



**BAY OF PLENTY
REGIONAL COUNCIL
TOI MOANA**

Submission Form

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2018

060

Post: The Chief Executive Bay of Plenty Regional Council PO Box 364 Whakatāne 3158	or Fax: 0800 884 882	or email: air@boprc.govt.nz
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Submitter Name:

This is a submission on **Proposed Plan Change 13 (Air Quality) to the Regional Natural Resources Plan**

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- 1 (a) I ~~am~~ not directly affected by an effect of the subject matter of the submission that adversely affects the environment; and
(b) My submission ~~does~~ does not relate to trade competition or the effects of trade competition. *[Delete the entire paragraph if you could not gain an advantage in trade competition through this submission.]*
- 2 The details of my submission are in the attached table.
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18 April 2018

Date

[Signature of person making submission or person authorised to sign on behalf of person making submission.]
[NOTE: A signature is not required if you make your submission by electronic means.]

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SUBMISSION POINTS:

Page No	Reference (e.g. Policy, Rule, Method or Objective number)	Support/Oppose	Decision Sought Say what changes to the plan you would like	Give Reasons
2	point of sale rule	attached		
4	phasing out of older style burners			
4	restrictions of installations by emissions rate			
5				



**Submission to the Bay of Plenty Regional Council -
Air Quality Plan**

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Introduction

- [1] The New Zealand Home Heating Association represents New Zealand's leading manufacturers, retailers, and installers of domestic wood burning appliances.
- [2] The NZHHA promotes the use of solid fuel burners as a safe and reliable method of heating in an environmentally sustainable manner. The NZHHA recognises that under the National Emissions Standards for Air Quality (NESAQ), regional councils must conduct monitoring in areas where it is likely that ambient air quality does not meet standards set for various contaminants.¹
- [3] Accordingly, the NZHHA supports air quality improvement initiatives and has worked extensively with other regional councils to:
- a. Improve emission rates of solid fuel appliances; and,
 - b. Introduce new technology burners; and,
 - c. Educate the public on appropriate fuel and best practice methods of operating solid fuel heaters.

Point of Sale Rule

- [4] The NZHHA considers that a Point of Sale (POS) method has its limitations at capturing a broad number of non-compliant wood burners and therefore will unlikely make a significant difference to air quality. Compared to other methods of improving air quality, POS is not a method widely supported by other regional councils.
- [5] In addition, the POS method imposes physical or administrative tasks onto the homeowner in what is already a very stressful experience of selling their home. The NZHHA considers that there are simpler and more effective ways to implement meaningful change to air quality.

Phasing out of Older Style Burners

- [6] The NZHHA considers that the major source of emissions will be from the 4000 older style burners that are still in use in the Rotorua air shed.² Without affirmative action on reducing the number of older style burners, it is submitted that the point of sale rule will have comparatively little effect on air quality.

¹ NESAQ Regulation 15

² Statement of Proposal: Review of the Rotorua District Council Air Quality Control Bylaw; page 7.

- [7] We recommend a graduated phasing out of older style burners. For example, older style burners over a certain age could be deemed non-compliant and could be incrementally phased out.
- [8] When introducing a phasing out scheme two points must be considered:
- 1 The effect on vulnerable persons; hardship could be mitigated by the availability of the current financial assistance packages such as "Hot Swap" and the rates rebate scheme.
 - 2 The effect on the local market to keep up with demand. This would require consultation with local suppliers and installers.
- [9] In response to ECAN's proposed changes to its air plan, a Commission was set up and chaired by Sir Graham Pankhurst.³ The Commissioners' panel recognised the importance of balancing legislative compliance with the social impact of imposing replacement costs on vulnerable persons. The issue of vulnerability was sufficient enough for the Panel to extend the 15 year LEB replacement policy to 20 years.⁴
- [10] Importantly, the Panel stressed the importance of financial assistance to protect those that are most vulnerable.⁵

The package appears to be structured to encourage an uptake of heat pumps, and while this may be understandable it does not meet the needs of the most vulnerable households, in particular those people who have access to free firewood. Nor do the total sums budgeted seem to be sufficient. The Panel's concern is that the critical balance between air quality and warm homes will not be achieved, fuel poverty will result and that inevitably there will be adverse health impacts.

- [11] The Commissioner's comments stress the balancing of achieving the legislative emissions target on one hand, whilst protecting those vulnerable persons on the other. Fuel poverty is a real threat from expensive electric heating options, particularly with substandard housing stocks and insulation.⁶ The likely result will be more illness from person living on cold and damp homes.⁷ The current health system is currently advising the Government they cannot cope with current facilities and staffing.⁸ By adding pressure there will

³ Report and Recommendations of the Hearing Commissioners, Pankhurst *et al*, 19 Sept 16.

⁴ *ibid* note 4, paragraph 340.

⁵ *ibid* note 4, paragraph 367.

⁶ Refer BRANZ Study Report SR 372 available at

https://www.branz.co.nz/cms_show_download.php?id=50335e67bb00f3e0464097be1d4d71ac8a85f6bf

⁷ NZ Herald "New Zealand homes: Damp, cold and mouldy"

http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11897319

⁸ Stuff.co.nz "The unhealthy pressure on our health system"

<https://www.stuff.co.nz/national/health/102002853/the-unhealthy-pressure-on-our-health-system>

likely be large additional negative health impacts in Rotorua.⁹ Keeping the options open to smaller wood burners provides a cost effective method that provides an effective heat to provide warm dry homes and healthy occupiers.¹⁰

[12] The NZHHA welcomes the current financial assistance available to Rotorua residents, and asks that any enforced changes attract the same level of funding.

[13] NZHHA recommends that low emission burners with less than 1.5g/kg are not subject to any phasing out regime.

Restriction of Installations by Emissions Rate

[14] The NZHHA welcomes the permitted installation of pellet burners in cases where no solid fuel burner is present. It is understood that the dispensation arises from the case that it is more likely that a lab tested pellet burner will perform similarly in real life situations.

[15] The NZHHA submits that the same dispensation ought to extend to Ultra Low Emission Burners (ULEBs).

[16] ECAN recognises the discrepancy between lab testing under NZS 4013 real life situations where operators can have an adverse effect on the emissions produced by wood burners. Accordingly, ECAN required evidence to measure real life operations and devised the testing method Canterbury Method 1.¹¹ The test procedure includes using partially seasoned wood and measuring the emissions during the start up phase.

[17] ECAN and Nelson are so confident in the testing results that ULEBs are now permitted into homes (including new homes) where none previously existed. The NZHHA encourages the BoPRC to consider the evidence produced by the CM1 test results as sufficient to warrant of installation of ULEBs into new homes or homes without existing wood burners.

[18] Interestingly, not all pellet burners are classified as ULEBs and some cannot be installed into new homes in Canterbury. Therefore, the mere fact that the

⁹ Rotorua Daily Post "Winter bugs keep GPs busy" 13 Jul 2016

¹⁰ Ministry of Social Development "Keeping warm and healthy this winter"
<https://www.msd.govt.nz/about-msd-and-our-work/publications-resources/brochures/keeping-warm-healthy.html>

¹¹ Canterbury Method 1 for testing of ultra- low emission wood burners, revision 1.6 Jun 2015.

appliance is a pellet burner does not necessarily mean that their emissions are less than other solid fuel burners.¹²

Recommendation: Increase Emissions Limit from 0.6g/kg to 1g/kg

- [19] The NZHHA opposes the emissions rate being set a 0.6g/kg and recommends that the rate be set at 1g/kg. It is submitted that imposing the 0.6g/kg does not have the effect of halving the exceedances of a 1g/kg emissions regime. Moreover, it is the NZHHA's view that imposing a 0.6g/kg standard will, over time, yield higher emissions because appliances between 0.6 and 1g/kg are typically lower powered appliances that yield smaller emissions per hour of use.
- [20] The emissions rating was used in the 1980's by the Christchurch City Council and was defined by time and measured as g/hour. However, the Closer Economic Relations agreement between Australia and New Zealand meant that the combined standard AS/NZS 7403:1992 was developed. The Australians insisted that emissions be defined by weight and measured as g/kg. The g/kg unit of measure was preferred by the Australians due to its favourable application to larger wood burners.
- [21] The measurement based on time is the real amount of emissions produced by a solid fuel burner. Whereas the weight based unit of measure normalises the size of all wood burners thereby not giving a true indication of the total emissions produced by a fire over a given period of time.
- [22] The g/kg rating has lead to obscure results. For example, it is nonsensical to suggest that a small woodburner producing 6.7kw at 0.7g/kg¹³ will produce more emissions, over the same time period, as a large scale woodburner producing 16.9kw at 0.5g/kg.¹⁴ Therefore, it is submitted there is little to be gained by banning fires between 0.6g/kg - 1.0 g/kg.

Wood Burner Availability and Suitability

- [23] Restricting appliances to below 0.6g/kg severely impacts the range of appropriately powered appliances to suit the homes that need heating. Many smaller houses are not suited to large powerful wood burners.
- [24] The NZHHA continually emphasises the importance of selecting the appropriate power to suit the size of the home. The common misconception

¹² Refer <https://www.ecan.govt.nz/data/authorised-burners/> "Low Emission Pellet Burners", accessed 12 Apr 18.

¹³ For example a Metro Tiny Rad

¹⁴ For example a Woodsman Tarras MkII

amongst purchasers is to get a big appliance because they "...can always dampen it down." However, as in many cases, the overpowered wood burner makes the living space uncomfortable and the occupants end up opening windows in order to cool down, thus wasting energy. Moreover, the fire spends most of its operational life dampened down and thus is likely producing more emissions than a smaller fire running on a higher setting.

[25] Following on from the small v large scale woodburner example above in para [22], the installing of only larger fires will result in higher emissions overall, compared to installing wood burners covering a wide range of small and large powered appliances.

[26] Furthermore the 0.6g/kg limit reduces the vast majority of many insert fires. The following is a list of appliances shows that the 0.6 rule eliminates 25 of the 40 fires that are below 0.6g/kg emission rating:

Manufacturer	Model	Emissions (MG/MJ)	Emission Factor (G/KG)	Efficiency (%)	Type	Wetback	Authorisation Number	Column1
Lansdowne Resource	Ethos Ares (with flue shield)		0.3	67	Fireplace insert	None	3001	<= .6
Lansdowne Resource	Ethos Ares (without flue shield)		0.3	67	Fireplace insert	None	3001	<= .6
Lansdowne Resource	Ethos Ares Deluxe	22	0.3	67	Fireplace insert	None	103880	<= .6
Lansdowne Resource	Ethos IS100 Ares (with flue shroud)		0.3	67	Fireplace insert	None	3001	<= .6
Glen Dimplex New Zealand	Masport Bannockburn I2000	29	0.4	68	Fireplace insert	None	154102	<= .6
Glen Dimplex New Zealand	Masport I3000	29	0.4	68	Fireplace insert	None	103868	<= .6
Aber Holdings Limited	Kent LOGFIRE II	36	0.5	69	Fireplace insert	None	142832	<= .6
Aber Holdings Limited	Kent RATA	36	0.5	69	Fireplace insert	None	142831	<= .6
Pioneer Manufacture	Metro Eco Smart	37	0.5	68	Fireplace insert	None	102411	<= .6
Crighton Engineering	Magnum Ardor	43	0.6	70	Fireplace insert	None	102990	<= .6
Crighton Engineering	Magnum Furno	43	0.6	69	Fireplace insert	None	102992	<= .6
Glen Dimplex New Zealand	Masport LE4000 Provincial	46	0.6	67	Fireplace insert	None	71591	<= .6
Pioneer Manufacture	Metro Eco Mega Smart	43	0.6	66	Fireplace insert	Wetback	111058	<= .6
Tropicalair Heating Limited	Tawa MK III (with flue shield)	44	0.6	65	Fireplace insert	None	111879	<= .6
Tropicalair Heating Limited	Tropicalair Furno	43	0.6	69	Fireplace insert	None	102217	<= .6
Glen Dimplex New Zealand	Masport I5000	55	0.70	66	Fireplace insert	None	111499	> .6
Pioneer Manufacture	Metro Eco Mega Smart	50	0.70	69	Fireplace insert	None	110719	> .6
Retail Links Limited	Jayline IS550	51	0.70	66	Built-in	None	141268	> .6
Glen Dimplex New Zealand	Masport Bannockburn I2000	60	0.80	66	Fireplace insert	Wetback	154103	> .6
Glen Dimplex New Zealand	Masport I3000	60	0.80	66	Fireplace insert	Wetback	111333	> .6
Pioneer Manufacture	Metro Eco Smart	59	0.80	67	Fireplace insert	Wetback	102426	> .6
Hewitsons Limited	Firenze Forte Flush AG08	65	0.90	69	Fireplace insert	None	90133	> .6

Hewitsons Limited	Firenze Kompact AG	65	0.90	67	Fireplace insert	None	<u>122076</u>	> 6
Pioneer Manufacturi	Metro Eco Trad	69	0.90	65	Fireplace insert	None	<u>101152</u>	>.6
Pioneer Manufactur	Metro Eco Trend	69	0.90	65	Fireplace insert	None	<u>101159</u>	>.6
Retail Links Limited	Jayline IS500	64	0.90	67	Fireplace insert	None	<u>111085</u>	>.6
W H Harris Ltd	Kent Logfire Supreme	64	0.90	67	Fireplace insert	None	<u>111086</u>	> 6
W H Harris Ltd	Woodsman Regent	65	0.90	69	Fireplace insert	None	<u>72526</u>	>.6
W H Harris Ltd	Woodsman Totara	64	0.90	67	Fireplace insert	None	<u>110220</u>	>.6
Escea Limited	Spartherm Varia Bh-P7	70.5	0.92	65	Built-in	None	<u>167169</u>	>.6
Escea Limited	Spartherm Varia 2L 80h-P7	73.2	0.96	65.9	Built-in	None	<u>168071</u>	>.6
Escea Limited	Spartherm Varia 2R 80h-P7	73.2	0.96	65.9	Built-in	None	<u>168072</u>	> 6
Escea Limited	Spartherm Varia ASH-P8	72.8	0.99	67	Built-in	None	<u>167168</u>	>.6
Escea Limited	Spartherm Vana AS-P8	72.8	0.99	67	Built-in	None	<u>167167</u>	>.6
Hewitsons Limited	Firenze Athena Aqualux AG	75	1.00	66	Fireplace insert	Wetback	<u>102108</u>	>.6
Hewitsons Limited	Firenze Bay AG (with Athena or Forte fas	67	1.00	74	Fireplace insert	None	<u>103157</u>	> 6
Hewitsons Limited	Firenze Forte Aqualux AG	75	1.00	66	Fireplace insert	Wetback	<u>102107</u>	> 6
Stovax Limited	Riva Studio 2	73	1.00	66	Built-in	None	<u>133649</u>	>.6
Yunca Heating	Yunca Xander Insert (CA Sub 1.0)	77.86	1.00	65	Built-in	None	<u>167121</u>	>.6
Hewitsons Limited	Firenze Athena Flush AG08	<77	<1.0	>65	Fireplace insert	None	<u>91593</u>	>.6

Fires less or equal than 0.6 **15**
Fires over 0.6 **25**

[27] As can be seen, the 0.6 limit significantly reduces the number of insert fires available for installations. Insert fires are typically found in older houses and a significant proportion of these will have vulnerable occupiers or.

[28] Importantly, other regional councils that have seen significant improvement in air quality such as Canterbury and Nelson have not relied on limitations less than 1g/kg. The NZHHA submits that the focus ought to be on the reduction of polluting appliances as discussed above in *Phasing out of Older Style Burners* rather than tighter restrictions on low emission burners.

Public Awareness of Good Wood

[29] A major effect on the emissions of a low emission wood burner, regardless of its emission rating, is the fuel placed in the appliance. Wet wood or appliances treated as incinerators by burning rubbish, will dramatically affect the appliance's emissions. The NZHHA recommends that the Rotorua Lakes Council work with the NZHHA in a "good wood" public education programme.¹⁵ Also the Council could run a campaign similar to those run in Canterbury to educate the public on the importance of using the right fuel.¹⁶

¹⁵ <https://nzhha.co.nz/learn-how-to-burn-smoke-free/>, accessed 29 Jun 17.

¹⁶ <http://www.stuff.co.nz/sponsored-content/11965855/Smoke-free-fires-are-hot-this-winter>, accessed 12 Apr 18.

[30] Further gains are achievable by introducing a monitoring scheme of local wood merchants to ensure that quality and properly seasoned wood is available to residents in the local area.

Conclusion

[31] The following summarises the NZHHA's considerations and recommendations in striking a balance between legislative compliance and socio-economic impacts:

- a. Either remove the point of sale rule in favour of simpler and more effective regime of incrementally phasing out older style burners.
- b. Tinkering with emission rates ie whether the limit is 0.6g/kg or 1g/kg will make little difference compared to a concerted effort on reducing older style burners.
- c. Retaining financial assistance such as the "Hot Swap" low interest loans and rate rebate assistance in any replacement scheme.
- d. Recommend increasing emission rate limit from 0.6g/kg to 1.0g/kg of solids burnt:
 - i. 0.6g/kg will unlikely yield results better than 1.0g/kg, because appliances below 0.6g/kg tend to be larger and more powerful and produce more emissions per hour than smaller wood burners.
 - ii. 0.6g/kg (or less) appliances are generally more powerful and are not suited to smaller homes,
 - iii. 0.6g/kg (or less) appliances, on average, cost much more than ones available between 0.6 and 1.0g/kg.
- e. That wood burners with an emissions rating of <1.5g/kg not be subject to any phasing out regime.
- f. Introduction of a rule to permit the installation of ULEB burners into new homes and homes that do not already have wood burners.



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7.5 Topic 2 – Rotorua domestic burners

7.5.1 Baseline

The National Environmental Standards for Air Quality (NESAQ) sets a limit of $50\mu\text{g}/\text{m}^3$ for fine particulates (or PM_{10}). This limit is not a “safe” concentration for fine particulates, but provides an acceptable level of protection for human health while still allowing for normal activities. The deadline for compliance is no more than three exceedances per year by September 2016, and one per year by 2020. An airshed is deemed unpolluted when it has not breached the standard for five years.

The Rotorua Airshed (the airshed) regularly exceeds the NESAQ (Figure 7.4).



Figure 7.4: Boundary of the Rotorua Airshed

During the 2015 and 2016 calendar years the Rotorua Airshed exceeded the standard 13 times and 11 times respectively (Figure 7.5) (BOPRC, 2017).

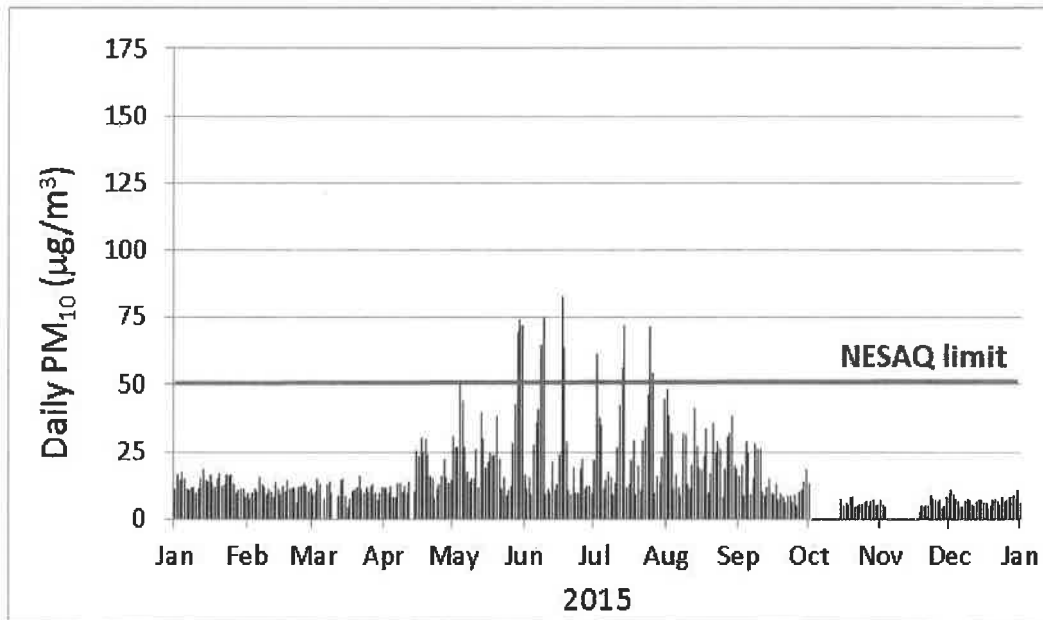


Figure 7.5: PM₁₀ (24 hour) values measured at Edmund Road, Rotorua 2015

History of the Rotorua Airshed

The Regional Council has carried out monitoring and research, including an emissions inventory,²⁸ a home heating survey,²⁹ and airshed modelling.³⁰ The inventory showed that although industry contributes to poor air quality, the main source of fine particulates in the Rotorua airshed in winter is domestic burners (Figure 7.6). The home heating survey confirmed that the older burners (not designed to the same standard as modern domestic burners) were a feature of the airshed.



Figure 7.6: Rotorua Airshed in 2008

The findings of the 2007 modelling and research are still considered relevant. The drivers of poor air quality have not changed. Although the burner replacement programme has been operating, the number of burners has not changed markedly.

²⁸ BOPRC (2007)

²⁹ BOPRC (2006)

³⁰ Fisher et al (2007)

National modelling undertaken in 2015 suggested that in Rotorua the contribution of domestic heating to winter PM₁₀ could be as high as 92%.³¹

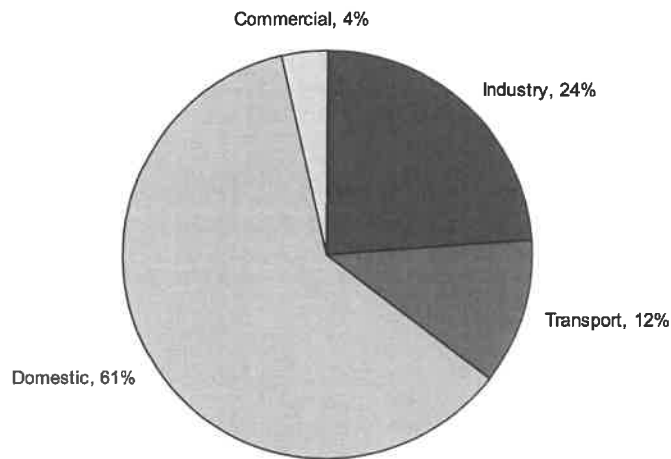


Figure 7.7: PM₁₀ winter percentage by source (BOPRC, 2007).

In 2007, modelling showed that in the Rotorua Airshed, PM₁₀ emissions from domestic sources would have to reduce by 60 tonnes/year to meet the NESAQ.³² To do that, 7,650 (89% of a total 8,550) domestic burners needed to be converted to cleaner heating. This number was calculated based on an assumption that 45% of domestic burners are converted to zero-emission appliances (such as heat pumps), 45% to low emission domestic burners, and 10% to pellet burners. This also assumed that five tonnes of PM₁₀ contributed to the airshed from backyard burning is banned through regional rules.³³

The Council prepared the Rotorua Air Quality Action Plan (the action plan) in December 2008, with a range of actions designed to reduce discharges of PM₁₀ in the airshed. Actions included rules, incentives, education, and research targeting domestic burners and industry³⁴.

The Rotorua Lakes Council introduced the Rotorua Air Quality Control Bylaw (the Bylaw) in 2010³⁵. The Bylaw restricts new burner installations to certain types and models, phases out indoor open fires and requires old burner to be removed at the point of property sale.

The number of exceedances of the NESAQ has fallen from highs of around 20-30 per year to 10+ per year in the last 10 years (Figure 7.8). The height of the individual exceedances has also reduced from highs of around 120µg/m³ to around 80µg/m³.³⁶

³¹ Environet Limited (2015).

³² Fisher et al. (2007).

³³ BOPRC (2007)

³⁴ BOPRC (2008).

³⁵ Rotorua District Council (2010).

³⁶ BOPRC (2017).

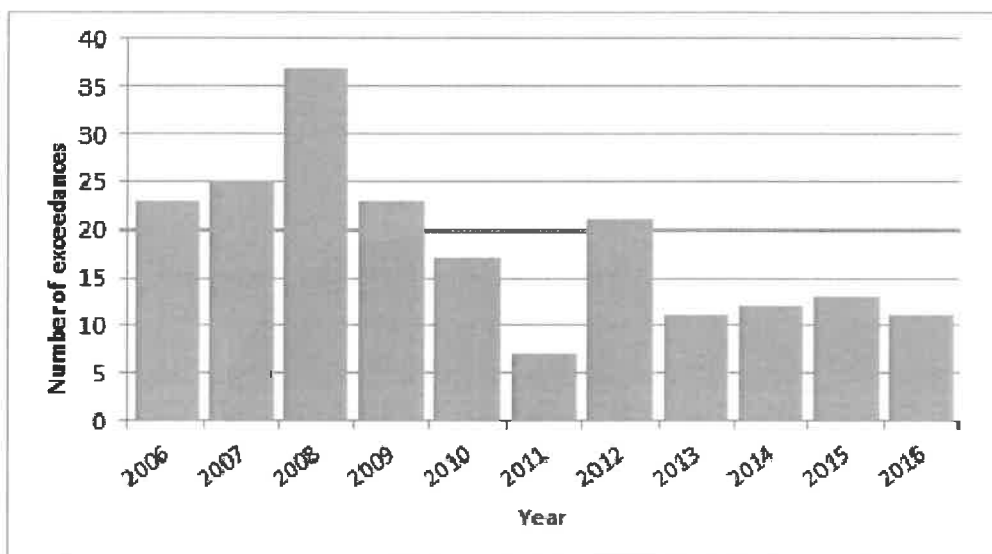


Figure 7.8: Rotorua Airshed annual PM_{10} exceedances of NESAQ: 2006-2016³⁷

The Bylaw was reviewed and updated in 2017³⁸. A key reason for the review was to address the continuing breaches of the NESAQ. The 2010 bylaw allowed new burners into the catchment provided they met the NESAQ standard. The update tightened the standard from 1.5 g/kg to 0.6 g/kg. The prohibition on indoor open fire use and the point-of-sale removal of non-complying wood burners remained in place.

The Council has implemented the action plan, converting approximately 4,500 burners to cleaner heating. The annual number of conversions (via the incentive schemes) has declined to about 250 per year. With four years to the NESAQ 2020 deadline and at least 3,150 burners still to convert (from original calculations) current actions are not expected to achieve the NESAQ targets.

Air quality and health

While domestic heating by solid fuel burners provides a benefit to individual households it imposes an uncompensated cost on the wider community in terms of poor health and reduced amenity.³⁹ The health cost includes early mortality, cardiac and respiratory hospital emissions (including for children), time off work and time out of school (Figure 7.9). Poor air quality can compromise people's ability to work and to get an education.

³⁷ Missing observations for 23 May - 28 June 2011 mean recorded exceedances are probably lower than actual..

³⁸ Rotorua District Council (2017).

³⁹ In economics this type of uncompensated cost is referred to as a negative externality.

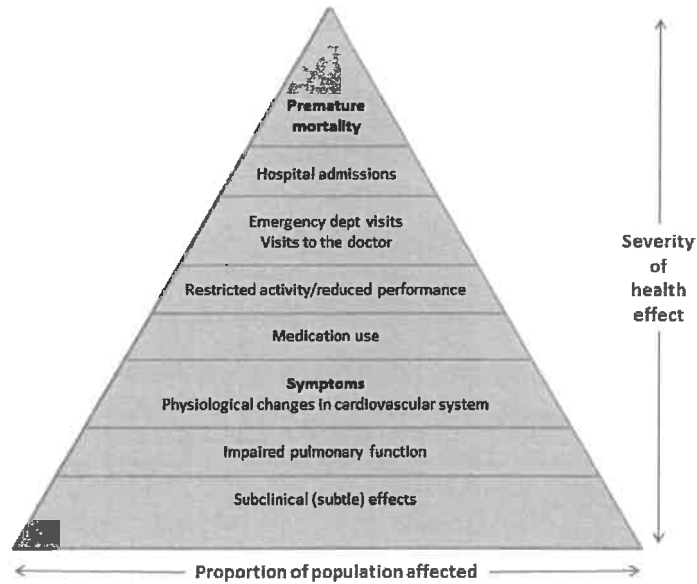


Figure 7.9: Pyramid of PM10 health effects (Source: WHO)

Premature death is the most extreme effect of poor air quality, and is a result of long term exposure to PM₁₀. Modelling of PM₁₀ emissions and health outcomes (based on 2006 levels and population) suggested that in the Rotorua district 5-16 people die prematurely each year as a result of exposure to PM₁₀ from domestic heating (Table 7.3).⁴⁰

The more immediate health impacts of exposure to PM₁₀ emissions include respiratory and cardio health issues, including doctor visits and hospitalisation, and days away from work or school. The modelling⁴¹ suggested annual impacts of 4-13 hospital admissions and 7,500-25,700 restricted activity days (e.g. not going to work/school) as a result of exposure to PM₁₀ from domestic heating. The number of people hospitalised, restricted, or otherwise affected by poor air quality is a function of population size – the number of cases increases with the size of a population, even if the air quality remains the same.

⁴⁰ Fisher et al. (2007).

⁴¹ Fisher et al (2007)

Table 7.3 Modelled health effects of exposure to PM10 emissions, by source, Rotorua district⁴²

Effect	Domestic heating	Motor Vehicles	Industry	Open burning
Premature mortality: All adults 30+ years	5 - 16	2 - 6	4 - 13	0 - 1
Premature mortality: Māori 30+ years	2 - 7	2	2 - 7	0
Cardiac admissions: All ages	1.2 - 3.7	0.4 - 1.3	0.9 - 2.8	0.1
Respiratory admissions: All ages	3.3 - 9.1	1.1 - 2.9	2.3 - 6.4	0.2 - 0.5
Respiratory admissions: Children 1-4 years	1.2 - 4.5	0.3 - 1.3	0.8 - 3.1	0.1 - 0.3
Respiratory admissions: Children 5-14 years	0 - 2.2	0 - 0.7	0 - 1.5	0 - 0.1
Restricted activity days	7,563 - 25,713	1,904 - 6,473	5,011 - 17,036	449 - 1,525

7.5.1 Relevant objectives

Discharges from Rotorua burners are the main source of PM₁₀ discharges in the Rotorua Airshed. The airshed is in breach of the standard for PM₁₀ in the NESAQ therefore AQ O2 is the most relevant objective for this topic.

AQ O2 The region's ambient air quality meets the National Environmental Standards for Air Quality (2004) and the Ambient Air Quality Guidelines (2002).

The breach of the NESAQ degrades the mauri of air, indicates an area with degraded air quality, and causes proven health effects, therefore AQ O1 also applies.

AQ O1 Protect the mauri of air and human health from adverse effects of anthropogenic contaminant discharges to air, and enhance air quality where degraded.

7.5.2 Options considered

Four options are considered to manage Rotorua burners.

Option 1: Status quo – Rely on national standards, local bylaw, regional policy statement, policies and rules in current plan, non-regulatory actions from Rotorua Air Quality Action Plan

Option 2 Plan Change – Provide additional policies and rules specific to Rotorua burners

⁴² This model is based on figures from the 2013 NZ Census when the Rotorua population was about 66,000. See HAPINZ website for model <http://www.hapinz.org.nz/>. In Table 7.3 the greyed rows are subsets of the white rows above e.g. premature mortality of Maori aged 30+ are a subset of premature mortality adults aged 30+.

Option 3 Less stringent – Have no policies or rules in Plan Change. Rely on RMA, NESAQ, RPS, other relevant national policies or standards and the local bylaw

Option 4 More stringent – Further restrictions on Rotorua burners

Option	Description	Relevant provisions
Option 1 Status Quo	<p>The RPS has a policy to manage the adverse effects of fine particulate contamination.</p> <p>The NESAQ restricts the discharge from new domestic burners in urban areas to an emission standard of 1.5g/kg.</p> <p>Under the current plan the use of domestic burners anywhere in the region is a permitted activity.</p> <p>The Rotorua Air Quality Control Bylaw (the Bylaw) 2017 restricts installation of new burners to low emission modern designs, bans indoor open fire use and requires removal of non-complying burners at point of property sale.</p> <p>The current plan has policies to avoid, remedy mitigate adverse effects of discharges to air, requires consideration of cumulative discharges and permits domestic burners.</p> <p>Council provides incentives to support Rotorua households replacing their old burners.</p>	<p>NESAQ – Regulations 22-24A</p> <p>RPS – Objective 1, Policy AQ 3A, Method 2, Method 3, Objective 10, Policy IR 1B. Policy IR 5B.</p> <p>Bylaw – Rules in Parts 3 and 4</p> <p>Air Plan Policies - 1(a), 1(b), 8</p> <p>Air Plan Rule – 3</p>
Option 2 Plan Change	<p>The RPS has a policy to manage the adverse effects of fine particulate contamination and the main method relevant to this Plan Change is regional plan implementation.</p> <p>The requirements under the NESAQ, RPS and the Bylaw are the same as for the status quo.</p> <p>Council provides incentives to support Rotorua households replacing their old burners.</p> <p>The Plan Change would introduce specific policies and rules to manage Rotorua burners. Key points are:</p> <ul style="list-style-type: none"> • Low emission, modern burners are a permitted activity when replacing existing burners. • Imposes an emission standard of 0.6 g/kg for new and replacement burners (stronger than the NES requirement of 1.5g/kg). • Enables new burners (new sources of emissions) in situations where offsets are made elsewhere in the airshed (a discretionary activity) • Restrict or phase out pre-2005 burners (non-complying from 2020) • Open fires are banned (as in the current plan) 	<p>NESAQ – Regulations 22-24A</p> <p>RPS – Objective 1, Policy AQ 3A, Method 2, Method 3, Objective 10, Policy IR 1B. Policy IR 5B.</p> <p>Bylaw – Rules in Parts 3 and 4</p> <p>PC 13 policies – AQ P1, AQ P3, AQ P4, AQ P7</p> <p>PC 13 rules – AQ R12-R14</p>
Option 3 Less stringent	<p>The less stringent option is the same as the status quo in terms of RMA provisions and has not been analysed separately.</p>	n/a
Option 4 More stringent	<p>The more stringent option would include stricter policies and rules in the Plan Change which may include:</p>	<p>NESAQ – Regulations 22-24A</p> <p>RPS – Objective 1, Policy</p>

Option	Description	Relevant provisions
	<ul style="list-style-type: none"> • Stricter requirements for replacement burners e.g. tamper resistant. • Allow only ULEBs as new installs or replacements. • Allow no new burners of any type or design – replacement of existing burners only. • Any burners not permitted by plan are prohibited, not allowing for any exceptional circumstances. • Earlier phase out date e.g. date of notification. • Rolling phase-outs of any burner older than 15 years (or nominated date range) 	<p>AQ 3A, Method 2, Method 3, Objective 10, Policy IR 1B. Policy IR 5B.</p> <p>Bylaw – Rules in Parts 3 and 4</p> <p>PC 13 – stricter policies and rules</p>

7.5.3 Evaluation of provisions to manage Rotorua burners

The scale and significance of this topic is rated as moderate to high.

The following table summarises the effectiveness and efficiency of the policy options to manage Rotorua burners:

Option 1: Status quo
Effectiveness
<p><i>Relevance – how effective are the provisions in achieving the objective/s</i></p> <p>To achieve AQ O2, the region’s air quality must meet the NESAQ and AAQGs. Currently the Rotorua Airshed regularly exceeds the daily ambient air quality standard for PM₁₀ in the NESAQ and AAQG (see Figure 7.4, above). The main source of PM₁₀ in the Rotorua Airshed is domestic burners.</p> <p>Option 1 does not identify ambient air quality in Rotorua as a specific issue and there are no controls on the use of domestic burners in the airshed. Management of domestic burners relies on incentives and other legislation.</p> <p>In 2006 it was estimated that PM₁₀ needed to be reduced by 60 tonnes per year (Fisher et al. 2006). At the time there were 8,550 burners in the airshed (BOPRC, 2006). Council estimated that 7,650 burners would need to be replaced to achieve the 60 tonne reduction. This figure assumed that 45% of homeowners would replace with heat pumps or flued gas, 10% would install pellet burners, and 45% would install a woodburner.</p> <p>This assumption was based on a combination of the expected uptake for EECA’s Clean Heat programme in 2009 (60% heat pumps, 20% woodburners, 15% pellet fires and 5% gas)⁴³ and the observed uptake from the Council’s participation in this programme where conversion was 70% woodburners, 20% heatpumps and 10% pellets⁴⁴. Due to the large difference in these conversion rates, and factors that indicated a higher likelihood of participating homeowners selecting woodburners throughout the trial, Council selected a midpoint of 45% between these two figures.</p> <p>The level of PM₁₀ reductions depends on which appliance the homeowner selects to replace their existing burner. When a burner is replaced with a heat pump, all the emissions are removed. However, when an old burner is replaced with a new burner, even a modern one, emissions reduce by only about half; for every two new burners in the airshed, another has to be removed, on top of the original estimate of removals.</p> <p>In 2009 the Council introduced the Bylaw and incentives to encourage conversions. The uptake of these incentives is discussed further below.</p> <p>Option 1 will not meet the NESAQ limit by the 2020 deadline (and therefore will not achieve AQ O2) for the</p>

⁴³ EECA (2009)

⁴⁴ BOPRC Memorandum (2011)

following reasons:

1. New burners – The NESAQ regulations restrict the installation of new woodburners in urban areas to those meeting the national standard and prohibit the installation of indoor open fires in gazetted airsheds. The regulations do not address coal burners or multi-fuel burners (the most polluting types). The Bylaw provides additional management, and restricts *all* new burner installations to those meeting the NESAQ regulations, including coal burners and multi-fuel burners. The Bylaw allows homeowners to install new burners where there was no burner previously. This introduces new sources of PM₁₀ into the airshed and adds to the existing problem.
2. Number of existing old burners – Over time older burners will be replaced by modern, cleaner burners. In the 2005 emissions inventory, 23% of burners in the Rotorua Airshed were less than five years old (installed between 2000 and 2005) and 11% were 5 - 10 years old (Figure 7.10). However, 48% of burners were installed prior to 1995 (and two-thirds of those before 1990), making them 10+ years old at that time. After 10-15 years burners become less efficient in terms of emissions and thermal efficiency (ability to warm a house). The survey results indicate that homeowners are slow to upgrade their burners. Without some form of regulation and/or a financial incentive natural attrition will not be sufficient to achieve the NESAQ target ambient air standard by the due date of 2020.

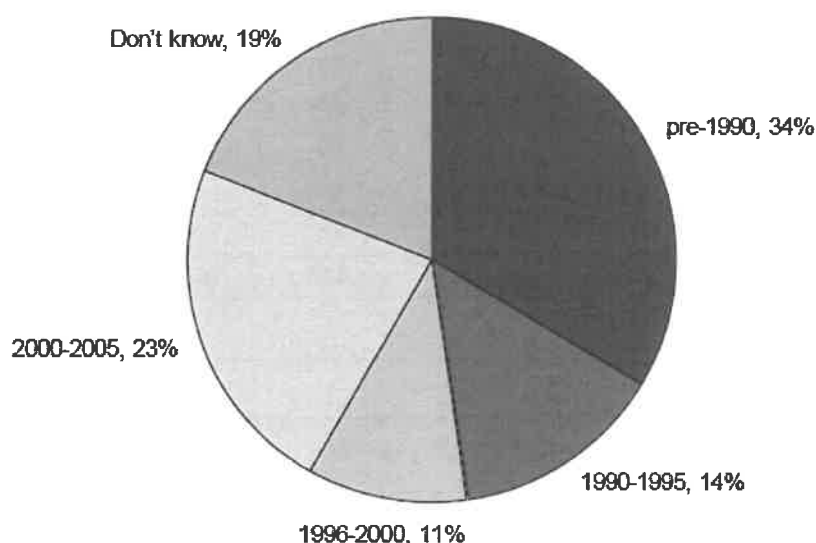


Figure 7.10: Age of Rotorua woodburner stock as at 2005 (BOPRC, 2007)

The NESAQ has no regulations to target existing burners, but Council's investigations show that older burners are an impediment to achieving the NESAQ. The Bylaw has two rules requiring the phase-out or removal of existing burners. The point of sale rule (effective since May 2012) requires any existing fire that does not comply with the NESAQ regulations to be removed before a house is sold. The open fire rule phased out indoor open fires in May 2015.

Despite these rules, the reduction of fires is not sufficient to reach the 60 tonne PM₁₀ reduction required to achieve the NESAQ (one or fewer exceedances by 2020). About 4,000 more burners must be converted to achieve the goal and AQ O2.

3. Burner-for-burner replacements – The burner-for-burner replacement rate has been higher than anticipated. Instead of the 45% rate assumed by Council, in the five years to 2015 70% of homeowners chose a replacement burner. In 2015 the Hot Swap loan terms were revised, and homeowners replacing burners with burners were charged interest on the previously interest free loan. Homeowners replacing burners with heat pumps were charged no interest. The burner replacement rate dropped to 34%. However, the six year average to 2016 dropped to 62%. Even with this recent change Option 1 will not make sufficient to comply with the NESAQ and achieve AQ O2.

4. Reduced uptake of incentives – Under Option 1, unless a property is sold, homeowners are not required to upgrade their burner. Council relies on financial incentives to drive replacements. Hot Swap loans, (where homeowners, including landlords, can take out an interest free loan and pay it back over ten years) have been available since 2010, but loan applications are trending downwards (Table 7.4). Council is not in a position to support an incentives programme indefinitely. A guarantee of continuing funding cannot be made under the Local Government Act 2002.

Table 7.4: Hot Swap loans approved, by year

Month	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
July	0	38	43	75	32	13
August	3	38	51	35	19	6
September	11	26	33	31	20	10
October	88	14	22	17	25	12
November	74	17	14	16	25	14
December	32	14	19	4	0	9
January	26	16	17	13	0	7
February	38	21	41	31	13	15
March	47	30	48	53	12	25
April	54	36	63	44	22	26
May	63	38	62	46	17	28
June	44	53	44	43	18	22
Total	480	341	457	408	203	187
Total loans approved						2076

Council estimates 4,000 woodburner conversions may still be needed. Currently Clean Heat grants and Hot Swap loans stand at about 200/year each. Under Option 1 the Rotorua Airshed is unlikely to achieve the NESAQ target by 2020.

5. Design standard – the NESAQ design standard of 1.5g/kg for woodburners was set 12 years ago, based on the technology at the time. Since then, burner design has continued to evolve as councils introduce more stringent rules to target domestic burning (e.g. 1.0 g/kg in Canterbury⁴⁵, 0.7g/kg in Otago⁴⁶). Woodburners are now regularly being designed and tested at 0.5g/kg. Continuing with a 1.5 g/kg emission rate reduces the chance of achieving the NESAQ targets as compared to introducing a lower emission limit.

In summary, the Bylaw and NESAQ do not regulate new burners sufficiently. Burners with emission rates up to 1.5 g/kg can be installed in the airshed. The Bylaw and NESAQ do not target older burners that must to be converted to cleaner heat to meet the NESAQ. Under Option 1 these older burners may remain in place unless the homeowner opts for an incentive such as a Clean Heat grant or Hot Swap loan. The number of Hot Swap loan applications is decreasing. Option 1 will not achieve AQ O2.

AQ O1 requires the enhancement of air quality where degraded. Any airshed not meeting the standards (included in AQ O2) has degraded air quality, therefore not achieving AQ O2 means not achieving.

Feasibility – whether the provisions are within council's powers, responsibilities and resources and ability to implement, monitor and enforce

The management of discharges of contaminants to air is specifically listed as a function of the Regional Council under the RMA (s30(1)(f)). Council is mandated to ensure that the region complies with the NESAQ.

⁴⁵ Canterbury Natural Resources Regional Plan 2009

⁴⁶ Regional Plan: Air for Otago 2003

Council currently administers and enforces the Bylaw on behalf of the Rotorua Lakes Council. Council works with real estate agencies and conveyance lawyers to raise awareness of the Bylaw and compliance requirements. Council uses a combination of building permits and transfer of property documents to follow up with compliance and enforcement.

Acceptability – whether the provisions have a fair distribution of impacts and level of political and community acceptance

Many households enjoy using burners to heat their homes and are likely to be reluctant to upgrade sooner than they consider necessary. Option 1 will be attractive to part of the community. Burners provide a benefit to individuals at a cost to the community; the sector of the community affected by poor air quality caused by high PM₁₀ concentrations will not find this option acceptable. Option 1 will not achieve the NESAQ, so it is unlikely to be supported politically, either at local or national level.

Summary of effectiveness: 1

Efficiency

Benefits

Environmental:

Option 1 represents a gradual improvement in air quality as aging woodburners are replaced, but it is insufficient to improve air quality to the NESAQ target.

Economic:

A relatively small but important economic benefit to some individual households who are recipients of the Clean Heat grant or an interest free loan for cleaner heating.

Community health costs are unlikely to reduce under Option 1 because of new burner installations and the higher PM₁₀ levels allowed for new burners.

Social

At an individual household level, the grants or Hot Swap loans have led to warmer homes for participants, and have contributed to an improvement in the air quality leading to an increase in wellbeing.

Cultural

Environmental benefits enhance the mauri of air.

Costs

Environmental

Ongoing poor air quality (below NESAQ target).

Economic

In 2012 the costs due to negative health outcomes associated with solid fuel domestic heating in the Rotorua Airshed was estimated to total ²⁰¹⁶\$38 million.⁴⁷ These costs were made up of mortality, cardiac and respiratory hospital admissions, and restricted activity days (Table 7.3, above). These costs may have reduced with the highest levels of emissions falling, but the airshed has had 11 or more exceedances of the standard each year since 2013, suggesting the health costs remain high.

Under Option 1 homeowners must remove noncompliant domestic burners at point-of-sale (of home). This may make a marginal difference to the price paid for a house (the new homeowner has six months in which they can apply for a Hot Swap loan to replace the burner).

The current programme to bring the Rotorua Airshed into compliance is costing the Regional Council approximately \$1.5 million per year to implement the Rotorua Air Quality Action Plan. This cost is funded through rates and is based on 50% targeted rate (Rotorua District) and 50% general rates (Bay of Plenty region).

Social

The health issues and social costs related to poor air quality affect for the wider community. The health issues impact disproportionately on Māori (see Table 7.3, above). Restricted activity days impact on the ability of individuals to work, play and get an education.

While there is a social and economic benefit to individuals in using solid fuel burners to warm their homes, it is at the expense of the wider community who have uncompensated costs in relation to health

⁴⁷ Based on the model associated with the Kuschel et al (2012a) report. Figures converted to 2016\$ using the GDP Implicit Price Deflator (Statistics NZ).

	<p>and wellbeing and amenity values.</p> <p>Reduced enjoyment of the ambient and local air due to discharges of contaminants to air.</p> <p><i>Cultural</i></p> <p>Poor air quality degrades the mauri of air.</p> <p>Reduced ability to enjoy a typical kiwi lifestyle which includes clean air.</p>
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Summary of efficiency: 2

Option 2: Plan Change

Effectiveness

Relevance

This option includes polices and rules to sit alongside the existing incentives (loans and grants) and build on existing regulations. The provisions are more stringent than the NESAQ and target domestic burners.

The proposed polices and rules (Option 2) take into account (1) the difference between laboratory versus real-life emissions from burners, and (2) the modifications to reduce emissions. These issues are not addressed by the NESAQ, the Bylaw or the current plan.

The first issue is the difference between the NESAQ design standard and real-life emissions. The design standard of 1.5g/kg is determined using a standardised testing method. During testing, firewood must be of a specified size, type (species) and moisture content. The fire is lit using a specified method and wood is loaded at a consistent rate. This ensures the test is measuring the performance of the fire, not the firewood or the user.

In real-life firewood varies in size, type and moisture content. Users have different practices that influence the level of emissions. Some people burn rubbish, including food waste and plastics which can increase PM₁₀ emissions and produce other toxic emissions.

Testing of woodburners in Tokoroa revealed the average, real-life discharges from burners was 4.6g/kg⁴⁸. Modern burners are cleaner than older burners (which burn at about 10g/kg⁴⁹), but 4.6g/kg is three times higher than the laboratory test of 1.5g/kg. Analysis shows that the lower the emissions rate recorded in the laboratory, the lower the real-life emissions⁵⁰.

Option 2 uses a design standard of 0.6g/kg. While this rate is below the NESAQ standard of 1.5g/kg, the rate was chosen because it represents a considerable improvement in PM₁₀ reduction as required for the Rotorua Airshed, and provides some choice in solid fuel home heating.^{51, 52}

Pellet burners are an exception and are proven to have low emissions both in the laboratory and in real-life. These burners are designed to burn manufactured wood pellets with a consistent size and moisture content. Pellets enter the burning chamber automatically during burning. This system removes both fuel and user variation. Real-life tests of pellet burners match laboratory emission rates⁵³. Pellet burners range from 1.5 g/kg down to 0.1 g/kg.

Knowing that woodburners do not perform in real-life as they do in the laboratory makes it difficult to guarantee cleaner air, even with low emission burners. Pellet burners are a potential solution. However, pellet burners require electricity, which may be an issue in areas where power cuts are frequent or lengthy. Pellet burners also require the purchase of purpose-made pellets, so may not be a practical option for low income households. Therefore Option 2 allows the replacement of an existing burner (all types except indoor open fires) with a new woodburner, provided it meets the required standard.

⁴⁸ Ministry for the Environment (2007).

⁴⁹ Environment Waikato (2006).

⁵⁰ Applied Research Services Limited (2016).

⁵¹ See for example the ECAN website which lists 11 woodburners meeting this standard <https://www.ecan.govt.nz/data/authorised-burners/>

⁵² Consideration was given to using 0.5g/kg. Increasing to 0.6g/kg provided a greater range of approved burners and did not significantly undermine the focus of reducing the emission rates of individual burners. See Report to Rotorua Air Quality Working Party 18 August 2017: Further Options for Rotorua Air Quality Control Bylaw

⁵³ Ministry for the Environment (2007).

Another issue is modification of burners to reduce emissions through some adjustment or attachment. This includes refurbishment of burners, similar to a car service where parts (such as baffles, bricks, tubes, and seals) are cleaned or replaced. This process may improve the performance of the burner, increasing efficiency and reducing emissions. However, there is no evidence that this provides a significant improvement, and because of this refurbished woodburners are non-complying under Option 2.

Other modifications include the installation of devices to reduce emissions produced by the fire while it is burning. These may be in the burning chamber to improve combustion, or attached to the flue to remove emissions. These devices are currently untested, unproven or uncertain.

Council considered the issues of real-life emissions, modification of woodburners along with scientific research. The information was used to develop the policy and rules package of Option 2 to ensure Rotorua burners are managed to achieve AQ O2.

New burners in the airshed (not replacing an existing burner) are limited to pellet burners. Although pellet burners discharge PM₁₀ into the airshed, it is at a lower rate than other burners - less than 1.5g/kg - in real life emissions.

The Bylaw phased out indoor open fires in May 2015. These emissions are considered to have been removed from the airshed, therefore any replacement of an indoor open fire with a burner of some type is adding new emissions. Under this option, indoor open fires can be replaced with a pellet burner (but not a woodburner). At the time that this Plan Change is notified, households with indoor open fires have had more than two years to replace their fire with another burner. This is considered to be sufficient time to take action.

The rules contain an exemption for indoor open fires in Heritage Buildings. Three of these Heritage Buildings contain indoor open fireplaces that have not been blocked off or replaced with modern woodburners and therefore may still be used. Although these three fires may still be used, they do not significantly contribute to the PM₁₀ in the Rotorua Airshed and their continued use will not significantly undermine the objectives. There is also an exemption for smoking and cooking of food. This activity does not burn large volumes of solid fuel over several hours and does not contribute significant amounts of PM₁₀.

The main source of PM₁₀ is the remaining stock of old burners. Option 2 phases out the most polluting types of burners, indoor open fires, coal burners, and multi-fuel burners by target dates. The phase out date for indoor open fires has passed (2015). The phase out date for the remaining burners is 2020.

This single rule is one of the key pathways to ensuring compliance with the PM₁₀ standard in the NESAQ and achieving AQ O2.

Ensuring air quality achieves AQ O2 means enhancing air quality where degraded and achieves AQ O1.

Feasibility

The management of discharges of contaminants to air is specifically listed as a function of the Regional Council (s30(1)(f)) therefore these provisions are within the powers and responsibilities of Council.

Monitoring and enforcement of this activity is challenging, but feasible. Other councils have enforced these types of rules for several years and have developed many options for monitoring and enforcement. These methods range from raising awareness of the rule (and relying on most people to do the right thing), up to checking chimneys for emissions and issuing notices. As houses are sold the point-of-sale rule will also be effective in achieving this.

The Council is already successfully enforcing the Rotorua Air Quality Bylaw, and will continue to do so during enforcement of the regional rules.

Option 2 assumes that Council will continue to fund the clean heat through the Hot Swap loans and grants, and will fund enforcement of the rules.

Acceptability

Ultimately this is a rule to limit the negative external effects that individual households have on the health and wellbeing of the wider community. A criticism of Option 2 is that it restricts choice in the market, both in terms of reducing the NESAQ standard for woodburners, and in terms of not allowing new woodburners in the airshed where they are not replacing existing. However, Option 2 is a direct response to the negative externality, which is a market failure, where the actions of individuals (or firms) are visited on (and uncompensated) the wider community.

Previous versions of these rules did not allow for pellet burners as new burners. This was not acceptable to or supported by the Rotorua Lakes Council.

Consultation on the draft plan shows a low acceptability for phasing out older burners. However, four

commenters provided positive feedback on the phase out of old burners. The majority of commenters on these rules were in opposition. However, many comments showed a misunderstanding of the draft rule, such as thinking the Council wanted to ban all burners. There was also considerable concern for the impact of changing burners on low income households. This is an effect that Council has already carefully considered, and mitigated through incentives schemes.

Two aspects of the Bylaw 2017 may impact on poorer households. One is potentially negative, the other potentially positive. The first is related to the removal of non-compliant solid fuel heaters when houses are sold. Non-compliant includes indoor open fires and pre-September 2005 wood burners. It is the seller's responsibility. Several things could happen at this point:

- (1) If the house is bought by someone who will live in it, they have six months from the house purchase to use the Hot Swap Scheme to install replacement heating. The property would also be eligible for a Hot Swap insulation loan. It is probably reasonable to expect that someone buying a house can also afford to heat it.
- (2) If the house is bought as a rental then it is up to the landlord to provide heating. Landlords are required by law to provide heating for the main living area, but the heating can be in many forms, and will not necessarily be cheap to run. In cases where a household previously had a wood burner and sufficient means to keep the house warm, they may be worse off. Landlords are not eligible for the Hot Swap Scheme, but are eligible for the Hot Swap insulation loan which can be added to rates and paid off over 10 years.

The degree of impact in a change from a wood burner to another heating option depends on two things: the household's ability to run the wood burner, and the cost of the new heating. Using a wood burner is not costless; it requires either the purchase or collection of sufficient wood for the winter. Where there is insufficient wood, poorer households may be better off with a heat pump. Heat pumps are relatively cheap to run, and are efficient heaters. If the replacement is a more expensive form of electric heating, households may tend not to run the appliance because of high costs. Whether they are worse off depends on how they used the wood burner.⁵⁴

The second aspect in terms of poorer households is that the proposed change to stop new installations of wood burners (in new houses or where not previously installed) is that it enables more households to retain existing wood burners. Two new installations require one existing wood burner to be removed to break-even on air quality.

The regulatory approach with provisions similar to those proposed in Option 2 is consistent with rules introduced by other councils. These rules have been successful in improving air quality where they have been in place and enforced for some time. For example, Nelson City Council introduced rules to restrict discharges from certain burners and would only allow woodburners to be installed if they were replacing existing woodburners in 2008.⁵⁵ Airshed A, in Nelson South, was once one of the worst airsheds in NZ. In 2015 all Nelson airsheds, including Airshed A, complied with the National Environmental Standards, although Nelson City Council noted that the warm and windy weather may have contributed to lower emissions and better dispersion of particulate matter.

As set out in Part 7.5.1 and this part of the report, Council has implemented many other actions to improve air quality in Rotorua. Rules are the last resort. Without this approach the Rotorua Airshed will cease moving towards the NESAQ, which is the air quality standard set for New Zealand.

Summary of effectiveness: 4

Efficiency

Benefits	Costs
<i>Environmental</i> Option 2 is a proactive approach to improving air quality, and moves the Rotorua Airshed towards	<i>Environmental</i> In the short term the Rotorua Airshed will experience poor air quality until the domestic heating stock is

⁵⁴ WINZ can pay up to \$200 to low income households to assist with an outstanding power accounts, or to reconnect electricity. People do not have to be on a benefit to qualify, and may not have to pay it back depending on their situation. This is done on a case-by-case basis. See <https://www.workandincome.govt.nz/eligibility/living-expenses/heating-and-power-bills.html#null> . Other options to manage winter power accounts include a smooth pay arrangement with the power company to avoid high winter bills.

⁵⁵ <http://nelson.govt.nz/assets/Our-council/Downloads/air-quality-plan/Nelson-Air-Quality-Plan-Air-Quality-Rules.pdf>

<p>the NESAQ.</p> <p><i>Economic</i></p> <p>The requirement for very low emission burners promotes innovation by producers. Contributes to increased demand for research and development of new solid fuel burning technologies and tamper resistant designs.⁵⁶</p> <p>Modelling suggests that community health costs under the Option 2 will reduce as air quality improves. These include premature mortality (a long term impact of poor air quality), cardio and respiratory hospital admissions, and restricted activity days.</p> <p>In the longer term positive health outcomes could be expected to contribute to productivity gains due to reductions in restricted activity days.</p> <p>A relatively small but important economic benefit to some individual households who are recipients of the Clean Heat grant or an interest free loan for cleaner heating.</p> <p>Better controls on air discharges reduce public complaints (long-term) reducing resources required for investigation and enforcement.</p> <p><i>Social</i></p> <p>Fewer nuisance issues through requirement for cleaner burners, and replacement of older burners.</p> <p>Improvement in quality of life through improved community health, with a reduction in restricted activity days, cardio and respiratory admissions, and premature death due to poor air quality. Over the period of change this is expected to be a substantial reduction.</p> <p><i>Cultural</i></p> <p>Moderate level improvement in air quality impacts positively on the mauri of air.</p> <p>Well managed air quality increases opportunity to enjoy the lifestyle that kiwis expect – the ability to enjoy the outdoors without adverse effects on health or well-being.</p> <p>Encourages cultural shift towards modern heating appliances to heat homes which are more efficient and better for the environment.</p> <p>Allows for limited continued use of indoor open fires in Heritage Buildings, preserving our past culture.</p>	<p>changed to cleaner heat.</p> <p><i>Economic</i></p> <p>Less acceptable to some of the community than Option 1 (the status quo), this Option 2 may have moderate costs to the Regional Council to progress plan Schedule 1 RMA process.</p> <p>Moderate to high costs to council for ongoing monitoring and enforcement. Other costs include communication to encourage change to cleaner heat, and to inform people that pre-2005 burners are no longer compliant, and continuing to administer the point-of-sale rule. Resource requirement will lessen over time as domestic burners are replaced with clean heating options.</p> <p>The incentives programme and Plan implementation costs are funded by through rates. Option 2 continues the cost of incentives and adds on the cost of implementation of the Proposed provisions.</p> <p>The definition of non-compliant woodburners in the point-of-sale rule means the removal of additional woodburners that may not have otherwise been removed. The removal will be a cost to home sellers, and the replacement is likely to be a cost to home buyers. Ultra low emission burners retail for about \$5,000.⁵⁷ Removal of existing burner and installation would be additional costs.</p> <p><i>Social</i></p> <p>In the shorter term the acute health issues associated with poor air quality are likely to persist while air quality improves.</p> <p>Reduced choices to homeowners for whom the installation of a woodburner in situations where there wasn't one (e.g. new homes) is no longer available unless the homeowner creates an offset elsewhere in the airshed (conditions apply).</p> <p>Reduced options for replacement burners, which now must meet more stringent emissions limits; however there is a range of options available that meet the Option 2 standard.</p> <p>Option 2 may result in some colder homes as a result of removal of pre-2005 burners at point-of-sale. It could affect people who were previously able to provide sufficient wood to warm a house, but are not able to pay the costs of electric or gas heating. This may be a particular issue with renting households.⁵⁸ However, wood is not a 'free' option. Where it is not bought it must be gathered. Gathering sufficient to adequately warm a house is likely to require a good source of quality wood, a trailer, a chainsaw and time.</p> <p>There is a risk of an increase in fuel poverty. This is</p>
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⁵⁶ See for example article in Stuff, 4 May 2016 'Ultra low-emission woodburners keep home fires burning', which describes the positive response from Christchurch design and manufacture of ultra low-emission burners and the market for those appliances <http://www.stuff.co.nz/life-style/home-property/79592206/ultra-lowemission-woodburners-keep-home-fires-burning>

⁵⁷ Consumer New Zealand www.consumer.org.nz/

⁵⁸ See Footnote 51 regarding WINZ assistance

	<p>mitigated by the gradual changes required by the policy, which allow homeowners to plan for the replacement of older domestic burners.</p> <p>For homeowners the availability of Hot Swap loans reduces the risk of increased fuel poverty.</p> <p><i>Cultural</i></p> <p>New Zealand has a culture of using fire for home heating. Some people will see this as reducing their ability to exercise their rights in this regard.</p>
<p>Summary of efficiency: 3</p>	
<p>Option 3: Less stringent – As noted above the less stringent option is the same as status quo so has not been analysed separately.</p>	
<p>Option 4: More stringent</p>	
<p>Effectiveness</p>	
<p><i>Relevance</i></p> <p>Option 4 includes a range of regulations more stringent than the NESAQ and Option 2, which would work alongside the incentives. The regulations could be introduced either individually or as a package, and would achieve AQ O2. The effectiveness of each regulation in achieving AQ O2 is discussed below.</p> <p>(1) Allow replacement burners only – only burners already installed in the airshed could be replaced with a new burner. Any house that does not have a burner would not be able to install one. This is the most effective way to restrict new discharges of PM₁₀ into the airshed.</p> <p>(2) Allow only ultra-low emission burners (ULEB) as replacements – Environment Canterbury identified a need for a burner that was designed to burn with “ultra low emissions” even when operated under real-life conditions. To facilitate this, they developed Canterbury Method 1.⁵⁹ This method required burners to discharge no more than 0.5g/kg when operated under conditions including burning wet wood, normal firewood sourced from a merchant (containing bark, knots, differing sizes) and a hardwood species. Burners that passed this test are called ultra-low emissions burners and there are now several affordable models available on the market.</p> <p>However, despite being tested using Canterbury Method 1, there is uncertainty as to the performance of these burners outside the laboratory. The method itself is under constant revision and no <i>in situ</i> real life tests have been carried out to date. Both Environment Canterbury and Bay of Plenty Regional Council have commissioned real-life testing of these burners. Results are pending.</p> <p>If the real-life emissions turn out to match (or at least resemble) the laboratory test results, ULEBs could be the future of solid fuel burning. At this stage it is uncertain if this is the case and therefore ULEBs are considered woodburners.</p> <p>As discussed in Option 2, ULEB have been designed to burn cleaner under conditions more like real-life. If this is the case, requiring households to replace their existing burners with a ULEB would significantly reduce the emissions of PM₁₀ into the airshed, and potentially provide the option of installing a burner to some houses that do not currently one.</p> <p>(3) Stricter requirements for burners (e.g. tamper resistant) – Most modern burners do not allow overnight burning because restricting oxygen to the burning chamber significantly increases emissions. There is anecdotal evidence that some burners can be altered (tampered with) after installation to allow for longer burning. Tampering results in a burner that does not meet the design standard of the NESAQ. The implications of tampering include increased fire risk, non-compliance with building permits and loss of insurance. If Council incentive funds were used to purchase a compliant burner that is tampered with, the community has funded something that provides no community benefit.</p>	

⁵⁹ Environment Canterbury (2015).

The Council commissioned an investigation into tamper resistance of burners. The investigation focussed on burners on the Ministry for the Environment approved woodburner list (as at 2015) that had a design standard of 0.5g/kg (in 2015) and were physically inspected to determine whether alterations could be made to allow for overnight burning.

Of 37 burners inspected, 29 allowed simple adjustment to the dampening system (tampering) to close off air to the fire. Only eight were found to be tamper resistant and of those, only one model had a water heater. There were several burners with a design standard just over the 0.5 g/kg threshold that would be classified as tamper resistant.

Follow up investigation was carried out in 2016 to expand the list of tamper resistant burners to ensure availability of a wide range of freestanding or insert burners, with and without water heaters. The list of burners to be inspected was expanded to include burners with a design standard of 1.0 g/kg.

- (4) Rolling replacement of burners – the Draft Plan contained a section of the rule requiring all burners within the Rotorua Airshed to be replaced after 15 years. This ongoing upgrade of would take advantage of the best technology, for example the introduction of ULEBs. However, the uncertainty about the real life performance of ULEBs means that this approach could not be realistically assessed for effectiveness.
- (5) Any burner not permitted is prohibited – Option 2 has any burner that is not permitted, non-complying. This allows for resource consents to be granted for burners in exceptional circumstances. This would be effective at reducing emissions, but not significantly as Council does not expect there to be many cases where exceptional circumstances apply.
- (6) Earlier phase out date – This option could bring the phase out date for older burners forward, allowing more time for monitoring and enforcement to ensure compliance with NESAQ (and achievement of AQ O2). This would be unlikely to be effective without a significant increase in resources to aid replacement of burners and monitor and enforce.

Feasibility

All of these regulations are within the Council's mandate to manage discharges of contaminants to air under RMA (s30(1)(f)). However, there is considerable uncertainty regarding the effectiveness of some of the regulations, and significant additional resources would be required for to monitor and enforce others to ensure their effectiveness, now and into the future.

Implementing the tamper-resistant option would require resourcing to inspect each type of burner and assess the ability to tamper with it. New types would also need inspection, and a list of compliant burners would need to be maintained. Implementing a rolling replacement means ongoing compliance monitoring and probably ongoing incentives to assist homeowners with conversions. The considerable resources required make this option less feasible.

Option 4 assumes that funding would be available to monitor and enforce.

Acceptability

Allowing replacement burners only and limiting these to ULEBs was the option presented to the community in the Draft Plan. This was not acceptable to the public or to Rotorua Lakes Council.

Stricter design standards may be acceptable to councillors and the community provided a suitable range of tamper-resistant burners is available. Currently there are at least eight, including one model with a water heater.

The stricter controls that would make up Option 4 are unlikely to be supported by councillors and the community due to shortened timeframes and significant costs (discussed further below), therefore this option would not be effective.

Summary of effectiveness: 1	
Efficiency	
Benefits	Costs
<i>Environmental</i>	<i>Environmental</i>

<p>Option 4 would improve air quality, and moves the Rotorua Airshed towards the NESAQ.</p> <p><i>Economic</i></p> <p>The economic benefits of Option 2 would apply here.</p> <p><i>Social</i></p> <p>The social benefits of Option 2 would also apply here.</p> <p><i>Cultural</i></p> <p>The cultural benefits of Option 2 would apply here.</p>	<p>In the short term the Rotorua Airshed will experience poor air quality until the domestic heating stock is changed to cleaner heat. In Option 4 this would potentially occur more quickly than in Option 2.</p> <p><i>Economic</i></p> <p>Option 4 is unlikely to be accepted by community and is likely to attract appeals (based on those received for the draft rules), leading to significant costs to the Regional Council to progress the plan Schedule 1 RMA process.</p> <p>High and immediate costs of monitoring and enforcement, and ongoing costs to ensure the 15-year replacement compliance. Resource requirement will lessen over time as domestic burners are replaced with clean heating options.</p> <p>The incentives programme and Plan implementation costs are funded by through rates. Option 2 continues the cost of incentives and adds on the cost of implementation of the Proposed provisions.</p> <p>The definition of non-compliant woodburners in the point-of-sale rule means the removal of additional woodburners that may not have otherwise been removed. The removal will be a cost to home sellers, and the replacement is likely to be a cost to home buyers.</p> <p>Moderate costs to households. Earlier replacement of non-compliant burners would reduce planning time for this expense.</p> <p>All residents of the Rotorua District may be required to pay a targeted rate to fund the implementation of the Rotorua Air Quality Action Plan.</p> <p>Monitoring and enforcement will need to start again in 15 years to ensure replacement of aging burners.</p> <p><i>Social</i></p> <p>Low risk of increased stress on homeowners through having to change how they heat their homes and pay for the fuel. The phasing of the change reduces this risk.</p> <p>Reduced choices to homeowners who can now no longer install a woodburner where one previously did not exist. This includes new homes.</p> <p>Reduced options for replacement burners, which now must meet more stringent emissions limits. The lower the emissions level the fewer options available in the market. The extreme would be a stricter regime with a complete ban on woodburners.</p> <p>Like Option 2, this option may result in some colder homes, but under the same circumstances. If a shorter timeframe were imposed this would exacerbate any fuel poverty problems.</p> <p>The increased stringency increases the risk of impacts on groups with higher deprivation and on general social impacts. The risk of unintended consequences also increases as we have less ability to predict impacts into the future.</p>
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	<p><i>Cultural</i></p> <p>New Zealand has a culture of using fire for home heating. Some people will see this as reducing their ability to exercise their rights in this regard.</p>
<p>Summary of efficiency: 3</p>	

7.5.4 Risk of acting or not acting

Council must assess the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions (s32(2)(c)). This is also consistent with Policy IR 1B of the RPS, which requires a precautionary approach when there is uncertainty.

The NESAQ air quality standard must be met by 2020. Modelling shows that domestic heating is responsible for at least 61%⁶⁰, and possibly 90%⁶¹ of PM₁₀ emissions. Monitoring shows that although air quality in the Rotorua Airshed has improved (fewer breaches of the standard), it is not sufficient to meet the NESAQ standard.

Currently there is significant uncertainty regarding ULEBs. These types of burners meet a design standard set out by Canterbury Method 1, not by the well-established, repeatable AS/NZS 4013:2014. Canterbury Method 1 is undergoing revisions therefore burners that meet this test should be regarded with caution until they have been tested in real-life conditions.

ULEBs could eventually prove to be the cleanest burners available, even in real life. If Council does not include ULEBs in the rules package to manage burners in the Rotorua Airshed it will miss the opportunity to improve burner stock. However, if the ULEBs do not perform well in real-life, there is a risk that emissions from these burners will be higher than their design standard of 0.5g/kg, thereby compromising the ability of the Rotorua Airshed to meet the NESAQ standard.

Real-life tests have been carried out on one type of ULEB (the Tropicair Duo) installed in 10 Rotorua houses. The results from this test are still being assessed but the initial results indicate that the average discharge is 1.0g/kg and that moisture content does not increase discharges. These results are not final and are only on one particular model of ULEB therefore should be treated with caution, however they are encouraging.

Currently ULEBs meeting the requirements of the NESAQ are considered no better or worse than any other burner that meets the same standards. Council has included ULEBs in the Plan Change with the same level of control as other NESAQ compliant woodburners. Additional testing on ULEBs will be carried out by Environment Canterbury during winter 2018 and the risk will be reassessed following further testing.

Nevertheless, there are low emission burners on the market that meet the standard required by Option 2.

There is considerable uncertainty regarding various emission-reducing devices which can be attached to existing burners – either inside the burning chamber or to the flue. These devices are subject to further scientific testing and investigation and

⁶⁰ Fisher (2007)

⁶¹ Environet Limited (2015).

are currently not proven to consistently reduce emissions, or to be practicable to domestic burning situations.

There is little doubt that acting (Option 2) will move the airshed towards compliance with the NESAQ. The risk of not acting is that the Rotorua Airshed will not meet the NESAQ, and the high costs to health and wellbeing will continue.

When further information is available regarding these devices, this risk can be re-assessed, but until then, the precautionary approach is recommended. Burners with these devices that do not meet the permitted activity rule (AQ R12) in the Plan Change will be considered to be non-complying (AQ R13).

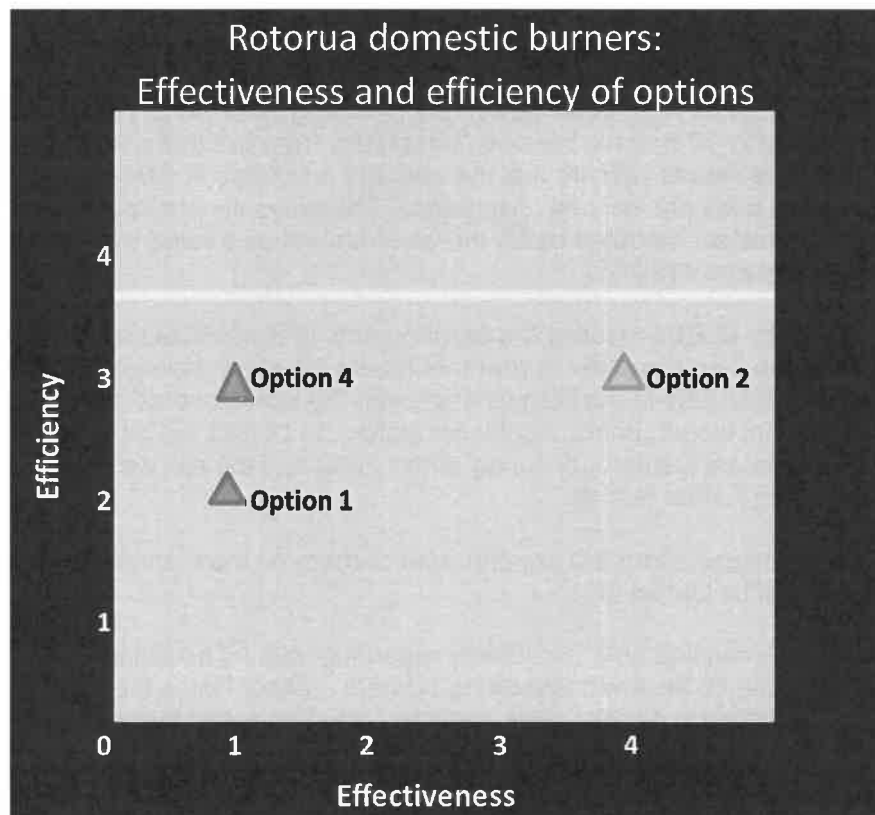
Having regard to this information, and taking into account the benefits and costs and the risks of acting or not acting, the most appropriate way of achieving

7.5.5 Justification of provisions stricter than national standards

The proposed change contains provisions stricter than national environmental standards. Justification for these provisions is provided in the analysis of Option 2.

7.5.6 Summary of assessment

The assessment shows Option 2 of the proposed Plan Change to be the most effective and efficient option to achieve the objectives regarding Rotorua burners. Option 2 reduces the number of new sources of PM₁₀, and ensures that replacements are low emission burners. This option addresses the high costs to the community from individual actions at a reasonable level. Option 1 has been in place for some considerable time, and the airshed remains a polluted airshed. Option 1 is not effective. Option 4 would achieve little more than Option 2 – the main difference being the timeframe, but it would require the Council to be very heavy-handed in enforcement, which would be costly but not necessarily effective.



Having regard to this information, and taking into account the benefits and costs and the risks of acting or not acting, the most appropriate way of contributing to the achievement of objectives AQ O1 and AQ O2 is by implementing policies AQ P1, AQ P3, AQ P4, and AQ P7 and rules AQ R12, AQ R13 and AQ R14.

