Energy Efficiency and Conservation Authority
Te Tari Tiaki Pūngao

Monitoring and evaluating the Warm Up New Zealand: Heat Smart Programme

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Energy Efficiency Conservation Authority

New Zealand

New Zealand Government

Energy Efficiency Conservation Authority

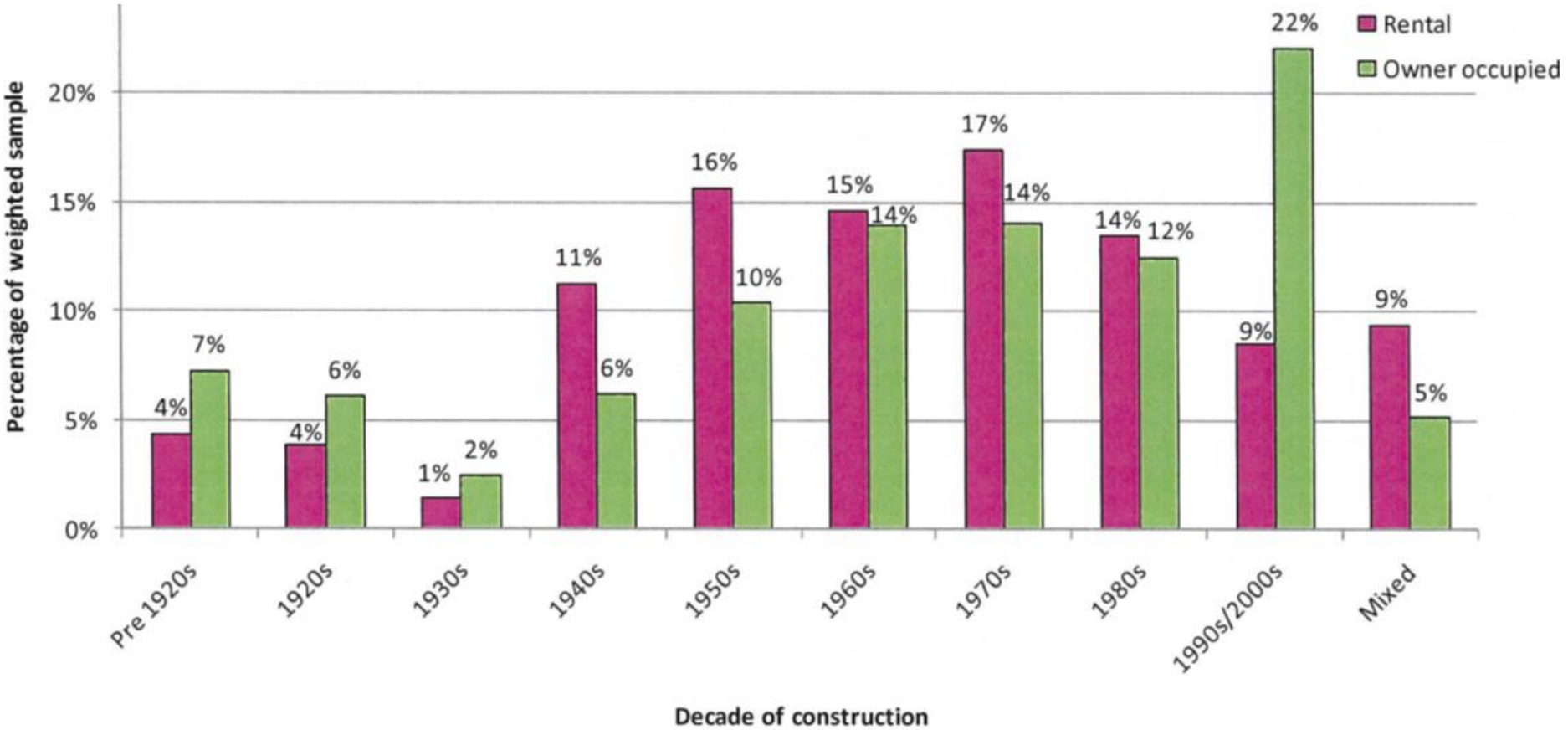
- a Government crown entity, formed 2008, and now has some 80 staff
- mandate to *encourage, support and promote energy efficiency, energy conservation, and the use of renewable sources of energy*
- broader Government initiatives:
  - 90% renewables target by 2025
  - operate an emissions trading scheme

EECA

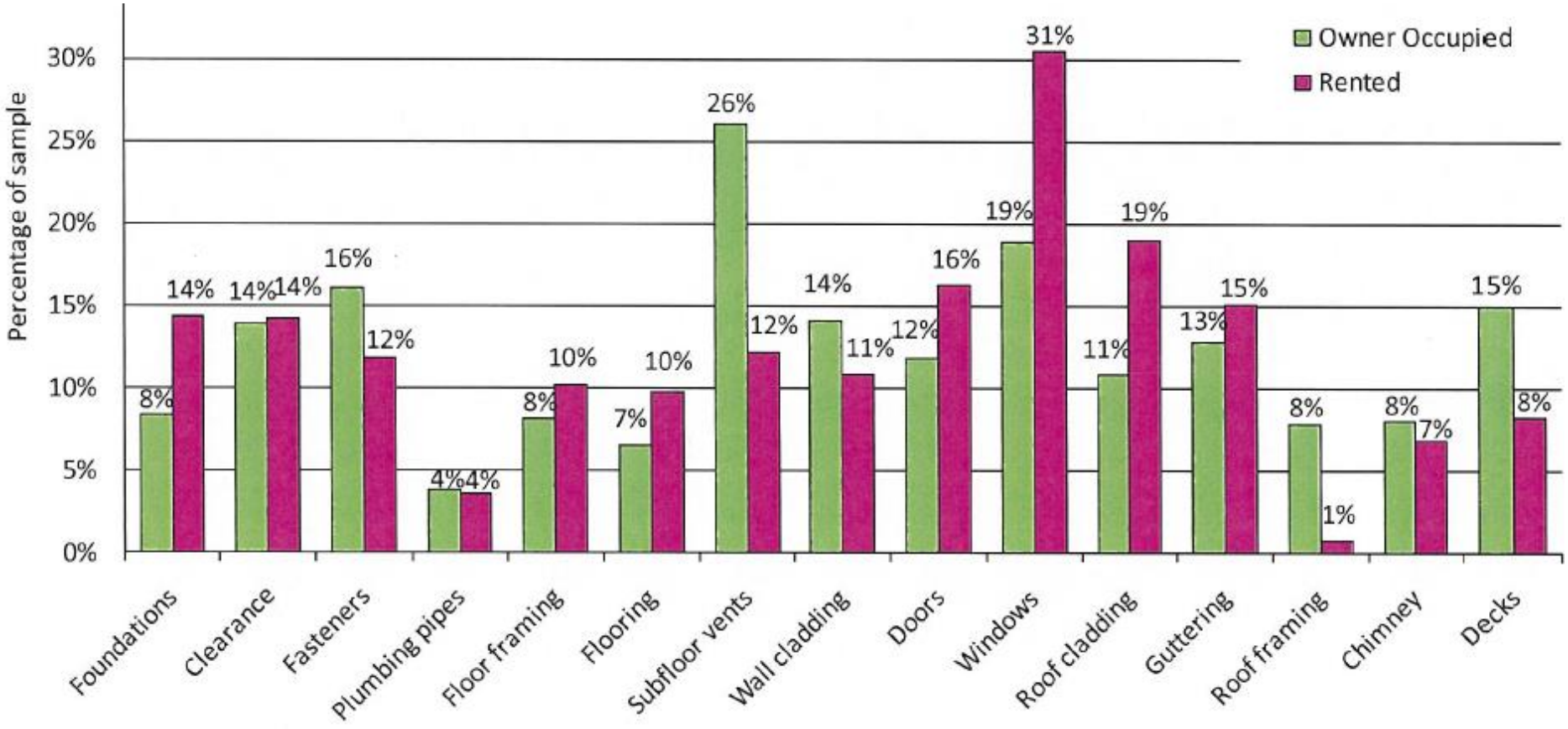
NZ residential sector

- 600,000 under-insulated homes
- cold climate and rising damp
- timber housing stock
- older buildings
- over crowding
- rheumatic fever
- ageing population
- excess winter hospitalisation
- no building code pre 1978 for any insulation standard

Age distribution of houses by occupancy



Exterior and envelope components in poor or serious condition



Warm Up New Zealand: Heat Smart

- home insulation programme, NZ$350 million for 188,500 low income and general income homes, commenced 2009
- achieved 241,038 homes
- aims - save energy, deliver health benefits and stimulate the economy
- part-funding for home-owners and landlords who owned homes built before 2000 for:
  - insulation retrofits (floor and ceiling)
  - heater retrofits (primarily heat pumps, also pellet burners and efficient wood-burners), gas
  - other retrofits (pipe lagging, draught-proofing, moisture barriers)

EECA

Overall programme acheivements

- strong safety focus, not DIY
- quality assurance:
  - retrofits reported to EECA in detail – materials, quantities
  - regular auditing and enforcement for non conformance
- built good relationship with small service provider base
- regular media coverage and promotion
- EECA team customer service – ensuring positive service delivery
- regular letters of gratitude from the public

Evidence based evaluation – Motu report

- independent evaluation conducted, commissioned through a different department - three reports on health, energy and economy
- first evaluation of its kind in New Zealand
- cost benefit analysis based
- proactive arrangement with health authorities providing addresses and health information about clients

Methodology

- high quality research - the treatment (insulated) group was tested against various control (non insulated) groups
- data on all homes in New Zealand is held by Quotable Value (QV), an organisation that provides the data that allows councils to assess rates
- using addresses of treated homes it was possible to identify up to 10 control homes with similar relevant characteristics such as size, condition, year of construction, and geographic location.
- treatment and control addresses could then be linked with the Government database - National Health Index, identifying likely occupants

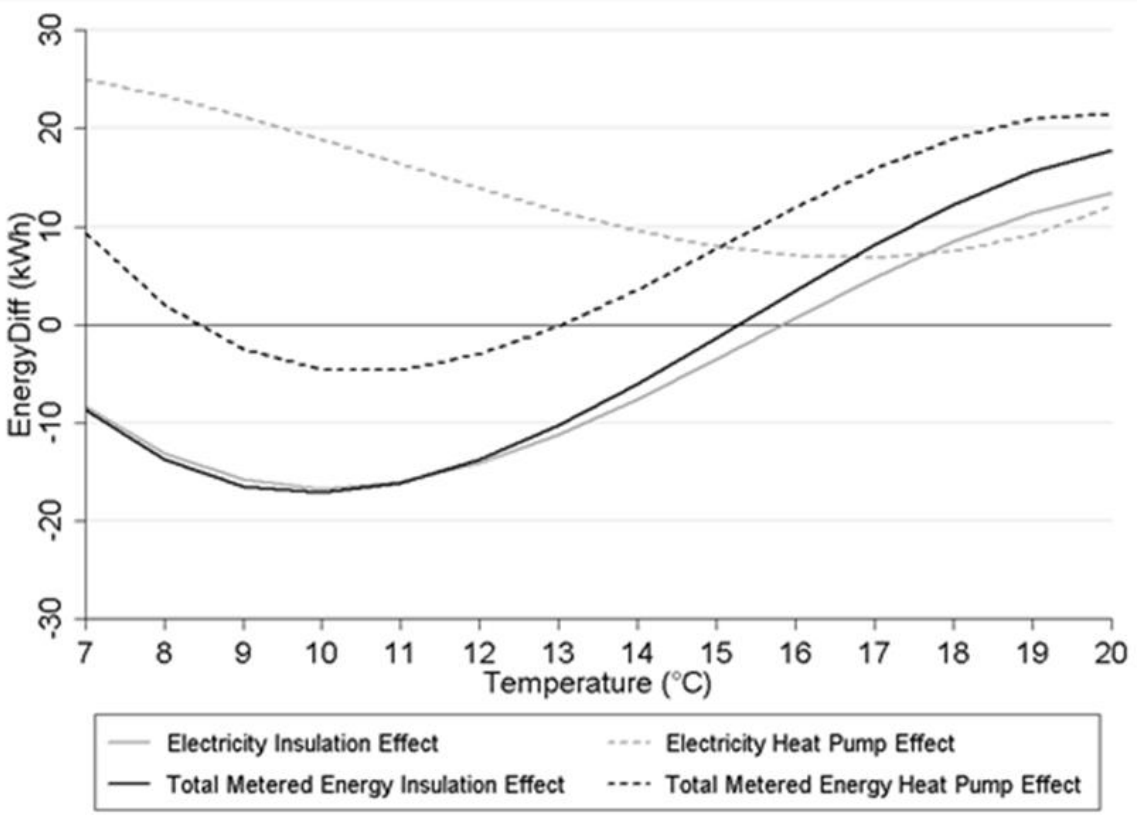
Energy use evaluation

- metered energy (electricity and reticulated gas, not wood/coal or stand alone gas)
- data provided by four of the biggest energy companies
- useable data for 12,082 treatment households, from an initial list of 46,655 treated households
- removed factors of influence - households that changed suppliers
- model used difference in monthly energy use between treatment households and control households
- for a year before treatment and a year after treatment

Energy use evaluation results

- with insulation saved 0.96% of average annual household electricity use

- with insulation saved 0.66% of average annual total metered energy use



Health cost evaluation

- NHI linked data provided over 900,000 treatment and control group individuals
  - cost of each publicly funded hospitalisation
  - cost of each Government subsidised pharmaceutical prescription
  - demographic information including date of death if applicable

Cost benefit evaluation continued

- key result: under favoured model assumptions:
  - net benefit of the programme NZ$951 million
  - benefit: cost ratio of NZ$5.20:1
- result driven largely by value of changes in mortality attributed to insulation
- model assumed insulation retrofits have a working life of 30 years and heating retrofits a working life of 10 years

Modelling changes in health costs

- key result: savings in monthly hospitalisation costs as a result of receiving **insulation** retrofit
  - saving of NZ$5.37 per household per month for total hospitalisations
  - evidence that benefits greater in low-income households

- savings observed in total monthly pharmaceutical costs per household following **insulation** retrofit
  - saving of NZ$0.92 per household per month

Modelling changes in mortality

- looked at changes in mortality rates for vulnerable elderly individuals

- found treatment resulted in a reduction in mortality rates for elderly individuals with pre-existing heart disease relative to comparable control group individuals

- these benefits were valued at the household level, using figures adapted from the transport sector:
  - NZ$613 annual saving for low-income household
  - NZ$216 annual saving for non-low-income household

Previous research on health benefits

- New Zealand research was a valuable source of information - randomised controlled trials of insulation retrofits and heating retrofits for low income households with asthmatic child occupants
- enabled the evaluation of changes in GP visits and changes in days off school or work attributable to insulation or heating
- predicted annual value of total benefits a **typical** study household might gain:
  - $47.75 from insulation retrofit
  - $4.64 from heating retrofit

Employment and industry impacts

- report looked at impact of Warm Up New Zealand: Heat Smart on employment and industry impacts, found:
  - increase in employment resulting from the first year of the programme of 64 – 431 full-time equivalent jobs.
  - additional producer surplus (revenue and profit) of $44 – 62 million dollars during first year of the programme

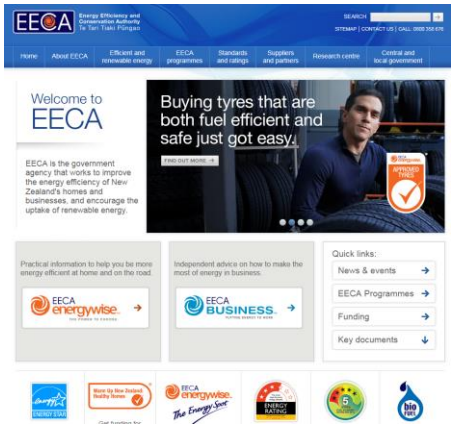
Limitations

- could not directly account for wood and coal use – a key area for potential health savings for asthmatics from air pollution and particulate matter
- full access to all meter data from energy companies not provided
- limited time period after installation of insulation in some cases
- reasons for heat pump increase in electricity consumption unclear
- limited data on changes in days off work or GP visits
- collecting data on cause of death would have strengthened evaluation of mortality data

Summary

- significant benefits of NZ$5.20:1 ROI
- strong quality assurance component
- programme specified appropriate products
- quality programme evaluation can leverage further funding
- strong private/public partnership
- the smaller nature of the industry – 70 suppliers means building good relationships, which ensures great customer satisfaction

Further information



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Acknowledgements

Health research organisations:

- He Kainga Oranga (Housing and Health programme of the Public Health Department of the University of Otago, Wellington)
- Victoria University
- Waikato University
- Motu Economic and Public Policy Research
- Covec
- led by Philippa Howden-Chapman Winner the Prime Minister's Science Prize,chair of the WHO Housing and Health Guideline Development Group and was a member of the Children's Commissioner's Expert Advisory Group on Solutions to Child Poverty