



Manaaki Whenua
Landcare Research

From Grey to Green

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Increasing resource Use

- *Currently exceed our global environmental footprint by a third*
- *New Zealand only lives within its footprint because of the low population base*
- *Increased resource use in developing countries will significantly impact on global consumption*



Close to home

- *Potential power shortages predicted*
- *Other infrastructural services need upgrading*
- *Always a focus on finding new resources*
- *Less attention paid to more efficient use of resources*





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How to make the change?

- *Education, absolutely essential but not enough*
- *Need to provide the right context to encourage behaviour change*
- *Behaviour change starts at home*
- *Planners, architects, engineers and politicians can all play a part*

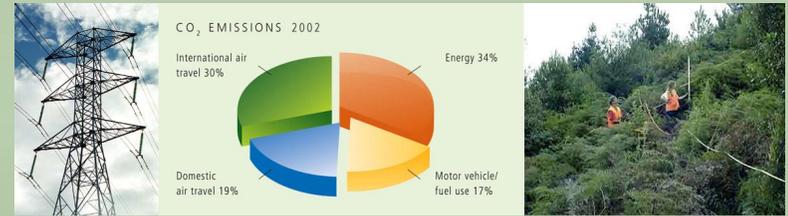




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Energy

- *Reduce demand through efficient use in well designed houses*
- *Houses should generate power and feed into local grids connected by a national grid*
- *The need for more power generation could be dramatically reduced.*





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Stormwater

- *Flash flooding caused by high impervious areas*
- *Contaminants of roads feed into streams and estuaries*





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Water use and waste

- *The use of potable water for 90% of household purposes is ridiculous*
- *Modern toilet systems are highly water inefficient*





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Why haven't we made more progress

- Prospective owners do not appreciate the problems or what can be achieved.
- There are too few professionals in the design industry with a background in ecological engineering and sustainable architecture.
- One can build anything if the price is right so there is a perception and sometimes a reality that eco-buildings are more expensive than conventional buildings.
- While the design industry has some understanding of the problem, the construction industry, construction contractors and material suppliers have very little.
- In general developers have not been interested in moderating development to address environmental concerns. There are some exceptions.
- Building code and compliance standards can work against innovation. Often people work to the minimum standards when going above them would be beneficial.
- Risk is a major factor in that anything new may be risky and may not be suggested by the design team or the construction company, because of liability issues.
- Environmental, economic and social data needs to be put in a form that is able to influence plans, codes and practice.



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The Landcare Research Building

- To house our National insect Collections of 6.5 million insects, one million of them mounted with pins, in a state of the art Collection facility.
- Likewise for our national fungal Collection of 600,000 specimens.
- Provide for containment facilities within our laboratories to meet PC2 standards.
- Provide containment and propagation glasshouses.
- Ensure that the building could be monitored as part of our on-going urban research.
- Provide space for 60 Landcare Research staff 25 MAF staff and a number of University collaborators.



Sustainability goals

- *The building had to be designed for sustainability.*
- *Construction costs were not to be increased because the building was sustainable.*
- *Projected energy operating costs should be around 60-70% less than for a conventional building.*
- *The building would make minimal use of municipal water, stormwater and sewage systems*
- *Use local labour/products if possible*

Typical Lab 300 kWh/m².year

Typical Office 150 kWh/m².year

Our target 100 kWh/m².year

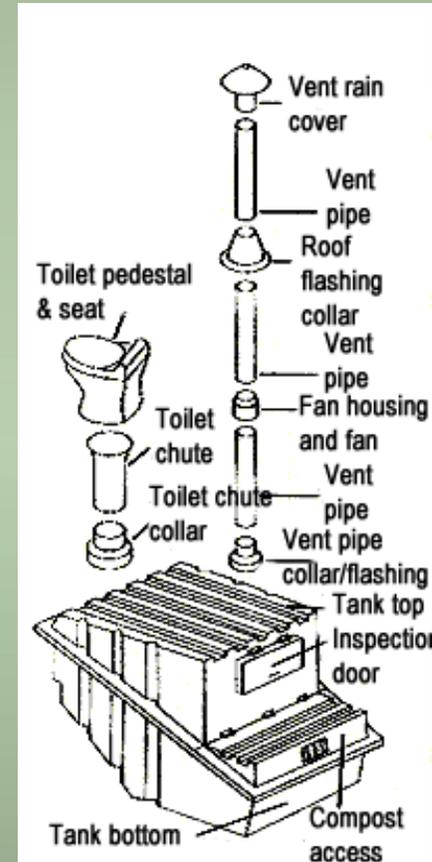
Energy Efficiency

- *Building materials*
- *Insulated walls and roof*
- *Windows*
- *Heat Recovery*
- *Solar panels*
- *Small wind generator*



Sewage

- *Minimising the load on infrastructure*
- *Composting toilets on first and second floors*
- *Low water use flush toilets on ground floor using recycled water*





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Water and Waste Management

- *Rainwater harvesting*
- *Purified water for the laboratories*
- *Stormwater and carpark runoff*



Other Features

- *Interface carpets, recycled resources*
- *Marmoleum laboratory floor covering*
- *Concrete floor in many areas*
- *Exposed ceilings in corridors*
- *Low energy light fittings*
- *Non-solvent paints*
- *The subject of a research and monitoring project*



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Simple suggestions for sustainable design

- Having a design team that is really committed to the goal and has in it some experience in sustainable design.
- Remembering that sustainable design does not have to stand out like a sore thumb, especially if that adds to the costs.
- Client and design team being prepared at this stage to take some, at least perceived risk, in moving away from the status quo.
- Having end-users who are prepared to accept a building that they may need to actively manage, open and close windows, accept a wider climate comfort range than normal.
- Choosing a framework for decision making, there are several available and spend the time required to consider the trade-offs in terms of sustainable features, eg the various aspects of embodied energy in choosing materials in relation to the life-cycle of the building.



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Longer term changes required

- Suppliers of materials should aim to only procure certified sustainable products.
- More robust and accepted financial systems should take account of the reduced operating costs of a sustainable building
- There will need to be a move away from working to the minimal building code and compliance standards.
- Councils need to be actively promoting sustainable design through a range of mechanisms and coordinating between their planning and consent departments so that they give a consistent message.

