

# Energy as a connector

## The genealogy of the OERC

Gerry Carrington and  
Janet Stephenson





OTAGO  
ENERGY  
RESEARCH CENTRE

The Steering Group for the OERC invites you to  
the launch of

## Otago Energy Research Centre

4.30pm

Monday 5 March 2007

Centre for Innovation

University of Otago

Cnr St David and Castle Streets

Dunedin

**Drinks and nibbles provided**

**Please RSVP by 12pm Friday 2 Mar to:**

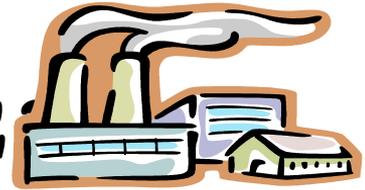
**Eluca Kim**

**[Eluca.kim@otago.ac.nz](mailto:Eluca.kim@otago.ac.nz)**

The Otago Energy Research Centre brings together some 40 researchers from across the Sciences, Business, Humanities and Health Sciences.

Together, we are interested in the complex interactions between energy supply, energy use, human behaviour, social processes and economic forces, and the implications of

# BURNING OUR CHILDREN'S FUTURE

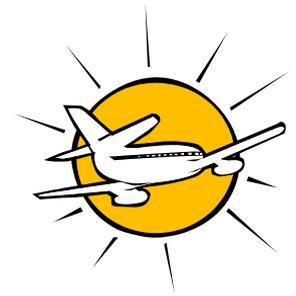


You are cordially invited to contribute to the development of the Research Agenda for a new Institute/Centre of Excellence covering Energy & Environmental Sustainability & Security, to be established at Otago in 2005. For general background see [www.med.govt.nz/ers/environment/sustainable-energy/](http://www.med.govt.nz/ers/environment/sustainable-energy/)

**WHEN: FRIDAY 18<sup>TH</sup> MARCH 2005, 0900-1700**  
**WHERE: UNICOL SEMINAR ROOM**

There will be a great line-up of speakers to help boost the discussions:

- \*Geoff White, Deputy Vice Chancellor, Research
- \*Gerry Carrington, Physics
- \*Keith Hunter, Chemistry
- \*Rob Lawson, Marketing
- \*Richard Morgan, Geography
- \*Rick Sibson, Geology
- \*Bob Lloyd, Physics



*Places are limited and demand will be high, so please rsvp to Sandy Wilson –*

*[sandy@physics.otago.ac.nz](mailto:sandy@physics.otago.ac.nz) asap*

*Morning & afternoon tea/coffee and lunch will be supplied*

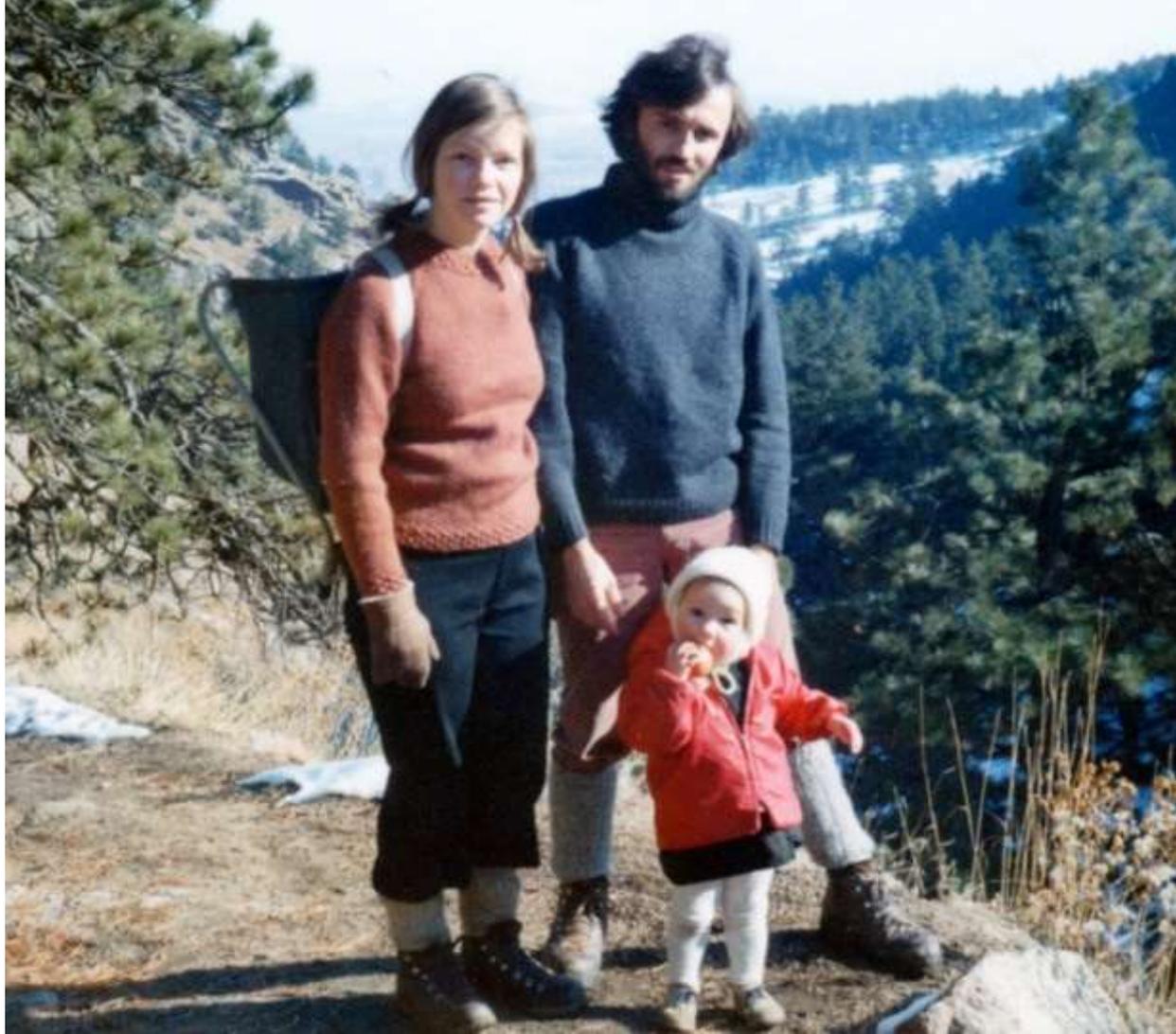


EVGNT  
TITV  
CVBBI  
RS  
06 8897

University of Colorado  
Administrative Annex 160  
Boulder, Colorado 80302

*Ch. Harrington*

This card is issued to help identify the person named thereon. It does not authorize the holder to coligate the University of Colorado in any manner.



# *Oil-carbon scissors*

Growth and global market pressures:

- Increased import cost for oil: \$Bs pa
- Potential cost of oil supply failure: \$B 10s pa

Pressure to limit CO<sub>2</sub> emissions due to environmental, health, trade:

- Expected Kyoto carbon liability: \$Bs

Two sharp hard-edged threats together:

- Cut into NZ's external accounts and well-being: \$Bs pa



# *Proposal*

- Government to fund a high-level planning project for the research to be carried out by NERI participants during the first 5-years after it is established:
  - A structured, integrated programme in support of Government energy objectives
  - Scale of the programme to be agreed
- Est. cost of the planning project \$350k
- Partners' planning team to work in coordination with, and report to govt steering group (MED, MoT, MFE, MoRST, EECA)



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*Te Whare Wananga o Otago*

OTAGO  
**ENERGY**  
RESEARCH CENTRE

WELCOME

to the launch of  
Otago Energy Research Centre  
5 March 2007

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Te Whare Wānanga o Ōtago

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- Energy is a huge issue & highly intractable
- Devastating consequences if we get it wrong
- No silver-bullets or solutions; piecemeal approaches are too slow and ineffective
- We need much more sophisticated cross-disciplinary research and communication
- The Otago Energy Research Centre aims to support this development at Otago



# Other initiatives from Otago

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- National Energy Research Institute    \$ \$
  - Energy education and outreach
  - Better links between industry and researchers
- NZ Energy Research Centre (CoRE)    ??
  - Research programme in sustainable energy

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Te Whare Wānanga o Ōtago

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- Accountancy
- Anthropology
- Biochemistry
- Chemistry
- Design
- Economics
- Law
- Marketing
- Physics
- Geography
- Geology
- Information Science
- Public Health
- Psychology
- Sociology
- Surveying
- Tourism
- Zoology

# An Energy Research Strategy for NZ

National Energy Research Institute

[www.neri.org.nz](http://www.neri.org.nz)

# Key global drivers of change

- Structural changes in fuel supply and demand
- New energy technologies & systems
- Implications of climate change & global agreements



# Why an Energy Research Strategy?

NZ doesn't have one!

- Global changes create unique risks and opportunities for NZ
- We need applied research to help manage these – on supply AND demand sides
- NERI's initiative:
  - Define the social, economic, environmental challenges
  - The medium-term energy research programmes they require

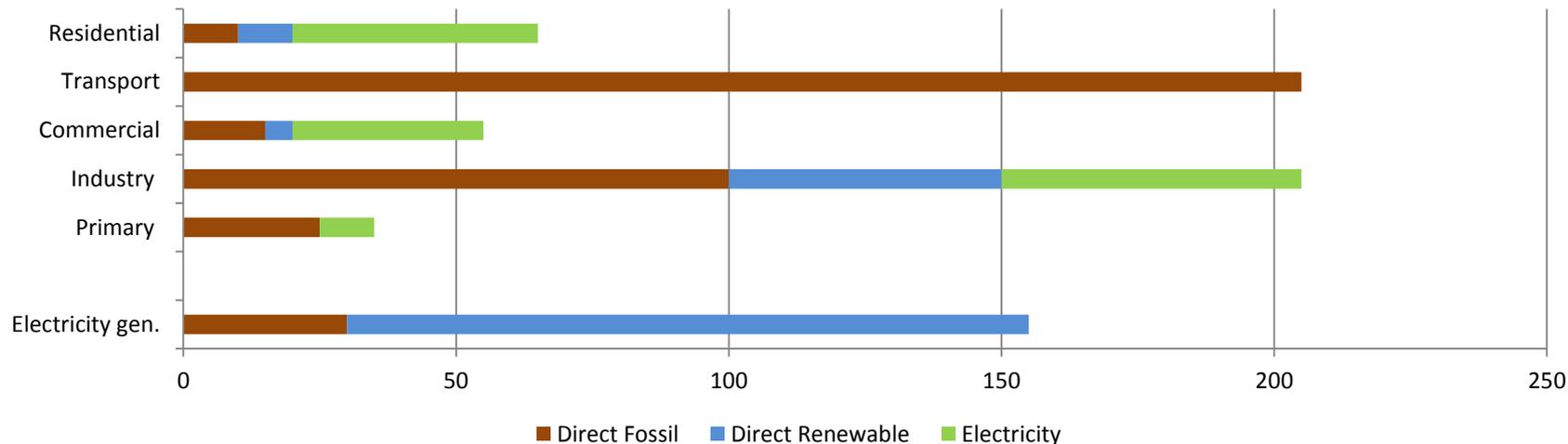


# Energy Use in New Zealand



## Approx NZ Energy Use by Sector 2015

MBIE Energy Balance Tables Petajoules



Transport nearly 100% fossil fuels.

Industrial around 50% direct fossil fuels with food (coal and gas) and chemicals (gas) making up 70% of this.

Milk drying a major part.

Electricity generation 70% renewable; fossil fuel for peaks and seasonal loads.

# The big medium-term risks



Container ship Napier

- Our reliance on long distance transport reduces our competitiveness
- Consumers move away from our major exports because we use fossil fuels
- The cost of reducing our GHG and other emissions disrupts our economy
- Our electricity demand becomes peakier requiring growth in fossil fuel use
- Energy affordability becomes worse
- Technology and business changes disrupt our stable and secure electricity supply

# The medium-term opportunities



- To grow our low-cost renewable energy supply
- To use this growth to switch users away from fossil fuels
- To develop high value consumer (export) markets and products using renewable energy
- To develop exports from research capabilities developed from this strategy



Working  
with nature

# The Proposed Research Challenges:

1. Reduce the cost of geothermal and its emissions
2. Develop low cost, cleaner ways to reduce peak demand on the grid
3. Further develop affordable ways to help keep homes warm and dry, particularly for renters
4. Maintain a stable and secure electricity supply in the face of changing technologies, business models and consumer demands
5. Develop telepresence and AR/VR as tools for NZ and international business

# The Challenges cont'd:

6. Develop dynamic charging to speed EV uptake, both here and internationally
7. Ensure NZ has a local supply of competitive fuels to service developments in long-haul land, marine and air transport
8. Develop high-value, low-GHG food markets and products
9. Find clean uses for NZ's fossil fuel resources
10. Grow NZ's internationally competitive niche energy R&D capabilities
11. Monitor and evaluate

# Next steps 2017

- More consultation
- Development of research programmes
- Launch by MBIE??

**Thank you**