

A Clean Energy Future

Beyond Zero Emissions, Uni. Of Melbourne, UNSW

**Oz energy renewables by 2020
Services need half 2010 energy**

**Mostly solar + wind, storage
Total cost similar to b.a.u.**

Invest 3% GDP for 10 years

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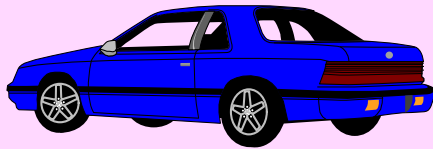
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Nuclear power for NZ ?

- **Too expensive**
- **Too slow**
- **Limited high-grade resources**
- **Environmental risks**
- **Radioactive waste**
- **Weapons proliferation ?**
- **Few benefits, high costs**

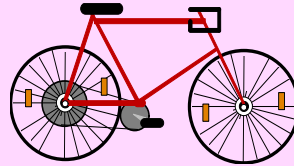
Transport options

- Public transport, bicycle
- Rail, ship freight
- Bio-fuels: alcohols, bio-diesel
- Hydrogen from renewables
- Solar electric vehicles



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Global average fuel efficiencies [MJ / passenger kilometre, 1990]

- | | |
|------------------|------|
| • Car | 2.91 |
| • Bus | 1.56 |
| • Diesel train | 1.44 |
| • Tram | 0.79 |
| • Electric train | 0.44 |
| • Bicycle | 0.06 |

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The hydrogen car ?

- Jan. 1999, Shell's hydrogen filling station [Hamburg]
- BP trialling hydrogen
- Iceland operating hydrogen fuel - cell buses, then boats, then cars . . .
- Moving to hydrogen economy by early 2020s

Two new towns compared

	Milton Keynes	Almere
• Car	59%	35%
• Transit	17%	17%
• Bicycle	6%	28%
• Walking	18%	20%
• % trips < 3 km	45%	85%
• Dwellings / Ha	20	40

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Doing nothing is not an option. Energy is vital. So we need to plan *now* for a sustainable future.

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“these recent crises - fuel, food and finance - are simply the three canaries in the mine. These are the early warning signals that our current **economic system is simply not sustainable.”**

WEF Global Agenda Summit, 2008

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Limits to Growth + 30 years data

On *all* key parameters [population, resource use, industrial output, agricultural production and pollution] we are on “standard run”. This leads to economic and ecological collapse before 2050.

“No-one has to change. Survival is optional”

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The underlying drivers

- Population growth
- Consumption per person
- Societal values

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New suite of values

- Domination of nature becomes *ecological sensitivity*
- Consumerism replaced by *quality of life*
- Individualism -> *human solidarity*

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Creating our future



- not determined
- various options
- our choices
- holiday analogy
- quality of life

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Questions ?