Environment Bay of Plenty
REGIONAL COUNCIL

Rotorua Air Quality
Action Plan

Photo courtesy of Jane Keam

What's the problem?

Air quality in New Zealand is governed by the Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins, and Other Toxics) Regulations 2004, more commonly referred to as the National Environmental Standards for Air Quality, or NESAQ. These standards came into effect on 1 September 2004. These standards put limits on the amount of pollution that is allowed in the air we breathe.

Air pollution in Rotorua is often assumed to be the characteristic sulphur smell. This naturally occurring smell is hydrogen sulphide and comes from the geothermal activity in the area.

There is a study underway that is investigating the long term effects of exposure to hydrogen sulphide. This study is outside the scope of this Action Plan. The pollution that most affects Rotorua's residents is something that most people are unaware of but is a problem all over the country.

Fine particulates are the cause of most of New Zealand's air pollution and are the result of burning wood, coal, and household rubbish, exhaust from vehicles, and some industrial activity, like sawmills.

The standards are concerned with pollution particulates that are smaller than 10 micrometres, a measurement referred to as PM_{10}. This measurement is so small that five PM_{10} can fit across the width of a human hair. They are so small that they act more like a gas and are breathed into lungs where they cause health effects. The daily maximum concentration of PM_{10} is 50 micrograms for every cubic metre of air ($\mu g/m^3$).

If the concentration gets too high it can affect health, with the most vulnerable being the elderly, the very young, and those who already have respiratory problems, such as asthma.

What's causing the problem?

The biggest source of particulates is from solid-fuel burners used for home heating.

A solid-fuel burner is any appliance that burns wood, coal, or pellets. Half of the city's homes use solid-fuel burners.

Industry also makes a significant contribution to the particulate concentration. Vehicles are also responsible for fine particulates, however only a small amount of the particulates in Rotorua come from traffic.

Over the last several years approximately 228 tonnes of particulates were discharged into Rotorua's air each year. To reduce air pollution to a level that is acceptable, at least 60 tonnes of particulates have to be stopped from getting into the air. Because home heating and industry contribute the most to this, the actions to reduce it focus on these sources.

Why have we created an Action Plan?

This Action Plan aims to reduce the amount of fine particulates being discharged into Rotorua's air by at least 60 tonnes a year. Having better air to breathe will improve the health of the city's inhabitants.

As well as the health effects, air pollution is unpleasant to look at and can reduce our level of enjoyment of a place. There is also an effect on the overall perception of Rotorua, and New Zealand as a whole. The presence of visible air pollution tarnishes the "clean, green" image that attracts many tourists to this country and to Rotorua.

Actions

The actions include a combination of regulatory (such as rules) and non-regulatory (voluntary) methods.

This Action Plan covers six areas:

- Reducing domestic emissions
- Restricting future domestic emissions
- Reducing industrial emissions
- Dry wood
- Community awareness
- Infrastructure development

Reducing domestic emissions (responsible for 60% of emissions)

Incentives

Why offer incentives?

To decrease air pollution in Rotorua, residents need to upgrade the way they heat their homes. Rules requiring upgrades are only one way to achieve this.

Many householders may already be thinking about upgrading their heating. However, the cost of changing it can be expensive, and different sectors of the community can afford more or less than others.

Offering incentives makes the process of change easier for both those who are looking to change, and those who are forced to change because of a rule.

Working together with the Energy Efficiency Conservation Authority (EECA) the financial burden on the community can be eased.

Actions

1 Long-term loan – Homeowners receive an advance from the council to convert their heating method. The loan is paid back over ten years by a targeted rate to the property.

2 Long-term loan (Rates Postponement) – Homeowners receive an advance from the council to convert their heating method. A targeted rate is applied to the property to pay back the loan and the rate is postponed until the property changes ownership.

3 EECA Clean Heat funding – Joint funding venture between EECA and local government to offer funding to upgrade heating in low-income housing.

Expected outcome

A total of 26.7 tonnes of fine particulates removed from the air. For more information see Appendix 1.

Regulations

What is the problem?

Emissions from domestic sources like household woodburners make up 60% of all fine particulates in the air in Rotorua.

Half of all households in Rotorua burn wood or coal to heat their homes

Many of these are old burners or open fires which allow more particulates to escape up the chimney. Upgrading these appliances will reduce the amount of pollution in Rotorua's air.

Also contributing to air pollution is the fact that 11% of households dispose of their rubbish and green waste by burning it in their backyard.

Actions

4 Backyard burning – Regional rule to ban outdoor burning of rubbish and green waste.

5 Burner upgrade at point of property sale – Regional rule requiring any solid fuel burner that does not meet the national environmental standard design standard to be replaced (by either vendor or purchaser) when the house is sold.

6 Open fires – Regional rule restricting the use of open fires for home heating by a specified date.

Expected outcome

A total of 40.2 tonnes of fine particulates removed from the air. For more information see Appendix 1.

Restricting future domestic emissions

What is the problem?

Reducing current emissions will go a long way towards solving the air pollution problem. However, it is sensible to stop the situation getting worse.

Future trends in ways to heat homes can be difficult to predict. Heat pumps are experiencing a market surge, but with increased uncertainty with power supply there may be a shift back towards burning solid fuel. To prevent air quality from declining further these regulations need to be in place before a major trend shift. Regulations will ensure that suitable burners are installed.

The intent is not to eliminate solid-fuel heating, but to ensure the cleanest, most up-to-date technology is used.

Actions

7 Restrict solid-fuel burners in new houses – Regional rule to restrict solid-fuel burners in new houses to those that meet the national standards.

8 Restrict new solid-fuel burners in existing houses – Regional rule to restrict new solid-fuel burners installed in existing houses to those that meet the national standards.

Expected outcome

Rules will prevent emissions from less efficient heating appliances and restrict new emissions to a total of 5.1 tonnes over five years. For more information see Appendix 1.

Reducing industrial emissions (responsible for 24% of emissions)

What is the problem?

Industries in Rotorua face the same problem as homeowners.

The emission reduction equipment used by industries can be old, and so is not as efficient as modern technology. A professional and independent consultant could assess the equipment being used and suggest improvements.

Large industries require a resource consent to discharge particulates into the air. However, all of these consents were issued before air quality became a concern in Rotorua and may let more pollutants be discharged than is ideal. Consent conditions can be reassessed to ensure particulate removal is adequate, but this process will take place only after discussions with industry.

Actions

9 Professional assessment – Contract a professional air discharge consultant to investigate modern particulate removal methods for major industry.

10 Update consent conditions – Assess and update conditions if necessary.

Expected outcome

A reduction in industrial emissions. This reduction depends on the actions taken and ranges from between 5 tonnes to 73 tonnes removed from the air. For more information see Appendix 1.

Dry wood

What is the problem?

Burning wet wood increases the amount of particulates released to the air.

There are many reasons why wet and/or unseasoned wood may be used:

- Poor preparation for winter
- Wood merchants selling poor quality wood
- Lack of dry wood storage
- Householder unaware of need to burn dry and seasoned wood

Any process that makes it easier to get good quality firewood, and store it appropriately once purchased, will help decrease the amount of particulates being discharged.

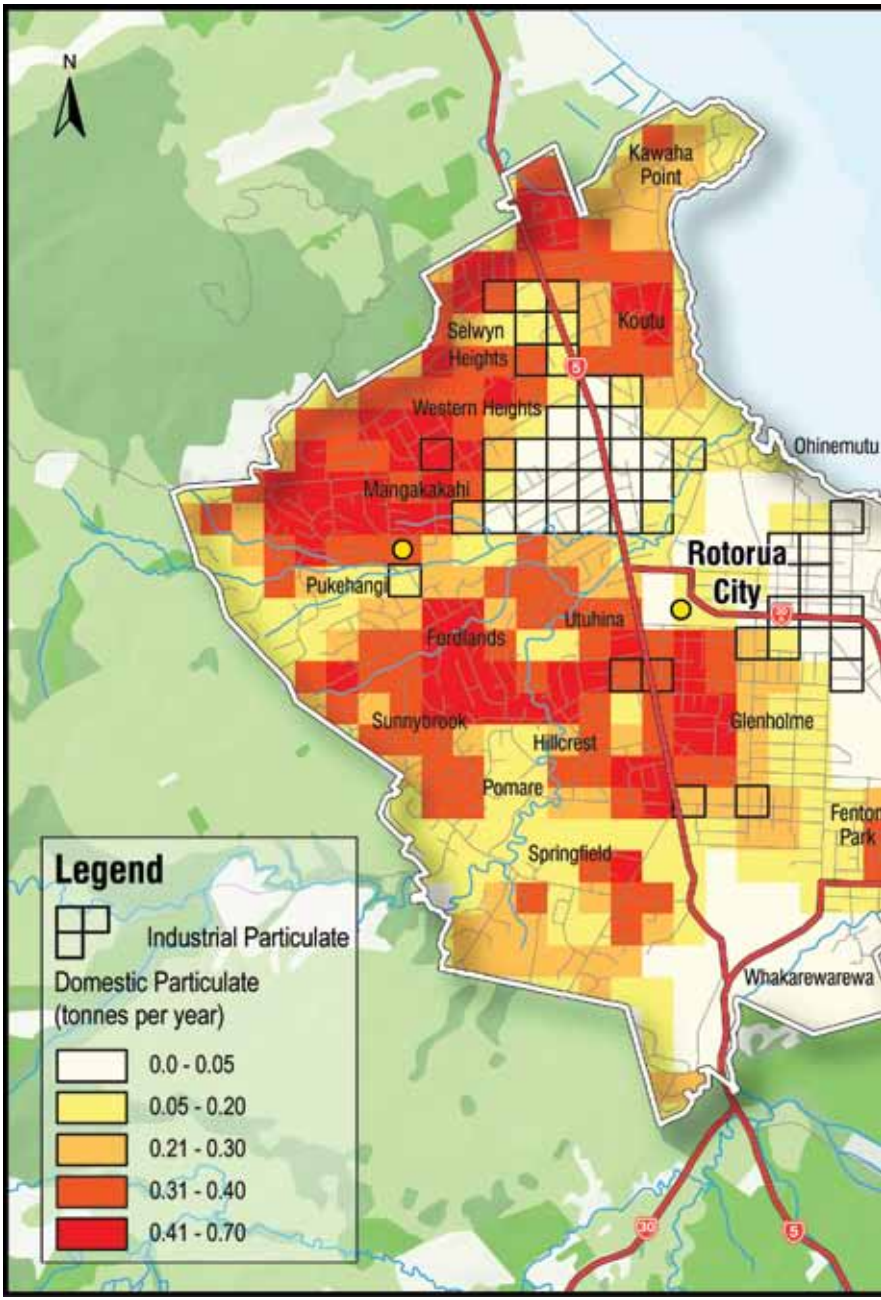
Although the environmental outcome is minimal, there are benefits for households as dry wood is more efficient for heating. There is also a chance to promote “good wood” as a public awareness/relations opportunity as burning wood is at the core of the air quality issue. This makes it an obvious and easy way to get good information into people’s homes about best practice. If the need to get and burn good wood is reinforced this may encourage better behaviour in those burning unseasoned wood.

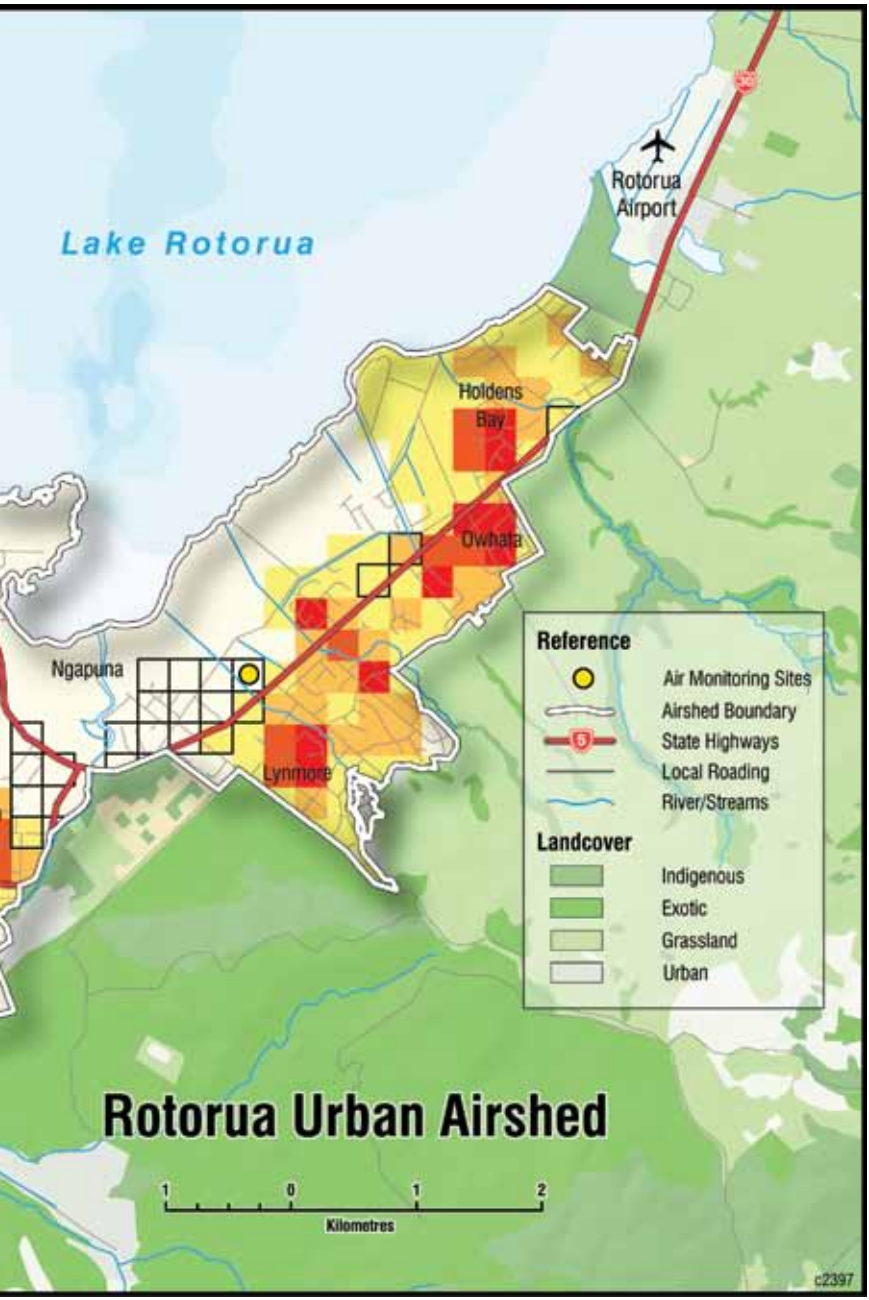
Action

11 Promote the burning of dry wood.

Expected outcome

The removal of 0.3 tonnes of fine particulates from the air. For more information see Appendix 1.


N
Kawaha Point
Selwyn Heights
Koutu
Western Heights
Ohinemutu
Mangakakahi
Rotorua City
Pukehangi
Utuhina
Fordlands
Sunnybrook
Glenholme
Hillcrest
Pomare
Springfield
Fenton Park
Whakarewarewa
Legend
Industrial Particulate
Domestic Particulate (tonnes per year)
0.0 - 0.05
0.05 - 0.20
0.21 - 0.30
0.31 - 0.40
0.41 - 0.70


Lake Rotorua
Rotorua Airport
Holdens Bay
Owhata
Ngapuna
Lynmore
Reference
Air Monitoring Sites
Airshed Boundary
State Highways
Local Roading
River/Streams
Landcover
Indigenous
Exotic
Grassland
Urban
Rotorua Urban Airshed
1 0 1 2
Kilometres
c2397

Community awareness

What is the problem?

Poor air quality is a community problem. With domestic heating causing the majority of emissions, the solution also rests with the community.

There is the potential for there to be a great deal of misinformation and scaremongering in the community, particularly regarding home-heating choices. A community that is misinformed is more likely to make poor decisions.

A community that is kept well informed and up-to-date with new trends and developments can work with local government for the greater good.

Community awareness may include:

- A social marketing campaign on reducing the toll to human health
- Employing a community liaison officer to work on education and distribution of information
- "Warm Homes" expos or displays

Action

12 Promote community awareness of the air quality issue.

Expected outcome

The removal of 0.5 tonnes of fine particulates from the air and a community feeling of ownership – everyone is an essential part of the solution. For more information see Appendix 1.

Infrastructure development

Why investigate infrastructure?

Heat and electricity generation from large-scale district heating schemes are two options being investigated for the future. Rotorua sits on a geothermal field and is close to forestry activities so makes these types of investments a viable option.

Each house that converts to a community scheme is one less household contributing particulates to the air from solid-fuel burning.

These projects will need significant funding and development. It is unlikely that either will be established in time for Rotorua to meet NESAQ requirements. However, a watch should be kept on the investigation and development of these options, to ensure that local authorities can respond as appropriate. The benefits of these projects go beyond improving air quality.

Actions

13 Research – Continue investigating the geothermal resource to identify potential opportunities.

14 Observe – Maintain a watch on infrastructure and resource opportunities to enable appropriate and timely responses.

Expected outcome

Opportunities for renewable energy will be identified, researched and developed for future use.

Other options

Out of the large number of options considered for inclusion in the Action Plan, some were not considered suitable at this stage. These included more stringent controls on industry and domestic burners.

At a later date, if the actions included in this Action Plan are not sufficient, these contingency options may be re-investigated.

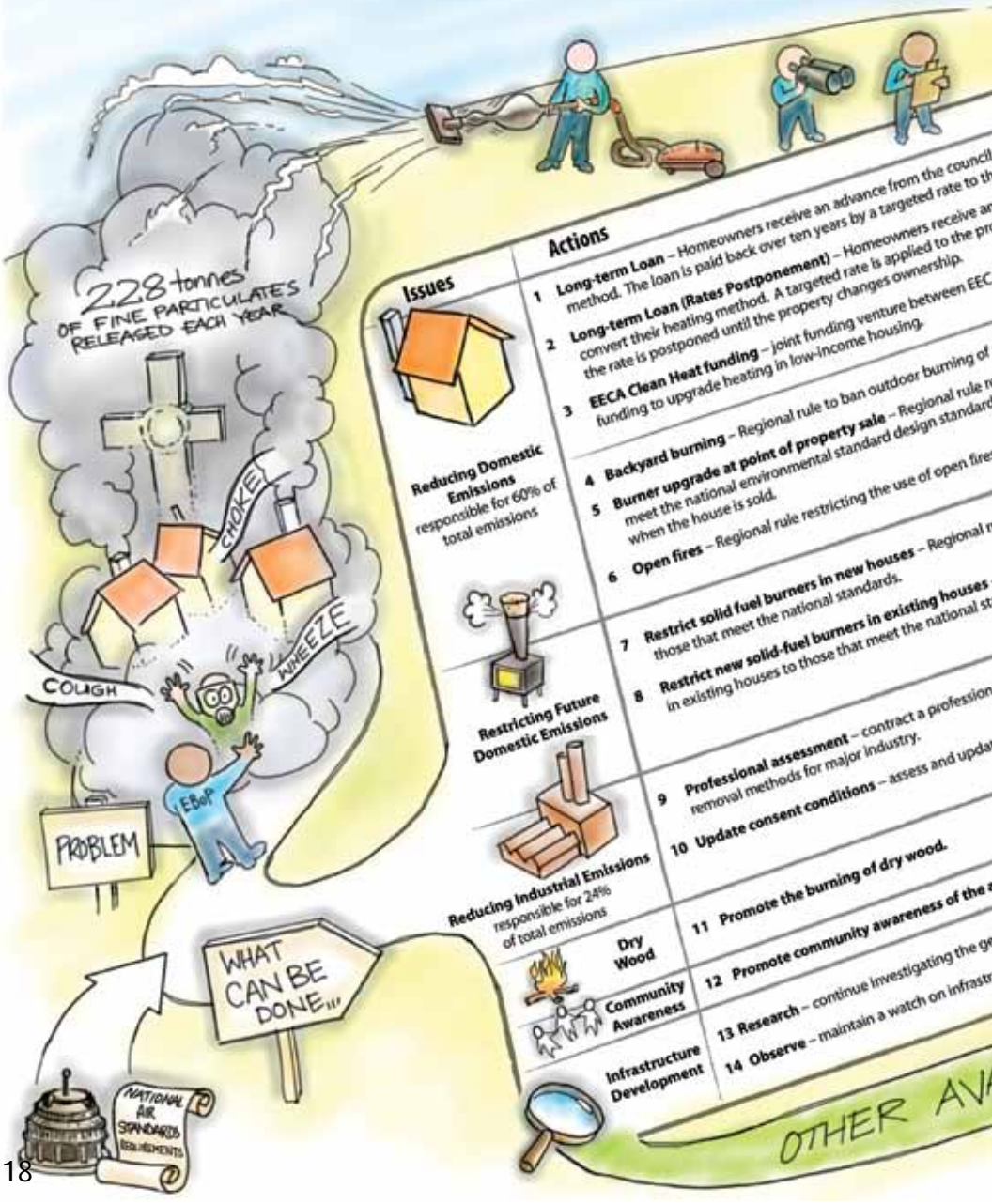
Several other options were investigated during the development of this Action Plan, but will not be pursued at this stage. Why these options were not investigated further is detailed in the Rotorua Air Quality Options Analysis Report.

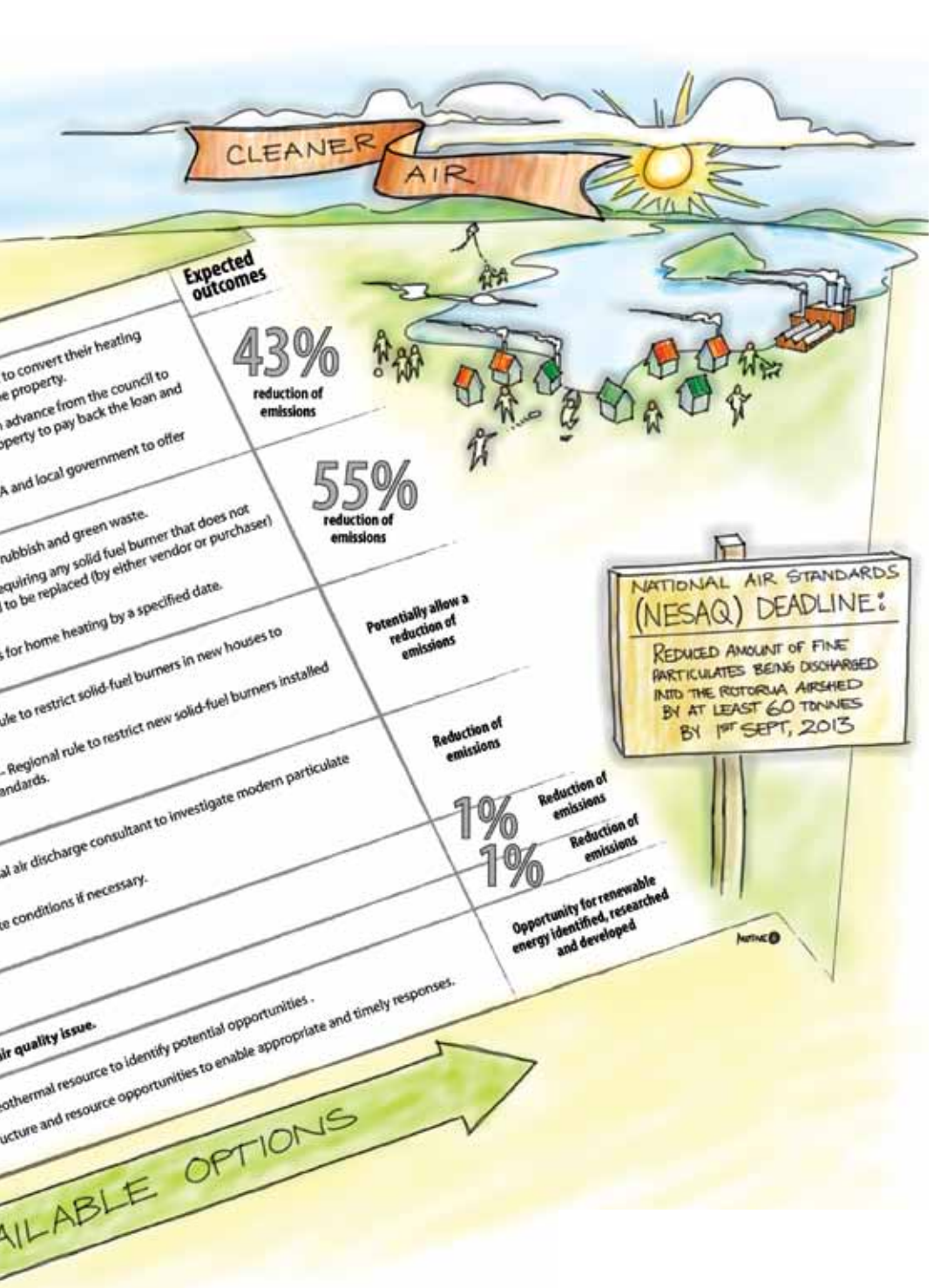
Action Plan review

When implementing the Action Plan patterns and trends are likely to emerge and these may change the basic assumptions used to calculate estimated reductions. In turn, this may result in some actions no longer being required, or conversely in more stringent actions becoming necessary.

The actions in this plan will be monitored as they are implemented, and an annual review of progress against targets is recommended. Because of the limited time available, any patterns that may hinder the removal of particulates from Rotorua's air should be picked up quickly. This will enable any necessary adjustments to be carried out immediately, rather than compounding the effect and running out of time to correct it.

Appendix 1: Summary of actions




CLEANER
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Expected outcomes
to convert their heating
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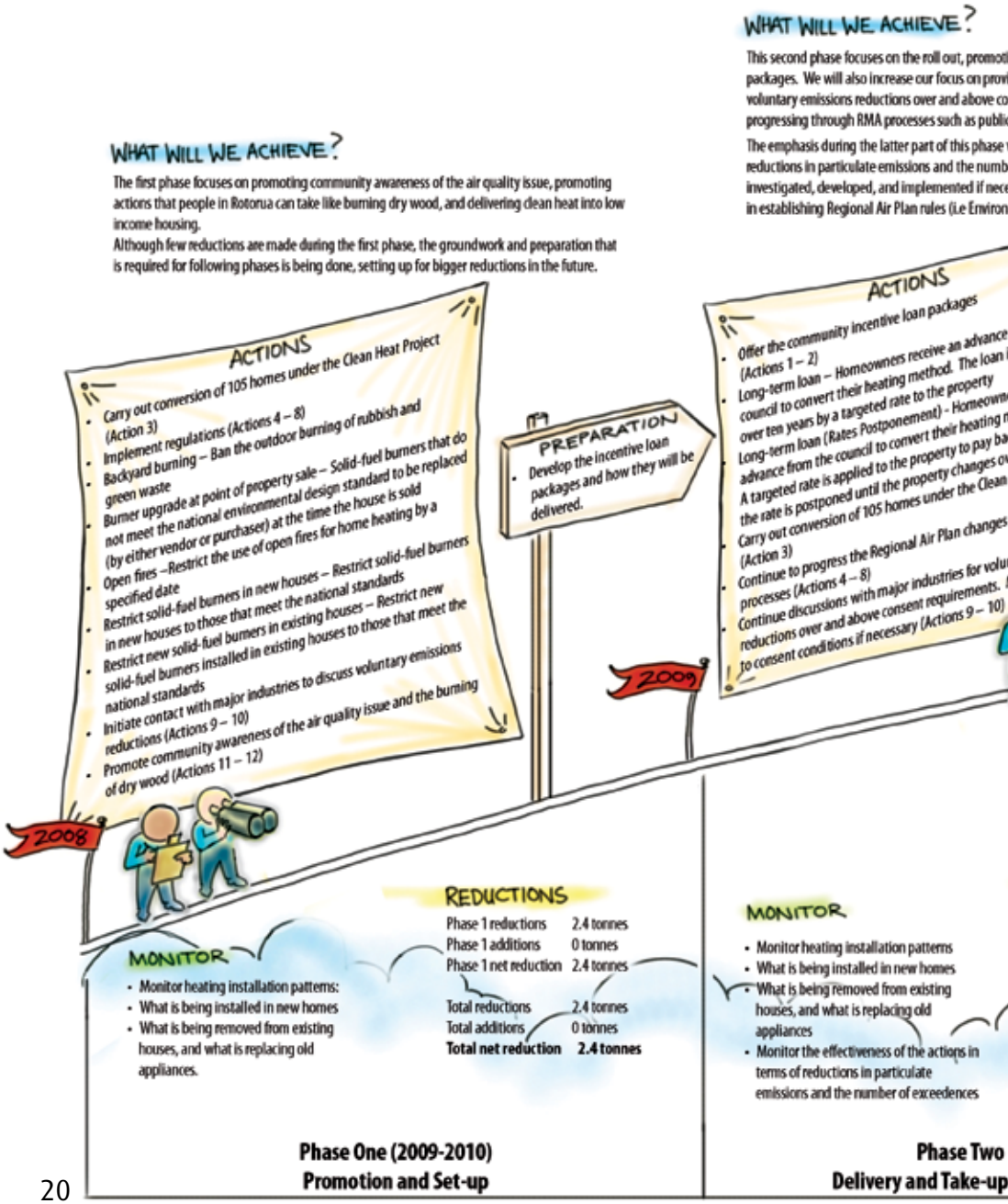
43%
reduction of emissions
55%
reduction of emissions
Potentially allow a reduction of emissions
Reduction of emissions
1%
Reduction of emissions
1%
Reduction of emissions
Opportunity for renewable energy identified, researched and developed
NATIONAL AIR STANDARDS
(NESAQ) DEADLINE:
REDUCED AMOUNT OF FINE PARTICULATES BEING DISCHARGED INTO THE ROTORUA AIRSHED BY AT LEAST 60 TONNES BY 1ST SEPT, 2013
AILABLE OPTIONS

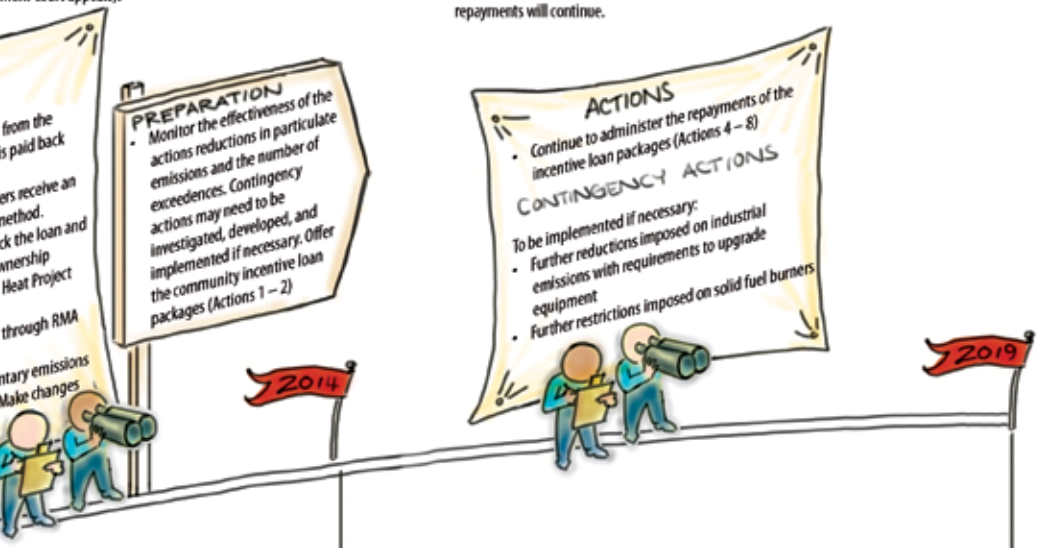
Appendix 2: Implementation plan



ion, and community take-up of the incentive loan
ding professional assessments to industry to agree
nsent requirements. Regional Air Plan rules should be
submissions, hearings and decisions.
will be on monitoring effectiveness of the actions,
er of exceedences. Contingency actions may need to be
ssary. This will be particularly necessary if we are delayed
ment (Court appeals).

WHAT WILL WE ACHIEVE?

The implementation of the Air Quality Action Plan is scheduled to be substantially complete by 2015. Incentive loan packages are not scheduled to run beyond 2014 and only administration of loan repayments will continue.



REDUCTIONS

Phase 2 reductions	25.1 tonnes
Phase 2 additions	0 tonnes
Phase 2 net reduction	25.1 tonnes
Total reductions	27.5 tonnes
Total additions	0 tonnes
Total net reduction	**27.5 tonnes**

MONITOR

- Monitor heating installation patterns
- What is being installed in new homes
- What is being removed from existing houses, and what is replacing old appliances

REDUCTIONS

Phase 3 reductions	40.2 tonnes
Phase 3 additions	5.1 tonnes
Phase 3 net reduction	35.1 tonnes
Total reductions	67.7 tonnes
Total additions	5.1 tonnes
Total net reduction	**62.6 tonnes**

(2010-2014)
of Incentive Packages

Phase Three (2014-2019)
Programme Wind Down

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