

# Regulatory Impact Statement: Overview of required information

## Regulatory Impact Statement

### National Environmental Standards for Air Quality Review

#### Agency Disclosure Statement

This Regulatory Impact Statement has been prepared by the Ministry for the Environment.

It provides an analysis of options to address issues around the perceived stringency, equity and compliance with the PM<sub>10</sub> (particulate matter less than 10 microns) regulations.

The Regulatory Impact Statement details the viable options that the Ministry considers are available to Government in balancing the costs to councils, industry and the public associated with actively managing PM<sub>10</sub> with the health benefits to New Zealanders by reducing air pollution. Costs and benefits of these viable options have been identified.

The Ministry, in identifying the costs and benefits of viable options has made a number of assumptions. The Ministry will seek to confirm or amend these assumptions through the proposed consultation process. The Ministry will run targeted workshops to further test these assumptions on costs and benefits.

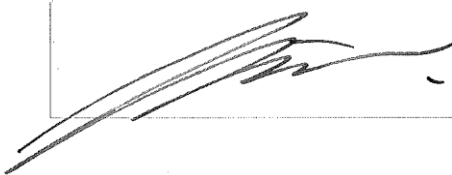
The Ministry is particularly interested in seeking information from stakeholders on the cost to industry and councils of complying with the various regulatory interventions proposed. Information on the drivers behind industry's decisions to establish businesses which emit PM<sub>10</sub> in particular areas (i.e. industry opportunity costs) will be sought through these targeted workshops.

The Ministry has no quantifiable information on the competition effects of air quality standards on industry (i.e. whether air quality standards are an impediment or encouragement to increased competition within airsheds). Competition effects are not considered material when considering air quality interventions

Further work will be undertaken on finalising transition periods to ensure that new regulations are implemented in the most effective and efficient manner.

Kevin Currie

Director, Environmental Protection, Ministry for the Environment



[Date] 12-5-10

## Background

Particulate matter (PM) is a collective term used to describe very small solid or liquid particles in the air, such as dust, smoke or fog.

PM<sub>10</sub> is an air pollutant of particular concern because high levels have been recorded in urban areas where majority of the population live. A PM<sub>10</sub> particle is less than 10 microns in diameter, or one-fifth of the diameter of human hair. These are easily inhaled and can be readily absorbed into the lungs. As a result, PM<sub>10</sub> can cause significant health effects, particularly for the elderly and infants, people with asthma and other respiratory diseases, and sufferers of other chronic diseases, such as heart disease.

Most PM<sub>10</sub> in New Zealand comes from burning solid fuels (ie, coal and wood) for home heating. This, along with the more frequent settled weather conditions during winter, is why most peak PM<sub>10</sub> levels occur during this time of year. Exhaust emissions from vehicles are another significant source of PM<sub>10</sub> in cities like Auckland. Industry, as well as natural sources such as pollen, mineral dust and sea salt, can also contribute to PM<sub>10</sub> levels. However, the sources and their contribution to PM<sub>10</sub> levels change during summer when transport and industry emissions become the major sources of emissions.

The specific drivers of PM<sub>10</sub> differ from region to region (and even within regions). Some regions have a focus on domestic emissions (Christchurch and Nelson); others are driven by industry (some areas in Otago) and others by transport (Auckland). Most regions (including those mentioned) face multiple drivers of PM<sub>10</sub> emissions and therefore require multi-faceted approaches to managing emissions. This has led Government to provide frameworks which establish environmental bottom lines with the capacity for localised solutions to meet those standards. Additionally Government has made significant progress in managing emissions from the transport sector (fuel emissions standards etc).

## Air Quality Standards

In October 2004, the Government introduced the national environmental standards for air quality<sup>1</sup> (the air quality standards). The air quality standards are regulations made under sections 43 and 44 of the Resource Management Act 1991 (RMA).

The air quality standards include:

- seven standards banning activities that discharge significant quantities of dioxins and other toxics into the air
- five standards for ambient (outdoor) air quality
- a design standard for new wood burners installed in urban areas
- a requirement for landfills over 1 million tonnes of refuse to collect greenhouse gas emissions.

On 10 June 2009, five years after the air quality standards took effect, the Minister for the Environment, Hon Dr Nick Smith, announced a review of the air quality standards. This review focused on the ambient air quality standards, particularly the regulation for particulate matter less than 10 microns in diameter (PM<sub>10</sub>). The Minister specifically wished to review three aspects of the PM<sub>10</sub> regulations. These were:

- the number of permitted exceedances of the standard
- the restrictions imposed on industry consents (Regulations 17 to 19)

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<sup>1</sup> Its full title is *Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins and other Toxics) Regulations 2004*.

- the associated timeline of 2013 for airsheds to comply with the standards to prevent industry consent restrictions to take effect.

The Minister appointed an independent technical advisory group (TAG) to support this review. The TAG prepared an independent report for the Minister – Air Quality – Getting the Balance Right, Report of the Technical Advisory Group on National Air Quality Standards. This report was presented to the Minister on 17 November 2009. A revised cost-benefit analysis report was prepared by the New Zealand Institute of Economic Research (NZIER) – The value of air quality standards: Review and update of cost benefit analysis of National Environmental Standards on air quality – to assist the review.

## Status quo

The ambient air quality standards are the minimum requirements that outdoor air quality should meet in order to guarantee a set level of protection for human health and the environment. The phrase ‘set level of protection’ is quite deliberate – it does not mean that all adverse health impacts will be avoided. This is because some pollutants (eg, PM<sub>10</sub>) do not have a ‘safe’ threshold under which no adverse health impacts will be experienced.

## Number of exceedances

The national environmental standard for air quality currently allows one permissible exceedance of the PM<sub>10</sub> standard in a year for each airshed. A breach of the standard occurs when the PM<sub>10</sub> standard is exceeded more than once in a year. Complying airsheds exceed the standard once or not at all in a year.

## Resource consent restrictions

The air quality standards set restrictions on resource consents depending on the state of air quality in the airshed and the significance of the discharge. If the impact of the discharge is significant and it is into an airshed where the PM<sub>10</sub> standard is breached, then an application for consent must be considered in accordance with either a straight or curved line path to compliance<sup>2</sup> (Regulations 17A and 17B). Consent applications can also be considered in accordance with Regulation 17C which allows the granting of consent if the increase in PM<sub>10</sub> brought about by the discharge is offset. Offsets mitigate the predicted impacts of an activity by reducing emissions elsewhere in the airshed.

There are no consent restrictions for consent applications in complying airsheds if the discharge will not cause the airshed to breach the PM<sub>10</sub> standard. However, the consenting authority must decline the consent application if the discharge will cause the airshed to breach the standard (Regulation 18).

Regulations 17 and 18 are effective from 1 September 2005 to 1 September 2013.

Beyond 1 September 2013, consent authorities must decline all resource consent applications to discharge PM<sub>10</sub> into the airshed if the airshed breaches the PM<sub>10</sub> standard or if the discharge is likely to cause the airshed to breach (Regulation 19).

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<sup>2</sup> The ‘straight line path’ and ‘curved line path’ are projections of how the regional council will attain compliance with the PM<sub>10</sub> standard by 1 September 2013. Regional paths are shown on the Ministry for the Environment’s website at <http://www.mfe.govt.nz/environmental-reporting/air/air-quality/pm10/nes/index.html>

## Compliance by 2013

The compliance timeline of 1 September 2013 is connected with the implementation of the industry consent restrictions. Compliance with the PM<sub>10</sub> standards by this date retains the ability of regional councils to grant industry consents (ie, not to be affected by Regulation 19).

## Cost-benefit analysis

Costs and benefits of the status quo have been derived from the status quo (A) stated in the NZIER report. This base status quo assumes that compliance will be achieved by 2013 leading to no industry penalties and the achievement of the full health benefits of the regulations.

However, we estimate that 10 airsheds are unlikely to comply with the standard by 2013 with another five airsheds possibly not complying. Because of this, an estimated status quo (B) was calculated based on the Ministry for the Environment's best estimate of current levels of actual and predicted compliance. The assumptions for status quo (B) include:

- compliance is achieved by 2017
- an estimated economic loss of \$22.3M per year for three years in value added to a region's economy for each industry that fails to obtain a consent due to the industry restrictions
- two industries will be affected per year from 2014 to 2017.

The benefits of achieving compliance by 2017 are reduced from \$1,289M (status quo (A)) to \$685M (status quo (B)). This is mainly caused by health losses (eg, increase in premature deaths and hospitalisations). Costs, on the other hand, increase from \$333M to \$485M. This increase in cost is from the loss of value added to a region's economy from the affected industries. This includes effects on employment and downstream suppliers.

The status quo discussed in this document shall hereafter refer to status quo (B).

Refer to figure 1 for the current regulatory framework for PM<sub>10</sub>.

## Problem definition

Air quality is influenced by various factors, each having a significant effect on pollution levels in an airshed. These include weather (eg, wind patterns, temperature), geography and the number and type of emission sources (both natural and anthropogenic). For example, a smaller airshed with few emission sources may have higher pollution levels than a larger airshed with a greater number of emission sources. This can be caused by very stable conditions in the smaller airshed or the presence of temperature inversions that do not allow for pollutant dispersion. This shows the localised nature of air quality and the complexity of airshed management.

Three problems have been identified with the air quality standards requiring review

- perceived stringency of the PM<sub>10</sub> standard
- equity of current regulations
- compliance with the PM<sub>10</sub> standard by 2013

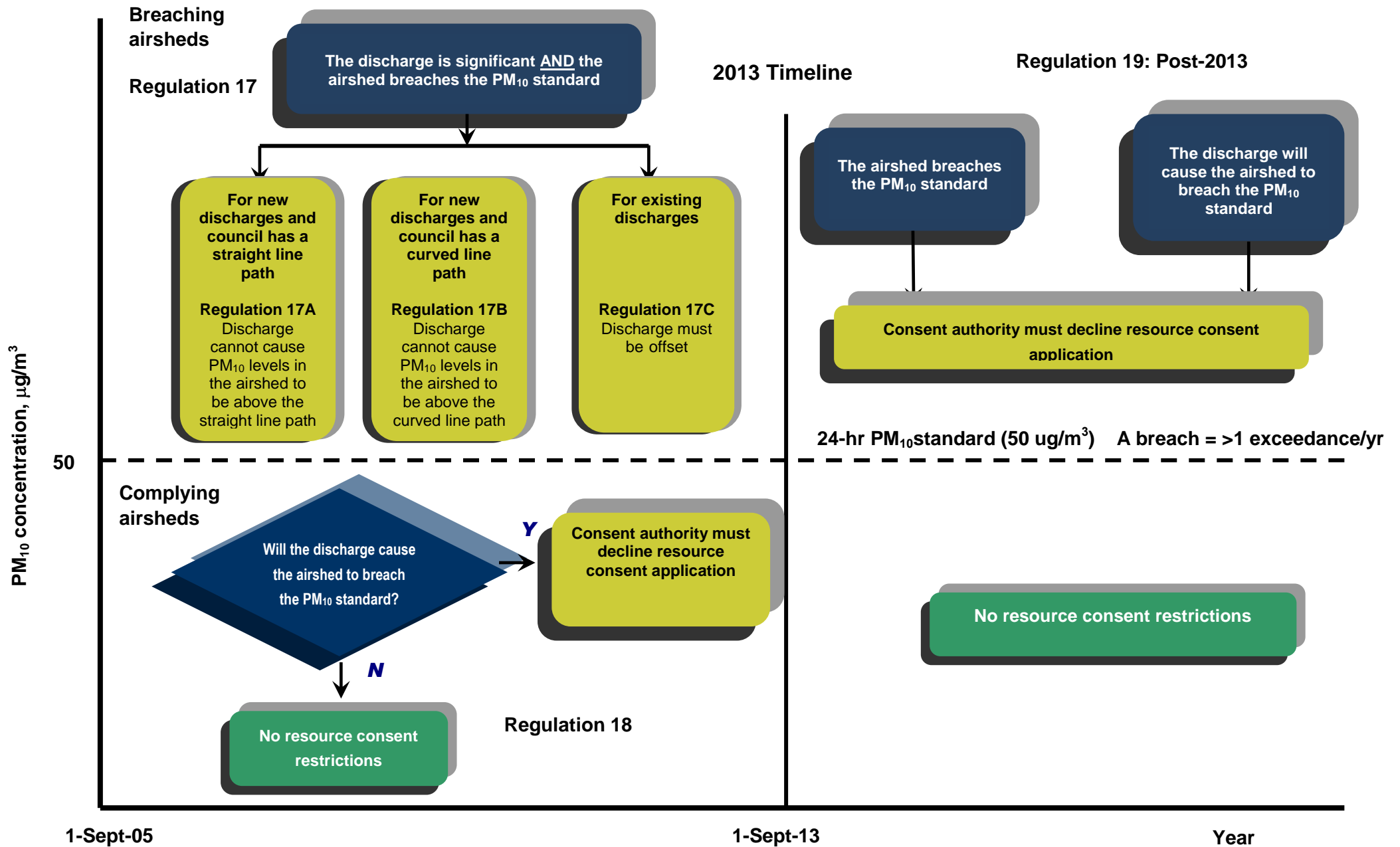


Figure 1. Current regulatory framework for PM<sub>10</sub>

## Perceived stringency of the PM<sub>10</sub> standards

Comparison with international air quality regulations show that other countries/organisations allow more exceedances in a year before the standard/guideline is breached. For example, Australia permits five exceedances of their national environmental protection measure for PM<sub>10</sub> and the World Health Organization accepts three exceedances of the global guideline for PM<sub>10</sub>. This makes one ask if the current level of stringency is appropriate in the New Zealand setting. A related problem is that of exceptional events (eg, bushfires, dust storms from Australia, volcanic eruptions). Current regulation is not clear on how to deal with these events (ie, whether to count these events as exceedances or not). Not providing this clarity may cause an airshed to unnecessarily breach the standard. Exceedances from exceptional events may misinform air quality management policy decisions if these cause the airshed to breach. It may also lead to increased compliance costs for councils and industry.

## Equity

The air quality standards set a bottom line requirement, whereby no resource consent may be issued for any discharge of PM<sub>10</sub> after 2013 if the PM<sub>10</sub> standard is breached in the airshed where the industry is located. Neither the Act, nor most regional plans, requires resource consent for discharges from the domestic sector and, therefore, the burden of these restrictions fall on industry (which do require resource consents). Moreover, studies have shown that domestic solid-fuel combustion, not industry, is the primary source of PM<sub>10</sub> pollution during winter, and hence these restrictions may not be equitable. The current restrictions also create investment uncertainty since the continued operation of industries (post-2013) depends on the compliance of the airshed in which it is located. This has significant economic and social implications.

## Compliance with the PM<sub>10</sub> standard by 2013

The air quality standards were promulgated in 2004 with the intent of compliance with the PM<sub>10</sub> standard (50 µg/m<sup>3</sup> as a daily average being met everywhere, every day of the year but one) by 2013. In 2008, five years before the compliance timeline, there were still 26 airsheds, representing 49 per cent of New Zealand's population, which did not comply with the PM<sub>10</sub> standard (refer to appendix 1). Air quality monitoring data shows that compliance rates for monitored airsheds are yet to reach 50 per cent<sup>3</sup> since the implementation of the standards.

We anticipate that in 2013 there will still be 10 airsheds that will not comply with the PM<sub>10</sub> standard with another five airsheds potentially also exceeding. These 15 airsheds represent 45 per cent of New Zealand's population.

The *Health and Air Pollution in New Zealand* (HAPiNZ) report<sup>4</sup> showed that around 1100 New Zealanders die prematurely from air pollution. In addition, air pollution is associated with over 700 extra hospitalisations and over 1.9M restricted activity days<sup>5</sup>. Another study conducted by Public Health South<sup>6</sup> showed that hospitalisation rates are significantly higher for residents of high pollution areas in Otago than for residents in low pollution areas. The study further showed that children under 5 years old living in areas with higher particulate levels are more than twice as likely to be admitted to hospital with a respiratory condition as children living in areas with low particulate levels. This demonstrates the health costs associated with non-compliance to the PM<sub>10</sub> standards.

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<sup>3</sup> The highest rate of compliance for monitored airsheds was in 2007 when 42 per cent of monitored airsheds complied with the standard. The lowest compliance rate was in 2006 when 27 per cent of monitored airsheds complied.

<sup>4</sup> This report can be accessed on the HAPiNZ website at [www.hapinz.org.nz](http://www.hapinz.org.nz)

<sup>5</sup> Restricted activity days are days on which people cannot do the things they might otherwise have done if air pollution was not present.

<sup>6</sup> Investigation of the Effect of Air Quality in Otago on Hospital Admission Rates, Public Health South Policy Planning and Information Team, June 2006

Airshed compliance costs vary from council to council depending on the scale of non-compliance. These can range from \$60k to \$5.5M per year as shown below:

- Tasman District Council - has implemented a rule requiring an upgrade of a non-compliant burner at the time a house is sold in Richmond and estimate they are spending \$60k per year to educate people about changing around 1,000 burners.
- Environment Bay of Plenty - are proposing a mixture of rules and financial assistance schemes, they estimate net costs of around \$10M in their ten-year plan to target around 8,500 burners in Rotorua.
- Environment Canterbury - has implemented a rate-based financial assistance programme for low-income households in Christchurch and budgeted nearly \$60M over 11 years to take out around 30,000 burners.

This shows the extent of work and funds needed to comply with the standards. Some councils, such as Nelson City Council, Tasman District Council and Environment Canterbury have taken significant steps towards complying with the standard while other councils have only just begun to address the problems in their airsheds.

## Objectives

The main objective of the PM<sub>10</sub> regulations review is to ensure they provide the maximum net benefit to New Zealanders taking into account the economic, social and environmental benefits and costs of air pollution. In line with this, the air quality standards review policy objectives are:

- Provision of greater certainty for industry by providing a “level-playing field” that clarifies environmental expectations prior to the resource consent process;
- Support for the protection of public health and the environment by providing a bottom-line standard that shall not be breached; and
- Provision of greater certainty in resource consent decision-making and regional plan preparation at the local level.

## Assumptions

The air quality standards review centres on addressing the problems identified in its terms of reference. Recommendations and submissions on other issues outside the scope of this review will be considered separately. Examples include the transport-related options included in the technical advisory group (TAG) report. These options have been referred to the Ministry of Transport for further consideration.

## Regulatory impact analysis

### 1.0 Technical Advisory Group recommendations

#### ***1.1 Increase the number of permitted exceedances to three per year***

This option was recommended by the technical advisory group (TAG) to align New Zealand's standard with that of the World Health Organization's (WHO) guideline<sup>7</sup>. Alignment with WHO's guideline was included in four of the six district health board submissions to the TAG.

The World Health Organization has established the adverse health effects of exposure to particulate matter through extensive epidemiology studies. Effects from particulate matter exposure have no safe threshold where no health effects can be experienced. Increasing the number of permitted exceedances to three per year will, therefore, have increased adverse impacts on public health. The estimated increase in premature mortality with this option is an extra 24 deaths per year (refer to appendix 2).

Effects on the status of compliance for over-allocated airsheds<sup>8</sup> are minimal with this option. However, the increase will positively impact on the status of compliance for approximately three to six airsheds that currently have two to three exceedances of the standard per year. This option will not only provide certainty but also has increased credibility.

This option does not optimise the policy objective of protecting public health since it is known that an increase of permitted exceedances will increase adverse health effects. This will result in transference of costs to the health sector.

#### ***1.2 Exclusion of exceptional events from being counted as exceedances***

The effects of exceptional events<sup>9</sup> on airshed compliance may be greater than initially assumed. An average of over 3,000 wildfires occurs in New Zealand annually, burning almost 5,900 hectares of grasslands, scrublands and forests<sup>10</sup>. Sixty per cent of these fires occur in the North Island and 34 per cent in the South Island.

Excluding exceedances to the PM<sub>10</sub> standard brought about by exceptional events is a more effective way of showing air quality in an airshed. This approach will provide greater clarity for councils in dealing with these events (ie, whether to count them as exceedances or not) and in drafting air quality management plans. It will also bring more investment certainty and equity since airshed compliance will not be based on uncontrollable events.

There may be ambiguity in classifying exceptional events. Clear guidance on classifying these events needs to be prepared by the Ministry for the Environment to mitigate any risks from this option.

#### ***1.3 Remove all industry consent restrictions (Regulations 17 to 19)***

This option involves the removal of all restrictions stated in Regulations 17 to 19. Industry consents will be assessed in accordance with regional air plan rules.

Removing all industry consent restrictions will provide industry with certainty since the process used in consents processing will be the established rules in the region's air plan.

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<sup>7</sup> Air Quality Guidelines Global Update 2005, World Health Organization, 2005.

<sup>8</sup> Over-allocated airsheds are airsheds with more than 10 exceedances of the PM<sub>10</sub> standard per year.

<sup>9</sup> Examples of these events include volcanic eruptions, dust storms (local and trans-boundary) and wildfires/bushfires.

<sup>10</sup> Rural Fire Research Update retrieved from [http://www.scionresearch.com/\\_\\_data/assets/pdf\\_file/0007/4489/SCION-RFRU-Issue-3\\_web.pdf](http://www.scionresearch.com/__data/assets/pdf_file/0007/4489/SCION-RFRU-Issue-3_web.pdf)

This option also has credibility since industry won't be unduly penalised and no threat to industry operations will be present. Critically, it gives councils the option to grant discharge consents for new industry as opposed to the status quo, which requires that consents be declined in breaching airsheds. However, there may still be equity issues surrounding this option. Although domestic emissions are the main source of PM<sub>10</sub> in winter (May to September), industrial emissions become a major or even the main source of PM<sub>10</sub> for the rest of the year<sup>11</sup> in some airsheds.

The risks of this option is that there will be no driver for industries to opt for clean technologies since there are no controls on the amount of emissions they discharge (unless regional councils have established emission caps).

#### **1.4 Extension of compliance timeline to 2020**

This option is an extension of the timeline for compliance to no later than 2020. Twenty-eight per cent of submitters to the TAG supported an extension of the timeline for compliance.

This option gives greater certainty for councils to comply with the standards at the same time still retaining pressure for action. Almost one-third of the responses from submitters to the TAG opted for an extension of the 2013 timeline compared with over one-tenth opting to retain the status quo<sup>12</sup>. A major trade-off for this option is the extension of the pollution exposure of populations living in breaching airsheds. This longer exposure period will result in increased health costs. However, an extension of the compliance timeline to 2020, used in conjunction with other options, may bring about earlier compliance with the standards.

This option significantly reduces the net benefits of achieving the standard by 2013 brought about by increased adverse health impacts. Extending the timeline for compliance may also be seen as inequitable for councils who have put in significant work and money to comply with the standards. Benefits from these early actions will decrease with the extension of the deadline. This option may also be seen as supporting those councils who have not taken steps to comply with the standards.

#### **1.5 Greater focus on education to increase public awareness of the health hazards of PM<sub>10</sub> exposure**

This TAG recommendation aims to support regulations by making them sustainable and credible. Buy-in from the public is essential in implementing measures that impose a considerable financial burden on stakeholders (eg, requiring wood burner conversions). Making the public aware or increasing their awareness of the adverse health effects of air pollution could help them recognise they are part of the solution to the problem. Quite a number of regional council websites contain extensive information on the health effects and causes of air pollution in their regions. Because of this, additional information at the national level may not be as cost-effective.

#### **1.6 Mandatory reporting of PM<sub>10</sub> monitoring results in all airsheds**

This recommendation is connected with public education by informing the public of the level of PM<sub>10</sub> in the airshed. It requires councils to report the results of PM<sub>10</sub> monitoring in their airsheds within three months of the end of each year. This is an expanded version of current regulation (Regulation 16) which requires public reporting of all exceedances of the

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<sup>11</sup> For example, emissions inventory data for Mosgiel (2005) shows that industry emissions comprise 100 per cent of emissions for three months (December to February) and is the main source of emissions for another 4 months of the year (March, April, October and November).

<sup>12</sup> Summary of submissions to the Technical Advisory Group for the review of the air quality standards, Ministry for the Environment, 2009.

standards. This option will require not only the reporting of exceedances but also of other monitoring data such as annual PM<sub>10</sub> averages and highest 24-hour concentrations. Regular reporting such as this would promote transparency and support existing education campaigns at the regional level.

### **1.7 Airshed Implementation Plans**

The TAG recommended that councils with airsheds that are unlikely to comply with the PM<sub>10</sub> standard by 2013 be required to submit to the Minister for the Environment an airshed implementation plan (AIP) for each non-complying airshed in their region. These plans will include information on how and when the standard will be achieved. This includes:

- Actions the council has taken to date to comply with the standards
- Future actions to be implemented in the airshed
- Timeline for the airshed to achieve compliance

There was significant support of this option from the submitters to the TAG. Eight of the 15 councils who provided a submission supported this option.

However, this proposal, as the TAG recommended it, is not legally feasible as it would create regulation without the authority of the enabling Act (the Resource Management Act 1991 (RMA)). Because of this, additional analysis of alternative options was undertaken. The result of this analysis is option 2.8. This option could achieve similar outcomes to what the TAG recommended using the existing powers of the Minister in the RMA.

### **1.8 Increased Ministerial oversight**

In connection with the recommendation for the submission of an AIP, the TAG also recommended increasing Ministerial oversight. This will be done through the review of a council's AIP. The Minister may impose a plan if he does not approve the council's AIP (eg, by the Minister appointing a Commissioner to develop a feasible plan). The requirement of AIPs is an approach similar to the system in place in the United States (US). In the US, it is the Environment Protection Agency's Administrator who reviews and approves/declines these plans.

This option is likewise currently not legally feasible as it is connected with option 1.8. Further analysis was also undertaken to find alternative options. The resulting alternative option is discussed as option 2.9.

### **1.9 Investigation of funding links**

This recommendation proposes to investigate the feasibility of linking Energy Efficiency and Conservation Authority (EECA) funding to address domestic emissions. The TAG proposes to link EECA clean heating grants to convert open fires and non-compliant wood burners in areas where no plan is in place to meet the standards. Providing funding in regions without plans in place may, however, be seen as rewarding councils who have not taken steps to meet the standards.

### **TAG recommendations outside the scope of the review**

The TAG made additional recommendations and identified options for issues outside the scope of the review. As such, they will be acted on separately or referred to the relevant government department (eg, Ministry of Transport). They are:

1. Investigate the development of longer-term averaging standard for PM<sub>10</sub>
2. Investigate the development of a short and longer-term standard for PM<sub>2.5</sub>

3. Update the Health and Air Pollution in New Zealand report
4. Emission screening of light-duty vehicles
5. Emission testing of heavy-duty vehicles
6. Accelerated/increased vehicle scrappage

The final TAG report, Air Quality – Getting the Balance Right, includes all TAG recommendations together with a summary of submissions to the TAG. This report can be accessed on the Ministry for the Environment’s website at [www.mfe.govt.nz](http://www.mfe.govt.nz)

## **2.0 Other options considered**

These include options from submitters to the TAG, the status quo and additional options resulting from further analysis by the Ministry for the Environment.

### **2.1 Percentile approach**

This approach was suggested by submitters to the TAG. It involves the use of percentiles (eg, 99th percentile) in determining compliance. This approach requires the statistical analysis of monitoring data. The percentile used will then correspond to a number of days per year (eg, 99<sup>th</sup> percentile will correspond to more than three daily exceedances per year). This approach is used by the World Health Organization.

The major issue with this option is its credibility. As stated in the TAG report, this option ‘does not pass the test of being simple<sup>13</sup>’. An additional component of this option is the need for more public education on how exceedances are computed.

A risk identified by the TAG is that this option ‘risks causing confusion in an area where public understanding of the issues needs to be enhanced, not undermined<sup>14</sup>’.

### **2.2 Rolling averages approach**

This option involves computing exceedances over a moving, multi-year time period. A number of permissible exceedances are identified together with a time period over which exceedances will be averaged. An example is the current limit used in the United States where the permitted number of exceedances is one per year averaged over three years.

The impact of this option is similar to that of the percentile approach. It is not a simple approach to use and significant public education needs to be undertaken for the public to understand how the approach works. It also does not provide certainty for investors and councils. Using the example above, if an airshed exceeds 3 times in one year, then it cannot exceed even once in the next two years to ensure it remains compliant with the standard. This means the status of airshed compliance for future years are significantly affected by the airshed’s performance the previous year. This approach likewise would make regulations more confusing and harder to implement.

### **2.3 Retain one permitted exceedance of the standard per year**

This option retains the status quo in light of the additional adverse health effects (including premature deaths) brought about by permitting additional exceedances. An increase in

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<sup>13</sup> Air Quality – Getting the Balance Right, Report of the Technical Advisory Group on National Air Quality Standards, p44.

<sup>14</sup> Ibid.

permitted exceedances will bring about transference of costs from councils, industry and the public to the health sector.

#### **2.4 Retain all industry restrictions**

This option likewise retains the status quo and gives greater weighting on decreasing/removing the adverse health effects of industry emissions. Not allowing the granting of industry consents in breaching airsheds after 2013 will bring about transference of compliance costs to the industry sector.

#### **2.5 Remove industry consent requirements (Regulations 17A, 17B, 18 and 19) but retain a revised offset requirement (mandatory offsets) for all industries in breaching airsheds after 2013**

This option proposes to remove the straight/curved line path condition for industry consents in breaching airsheds and industry consent restrictions after 2013. However, a revised offset<sup>15</sup> requirement will be retained by making offsets mandatory for significant discharges (existing and new) in breaching airsheds. Just like option 1.3, this gives councils the option to grant discharge consents for industry as opposed to the status quo, which requires that consents be declined in breaching airsheds.

This option promotes a 'do no harm' approach and ensures that emission levels do not get worse. As such, a level of public health protection is achieved. This option is less stringent than the current straight/curved line path requirements since it only ensures that things do not get worse, as opposed to mandating action to make things better. Like the option recommended by the TAG, an important feature of this option is that councils can continue to issue discharge consents for industry after 2013 as opposed to the status quo. It appropriately addresses the need for industry discharge controls at the same time providing industry with investment certainty. Councils and industry already have an idea of how this scheme works since it is included in the current regulations. Offsets are part of the conditions of three industrial consents issued by Environment Canterbury since the standards took effect (refer to appendix 3). Despite this, offsets may still be seen as an inequitable restriction on industry.

#### **2.6 Remove industry consent requirements (Regulations 17A, 17B, 18 and 19) but retain a revised offset requirement (mandatory offsets) for new industries in breaching airsheds after 2018**

This is very similar to option 2.5. The difference lies in the industries to be affected and the timeline for the mandatory offsets to take effect. This option only requires mandatory offsets for new industries in breaching airsheds. Moreover, councils are given more time to comply with the air quality standards before mandatory offsets take effect.

New industries will incur additional costs due to offsets. As such, it may put them at a commercial disadvantage. On the other hand, mandatory offset requirements may steer them to adopt cleaner technologies from the start.

#### **2.7 National guidance on solid-fuel home heating emission restrictions in breaching airsheds**

This option seeks to target the main source of PM<sub>10</sub> emissions during winter. Studies have shown that solid-fuel home heating appliances (eg, open fires, wood burners, coal and multi-fuel heaters) emit the most PM<sub>10</sub> during winter when the use of home heating is at its peak.

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<sup>15</sup> Offsets mitigate the predicted impacts of an activity by reducing emissions elsewhere in the airshed. Reducing the emissions of a hospital boiler in an airshed where an industrial development will discharge five tonnes of PM<sub>10</sub> is an offset example.

The option involves guidance on mandatory domestic emission controls for any airshed that breaches the standard. This will provide best practice guidance to manage domestic fires. This may be followed by additional domestic controls imposed by local councils. Further information on costs of such an approach will be sought through targeted consultation. Examples of controls include a rolling schedule of domestic emission controls that take effect every three years. Each stage will introduce additional controls if the airshed continues to breach the PM<sub>10</sub> standard (eg, first stage – ban new open fires, second stage – add a ban on the use of existing open fires, third stage – add a ban for new and existing coal, multi-fuel and non-complying wood burners).

A number of councils have already adopted domestic emission control measures (Nelson City Council, Environment Canterbury, Hawke's Bay Regional Council) and have included them in their regional air plans without the need for central government guidance. Air quality monitoring data has shown this approach's effectiveness in reducing both PM<sub>10</sub> concentrations and the number of times the PM<sub>10</sub> standard is exceeded. This results in reduced pollution exposure. It also promotes equity since domestic emissions are the main source of PM<sub>10</sub> emissions during winter, when almost all exceedances of the standard occurs.

For example, an airshed breaching in 2013 results in a ban on new open fires in the airshed from 2013 onwards. An assessment at the end of the 3-year period (2017) will be undertaken to see if the airshed complies with the standard. The airshed will no longer be subject to the second stage of restrictions if it complies but if it breaches from 2017 onwards it will be subject to additional restrictions. Another assessment will be conducted after three years to determine whether the airshed will be subject to further controls or not. It is anticipated that compliance will be achieved after three stages have taken effect. Appendix 4 shows a diagram of this process.

## ***2.8 Use of existing Ministerial powers under the Resource Management Act 1991 (RMA)***

The RMA currently provides the Minister with various oversight powers. Section 27 of the RMA is one of them. This involves the power of the Minister to request information from councils. The information requested can be modelled after the airshed implementation plans (AIP) recommended by the TAG. The advantage of this option is that it can be implemented straight away without the need for revising legislation.

Getting information from councils is an effective way of determining council performance. The assessment of performance which follows this survey of councils will also pave the way for recognising councils who have done excellent work thus far. On the other hand, it will also identify councils that have not taken steps to address their air quality issues.

## ***2.9 Preparation of an air quality compliance strategy***

The air quality compliance strategy will outline the complete suite of options the Minister may take when councils fail to take action to address non-compliance and airsheds continue to breach the standard. This seeks to provide an alternative to the TAG recommendation of increased Ministerial oversight. It includes using powers currently available to the Minister under the RMA (council review under section 24 and requirement of a plan change under section 25). In addition, the strategy will also include actions involving the linking/removal of funding and exploring other funding options (eg, voluntary targeted rates). This is to be used in conjunction with option 2.8 to achieve similar outcomes to the TAG recommendation for Minister-approved airshed implementation plans (option 1.7 and 1.8).

This option would provide certainty to councils by providing a clear picture of what possible sanctions their non-compliance may have. This is an approach aimed at ensuring councils are taking steps to reduce pollution levels in their airsheds. Local solutions to local problems are encouraged but with increased Ministerial oversight.

### **2.10 Preparation of a National Policy Statement (NPS)**

The NPS is an RMA-based instrument that can set compliance objectives (targets) of the air quality standard by a set date. It will require councils to prepare policies which include methods for achieving the standard. The Environment Court will decide whether a regional plan gives effect to the NPS (s82).

This option is able to achieve some of the components of the TAG's recommendation for Minister-approved airshed implementation plans. However, an NPS of this nature is narrow in focus and probably does not justify a high level NPS. It would also have a marginal advantage compared with using the national environmental standards alone. Hence, it would have credibility issues. The process of preparing an NPS and the subsequent changes to and implementation of regional plans will also take significantly longer to take effect (approximately 3 to 4 years). As such, it delays the move towards compliance and extends the population's pollution exposure. It will achieve similar outcomes to the use of the Minister's powers under section 27 of the RMA paired with a compliance strategy but would cost significantly more for the Ministry and councils and would take longer to draft and implement.

Addressing the problem of compliance will significantly be delayed with this option.

### **2.11 Amendment of the Resource Management Act 1991 to allow for the requirement of Minister-approved airshed implementation plans**

This option proposes to amend the RMA, which is the enabling act, to allow for Minister-approved implementation plans.

This amendment has the potential to be applied to all national environmental standards. However, the requirement of airshed implementation plans still needs to be fully scoped in terms of its relationship with regional, community and annual plans. Other aspects such as the status and process of developing these plans also need to be identified. The inclusion of any sanctions for not achieving a standard will also need to be fully scoped in terms of the overall intent of the RMA and Local Government Act 2002. Amending the RMA and the resulting application of the changes at the council level (eg, drafting of plans) will take approximately 4 to 5 years.

A significant risk for this option is the possibility of proving, after careful review, that amending the RMA is not recommended. In this case the problem of compliance has not been addressed and another round of analysis will need to be undertaken.

## **3.0 Packaged options**

Standards are not standalone regulations that address a specific problem. Problems to be solved are interconnected and as such require a combination of options that would result in a realistic balance between benefits and costs. Options form part of a spectrum. At one end, options impose externalities on polluters to meet PM<sub>10</sub> standards; at the other end, certainty for industry and councils in fairly slow implementation of air quality standards.

Options that were not feasible/practical have been ruled out. These include options 2.1, 2.2, 2.10 and 2.11. Options 2.1 and 2.2 both run the risk of making the regulations more

confusing thereby diminishing their credibility. Options 2.10 and 2.11 will both take a significant amount of time and resources to take effect. These options may achieve similar outcomes but will significantly delay the timeline for compliance, increase costs and reduce certainty for all participants during the interregnum between passage of these instruments/restrictions.

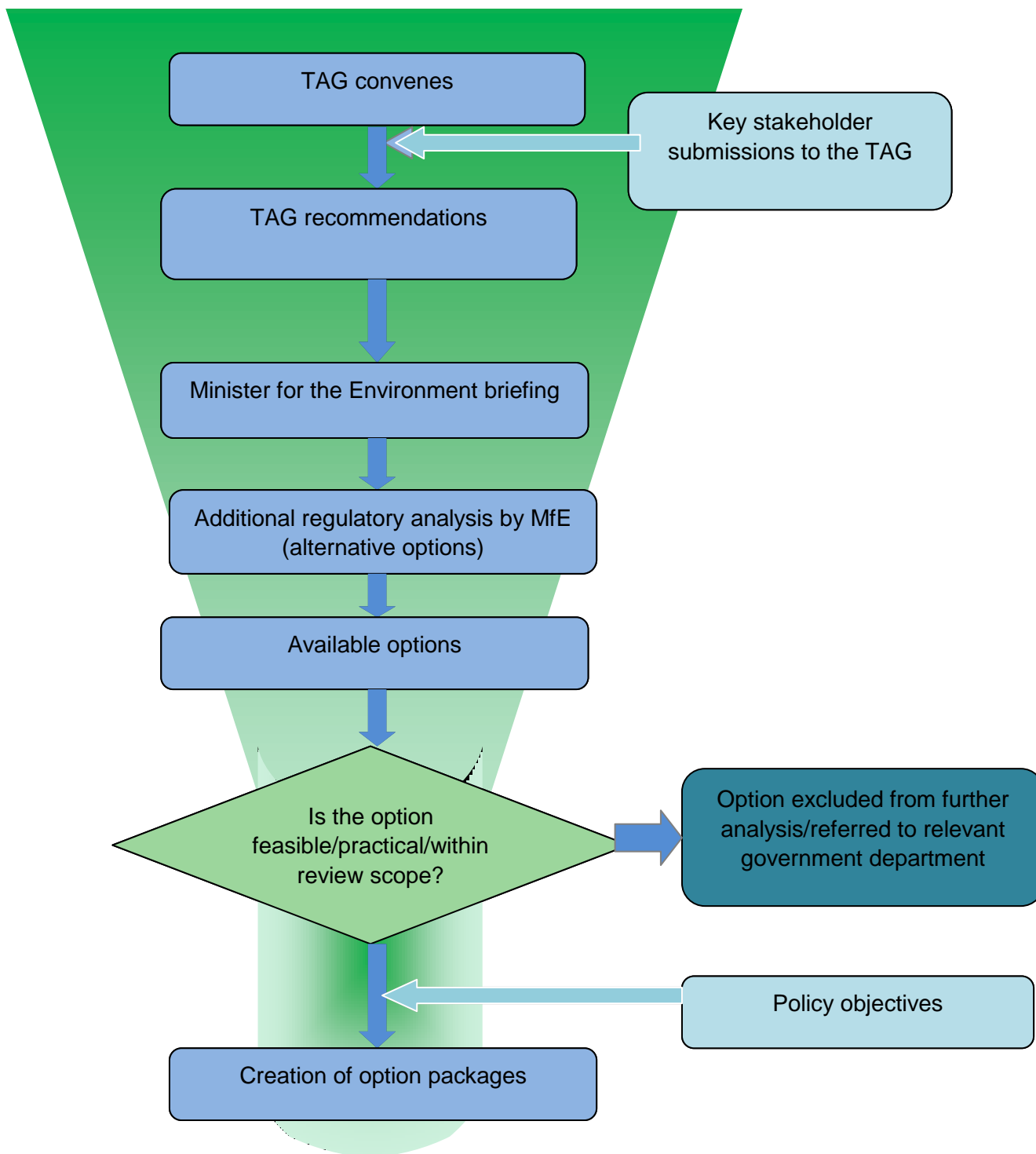
Quite a number of combinations can be made with the number of available options described in the previous section. To simplify this, four additional option packages were created in addition to the TAG's recommendations. The TAG recommendations (Option 1) form the foundation of these option packages. Option variations occur depending on what objective the option seeks to achieve. The process used to create these packages is shown in figure 2. These packages show different scenarios that aim to achieve the policy objectives.

Table 2 shows a summary of the proposed option packages compared with status quo. All options are assessed for the period 2008-2020 in alignment with the NZIER cost-benefit analysis. All options are also assessed against the current standards assuming compliance by 2017 and the implementation of industry bans after 2013.

### **Option 1 – TAG recommendations**

- **Increase permitted exceedances from 1 to 3**
- **Exclude exceptional events from being counted as exceedances**
- **Remove all industry consent restrictions**
- **Extend timeline for compliance to 2020 (maximum)**
- **Greater focus on education**
- **Mandatory reporting (PM<sub>10</sub> monitoring data)**
- **Submission of Airshed Implementation Plans**
- **Increased Ministerial oversight**
- **Investigate funding links (link funding in areas without a plan in place)**

This option has an estimated benefit of \$383M which is \$302M less than the status quo (\$685M). This is due to reduced health benefits from prolonged public exposure to elevated PM<sub>10</sub> levels. It is also anticipated that annual average PM<sub>10</sub> levels will increase leading to an increase in premature deaths (refer to appendix 2). However, costs for this option are \$344M less than the status quo (\$438M). This is due to the removal of industry losses resulting from the current industry consent restrictions and the extension of the timeline for compliance to 2020.



**Figure 2. Process used in the creation of packaged options**

## Option 2

- **Retain 1 permitted exceedance**
- **Retain industry restrictions**
- **Retain 2013 timeline for compliance**
- **Greater focus on education**
- **Mandatory reporting (PM<sub>10</sub> monitoring data)**
- **Use of existing Ministerial powers under the RMA (s27)\***
- **Establishment of an air quality compliance strategy\***
- **Investigate funding links (link funding to breaching airsheds)**
- **National guidance on domestic emission restrictions**

\* - These replace the TAG recommendation for Minister-approved AIPs

This option package maximises the policy objective of protecting public health. As such, it retains the status quo provisions on industry restrictions, number of exceedances and the timeline for compliance of 2013. This is packaged with the remaining recommendations of the TAG (eg, mandatory PM<sub>10</sub> reporting, education on health effects, funding links) except for the exclusion of exceptional events. To further increase public health protection, this option also includes a provision on national domestic emission restrictions.

Significant costs for industry remain with the retention of industry consent restrictions. However, option 2 also imposes costs to the domestic sector by imposing national domestic emission controls. Councils are also anticipated to incur increased costs to comply with the standards by 2013. This timeline and significant economic costs imposed on the industry sector decreases the credibility of this option. Since it is anticipated that some airsheds will still breach by 2013, the date of compliance for this option is assumed to be 2015.

Option 2 has an estimated benefit of \$987M brought about by health benefits and a cost of \$268M. This results in an increase in benefits of \$302M and a decrease in costs of \$170M compared with the status quo.

## Option 3

- **Retain 1 permitted exceedance**
- **Exclude exceptional events from being counted as exceedances**
- **Mandatory offsets for all discharge consents in breaching airsheds after 2013**
- **Retain 2013 timeline for compliance**
- **Greater focus on education**
- **Mandatory reporting (PM<sub>10</sub> monitoring data)**
- **Use of existing Ministerial powers under the RMA (s27)\***
- **Establishment of an air quality compliance strategy\***
- **Investigate funding links (link funding to breaching airsheds)**
- **National guidance on domestic emission restrictions**

\* - These replace the TAG recommendation for Minister-approved AIPs

This option package aims to equally weigh obtaining health benefits and ensuring equity. The status quo for the number of exceedances and the compliance timeline of 2013 are retained to minimise adverse health effects. Industry consent restrictions are partially repealed. This allows councils to grant industry resource consents and provides industry with greater

certainty. However, not all controls have been removed. To address the issue of equity, this option includes a provision that requires mandatory offsets for all industries in breaching airsheds after 2013 together with national domestic emission controls.

Excluding exceptional events from being counted as exceedances has been included in this option to provide councils with greater clarity in managing air quality in their airsheds. The assumed timeline for compliance with this option is 2015.

Councils with breaching airsheds (despite industry and domestic controls) will be subject to increased Ministerial oversight in the form of airshed performance monitoring through the powers of the Minister to require information under section 27 of the Resource Management Act 1991. This will be complemented by an airshed compliance strategy developed by the Ministry for the Environment.

All industries either applying for a renewal or a new consent will be required to offset their emissions after 2013 if they are located in a breaching airshed.

Total estimated benefits are the same as option 2 (\$987M) due to health benefits from less exposure to elevated PM<sub>10</sub> levels. However, costs are reduced as a result of lower industry costs (offset costs instead of industry losses). The estimated cost of offsetting one tonne of PM<sub>10</sub> ranges from \$21k to \$140k (average of \$80k per tonne). Assuming an average discharge rate of five tonnes per year for each industry, this will equate to an estimated one-time offset cost of \$400k per affected industry. These costs are significantly lower compared with the economic effects of the status quo of \$22.3M<sup>16</sup> per year for three years for each affected industry.

#### **Option 4 – The proposed option**

- **Increase permitted exceedances from 1 to 3**
- **Exclude exceptional events from being counted as exceedances**
- **Mandatory offsets for new industry consents in breaching airsheds after 2018**
- **Extend timeline to 2018 (maximum)**
- **Mandatory reporting (PM<sub>10</sub> monitoring data)**
- **Use of existing Ministerial powers under the RMA (s27)\***
- **Establishment of an air quality compliance strategy\***
- **Investigate funding links (remove funding from breaching airsheds)**

\* - These replace the TAG recommendation for Minister-approved AIPs

This option is almost completely based on the TAG recommendations with the exception of the inclusion of mandatory offsets for new industry consents in breaching airsheds and not putting more focus on education on top of existing programmes. It puts weight on lowering compliance costs and increasing Ministerial oversight over the next 7 years.

In this option, domestic emissions will be addressed through increased Ministerial oversight of Regional Council performance. The Minister will play an active role in monitoring airshed performance by ensuring that councils are addressing air quality issues in their regions. The Minister also intends to take steps to address any gross non-compliance of the standards by establishing an air quality compliance strategy.

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<sup>16</sup> This figure was estimated using the Auckland Regional Council Economic model.

The mandatory offsets provision applies to new industries in breaching airsheds after 2018. It is anticipated that effects to industry will be minimised since Councils have a longer time to comply with the standards.

As a result, this option has a significantly lower cost compared with the status quo (\$126M). However, there is also a \$151M decrease in benefits from \$685M in the status quo to \$534M for this option. Extending the timeline for compliance from 2013 to 2018 decreases direct costs to industry and councils but have also led to a decrease in health benefits by lengthening public exposure to elevated PM<sub>10</sub> levels.

Table 3 shows the summary of effects of the various options as compared with the status quo together with the timeline for compliance for each option.

### **Option 5**

- **Increase permitted exceedances from 1 to 3**
- **Exclude exceptional events from being counted as exceedances**
- **Remove all industry consent restrictions**
- **Extend timeline to 2020 (maximum)**
- **Investigate funding links**

This option has the least benefits (\$232M) which are \$453M less than the status quo. Costs are decreased by \$303M but the resulting net present value is the only one less than the status quo (-\$90M).

Table 3 shows the summary of effects of the various options against the status quo. Appendix 5 shows the summary of costs and benefits of the various options.

Table 2. Summary of proposed option packages compared with the status quo

Status quo	Option 1 (TAG recommendations)	Option 2	Option 3	Option 4	Option 5
<ul style="list-style-type: none"> <li>One permitted exceedance per year</li> <li>Industry consent restrictions from 2013</li> <li>Compliance timeline - 2013</li> </ul>	<ul style="list-style-type: none"> <li>Increase permitted exceedances from 1 to 3</li> <li>Exclude exceptional events from being counted as exceedances</li> <li>Remove all industry consent restrictions</li> <li>Extend timeline to 2020 (maximum)</li> <li>Greater focus on education</li> <li>Mandatory reporting (PM<sub>10</sub> monitoring data)</li> <li>Submission of Airshed Implementation Plans</li> <li>Increased Ministerial oversight</li> <li>Investigate funding links (link funding in areas without a plan in place)</li> </ul>	<ul style="list-style-type: none"> <li>Retain 1 permitted exceedance</li> <li>Retain industry restrictions</li> <li>Retain 2013 timeline</li> <li>Greater focus on education</li> <li>Mandatory reporting (PM<sub>10</sub> monitoring data)</li> <li>Use of existing Ministerial powers under the RMA (s27)*</li> <li>Establishment of an air quality compliance strategy*</li> <li>Submission of Airshed Implementation Plans*</li> <li>Increased Ministerial oversight**</li> <li>Investigate funding links (link funding to breaching airsheds)</li> <li>Guidance on domestic emission restrictions</li> </ul>	<ul style="list-style-type: none"> <li>Retain 1 permitted exceedance</li> <li>Exclude exceptional events from being counted as exceedances</li> <li>Mandatory offsets for <u>all</u> discharge consents in breaching airsheds after 2013</li> <li>Retain 2013 timeline</li> <li>Greater focus on education</li> <li>Mandatory reporting (PM<sub>10</sub> monitoring data)</li> <li>Use of existing Ministerial powers under the RMA (s27)*</li> <li>Establishment of an air quality compliance strategy*</li> <li>Investigate funding links (link funding to breaching airsheds)</li> <li>Guidance on domestic emission restrictions</li> </ul>	<ul style="list-style-type: none"> <li>Increase permitted exceedances from 1 to 3</li> <li>Exclude exceptional events from being counted as exceedances</li> <li>Mandatory offsets for <u>new</u> industry consents in breaching airsheds after 2018</li> <li>Extend timeline to 2018 (maximum)</li> <li>Mandatory reporting (PM<sub>10</sub> monitoring data)</li> <li>Use of existing Ministerial powers under the RMA (s27)*</li> <li>Establishment of an air quality compliance strategy*</li> <li>Investigate funding links (remove funding from breaching airsheds)</li> </ul>	<ul style="list-style-type: none"> <li>Increase permitted exceedances from 1 to 3</li> <li>Exclude exceptional events from being counted as exceedances</li> <li>Remove all industry consent restrictions</li> <li>Extend timeline to 2020 (maximum)</li> <li>Investigate funding links</li> </ul>

<b>Key trade-offs</b>	The status quo puts the greatest weight on <b>health benefits and does not take equity into account.</b>	This option puts a premium on <b>credibility</b> with the assumption that this would likely lead to lasting solutions.	This option puts the <b>greatest weight on obtaining health benefits.</b> It retains the status quo, includes some of the TAG recommendations and adds national guidance on domestic emission controls.	This option aims to <b>equally weigh obtaining health benefits and equity.</b> It retains the status quo for exceedances and the timeline but retains a revised offset requirement for industry. It also includes provisions for exceptional events and national guidance on domestic emission controls.	This option puts <b>weight on lowering compliance costs and increasing Ministerial oversight.</b> Health benefits decreased.	This option puts the <b>greatest weight on imposing the least compliance costs for industry and councils.</b> Health costs are highest under this option.
<b>Risks</b>	Significant negative economic impacts	Longer public exposure to pollution.	Negative economic impacts	Approximately 10 airsheds likely to be significantly affected	Longer public exposure to pollution. Does not address domestic emissions	Most health costs. Externalities not faced by polluters.
<b>Effectiveness</b>	Has been ineffective in bringing about compliance	Focus on non-regulatory measures for compliance	Effective in protecting public health	Mix of regulatory and non-regulatory measures that decrease the economic impact on industries.	Longer timeline for compliance. Focus on enhanced non-regulatory measures that target domestic emissions	Risk that councils/industry fail to comply with standards
<b>Equity</b>	Inequitable – only penalises industry	Removes industry controls but fail to address domestic emissions	Provides guidance on managing domestic emissions but severely penalises industry	Provides guidance on managing domestic emissions and imposes sufficient industry controls	Does not completely remove industry restrictions and gives councils more time to comply with standards	Inequitable – adverse health effects likely
<b>Credibility</b>	Minimal credibility	Credible	Minimal credibility	Credible	Credible	Minimal credibility
<b>Certainty</b>	Provides minimal investment certainty	Certainty for industry and councils	Provides minimal investment certainty	Certainty for industry and councils	Certainty for industry and councils	Certainty for industry and councils
<b>Cost-effectiveness</b>		ΔBenefits : \$ -302M ΔCosts : \$ -344M ΔNPV : \$ 43M	ΔBenefits : \$ 302M ΔCosts : \$ -170M ΔNPV : \$ 472M	ΔBenefits : \$ 302M ΔCosts : \$ -244M ΔNPV : \$ 546M	ΔBenefits : \$ -151M ΔCosts : \$ -312M ΔNPV : \$ 161M	ΔBenefits : \$ -453M ΔCosts : \$ -363M ΔNPV : \$ -90M
	Significant costs for industry in terms of income losses.	Minimal cost on industry. Increased costs for councils, the public & MfE. Transfers burden to the health system in lost benefits.	Significant costs on industry with increased costs for councils and MfE.	Significantly decreased industry costs (offsets rather than losses) but retains health benefits.	Minimal cost on industry. Increased costs for councils, the public & MfE. Transfers burden to the health system.	Minimal costs for industry. Transference of costs to the health sector.

\* - These replace the TAG recommendation for Minister-approved airshed implementation plans

**Table 3. Summary of effects of the various options as compared with the status quo**

Option	Compliance timeline*										Major effects
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Status quo											Significant industry costs/losses Health benefits Minimal credibility Ineffective in bringing about compliance Inequitable
Option 1											↓Industry costs/losses ↓Health benefits ↑Credibility ↑Effectiveness ↑Equity
Option 2											↓Industry costs/losses ↑Health benefits -Credibility ↑Effectiveness ↑Equity
Option 3											↓Industry costs/losses ↑Health benefits ↑Credibility ↑Effectiveness ↑Equity
Option 4											↓Industry costs/losses ↓Health benefits ↑Credibility ↑Effectiveness ↑Equity
Option 5											↓Industry costs/losses ↓Health benefits ↓Credibility ↓Effectiveness -Equity

\* - As assumed in computing cost and benefit estimates

Appendix 6 shows the assumptions used in the estimation of benefits and costs.

## Consultation

TAG requested submissions from 150 major stakeholders including all regional and unitary councils, Local Government New Zealand, selected industry and business organisations, all Public Health Units of the District Health Boards and central government agencies with a portfolio interest in air quality. 37 written submissions were received along with four additional, voluntary submissions.

A comprehensive report on submissions to TAG was prepared by the Ministry for the Environment and this is contained as Annex A of the TAG report (available online at [www.mfe.govt.nz](http://www.mfe.govt.nz)).

In brief, submitters responded as follows:

- a. number of permissible exceedances:** 16 per cent of respondents favoured retaining one exceedance as the standard; 35 per cent favoured allowing between two and five exceedances; and 49 per cent favoured some other approach. The majority of regional councils favoured retaining one exceedance although this was often predicated on suggested amendments regarding industry restrictions and/or alternative approaches. Amongst the suggestions for alternative approaches were suggestions of using a percentile approach and applying a rolling-average approach. Several respondents argued that exceptions should be made for extreme events (e.g., dust-storms or volcanic events).
- b. target timeline:** 12 per cent favoured retaining the 2013 timeline; 29 percent favoured extending the timeline (with half of those who responded here favouring extending the timeline to 2020); and 59 per cent favoured some other approach. Several submitters suggested requiring non-complying councils to submit “non-attainment plans”.
- c. resource consent restrictions:** one submitter favoured retaining the constraints on industrial consents; 37 per cent favoured removing the restriction; and 62 per cent favoured some other approach. The removal of the constraints on industrial consents was supported by the majority of industry and regional councils. The key reason provided was the inequity of restricting industry when industry generally made only a non-significant contribution to regional air pollution. A number of submitters favoured restrictions on the sectors primarily responsible for PM<sub>10</sub> pollution.

## Conclusions and recommendations

The choice of the most appropriate package of options falls on a spectrum – there are inevitable trade-offs between options. The Ministry considers that the Status Quo and Option 5 are not feasible or practical in meeting the objectives of the review. All other options are viable.

A comparative cost-benefit analysis of packaged options also shows that Option 3 has the highest net present value (\$794M) of all the options.

## Implementation

Following consultation and analysis of submissions on the discussion document, Government will make decision on any regulatory amendments to be made.

Amendments to the PM<sub>10</sub> regulations will become effective 28 days after being gazetted, with an additional 2-year transitional period.

A key component of the proposed amendments is an air quality compliance strategy (refer to option 3.3). This strategy will be published by the Ministry as part of the amendments for addressing airshed compliance. The Ministry likewise needs to publish a guidance document on the following:

- determination of significance of discharges
- classification of exceptional events
- mandatory offset mechanisms
- best practice approaches to managing PM<sub>10</sub> emissions from various sources (eg, domestic and industrial).

This guidance document will be similar to the user's guide document<sup>17</sup> published by the Ministry when the national environmental standards took effect.

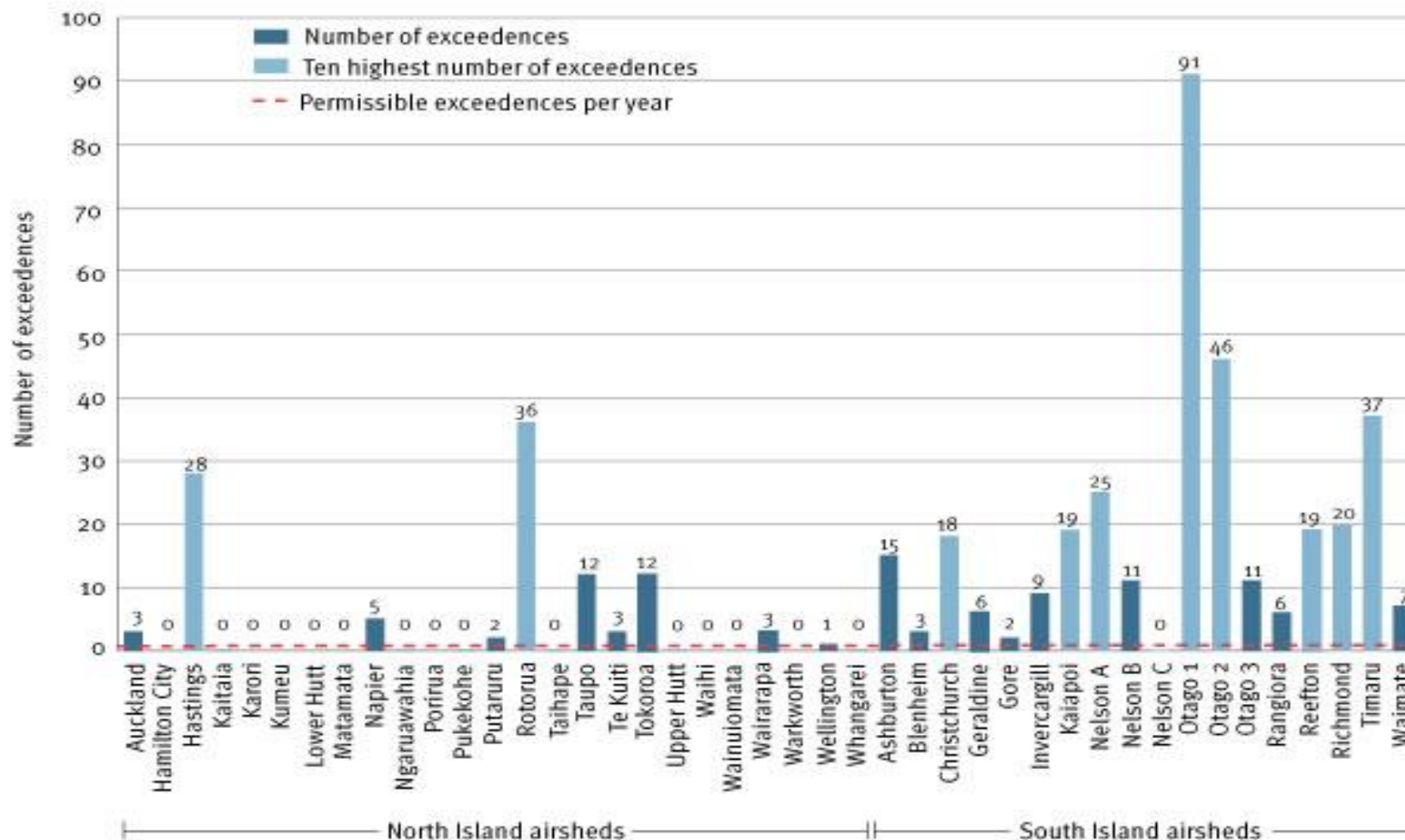
## Monitoring, evaluation and review

The Ministry for Environment will work closely with regional councils to monitor the uptake of the amendments and evaluate the implementation of the regulations. As part of the proposed amendments, the Minister will closely monitor airshed compliance and will require periodic (eg, annual) information from councils. A further evaluation will be carried out by the Ministry after five years of the amendments being implemented. This would assess the effectiveness of the reforms in achieving the policy intent.

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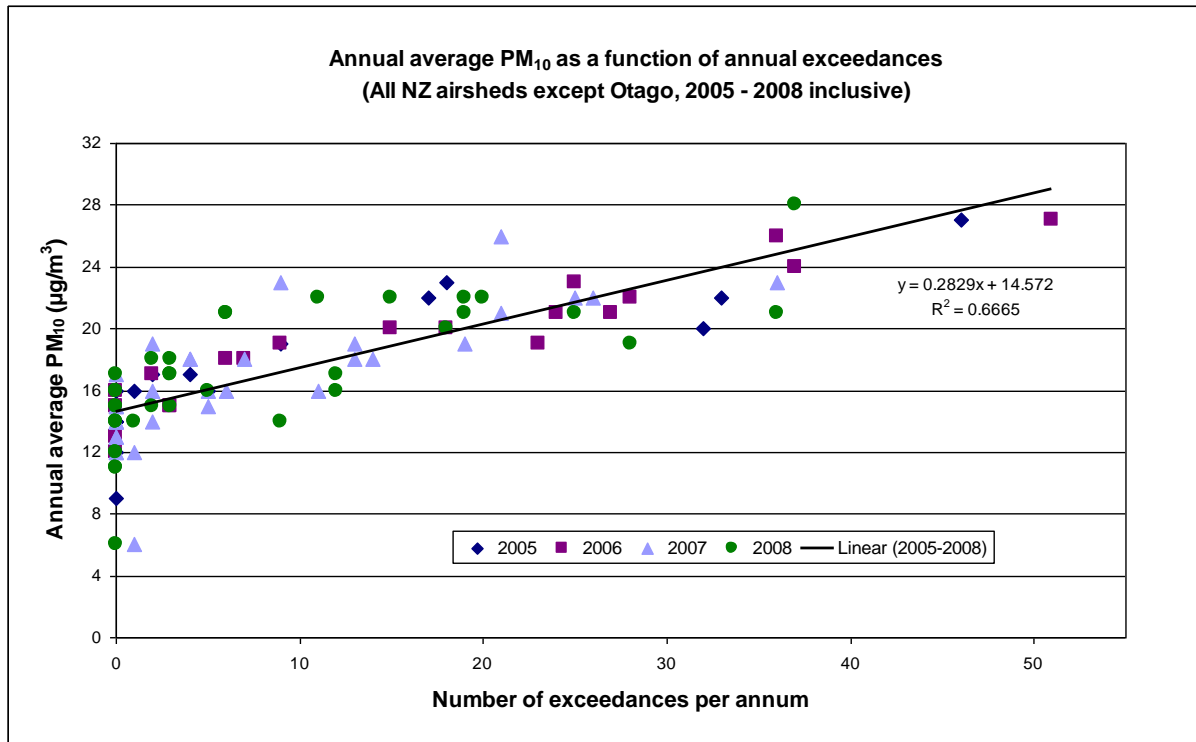
<sup>17</sup> Ministry for the Environment. 2005. *Updated User's Guide to Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins and Other Toxics) Regulations 2004 (Including Amendments 2005)*.

Appendix 1. Number of exceedances of the PM<sub>10</sub> standard in New Zealand airsheds, 2008



## Appendix 2. Estimation of additional premature deaths if permitted exceedances are increased from 1 to 3

The figure below shows how the annual average PM<sub>10</sub> concentration varies with the number of exceedances. This is based on monitoring data for all New Zealand airsheds from 2005 to 2008 (except Otago whose data are excluded because their airsheds include towns that are separated by considerable distance).



Applying linear regression, the results yield the following relationship:

$$\text{Annual average PM}_{10} \text{ concentration (in } \mu\text{g/m}^3\text{)} = 0.2829 * \text{no of PM}_{10} \text{ exceedances} + 14.572$$

Using this formula:

- one exceedance results in an annual average PM<sub>10</sub> concentration of 14.85 µg/m<sup>3</sup>
- three exceedances results in an annual average PM<sub>10</sub> concentration of 15.42 µg/m<sup>3</sup>

Therefore, going from one to three exceedances increases annual PM<sub>10</sub> concentrations by 3.8 per cent<sup>18</sup>.

As the equations used to calculate the health effects are proportional to annual PM<sub>10</sub> concentrations the resultant health effects will also increase by 3.8 per cent.

<sup>18</sup> Equals (15.42-14.85)/14.85

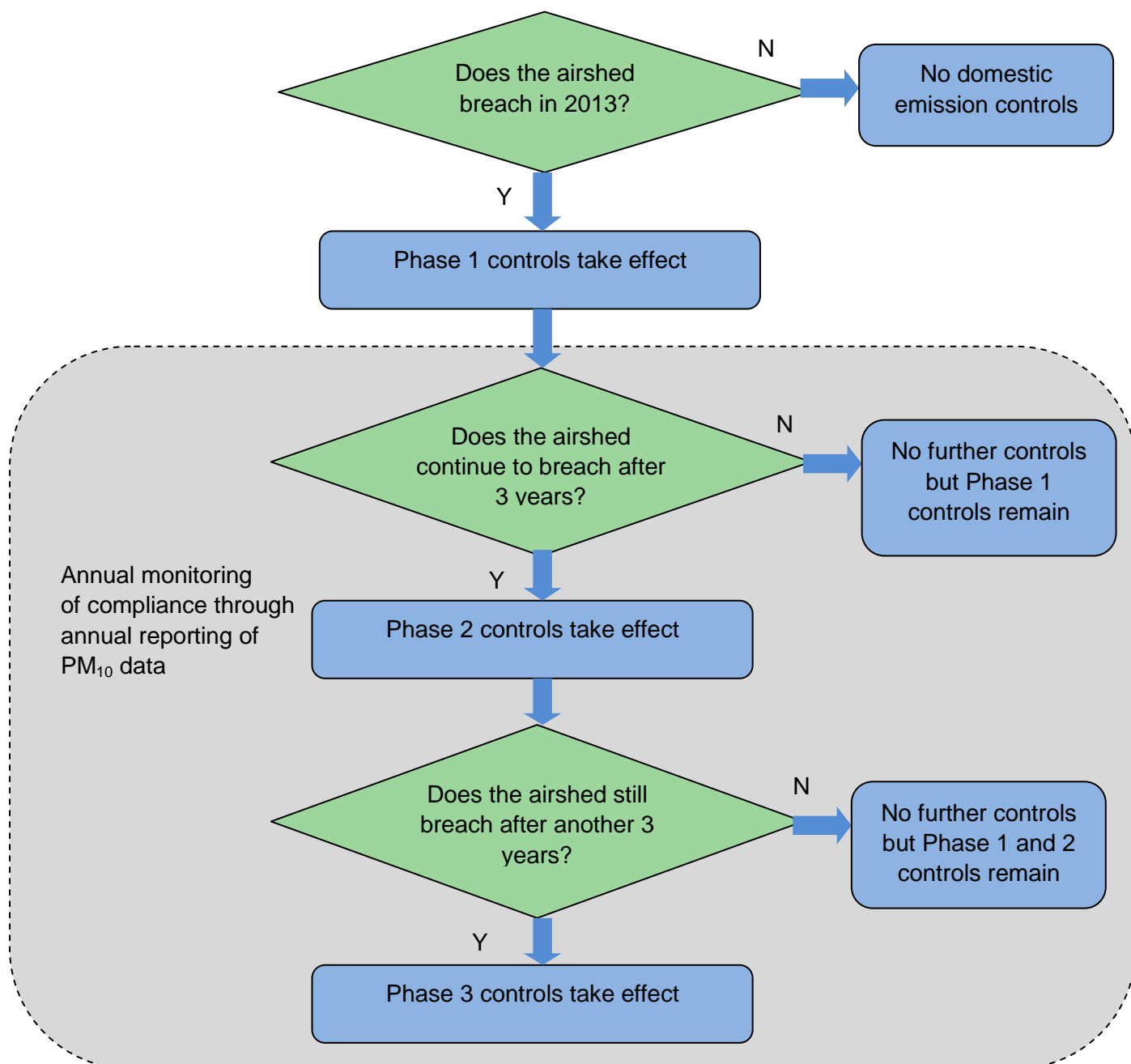
### Appendix 3. Existing resource consents with offset provisions

An example of a consent holder voluntarily offsetting their emissions is that of NZ Dairies Ltd. This plant has a coal-fired boiler consent to discharge 7.4 kg/hr of total suspended particulates (70 per cent of which is PM<sub>10</sub>). NZ Dairies voluntarily funded the replacement of 36 open fires and older wood burners with either pellet burners or heat pumps in the neighbouring Waimate airshed. Over 80 per cent of these were conversions to heat pumps. This resulted in a total offset cost of \$115,520. This includes purchase and installation costs (average of \$3,210/conversion).

All consents were issued by Environment Canterbury.

Consent holder	Offset condition
<p><b>Solid Energy New Zealand Ltd</b> Various locations in the Canterbury region</p> <p>Consent number: CRC093443 Validity: Sept 2009 to Aug 2044 (35 years)</p>	<p>At least once every 12 months, from the commencement of this consent, the consent holder shall provide a report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, containing the following information: (a) The number of houses in the Clean Air Zones, and the location of each of these houses, in which a pellet boiler has been installed under this consent; (b) The number of houses in the Clean Air Zones, and the location of each of these houses, in which a pellet burner has been installed by the consent holder as a replacement for an existing solid fuel burner other than a pellet burner, and which does not appear on the list produced in accordance with conditions of consent CRC083611; and (c) For each Clean Air Zone, if the number of houses listed under condition (9)(b) is less than three times the number of houses listed under condition (9)(a), the consent holder shall report on the steps to be undertaken to increase that ratio to three to one.</p>
<p><b>Spark Energy Limited</b> Throughout Christchurch</p> <p>Consent number: CRC101973 Validity: March 2010 to March 2045 (35 years)</p>	<p>At least once every 12 months, from the commencement of this consent, the consent holder shall provide a report to the Canterbury Regional Council (Attn: Manager Compliance and Enforcement) containing the following information: (a) The number of houses and the location of each of these houses, in which a pellet boiler has been installed under this consent in Clean Air Zone 1; (b) The number of houses in Clean Air Zone 1 and the location of each of these houses in which a pellet burner or a heat pump has been installed by the consent holder as a replacement for an existing solid fuel burner other than a pellet burner, and which does not appear on the list produced in accordance with conditions of consent CRC083611.1 or CRC093443; and (c) If the number of houses in which a pellet boiler has been installed is more than the sum of number of pellet burners installed under condition 9(b) divided by three plus the number of heat pumps installed under condition 9(b), then the consent holder shall report on the steps taken to rectify the deficit.</p>
<p><b>Meridian Energy</b> 122 Meadows Road, WASHDYKE</p> <p>Consent number: CRC101564 Validity: March 2010 to March 2045 (35 years)</p>	<p>(a) Discharges under this consent shall be from the operation of boilers with a maximum total net output capacity of not more than 20 megawatts. (b) After a period of 12 months from the date on which this consent is first exercised, the discharges shall be from boilers running at a maximum total net output capacity of not more than: (i) 16.5 megawatts, at any time when consent CRC930053 is being exercised; or (ii) 17.8 megawatts when the activities described in conditions (2) to (10) inclusive, of consent CRC951898 are occurring; or (iii) 14.3 megawatts when consent CRC930053 is being exercised and when discharges described in conditions (2) to (10) inclusive, of consent CRC951898 are occurring. (c) The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, of the date on which this consent is first exercised.</p>

## Appendix 4. Implementation process for domestic emission controls



### Examples of controls:

**Phase 1** – No new domestic solid-fuel open fires. No new domestic solid-fuel burners (ie, cap airshed allocation). All new coal and multi-fuel domestic solid-fuel burners must be clean and efficient. Use of existing domestic solid-fuel open fires prohibited when the house is sold. Use of existing domestic coal, multi-fuel and wood burners >15 years old will be prohibited when the house is sold.

**Phase 2** – Use of existing domestic solid-fuel open fires prohibited. Use of existing domestic coal, multi-fuel and wood burners > 15 years old prohibited unless they are clean and efficient. Use of existing domestic coal, multi-fuel and wood burners prohibited when the house is sold unless they are clean and efficient.

**Phase 3** – Use of existing domestic coal, multi-fuel and wood burners prohibited unless they are clean and efficient.

Appendix 5. Summary of Packages Evaluated for the AQNES Review

Costs relative to Business As Usual*			NES as it was drafted comply by 2013	NES current progress comply by 2017	comply by 2019	comply by 2015	comply by 2015	comply by 2018	comply by 2020
Proposed by	No	Description	Original AQNES	Status Quo	Option 1	Option 2	Option 3	Option 4	Option 5
TAG	1	Increase no of exceedances from 1 to 3			1			1	1
TAG	2	Allow exceptional events			2		2	2	2
TAG	3	Removal ALL industry restrictions			3				3
TAG	4	Extend timeline to 2020 max			4			4	4
TAG	5	Undertake education			5	5	5		
TAG	6	Require mandatory reporting by RCs			6	6	6	6	
TAG	7	Require airshed implementation plans			7	7	7	7	
TAG	8	Use Ministerial powers for non-compliance			8	8	8	8	
TAG	9	Investigate linking funding to non-complying airsheds			9	9	9	9	9
MfE & Others	10	Retain 1 exceedance	10	10		10	10		
MfE & Others	11	Retain industry ban from 2013	11	11		11			
MfE & Others	12	Require mandatory offsets for ALL industry from 2013					12		
MfE & Others	13	Require mandatory offsets for NEW industry from 2020						13	
MfE & Others	14	Develop national domestic fire restriction guidance				14	14		
		PV Combined Benefits \$M (2008 dollars) for 2008-2020 inclusive	1289	685	383	987	987	534	232
		PV Costs \$M for 2008-2020 inclusive	333	438	93	268	193	126	74
		<b>NPV \$M for 2008-2020 inclusive</b>	<b>955</b>	<b>247</b>	<b>290</b>	<b>719</b>	<b>794</b>	<b>408</b>	<b>158</b>
		<b>All in 2008 dollars for period 2008 to 2020</b>							
* Business as Usual = no standards in place			Note there is little difference between Option 1 (TAG) and Option 4 because the offsets proposed in Option 4 do not kick in until after 2018						

Marginal Costs relative to Status Quo (B)^			comply by 2017	comply by 2019	comply by 2015	comply by 2015	comply by 2018	comply by 2020
			Status Quo (B)	Option 1	Option 2	Option 3	Option 4	Option 5
		PV Combined Benefits \$M (2008 dollars)	0	-302	302	302	-151	-453
		for 2008-2020 inclusive						
		PV Costs \$M	0	-344	-170	-244	-312	-363
		for 2008-2020 inclusive						
		<b>NPV \$M</b>	<b>0</b>	<b>42</b>	<b>472</b>	<b>546</b>	<b>161</b>	<b>-90</b>
		for 2008-2020 inclusive						

^ Status Quo = current progress of original standards

## Appendix 6. Assumptions used in the estimation of benefits and costs

Note:

- All costs are assumed to be in 2008 dollars and are for the period 2008 to 2020.
- The costs and benefits are calculated relative to “business as usual” (i.e. with no standards in place).
- The NZIER report<sup>19</sup> uses the terminology “status quo” for “business is usual”. However, in this regulatory impact statement “status quo” means the current regulations, which are defined in the NZIER report as the “2013 option”.

### **Status Quo**

This estimated status quo is based on the Ministry for the Environment’s best estimate of current levels of actual and predicted compliance. This assumes compliance is achieved by 2017. This assumes an estimated economic loss of \$22.3M in value added to a region’s economy per year for three years for each industry that fails to obtain a consent due to the industry restrictions. It further assumes that two industries will be affected per year from 2014 to 2017. The resulting estimated benefits amount to \$685M while costs amount to \$438M.

### **Option 1 - TAG recommendations**

This package assumes compliance is achieved by 2019 (as some airsheds will achieve compliance before the 2020 maximum deadline).

Therefore, the health benefits are interpolated between the 2013 and 2020 benefits shown in the NZIER report and reduce to PV \$383M.

The original costs are also derived from the modelling undertaken for the NZIER report and reduce to PV \$91 M. Additional costs of PV \$2M are also included for the following components:

- Education at \$50k per annum from 2011 to 2020
- Mandatory reporting at \$10k per council per annum (i.e. \$160k each year) from 2011 to 2020
- Airshed implementation plans at \$100k one-off in 2011 for each likely non-complying airshed (i.e. \$1.5M)
- Ministerial intervention at \$150k per annum for 2014 and 2015

Together, the original and additional costs bring the total costs to PV \$93M.

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<sup>19</sup> NZIER (2009). *The value of air quality standards: Review and update of cost benefit analysis of National Environmental Standards on air quality*, Report for the Ministry for the Environment, October 2009, Table 10, p.47

## **Option 2**

This package assumes that compliance will be delayed slightly to 2015 (over the original 2013 deadline).

Therefore, the health benefits are interpolated between the 2013 and 2020 benefits shown in the NZIER report and reduce to PV \$987M.

The original costs are also derived from the modelling undertaken for the NZIER report and reduce to PV \$190M. Additional costs of PV \$78M are also included for the following components:

- Loss of two existing industries whose consents are declined in non-complying airsheds (one each in 2014 and 2015) which cost their regional economies \$22.31M per annum in value added for three years each until the economies recover
- Education at \$50k per annum from 2011 to 2020
- Mandatory reporting at \$10k per council per annum (i.e. \$160k each year) from 2011 to 2020
- Airshed implementation plans at \$100k one-off in 2011 for each likely non-complying airshed (i.e. \$1.5M)
- Ministerial intervention at \$150k per annum for 2014 and 2015
- Preparation of national domestic fire restriction guidance by the Ministry for the Environment at \$100k one-off in 2011.

Together, the original and additional costs bring the total costs to PV \$268M.

## **Option 3**

This package assumes that compliance will be delayed slightly to 2015 (over the original 2013 deadline).

Therefore the health benefits are interpolated between the 2013 and 2020 benefits shown in the NZIER report and reduce to PV \$987M.

The original costs are also derived from the modelling undertaken for the NZIER report and reduce to PV \$190M. Additional costs of PV \$3 M are also included for the following components:

- Offsetting of two existing industries and two new industries in non-complying airsheds (one of each in 2014 and 2015) which costs the industries \$0.4 M each for a one-off payment.
- Education at \$50k per annum from 2011 to 2020
- Mandatory reporting at \$10k per council per annum (i.e. \$160k each year) from 2011 to 2020
- Airshed implementation plans at \$100k one-off in 2011 for each likely non-complying airshed (i.e. \$1.5M)
- Ministerial intervention at \$150k per annum for 2014 and 2015
- Preparation of national domestic fire restriction guidance by the Ministry for the Environment at \$100k one-off in 2011.

Together, the original and additional costs bring the total costs to PV \$193M.

#### ***Option 4***

This package assumes compliance is achieved by 2018.

Therefore, the health benefits are interpolated between the 2013 and 2018 benefits shown in the NZIER report and reduce to PV \$534M.

The original costs are also derived from the modelling undertaken for the NZIER report and reduce to PV \$124M. Additional costs of PV \$2 M are also included for the following components:

- Mandatory reporting at \$10k per council per annum (i.e. \$160k each year) from 2011 to 2020
- One industry offset per year for 2019 and 2020
- Airshed implementation plans at \$100k one-off in 2011 for each likely non-complying airshed (i.e. \$1.4M)
- Ministerial intervention at \$150k per annum for 2014 and 2015.

Together, the original and additional costs bring the total costs to PV \$126M.

#### ***Option 5***

This package assumes compliance is achieved by 2020.

Therefore the health benefits are the 2020 benefits shown in the NZIER report and reduce to PV \$232M.

The original costs are the 2020 costs shown in the NZIER report and reduce to PV \$74M. No additional costs are included.