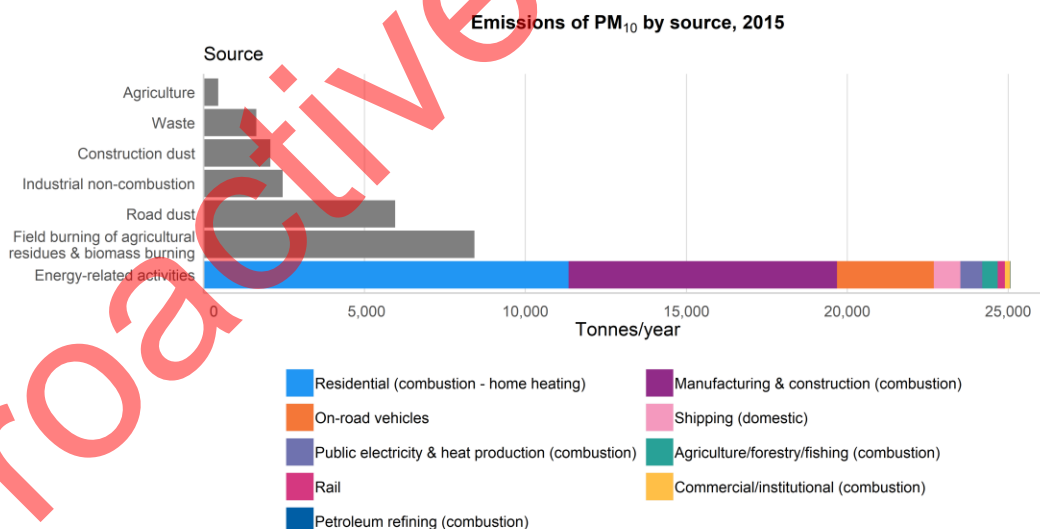
Air quality in New Zealand

The *Our air 2018* report shows air quality in New Zealand is generally good in most places at most times of the year and that the overall trend is slightly improving. However, the report also shows activities in certain parts of the country and at certain times of the year, mainly winter, are an issue (Ministry for the Environment and Stats NZ, 2018).

Our air quality profile is different from most of the rest of the world. New Zealand has two main causes of air pollution: burning wood and coal in winter for home heating, and traffic all year round.

Figure 3 (PM₁₀) and figure 4 (PM_{2.5}) show national emissions for 2015. They do not account for the seasonal nature of home-heating emissions, how sources are distributed or varying regional patterns.

Figure 3: Emissions of PM₁₀ by source, 2015

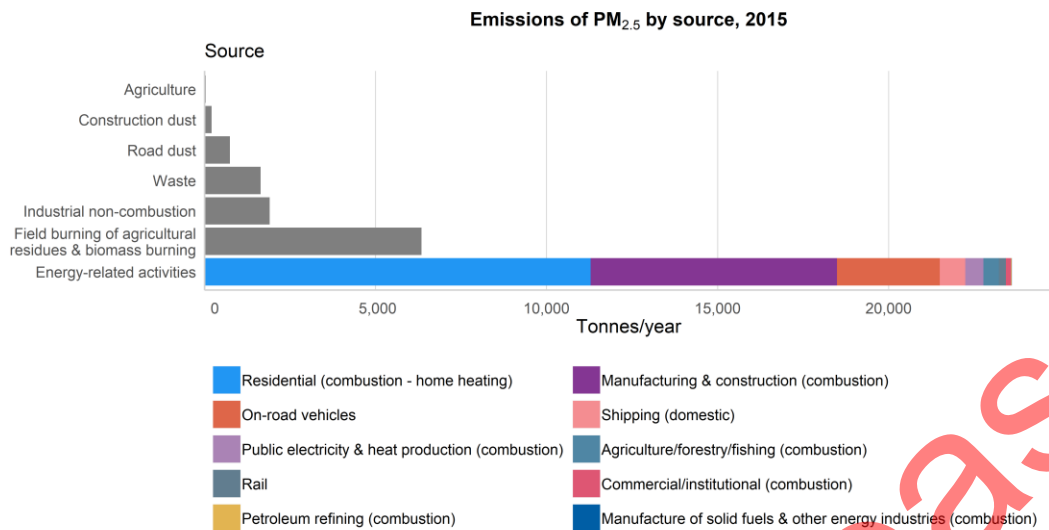


Data source: Emission Impossible Ltd

Note: Sub-sectors with less than 1% of sector emissions are excluded. Home heating emissions are assumed to be the same as the 2013 national emissions inventory (Wilton et al. 2015) because updated population data were not readily available. PM₁₀ – particulate matter 10 micrometres or less in diameter.

Source: Ministry for the Environment and Stats NZ (2018), p28

Figure 4: Emissions of PM_{2.5} by source, 2015



Data source: Emission Impossible Ltd

Note: Sub-sectors with less than 1% of sector emissions are excluded. Home heating emissions are assumed to be the same as the 2013 national emissions inventory (Wilton et al. 2015) because updated population data were not readily available. PM_{2.5} – particulate matter, 10 micrometres or less in diameter.

Source: Ministry for the Environment and Stats NZ (2018), p24

Home heating: the largest source of PM emissions

In New Zealand, burning wood and coal for home heating is the biggest, single human-made source of PM. Over time, fewer homes have been burning wood and coal, but it is still an important way to keep warm.

Most PM from wood and coal smoke is the smaller PM_{2.5}, and most of it is emitted in winter.

In 2015, residential emissions, mainly burning wood for heating, accounted for 25 per cent of annual emissions of PM₁₀ and 33 per cent of annual emissions of PM_{2.5} (see figures 3 and 4 above). However, regional councils' inventories show that on winter days home heating can account for up to 90 per cent of total PM₁₀ and 91 per cent of PM_{2.5}.

Most breaches of the PM thresholds occur during these winter months.

The amount and type of PM people are exposed to is highly dependent on how well the wood burns. This, in turn, depends on:

- the wood burner
- the temperature of the fire
- the moisture content of the wood
- what is being burnt (for example, treated timber offcuts or painted timber)
- how quickly the smoke disperses.

Some towns and cities are more prone to winter air pollution than other areas. It can vary because of other factors including geography, topography, weather, time and season. Therefore, air pollution can be very local.

Temperature inversions exacerbate air pollution during the cooler months. An inversion occurs when a layer of cool air close to the ground is covered by a layer of warmer air which acts as a lid, trapping pollutants and allowing them to build up. Topography, such as valleys and basins, can act as extra barriers.

Other significant sources

Combustion

Other important sources of PM emissions are burning wood in construction and manufacturing processes, such as wood-fired boilers. In 2015, this accounted for 15 per cent of PM₁₀ and 17 per cent of PM_{2.5}.

Open burning produced 18 per cent of both PM₁₀ and PM_{2.5}.

Vehicles

Emissions from vehicles are the most important non-biomass combustion source of PM, most of which is PM_{2.5}. As well as vehicle exhausts, traffic also generates PM through abrasion of pavement, tyres and brake pads.

Emissions from exhausts are regulated by the Vehicle Exhaust Emissions Rule 2007, administered by the Ministry of Transport. This sets the minimum (harmful) exhaust emissions standards for all vehicles entering the fleet. This rule, and the changes in fuel quality standards, have led to measurable improvements in roadside air quality.

While *Our air 2018* shows us a national picture, in some areas, particularly in our bigger towns and cities, transport produces a higher proportion of PM.

The *Government Policy Statement on Land Transport 2018/19–2027/28* commits resources to reducing transport's negative effects on the local environment and public health, including reducing air pollution.

Dust

Another important source of PM is dust from unsealed roads, which is mainly larger particles. Road dust can contain traces of minerals and metals from tyre and brake wear. All vehicles can cause dust to be suspended in the air near unsealed roads, but heavy vehicles can generate particularly large amounts. Dry periods and higher vehicle speeds can exacerbate the problem (Emission Impossible, 2019). Nationally, road dust is estimated to contribute 12 per cent of PM₁₀, but only 2 per cent of PM_{2.5}. Road dust is mostly an issue in rural areas where exposure for people is low, but it can be a significant issue locally.

Natural

Sea salt is the largest source of natural PM in New Zealand (Ministry for the Environment and Stats NZ, 2018, p38) and contributes mostly to the coarse part of PM₁₀. Other natural sources include windblown dust (airborne soil not caused by human activity), pollen, volcanic ash and particles formed from gaseous precursors (such as secondary sulphate from sulphur-containing gases produced by phytoplankton in the ocean, or volcanic emissions).

Managing air quality in New Zealand

The Resource Management Act 1991

The [Resource Management Act 1991](#) (RMA) promotes the sustainable management of natural and physical resources, including safeguarding the life-supporting capacity of the air. Local and central government have roles and responsibilities for managing the sources of air pollutants.

Through the RMA, the Government can set national environmental standards (NES), regulations made under Section 43 of the RMA. NES ensure a consistent standard for an activity or use of a resource.

National Environmental Standards for Air Quality

The [National Environmental Standards for Air Quality](#) (NESAQ) set an acceptable minimum level of health protection for all New Zealanders and the environment.

The NESAQ were introduced in 2004 and last amended in 2011. These interlinked standards regulate air quality, covering particulate matter (PM) and other pollutants.

The NESAQ currently manage PM pollution through:

- a daily ambient air quality standard for PM₁₀ of 50 µg/m³ (micrograms per cubic metre)
- a maximum number of times per year the standards can be exceeded
- emissions and thermal efficiency standards for wood burners newly installed in properties less than two hectares in size
- an indefinite ban on newly installed domestic, solid-fuel burning open fires (open fires) in airsheds that have breached the PM₁₀ standard
- a requirement for councils to decline new resource consent applications for PM₁₀ discharges in PM₁₀ polluted airsheds, unless the applicant will offset the discharge within the same airshed
- the ability for councils to introduce more stringent provisions through regional plans and bylaws.

For more detail, see the box below.

Current NESAQ standards

Ambient (outdoor) particulate matter is controlled by a set of standards for PM₁₀.

PM₁₀ standard

A maximum concentration of PM₁₀ of 50 µg/m³ (micrograms per cubic metre) applies as a 24-hour (daily) average.

Regional councils and unitary authorities must monitor areas where PM₁₀ concentrations are likely (or known) to exceed the PM₁₀ standard.

All breaches of the PM₁₀ standard must be publicly notified.

An airshed is considered to be 'polluted' when the PM₁₀ standard has been exceeded more than once per year, averaged where possible over the previous five years. The airshed continues to be polluted until it has demonstrated compliance (by not breaching the PM₁₀ standard) for five years. (See box on page 19 for further information on airsheds.)

Airsheds that frequently exceeded the PM₁₀ standard in 2011, when the NESAQ was last amended, were provided transitional air quality targets. This allowed more exceedances of the standard when determining whether an airshed is 'polluted'. However, from 1 September 2020, all airsheds are only permitted one exceedance in a 12-month period.

The NESAQ sets out:

- how to calculate and measure exceedances, using an average exceedance per year calculation based on meaningful data requirements to determine polluted status
- methods for monitoring PM₁₀, including Australian/New Zealand Standards
- a ban on discharges from domestic, solid-fuel burning open fires, newly installed in breached airsheds.

Exceptional circumstances

A regional council may apply to the Minister for the Environment for an exceedance of the PM₁₀ standard to be formally recognised as caused by an exceptional circumstance.

Exceptional circumstance exceedances are ignored when determining whether the regulations for open fires and resource consent applications to discharge PM₁₀ have been triggered.

Exceptional circumstances must be beyond the reasonable control of the regional council, for example, volcanic eruptions, wildfires and storm-driven sea salt.

Resource consents in polluted airsheds

Resource consent applications for activities that will contribute more than 2.5 µg/m³ of PM₁₀ to a polluted airshed must be declined by a regional council or unitary authority. An exception is when the applicant will 'offset' the discharge by a corresponding reduction in discharge elsewhere in the same airshed.

Newly installed, solid-fuel burners

The current solid-fuel burner standards only apply to wood burners for home heating, newly installed on properties under two hectares in size. The standards are:

- a discharge of no more than 1.5g of particulate per kilogram of dry wood burnt (the **emission standard**)
- at least a 65 per cent ratio of useable heat energy output to energy input (the **thermal efficiency standard**).

The methods for measuring and calculating the emission and thermal efficiency standards are specified by reference to Australian/New Zealand Standards or functionally equivalent methods.

Supporting material for NESAQ

There are a range of guidance documents to help implement the NESAQ:

- the [National Air Quality Compliance Strategy](#) (Ministry for the Environment, 2011a) sets out the practices regional councils and unitary authorities must follow to comply with the current PM₁₀ standard
- a [users' guide for the revised NESAQ](#) (Ministry for the Environment, 2011b) explains the provisions of the NESAQ up to, and including, the 2011 amendments
- a [series of good practice guides](#) for managing air quality.

Ambient air quality guidelines

New Zealand has [Ambient Air Quality Guidelines](#) (Ministry for the Environment, 2002). The guideline values are minimum requirements that all outdoor air quality should meet to protect people and ecosystems from significant adverse effects. The guidelines promote both ecosystem and human health, whereas the NESAQ are based on human health only. The guidelines were last updated in 2002. Regional councils may have their own local guidelines.

The national air quality guidelines for PM₁₀ are 50 µg/m³ (24-hour average) and 20 µg/m³ (annual average).

For PM_{2.5} a monitoring value of 25 µg/m³ (24-hour average) is recommended.

Role of local authorities

The primary responsibility for managing air quality under the RMA lies with regional councils (including unitary authorities). Regional councils have responsibilities for the control of discharges of contaminants to air, and for the integration of infrastructure with land use and regional transport planning (under the Local Government Act 2002).

The NESAQ require regional councils to ensure the air quality standards are met in their regions. Councils must identify and monitor areas where air quality is likely, or known, to exceed the NESAQ (see box on page 20).

Regional councils can use several tools to manage air quality to meet the standards. These will be different for each region, reflecting different local air quality issues. For example councils can:

- set policies, methods and rules through their regional plans (these can be more stringent than the NESAQ)
- regulate discharges to air from industrial and trade premises through resource consents
- establish bylaws
- set public transport and active transport (such as walking and cycling) investments in Regional Land Transport Strategies
- monitor and report ambient concentrations
- investigate and respond to public concerns
- run education campaigns

- provide incentives for people to use cleaner forms of home heating.

Territorial authorities (city and district councils) do not have a specific air quality management function under the RMA but have the primary responsibility for land use (for example, the location of activities that may discharge contaminants to air). However, territorial authorities are able to make bylaws under the Local Government Act 2002.

Territorial authorities also issue consents under the Building Act relating to (amongst other things) domestic fires. They need to ensure these are compliant with the NESAQ.

Managing transport emissions

The Ministry of Transport and the Waka Kotahi New Zealand Transport Agency can influence emissions and exposure to PM from transport through their respective policy and delivery functions.

Ensuring the land transport system enables better environmental outcomes is a supporting priority of the [Government Policy Statement on Land Transport: 2018/19–27/28](#). This includes an objective to reduce transport's negative effects on the local environment and public health.

Some important ways to influence transport-related PM exposure are through route selection, buffer distances and integrated planning approaches (such as transport and land-use planning in conjunction with territorial authorities). The PM₁₀ standard is used to inform the significance of effects from large infrastructure projects, along with regional air quality targets.

Other relevant policy, regulatory and delivery functions include:

- the National Land Transport Programme which gives effect to the Government Policy Statement on Transport 2018. This sets a strategic direction to reduce adverse effects from transport on the local environment and health
- entry and certification requirements to ensure vehicles entering New Zealand meet emissions standards
- Vehicle Exhaust Emissions Rule 2007 which prohibits removal of, or tampering with, a vehicle's emissions control equipment, and requires vehicles to pass a five-second, visible smoke check during a Warrant of Fitness/Certificate of Fitness inspection
- Road User Rule 2004 which prohibits a vehicle from emitting visible smoke for 10 seconds or more while it is being driven on a road
- vehicle and fuel quality standards
- electric vehicle programme to encourage (and remove barriers for) the uptake of electric vehicles
- public transport standards, strategies, planning and investment
- walking and cycling standards, strategies, planning and investment
- travel demand management.

Airsheds and monitoring sites

Airsheds

A NESAQ airshed is a geographic area for air quality management. It extends upwards from ground level with no upper limit and includes coastal marine areas.

Under the NESAQ, the geographic boundary of each regional council or unitary authority defines their airshed. However, the local authority may apply to the Minister for the Environment to partition off a part of their region as a separate airshed for air quality management. These sub-airsheds are specified by notice in the Gazette and are commonly known as 'gazetted airsheds'.

There are 89 airsheds in New Zealand: 73 gazetted airsheds and 16 airsheds defined by the regional council and unitary authority boundaries.

Monitoring sites

While everywhere within New Zealand is an airshed, monitoring is not required where an airshed is unlikely to breach an ambient standard.

Monitoring is needed where people are likely to be exposed to PM and where the standards are most likely to be breached by the greatest margin.

Airsheds may have more than one monitoring site. Individual sites often do not represent the entire airshed and different sources of pollutants may need to be monitored.

World Health Organization guidelines

The [World Health Organization \(WHO\) air quality guidelines](#) (World Health Organization, 2006) were developed in response to the threat that air pollution poses to public health globally.

The guidelines are not standards or legally binding criteria, but they offer guidance for reducing the health impacts of air pollution, based on the ongoing expert evaluation of scientific evidence.

The WHO has four guidelines for levels of PM in the air. They cover long- and short-term exposure to both PM₁₀ and PM_{2.5}.

A 2015 review showed the need to re-evaluate the guideline levels in light of an improved evidence base. The revised guidelines are expected to be published in late 2020.

Table 2 sets out the standards and guidelines.

Table 2: Summary of particulate matter standards and guidelines

	NESAQ (2011)	Ambient air quality guidelines (NZ) (2002)	WHO guidelines (2005)
all standards in µg/m ³			
PM ₁₀ daily	50	50	50
PM ₁₀ annual	–	20	20
PM _{2.5} daily	–	25	25
PM _{2.5} annual	–	–	10

Minamata Convention on Mercury

In 2013, New Zealand signed the [Minamata Convention on Mercury](#) – an international environmental treaty addressing the global threat to human health and the environment from anthropogenic (human-made) mercury pollution.

One of the steps New Zealand needs to take to ratify the Convention is to set controls on emissions to air from mercury, including from certain, specified industrial processes. This requires two amendments to the NESAQ:

- introduce new standards to prohibit the use of mercury in certain, listed processes
- incorporate international best practice guidance that decision-makers must consider for listed mercury emissions sources.

The most significant human-made releases of mercury globally are through emissions to air.

Anthropogenic mercury is not a significant pollutant in New Zealand, as many of the activities and processes controlled by the Convention do not take place here, and mercury use is minor.

Parties must also control and reduce mercury emissions from five source categories. The categories currently carried out in New Zealand mainly relate to coal combustion through coal-fired boiler plants and industrial coal-fired boilers.

Other national direction under the RMA

The Government consulted on a range of national direction instruments in the latter half of 2019. Created under the RMA, these instruments support decision-making on environmental, social, cultural and economic wellbeing.

Most relevant to the NESAQ is the **proposed National Policy Statement on Urban Development (NPS-UD)**. Urban development is closely linked to managing air quality, as most discharges to air occur in areas where most New Zealanders live. One purpose of the NPS-UD is to ensure growth is strategically planned and leads to well-functioning cities that contribute positively to our wellbeing. Strategic planning can influence:

- communities' exposure to air pollution, particularly for vulnerable groups such as children and the elderly
- the type of contaminants communities are exposed to because of land-use decisions such as zoning and consenting.

This is particularly important where policies encourage intensification along major transport corridors.

Why change the standards?

We are proposing changes to the NESAQ to:

- take into account improved scientific understanding and evidence about the health impacts of particulate matter
- better target controllable sources of air pollution.

Currently, the NESAQ deals with particulate matter pollution by regulating PM₁₀. However, there are two main issues with this approach:

- current science shows that PM₁₀ is not the best indicator of the health impacts of particulate matter pollution. Reducing exposure to PM_{2.5} is found to be of greatest benefit in terms of human health impacts, specifically a better way of reducing respiratory and cardiovascular disease and premature death
- the coarse component of PM₁₀ includes naturally-occurring particles over which we have no control. Most of the PM₁₀ that is of concern to human health in New Zealand is made up of smaller, PM_{2.5} particles from burning solid-fuel for home heating, industrial bio-mass combustion and vehicle combustion.

Better indicator of health effects

Research shows that particles in the air smaller than 2.5 micrometres in diameter (PM_{2.5}) are more hazardous to people's health than coarse, larger particles (particles in the PM_{2.5-10} range) (World Health Organization, 2013). Coarse particles can cause health issues but are generally filtered out in the nose and throat. Fine particles (PM_{2.5}) can travel deep into the lungs and enter the bloodstream, which can cause respiratory and cardiovascular disease and premature death.

In 2015, the Parliamentary Commissioner for the Environment released the report *The state of air quality in New Zealand*. The Commissioner called for a review of the NESAQ to bring it up to date with recent scientific findings, notably on particulate matter. The report concluded the most important ambient air guideline is for long-term exposure to PM_{2.5}. This conclusion is consistent with the 2013 WHO review of health impacts of particulate matter.

In 2019, in response to *Our air 2018*, the Commissioner for the Environment built on that recommendation by requesting the NESAQ include both an annual average and a 24-hour national standard for PM_{2.5}. Their reasons were that health effects of exposure to fine particulate are associated with both short- and long-term exposure. The Commissioner stated that, "it is no longer acceptable for New Zealand to continue to be without standards for this pollutant."

Focusing on controllable sources

PM_{2.5} is a better indicator than PM₁₀ for combustion emissions (from home heating, industry, and transport tailpipe emissions). Measuring PM₁₀ can capture naturally-sourced particles such as sea salt and pollen.

The local environment can have a significant impact on councils' ability to influence particulate matter concentrations, as councils are only able to manage human-made sources.

Some exceedances of the existing daily average PM₁₀ standard have a large component of natural particulate matter which is usually comprised of coarser particles (PM_{2.5-10}). Regional councils can apply to the Minister for the Environment for a decision that an exceedance was caused by exceptional circumstances and can, therefore, be excluded from contributing to a breach of the standards (see page 17 for further information). However, this can create an administrative burden that is not directed at improving air quality.

As PM_{2.5} is a subset of PM₁₀, PM₁₀ could be considered as a proxy for PM_{2.5}. However, this would rely on an assumption that PM_{2.5} is a consistent proportion of PM₁₀. The natural background source contributions are not constant around the country or throughout the year. To achieve similar health outcomes, areas with higher contributions from natural sources would have to over-regulate human-made sources, and areas with lower natural source contributions would need to adequately manage human-made sources.

PM_{2.5} is considered a more effective measure of air quality than PM₁₀ as it excludes the larger, naturally occurring particles. Natural occurrences are not usually a significant component of PM_{2.5}. Moving to a PM_{2.5} standard as the primary regulation for particulate matter management would avoid the need to comply with something that is not under councils' control.

Progressive improvements

Air quality has been improving since the introduction of the NESAQ and some areas have made significant gains. However, in other areas pollution still regularly exceeds the PM₁₀ standard.

There is no safe level of particulate matter pollution, so it is important to keep making improvements even though our air is generally good most of the time.

Balancing better air quality with affordable heating

We need to balance our approach to improving air quality and associated health impacts with not unduly exposing New Zealanders to health problems linked to cold homes.

Adequate home heating has a number of public-health benefits. Heating can directly reduce illness by helping maintain a minimum indoor air temperature. Also warmer houses control humidity, lowering dampness and inhibiting the growth of mould and fungi. Exposure to mould and fungi is associated with illnesses such as asthma and respiratory infections.

Fewer homes are burning wood or coal for heat, but these are still important home heating methods in New Zealand. Wood burners heated 33 per cent of North Island homes and 47 per cent of South Island homes in 2013. In the same year, coal burners heated 2 per cent of North Island homes and 10 per cent of South Island homes (Statistics New Zealand, 2014).

The proposals attempt to balance the affordability of solid-fuel burners against a transition to progressively lower PM emissions from homes. Strengthening design standards to encourage the supply and uptake of low-emission heaters (domestic burner appliances emitting low levels of particulate matter) is a practical option that will enable households to continue using solid fuels while transitioning to a progressively healthier level of indoor and outdoor air quality.

Government programmes are in place to reduce home-heating emissions and help communities move to cleaner heating. Recent measures include Warmer Kiwi Homes home

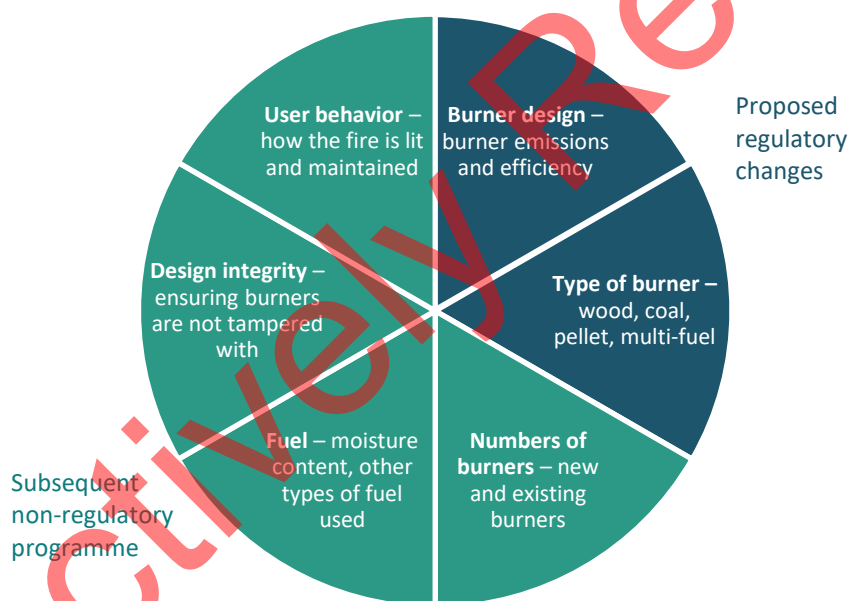
heating and insulation grants and the Residential Tenancies (Healthy Homes Standards) Regulations 2019 under the Healthy Homes Guarantees Act 1986. The regulations came into effect in July 2019 and supplement the NESAQ by ensuring rental properties are warm, dry and more energy efficient, which means less need to burn fuel.

Influencing behaviour

Burner design standards are just one aspect of reducing air pollution from home heating. Housing policies, funding and loans, behaviour change and public education are also required. Regional councils already play a big role in this space with incentives programmes or funding schemes in several places throughout the country to help people transition to less-polluting forms of heating.

These programmes collectively lead to reductions in PM emissions from home heating and improve the quality of our housing. Figure 5 shows the many factors that can affect the amount of emissions from home heating.

Figure 5: Factors that affect the amount of emissions from home heating



An integrated approach is necessary to continue to drive progressive improvements in home-heating performance and ambient air quality. It is proposed these amendments to the NESAQ are followed by non-regulatory tools to change behaviour, educate people about the impact of certain actions, promote good practice for using burners and discourage:

- burning wet wood
- burning treated timber and plastic
- modifying factory settings on solid-fuel burners
- burning waste outdoors.

What is being proposed – particulate matter

Introducing PM_{2.5} as the primary regulatory tool to manage ambient particulate matter

Summary and rationale

We propose to introduce both an annual and a daily standard for PM_{2.5} (fine particulate matter) into the current ambient air quality standards framework of the NESAQ. The new standards would be set at the levels recommended by the World Health Organization.

The annual average limit of 10 µg/m³ would manage long-term impacts from exposure.

To complement the annual average limit, **the daily (24-hour) average limit** of 25 µg/m³ (including no more than three exceedances per 12-month period) would manage the health effects from short-term exposure to fine particulate matter. In particular, this would address the seasonal nature of PM_{2.5} emissions from home heating (high winter levels versus low summer levels).

These two standards would replace the existing PM₁₀ standard as the main regulatory tool for managing ambient particulate matter. International science shows most health effects are the result of exposure to the smaller PM_{2.5} particles that form a subset of PM₁₀. In New Zealand, PM_{2.5} comprises the vast majority of PM₁₀ (Ministry for the Environment and Stats NZ, 2018).

Setting the standards in line with the WHO guidelines provides a minimum level of health protection balanced with feasibility, acknowledging there is no safe limit of exposure to PM. Regional councils may continue to make rules or bylaws that are more stringent than these proposals.

The new PM_{2.5} standards would retain all the requirements of the current PM₁₀ standard, including monitoring, meaningful data, public notification of breaches and mitigation measures for breaching the standards (declining or offsetting resource consents for PM_{2.5} discharges and prohibiting open fires).

A transition period will be provided to allow councils to purchase equipment and implement PM_{2.5} monitoring. The ambient PM_{2.5} standards will then apply.

To support the new standards, we propose to work with regional councils to update the *National Air Quality Compliance Strategy*. This could include a framework for councils to set and report on air quality targets. We do not propose to include target dates in the regulations for meeting the PM_{2.5} threshold concentrations or achieving the allowable number of exceedances.

Under regulation 17, councils must decline resource consent applications for certain discharges of PM₁₀ that could affect a polluted airshed, unless the applicant will offset them by reducing another discharge in the airshed. We would take a similar approach with PM_{2.5}.

Proposal

1. Introduce ambient air quality standards for short- and long-term PM_{2.5} threshold concentration, set at the levels recommended by the World Health Organization:
 - a. set the daily (24-hour) average PM_{2.5} limit at 25 µg/m³, with three or fewer exceedances allowed in a 1- month period
 - b. set the annual average PM_{2.5} limit at 10 µg/m³.
2. Require regional councils and unitary authorities to monitor PM_{2.5} and publicly notify any breaches.
3. PM_{2.5} would replace PM₁₀ as the 'trigger' for the current mitigation measures, including:
 - a. the provision to decline new resource consent applications for PM discharges in polluted airsheds unless the discharge would be offset (regulation 17)
 - b. prohibiting discharges from newly installed, domestic solid-fuel open fires in airsheds that have breached a PM standard (regulation 24A).

Questions

- Q1. Do you agree the proposed PM_{2.5} standards should replace the PM₁₀ standard as the primary standard for managing particulate matter?
- Q2. Do you agree we should include both a daily and an annual standard for PM_{2.5}?
- Q3. Do you agree the standards should reflect the WHO guidelines?
- Q4. Do you consider your airshed would meet the proposed PM_{2.5} standards? If not, what emissions sources do you expect to be most problematic?

Retain the PM₁₀ standard with reduced mitigation requirements for breaches

Summary and rationale

As discussed above, we propose to replace the current PM₁₀ standard with PM_{2.5} standards as the primary measure for managing air quality. We propose:

- retaining the PM₁₀ standard, along with requirements to monitor and publicly notify any breaches
- removing the mitigation requirements that a breach of the PM₁₀ standard triggers. These would instead be triggered by a breach of either the daily or annual PM_{2.5} standard:
 - prohibiting discharges from open fires installed after the breach (regulation 24A)
 - declining new resource consent applications for PM₁₀ discharges in polluted airsheds (regulation 17).

Shifting the mitigation requirements to the PM_{2.5} standards ensures efforts are focused on controllable, human-generated sources of PM.

The PM₁₀ data set remains valuable information, and we consider it would be premature to discontinue monitoring or managing it at this stage. It will help inform future policy once the WHO ambient air guidelines are updated.

Exposure to the coarse particles can still cause health effects. We understand a large portion of the coarse particles (PM_{2.5-10}) in New Zealand occur naturally, for example, as sea salt and pollen, and cannot be controlled. Some coarse particles relate to road dust, which is a common issue that councils and transport authorities are already managing. Dust from roads, and other activities such as quarrying or earthworks, is generally a localised issue in rural and semi-rural areas, and ambient air quality monitoring does not always capture it.

Proposal

4. Amend the ambient air quality standard for PM₁₀ to:
 - a. remove the requirement to decline or offset new resource consent applications for PM₁₀ discharges in polluted airsheds
 - b. remove the requirements to prohibit discharges from newly installed open fires in airsheds where the PM₁₀ standard is breached (existing bans will still apply)
5. Retain requirements to monitor PM₁₀ if a breach of the PM₁₀ standard is likely, and to publicly notify any breach.

Questions

- Q5. Do you agree councils should be required to keep monitoring and managing PM₁₀?
- Q6. What would be the additional costs involved in retaining PM₁₀ monitoring alongside PM_{2.5} monitoring, versus the potential loss of valuable monitoring information?

Polluted airsheds and resource consents

Summary and rationale

Moving from a PM₁₀ standard to PM_{2.5} standards means we need to amend the way we determine if airsheds are polluted. A polluted airshed currently 'triggers' a mitigation requirement for regional councils to not allow more than minor increases in consented PM₁₀ discharges into the relevant airshed.

An airshed is classified as polluted under the current NESAQ if the airshed's average exceedances of the PM₁₀ standard over the previous five years was more than one per year (or if there is less than five years data, then averaged over the one or more 12-month periods within the previous five years for which there is data). An airshed continues to be polluted until the PM₁₀ standard has not been breached in the previous five years.

If the airshed is considered polluted, the regional council must decline any new resource consent application for a discharge of more than 2.5 µg/m³ of PM₁₀ (five per cent of the standard) within the affected airshed, unless the applicant will offset the discharge within the same airshed (regulation 17). This provision applies to discharges controlled, or not permitted, by the regional plan. We understand the modelling to determine the level of discharge, as measured outside the site of the resource consent, is problematic to implement and does not consider the cumulative impact of multiple discharges.

We propose transitioning this provision to the PM_{2.5} regime. The PM_{2.5} standards would be used to determine an airshed's polluted status. Where possible, the determination would retain the requirement to use an average of the previous five years to smooth the inter-annual

effects of meteorology and the requirement for the calculation to be based on meaningful data. The meaningful data provision requires a minimum proportion of data captured and validated. This is to ensure compliance calculations are based on sufficient and appropriate data.

A polluted airshed would require the regional council to decline consent applications for new PM_{2.5} discharges into the polluted airshed, unless the applicant would offset the discharge within the same airshed. We understand a minimum PM_{2.5} discharge of 1.25 µg/m³ (five per cent of the proposed standard) might not be a practical minimum to implement. We propose using the consultation period to further explore practical options to transition the offsets provision to the PM_{2.5} regime.

A breach of the PM₁₀ would no longer trigger the polluted status. However, the current polluted status of an airshed would be carried over on the basis that, with New Zealand's emissions profile, most airsheds that are currently polluted in terms of PM₁₀ are highly likely to also be polluted under a PM_{2.5} standard.

Initially, not all airsheds will have enough history of PM_{2.5} monitoring data to determine if they are polluted (a minimum of 12 months is required). As a transitional provision, PM₁₀ data and the PM₁₀ standard would continue to be used until there is adequate PM_{2.5} data.

The proposal would also retain:

- existing gazetted airsheds and the ability for a regional council to define part of their region to be a separate airshed by notice in the Gazette
- the requirement for an airshed to remain classified as polluted for five years from the most recent breach
- the ability for councils to make rules or bylaws that are more stringent than these proposals.

Proposal

6. Transition the 'offsets' provision from PM₁₀ to the PM_{2.5} regime:
 - a. An airshed would be classified as polluted if on average it exceeded the permissible exceedances allowed by the daily PM_{2.5} standard, or the annual PM_{2.5} limit. This average would be calculated using a minimum of 12 months of meaningful data within the previous five years. The airshed would continue to be polluted until the daily and annual PM_{2.5} standards had not been breached in the previous five years.
 - b. The polluted status of an airshed would require the regional council to decline new resource consent applications for PM_{2.5} discharges into the polluted airshed (discharge threshold to be considered), other than the site on which the consent would be exercised, unless the applicant would offset the discharge within the same airshed.
 - c. Where an airshed does not yet have adequate meaningful PM_{2.5} monitoring data, the PM₁₀ standard would continue to be used to determine its 'polluted' status.

Questions

- Q7. Do you agree an airshed should be deemed polluted if it breaches either the annual or the daily PM_{2.5} standard?
- Q8. If all new resource consent application to discharge PM_{2.5} into a polluted airshed must be offset or declined, how would this affect your activities, or activities in your region?

- Q9. Can you identify a more appropriate, measurable threshold for controlling consented discharges in a PM_{2.5} context?
- Q10. Do you agree that if a council does not have adequate PM_{2.5} data, the airshed's classification under the PM₁₀ standards should continue to apply?

Proactively Released

What is being proposed – domestic solid-fuel burners

Emissions standard

Summary and rationale

We propose an emissions standard for newly installed, solid-fuel burners that is stricter than the current standard of 1.5g/kg.

Since the current wood-burner emission standards were set in 2004, wood-burner technology has improved. We consider reducing the emissions standard will drive continued innovation to reduce emissions from solid-fuel burners.

Some councils¹ have already set lower (stricter) emissions standards for specific airsheds. The industry has responded with burners that comply with these.

Solid-fuel burners currently available in New Zealand would meet the proposed new standard. A [list of all approved burners](#) is available on the Ministry for the Environment website.

The thermal efficiency standard of 65 per cent will be retained. Councils may continue to make rules or bylaws that are more stringent than this proposal.

Proposal

7. Lower the emissions design standard for domestic burners to no more than 1.0g/kg.

Questions

Q11. Do you agree with the proposal to reduce the emissions standard to no more than 1.0g/kg? If not, what do you think the standard should be?

Q12. Are there areas where a lower (more stringent) standard could be applied?

¹ Environment Canterbury has identified ultra-low emission burners that are permitted in all areas indefinitely. These have emissions of 38mg/MJ of usable heat, equivalent to 0.5g/kg emissions and 65 per cent efficiency. Environment Canterbury's low-emission burners (which are allowable for most areas but being phased out of the 'clean air zones') have maximum emissions of 1.0g/kg.

Environment Bay of Plenty has set out in Plan Change 13 (currently subject to appeals) an emissions threshold of 0.60g/kg for low-emission burners in its Rotorua airshed.

Nelson Air Quality Plan specifies problem airsheds where certain older burners have been phased out, and allows only approved ultra-low-emission burners (ULEBs). ULEBs are tested under strict, real-life operating conditions to meet an emissions and efficiency standard of 38mg/MJ, equivalent to emissions less than 0.5g/kg and a thermal efficiency of 65 per cent or greater. In other areas, the NESAQ emissions and thermal standards are applied to all small-scale, solid-fuel burners.

All domestic, solid-fuel burners covered

Summary and rationale

The current burner standards do not equitably target all household PM emissions. They only apply to domestic woodburners used for space heating. Emissions from other uses of household burners and other types of fuel that contribute to PM pollution are not controlled.

We propose extending these regulations to include discharges from all types of domestic, solid-fuel burners newly installed in a building on properties less than two hectares in size. This would include wood, coal, multi-fuel and pellet burners, and would cover burners used for space heating, cooking, water heating and open fires.

This proposal would result in more appliances (new, used and refurbished) being deemed non-compliant. For example, no coal burners or open fires currently on the market would meet either the new emissions standard or the current emissions standard.

See the Ministry's website for a [list of solid-fuel burners that have been assessed under the NESAQ](#).

This proposal would only apply to burners installed after the amended regulations come into effect. It would cover new, used, and refurbished burners. Existing burners could continue to be operated if they were installed legally, unless otherwise restricted by local council rules.

Properties over two hectares in size would remain excluded from the burner regulations.

Councils may continue to make rules or bylaws that are more stringent than this proposal.

Proposal

8. Include all types of solid-fuel burners under the existing burner regulations that prohibit discharges from newly installed, domestic burners unless they meet the emissions limit and thermal efficiency standards. This would include **all** types of domestic, solid-fuel burners such as wood burners, coal burners, multi-fuel burners, pellet burners, open fires, space heaters, cookers and water boilers.

Question

Q13. Do you agree the new emissions standard should apply to all domestic, solid-fuel burners newly installed in properties less than two hectares in size?

Q14. Do the current methods to measure emissions and thermal efficiency need updating or changing? For example, to address any trade-off between thermal efficiency and emissions, or to test other types of burners or burner modifications that seek to reduce emissions?

What is being proposed – mercury emissions

The Government proposes to amend the NESAQ to control emissions to air and prohibit certain industrial processes to ratify the Minamata Convention on Mercury.

Summary and rationale

New Zealand signed the Minamata Convention on Mercury in 2013 but has not yet ratified it. To address the obligations under Articles 5(6) and 8 of the Convention, and take one of the steps to ratify the Convention, we propose two amendments to the NESAQ:

1. prohibit the use of mercury in certain, listed processes known as Annex B processes. These have not been carried out in New Zealand, and they are not likely to be as technology has improved, removing the need for mercury
2. require applications for specified, new activities involving emissions of mercury to air, known as Annex D sources, to consider international best practice guidance (a combination of best available techniques and best environmental practice).²

Article 8 of the Convention identifies five emissions point source categories known as Annex D sources, such as coal-fired power plants and industrial boilers. The Convention requires consideration of international best practice guidance when deciding on controls for these sources.

For our purposes, [this Convention guidance](#) provides the range of methods that will apply and identifies tools available. All guidance is available on the [Minamata Convention website](#).

Following best practice guidance aims to control and reduce (where feasible) emissions of mercury to air from Annex D source categories. As long as a facility uses one or more of the measures in the guidance for each source category, this will achieve the purpose of controlling or reducing mercury emissions to air.

No change is needed for existing Annex D activities, but any new (or substantially modified) source must use the guidelines. Small boilers (under 2MW) will not be affected.

In New Zealand, current best practice is unlikely to result in significantly stricter controls than the RMA and resource consents require.

² BAT options include taking measures to reduce mercury content in fuel (through washing, selecting or blending), reduce mercury emissions during combustion, and remove mercury as a co-benefit by conventional pollution control systems and mercury control techniques (such as activated carbon injection). Both BAT and BEP should be used together to form best practice. This could include maintaining pollution control strategies and environmentally-sound management of the plant and coal combustion residues.

Proposal

9. Introduce new standards that prohibit the use of mercury in facilities being used in the manufacturing processes below to reduce the possibility of emitting mercury to air:
 - a. chlor-alkali production
 - b. acetaldehyde production in which mercury or mercury compounds are used as a catalyst
 - c. vinyl chloride monomer production
 - d. sodium or potassium methylate or ethylate
 - e. production of polyurethane using mercury-containing catalysts.
10. Incorporate international best practice guidance, in accordance with Article 8(8)(a) of the Minamata Convention on Mercury, as a mandatory consideration for councils when making planning or consenting decisions about the discharges of mercury from the Annex D sources listed, ie:
 - a. coal-fired power plants
 - b. coal-fired industrial boilers
 - c. smelting and roasting processes used in the production of non-ferrous metals
 - d. waste incineration facilities
 - e. cement clinker production facilities.

Questions

- Q15. Do you support the proposed amendments to the NESAQ to support ratification of the Minamata Convention on Mercury?
- Q16. Do you agree with how these amendments will affect industry?
- Q17. What additional guidance do you think will be needed to support implementation of the proposed amendments? Will industry need help to interpret the best practice guidance for the New Zealand context?
- Q18. Do you use any of the manufacturing processes in Proposal 9? If so, does this process use mercury?
- Q19. Do you agree with the Government's proposed approach to regulate the source categories in Proposal 10? If not, why not?
- Q20. What air pollution control technologies are currently required for existing source categories listed in Proposal 10?

Timing, implementation and transitional provisions

The amendments to the NESAQ would come into immediate effect at the time they are gazetted.

Regional councils and unitary authorities would need to amend their plans as soon as practicable to remove any duplicate or conflicting provisions. However, they may keep provisions that are more stringent than the NESAQ. Councils may also develop new plan provisions through standard processes that are more stringent than, or complement, the NESAQ.

To allow time for compliance, transitional provisions may be needed. For example, some councils may need to purchase additional monitoring equipment.

Proposal

11. Transitional provisions are needed for:
 - a. regional councils and unitary authorities to start monitoring PM_{2.5} if they do not already do so.
 - b. newly non-compliant burners that have been purchased, but not yet installed.

Questions

- Q21. Do you agree that lead-in times are required for starting to monitor PM_{2.5} and for burners that will no longer be compliant? What lead-in times would you suggest and why?
- Q22. Are there any other matters you think would require transitional provisions? If so, what?

Summary of current and proposed provisions

Table 3: Summary of current and proposed provisions

Note: This table only includes the provisions we expect to amend

Proposed amendments	Current NESAQ provisions	Proposed provisions
Particulate matter		
PM _{2.5}	None	Daily average PM _{2.5} standard – 25 µg/m ³ (three or fewer exceedances allowed in a 12-month period) Annual average PM _{2.5} standard – 10 µg/m ³ Monitoring required in all airsheds Publicly notify breaches Replace PM ₁₀ with PM _{2.5} for ‘offset’ and open fires provisions
PM ₁₀	Daily average PM ₁₀ standard – 50 µg/m ³ One exceedances of daily PM ₁₀ allowed from 1 September 2020	PM ₁₀ standard retained Monitoring requirements retained Publicly notify breaches
‘Offset’ discharges in polluted airsheds	‘Polluted’ if daily PM ₁₀ standard breached, averaged where possible over previous five years Polluted until PM ₁₀ standard not breached in previous five years New resource consent applications that will increase PM ₁₀ by more than 2.5 µg/m ³ in a polluted airshed must be declined, unless discharges will be offset elsewhere in airshed	Reflect change from PM ₁₀ to PM _{2.5} standards ‘Polluted’ if either daily or annual PM _{2.5} standards breached, where possible averaged over previous five years Meaningful data required to calculate average exceedances Polluted until neither PM _{2.5} standard has been breached in previous five years PM ₁₀ standard used where airshed does not yet have adequate meaningful PM _{2.5} data Decline new consent applications to discharge PM _{2.5} in a polluted airshed, unless offset within the same airshed
Solid-fuel burners		
Emissions standard for burners	No more than 1.5g/kg	No more than 1.0g/kg Specify updated and/or appropriate methods for measuring
Thermal efficiency standard for burners	No less than 65 per cent	No less than 65 per cent (no change) Specify updated and/or appropriate methods for calculating
Application of standard for burners	Applies to new wood burners	Applies to all new domestic solid-fuel burners including open fires, wood, coal, pellet, and multi-fuel burners, cookers and water boilers
	Applies only to properties of less than two hectares	Applies only to properties of less than two hectares (no change)

Solid-fuel burning, open fires prohibited	Prohibit discharges indefinitely from newly installed, solid-fuel open fires when PM ₁₀ standard is breached	Reflect change from PM ₁₀ standard to PM _{2.5} standards Applies indefinitely when either daily or annual PM _{2.5} standard is breached
Monitoring		
Monitoring methods	Specified in Schedule 2 of the NESAQ Various Australian/New Zealand standards and United States Code of Federal Regulations for monitoring PM ₁₀	Specify updated and appropriate methods for monitoring PM ₁₀ and PM _{2.5} in Schedule 2 of the NESAQ
Mercury		
Use of mercury in industrial processes	None	Prohibit use of mercury in certain industrial processes specified in Annex B of the Minamata Convention
Emissions that may contain mercury	None	Incorporate by reference international best practice guidelines for emissions sources specified in Annex D of the Minamata Convention

Impact of the proposals

Particulate matter and solid-fuel burners

This section describes the type of costs and benefits to different groups. It includes a summary of the main findings of a cost-benefit analysis (CBA). The CBA was prepared for the proposed amendments to the particulate matter standards (Market Economics, 2019) to assess their national impact.

Costs to households

Installing a solid-fuel burner would be a one-off cost with ongoing fuel costs. The proposal does not require any burners to be replaced and only applies when a household chooses to install or replace a burner.

The one-off costs are the difference between the cost of purchasing and installing an appliance that complies with the proposed emissions standard and what a household would have spent on their preferred heating source if the policy was not in effect. In most areas, this means the difference between a 1.0g/kg burner (the proposed emission standard) and a 1.5g/kg burner (the current emission standard).

Costs to local and central government

Regional councils and unitary authorities would need to buy new equipment that can monitor PM_{2.5} if they do not already have this. Other costs include updating plans and public education.

Central government would have costs to cover implementation assistance to councils, such as producing written guidance and holding workshops.

The total costs of the proposed amendments are estimated at \$97.7 million over 10 years.

Benefits

When air quality improves, the harm to health decreases, and therefore health costs decrease. This reduced or avoided cost is interpreted as a benefit to society. It is calculated on the number of premature deaths, respiratory and cardiac hospitalisations, and days people are restricted from usual activities attributable to exposure to PM_{2.5}.

The CBA assessed the total benefits in terms of avoided health costs as \$820.2 million over 10 years.

Cost-benefit ratio

Table 4 sets out the costs and benefits.

The expected cost benefit ratio is 8.4. For every dollar spent, there would be \$8.40 of health cost savings.

Table 4: National level costs and benefits

		\$m	Cost benefit ratio
Total	Costs: public and private costs	\$159.6	
	Benefits: avoided health costs	\$1,409.4	
Net present value	Costs: public and private costs	\$97.7	
	Benefits: avoided health costs	\$820.2	8.4

Distribution of costs

In addition to the total costs and benefits at a national level, it is important to consider the distribution of costs and benefits across communities.

A community's ability and willingness to pay was not directly assessed as part of the cost-benefit analysis. However, the costs were viewed in terms of the level of deprivation in each airshed. Affordability may be an issue for the most deprived areas. It will, therefore, be important to:

- consider how to ease the burden on households where there is both high air pollution and high deprivation
- ensure in these areas the health costs don't shift to the impacts of living in cold houses.

Government programmes can help moderate these impacts (see page 24).

Impacts for Māori

We do not yet have a complete picture of the impacts for Māori. We propose further, targeted engagement with Māori, particularly in areas where the impact is likely to be higher. It is a difficult trade-off between affordable energy and improved air quality.

We are also aware that some papakāinga (communal housing) and marae rely on solid-fuel burning for heating, water heating and cooking. We propose further investigation to how these should be addressed by the regulations over the consultation period, including targeted engagement with iwi.

Mercury emissions

None of the Annex B manufacturing processes in Proposal 9 of the Minamata Convention on Mercury are used in New Zealand and alternative mercury-free processes are available. We do not think there will be any impact for industry.

We consider the proposed mercury emissions regulations in Proposal 11 of the Minamata Convention on Mercury will have a minimal impact because they only apply to new or substantially modified sources. Few point sources fall within these source categories (except coal-fired industrial boilers). It is highly unlikely there will be many resource consent applications to operate a new facility.

Currently, a discharge consent is required to operate any Annex D source categories. This contains measures such as air pollution control that would comply with international best practice guidance. In our view, future compliance for all categories would be business as usual. Councils may incur costs when assessing whether a resource consent applicant is proposing to adopt a measure from the international best practice guidance. See the [appendix](#) for more detail.

Table 5: Impact of controlling industrial emissions of mercury to air

Process or source category	Use in New Zealand	Expected impact of regulation
<i>Minamata Convention on Mercury Annex B processes</i>		
Chlor-alkali production Acetaldehyde production in which mercury or mercury compounds are used as a catalyst Vinyl chlorine monomer production Sodium or potassium methylate or ethylate Production of polyurethane using mercury containing catalysts	None of these processes are carried out in New Zealand as they have been replaced with newer technology that does not use mercury	Minimal to none
<i>Minamata Convention on Mercury Annex D sources</i>		
Coal-fired power plants	One – Huntly power station	Minimal This station already meets the best practice criteria so no change is needed
Coal-fired industrial boilers	Less than 400 coal-fired boilers, of which around half are less than 1 MW	Low New or substantially modified facilities over 2 MW would require best practice
Smelting and roasting processes used in the production of non-ferrous metals	Gold smelting at six mines. No primary smelting of other non-ferrous metals (zinc, copper and lead) One aluminium smelting plant at Tiwai Point	Low Current facilities would not be affected. Best practice would be required for any new or substantially modified operation involving smelting and roasting The alumina imported for use at Tiwai Point is already highly refined and believed not to include any significant mercury content
Waste incineration facilities	One high temperature waste incinerator One medical waste incinerator One sewage sludge incinerator Less than 60 school incinerators (this is declining) One quarantine waste incinerator	Low Waste incineration is already regulated by the Air Quality Standards to control emissions. Most existing facilities are likely to meet best practice (but would not be in scope of the regulation). Any new or substantially modified facility would require best practice

Process or source category	Use in New Zealand	Expected impact of regulation
Cement clinker production facilities	One: Golden Bay Cement, Whangarei. ³	Minimal. The plant uses bag filters to control emissions which already meet best practice criteria

Consistency with the purpose of the Resource Management Act 1991

Under section 46(4)(a)(ii) of Resource Management Act 1991 (RMA), the Minister for the Environment is required to state why they consider any proposed changes to a national environmental standard are consistent with the purpose of the RMA.

The purpose of the RMA, as stated in section 5, is to promote the sustainable management of natural and physical resources. Sustainable management means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety, while:

- a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations
- b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems and
- c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The proposals are consistent with this purpose as the new standards are designed to provide for communities' health and wellbeing, as well as sustaining the life-supporting capacity of air.

³ Bingham A, Graham B. 2017. *Mercury Inventory for New Zealand: 2016*. Prepared for the Ministry for the Environment by JCL Air & Environment Limited and Graham Environmental Consulting Limited. Wellington: Ministry for the Environment, p 20.

Consultation process

Timeframes and next steps

This consultation ends at 5pm on **Friday 24 April 2020**.

Process following consultation

The feedback from this consultation will inform the Government's final decisions about amendments to the National Environmental Standard on Air Quality (NESAQ).

In accordance with the requirements of section 46A of the RMA, the Minister has decided to use the 'alternative' process for amendments. When consultation has ended:

- we will prepare a summary of the submissions and recommend changes to the amendments in response
- the Minister will receive the report and recommendations
- we will then seek agreement from the Minister and Cabinet to make the amendments and recommended changes.

If the Minister and Cabinet approve, the amendments are likely to take effect in late 2020.

How to make a submission

The Government welcomes your feedback on the proposed amendments. The questions in this document are a guide only. You do not have to answer all the questions, and all comments are welcome.

To ensure others clearly understand your point of view, you should explain the reasons for your views and give supporting evidence if needed.

You can make a submission in two ways.

1. Use our online submission tool, available at www.mfe.govt.nz/consultations/nes-airquality
This is our preferred way to receive submissions.
2. Write your own submission.

If you are posting your submission, send it to:

Air Quality NES consultation
Ministry for the Environment
PO Box 10362
Wellington 6143

Include:

- the title of the consultation *Amendments to the National Environmental Standards on Air Quality: particulate matter and mercury emissions*
- your name and/or organisation

- your postal address
- your telephone number
- your email address.

If you are emailing your submission, send it to AirQualityNESsubmissions@mfe.govt.nz as a

- PDF, or
- Microsoft Word document (2003 or later version).

Submissions close at 5pm on Friday 24 April 2020.

For more information

Please send any queries to:

Email: AirQualityNESsubmissions@mfe.govt.nz

Postal: Ministry for the Environment, PO Box 10362, Wellington 6143

Publishing and releasing submissions

All or part of any written submission the Ministry for the Environment receives electronically or in printed form, including your name, may be published on our website, www.mfe.govt.nz. Unless you clearly specify otherwise in your submission, the Ministry will consider that you have consented to website posting of both your submission and your name.

Submissions may be released to the public under the Official Information Act 1982 following requests to the Ministry for the Environment (including by email). Please advise if you object to the release of any information contained in your submission and, in particular, which part(s) you consider should be withheld, together with the reason(s) for withholding the information.

Any personal information you supply to the Ministry when making a submission will only be used by the Ministry in relation to the consultation covered in this document. You have the right to request access to or to correct any personal information you supply to the Ministry.

If you have any questions about the publishing and releasing of submissions, or if you would like to access or correct any personal information you have supplied, please email info@mfe.govt.nz.

Consultation questions

The box below sets out the full list of questions in this document.

Questions

Introduce PM_{2.5} as the primary regulatory tool to manage particulate matter pollution

- Q1. Do you agree the proposed PM_{2.5} standards should replace the PM₁₀ standard as the primary standard for managing particulate matter?
- Q2. Do you agree we should include both a daily and an annual standard for PM_{2.5}?
- Q3. Do you agree the standards should reflect the WHO guidelines?
- Q4. Do you consider that your airshed would meet the proposed PM_{2.5} standards? If not, what emissions sources do you expect to be most problematic?

Retain the PM₁₀ standard with reduced consequences for breaches

- Q5. Do you agree councils should be required to keep monitoring PM₁₀?
- Q6. What would be the additional costs involved in retaining PM₁₀ monitoring alongside PM_{2.5} monitoring, versus the potential loss of valuable monitoring information?

Polluted airsheds

- Q7. Do you agree an airshed should be deemed polluted if it exceeds either the annual or the daily PM_{2.5} standard?
- Q8. If all new resource consent application to discharge PM_{2.5} into a polluted airshed must be offset or declined, how would this affect your activities, or activities in your region?
- Q9. Can you identify a more appropriate, measurable threshold for controlling consented discharges in a PM_{2.5} context?
- Q10. Do you agree that if councils do not have adequate PM_{2.5} data, the airshed's classification under the PM₁₀ standards should apply?

Domestic solid-fuel burner emissions standard

- Q11. Do you agree with the proposal to reduce the emissions standard to no more than 1.0g/kg? If not, what do you think the standard should be?
- Q12. Are there areas where a lower (more stringent) standard could be applied?

All domestic solid-fuel burners covered

- Q13. Do you agree the new emissions standard should apply to all new domestic, solid-fuel burners newly installed on properties less than two hectares in size?
- Q14. Do the current methods to measure emissions and thermal efficiency need updating or changing? For example, to address any trade-off between thermal efficiency and emissions, or to test other types of burners or burner modifications that seek to reduce emissions?

Mercury emissions

- Q15. Do you support the proposed amendments to the NESAQ to support ratification of the Minamata Convention on Mercury?
- Q16. Do you agree with how these amendments will affect industry?

- Q17. What guidance do you think will be needed to support implementation of the proposed amendments? Will industry need help to interpret the best practice guidance for the New Zealand context?
- Q18. Do you use any of the manufacturing processes listed in Proposal 9? If so, does this process use mercury?
- Q19. Do you agree with the Government's proposed approach to regulate the source categories in Proposal 10? If not, why not?
- Q20. What air pollution control technologies are currently required for existing source categories listed in Proposal 10?

Timing, implementation and transitional provisions

- Q21. Do you agree that lead-in times are required for starting to monitor PM_{2.5} and for burners that will no longer be compliant? What lead-in times do you suggest and why?
- Q22. Are there any matters you think would require transitional provisions? If so, what?

Other comments

- Q23. Do you have any other comments you wish to make?

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Coversheet: Amending the National Environmental Standards for Air Quality

Advising agencies	<i>Ministry for the Environment</i>
Decision sought	<i>Agreement to a package of proposed amendments to the National Environmental Standards for Air Quality</i>
Proposing Ministers	<i>Hon Nanaia Mahuta, Associate Minister for the Environment Hon David Parker, Minister for the Environment</i>

Summary: Problem and Proposed Approach

<p>Problem Definition</p> <p>What problem or opportunity does this proposal seek to address? Why is Government intervention required?</p>
<p>Human activities and natural sources emit gases and particles into the air. Some of these emissions can have a negative impact on air quality and can harm our health, our environment and our economy. In New Zealand, particulate matter is the air pollutant of most concern to human health, especially fine particles (PM_{2.5}) which have a direct causal link to premature mortality. We have clear evidence that the main source of PM_{2.5} in New Zealand is burning wood and coal for domestic heating.</p> <p>Over the last 15 years, regional council implementation of the existing regulations has successfully achieved reductions in air pollution in many urban airsheds in New Zealand. This has improved public health, with the majority of New Zealanders now enjoying air quality in compliance with the regulations.</p> <p>However, it is timely to update these regulations to reflect the large body of science about the health impacts of fine particulate matter that has developed since they were introduced in 2004. This also affords an opportunity to undertake technical amendments to address exceedances caused by natural sources and New Zealand’s commitments under the Minamata Convention on Mercury.</p>
<p>Proposed Approach</p> <p>How will Government intervention work to bring about the desired change? How is this the best option?</p>
<p>Amendments to the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (the NESAQ) will set new standards for emissions of fine particles and regulate the use of wood, coal and other solid fuels for domestic heating. This will ensure appropriate and targeted regulation of New Zealand’s main source of particulate pollution.</p>

Section B: Summary Impacts: Benefits and costs

Who are the main expected beneficiaries and what is the nature of the expected benefit?

The expected beneficiaries are the public. With better air quality, people will enjoy better health. Through avoided health costs, the government also benefits.

Avoided health costs were estimated in the Cost Benefit Analysis report (CBA). These were calculated by translating the annual PM_{2.5} and annual PM₁₀ concentrations into health effects (ie, response ratio) and then applying a cost to each 'new' health incident:

Estimated cost per case from PM_{2.5} exposure

Health effect	Avoided health cost (\$NZD)	Estimated number of cases
Premature mortality	\$4.06m per life ¹	646
Cardiac admissions	\$5,381 per admission	215.3
Respiratory admissions	\$7,432 per admission	422.4
Restricted Activity Days	\$70 per day	1,600,647

An overall reduction in particulate matter emissions will have an associated avoided health cost. It may also have other benefits in terms of climate change mitigation, cultural values, amenity impacts, and economic benefits for manufacturers, importers and retailers of compliant domestic burners and heat pumps, and for tourist operators that rely on New Zealand's 'clean green' image.

Where do the costs fall?

All 16 regional councils and unitary authorities are expected to incur costs for activities such as purchasing new monitoring equipment, updating resource management plans, community education regarding the new rules, and monitoring and evaluation of updated plans and rules. Actual costs will vary depending on the council.²

Apart from the cost of the regulatory process, the Government is expected to incur minimal costs for written guidance and policy implementation workshops delivered by officials at the MfE. This will be carried out within baseline departmental budgets.

Costs to private households vary depending on existing regional rules. We anticipate costs would be higher in areas that are not currently subject to any regional rules for solid fuel domestic burners.

¹ Value of Statistical Life Years (VOSL) is a method to determine premature mortality costs. The method is detailed in the Cost Benefit Analysis (CBA), Market Economics, 2019. The report also details that a health cost of \$189,104 per annum could be used for comparative purposes of a different method - the Value of Life Years Lost (VLYL).

² The implementation costs incurred by regional councils are subject to generic figures as outlined in the CBA report. Councils have a devolved responsibility under the RMA to comply with the NESAQ, however, councils may vary in their methods to achieve compliance with the regulations eg, through education or enforcement. Councils could use the CBA model during consultation in order to assign their own projected implementation costs.

The extent of the change from status quo is affected by factors which include, but are not limited to the:

- scale of reductions required in PM levels,
- population of usual residents in an airshed,
- preference of one fuel type relative to another (influencing factors include dwelling size, heat output in terms of kilowatts per hour (kWh), price of fuel (cents per unit of kWh) , elasticity of demand).

Suppliers and manufacturers of domestic burners may incur costs for changing their manufacturing processes, designing and developing new burners. However, there is already an established market for low emissions and ultra low emissions burners available in New Zealand. We note that some suppliers may be left with stocks of non-compliant burners that they cannot sell if there is not enough time to transition to the new standards. Costs for testing and certification of new burners against new emissions standards are the same as the status quo.

What are the likely risks and unintended impacts, how significant are they and how will they be minimised or mitigated?

By introducing annual average and daily average PM_{2.5} standards, fewer airsheds may be classified as polluted. Based on measured exceedances data, there are approximately 20 airsheds currently in breach of the daily average PM₁₀ standards. Based on modelled exceedances data, we estimate there would be 15 airsheds in breach of the PM_{2.5} standards. An airshed is classified 'polluted' if it breaches the standard, as averaged over the previous five years. An airshed is no longer 'polluted' if it has not breached the standard in the previous five years. Where airsheds stop being classified as polluted, more industrial discharge consents may be issued, affecting air quality. Some lead in time to begin measuring PM_{2.5} and for councils to consider their regional air plans may help to mitigate this.

The proposals allow councils the discretion to implement their regional rules that are stricter than the national regulations. Council rules that prevent the use of non-compliant domestic burners may leave some households unable to afford to heat their homes through alternate means. Non-regulatory measures to support behaviour change may help to minimise this risk.

Changing to a PM_{2.5} standard may affect councils' responsibility for/ability to regulate larger particles such as dust from unsealed roads and silica dust from quarries, which can also have health impacts in affected communities. While only a few communities are affected i.e. in Northland and in Christchurch, keeping a standard for PM₁₀ will help to mitigate this risk.

Identify any significant incompatibility with the Government's 'Expectations for the design of regulatory systems'.

We believe the preferred option is compatible with the Government's 'Expectations for the design of regulatory systems'.

Section C: Evidence certainty and quality assurance

Agency rating of evidence certainty?

Medium confidence. *Our air 2018* provides recent, robust evidence of the state of air quality in New Zealand. Other sources of evidence including WHO reports, the Health and Air Pollution in New Zealand (HAPINZ) study, and emissions inventories are older but provide reliable indications of the health impacts of particulate matter and dominance of PM_{2.5} within New Zealand's PM₁₀ emissions.

The most up-to-date information in this analysis comes from near-final versions of the research report on modelled health impacts of PM_{2.5} in New Zealand and the CBA. These are currently awaiting further review.

Public and stakeholder consultation on the preferred option for proposed amendments will be a significant contribution to the evidence base.

Quality Assurance Reviewing Agency:

Ministry for the Environment

Quality Assurance Assessment:

The Ministry for the Environment's Quality Assurance panel has reviewed the Regulatory Impact Assessment and confirms the information provided meets the quality assessment criteria, for this stage of the process, and is likely to facilitate effective consultation on the proposals. The consultation will provide information where there is currently uncertainty and later support the delivery of a final Regulatory Impact Assessment to inform subsequent decisions.

Impact Statement: Amending the National Environmental Standards for Air Quality

Section 1: General information

Purpose
<p>The Ministry for the Environment is solely responsible for the analysis and advice set out in this Regulatory Impact Statement, except as otherwise explicitly indicated. This analysis and advice has been produced for the purpose of informing:</p> <ul style="list-style-type: none">• decisions to be taken by Cabinet on the release of a government discussion document for public consultation, to refine a preferred option to amend the NESAQ• stakeholders to be consulted on a government discussion document <p>Proposals to implement the obligations contained in the Minamata Convention on Mercury have been analysed through a separate process. Consultation on those proposals that relate to amending the NESAQ are part of this process.</p>
Key limitations or Constraints on Analysis
<p><i>Consultation and testing</i></p> <p>This is a pre-consultation RIS. We are seeking feedback on the content of the proposals in a discussion document and testing options with technical experts on an ongoing basis, as part of the consultation process. Post consultation, a cost-benefit analysis as required under section 32 of the Resource Management Act 1991 (RMA) will be undertaken on final recommendations for Ministerial consideration.</p> <p><i>Scope of proposed amendments</i></p> <p>The scope of proposed amendments to the NESAQ focuses on the health impacts of particulate matter (PM) in the air, based on international and national research that links the inhalation of smaller particles with severe health impacts.</p> <p>The Our air 2018³ report is part of the Ministry for the Environment and Statistics New Zealand's environmental reporting series. The report indicates that PM_{2.5} is the air pollutant of most concern in New Zealand in terms of health impact. It also references emissions inventories which confirm that burning wood and coal for domestic heating is the most common source of PM₁₀ and PM_{2.5} in New Zealand.⁴ Therefore, the amendments focus on ambient (outdoor) air quality and the impacts of PM from domestic burners for home heating. The range of options considered reflects this scope and includes regulatory and non-regulatory measures. Where proposals include non-regulatory measures, these have not yet been scoped.</p>

³ Ministry for the Environment (MfE) & Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*. Retrieved from www.mfe.govt.nz and www.stats.govt.nz.

⁴ Emission Impossible Ltd (2018). *National Air Emissions Inventory 2015*. Retrieved from www.mfe.govt.nz

The environmental reporting series has indicated improvements in air quality since the NESAQ came into force in 2004. We have not undertaken specific evaluation the effectiveness of the NESAQ.

The scope does not include consideration of the effects of PM emissions on indoor air quality, even though most people spend most of their time indoors. The scope also excludes consideration of standards in the NESAQ relating to gases including sulphur dioxide, nitrogen dioxide and ozone which also have health impacts. Future work to improve the regulations may include scope to consider noxious gases.

While proposed amendments to the NESAQ to implement the obligations contained in the Minamata Convention on Mercury will be consulted on as part of this process, analysis of those proposals was undertaken separately.

Evidence for impact analysis

This analysis relies on the assumptions used for modelling of the health impacts of PM_{2.5} in New Zealand, and the CBA for the preferred option set out in this RIS.

Census data from 2018 is a constraint on modelling because data about home heating sources is not yet available, and population data is no longer reported by Census Area Unit (CAU). CAUs have been replaced by the 'statistical area 2' classification. This is an issue because New Zealand's air quality health impact models have been developed by linking airsheds with their relevant CAU. Therefore, modelling has relied on 2013 census data.

There is currently work underway to update the World Health Organisation Ambient Air Guidelines (WHO Guidelines) and the Health and Air Pollution in New Zealand (HAPINZ) report. Since these are not available yet, this analysis has relied on information from the 2005 WHO Guidelines and the 2012 HAPINZ report, among other sources.

Responsible Manager (signature and date)



26/11/19

Liz Moncrieff

Air Quality Policy

Natural and Built Systems

Ministry for the Environment

Section 2: Problem definition and objectives

2.1 What is the context within which action is proposed?

New Zealand's air quality is affected by contaminants from various sources

Human activities and natural processes emit gases and particles into the air. Some of these emissions can have a negative impact on air quality. In New Zealand, this includes emissions from human activities (anthropogenic air pollution) such as burning fuels for home heating, vehicle exhaust from combustion engines, emissions from industrial processes, power generation, agriculture, pesticides, and dust from unpaved roads and unpaved areas such as quarries, farms, or construction sites. It also includes emissions from natural sources including wind-blown dust, pollen, smoke from wildfires, sea salt, and ash and gases from volcanic activity. Depending on the source, emissions will be characterised by particles of a certain size range and/or certain types of gases, with varying health impacts.⁵

Particulate matter (PM) in our air can have health impacts

The most significant human health impacts from poor air quality are associated with exposure to PM.⁶ PM is a collective term for solid and liquid particles suspended in the air that are small enough to be inhaled. PM varies greatly in structure and chemical composition, depending on the size of the particle and source of the material; it correspondingly varies in the potential to cause harm.

Exposure to PM can have health impacts ranging from shortness of breath, coughing or chest pain, to disease and premature death from cardiovascular and respiratory causes. It can cause lung cancer and exacerbate asthma and emphysema. Studies point to possible links with diabetes and atherosclerosis due to an increase in inflammation.⁷

People with pre-existing heart or lung disease, young children, and the elderly, are the most likely to suffer adverse health effects from exposure to PM. The effects can be especially serious for the very young. PM exposure has been associated with premature birth, low birth weight, and infant bronchiolitis. It has also been associated with respiratory infections, asthma, and chronic reduced rate of lung growth in young children.⁸

The 2012 Health and Air Pollution Impacts in New Zealand (HAPINZ) study, based on PM₁₀ measurements, estimated the total social costs associated with anthropogenic air pollution in New Zealand to be \$4.28 billion per year or \$1,061 per person, with the following contributions attributed to each source:⁹

- 56 percent due to domestic fires

⁵ MfE & Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*, p18.

⁶ Health Effects Institute (2018). *State of global air 2018. Special Report*. Health Effects Institute, Boston, USA.

⁷ World Health Organization (WHO) (2013). *Review of evidence on health aspects of air pollution – REVIHAAP Project*. Retrieved from <http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/publications/2013/review-of-evidence-on-health-aspects-of-air-pollution-revihaap-project-final-technical-report>.

⁸ WHO (2013); United States Environmental Protection Agency (US EPA) (2009). *Integrated Science Assessment for Particulate Matter*. <https://doi.org/EPA/600/R-08/139F>.

⁹ Kuschel, G, Metcalfe, J, Wilton, E, Guria, J, Hales, S, Rolfe, K, & Woodward, A (2012). *Updated Health and Air Pollution in New Zealand Study Volume 1: Summary report (Vol. 1)*. Retrieved from http://www.hapinz.org.nz/HAPINZ_Update_Vol2_Technical_Report.pdf.

- 22 percent due to motor vehicles
- 12 percent due to open burning
- 10 percent due to industry

PM is often classified according to its size. PM₁₀ has a diameter of 10 micrometres (µm) or less. PM_{2.5} has a diameter of less than 2.5 µm and is, therefore, a subset of smaller particles within the PM₁₀ range. Ultrafine particles are an even smaller subset (less than 0.1 µm or 25 times smaller than PM_{2.5}). In general, the smaller the particle, the greater the impact on human health, as smaller particles can penetrate more deeply into the human body. Fine particles (PM_{2.5} or smaller) are now recognised as having the highest health risk and are mainly created by human activities.¹⁰

Health impacts modelling for the purposes of this analysis estimated the annual health outcomes attributable to PM_{2.5}, based on 2018 data, as follows:

- 646 premature deaths (among adults aged 30 years and above)
- 215 cardiac hospital admissions (all ages)
- 422 respiratory hospital admissions (all ages)
- 1.6 million restricted activity days

Other impacts of PM

Aside from the impact on human health, PM has other impacts, including those on natural ecosystems and biodiversity, agriculture, visibility, recreation, and cultural values. Data are lacking in New Zealand for these types of impacts, but they have been studied extensively overseas. There are also climate change implications related to PM. Changes to the climate system can be caused by air pollutants (that can heat or cool the climate); and in turn, a warming climate can affect pollutants that are already in the air.

PM_{2.5} in the form of black carbon or soot is very good at absorbing sunlight.¹¹ In the atmosphere, its overall effect is to warm the climate. If black carbon deposits on ice or snow, it decreases Earth's ability to reflect the warming rays of the sun, while absorbing heat and hastening the melt of snow and glaciers, which in turn raises sea levels. Black carbon generally comes from vehicle emissions (especially from diesel engines), burning solid fuels (wood or coal) for home heating, or agricultural biomass burn-offs.

PM from home heating is an issue in New Zealand

Monitoring of air pollutants across New Zealand's shows that our air quality profile is different to most of the rest of the world.

New Zealand comprises 16 regions. Each region constitutes an airshed, and across the country there are 73 further airsheds within regions which have been notified in the New Zealand Gazette. An airshed is a geographic boundary defined by existing regional boundaries, or by a regional council or unitary authority for air quality management where, in practice, part of the atmosphere is assumed to behave in a coherent way, particularly in how emissions disperse.

Monitoring of air pollutants in airsheds shows that our air quality is good in most places and

¹⁰ MfE & Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*, p10-11.

¹¹ MfE & Stats NZ (2018). *New Zealand's Environmental Reporting Series: Our air 2018*, p55-56.

at most times of the year. However, in cooler months emissions from home heating in urban areas can raise pollutants to levels that exceed current standards and affect human health, especially when weather and landscape (topography) are favourable for the build-up of pollutants. Pollutants from vehicle emissions are a concern as well, mainly in large urban centres, throughout the year. Other pollutants can be significant locally.

PM_{2.5} makes up a high percentage of estimated human-made PM concentrations in New Zealand. In 2015, PM_{2.5} comprised 94 percent PM emissions from human activities (combustion), and 75 percent of PM emissions from all sources. Residential emissions were the biggest source of both PM₁₀ (25 percent), and PM_{2.5} (33 percent) in New Zealand. Most PM from residential emissions came from burning wood and coal for home heating.

The number of homes burning wood or coal for heat has decreased over time, but they are still important home heating methods in New Zealand. Wood burners heated 33 percent of North Island homes and 47 percent of South Island homes in 2013. While wood burners are by far the most used solid fuel burning appliance in New Zealand, coal burners can emit about four times the particulate matter of a woodburner. A history of burning coal for heating has contributed to poor air quality in areas such as Southland, Canterbury and Otago. Council interventions in these areas have helped to reduce households' reliance on coal.

Those most at risk of exposure to PM from burning wood or coal for home heating commonly reside in neighbourhoods comprised of older homes (fitted with older burners), in areas where temperatures are low in winter, and local topography and climate can create inversion layers which limit the dispersal of air contaminants.

Measures to reduce exposure to PM from domestic burners in these areas can disproportionately impact low-socio economic households. Heating helps to minimise dampness and mould by maintaining a minimum indoor air temperature, controlling relative humidity, reducing dampness and inhibiting the growth of mould and fungi. Reducing the use of domestic burners may increase the risk of illness associated with dampness and mould, such as asthma and respiratory infections, in households that cannot afford to heat their homes with other sources of energy.

PM_{2.5} is not explicitly regulated in New Zealand

The quality of our air is affected by a wide range of human activities and natural sources. New Zealand currently only has a national standard for PM₁₀, and is one of the few developed countries without a national standard for PM_{2.5}. Without further action, regional councils and unitary authorities will continue to work towards improvements in air quality in their regions, taking varied approaches to address different sources of PM₁₀, PM_{2.5} and gases to comply with the NESAQ.

Population growth and urbanisation may exacerbate the health impacts of air pollution in areas where exposure to PM is already an issue. Additionally, as our population ages, more people will be at higher risk of the effects of PM_{2.5}. Changes to our climate may change our demand for home heating over winter, with reduced demand where the climate is warmer.

The overall system for managing air quality in New Zealand has not been assessed as a whole. However, an air domain report is produced every three years as part of the Ministry for the Environment's and Statistics New Zealand's environmental reporting series. The most recent report is Our air 2018. It indicates that New Zealand's air quality is generally good and

has improved over time, though PM emissions from home heating in winter continue to affect human health. This implies that the overall system is working effectively, but further refinement is required to improve health outcomes.

The Parliamentary Commissioner for the Environment (PCE) provided commentary on the 2014 Air Domain report and Our air 2018. PCE recommended updating particulate matter standards to reflect current scientific understanding, and inclusion of both a daily and annual average national standard for PM_{2.5}.

Implementing separate standards for PM₁₀ and PM_{2.5} is an effective way of reducing disease and premature death from cardiovascular and respiratory causes, and restricted activity days. As per the WHO Guidelines, regulating PM₁₀ and PM_{2.5} can protect against adverse health effects arising from short- and long-term exposure to both pollutants. Daily, short-term standards can help to protect against acute health effects, while annual long-term standards protect against cumulative and chronic health effects. Daily and annual standards are also useful to manage pollutants that demonstrate significant seasonal variations, as well as those that demonstrate high baseline concentrations year round.

2.2 What regulatory system, or systems, are already in place?

Central Government

New Zealand's primary regulatory tools for managing ambient air quality are:

- the RMA
- the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ), made under the RMA
- the Ambient Air Quality Guidelines
- Land Transport Rule: Vehicle Exhaust Emissions 2007 (Vehicle Emissions Rule)

The Ministry for the Environment administers the RMA, NESAQ and Ambient Air Quality guidelines. The Ministry of Transport administers the Vehicle Emissions Rule.

These primary tools are supported by central government initiatives to address potential health impacts associated with home heating. Such initiatives include:

- the Warmer Kiwi Homes programme
- the Residential Tenancies (Healthy Homes Standards) Regulations 2019 (Healthy Homes Standards)
- Winter Energy Payment
- As a major provider of housing (via Kāinga ora), the government already installs low emission burners that are well below the proposed new emission standard (0.33g/kg)

Under the Health Act 1956, the Ministry of Health is responsible for improving, promoting and protecting public health. This includes responsibility for public health in relation to infectious diseases, health emergencies and environmental health (air pollution, waterborne and foodborne illness, radiation etc.).

Resource Management Act 1991

The RMA is New Zealand's main piece of legislation that sets out how we should manage our environment, including managing discharges to air, land, water and coastal marine areas

and regulating land use and the provision of infrastructure. The RMA is based on the principle of sustainable management which involves considering effects of activities on the environment now and in the future when making resource management decisions.

National Environmental Standards for Air Quality

The NESAQ are regulations made under the Resource Management Act 1991, which aim to set a guaranteed minimum level of health protection for all New Zealanders.

The NESAQ was introduced 8 October 2004 and were last amended in 2011. It is made up of 14 separate but interlinked regulations. This includes:

- five ambient (outdoor) air quality standards for contaminants (including PM₁₀, carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone)
- seven standards prohibiting activities that discharge significant quantities of dioxins and other toxics into the air
- emissions and efficiency standards for new wood burners in properties less than two hectares
- a prohibition on the operation of new domestic open fires in polluted airsheds
- a requirement for large landfills to collect greenhouse gas emissions.

Under the NESAQ, regional councils and unitary authorities are required to identify and monitor areas where air quality is likely, or known, to exceed the ambient air quality standards. Each region of New Zealand is an airshed for the purposes of the NESAQ. Additionally, regional councils may gazette defined geographical boundaries as airsheds for the purpose of air quality management. These gazetted airsheds are generally assumed to behave in a coherent way, particularly in how emissions disperse. When an airshed is in breach of the ambient PM₁₀ standard, new open fires are prohibited indefinitely. When an airshed is in breach of the ambient PM₁₀ standard, averaged where possible over the previous five years, it is classified as a polluted airshed and new discharges of PM₁₀ from industry are prohibited unless they will be offset.

Vehicle Emissions Rule

The vehicle emissions rule sets emission limits for new motor vehicles in New Zealand. It aims to achieve improvements in air quality by reducing the levels of harmful emissions from motor vehicles.

Warmer Kiwi Homes

Warmer Kiwi Homes is a four-year Government programme offering subsidies for low-emissions home heating sources as well as ceiling and underfloor insulation. It is administered by the Energy Efficiency and Conservation Authority and aims to assist low-income homeowners to make their houses warmer, drier and healthier.

Healthy Homes Standards

The Healthy Homes Standards aim to make a significant change to the quality of New Zealand rental homes. The Standards are administered by the Ministry of Housing and Urban Development and cover improvements to heating, insulation, and ventilation, and addressing issues with moisture ingress and drainage and draught stopping.

Winter Energy Payment

The Winter Energy Payment from Work and Income New Zealand (WINZ) is an additional, automatic payment to superannuitants, veterans, jobseekers, sole parents and other eligible candidates who are already receiving weekly payments from WINZ. The Winter Energy Payment aims to assist beneficiaries to cover additional expenses associated with home heating over the winter months.

Local Government

Regional councils and unitary authorities have responsibilities under the RMA for managing air quality in their regions and ensuring their regions meet the standards in the NESAQ.

To meet their responsibilities, regional councils and unitary authorities can establish policies and rules through regional plans to manage particular issues in their regions, issue resource consents for discharges from industrial and trade premises, investigate and respond to public concerns, carry out education campaigns and provide incentives for people to use cleaner forms of home heating.

Under section 44A of the RMA, territorial authorities must observe the NESAQ. This includes implementation of the relevant regional council's air quality rules and policies within their areas. They also have a role in implementing the NESAQ through issuing building consents for solid fuel appliances, establishing bylaws and supporting regional councils' regulatory and non-regulatory initiatives. As road controlling authorities, territorial authorities are also have responsibility for transport emissions.

International interests

World Health Organisation

The World Health Organization (WHO) developed air quality guidelines in response to the threat that air pollution poses to public health globally. The WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide - Global update 2005 (WHO Guidelines) are not standards or legally binding criteria, but are designed to offer guidance in reducing the health impacts of air pollution, based on the ongoing expert evaluation of scientific evidence.

The WHO Guidelines are relevant to the diverse conditions of all six WHO regions – New Zealand is in the Western Pacific Region – and support a broad range of policy options for air quality management. The WHO Guidelines include daily and annual concentration limits levels for both PM_{2.5} and PM₁₀ in order to protect against adverse health effects arising from short- and long-term exposure to both pollutants. The NESAQ contains a daily PM₁₀ standard (only), which is consistent with the daily PM₁₀ WHO Guidelines. The NESAQ does not contain any PM_{2.5} standards.

The WHO Guidelines are currently under review, with an update proposed to be released at the end of 2020. WHO Guidelines are developed through rigorous processes and based on scientific evidence.

Minamata Convention on Mercury

In 2013 New Zealand signed the Minamata Convention on Mercury – an international environmental treaty aimed at addressing the global threat to human health and the environment posed by anthropogenic (human-made) mercury pollution.

The most significant anthropogenic releases of mercury globally are through emissions to air.

To ratify the Minamata Convention, parties must establish controls on emissions to air from mercury, including from certain industrial processes.

Anthropogenic mercury is not a significant pollutant in New Zealand as many of the activities and processes controlled by the Convention do not take place here and mercury use is minor. The relevant categories currently carried out in New Zealand chiefly relate to coal combustion through coal-fired boiler plants, and industrial coal-fired boilers.

New Zealand's ratification of the Minamata Convention requires three key steps. One step requires two amendments to the NESAQ that will:

- introduce new standards to prohibit the use of mercury in certain listed processes
- incorporate by reference international best practice guidance that decision-makers must consider when making decisions on controls for listed sources.

Proposals to ratify the Minamata Convention have been analysed through a separate process. Consultation on proposals that relate to amending the NESAQ will be part of the consultation on the broader package of proposed amendments.

2.3 What is the policy problem or opportunity?

New Zealand's current regulatory framework for managing air quality, specifically the regulation of PM in the NESAQ, is out of step with scientific research on the links between PM and human health, improvements in home heating technology, and current international best practice for the regulation of PM.

Overall, the NESAQ has contributed to gradual improvements to air quality in New Zealand since it was introduced in 2004. However, it only deals with PM pollution by regulating PM₁₀. This is a problem because:

- science shows that PM₁₀ is not the best indicator of the health impacts of particulate matter pollution. It is possible for an airshed to meet the daily average PM₁₀ standard while experiencing high concentrations of PM_{2.5} that can contribute to significant health impacts.
- focusing on regulating PM₁₀ requires councils to measure and understand sources of larger, local and naturally occurring PM, over which they have limited control. This shifts effort away from controlling more harmful, smaller particles from human activities (such as home heating) which they do have some regulatory ability to manage

While PM_{2.5} is a subset of PM₁₀, neither is a proxy indicator for the other. PM_{2.5} is not a consistent proportion of PM₁₀, and natural background source contributions are not constant around the country or throughout the year. Some human activities generate PM₁₀ including silica dust from quarries and dust from unsealed roads which can have significant health impacts for people in certain areas of New Zealand. Such activities can be managed by councils and property owners eg, by sealing roads and watering down dust at quarry sites. Because of this, there is value in maintaining measurement and monitoring of PM₁₀.

Regional councils and unitary authorities have wide discretion to manage air quality in their own regions in order to meet the requirements of NESAQ. Some councils have the community support, resource and capacity to implement rules that are more stringent than the NESAQ and/or initiatives to improve regional air quality. However, councils cannot be

expected to reduce the health impacts of PM_{2.5} at the national scale under current circumstances. Several councils have begun to monitor PM_{2.5}, but in the absence of a national standard, they lack direction about the 'acceptable' concentrations of PM_{2.5} and parameters for measurement and monitoring. While there is no safe threshold for PM in ambient air, there does need to be a standard to trigger a regulatory response and facilitate progressive reductions in overall PM emissions.

The objective of the NESAQ is to reduce the health impacts of poor air quality in New Zealand. The current regulatory system will not directly address the health impacts of PM_{2.5} and local authorities and individuals will take an ad hoc approach if not directed by Government.

2.4 Are there any constraints on the scope for decision making?

Ministerial decisions on the scope of amendments to the NESAQ include introducing ambient air quality standards for PM_{2.5}, and relevant updates to reduce health impacts associated with exposure to emissions from home heating sources.

Ministerial decisions have ruled out prohibitions on behaviours that can increase emissions from woodburners such as burning wet wood, burning 'dirty' fuels such as treated timber and plastics, or modifying a woodburner in a way that alters its efficiency, and behaviours that increase PM_{2.5} exposure generally such as outdoor burning. Ministerial decisions have also ruled out any requirement to replace woodburners before the end of their useful life eg, replacement when the property is sold. Instead, non-regulatory approaches to encourage changes to these types of behaviours are within scope. Changes to standards relating to ambient air quality standards for gaseous pollutants (carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone) and changes to the mechanisms for managing PM emissions air quality are also out of the scope of these amendments.

Constraints on the scope of the amendments acknowledge that some of the most vulnerable households would experience compliance issues if there were prohibited behaviours for woodburner operation.

Current processes to update the WHO Guidelines and 2012 Health and Air Pollution in New Zealand (HAPINZ) study won't be completed until late 2020. Amendments to the NESAQ will proceed ahead of the updates. We anticipate there may need to be further amendments to the NESAQ following publication of the updated WHO Guidelines and HAPINZ report.

2.5 What do stakeholders think?

Policy development is still at an early stage and Government has not made any policy decisions in relation to the proposed amendments.

We carried out early, targeted engagement with regional councils and some iwi in 2018 to explore the broad scope of a proposed set of amendments. This engagement highlighted broad support for the transition to PM_{2.5} as one of the regulatory tools for managing particulate matter. It identified some other issues that regional councils were interested in exploring, but these were subsequently agreed by the Minister to not be in scope of the package now proposed (set out in 2.4 above).

We sought the views of government agencies and a subset of the National Air Quality Working Group on the options set out in this analysis. We have not yet engaged with other key stakeholder including regional councils and unitary authorities, iwi authorities and domestic burner suppliers.

Officials from the Ministry of Health commented that the timing of these amendments should to align with WHO Guideline update (expected late 2020) to benefit from scientific expertise. They also consider that a wider review of the NESAQ be undertaken to achieve improvements in national public health. The review would include assessment of:

- other NESAQ pollutants e.g. nitrogen dioxide and sulphur dioxide
- other air pollutants such as benzene, benzo(a) pyrene (BaP) and arsenic which are known to increase cancer or be elevated above guideline levels in urban areas.

Officials from Kainga Ora questioned whether standards for indoor air quality would be within scope. They also expressed support for retaining the PM₁₀ standard, expanding emissions standards to all types of domestic solid fuel burners, and non-regulatory measures to encourage appropriate use of domestic burners. Kainga Ora also considered the impacts of Options 4 and 5 in this paper.

Officials from the Ministry of Transport expressed concern about the focus of the proposals on home heating emissions, the absence of proposals relating to PM_{2.5} emissions from industry and transport, and the absence of proposals for other key pollutants, including nitrogen oxides.

Public consultation on a discussion document that sets out the preferred option for proposed amendments to the NESAQ is planned for early 2020 over 6-8 weeks, pending Ministerial and Cabinet decisions. Given the narrow scope and technical nature of the amendments, consultation will involve publication of the discussion document with opportunity to make submissions online and targeted engagement with regional councils and unitary authorities, iwi and relevant stakeholder groups such as the New Zealand Home Heating Association.

Section 3: Options identification

3.1 What options are available to address the problem?

From the analysis of airshed progress data, including regional council PM₁₀ monitoring and compliance, a health-impact assessment and cost-benefit analysis, the Ministry has identified four policy options that combine regulatory and non-regulatory measures. Each option could to a greater or lesser extent achieve the objectives of the NESAQ and can be compared against the Status Quo.

These options range from a 'minimal' regulatory framework which allows for a greater degree of local discretion and minimal changes to the current NESAQ, to a comprehensively centralised and standardised approach which would see all New Zealanders treated equally, but may be unduly restrictive in areas where air quality is not currently a problem.

The options have been developed based on seven variables:

- ambient air quality standard(s) for PM₁₀
- ambient air quality standard(s) for PM_{2.5}
- compliance timeframes for meeting PM standards
- airshed status if PM standards breached
- emissions standards for domestic burners
- other incentives to reduce PM emissions
- ability of local rules to be more stringent than NESAQ provisions

The options are listed below in order of degree of change to the current NESAQ. Details of each option are set out in Appendix A.

Option 1 - Status Quo

Continuation of the current regulatory framework with no amendments to the NESAQ. The status quo includes a daily standard for PM₁₀ of 50 µg/m³. There is no daily average or annual average standard for PM_{2.5}. By 1 September 2020, all airsheds will only be allowed one or fewer exceedances of the PM₁₀ standard in a 12 month period.

If the PM₁₀ standard is breached, where possible averaged over the previous five years, the airshed will be classified as 'polluted' and the relevant council must not grant resource consents for discharges that would increase the concentration of PM₁₀ by more than 2.5 µg/m³ in any part of the polluted airshed. An exception exists where the discharge can be offset by equivalent or greater reductions in PM₁₀ discharges elsewhere in that airshed. In theory, this helps to limit new sources of PM₁₀ and encourages councils to take steps to reduce overall emissions in the affected airshed. In practice, emissions offset provisions are not commonly used, and do not consider the cumulative effect of multiple small discharges. Instead councils have concentrated on measures to reduce residential emissions. To remove a 'polluted airshed' classification and enable resource consent to be issued, the airshed must comply with the PM₁₀ standard for five consecutive years.

Woodburners installed after 1 September 2005 on properties under two hectares must be designed to discharge less than 1.5 grams of particles for each kilogram of dry wood burnt, and the thermal efficiency must not be less than 65 percent.

Domestic solid fuel burning open fires cannot be installed in a breached airshed. Regional and local rules, resource consents or bylaws that are more stringent than regulations in the NESAQ prevail.

The Ministry does not consider this a feasible option because New Zealand would not be managing the PM fraction that is responsible for most health impacts from PM. The status quo is therefore only included as a baseline for measuring the effectiveness of other options.

Option 2 – Minimal regulation

Specific regulatory changes, supported by a significant non-regulatory package to support New Zealanders to reduce their home heating emissions.

Few amendments to the NESAQ, including:

- removal of the daily average standard for PM₁₀ of 50 µg/m³, while retaining the daily average PM₁₀ guideline in the Ambient Air Guidelines. The Ambient Air Guidelines are not legally binding.
- introducing an annual average standard for PM_{2.5} of 10 µg/m³
- changing the compliance timeframes. By 2023, no exceedances of the PM_{2.5} standard will be allowed

If the PM_{2.5} standard is breached, the mitigation mechanisms in the status quo will apply. If the airshed is breached when averaged over the previous five years, the airshed will be classified as 'polluted' and the relevant council must not grant resource consents for discharges that would increase the concentration of PM_{2.5} by more than 2.5 µg/m³ in any part of the polluted airshed. An exception will apply where the discharge will be offset by equivalent or greater reductions in PM_{2.5} discharges elsewhere in that airshed. To remove a 'polluted airshed' classification, the airshed will need to comply with the PM_{2.5} standard for five consecutive years.

Development of centrally-led, non-regulatory mechanisms to drive behaviour change around:

- buying, replacing and operating domestic burners, including selection of fuels, maintenance and modifications to burners
- reducing other residential PM emissions from activities such as domestic solid-fuel burning in open fires and outdoor burning.

Regional and local rules, resource consents or bylaws that are more stringent than regulations in the NESAQ will continue to prevail.

Option 3 – Increased regulation (preferred)

Adopt the more critical health indicators for PM and retain the PM₁₀ standard for monitoring purposes only. Expand regulations to all types of new domestic solid-fuel burners installed in urban areas, and introduce stricter emissions standards to drive behaviour and industry innovation that will reduce PM_{2.5} emissions

A narrow suite of amendments to the NESAQ including:

- retaining the daily standard for PM₁₀ of 50 µg/m³ for the purposes of monitoring and reporting only. Exceedances would not count towards classification as a polluted airshed

- introducing standards for ambient PM_{2.5}
 - annual average standard of 10 µg/m³ – no exceedances will be allowed
 - daily average standard of 25 µg/m³ – three or fewer exceedances will be allowed in a 12 month period
- expanding design standards and thermal efficiency standards for woodburners to all newly installed domestic solid-fuel burners (open fires, coal burners, pellet burners and multi-fuel burners, cookers, water boilers etc) installed on properties two hectares or smaller after amendments to the NESAQ come into force. The amendments will not apply to existing burners
- lowering the emissions standard to require that all domestic solid-fuel burners covered under the regulations be designed to discharge less than 1.0 grams per kilogram of fuel burnt. The thermal efficiency standard will stay the same.

If the PM_{2.5} annual or daily standard is breached, the mechanisms in the status quo will apply. If the airshed is breached when averaged over the previous five years, the airshed will be classified as 'polluted' and the relevant council must not grant resource consents for discharges that would increase the concentration of PM_{2.5} by more than 2.5 µg/m³ in any part of the polluted airshed. An exception will apply where the applicant will offset the discharge by equivalent or greater reductions in PM_{2.5} discharges elsewhere in that airshed. To remove a 'polluted airshed' classification, the airshed will need to comply with both of the PM_{2.5} standards for five consecutive years. The airshed will not be classified as polluted if the daily average PM₁₀ standard is breached.

Investigation of support for councils to deliver non-regulatory mechanisms to drive behaviour change around:

- buying, replacing and operating domestic burners, including selection of fuels, maintenance and modifications to burners
- reducing other residential PM emissions from activities such as domestic solid-fuel burning in open fires and outdoor burning.

Regional and local rules, resource consents or bylaws that are more stringent than regulations in the NESAQ will continue to prevail. This will enable councils to continue their progress on reducing emissions

Option 4 – Strong regulation

Adopt the more critical health indicators for PM and retain the PM₁₀ standard. Drive further emissions reductions from domestic burners. More stringent requirements for polluted airsheds.

A broader suite of amendments to the NESAQ including:

- retaining the daily average standard for PM₁₀ of 50 µg/m³
- introducing standards for PM_{2.5}
 - annual average standard of 10 µg/m³
 - daily average standard of 25 µg/m³
- expanding design standards and thermal efficiency standards for woodburners to all domestic solid-fuel burners (open fires, coal burners, pellet burners and multi-fuel burners, cookers, water boilers etc) installed on properties under two hectares, after amendments to the NESAQ come into force

- lowering the emissions standard to require that all domestic solid-fuel burners covered under the regulations be designed to discharge less than 0.5 gram per kilogram of fuel burnt in all polluted airsheds, and less than 1 gram per kilogram of fuel burnt in all other airsheds. The thermal efficiency standard will stay the same
- introducing prohibition on unsuitable fuels for domestic solid-fuel burners, such as plastic and treated timber
- introducing a requirement for councils to adopt a 'point of sale rule' for the removal and replacement of non-compliant woodburners when a property is sold in a polluted airshed. An exception will apply for councils with existing 'phase-out' rules for woodburners.
- introducing a prohibition on outdoor burning on all residential properties.

If any of the PM standards are breached, the mechanism in the status quo (as described in Option 3) will apply.

Existing regional and local rules, resource consents or bylaws that are more stringent than regulations in the NESAQ will continue to prevail. No new rules may be established where a matter is already covered by the NESAQ.

Option 5 – Stringent regulation

An ambitious and stringent nationally consistent standard. Adopt all WHO Guidelines for PM₁₀ and PM_{2.5} as standards, and strengthen and introduce rules to reduce domestic heating emissions. Drive further emissions reductions through regulation and remove inconsistencies between regions.

A stricter suite of amendments to the NESAQ including:

- retaining the daily average standard for PM₁₀ of 50 µg/m³
- introducing an annual average standard for PM₁₀ of 20 µg/m³
- introducing standards for PM_{2.5}
 - annual average standard of 10 µg/m³
 - daily average standard of 25 µg/m³
- expanding design standards and thermal efficiency standards for woodburners to all domestic solid-fuel burners (open fires, coal burners, pellet burners and multi-fuel burners, cookers, water boilers etc) installed after amendments to the NESAQ come into force
- lowering the emissions standard to require that all domestic solid-fuel burners covered under the regulations be designed to discharge less than 0.5 grams per kilogram of fuel burnt. The thermal efficiency standard will stay the same
- introducing prohibition on unsuitable fuels for domestic solid-fuel burners, such as plastic and treated timber
- introducing a requirement for councils to adopt a 'point of sale rule' for the removal and replacement of non-compliant woodburners when a property is sold in a polluted airshed. An exception will apply for councils with existing 'phase-out' rules for woodburners.
- introducing a prohibition on installing domestic solid-fuel open fires after amendments to the NESAQ come into force, on all residential properties.
- introducing a prohibition on outdoor burning on all residential properties.

If any of the PM standards are breached, the mechanism in the status quo (as described in Option 3) will apply.

Existing regional and local rules, resource consents or bylaws that are more stringent than regulations in the NESAQ will have to be removed. No new rules may be established where a matter is already covered by the NESAQ.

We would not recommend Options 4 and 5 because the provisions may be overly restrictive. Prohibiting outdoor burning on all residential properties may be seen as unreasonable if it prevented outdoor cooking ie, barbeque or hangi. Such regulations may also interfere with local and regional open fire rules. Point of sale rules can be difficult for councils to administer and enforce, and confusing and expensive for vendors and purchasers. Homes containing older burners often take decades to be listed for sale, with impacts on the effectiveness of such rules.

3.2 What criteria, in addition to monetary costs and benefits, have been used to assess the likely impacts of the options under consideration?

Based on the objective of improving air quality in New Zealand through reflecting updated scientific findings on the health impacts of PM, we have developed the following criteria and use these to assess the pros and cons of each option:

1. **Cost** – costs of implementation
2. **Effective** – achieves health benefits by improving air quality. Reflects up to date science on the health impacts of PM
3. **Implementable** – precise for councils to implement and enforce. Easy for households to understand. Easy for Government to monitor and assess for effectiveness in terms of air quality improvement, implementation and enforcement. Easy for industry to comply
4. **Flexible** – provides for appropriate level of local flexibility in management approaches where this will result in the best outcome for air quality
5. **Equitable** – affects all households equally. Affects all councils equally. Affects all businesses equally

3.3 What other options have been ruled out of scope, or not considered, and why?

Technical standards for industrial emissions have not been considered because the amendments aim to drive improvements in air quality by updating regulations to address PM_{2.5}, residential home heating emissions as our most common source of PM_{2.5}

A prohibition on the sale of domestic solid-fuel burners that would not meet the emissions and thermal efficiency standards has not been given further consideration at this stage due to time constraints. Prohibiting non-compliant burner sales is not directly related to primary objective of updating air quality regulations.

Section 4: Impact Analysis

Marginal impact: How does each of the options identified at section 3.1 compare with the counterfactual, under each of the criteria set out in section 3.2?

	1) Status quo	2) Minimal regulation	3) Increased regulation	4) Strong regulation	5) Stringent regulation
Cost	0	- Compliance costs to councils. Costs to Government to establish non-regulatory mechanisms	- Compliance costs to councils and households Costs to councils to establish non-regulatory mechanisms	-- Compliance costs to councils and households	-- High compliance costs to councils and households
Effective	0	+ NESAQ based on PM _{2.5} annual standard	+ NESAQ based on PM _{2.5} annual and daily standards	++ NESAQ based on PM _{2.5} annual and daily standards and PM ₁₀ daily standard	++ NESAQ based on PM _{2.5} annual and daily standards and PM ₁₀ annual and daily standards
Implementable	0	0 Replacement PM standard with similar monitoring and enforcement requirements as status quo Supported by centrally-led non-regulatory measures	0 Additional PM standards with similar monitoring and enforcement requirements as status quo Supported by council-led non-regulatory measures	-- Additional PM standards with additional monitoring and enforcement requirements	-- Additional PM standards with additional monitoring and enforcement requirements
Flexible	0	0 Councils and households maintain discretion. Councils can make more stringent rules than the NES	0 Councils and households maintain discretion. Councils can make more stringent rules than the NES	- More directive to councils and households. Councils can keep rules that are more stringent rules than the NES	-- Directive to councils and households. Councils can't keep rules that are more stringent rules than the NES

Equitable	0	0 Different requirements on households and businesses in polluted airsheds and those in non-polluted airsheds	+ More similar requirements on households using different types of solid fuels for home heating	+ Different requirements on households and businesses in polluted airsheds and those in non-polluted airsheds. All households required to use suitable fuels. All councils required to have phase out/point-of-sale rules.	++ Councils, households and businesses all subject to same requirements
Overall assessment	0	0 About the same as the status quo	+ Better the status quo. More effective at reducing health impact of PM and more equitable	- Worse than the status quo. More compliance costs, harder to implement and less flexibility for councils	-- Much worse than the status quo. More compliance costs, harder to implement and much less flexibility for councils

Key:

++ much better than the status quo

+ better than the status quo

0 about the same the status quo

- worse than the status quo

-- much worse than the status quo

Section 5: Conclusions

5.1 What option, or combination of options, is likely best to address the problem, meet the policy objectives and deliver the highest net benefits?

Option 3 is preferred. It includes sets out a suite of regulatory measures, to be supported by non-regulatory mechanisms.

Costs

In 2017, we estimated total costs for monitoring PM_{2.5} to be \$2.275 million across all councils, relative to the status quo cost of monitoring PM₁₀. This is based on an assumption that 35 airsheds would likely require new PM_{2.5} monitoring equipment, at a cost of \$65,000 per airshed. We also estimated that all councils would also have costs to update their plans (\$25,000 per council) and educate their communities on emissions standards for domestic solid fuel burners (\$50,000 per council). These estimates were used in the CBA, though we intend to seek feedback on these costs through consultation.

We consider the costs associated with shifting to a PM_{2.5} monitoring regime may be lower than the CBA estimate, given that new, low-cost, US EPA-approved equipment that can measure both PM₁₀ and PM_{2.5} simultaneously is now readily available (at approximately \$20,000 per monitor). We acknowledge that some councils may prefer to install PM_{2.5} monitors alongside existing equipment instead of replacement, to ensure continuation of PM₁₀ records. The costs of doing so will generally be higher than replacing existing equipment with monitors designed for concurrent PM₁₀ and PM_{2.5} monitoring. We do not anticipate that the costs of monitoring, enforcement and evaluation would be significantly different from the status quo. However, councils and Government may also have costs to investigate and implement non-regulatory measures to reduce the health impacts of PM.

Households will only experience costs when seeking to install a new domestic solid-fuel burner (as a new heating source or as a replacement for an existing burner) after the date that the NESAQ amendments take effect. This recognises that ongoing use of existing non-compliant burners will have health benefits for households by keeping homes warm and dry at relatively low cost (coal or wood for heating costs approximately \$450-970 per year), even though they contribute to poorer ambient air quality. For the purposes of the CBA, we estimate that the cost of a new domestic burner that meets the 1.0g/kg emissions threshold would be \$3,800 including any removal, installation and consenting costs. We also intend to seek feedback on these costs through consultation.

Effectiveness

Adopting the daily and annual PM_{2.5} standard and retaining the daily PM₁₀ threshold for monitoring purposes will enable councils and government to manage air quality based on the best available science. The new standards would be based on PM_{2.5}, to target the health impacts of human-made particulate matter rather than natural sources of particulate matter. It would be useful to continue to observe trends in PM₁₀ because neither air pollutant is a proxy for the other. Ongoing exposure to human generated sources of PM₁₀ including dust from unsealed roads or silica dust from quarries can have significant health impacts for individuals in selected areas. Continuing to monitor PM₁₀ will help to inform future policy after the WHO Guidelines and the 2012 HAPINZ study have been updated.

By setting a solid fuel emissions target rather than a wood burner emissions target, this framework introduces controls over coal burners for the first time. This will affect

household choice around heating sources, but we would expect improvements in air quality and avoided health costs because of the lower emissions standard. In addition, lowering the emission standard for wood burners and applying it to all new domestic solid-fuel burners installed in urban areas (1.0 grams of particles per kilogram of suitable fuel burnt rather than 1.5 grams of particles per kilogram of dry wood burnt) will drive reductions in PM_{2.5} emissions and encourage further industry innovation.

Extending the emission target to all new domestic solid-fuel burners will ensure future sources of PM in an airshed are reduced, and facilitate more households to transition to cleaner forms of heating.

Implementable

The preferred option is designed using existing measures that councils use to address PM in their regions, therefore implementation is expected to be manageable. Some councils including Environment Canterbury, Bay of Plenty Regional Council and Otago Regional Council already have low emissions standards for woodburners in their areas (0.5-0.7 grams of particles per kilogram of dry wood burnt). Businesses have responded by supplying low emissions and ultra-low emissions burners to meet community demand. Domestic burner technology continues to improve and allows for compliance with lower emissions standards.

Several councils, including Otago Regional Council, Nelson District Council and Rotorua District Council, already regulate the use of all types of domestic solid-fuel burners. Amending the NESAQ to regulate the installation of new domestic burners in the same manner will be much easier to implement than a split approach for polluted and non-polluted airsheds – given that the status of an airshed can change.

Because the suite of regulatory changes are set nationally, they would come into force immediately upon amendment of the NESAQ, rather than an estimated two year wait for rules to be developed through an RMA Schedule 1 process. This would give the new air quality measures a kick start and reduce the planning costs on councils.

We would anticipate councils will take approximately two years to establish formal monitoring of PM_{2.5} in their airsheds and one year of monitoring to collect meaningful data. As mentioned above, many councils have already purchased equipment capable of monitoring PM_{2.5} and will be in a position to collect meaningful data from the date of the NESAQ amendments coming into force.

Compliance monitoring by councils, either risk-based or complaints-based, helps ensure that rules and regulations are adhered to so that adverse effects on the environment are limited. For permitted activities subject to conditions, such as emission limits for new installations of domestic solid-fuel burners, compliance monitoring helps ensure those conditions are met. Further information on implementation will be gathered through consultation.

Flexible

The preferred option is less flexible than the status quo to allow for greater national consistency. It is more directive to councils and households about the activities that need to be managed in order to reduce health impacts from exposure to PM. However, it retains a level of discretion for Councils to keep existing rules and create new rules that are more

stringent rules than the NESAQ, as well as discretion to develop non-regulatory mechanisms to improve air quality in their regions.

Equitable

The new PM_{2.5} standards will affect councils differently, depending on their existing monitoring equipment and processes, and their emissions profiles. Councils that are not currently monitoring PM_{2.5} will face a cost of approximately \$65,000 per airshed to set up new equipment and processes to meet the standard. The new standards will serve to create certainty for councils (including Environment Canterbury, Greater Wellington Regional Council and Auckland Council) that are already monitoring PM_{2.5} in their airsheds.

Where airsheds experience elevated PM_{2.5} concentrations from home heating emissions in winter, councils will need to manage compliance with the daily average PM_{2.5} standard. Councils responsible for airsheds where PM_{2.5} levels are characterised by transport emissions year-round will need to focus efforts on compliance with the annual average PM_{2.5} standard. This is more equitable than the status quo daily average PM₁₀ standard, which affects airsheds that are dominated by home heating emissions much more than airsheds dominated by transport emissions.

Businesses, particularly industrial businesses seeking new resource consents, may be affected differently depending on their emissions profiles, but this is already the case under status quo.

Emissions standards for domestic burners will affect households in rural and urban communities differently. Properties under two hectares are generally in urban areas. Such households will be more restricted in their choices when seeking to install a new domestic burner.

Allowing for investigation of non-regulatory mechanisms to support councils to drive changes in behaviour around operating and replacing domestic burners and around outdoor burning, rather than imposing strict rules, will help to ease the compliance burden on those lower socio-economic households that rely on low-cost fuel sources for heating.

5.2 Summary table of costs and benefits of the preferred approach

Affected parties <i>(identify)</i>	Comment: <i>nature of cost or benefit (eg ongoing, one-off), evidence and assumption (eg compliance rates), risks</i>	Impact <i>\$m present value, for monetised impacts; high, medium or low for non-monetised impacts</i>	Evidence certainty <i>(High, medium or low)</i>
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Additional costs of proposed approach, compared to taking no action

Regulated parties

Households	Burner installation	900 per household	Medium
	New burner appliance	3,500 per household	
	Council consent	500 per household	
	New heat pump appliance	3,800 per household	

Regulators			
Ministry for the Environment	Policy development	200,000	Medium
	Policy implementation (support and written guidance)	100,000	
Regional Councils and Unitary Authorities	Updating plans (25,000)	400,000	Medium
	Community education on new rules (50,000)	800,000	
	Monitoring equipment (65,000)	2,275,000	
	Annual monitoring, enforcement, and evaluation (25,000)	400,000	
Wider Government			
Warmer Kiwi Homes programme (EECA)	Greater uptake of subsidy for heat pumps and low emissions wood burners (up to 2,500 per household)	Low	
Total Monetised Cost		97,700,000	Medium
Non-monetised costs		Low	

Expected benefits of proposed approach, compared to taking no action			
Regulated parties			
Households	Avoided health cost	Medium	
Wider Government			
Healthy Homes Standards (HUD)	Facilitate compliance with standards	Low	
Other parties			
Wider Society	Premature mortality - VOSL (4,060,000 per person)	820,200,000	Medium
	Respiratory hospital admissions (5,381 per patient)		
	Cardiac hospital admissions (7,432 per patient)		
	Restricted activity days as a result of long term exposure to PM _{2.5} (70 per day)		
Total Monetised Benefit		820,200,000	Medium
Non-monetised benefits		Medium	

5.3 What other impacts is this approach likely to have?

Proposals for investigating, developing and implementing non-regulatory mechanisms have not been fully scoped as part of this policy package which focuses on regulatory change. Costs will likely be assigned to Government and councils and benefits will accrue to communities, especially low-income households.

The CBA report uses the New Zealand Social Deprivation score as a proxy for the ability to pay the private costs associated with the policy options. A support package for a home heating scheme could alleviate some of the burden on socially deprived sections of the community, such as those already in place in a number of towns (as discussed under 5.1 below).

We do not yet have a complete picture of the impacts for Māori. It will be necessary through the consultation process to engage directly with Māori, particularly in areas where they are likely to be more impacted by the proposals, such as more polluted airsheds. Te Puni Kokiri provided estimates that fuel poverty affects 25 percent of households. It is a difficult trade-off between affordable energy and improved air quality. Further, targeted engagement with Māori is proposed on this matter.

5.4 Is the preferred option compatible with the Government's 'Expectations for the design of regulatory systems'?

We believe the preferred option is compatible with the Government's 'Expectations for the design of regulatory systems'.

In particular it is flexible enough to allow regulators (regional councils and unitary authorities) to adapt their regulatory approach to the needs of their local communities. The preferred option is also consistent with relevant international standards, and supports compliance with New Zealand's international obligations. It has clear objectives, and aims to achieve those objectives in a least cost way.

Section 6: Implementation and operation

6.1 How will the new arrangements work in practice?

Assistance, guidance and support will need to be made available to help councils, communities and industry to understand and comply with the new standards. We will seek information from stakeholders about the appropriate forms of support and guidance through the consultation process.

The preferred option requires regulatory changes to the NESAQ which local authorities are required to monitor, comply with, and enforce as part of their responsibilities under the RMA to implement national direction instruments. Most of the regulatory changes contained within the option are based on existing council rules.

Council compliance

In the absence of a compliance timeframe, we intend to develop implementation guidance for councils that will set out an expectation that councils take a maximum of two years to establish formal monitoring of PM_{2.5} in their airsheds and one year of monitoring to begin collecting meaningful data. Several councils have already purchased and set up equipment capable of monitoring PM_{2.5} and are already collecting/will be in a position to collect meaningful data from the date of the NESAQ amendments coming into force.

It is likely that monitoring and enforcement could be carried out within councils' existing functions and budget baselines. Some additional compliance monitoring capacity may be required to roll out the new national rules.

Compliance monitoring by councils, either risk-based or complaints-based, helps ensure that rules and regulations are adhered to so that adverse effects on the environment are limited. For permitted activities subject to conditions, such as emission limits for new installations of domestic solid-fuel burners, compliance monitoring and building consenting for installation of domestic burners will help to ensure those conditions are met.

Although 'softer', non-regulatory measures (such as education or on-site support) are normally effective in achieving compliance, enforcement action should be taken where these methods fail to deter and penalise non-compliance of the NESAQ. There is a range of enforcement options that regional councils can pursue under section 9 of the RMA. These include abatement notices, infringement notices, to enforcement orders, and prosecutions against those in breach of plan rules and consent conditions.

Household compliance

Government and councils will need to establish clear, targeted messaging and monitoring to ensure households are aware of regulations relating to new domestic burners on properties under two hectares. Some households, particularly low income households, may require assistance to meet the requirements.

It is the status quo for councils in areas of poorer air quality, including Rotorua, Tokoroa, Masterton and Wainuiomata, to offer subsidies and/or loans to assist and incentivise households that rely on wood or coal burners to transition to cleaner forms of heating. In addition, the Government operates the Warmer Kiwi Homes programme and Winter

Energy Payment for low-income households and individuals to access clean, energy efficient forms of home heating. We expect these types of initiatives to continue and potentially expand.

National guidance

Following any changes to the NESAQ, we would provide implementation guidance to regional councils and would continue to regularly monitor and evaluate the implementation of the NESAQ. We propose that the regulations would be reviewed every five years and updated as necessary.

6.2 What are the implementation risks?

We are aware of risks relating to:

- the definition of gazetted airshed boundaries according to experience of PM₁₀ issues rather than PM_{2.5} issues
- the capacity of councils to monitor both PM_{2.5} and PM₁₀
- slow retirement rates of domestic solid-fuel burners
- the lack of air quality data from areas that are not currently monitored

We will seek information from stakeholders about the risks of implementing the proposed amendments through the consultation process.

Section 7: Monitoring, evaluation and review

7.1 How will the impact of the new arrangements be monitored?

The Ministry obtains regular air quality monitoring data from regional councils which provides an overview of national air quality and progress against current targets. This data is published to the Ministry website.

The environmental reporting series by the Ministry for the Environment and Statistics New Zealand's environmental reporting series also provides information on changes and trends in New Zealand's air quality since the NESAQ came into force in 2004.

In terms of measuring the effectiveness of the NESAQ, the Ministry could gather and analyse baseline data such as:

- PM_{2.5} monitoring data
- Air quality discharge consents issued
- The number of infringement notices issued by regional councils for breaches of consents or breaches of the NESAQ
- The number of building consents for domestic solid fuel burners

7.2 When and how will the new arrangements be reviewed?

Under section 24(f) of the RMA, the Minister for the Environment must carry out monitoring of the effect and implementation of the RMA, including any regulations in force under it.

As part of the Ministry's regulatory stewardship responsibilities, regulation is generally reviewed for implementation and effectiveness at three to five yearly intervals depending on the subject matter and any other intervening factors.

There is inevitably a lead in time before new regulation can be fully implemented by regional councils and measures begin to take effect. This is called a benefit lag and we expect this will be at least five years for the NESAQ amendments. It is likely then that a first implementation review at three years would take the form of checking that councils have incorporated the NESAQ amendments into their air plans. This would also be an appropriate time to also consider updates to WHO Guidelines and upcoming New Zealand research into the health impacts of air pollution.

Appendix A – Options

	Option 1 - Status quo	Option 2 – Minimal regulation	Option 3 – Increased regulation (preferred option)	Option 4 – Strong regulation	Option 5 – Stringent regulation
		Minimise regulations for monitoring and implement a significant non-regulatory package to support New Zealanders to reduce their home heating emissions. Allow councils to continue with their progress reducing emissions through more stringent rules.	Adopt the more critical health indicators for PM, and retain the PM ₁₀ standard for monitoring purposes only to inform future policy after the WHO guidelines have been reviewed. Set out minimum burner standards. Allow councils to continue with their progress reducing emissions through more stringent rules. Investigate further support for councils to deliver non-regulatory behaviour change mechanisms.	Adopt the more critical health indicators for PM and retain the current PM ₁₀ standard. Drive further emissions reductions through regulation. More stringent requirements for polluted airsheds. Allow councils to keep existing local rules, but no new rules to be established.	An ambitious and stringent nationally consistent standard. Adopt all WHO guidelines for PM ₁₀ and PM _{2.5} as standards, and strengthen and introduce rules to reduce domestic heating emissions. Drive further emissions reductions through regulation, and remove inconsistencies between regions.
Ambient air quality standard(s) for PM ₁₀	Daily average PM ₁₀ standard of 50 µg/m ³ Exceedances of the standard must be publicly notified	Remove the PM ₁₀ standard – retain the existing PM ₁₀ guidelines in the Ambient Air Quality Guidelines. Remove requirement for exceedances to be publicly notified	Retain the existing daily average PM ₁₀ standard of 50 µg/m ³ only for the purpose of monitoring and publicly notifying any exceedances.	Retain the existing daily average PM ₁₀ standard of 50 µg/m ³ Retain requirement for exceedances to be publicly notified	Retain the existing daily average PM ₁₀ standard of 50 µg/m ³ Introduce the WHO annual average standard for PM ₁₀ of 20 µg/m ³ Retain requirement for exceedances to be publicly notified
Ambient air quality standard(s) for PM _{2.5}	n/a		Introduce the WHO ambient air quality annual average standard for PM _{2.5} of 10 µg/m ³ Exceedances of the standard must be publicly notified		
		No daily average standard for PM _{2.5}		Introduce the WHO ambient air quality daily average standard for PM _{2.5} of 25 µg/m ³ Exceedances of the standard must be publicly notified	
Allowable exceedances and compliance timeframes for meeting PM standards	One or fewer exceedances of the daily average PM ₁₀ standard in a 12-month period by 1 September 2020	Amend the compliance timeframe for all airsheds to allow no exceedances of the annual average PM _{2.5} limit by 2023.	Amend the allowable exceedances. In a 12-month period: <ul style="list-style-type: none"> Three or fewer exceedances of the daily average PM_{2.5} standard No exceedances of the annual average PM_{2.5} standard No compliance timeframe	In a 12-month period: <ul style="list-style-type: none"> One or fewer exceedances of the daily average PM₁₀ standard No exceedances of the annual average PM₁₀ standard Three or fewer exceedances of the daily average PM_{2.5} standard No exceedances of the annual average PM_{2.5} standard (Option 5 only) No compliance timeframe	
Airshed status if PM standard(s) breached	Airshed is classified as 'polluted' if daily average PM ₁₀ standard is breached, averaged over previous five years Polluted status restricts granting of resource consents for activities that would increase the daily average concentration of PM ₁₀ by more than 2.5µg/m ³ . Polluted status removed if airshed is compliant with daily average PM ₁₀ standard for five consecutive years	Airshed is classified as 'polluted' if annual average (or daily average) PM _{2.5} standard is breached, averaged over the previous five years Airshed is not classified as 'polluted' if daily average PM ₁₀ standard is breached (Option 3 only) Polluted status restricts granting of resource consents for activities that would contribute PM _{2.5} to the airshed. Polluted status removed if airshed is compliant with both PM _{2.5} standards for five consecutive years		Airshed is classified as 'polluted' if a PM ₁₀ or PM _{2.5} standard is breached, averaged over the previous five years. Polluted status restricts granting of resource consents for activities that would contribute PM ₁₀ or PM _{2.5} to the airshed. Polluted status removed if airshed is compliant with all standards for five consecutive years	

Design standards for domestic burners	Discharges from new woodburners on properties smaller than two hectares are prohibited unless <ul style="list-style-type: none"> the discharge is less than 1.5 grams of particles for each kilogram of dry wood burnt; and the thermal efficiency is not less than 65 percent. 	Develop non-regulatory mechanisms to drive behaviour change for buying, operating and replacing domestic heating burners (including maintenance, modifications and fuel type).	Expand the existing woodburner emissions and thermal efficiency standards to apply to all domestic burners (ie, open fires, coal, pellet and multi-fuel burners, cookers, water boilers) on properties under 2 hectares		Expand the existing woodburner emissions and thermal efficiency standards to apply to all domestic burners (ie, open fires, coal, pellet and multi-fuel burners, cookers, water boilers) on all residential properties
			Lower the emissions standard for all new domestic burners covered under these regulations to no more than 1.0g/kg Retain 65 percent thermal efficiency standard	Lower the emissions standard for all new domestic burners covered under these regulations to: <ul style="list-style-type: none"> no more than 0.5g/kg in polluted airsheds no more than 1.0g/kg in non-polluted airsheds Retain 65 percent thermal efficiency standard	Lower the emissions standard for all new domestic burners covered under these regulations to no more than 0.5g/kg Retain 65 percent thermal efficiency standard
			Investigate non-regulatory mechanisms to support councils to further drive behaviour change in operating and replacing domestic heating burners, (including maintenance, modifications and fuel type).	Prohibit unsuitable fuels for domestic heating burners.	
Other incentives to reduce PM emissions	No new domestic open fires on properties under two hectares in polluted airsheds.	Retain restriction on domestic open fires in polluted airsheds	Retain restriction on domestic open fires in polluted airsheds	Retain restriction on domestic open fires in polluted airsheds	Expand restriction on domestic open fires to include properties over two hectares and properties outside polluted airsheds
		Develop non-regulatory mechanisms to drive behaviour change for other urban residential PM emissions, including open and outdoor burning.	Investigate non-regulatory mechanisms to support councils to further drive behaviour change in outdoor burning	Introduce prohibition on outdoor burning on any residential property	Introduce prohibition on outdoor burning on any residential property
Stringency of local rules	Councils have ability to establish more stringent rules than the NESAQ	Councils retain ability to establish more stringent rules.		Existing council rules may continue but no new regional rules may be established where a matter is already covered by the Air Quality NES.	No new regional rules may be established where a matter is already covered by the Air Quality NES, and existing rules must be removed.
Specification of methods	Methods for monitoring PM ₁₀ incorporated by reference Methods for measuring emissions standards and thermal efficiency standards incorporated by reference	Update methods for monitoring PM ₁₀ Incorporate appropriate methods for monitoring PM _{2.5} Update methods for measuring emissions standards and thermal efficiency standards			

Impact Summary: Ratification of the Minamata Convention on Mercury

Section 1: General information

Purpose
<p>The Government intends to ratify the Minamata Convention on Mercury. To do so requires the introduction of a new set of regulations.</p> <p>This Regulatory Impact Statement (RIS) considers the proposed approach towards ratification and the impacts of the proposed controls on New Zealand under the:</p> <ul style="list-style-type: none">• <i>Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ)</i> – to regulate industrial emissions of mercury to air, and to prohibit the use of mercury and mercury compounds in specific manufacturing processes• <i>Imports and Exports (Restrictions) Act 1988</i> – to regulate the import and export of mercury and prohibit specific mercury-added products• <i>Waste Minimisation Act 2008</i> – to create new regulations to ban the manufacture and sale of specific mercury-added products. <p>We intend to progress the new set of regulations in 2020 as a regulatory package. However, amendments to the NESAQ to ratify the Minamata Convention are being incorporated into a separate, broader process to amend the NESAQ, also in 2020.</p>
Key Limitations or Constraints on Analysis
<p>Constraints on analysis:</p> <ul style="list-style-type: none">• This RIS was prepared in 2018 (and updated during November 2019 – January 2020), and reflects views of affected stakeholders. The analysis will be refined following public consultation.• Where there is limited data on the impact of anthropogenic mercury in New Zealand, the analysis has relied on international standards and assumptions to estimate the impact of measures in the New Zealand context (e.g. the amount of mercury emitted from certain industrial processes).• Due to their nature, there can be uncertainties with judging political and reputational risks and these are difficult to quantify. MfE is confident in the evidence and assumptions underpinning the problem definition and analysis of the risk to New Zealand’s international reputation. The Ministry of Foreign Affairs and Trade has been consulted.
Responsible Manager (signature and date):
<p>Amanda Baldwin 3 February 2020 Manager, Environmental Risk and Innovation Ministry for the Environment</p>

Section 2: Problem definition and objectives

2.1 What is the policy problem or opportunity?

The current situation

Exposure to mercury is a well-documented risk to human health and the environment. Humans are mainly exposed from emissions in the air, and from eating certain foods (mostly marine fish as mercury bio-accumulates in the food chain).

The Minamata Convention on Mercury was adopted in 2013 and entered into force on 16 August 2017. The Convention's purpose is to protect human health and the environment from anthropogenic releases of mercury and mercury compounds. It requires Parties to introduce controls on mercury sources. These include primary mining, trade, manufacturing processes, emissions and releases to air, land and water and waste mercury. It also phases out certain non-essential mercury products.

From 2008-2013, New Zealand participated in the negotiations of the Convention. MfE led New Zealand's participation based on a mandate from Cabinet (Cab Minute (11) 29/9 refers). In 2013, New Zealand signed the Convention. Following New Zealand signing, a [National Interest Analysis](#) (NIA) was presented to Parliament as part of the parliamentary treaty examination process and the Foreign Affairs and Defence Select Committee's report recommended New Zealand ratify the Convention.

The NIA found that anthropogenic mercury is not a significant pollutant in New Zealand, but it is still in New Zealand's interests to ratify the Convention. A 2018 biomonitoring study¹ prepared for the Ministry of Health found that none of the study participants had blood mercury concentrations above Health Canada's blood mercury guidance value (of 20 µg/L; there currently is no New Zealand blood mercury notification level). The geometric mean for blood mercury in New Zealanders was approximately double the geometric mean reported for the US, Canada and Germany. The New Zealand geometric means were comparable to those reported for France, and lower than that reported for Korea. Ratifying would benefit New Zealanders.

Why does this constitute a problem?

Unable to influence future implementation of the Convention

As a non-Party, New Zealand can only participate in meetings of the Convention as an observer and is unable to influence the decisions and future implementation of the Convention. This creates risks for other, higher priority forums as decisions as "agreed text" in one forum is often used to advance agendas in other international legal fora. There are difficulties in quantifying and predicting this risk, the extent of which depends on the nature of the "agreed text" and the context where it emerged. However, it could have considerable negative impact on New Zealand's interests.

Reputational risks

New Zealand relies on rules-based multilateralism to meet foreign policy, trade and environmental goals that are beyond our capacity to meet alone. Ratifying, and actively participating in the Convention, helps maintain our reputation as being committed to addressing global environmental challenges. In contrast, remaining outside of the Convention creates risks to New Zealand's international environmental reputation. 116 countries have ratified the Convention so far, including most of our likemindeds on environmental issues.

Environmental risks

¹ t Mannelje A, Coakley J, Douwes J. (2018) *Report of the Biological Monitoring of Selected Chemicals of Concern. Results of the New Zealand biological monitoring programme, 2014-2016*. Technical Report 2017-1. March. Centre for Public Health Research. Massey University. Wellington.

Without ratifying, or taking other action on mercury-added products, there is a small risk that New Zealand could become a 'dumping ground' for these products as they are phased out in overseas markets. This would increase the amount of mercury in the New Zealand waste stream, which could pose environmental risks in the longer term. Mercury emitted from landfill into the environment is a significant portion of all anthropogenic releases in New Zealand.

There is a risk that without global action through the Convention, the risk posed by mercury to New Zealand and the Pacific region could increase over time. As mercury has transboundary effects, continued emissions by other countries could have a negative impact on our region. This raises risks to human health. Mercury exposure has negative health effects, as well as environmental and economic risks for the sustainability of Pacific fisheries, particularly in species which are prone to mercury bioaccumulation. It is in New Zealand's long term interests to support global action against a harmful pollutant, even if New Zealand is not currently facing immediate environmental risk.

Why government action is needed

Only the government can take binding treaty action on behalf of New Zealand, subject to parliamentary treaty examination and implementation of any required legislative amendments and changes to processes. Although New Zealand has signed the Convention and the parliamentary treaty examination process is complete, ratification is not possible until New Zealand meets the legally binding requirements of the Convention. Many of the Convention's requirements are already met by New Zealand's existing laws and regulations, but some require changes to legislative settings in order for them to be fully met (see section 2.3). These obligations are:

- Article 3 to enact trade controls (permits for trade in mercury);
- Article 4 to ban the manufacture and trade of certain mercury-added products (as part of the phasedown of certain mercury containing products); and
- Articles 5 and 8 to control emissions from mercury to air, including from certain industrial processes using mercury and mercury compounds.

Note that the provisions of Article 3 do not apply to quantities of mercury used in laboratory scale research or as a reference standard. It also does not apply to naturally occurring trace quantities of mercury and mercury compounds present in such products as non-mercury metals, ores, or mineral products, including coal, or products derived from these materials, and unintentional trace quantities in chemical products, or mercury-added products.

Meeting the obligations of the Convention will support the following objectives:

- prevent more products from entering the waste stream in the long term by phasing out the import of non-essential mercury products;
- maintain our international reputation;
- participate in decision-making as a Party at meetings to ensure our interests are taken into account, including in decisions as to whether new mercury sources or products are added to the Conventions controls; and
- avoid and mitigate potential future risk of increased mercury accumulation in Pacific marine fisheries.

Why does this issue need to be addressed now?

116 states² have become Parties to the Convention. The Convention 'entered into force' on 16 August 2017. As more states become Parties to the Convention, New Zealand's status as an observer outside of the Convention poses an increasing reputational risk.

² In this context 'state' includes both countries and regional economic integration organisations (the European Union). 116 states was correct at 20 January 2020.

As the Convention is now in force, it has an active work programme, which New Zealand has limited influence over. Every year, the Conference of the Parties meets, and makes decisions about how the Convention will operate. These decisions include legal and political commitments for Parties that also impact on non-Parties. As an observer, New Zealand's influence and ability to advocate for its perspective is reduced as we cannot participate in decision making. There is a resulting risk of outcomes which are not suitable for the New Zealand context and which could increase the future costs of being a Party.

Under the Convention, non-essential mercury-added products listed in Part I of Annex A shall not be allowed after 2020. Regulating mercury products after 2020 would mean an immediate ban on import and manufacture rather than a phasedown with a lead in period. If New Zealand's regulatory amendments can be completed in 2020, it would give industry and consumers in New Zealand a few months to prepare for the regulations. The proposed ban on sale, which is to support the prohibition on trade under the Convention, will not apply to the sale of second hand products.

2.2 Who is affected and how?

MfE commissioned [inventories of mercury](#) in New Zealand for 2008, 2012 and 2016 which form the basis of the following information. There are two key ways that stakeholders in New Zealand will be affected: controls on mercury emissions sources, and the phasedown of mercury products. The impact of each of these is summarised below. Consultation will gather additional information about the impact of the proposed regulations.

Emissions of mercury – these proposals form part of the separate work stream to amend the NESAQ

Point sources

There are specific types of mercury-emitting processes known as 'Annex D sources', which would need to be controlled in order to meet the Convention's requirements on emissions to air. Industries which commence any of these activities at least one year after the Convention enters into force for New Zealand, would need to ensure that any future facilities, or facilities which are significantly upgraded meet the 'best available techniques and best environmental practice' (BATBEP) standard set by guidelines under the Convention. Largely, the BATBEP standard is already met in New Zealand, and would thus also be met by any future facilities or upgrades.

The impact on stakeholders and groups who currently undertake an Annex D activity is summarised below:

- *All Annex D sources:* Regional councils would need to ensure their resource consent decisions take into account whether new Annex D facilities met the BATBEP standard.
- *Coal-fired power plant* Huntly power station falls into this category. Minimal change is needed as this station already meets the BATBEP criteria.
- *Coal-fired industrial boilers above 2MW:* There are less than 400 coal fired boilers in New Zealand, of which around half are less than 1MW. Current operators are not affected, but any upgrade of facilities, or new coal-fired industrial boilers will be required to meet the BATBEP criteria.
- *Smelting and roasting processes used in the production of non-ferrous metals:* Gold smelting happens at six mines in New Zealand. Relevant stakeholders will need to ensure BATBEP standard is met by any new operation involving smelting and roasting.
- *Cement clinker production facilities:* There is one cement plant in New Zealand. The cement plant utilises bag filters to control emissions, which already meet BATBEP criteria. Relevant stakeholders will need to ensure future facilities also meet the

BATBEP standard.

Manufacturing processes which use mercury

There are five types of manufacturing processes set out in Annex B in which the use of mercury is prohibited or restricted under the Convention. No stakeholders will be affected as none of these processes have been carried out in New Zealand since the 1980s. Since then newer technology has replaced any mercury previously used. Prohibition of future use will be progressed through the separate workstream to amend the NESAQ.

Mercury-added products used in New Zealand

Overall, the use of mercury-containing products in New Zealand is reducing as mercury free alternatives are increasingly available (and in many cases, more efficient). As there are effective alternatives to the products being prohibited there will be limited negative impact on consumer choice and autonomy from the controls. The categories of products in scope of the Convention's controls (Annex A of the Convention) are briefly listed below.

Lighting products containing specified quantities of mercury

The main categories of lights that will be affected by the Convention's phasedown of mercury-added products are: compact fluorescent lamps (CFLs), linear fluorescent lamps (LFLs), and high pressure mercury vapour lamps, all for general lighting purposes.

Sales of CFLs are decreasing in New Zealand every year (about 1 million units sold in 2019) as consumers increasingly switch to LEDs which offer a cost effective alternative (LEDs are mercury free). Despite falling sales, CFLs are likely to remain part of the New Zealand lighting market in the shorter term. Product is available that can meet the lower mercury threshold.

Consistent with CFLs, LFLs sales in New Zealand are falling also (about 1 million units sold in 2019) as more consumers switch to LEDs, although sales are not falling as quickly as for CFLs. Information from industry suggests that most LFLs in New Zealand contain less than 5 mg of mercury in practice, which is below the threshold set by the Convention (and therefore does not need to be prohibited). Importers and retailers of LFLs will need to ensure that after 2020, they only import and sell LFLs which are compliant; this may require additional checks of their product. Consumers and end users will need to replace non-compliant LFLs at their end of life with products containing lower levels of mercury, or alternative products.

High pressure mercury vapour lamps are used in some street lighting or community sports field lighting. Current importers, retailers and users of lamps, including some councils, will be affected by the prohibition. Although alternatives are available, they may incur some transition costs from when the lamps need to be replaced to upgrade equipment to transition to light emitting diodes (LEDs). We anticipate these costs will be offset by LEDs being more efficient over the longer term.

Batteries

There are four different types of mercury-containing button cell available in New Zealand used in devices such as calculators, watches, cameras and hearing aids. The majority of batteries sold in New Zealand will not be affected by the phasedown as they do not contain mercury, or contain only very low levels, and do not meet the threshold where prohibition is required. Batteries with content above 2% mercury will be banned from import and sale after 2020 due to the global phasedown. This will affect importers, suppliers, retailers and end-users of these products. The impact is not expected to be significant if there is sufficient lead in time to the regulation so that existing stock can be gradually reduced and replaced with mercury free alternatives.

Non-electronic measuring devices (barometers, hygrometers, manometers, thermometers, sphygmomanometers)

Small numbers of these devices are used for some technical purposes, although in most cases there are mercury free alternatives, and their overall use is declining. Where there is

no viable alternative, ongoing use is possible by New Zealand registering for an exemption from the phase out date with the Convention secretariat, which would apply for five years (with the ability to extend this for one single additional five year period if other Parties agree). Targeted consultation will provide information about the impact of the phasedown of these products and whether any exemptions from the phase out date are needed.

Switches and relays

Historically mercury has been used in electrical rectifiers and mercury arc valves, which were used in electricity distribution networks and industrial facilities. At the consumer level, small mercury tilt switches have been widely used in electrical appliances, in car boot light switches and ABS braking systems. In general, mercury switches are used in older, less efficient technology. Their use is declining and mercury free alternatives are available. New Zealand's largest home appliance manufacturer confirmed that they do not use mercury-containing components in any of their products, in part because many overseas markets, particularly the EU, restrict the use of mercury in consumer goods. In addition, power operators in New Zealand are gradually replacing these with mercury-free devices.

2.3 Are there any constraints on the scope for decision making?

New Zealand will not be able to ratify the Convention until all the required regulatory amendments are completed, and to demonstrate that we will be compliant with all Convention obligations by the time they enter into force for New Zealand.

Section 87B of the Resource Management Act 1991 was amended on 23 October 2019 to make primary mercury mining a prohibited activity, as per section 129 of the Statutes Amendment Act 2019.

Three other regulatory amendment processes still need to be progressed. These are:

- Amending the NESAQ to control emissions to air and prohibit certain industrial processes from mercury and mercury compounds
- Amending the Imports and Exports (Restrictions) Prohibition Order (No 2) 2004 (Imports and Exports Order) under the Imports & Exports (Restrictions) Act 1988 to require permits for trade in mercury, and to prohibit the import and export of certain mercury-added products
- Creating new regulations under the Waste Minimisation Act 2008 (WMA) to prohibit the manufacture and sale of listed mercury-added products.

Section 3: Options identification

3.1 What options have been considered?

Range of options considered

New Zealand needs to enact domestic law to implement the Convention. In order to be compliant with the Convention, all of its obligations need to be implemented by the time they enter into force for New Zealand. Where treaty obligations cannot be performed under existing domestic legislation, legislative change will be required. Therefore only options that included primary or secondary legislative change were considered.

Three options were identified:

1. A package of regulation (secondary legislation) – This would use regulatory instruments and items already in the Ministry's work programme to meet the Convention's obligations. These could be undertaken as a single package, or separate regulatory amendment processes. This would include:
 - a. Amending the Imports and Exports Order under the Imports and Exports (Restrictions) Act 1988 to require permits for trade in mercury, and prohibit import and export of certain mercury-added products. The Imports and Exports Order was created to give effect to New Zealand's trade related obligations under similar multilateral environmental agreements
 - b. Create regulations under section 23(1)(b) of the WMA to prohibit the sale of mercury-added products to create a workable enforcement mechanism to support the ban on import and export of certain mercury-added products
 - c. Amend the NESAQ to prohibit the use of mercury in certain processes which have high emissions, and require best practice to control emissions of mercury from certain activities.
2. A new stand-alone Bill to address mercury and enact the Convention's obligations.
3. A new National Environmental Standard (NES) on Mercury – National environmental standards are regulations that prescribe standards for environmental matters which are issued under sections 43 of the Resource Management Act 1991. This would be supported by regulations created under the Waste Minimisation Act 2008 to prohibit the sale and manufacture of products, and amendments to the Imports and Exports Order needed to meet trade related obligations.

Criteria used to assess the options:

Four criteria were used to analyse the options:

1. Will the option enable New Zealand to meet all obligations under the Convention?
 - a. Enacting trade controls (permits for trade in mercury)
 - b. Banning the manufacture, sale and trade of certain mercury-added products after 2020
 - c. Controlling mercury emissions, including from certain industrial processes
 - d. Note that the prohibition of primary mercury mining has been progressed separately
2. How cost effective is the option, and is it proportionate to the problem that mercury poses to New Zealand?
3. How will the option impact New Zealand's timeframe for ratification? Options which enable New Zealand to ratify sooner are preferred, as these lessen the likelihood of reputational risk from 'falling behind' likeminded countries.

4. How well will the option address the future risk from mercury in New Zealand, limit future emissions in New Zealand, and enable New Zealand to support global action by participating in and influencing the future direction of the Convention? Being able to influence global action on mercury is important as emissions can have transboundary impacts, and could affect our region in the future.

Analysis of each option against the criteria

1. A package of regulation (secondary legislation) – This would use existing regulatory instruments and items already in the Ministry’s work programme to meet the Convention’s obligations
 - a. Meets all obligations of the Convention.
 - b. Is an effective use of resource as obligations will be met by Order in Council and existing legislative instruments.
 - c. Impact on councils of amendments to the NESAQ will be reduced by including the mercury-related proposals with other proposed changes to the NESAQ.
 - d. Requires regulatory change under three separate Acts. Delivery is dependent on the Ministry’s wider work programme, as changing priorities or lack of resources can potentially delay one or all of the three amendment processes.
 - e. Would be effective in addressing the future risk to New Zealand from mercury as it would address New Zealand emissions directly through the controls. It would also increase support for global action to reduce emissions (which have transboundary impacts, and could affect our region in the future). New Zealand’s ratification by 2021 would potentially enable New Zealand to participate in COP5 (2021) as a Party, and be able to influence the future implementation of the Convention.
2. A new Bill to address mercury and enact the Convention’s obligations
 - a. Would be effective in ensuring New Zealand meets all obligations, as a new primary law instrument could have a broad scope.
 - b. Would need significant governmental and parliamentary resource.
 - c. Resource requirement would be out of proportion to the relatively low risk that mercury poses to the New Zealand environment and human health.
 - d. Likely a long timeframe until New Zealand is able to ratify and participate in Convention decision-making as a Party.
3. A NES on Mercury - creation of a new regulatory instrument to meet the Convention’s obligations
 - a. Would not meet all obligations as the scope of the Resource Management Act does not extend to the import or export, or manufacture of products or substances. These would need to be addressed via regulations under the WMA and by amending the Imports and Exports Order.
 - b. Potential for overlap with existing national environmental standards, and wider regulations.
 - c. Additional cost for local government of a new NES.
 - d. Would still need to be supported by wider regulatory changes.
 - e. Potentially a long timeframe until New Zealand was able to ratify and able to

participate in the Convention as a Party.

3.2 Which of these options is the proposed approach?

Option 1 is the preferred option to address mercury in New Zealand, implement the Convention's obligations and enable New Zealand to ratify.

It will be effective in meeting the key Convention obligations relating to trade, mercury-added products and mercury emissions, enabling New Zealand to ratify the Convention. In addition, it is proportionate to the low immediate risk posed by mercury to New Zealand while still contributing to global action which will safeguard New Zealand and Pacific fisheries in the longer term. It is also the most cost effective option. This is because using secondary legislation and existing instruments is less costly in terms of administration for Government, and is more simple and does not pose additional costs for stakeholders.

The three regulatory amendment processes have different stakeholders, and separate consultation processes will enable targeted consultation.

Option 1 is compatible with the Government's 'expectations for the design of regulatory systems'. Although the proposals will affect trade and market competition (by prohibiting certain products), this is consistent with international obligations and actions taken by other countries.

Section 4: Impact Analysis (Proposed approach)

4.1 Summary table of costs and benefits		
<p>Notes on costs:</p> <ul style="list-style-type: none"> The below costs are what is expected based on available information. MfE intends to consult on amendments to the NESAQ early 2020 (February-April) and mercury-related proposals will be part of the broader consultation Creating new regulations under the WMA requires statutory consultation. Amending the Imports and Exports Order does not require statutory consultation. The Ministry plans to undertake consultation in early 2020 on both these regulatory proposals together. The impact on industry is not expected to be significant. There will be new permitting functions for the EPA under the Imports and Exports Order, and new enforcement functions under the WMA. 		
Affected Parties (identify)	Comment:	Impact
	nature of cost or benefit (e.g. ongoing, one-off), evidence and assumption (e.g. compliance rates), risks	\$m present value, for monetised impacts; high, medium or low for non-monetised impacts
Additional costs of proposed approach, compared to taking no action		
Retailers and importers (mercury-added products)	<p>Inventory data shows that the use of these products is low and has been declining in recent years due to the availability of alternatives. They are subject to an international phasedown under the Convention, so import will reduce over time as production ceases overseas</p> <p>It will mean minor costs for retailers and importers, as they change stock from mercury products to alternatives after 2020, and checks may be undertaken to ensure stock is compliant</p>	Low
Consumers (mercury-added products)	<p>For some uses (e.g. certain types of lamps) there may be one-off costs from changing fittings at end of life, to change to mercury free alternatives.</p> <p>New Zealand will be able to apply for an exemption for any products where there are no viable alternatives</p>	Low
Emitters (Annex D sources)	Emitters will need to ensure that any new facilities, or significantly upgraded facilities, meet the BATBEP standard. The view of MfE is that this standard is most likely already met via the RMA process. Consultation will confirm this	Low
Importers and exporters of mercury (trade controls)	<p>Overall trade levels are low, trade is not significantly restricted and other countries may require this in any case (as the Convention includes controls for trade with non-Parties)</p> <p>Importers or exporters will need to apply for a permit to import or export mercury. They will need to provide additional information that illustrates its source or use is compliant with the Convention (i.e. is recycled source not sourced from mercury mining)</p>	Low

Environmental Protection Authority (EPA)	Under the proposals, the EPA will need to implement the Imports and Exports Order permitting scheme for trade in mercury, and this will be aligned with similar functions already being undertaken by the EPA. There will be cost implications if the EPA becomes responsible for ensuring compliance under the proposed WMA regulations.	EPA estimates approx. 4 FTE will be required for implementation (permitting) Approx 0.8FTE once operational (permitting) Compliance FTE?
NZ Customs	Enforcement is concentrated at point of sale (not the border). Customs will take a risk based approach to monitoring imports of mercury products	Low
Regional councils	Councils will need to assess whether proposed new Annex D sources meet the 'best environmental technique best environmental practice' standard The view of MfE is that this standard is most likely already met via the RMA process. Consultation will confirm this	Low
Ministry for the Environment	MfE will need to oversee the regulatory changes. This will impose additional staff time and opportunity costs. This is because MfE will not be able to undertake other items on the work programme	Low (1 FTE) over 2020
Non-monetised costs		Low
Expected benefits of proposed approach, compared to taking no action		
Retailers and importers (mercury-added products)	Retailers and importers will have advance notice and more certainty about the international phasedown, improving their ability to prepare for the move to alternative products	Low
Consumers (mercury-added products)	Alternatives to mercury products are more energy efficient and last longer, leading to lower running costs. They also do not pose a risk to health if they break (minor risks posed by mercury in lamps)	Medium
Emitters (Annex D sources)	Same as the status quo	No impact
Importers and exporters of mercury (trade controls)	Increased certainty over how to access mercury if they need to trade with a Minamata Party (who will apply it to all trading partners, not just those who are also Party to the Convention)	Low
Energy Efficiency and Conservation Authority (EECA)	The phasedown of mercury products will support the shift to more energy efficient products, namely lights and lamps	Medium
EPA	Increased certainty over how to process requests for trade in mercury if contacted by another Minamata Party (who will apply it to all trading partners, not just those who are also Party to the Convention)	Low
NZ Customs	Same as the status quo	No impact
Ministry for the Environment	Enables full participation in the Minamata Convention meetings, allowing MfE to influence and seek synergies in the international environmental agenda, and is positive for New Zealand's reputation. While positive, this is not a	Low

	high priority forum for New Zealand	
Non-monetised benefits	Through reporting, New Zealand is able to demonstrate its contribution to the Convention	Medium
4.2 What other impacts is this approach likely to have?		
<p>There are benefits to climate change mitigation by encouraging the uptake of more efficient products, such as lamps for use in office settings and street lighting. Reducing coal use will impact on both mercury emissions and emissions of carbon dioxide (a greenhouse gas). Ratifying the Convention will also be positive for New Zealand's reputation internationally as it will illustrate New Zealand commitment to global action to address environmental challenges.</p>		

Proactively Released

Section 5: Stakeholder views

5.1 What do stakeholders think about the problem and the proposed solution?

Planned consultation

MfE is planning to undertake:

- a nine week public consultation on amendments to the NESAQ (including mercury-related) in February-April 2020
- consultation with targeted stakeholders on the creation of regulations under the WMA and on amendments to the Imports and Exports Order in early 2020.

Consultation across government

Intergovernmental consultation helped shape the policy proposals. MfE has consulted with the EPA, Ministry of Health (MoH), Medsafe, Ministry of Primary Industries (MPI), the New Zealand Customs Service (Customs), Ministry of Foreign Affairs and Trade (MFAT), the Ministry of Business, Innovation and Employment (MBIE) and EECA. This has taken place while the Convention was under negotiation, through the parliamentary treaty examination process, and as the approach to ratification has been developed:

- The EPA has raised concerns about the implementation of enforcement functions for the proposed WMA regulations. The Environmental Protection Authority Act 2011 (EPAA) does not list WMA as an “environmental Act” with respect to which the EPA would have regulatory or compliance functions. While the EPA have been appointed as enforcement officers for the Waste Minimisation (Microbeads) regulations, this is not a durable solution for future appointments as the EPA are not resourced to do this work. The Ministry and the EPA are continuing discussions on how to resolve this issue in relation to a broad range of WMA enforcement functions (such as the plastic bags regulations). Note that the Secretary for the Environment is still legally able to appoint the EPA as enforcement officers for the WMA regulations.
- In relation to the proposed new permitting system for the import and export of mercury, the EPA notes that it would seek to align the implementation of that function with similar functions it holds in relation to permits for trade in hazardous chemicals or wastes. The EPA also advised that the proposals require additional resourcing. Currently, the Imports and Exports Order does not have a cost recovery mechanism and the EPA is not able to recover costs for considering permit applications. This is opposed to a more recent order (the Imports and Exports (Asbestos-containing Products) Prohibition Order 2016) also under the Imports and Exports (Restrictions) Act 1988 which does include cost recovery. EPA needs funding for the implementation costs as well as the on-going business as usual costs.
- The EPA has also advised that it as a whole will require additional resourcing in order to address the cumulative impact of multiple small additions to its functions. Without additional funding or cost recovery, EPA will not be able to give effect to these proposals. There would need to be future conversations on EPA Crown Funding and Third Party Fees, options for statutory change to permit new fees, and future Budget initiatives for new EPA activities or maintaining capability.
- Customs raised concerns about implementation of border controls on mercury products, and as a result the ban on sale was proposed (for regulatory coherence) and a risk assessment was developed to inform the proposal and its implementation.
- MFAT supports ratifying the Convention as this supports the multilateral system in dealing with global environmental challenges, would help protect New Zealand’s international reputation and would enable full participation in the Convention’s

decision-making processes.

- Medsafe and MoH noted the need to ensure continued access to measuring devices which contained mercury for essential calibration purposes. This has been reflected in planning for implementation. They also noted the need to ensure continued access to dental amalgam (which contains mercury) as an option for dental restoration. The Convention contains measures on dental amalgam, which are already met within existing policy settings and no changes are needed in order to ratify. MfE will ensure that this is clearly communicated in the consultation document.
- EECA supported encouraging the move to more efficient products and noted the need for clear communication with affected Parties where products are covered by both energy standards and Convention controls.
- MPI advised on the low risk posed to New Zealanders generally by the consumption of fish, and MfE will ensure that this is clearly communicated in the consultation document.
- MBIE advised on the proposed use of the Imports and Exports Order to regulate trade in mercury. While MfE has policy responsibility for the Order, MBIE administers the Order as the Minister of Commerce and Consumer Affairs retains parliamentary responsibility as the Minister responsible for the Imports and Exports (Restrictions) Act 1988. MBIE agreed it is an appropriate use of the instrument.

Wider consultation

Previously, MfE has engaged with various groups around ratifying the Convention and associated wider issues:

- 2008-2013 engagement to inform New Zealand's negotiating position while the Convention was under negotiation;
- 2013-2014 consultation informed the question of whether New Zealand should ratify through parliamentary treaty examination process and review by select committee;
- 2015-2016 engagement to inform New Zealand's approach to the development of BATBEP practice guidelines on emissions to air which were negotiated at the Convention's first Conference of the Parties in late 2017.

Industry feedback

Feedback to the Select Committee indicated that a key concern from industry is that any approach should be appropriate for the New Zealand context. Similarly, targeted engagement with groups likely to be affected by proposed regulation of Annex D sources, (coal-fired boilers and power plants, as well as waste incinerators), heard strong views that regulation should target the most significant point sources only. This has been reflected in the current proposal to only regulate coal-fired boilers over 2 megawatts.

Regional councils

MfE also consulted regional councils to inform the development of advice around Annex D sources, and air quality controls. This included a survey of councils through the National Air Quality Working Group. This advice was reflected in the decision to combined regulatory updates to the NESAQ within the wider MfE air quality work programme, to ensure that the regulatory burden on councils is minimised.

Iwi engagement

In 2011-12, MfE sent letters and information to iwi whose rohe include areas with naturally elevated levels of mercury, (chiefly the central north island geothermal plateau), and iwi with relationship agreements with MfE. This letter informed them of the international negotiations, and welcomed input and views. Natural emissions are not affected by the Convention, but as these regions can face some impacts from mercury (i.e. recommended limits on frequency of

consumption of trout from geothermal lakes) MfE thought the Convention may have been of interest. However, no responses were received.

The consultation on the NESAQ intends to seek hapū, iwi and Māori (inclusive of Maori Organisations, Trusts and Incorporations) views through targeted engagement and the online submission process.

Other feedback

In addition to the above, there were a number of submissions to the select committee supporting further regulation of dental amalgam (which contains mercury). Under the Convention dental amalgam is subject to a phasedown (Article 4(3) refers) and each Party must take at least two of nine possible measures to reduce its use. Ministry of Health has confirmed that New Zealand already meets more than two of these measures so no policy or regulatory change is required.

Proactively Released

Section 6: Implementation and operation

6.1 How will the new arrangements be given effect?

How the proposed approach will be given effect

The proposed approach to regulating trade in mercury phasing down certain mercury added products and controlling mercury emissions to air from certain processes will be given effect through regulations made by Order in Council.

This includes:

1. amending the NESAQ under the Resource Management Act 1991 (RMA)
2. amending the Imports and Exports Order under the Imports and Exports (Restrictions) Act 1988
3. creating regulations under the WMA.

Ongoing operation and enforcement

The Ministry will be responsible for overall implementation of the Convention, including policy related to trade settings of mercury, the proposed prohibition on certain mercury products, and emissions controls.

The EPA currently considers permit applications for exports and imports of hazardous wastes, imports of asbestos-containing products and exports of Stockholm Convention and other certain chemicals under the Imports and Exports (Restrictions) Act (1988). Once the proposals are implemented, the EPA will also administer the permitting system for imports and exports of mercury. The EPA considers that it will need additional funding for the new mercury permitting requirements.

Enforcement of regulations under the WMA will be by enforcement officers who are appointed by the Secretary for the Environment. A ban on the sale and manufacture of mercury-containing products would likely require additional compliance, monitoring and enforcement resource. The Ministry for the Environment is currently considering options for these functions and resourcing. The EPA already has a role enforcing WMA regulations which prohibit the sale of microbeads. If the EPA becomes responsible for enforcing the WMA regulations related to mercury products, it would seek to align these functions. The EPA considers that it will need additional funding for any new enforcement function under the WMA.

Customs has a role enforcing the Imports and Exports Order at the border, including in relation to the import and export controls on mercury products. However, we plan to take a holistic approach to enforcing the restrictions on mercury products and therefore propose to concentrate enforcement of the controls at the point of sale, rather than at the border.

Regional councils will be responsible for enforcing changes to the NESAQ through regional plans and resource consents.

Timing of the new arrangements

In addition to previous consultation around the signing of the Convention, targeted consultation on these proposals will give affected stakeholders time to appraise the proposals and raise any concerns.

Control emissions to air, including from certain industrial processes

The process to amend the NESAQ may be completed by early 2021, pending Government decisions and priorities.

Trade in mercury

The proposed changes to trade in mercury will come into effect 28 days after the Order in Council is gazetted. The plan is for this to happen mid-late 2020. The impact of this regulation is minor (chiefly an amendment to existing permitting processes). Stakeholders will be advised.

Prohibition of certain mercury-added products

Under the Convention, the obligations on prohibiting certain mercury-added products apply after 2020. The Ministry therefore proposes to use 1 January 2021 as the deadline for New Zealand's domestic regulations on the sale and import of mercury products. This is consistent with New Zealand's international obligations, aligns with international markets for these products, and will give industry and consumers in New Zealand sufficient time to prepare for the regulations.

Management of implementation risks

Some elements of the design of the regulations may be adjusted depending on the outcome of consultation with affected stakeholders.

Proactively Released

Section 7: Monitoring, evaluation and review

7.1 How will the impact of the new arrangements be monitored?

Officials from the Ministry, MFAT, MPI, EPA and Customs meet regularly as part of an interagency group on chemical and waste multilateral environmental agreements (MEAs). This group is responsible for ensuring New Zealand's compliance with these MEAs which includes regularly reviewing policy settings and amending them as required. This group will also monitor compliance and implementation of the Minamata Convention on an ongoing basis, similar to the role it had regarding New Zealand's participation in the negotiations which led to the Convention.

Under the Convention, New Zealand will have obligations to report every two and four years on progress in implementing the Convention, to the Convention Secretariat (housed in the United Nations Environment Programme). As the lead agency for the Convention, the Ministry will be responsible for ensuring that New Zealand meets this obligation.

The Ministry will report on:

- volumes of permits for import and export of mercury (this data will be collected by the EPA as part of implementing the proposals)
- Information on the policy and regulatory measures taken to implement the phasedown on mercury-added products
- Whether there are any new Annex D sources, and measures taken to address emissions from these sources, including the use of best available techniques or best environmental practices (this data will be collected via resource consent decisions)

The requirement to collate this information regularly will also enable the Ministry and the interagency group on chemical and waste MEAs to monitor the effectiveness of the proposals.

7.2 When and how will the new arrangements be reviewed?

Although there is no planned review of the arrangements scheduled, the proposed regulations and amendments will be within the scope of wider reviews undertaken by MfE. As outlined in its Regulatory Stewardship strategy, the Ministry regularly reviews the legislation and regulations it is responsible for. The NESAQ should be reviewed regularly, to detect vulnerabilities and can contribute to avoiding significant system failure.

In addition, the need for a specific review of the arrangements will be assessed based on the monitoring outlined above. Such a review would be carried out by the Ministry and the interagency group on chemical and waste MEAs. Stakeholders will be able to raise concerns on an ongoing basis, by contacting the Ministry about any issues, or the EPA with any concerns around implementation or enforcement.



Cabinet

Minute of Decision

This document contains information for the New Zealand Cabinet. It must be treated in confidence and handled in accordance with any security classification, or other endorsement. The information can only be released, including under the Official Information Act 1982, by persons with the appropriate authority.

National Environmental Standards for Air Quality: Particulate Matter and Mercury Emissions: Release of Discussion Document

Portfolio Associate Environment (Hon Nanaia Mahuta)

On 24 February 2020, following reference from the Cabinet Environment, Energy and Climate Committee (ENV), Cabinet:

- 1 **noted** that amendments to the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ) are proposed to take into account current scientific findings about the health impacts of particulate matter and to better target controllable sources of air pollution;
- 2 **noted** that the proposed package of amendments to the NESAQ includes:
 - 2.1 introducing PM_{2.5} standards as the primary regulatory tool to manage particulate matter;
 - 2.2 making the domestic solid-fuel burner emissions standard more stringent, and expanding them to cover all types of burners;
 - 2.3 regulating certain activities using mercury;
- 3 **noted** that amendments to the NESAQ are proposed in order for New Zealand to implement the *Minamata Convention on Mercury*;
- 4 **noted** that New Zealand is one of the few developed countries with no air quality standard for PM_{2.5};
- 5 **noted** that public consultation on the proposed amendments is proposed for March and April 2020, for a minimum of eight weeks;
- 6 **agreed** to release the discussion document *Proposed Amendments to the National Environmental Standards for Air Quality: Particulate Matter and Mercury Emissions* (the discussion document), attached to the paper under CAB-20-SUB-0052 for the purposes of public consultation;
- 7 **authorised** the Associate Minister for the Environment (Hon Nanaia Mahuta) to make any final minor or technical changes to the discussion document prior to its release;
- 8 **invited** the Associate Minister for the Environment (Hon Nanaia Mahuta) to report back to ENV in August 2020 with final policy proposals following the consultation;

9 **invited** the Minister for the Environment, within three years of the proposed amendments coming into force, to review the NESAQ to assess:

9.1 the efficiency and effectiveness of the NESAQ in achieving the purpose of the Resource Management Act 1991;

9.2 the effect of the NESAQ on air quality in New Zealand;

9.3 the alignment of the NESAQ with current scientific understanding and international recommendations.

Michael Webster
Secretary of the Cabinet

Hard-copy distribution:

Prime Minister
Deputy Prime Minister
Associate Minister for the Environment (Hon Nanaia Mahuta)