

This submission addresses a narrow and technical portion of the vast subject of New Zealand’s opportunities to mitigate and adapt to climate change. It does so within the framework set by the terms of reference: to “maximise the opportunities and minimise the costs and risks of transitioning to a lower net-emissions economy . . . while at the same time continuing to grow incomes and wellbeing.”

The Commission asks: **Q1: How can it add the most value in this inquiry?**

I answer:

- recognise climate change policy and regulation as a regulatory failure
- identify those opportunities that offer the biggest bang for the buck to mitigate and adapt to climate change
- treat the best of such opportunities as “projects” amenable to SWOT analysis
- use your Commission’s extensive knowledge of New Zealand’s regulatory systems and failures to make specific recommendations to overcome the barriers.

I propose a well-defined project: **to increase both energy efficiency and renewable energy supply in the residential sector with the aim of limiting fossil fuel for electricity generation to a very few percent in dry hydro years, and zero in normal years.**

This project must involve both business enterprises and regulators, to identify the most cost-effective technologies, market and pricing systems, and innovative financing systems. **And it is the core business of the Productivity Commission** to identify and analyse exactly this type of opportunity.

To mitigate and adapt to climate change, I believe the biggest bang for the buck is plain old, boring old, energy efficiency. And some of the biggest opportunities to grow wellbeing and worthwhile employment lie within the residential sector.

This action will directly improve well-being, as Stats NZ has recently reported<sup>1</sup>:  
“Keeping warm [is] a hardship for almost three in ten households”.

Warm homes upgrades provide thousands of jobs distributed over the whole country.

Also, research and development of new technologies in the rapidly evolving energy sector will provide high-paying jobs and opportunities for export. Rooftop solar and batteries are getting all the media exposure, but NZ development of efficient and clean wood burning will do more both to reduce emissions, and to reduce capital and running costs of energy supply. It also offers potentially major export opportunities, in both developed and less-developed countries.

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<sup>1</sup>[http://www.stats.govt.nz/browse\\_for\\_stats/people\\_and\\_communities/Households/energy-hardship-mr.aspx](http://www.stats.govt.nz/browse_for_stats/people_and_communities/Households/energy-hardship-mr.aspx)

**Q 2: Other approaches [other than supply] to reduce emissions?**

**A: Identify opportunities in HH sector to reduce demand for fossil fuels.**

When gas-fired peaking stations are generating, they will generally be “on the margin”, that is, every kWh of electric heating that’s turned off means gas peaking generation will be reduced.

The effect is magnified because network losses are greatest at peak times.

**Q 6, 7: What are the main barriers to sequestering carbon in NZ forests, and policies to encourage more sequestration**

**A: Find ways to account for small and/or narrow forest strips as carbon sinks. Firewood forests close to urban centres will make household wood burning much more economic: Also revise the definitions of “forest” to enable wildling pines to be harvested and replaced, in appropriate locations by firewood forests.**

Technology development is needed to find the most cost-effective way to manage messy slash, whether from wildling pines, or logging sites, or other tree harvesting systems. Good quality wood chip make an excellent industrial fuel; sawdust or shavings can be pressed into manufactured firelogs. Torrefaction of feedstocks – heating to partially char them – leads to an energy-dense briquette or firelog that absorbs little moisture – any household with space under cover could store most of a winter’s firewood (as boxed firelogs) along part of a garage wall. (I did so, this year, when I ran out of dry firewood.)

SWOT analysis suggests a big OPPORTUNITY would be for city councils to designate specific areas as firewood forests; some being (probably pine) plantations to be clearfelled, but others being coppicing species many of which attract native birds, and feed bees – tagasaste (tree lucerne) and winter-flowering eucalypts being amongst the best. Some natives, e.g. lacebarks, are also fast-growing and provide excellent firewood.

A particular opportunity might be commuter cycle paths – the Hutt River cycle trail is an excellent example. Its willows might be regularly harvested for firewood, and progressively be replaced by tagasaste, lacebark, etc; and designated as an ecological/ firewood reserve.

**Q 12: changes needed to regulatory, institutional, infrastructural arrangements including the electricity market, to facilitate carbon reduction?**

**A: summarising the answer for the HH sector:**

- **Regulatory** – Part IV of the Commerce Act is designed to protect revenues of network industries, guaranteeing them a return on their weighted average cost of capital. This is no longer appropriate for lines companies as disruptors, especially rooftop solar and batteries – can compete with them - reducing demand and threatening profitability of both centralised generation and transmission. The Act needs to be changed to recognise the value of both solar and firewood as competing with network services.
- **Institutional** – The Electricity Authority (the EA) is no longer fit for purpose; like the Commerce Act it is designed to protect the interests of the “Market Participants” who are generators and retailers, network companies, and (importantly) the Major Electricity Users’ Group (industrial consumers). Yet household consumers consume one third of the electricity generated, and provide one half of gentailer revenues. Their interests are NOT protected by either the EA or ComCom.
- **Infrastructural** – The business requirements for electricity companies are the dominant barrier to low-carbon strategies. Profitability of lines companies is now protected by Part IV of the Commerce Act -- the \$900 million giant pylons from Waikato to Auckland<sup>2</sup> will be paid for by consumers even if they are never used and useful. A distribution company, Powerco, wants to invest \$1.32 billion in upgrading its electricity lines network over 5 years, starting in 2018.<sup>3</sup>
- **The electricity market** – The electricity market is now defined (in a Commerce Commission decision on electricity governance in 2002) as excluding services and products that compete with electricity. That narrowing of scope has meant that many of my own submissions are simply ignored. The electricity market DOES NOT protect consumers from the relentless price rises to HH power prices that took place since 2000. Many consumers are defecting, partially or completely, from the national grid simply because they reject the corporate culture of profiteering.

**Q 13: Evidence on possible physical effects of climate change on renewables sources?**

**A: unlike wind, solar and hydro (where climate change is likely to cause more variability) the added CO2 and extra warmth is a benefit, encouraging faster growth of trees.**

- In urban areas their shade will be appreciated especially on cycleways/ walkways. Street trees can be managed to offer shade in summer while letting in winter sunshine (by crown lifting). In doing so, they will produce firewood, and twigs and leaves can be composted as a valuable mulch for urban gardens.
- This will support employment of arborists and gardeners. Also an opportunity for community groups and even use of prison labour (already used by some firewood merchants).
- Also important is the development of machinery to more efficiently convert branches and small trees to saleable firewood and kindling. At present, most arborists simply put the whole lot through chippers, leaving the residue to rot, losing its energy content (and being a real noise nuisance). Technology development is needed here!

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<sup>2</sup> <http://www.comcom.govt.nz/the-commission/media-centre/media-releases/2015/commission-confirms-north-island-grid-upgrade-project-decision/>

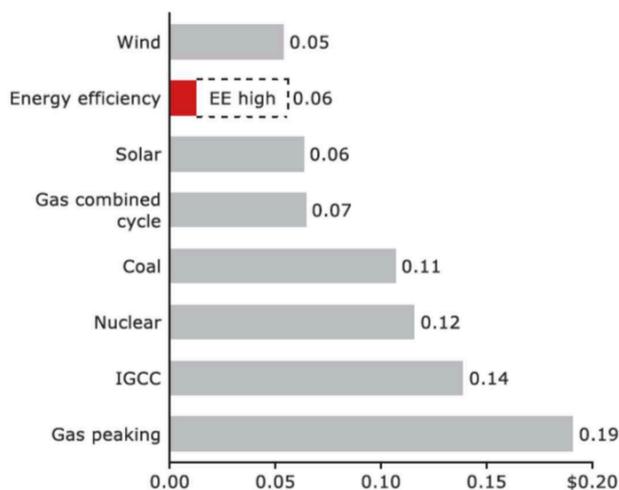
<sup>3</sup> <http://www.comcom.govt.nz/regulated-industries/electricity/cpp/cpp-proposals-and-decisions/powercocpp/powerco-customised-price-quality-path-proposal/>

## Q 14 – opportunities and barriers to reducing electricity emissions?

A. Household demand creates the highest peaks in NZ, and peaking electricity costs almost 10 times as much as typical energy efficiency<sup>4</sup>.

### Energy Efficiency

LCOE by resource (\$/kWh)



- Energy efficiency is **cheaper than investing in additional generation**
- A range of studies tags the **average price of EE around ~2 cents per kWh**
- Participant costs of EE programs **may add ~40%** (e.g., customer installation costs)
- Average cost of **generating power from new sources can be many times that amount**

Since NZ's highest peaks are in winter, any home heating that doesn't use electricity is especially valuable, the more so because network losses are at least twice as high at peak times than during the rest of the year.

The only renewable home heating option is firewood – including wood products such as pellets or firelogs. There's a small fossil fuel content in sourcing firewood, splitting and delivering it – I have estimated that as no more than 5%. Pellets have a somewhat higher energy cost; firelogs pressed from shavings or sawdust have a small energy cost also.

Home heating from firewood is, I believe, the single most valuable way to reduce electricity greenhouse emissions, and (next to energy efficiency, which also reduces peak demands) is the biggest contribution households can make to reduce NZ's greenhouse emissions.

<sup>4</sup> <http://leanz.org.nz/uploads/presentations/Technology%20Changes%20and%20Electricity%20Market%20Design.pdf>

**Q 16 – best policies and initiatives for low-carbon design and use in buildings**

**A – The suggestions and comments in the issues paper are all relevant and important.**

I also agree with the Royal Society that building energy efficiency standards should be made far more stringent. The issues paper mentions the discontinuing of the Warm Up NZ programme; the political background for that should definitely be investigated and analysed.

I also support the Royal Society’s recommendations for educating and training on low-emissions options.

**Q 19: What type of direct regulation would best help NZ transition to a low-emissions economy?**

A. In the household energy sector, one direct regulation has so far proven to be an insuperable barrier to efficient household wood burning. The National Environmental Standard on Air Quality (NESAQ) requires a linear reduction, each year, in fine particle pollution in each polluted airshed, to reach near-zero in 2020. Regional Councils are “required” to take steps to achieve this path; Environment Canterbury interprets that to require removal of log burners more than 15 years old. The effect (surely intended) is to make wood burning uneconomic.

This standard is being revised now, but people close to the process are warning that any revisions are unlikely to affect the prejudice held by – and promoted by – many regional councils. “Ban log fires” has been, for two decades, effectively an objective of air quality regulation.

A new NESAQ needs to regulate cumulative emissions rather than daily maximum pollution. The former is much more closely correlated with health impacts than are acute pollution episodes. NESAQ must regulate only the harmful emissions that come from the chimney, NOT the type of wood burner that causes the emissions.

In the case of the Electricity Code, a regulation that’s administered by the Electricity Authority, the Interpretation of the Statutory Objective needs to restore climate change as within scope. This in turn requires “sustainable” and “fair” to be restored as objectives of the Authority, as they were of its predecessor the Electricity Commission.

**Q 21 What type of market mechanisms would best help NZ transition to a low-emissions economy?**

**A: For the household sector, pricing options that encourage reduction of peak loads would have the biggest effect.**

Two American organisations have, in my view, done the best work in exploring pricing options – the Regulatory Assistance Project, and Rocky Mountain Institute.

“Rate Design for the Distribution Edge”, at [http://www.rmi.org/elab\\_rate\\_design](http://www.rmi.org/elab_rate_design) was given to me by Electricity Authority analysts; it addresses how electricity pricing can encourage “distributed energy resources”, which includes solar but would apply equally to home heating with wood. It notes (page 12) – “Today’s rate designs increasingly reflect yesterday’s grid,” Their section on “Recommendations for Regulators” suggests a staged approach to introducing sophisticated pricing options, which include hourly (in NZ, half-hourly) pricing, time-of-use pricing, critical peak pricing and others. There should be continued focus on both social equity and resource efficiency. “New rate designs can maintain the focus on resource efficiency by limiting the portion of a customer bill collected through fixed charges.”

The Regulatory Assistance Project describes itself as follows:

“We are former utility and environmental regulators, industry executives, system operators, and other policymakers and officials with extensive experience in the power sector. Our team focuses on the world's four largest power markets, responsible for half of all power generation: China, Europe, India, and the United States.”

Their 2015 report: Smart Rate Design for a Smart Future: -

[http://www.raponline.org/knowledge-center/smart-rate-design-for-a-smart-future/?\\_sf\\_s=smart+rate+design](http://www.raponline.org/knowledge-center/smart-rate-design-for-a-smart-future/?_sf_s=smart+rate+design)

Is outstandingly readable, setting out the common types of cost-reflective tariffs, and comparing these to traditional tariffs.

“High recurring fixed charges provide utilities with stable revenues and address their immediate concerns. In doing so, they punish lower- usage customers, discourage efficiency improvements and adoption of distributed renewables, and over time can lead to an unnecessary increase in consumption or promote customer grid defection. . . . Good rate design addresses the legitimate concerns of all major interests, provides a framework for stable regulation of utilities, and enables the growth of renewable energy and energy efficiency to meet electricity requirements.”

## **Q 22: what type of support for innovation and technology would best help NZ transition to a low-emissions economy?**

### **A. Support for development of a truly low-emissions household wood-burner.**

A home-sized down-draft wood burner was demonstrated in 2002; its smoke emissions were less than a hundredth of other “approved” wood burners. But ECan’s consultation on revising the air quality wood burner standard did not enable the down-draft type to be tested.

**Q 27 – What policies and institutions would provide better confidence for investors? –**

**A. A properly supported parliamentary commissioner for climate change, with particular expertise in regulatory frameworks designed to protect the public interest, and to resist what are now all-too-effective lobbying from some business interests.**

I agree with our Parliamentary Commissioner for the Environment, that the UK climate legislation offers a good model to build on.

**Q 31 – What types of analysis and underlying data would add the greatest value to this inquiry?**

**A: I agree strongly with your reasoning, that applied forward reasoning “might identify how policy decisions may lock-in pathways that lead to transformative change ...”**

Scenario analysis in the NZ energy sector is too strongly influenced by assumptions that suit the incumbent, dominant, energy corporations: MBIE’s Electricity Demand and Generation Scenarios assume that total electricity demand will grow by 1.1% Per year – despite that in 2016 the actual grid demand was the same as demand in 2007. Residential demand per household, averaged over the country, has fallen from about 8000 kWh per year to about 7100 kWh per year.

The Electricity Authority’s cost-benefit analyses have attracted an increasing amount of criticism – submissions on its most recent transmission pricing cost-benefit analysis were analysed by Covec Consulting, who found that some 60 experts disagreed at least in part with the Authority’s own analysis.

I note that the two reports I referenced above, on rate design, both identify pathways towards a new energy-efficient economy, and note that continuing on the old path will make transition to a new economy increasingly difficult.

**Q 35: What measures should help support vulnerable businesses and households ... in a transition to a low emissions economy?**

**A. This is extensively discussed in the Regulatory Assistance Project’s report quoted above. In short, high fixed charges discourage energy efficiency and penalise poor customers, yet electricity businesses are lobbying (n NZ also) to increase fixed charges, to protect their revenues.**

**Q 39: What are main benefits and opportunities to NZ from a transition to a low-emissions economy?**

**A. The main benefit to people will come from decentralising the essential services of energy supply: locally supplied renewable energy is becoming cheaper all the time, as technology develops.**

The growth-oriented developments of the major corporates – in electricity but also oil and gas – this growth inevitably increases carbon emissions and is also leading to higher energy prices.

New Zealand’s Energy Strategy in 2011 specifically mentioned developing energy (also mineral) resources) to support economic growth. That was the Think Big theory, which proved to be a financial failure.

The decentralised development path is quite different, and attempts to follow both paths – centralised and decentralised – at once will be costly and lead to more climate-changing emissions.

A diagram I copied from an RMI blog says it all:

[http://blog.rmi.org/blog\\_2015\\_07\\_01\\_the\\_grid\\_is\\_at\\_a\\_fork\\_in\\_the\\_road](http://blog.rmi.org/blog_2015_07_01_the_grid_is_at_a_fork_in_the_road)

