Air Quality SIG

Priority allocation

- 13 research needs identified

- Evaluation criteria used:
  - Significance: international/national/local issue
  - Value: in helping to meet statutory responsibilities
  - Urgency: how soon do we need the research
  - Incremental: do we need this before we can do the next step

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Context

- Ambient air quality guidelines established in 2002

- National Environmental Standards in 2004

- Main issue: PM_{10} (particulate matter less than 10 microns in diameter)

- Main source: home heating

- Management: emission limits placed on wood burners (NES), restrictions on the installation and use of burners across NZ

- PM_{10} NES under review – revised version out end of year

Priority 1:
Accountability/effective management

- Air quality management is targeted, cost-effective and results driven

- Improvements in air quality actually decrease risks to health

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- Key research questions:

  - Is management having the impact predicted?

  - Are there other options that would provide better/ guaranteed emission reductions (e.g. broad-scale infrastructure solutions)?

  - Have reductions in home heating emissions actually decreased risks to health?

  - Do we have the tools needed to accurately determine policy effectiveness?

  - How can management be more targeted, cost-effective and results-driven? Focus on those that need it most (susceptible populations) and on the most toxic contaminants?

- **Significant:** measures have been introduced at the local and national level

- **Of value:** new management approaches may be required if measures are not sufficient/effective

- **Urgent:** more challenging standards (e.g. $PM_{2.5}$) will require more innovative solutions

- **Risk:** costs to community and health is high if measures are not achieving outcomes

- **Incremental:** to know how far we've got to go

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Priority 2: Identification of key sources and their contributions

- Linked to accountability/ effectiveness research
- Air quality managed by controlling discharges to air
- Assume a 1:1 relationship between emissions and concentrations

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Background

- Emission inventories: relative contribution of the main sources to emissions

- Management targets the worst polluters identified by inventories (home heating: open fires and older wood burners)

- Some research suggests that estimated emissions decreasing at a faster rate than concentrations (emission estimates wrong?)

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- **Research required:**

  – Validation methods and uncertainty quantification

  – Comprehensive in-home emission studies to provide reliable wood burner use and emissions data

  – Develop new methods (not reliant on householder surveys) for quantifying emissions, and from sources otherwise difficult to estimate (e.g. Rural burns, background, natural, paved road dust)

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- **Significant:** measures have been introduced at the local and national level

- **Of value:** enable more accurate prediction of target compliance, ensure targets met

- **Urgent:** potential introduction of a $PM_{2.5}$ std means further management required (based on robust science)

- **Risk:** objectives may not be met as measures may not be the most effective

- **Incremental:** better science for better solutions

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Priority 3: Air toxics and other contaminants

- Air quality issues are not just limited to PM_{10}

- NZ Ambient Air Quality Guidelines:
  - 1,3 butadiene, formaldehyde, acetaldehyde, benzo(a) pyrene, benzene, mercury, chromium VI, arsenic and arsene
  - Largely ignored, some measurements (often not std methods) and not managed directly
  - Benzene exceeded at some road-side sites
  - Benzo(a)pyrene 10 x GL in Christchurch, 20 x GL in Timaru

- USEPA and WHO have $PM_{2.5}$ standards

- Greater focus internationally on air toxics and various constituents of PM, and on a change from single pollutant management to a multi-pollutant approach

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Research needs

- Extent of the problem and whether or not current PM_{10} strategies are helping or making things worse

- Prioritisation of contaminants based on toxicity and mix of sources

- Development of cheap, effective screening and analytical methods

- Development of a speciated source dataset (ie a library of source profiles including all relevant contaminants)

- Investigation into how a multi-pollutant approach to management might be implemented in New Zealand with recommendations for monitoring

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- **Significant:** local, national and international

- **Of value:** current guidelines and international standards being ignored. May deliver better health outcomes

- **Urgent:** likely that NES will eventually be developed, moves towards multi-pollutant management

- **Risk:** regulation ahead of science

- **Incremental:** better science for better solutions but hard to get $$ without the push of standards

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