Preparing for an uncertain future: regional energy resilience in Canterbury

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It may be hard for an egg to turn into a bird: it would be a jolly sight harder for it to learn to fly while remaining an egg. We are like eggs at present. And you cannot go on indefinitely being just an ordinary, decent egg. We must be hatched or go bad.

C. S. Lewis
What kind of future do we want - will we get?
‘Tectonic Stresses’

**Energy** - increasing scarcity of conventional oil

**Environmental** (ecosystem degradation)

**Climate**

**Economics** (North vs. South disparity)

**Population**

Thomas Homer-Dixon, “The Upside of Down”
‘Third World’ emissions are rising fast
Draft New Zealand Energy Strategy

• Develop resources
• Secure and affordable energy
• Efficient use
• Environmental responsibility

…in no particular order?!
ECan and energy

- **Strategy**
  - Canterbury Regional Energy Strategy (+ Forum)
  - Energy Demonstration Projects

- **Investigations**

- **Monitoring**

- **Territorial authority liaison**

- **Regional environment report**

- **Regional policy effectiveness**
Key energy issues /features for Canterbury

- Electricity security
- Imported liquid (transport) fuel security
- Energy efficiency (and conservation)
- Synergy between water resources, (wind resource) and energy efficiency

- Country’s highest private MV ownership rate
- Summer time peaks (irrigation)
- Greatest regional no. of ‘smart’ meters?
- Lack of big industry / large % of SMEs
Resource Management Act (RMA)

RMA (1991) (+ amendments)

- **S7ba**: efficiency of end use of energy;
- **S7j** benefits derived from the use and development of renewable energy
- **S30(1)gb**: …strategic integration of infrastructure with land use
Regional Policy Statement - Energy

Policy 2 - Encourage small and community-scale distributed renewable electricity generation

Policy 3 – Benefits of energy generation facilities and electricity high-voltage network

Policy 4 – Reliable and resilient electricity high-voltage network within Canterbury

Policy 5 - To encourage efficient, reliable and resilient electricity generation within Canterbury.
Territorial authorities and District Plans

Far North District
renewable energy and energy efficiency

Porirua City
windfarms in Rural Zone areas

Waitaki District
District Plan – provisions around development (> 900m); transmission line or small-scale generation of any type – *non-permitted activities*

Christchurch City
Outstanding Natural Landscape vs. appropriate development

Waimate District
new generation plans - amendments re: transmission and renewable energy
A strategic response

We cannot predict the future, but we can prepare for it.

This strategy is designed to enhance the energy resilience of Canterbury by ensuring we have a secure, reliable, affordable and sustainable energy system

…taking a 20-year outlook.
Areas of action

1. Keep options open
2. Encourage diversity of energy generation and use
3. Encourage and environment of innovation
4. Enhance resilient economic and community development.
5. Build relationships across sectors
6. Provide a good flow of information
Identified challenges for strategy implementation

- National policies (e.g. NZES - 2010 review)
- Impact of planning decisions
- Increasing sector demands on electricity supply
- Oil supply restrictions / increasing prices
- Flow on effect of investment decisions
- Impacts of economic situation on energy system
- Level / type of business activity in the region
- Timeframe of new energy technologies (supply and demand)
- Which sectors adopt (technologies) - and how?
Making it happen

Shared Regional Energy Strategy

ECan
Stake-holder 1
Stake-holder 2
Stake-holder 3

Actions requiring ECan leadership/responsibility
Actions requiring ECan involvement
Actions not requiring ECan involvement

Ecan Led
Energy Working Group
Canterbury Regional Energy Strategy Project

• Stock-take of the (2007) energy situation

• Improved approach to energy planning w.r.t. regional priorities and tradeoffs

• What are the local opportunities? To deliver improved regional energy security and reliability?
Regional Statement of Opportunities for Energy

Hydro
- micro and mini schemes
- water storage

Wind
- mini wind farms
- hot spots (gorges, etc)

Biomass
- dedicated retired land growing high-energy products (e.g. gorse)
- wood to gas conversion
- Biofuels

Solar, marine, etc – not viable economically
City Council’s energy strategy

28 initiatives including:

- establishment of Christchurch Agency for Energy (CAFE)
  - CCC, Meridian, EECA, Orion… and ECan
- Residential thermography
- Solar hot water (Solar City?)

Funded by carbon credits, not rates
ECan Clean Heat Project
Oilfield decline rates (IEA 2008)

- Pre-1970s
- 1970s
- 1980s
- 1990s
- 2000 - 2007

Year production started

- OPEC
- Non-OPEC

- 0%
- 2%
- 4%
- 6%
- 8%
- 10%
- 12%
- 14%
- 16%
2007 - Peak Oil (and climate change) impact on ECan portfolios

Regional Land Transport

Public Passenger Transport

Land Use

Pests and Biodiversity

Logo source: David Holmgren
2009 - Peak Oil impact on Canterbury communities and sectors

1. Understanding the dynamics of the international oil market

2. Dialogue with local stakeholders through semi-structured interviews to gauge their views on future oil vulnerability
Conclusions from recent reports

“the sources of oil to meet rising demand, the cost of producing it and the prices that consumers will need to pay for it are extremely uncertain, perhaps more than ever”
IEA (2008)

“A peak in conventional oil production before 2030 appears likely and there is a significant risk of a peak before 2020. Given the lead times required to both develop substitute fuels and improve energy efficiency, this risk needs to be given serious consideration”
UKERC (2009)
Interviewee themes

• Specific impact of the oil price spike in 07/08?
• What relative importance is attached to future oil vulnerability, including views on the future oil price?
• Technology and innovation
• Views on the possibility of a short term disruption to oil supply
• What role for Environment Canterbury on this issue?
Impact of the oil price spike in 07/08?

- Vulnerable sectors/organisations – export, transport, long distance tourism, rural, households with low/fixed incomes

- Impacts somewhat merged with other issues (financial crisis, recession)

- Generally, organisations caught out by the suddenness of the rise

- A few organisations have taken a long term, strategic view; most haven’t
Stakeholder views on future oil vulnerability and the future oil price

• World not running out of oil…but running out of cheap oil – general belief that oil prices would continue to rise

• Oil price consciousness generally short-lived - climate change policies currently seen as a more significant driver of change

• Variable responses going forward:
  – Somewhat transitory impact for many – now back to BAU
  – Fundamental to business survival for others (e.g. Air NZ)
  – Tourism industry strategic study
Technology and innovation

- Technological optimism
- Alternative fuels from NZ’s large biomass resource?
- Electric Vehicles – turns focus to clean electricity supply security and grid integrity
Likelihood of a short term disruption to oil supply?

• High proportion of interviewees considered there was a realistic risk ....but:
  – Not much knowledge on planned contingencies
  – Not much evidence of risk management strategies being adopted
Recommendations for ECan

1. Stakeholder briefing around oil security and oil emergency response procedures

2. Determine EV considerations re: planning for a secure and sustainable electricity supply and grid architecture in the region

3. Risk Management – encourage regional organisations to adopt appropriate risk management strategies to deal with:
   - oil price pathways and price volatility
   - possibility of short term supply disruption

4. adopt approached to increase non-active transportation modes

Recommendations strongly endorsed by Regional Transport committee, Dec 2009
Is electrified land transport the answer?

Clive Matthew-Wilson, *Dog & Lemon Guide*

**+ves**
- Reduced dependency on liq. Fuels
- Some efficiency gains esp. for ‘special trips on empty roads’

**-ves**
- Carbon intensity of electricity
- Congestion decreases?
- Efficiency overtaken by ‘perpetual growth’
What about biofuels?

• Can we make enough?
• Supplementary, low % blends (biodiesel and ethanol)
• Focus on diesel substitutes
• No to ‘bad’ fuel imports
Canterbury Water Management Strategy

Identify potential opportunities for social / technological innovations to reduce the energy demands for irrigation

• By 2015… electricity used in the use of water
• By 2040, energy used per hectare for irrigation
We need numbers, not adjectives!
Barriers /considerations w.r.t. renewable energy

District plan provisions
  – E.g. what is ‘appropriate’?
Economics
Access to grid / networks
Site location / landscape
Ecology/biodiversity
Funding and incentives
Lack of guidelines
Risks and opportunities
‘Merton’ Rules?
BioGenCool (Natural Systems) – energy dairy waste

Biodigestion of waste materials to biogas
Cogeneration of biogas into heat and power
Power used on site to produce ice for cooling
Bio-crude oil from wastewater algae
EECA wood energy projects

Radford Yarns

Mairehau HS

NZ Foam Latex
Biogas from piggery waste

EECA Biogas feasibility studies, including:

- Lepper Piggery, Taranaki – up and running
- **Selwyn District** – Rolleston Prison – ”Feasibility Study for Construction and Operation of a Regional Digester Facility”
  – with Dept of Corrections and NZ Pork
Central Canterbury Irrigation Areas Based on Land Parcel to Consent Information Match & Satellite Imagery (not including Banks Peninsula)
Canterbury’s wind resource

- Some observations
  - 0.2% of NZ’s electricity generation
  - 7.5% nationally (21% S Island)
  - N Canterbury - favourable sites; localised hotspots
  - S Canterbury – better for hydro?!
Canterbury’s ‘wind farms’
Wind ‘on the radar’

Mt Cass (MainPower)
  - 35-40 MW

Project Hurunui (Meridian)
  - 80-90MW
Community wind project - Harbour Wind

• Banks Peninsula community electricity generation from 3-6 wind turbine cluster (1.5-3MW)

• Provision in Banks Peninsula District Plan re: no inappropriate development on an outstanding natural landscape (ONL)

• Community challenge:
  – ‘appropriate’ development vs. ONL

Source: NASA
Transition (energy descent) community groups

Lincoln EnviroTown Trust
Project Lyttelton
Sustainable Living Education Trust
St Albans Community - Community energy expo
Mt Pleasant Community - Sustainable transport
New Brighton Project – weekend eco market
Roimata Community - energy checks
Sumner Redcliffs Project - community resources
Transition Timaru - learning / behaviour change
JUST LOOK AT THOSE EYESORES!