# ELECTRICITY PRICE REVIEW

Email your submission to energymarkets@mbie.govt.nz or post it to:

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|---|---|
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## Summary of questions

## Part three: Consumers and prices

### Consumer interests

1. *What are your views on the assessment of consumers' priorities?*

Consumers are so disaffected by the recent price rises that an increasing number are going solar, and would even disconnect from the grid if they could. They are unconvinced by claims that prices are no longer rising – that may be true by certain measures but is definitely not true for those who don't switch for whatever reason – they pay a "loyalty tax".

Indeed ever since the original restructuring, politicians have claimed that reforms would reduce consumer prices. That is now met by derision, from most consumers.

Not mentioned in your section is that at least one consumer forum convened by the industry agreed that moving to low or very low carbon emissions was a strong priority for themselves and many other consumers.

2. *What are your views on whether consumers have an effective voice in the electricity sector?*

Consumers were represented on advisory groups in the early stages of reforms, from the mid 1990s through about 2010. The Electricity Authority has revised the scope of these groups; the latest iteration replaced the Retail & Consumer Advisory Group with an "Innovation and Participation Advisory Group". Its name indicates correctly that it discusses what consumers are to be offered by the industry, not what consumers actually prefer. No small-consumers are on that group - even the ConsumerNZ representative has left it.

3. *What are your views on whether consumers trust the electricity sector to look after their interests?*

They don't, with reason. The sector considers that monopoly profits are a long-term benefit to consumers (a summary of the prolix Interpretation of the Statutory Objective, sections A5-A7). Retailers' interactions with their consumers are often unsatisfactory and the subject of complaints..Disconnections for non-payment are increasing.

### Prices

4. *What are your views on the assessment of the make-up of recent price changes?*

I agree that retailing charges have increased sharply since 2004 (and far more, since restructuring began). When the bulk supply tariff was charged to the pre-restructured electricity supply authorities (before the spot market was formed), retailing charges were kept at 3% of the residential power bill. The Review notes that they are now at least 10%.

5. *What are your views on the assessment of how electricity prices compare internationally?*

MBIE no longer republishes the IEA data set on international comparisons: these are available only for 900 euros. Scanning the graphs on page 24, it appears that the differential between residential and industrial prices is one of the highest in the world. Is it?

6. *What are your views on the outlook for electricity prices?*

A near-doubling of generation, some of which is to serve export-exposed industries, will be funded more by residential consumers than by industrial ones. Prices will rise. Instead, classical regulatory principles designed to minimise costs not maximise profits are being adapted overseas to accommodate so-called disruptive technologies - which are in fact needed to drive down New Zealand's carbon emissions. This will not happen if Market Participants continue to drive the priorities of the Electricity Authority.

## Affordability

7. *What are your views on the assessment of the size of the affordability problem?*

The surveys quoted in the Review make it clear that energy hardship is widespread in New Zealand.

8. *What are your views of the assessment of the causes of the affordability problem?*

The shift in charges for common costs, from business to residential consumers (as discussed in the technical paper) is one major cause of the decreased residential affordability revealed in recent surveys. But at least as important is probably the inflation of asset values resulting from the mergers and takeovers of the Bradford Reforms (splitting local power companies into separate retailers and network companies). Finally, the exercise of market power in spot prices, the impact of which was calculated first in the Wolak report, and more recently by Poletti, is as important or more. Only the first was discussed in the Review document.

9. *What are your views of the assessment of the outlook for the affordability problem?*

The outlook for affordability is poor so long as government's energy policy continues to promote expansion of generation. The industry's preference is to use payments from central government to counter the affordability problem. Money will soon run out. Instead, a combination of targeted energy efficiency programme and, improved building standards will make electricity more affordable.

## Summary of feedback on Part three

| 10 *Please summarise your key points on Part three.* |
| --- |
| Consumers are so disaffected by rising power prices that an increasing number are investing in solar and finding other ways to cut their power bills.Residential consumers were represented on advisory groups in the early stages of reforms but have now been excluded entirely. Power is increasingly unaffordable, and the outlook is poor so long as government's energy policies continue to promote expansion of generation. |

## Solutions to issues and concerns raised in Part three

| 11 *Please* briefly describe any potential solutions to the issues and concerns raised in Part three. |
| --- |
| A directive for "Energy efficiency first" would require the industry to think and analyse soft options before embarking on new power projects. I quoted an extensive report on regulatory options to keep power companies viable in fair competition with disruptive technologies. Such options would be subject to a morass of interlocking obligations and industry-protective regulation. This must however be faced as a low-carbon energy sector would be unaffordable without regulatory change. |

## Part four: Industry

### Generation

12 *What are your views on the assessment of generation sector performance?*

Generation is subject to close to a billion dollars per year of market power rents, according to analyses by Wolak and Poletti. These rents are considered by some to be necessary to enable new power capacity to be built. "Performance" (as in the question) takes the shareholder's view, in opposition to the small-consumers' view.

13 *What are your views of the assessment of barriers to competition in the generation sector?*

It's not so much the barriers within the industry that adds unnecessary costs – it's the barriers to competition from distributed energy and energy efficiency businesses. The Review ignores that.

14 *What are your views on whether current arrangements will ensure sufficient new generation to meet demand?*

New Zealand is on track for yet another generation surplus, as has happened several times before. Accordingly it is seeking new uses for surplus electricity, such as replacing industrial boilers gas or coal, with proposed electric boilers.

### Retailing

15 *What are your views on the assessment of retail sector performance?*

Gentailers are competing on price alone, Their costs are being cross-subsidised by those who can't or won't switch. The costs of retailing today are completely unacceptable, being around 10% of the total power bill, compared to 3% before the "market" began. However new retailers including Powershop, Flick and Electric Kiwi, each have very different pricing models, which consumers will increasingly find attractive. More power to them – I hope consumers will soon recognize this. However there are risks that will increase as the market power of generators remains unregulated.

16 *What are your views on the assessment of barriers to competition in retailing?*

The biggest barrier is probably the save/ winback system, which in telecommunications is prohibited by regulation. It needs to be eliminated or severely modified for electricity.

### Vertical integration

17 *What are your views on the assessment of vertical integration and the contract market?*

Economic studies of New Zealand's contract market are important but are not casual reading. A "nuclear option" of complete atomization is probably as bad. But the contract market is complex and poorly described in publicly available reports. I cannot comment further.

18 *What are your views on the assessment of generators' and retailers' profits?*

Both are excessive, as described in publications by Geoff Bertram, Frank Wolak, Stephen Poletti, and others. Bringing profits down to acceptable commercial levels would require unwinding a morass of linked contracts, financial obligations and laws, not to say a redesign of the whole electricity market system. The U.S. has enjoyed over a century of regulatory reform, and offers a wealth of models from which New Zealand could create a fair set of obligations and profits.

## Transmission

19 *What are your views on the process, timing and fairness aspects of the transmission pricing methodology?*

The TPM proposal is based on the "beneficiaries pay" principle, even though the original TPM framework, consulted on many years ago confirmed that "exacerbators pay" is more efficient. I believe this is the result of industry preference for passive consumers that do not respond to price.

## Distribution

20 *What are your views on the assessment of distributors' profits?*

These are also excessive – refer to Geoff Bertram's analyses.

21 *What are your views on the assessment of barriers to greater efficiency for distributors?*

Distributors are the only companies that deeply understand the local costs of electricity supply. They should be extending the opportunities for consumers' demand to respond to price, especially to real-time price. Ripple control should be brought back into widespread use – the use of that flexibility-resource to bid into the reserve market would seem less valuable than to constrain wasteful peak loads, which cause losses as the square of the current in the lines.

22 *What are your views on the assessment of the allocation of distribution costs?*

The typical allocation of common costs to residential, far more than to business consumers, is a sign of businesses dominating the electricity industry strategies. Residential consumers are the cash cows. Probably the best allocation would be an equal share of costs, between incremental and stand-alone. However a slice of this allocation could well be pooled and directed to fund residential energy efficiency in cases of hardship.

23 *What are your views on the assessment of challenges facing electricity distribution?*

Consider the "challenge" of distribution pricing and planning to be an opportunity. This sector is where price-responsive demand really works. Some companies, especially Orion and perhaps Vector, are already meeting these challenges head-on. Learn from them!

## Summary of feedback on Part four

24 *Please summarise your key points on Part four.*

Generation is subject to close to a billion dollars per year of market power rents, Their "Performance" (as in the question) takes the shareholder's view, in opposition to the small-consumers' view.

New Zealand is on track for yet another generation surplus, as has happened several times before. Accordingly it is seeking new uses for surplus electricity, such as replacing industrial boilers gas or coal, with proposed electric boilers.

Gentailers are competing on price alone, Their costs are being cross-subsidised by those who can't or won't switch. The costs of retailing today are completely unacceptable.

The biggest barrier is probably the save/ winback system, which in telecommunications is prohibited by regulation.

Generator, retailer and distributor profits are all excessive, and require unwinding a morass of linked contracts, financial obligations and laws, not to say a redesign of the whole electricity market system.

The TPM proposal, based on the "beneficiaries pay" principle is less efficient than an "exacerbators pay" system. I believe this is the result of industry preference for passive consumers that do not respond to price.

Distributors are the only companies that deeply understand the local costs of electricity supply. They should be extending the opportunities for consumers' demand to respond to price, especially to real-time price.

Allocation of common costs to residential, far more than to business consumers, is a sign of businesses dominating the electricity industry strategies. Residential consumers are the cash cows. Probably the best allocation would be an equal share of costs, between incremental and stand-alone. However a slice of this allocation could well be pooled and directed to fund residential energy efficiency in cases of hardship.

## Solutions to issues and concerns raised in Part four

25 Please briefly describe any potential solutions to the issues and concerns raised in Part four.

A redesign of both wholesale and retail electricity markets is called for. The obvious consultant to assist that would be the Regulatory Assistance Project, which has consulted in many U.S. states, in the UK, in Europe, and now in China and India.

With New Zealand's wealth of renewable energy, and literate population, we could be an attractive place to trial new strategies and associated regulation to promote a genuine carbon-zero economy.

## Part five: Technology and regulation

### Technology

| 26 | *What are your views on the assessment of the impact of technology on consumers and the electricity industry?* |
|---|---|
| Consumers are using any technology they can afford, "new" or old, to reduce power bills as they widely recognize as unfair. | |

| 27 | *What are you views on the assessment of the impact of technology on pricing mechanisms and the fairness of prices?* |
|---|---|
| I don't accept that solar customers are being cross-subsidised by low-income consumers. | |

| 28 | *What are your views on how emerging technology will affect security of supply, resilience and prices?* |
|---|---|
| In-home batteries will add to household security, as will solar rooftops. These can optionally be used by distributors to improve the security of the network. More important is the security that could be improved by using biomass energy in homes, schools, industry and even in power generation. Biomass is the obvious "stored" energy to be utilized in dry years, and new technology can enable even green wood to be burned at maximum efficiency with virtually no pollution. | |

### Regulation

| 29 | *What are your views on the assessment of the place of environmental sustainability and fairness in the regulatory system?* |
|---|---|
| They both belong fully incorporated within the regulatory system. It's the job of regulators to balance such objectives with financial and industry objectives. The best reference for the above statements is a series of monthly blogs by Scott Hempling, who visited NZ some years ago. Google it! | |

| 30 | *What are your views on the assessment of low fixed charge tariff regulations?* |
|---|---|
| A low fixed charge is the proper tariff for all residential consumers, large or small. This maximises its energy efficiency property. This Is thoroughly addressed in "Smart Rates for a Smart Future", described and referenced in the final section of this submission. It should be the standard tariff, with optional "all you can eat" pricing deals for any consumers who so choose. | |

| 31 | *What are your views on the assessment of gaps or overlaps between the regulators?* |
|---|---|

The Electricity Authority's work plans are determined after consultation with Market Participants. The failure to accommodate residential consumer preferences is a direct result of that. Residential consumers and providers of distributed energy should carry equal weight in the governance system with business customers.

32 *What are your views on the assessment of whether the regulatory framework and regulators' workplans enable new technologies and business models to emerge?*

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33 *What are your views on the assessment of other matters for the regulatory framework?*

The missing "other matter" is the needs and preferences of residential consumers

## Summary of feedback on Part five

34 *Please summarise your key points on Part five.*

Environmental sustainability and fairness both need to be fully incorporated into the regulatory system. It's the job of regulators to balance such objectives with financial and industry objectives.

Low fixed charge regulation must be maintained, but to keep it simple, should become a universal standard tariff. This maximises its energy efficiency property.

Today's gaps between the two main regulators are unacceptable. They should become a single energy regulator with a broad mandate including carbon emission reduction. Residential consumers and providers of distributed energy should carry equal weight in the governance system with business customers.

## Solutions to issues and concerns raised in Part five

35 *Please briefly describe any potential solutions to the issues and concerns raised in Part five.*

There is only one solution – a wholesale change to governance of the electricity industry with priorities modelled on the European Energy Efficiency Directive – energy efficiency first, and consumers given a chance to be active participants in the market.

## Additional information

36 *Please briefly provide any additional information or comment you would like to include in your submission.*

Attached please find a full submission on the Price Review. I

Submission, Electricity Price Review. Molly Melhuish, 9(2)(a) [redacted], 23 Oct 2018

**AN INDUSTRY-FRIENDLY STRATEGY**

**This Review was preceded by consultation on its terms of reference, but only market participants were consulted. The Review's discussions and findings treat small consumers as passive responders to what "the market" offers, not as active participants. Pricing is now driven by industry incentives to increase shareholder value, not to minimise cost of supply.**

**This contrasts with energy strategies in the UK, Europe, and many U.S. states, which put "energy efficiency first"[1], and favour pricing that encourages demand reduction at times supply is costly. Such strategies, originally devised to reduce costs of electricity supply, are now found to be valuable for reducing carbon emissions.**

**Electricity regulators in New Zealand promote "choice" between electricity retailers. Instead, in a carbon-constrained world, "choice" needs to be between being an active "prosumer" or a passive consumer choosing convenience over price. Prosumers should be rewarded for choosing to invest in energy efficiency and/ or solar and biomass energy - to reduce their need for purchased energy, to add resilience, and to reduce New Zealand's carbon emissions.**

**REVIEW OBJECTIVES AND SCOPE**

**Your foreword sets out your aim as addressing "consumer fairness and affordability", while looking "closely at the ability of the regulatory framework to make the most of the opportunities of emerging technologies. I agree with all three priorities.**

**However the foreword and Introduction both relegate the World Council's electricity "trilemma - security of supply, equity and environmental sustainability"- as subsidiary to "a different trilemma – that of fairness, affordability and competitiveness." I disagree with that change in focus.**

**I reject the omission of "environmental sustainability" from electricity regulation, as set out in the Electricity Act 2010. The Review notes the findings of the 2009 Ministerial Review – "wide ranging objectives resulted in duplication and poor focus". In contrast, the Commerce Commission accepts the need to balance different objectives. I agree with the Review saying that a more joined-up approach is needed, but think a single regulator is the best solution.**

**"Competitiveness" should not be a primary objective – it should be recognised as a**

[1] https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans

**means to reduce the many costs of regulation. In New Zealand deregulation is taken to the extreme, with consumers incentivised to switch near-identical power offers frequently (a cost in itself), a major incentive seeming to be the lump sum cash offers to switchers. Non-switchers are recognised as in effect paying a "loyalty tax". Your review notes that retailing costs have risen sharply and now exceed the ~10c/kWh transmission component of the power bill. This is a "cost of competition". I believe it significantly exceeds the so-called cross-subsidy from high-use households to low-use ones as described by Concept Consulting reports between March and November 2017[2] supporting the industry campaign against the Low Fixed Charge regime.**

**PRICING FOR AFFORDABILITY**

**Many of New Zealand's electricity consumers suffer from fuel poverty – the choice whether to heat or eat. This choice is only partly due to high prices; other essential services, especially rent, contribute. By conventional measures around a quarter of New Zealand households experience fuel poverty; a higher number show at least some indicators of fuel hardship.**

**Concept Consulting's report on energy hardship[3] focuses on hardship of low-income high-user consumers, and concludes that high per-kWh charges for these people will add to their fuel poverty. Their graph on page 59 shows that 35% of the "lowest decile" (referring to meshblock not income) in Wellington for example are using 8000 kWh or more, so the higher per-kWh price in the low fixed charge regime would disadvantage them. This ignores the fact that such consumers ought to be on a standard tariff with reduce per-kWh price. In fact the meshblock basis has dubious merit; a sample based on actual incomes, even though smaller, would be preferred.**

**Energy efficiency initiatives are clearly the most cost-effective way to alleviate energy hardship, as saving energy is essentially always cheaper than generating and distributing it. But Concept considers wall insulation and added double glazing not to be cost-effective[4]. They call for Government to address energy hardship through income supplements such as the Winter Energy Payment, but more targeted.**

**Instead, energy efficiency measures should be the first response to an energy-deprived household, even if it "eats the lunch off the company's table" (as Wellington Electricity's CEO once said on national radio, referring to improved efficiency of street lights).**

**PRICE LEVELS - FAIR? OR EXCESS PROFITS?**

**The question of whether gentailers or distribution companies are making excess profits has been extensively analysed, for example by Geoff Bertram[5] and by**

[2] http://www.concept.co.nz/publications.html

[3] http://www.concept.co.nz/uploads/2/5/5/4/25542442/options_for_electricity_focussed_social_measures_final.pdf

[4] https://www.pce.parliament.nz/media/1721/summary-report-energy-related-carbon-abatement_.pdf

[5] http://www.geoffbertram.com/fileadmin/publications/Asset%20revaluations,%20price%20gouging,%20and%20barriers%20for%20website.pdf

**Stephen Poletti[6]. I do not presume to elaborate on their conclusions, the short answer is, yes. Merger and takeover activity since Bradford's reforms jacked up network asset values, which are now entrenched within the regulatory rules.**

**Poletti's recent finding has been widely quoted, that generators made some $5.4 billion of excess profits (market rents) from 2010 to 2015. Earlier calculations by Professor Wolak of market rents from 2000-2007 showed excess profits of $4.3 billion[7]. That finding was much-criticised, yet the calculation followed standard economic practice. Wolak had remarked that such excess profits would be regulated away in other countries, but are perfectly legal in New Zealand. Poletti remarks that market power rents can enable building of excess capacity.**

**On the wholesale market, true competition would drive spot prices down to short-run marginal costs – the cost of the most expensive generator actually dispatched. New Zealand's most expensive generator is the oil-fired peaker, Whirinaki, at 27c/kWh. Yet spot prices have exceeded $1/kWh many times this year, compared to very rarely in previous years.**

**The Review takes the long-run cost of new generation, not the short-run marginal cost, as the efficient price. Given recent excess profits, it is no wonder that new power projects are now being announced – a $100m peaking station in Taranaki and a new wind farm in Waverly.**

**Just as significant but little recognised is the excess profits realised in wet years when the short-run cost of hydro is very close to zero. Yet night-time spot prices in a recent very wet year averaged almost 3 c/kWh – a pure windfall to generators.**

**PRICE STRUCTURES: ARE THEY EFFICIENT?**

**The structure of New Zealand's electricity prices – that is, how prices differ by time of day, by type of consumer etc. – is set by the Electricity Authority. Price structure has a profound impact on the choices made by customers, utilities, and other electric market participants, according to the U.S. consultancy, the Regulatory Assistance Project, which has advised many European countries and also China on how to design electricity regulation for efficient and fair pricing during a time of rapid technological change.**

> **"Utilities face unprecedented changes in the way power is generated and delivered. With the ramp-up in distributed generation, energy efficiency and demand response, electric vehicles, smart appliances, and more, the industry must rethink its rate structures to accommodate and encourage these innovations. Progressive rate design can make the difference in cost-effectively meeting public policy objectives—to use electricity more**

[6] https://cdn.auckland.ac.nz/assets/business/about/our-research/research-institutes-and-centres/energy-centre/reports/Market%20Power%20in%20the%20NZ%20wholesale%20market%202010-2016.pdf

[7] http://motu-www.motu.org.nz/wpapers/environment/Browne.pdf

> **efficiently, meet environmental goals, and minimize adverse social impacts—while ensuring adequate revenue for utilities."[8]**

**The RAP report quoted above, "Smart Rate Design for a Smart Future", describes time-of-use pricing, critical peak pricing, real-time pricing, and other elements of modern pricing systems designed to encourage a consumer to adapt their demand to reflect actual cost of supply. This is surely efficient pricing.**

**The report contrasts these strategies with a "not so smart future" in which high fixed charges provide utilities with stable revenues, but punish lower-usage customers and discourage efficiency improvements and adoption of distributed renewables, and over time can lead to an unnecessary increase in consumption, or increasing disconnections from the grid.**

> **"Such rates are economically inefficient and inequitable and are not justified by any fundamental principle of neoclassical economic theory. They are, in fact, nothing more than a government-sanctioned exercise of monopoly power. The adverse impacts on electric consumers and public policy goals for electricity regulation include skewed incentives against energy efficiency, customers looking to go totally off the grid, and higher bills for most low-income households. . . Regulators . . . should strive to avoid expensive mistakes based on defense of the legacy structure of the industry. Instead, regulators will need to focus on identifying costs and benefits of alternative strategies and seek to maximize the net value to customers and society."**

**Those remarks apply precisely to the evident campaign to repeal the Low Fixed Charge regulations[9], led by the Electricity Networks Association and supported by a succession of publications by Concept between March and November 2017.[10] The Review's analyses are taken mostly from the work that led to that group of publications.**

**The Rocky Mountain Institute has published a separate report with very similar conclusions – that price-responsive demand is an essential part of modern pricing strategy.[11]**

**New Zealand consumers can opt for spot-price contracts, first offered by Flick, now also by other retailers. Spot prices are said to be typically higher during winter, and weekdays at breakfast and dinner time, so it should be efficient for consumers to shift their demand away from such times. This is called "price-responsive demand", and is widely advocated in publications on efficient pricing in the new commercial environment. Price-responsive demand should reduce costs of**

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[8] http://www.raponline.org/document/download/id/7680

[9] http://www.electricity.org.nz/news-and-events/news/why-the-low-fixed-charge-regulations-should-be-removed/

[10] http://www.concept.co.nz/publications.html

[11] https://rmi.org/wp-content/uploads/2017/04/2014-25_e

**the whole electricity system, and thus benefit all consumers.**

**Unfortunately this year spot prices rose to over $1/kWh an unprecedented number of times in winter, and have averaged over 50c/kWh as this is being written in late October, due to a gas outage in New Zealand's biggest gas field, Pohokura[12]. Averaged over the week, spot prices were just 7.5c/kWh in mid-September, but around 35c/kWh in mid-October. This is NOT efficient pricing – the spot-price consumer is facing the full dry-year risk. In contrast the main retailers typically buy at the spot price only 10% or less of the electricity that they re-sell, and hedge around 90% of the rest at a fixed price. Flick customers, if they had realised, could have switched to their "Fixie" energy price contract, which even in mid-October was just 7.8c/kWh all day (exclusive of network and other costs) in all hours.**

**What was missing this year was the consumer information – the outage at Pohokura seems to have been treated as a commercial secret and not reported in the public media for at least two weeks. Companies such as Electric Kiwi are no longer accepting customers wanting to switch away from Flick. Efficient pricing requires full and timely information!**

**THE ELECTRICITY INDUSTRY – OUTLOOK FOR GENERATION**

**The Review states: "The key challenge is the potential need to build a lot of new generation." It predicts "a retreat of most non-electricity sources of energy in all areas of the economy." This is indeed the conclusion of the scenario reports quoted in the Review – heavily influenced by the strategies of both Government and market participants to grow the outputs and asset values of the electricity sector.**

**I disagree with that view, which puts the interests of electricity suppliers and their shareholders far ahead of the interests of residential consumers and even more so, suppliers of distributed energy services. A morass of interlocking obligations - laws, regulations, the Electricity Code, financial obligations, and (importantly) previous legal decisions - protects the interests of the major electricity suppliers. The Electricity Authority is in effect accountable to the Market Participants through an annual consultation process. Long experience shows that concerns of residential consumers are sidelined, and the interests of solar and energy efficiency businesses are generally overridden.**

**The Review says that today's regulatory system is "predictable and helps maintain a low-risk investment environment for a capital intensive industry". Indeed so - it creates incentives and opportunities to drive competing energy businesses into retreat. The system was set up with the formation of the electricity state-owned enterprises, later fully or partially privatised. It was progressively revised to entrench monopoly profits, which are now treated as a "long-term benefit to consumers" because they enable expansion of power generation assets almost at will.**

**The underlying driver for this expansion is described in the 2011 New Zealand**

[12] http://www.scoop.co.nz/stories/BU1810/S00381/high-power-prices-to-persist-with-pohokura-outage.htm

**Energy Strategy – "The government's goal is for the energy sector to maximise its contribution to economic growth". The accompanying NZ Energy and Efficiency Strategy was revised in 2017 to minimise residential efficiency programmes, and to expand initiatives for industrial heat and electric vehicles. Both are designed to expand electrification of the NZ economy.**

**TECHNOLOGY and INNOVATION**

**The Review identifies "innovation" as including solar energy, batteries, and electric vehicles. Those are indeed the focus areas of Concept's three-part New Technologies Study. In contrast, the Productivity Commission's final report[13] recognises that the omission of biomass energy from its draft report had lost sight of a very cost-effective way of reducing carbon emissions from the energy sector.**

**"Emerging technology" therefore needs to be broadened to include biomass energy, deployed at scales ranging from household, to commercial and industrial – and even to power generation itself. The need is to provide extra energy during winter peaks and especially dry years. Research, development and commercialisation of ultra-clean wood burning must take the highest priority in New Zealand, where early developments are already promising.**

**The down-draft burner designed by Roger Best has been demonstrated to yield particulate emissions a tenth or less of the new standard for "ultra-clean", acceptable in polluted airsheds such as Christchurch. It is also far more convenient than conventional burners as the tall narrow firebox is filled to the top, and the wood is "conditioned" as it falls towards the incandescent charcoal at the bottom. The moisture and smoke are gasified into hydrogen and carbon monoxide, which burn cleanly. Once the system is hot, poorly seasoned wood or even a proportion of green wood can be added.**

**A gasifier burner being developed by Ian Cave goes a big step farther. The fuel bin is sealed and heated to as high as 500 degrees, and preheated air is introduced to the combustion chamber at the desired rate. The resulting gases are burned in a separate chamber where there is no flame at all, only a uniform glow at 700-1000 degrees, capturing all the available energy but too cool to form nitrogen oxides or other polluting gases. It can burn a single 20 kg log of green pine, lasting a full day without further attention. However it requires an experienced operator - and further development to become idiot-proof.**

**Both types of burner are ideal for community-energy development, where firewood can be grown on-site or nearby, and harvested and utilised exactly when needed. Natives and bee-friendly exotics burn as easily as pine. The burners could be pre-heated by electricity for easy starting, and could store excess energy as hot water in large insulated buffer tanks thus covering morning and evening peak loads. Storing heat is far, far less capital-intensive than storing electricity in batteries. And the burners could even be fitted with thermoelectric generators, providing enough electricity for lighting and "devices" during electricity outages.**

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[13] https://www.productivity.govt.nz/sites/default/files/Productivity%20Commission_Low-emissions%20economy_Final%20Report_FINAL_2.pdf

**Thus maraes, schools, and such centres could provide for community needs during disaster events.**

**This last refinement provides the missing link to enable truly carbon-zero end-use energy services. All the scenarios described in recent electricity reports require extra thermal generation for winter peaks, and stored fossil fuel – even coal - to cover for dry hydro years. Their alternative is to build excess wind and possibly geothermal generation, which will spill to waste when hydro energy is excess to needs. At least seven new gas turbine stations are proposed in MBIE's low-carbon scenarios - these will cost at least $100m each and require further investment in gas supply and electricity networks.**

**Instead, clean wood burning at household or preferably at community level could provide water and space heat at 100% carbon-zero using local labour, while use of their electric pre-heat system could absorb any surplus wind or solar generation thus saving firewood. Adding thermoelectric generators (whose costs will decrease as their use increases, like solar) makes for a far more resilient system than the increasingly all-electric future envisaged in official reports today.**

**One new power station technology, the Allam Cycle, is strictly carbon-zero; it burns methane and captures all its CO2 at high pressure ready to be pumped underground. Its first trial is a 25 MW pilot plant in Texas,[14] which is expected to generate power soon; the combustion itself went live in May. It is as efficient as today's combined cycle plants, but much smaller in physical size as its working fluid is liquid carbon dioxide under 300 atmosphere pressure, instead of the hot gases that drive today's gas-turbine power stations. It doesn't require a second steam turbine to generate further electricity from the turbine's waste heat. Experimental technology is nothing new to Taranaki, where the world's first synthetic petrol plant was built and run successfully (it was shut down only because the price of petrol dropped rapidly soon after it was built). New Zealand is not short of experienced power and combustion engineers. It would be ideal for taking Allam Cycle generation to a new level by running it on pyrolysis gas from wood, and pumping the CO2 from its combustion into depleted reservoirs. This would be truly carbon-negative generation, while maintaining the security of electricity supply that makes thermal generation so valuable.**

**REGULATION FOR EVOLVING TECHNOLOGY**

**"Competition" is consistently treated by the Electricity Authority as having consumers swit between near-identical suppliers competing on price, often including one-off sweeteners. Competition between electricity and its alternatives, especially energy efficiency and biomass energy, is ignored or actively suppressed.**

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[14] http://www.valve-world.net/webarticles/2018/08/13/first-fire-supercritical-co2-power-plant.html

**building standards especially for the increasing amount of higher-density housing.**

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## CONCLUSION

**The industry's ambition to grow their assets appears to be accepted in the Review: "Much more generation will be needed . . . Electrification of the economy could double demand." This would certainly increase prices to household consumers. Most of the new demand is to come from commercial and especially industrial consumers, who pay much less than householders. Householders who can afford to will increasingly disconnect, or install solar or energy efficiency measures. Those who cannot afford to will suffer increasing fuel poverty.**

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**Submission, Electricity Price Review.** Molly Melhuish [redacted], 23 Oct 2018

AN INDUSTRY-FRIENDLY STRATEGY

This Review was preceded by consultation on its terms of reference, but only market participants were consulted The Review's discussions and findings treat small consumers as passive responders to what "the market" offers, not as active participants Pricing is now driven by industry incentives to increase shareholder value, not to minimise cost of supply

This contrasts with energy strategies in the UK, Europe, and many U S states, which put "energy efficiency first"[1], and favour pricing that encourages demand reduction at times supply is costly Such strategies, originally devised to reduce costs of electricity supply, are now found to be valuable for reducing carbon emissions

Electricity regulators in New Zealand promote "choice" between electricity retailers Instead, in a carbon-constrained world, "choice" needs to be between being an active "prosumer" or a passive consumer choosing convenience over price Prosumers should be rewarded for choosing to invest in energy efficiency and/ or solar and biomass energy - to reduce their need for purchased energy, to add resilience, and to reduce New Zealand's carbon emissions

REVIEW OBJECTIVES AND SCOPE

Your foreword sets out your aim as addressing "consumer fairness and affordability", while looking "closely at the ability of the regulatory framework to make the most of the opportunities of emerging technologies I agree with all three priorities

However the foreword and Introduction both relegate the World Council's electricity "trilemma - security of supply, equity and environmental sustainability"- as subsidiary to "a different trilemma – that of fairness, affordability and competitiveness " I disagree with that change in focus

I reject the omission of "environmental sustainability" from electricity regulation, as set out in the Electricity Act 2010 The Review notes the findings of the 2009 Ministerial Review – "wide ranging objectives resulted in duplication and poor focus" In contrast, the Commerce Commission accepts the need to balance different objectives I agree with the Review saying that a more joined-up approach is needed, but think a single regulator is the best solution

"Competitiveness" should not be a primary objective – it should be recognised as a means to reduce the many costs of regulation In New Zealand deregulation is taken to the extreme, with consumers incentivised to switch near-identical power offers frequently (a cost in itself), a major incentive seeming to be the lump sum cash offers to switchers Non-switchers are recognised as in effect paying a "loyalty tax" Your review notes that retailing costs have risen sharply and now exceed the ~10c/kWh transmission component of the power bill This is a "cost of competition" I believe it significantly exceeds the so-called cross-subsidy from high-use households to low-use ones as described by Concept Consulting reports between

[1] https //ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans

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PRICING FOR AFFORDABILITY

[1] https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans
[2] http://www.concept.co.nz/uploads/2/5/5/4/25542442/new_technologies_social_report_v3.0.pdf

Many of New Zealand's electricity consumers suffer from fuel poverty – the choice whether to heat or eat. This choice is only partly due to high prices; other essential services, especially rent, contribute. By conventional measures around a quarter of New Zealand households experience fuel poverty; a higher number show at least some indicators of fuel hardship.

Concept Consulting's report on energy hardship[3] focuses on hardship of low-income high-user consumers, and concludes that high per-kWh charges for these people will add to their fuel poverty. Their graph on page 59 shows that 35% of the "lowest decile" (referring to meshblock not income) in Wellington for example are using 8000 kWh or more, so the higher per-kWh price in the low fixed charge regime would disadvantage them. This ignores the fact that such consumers ought to be on a standard tariff with reduced per-kWh price. In fact the meshblock basis has dubious merit; a sample based on actual incomes, even though smaller, would be preferred.

Energy efficiency initiatives are clearly the most cost-effective way to alleviate energy hardship, as saving energy is essentially always cheaper than generating and distributing it. But Concept considers wall insulation and added double glazing not to be cost-effective[4]. They call for Government to address energy hardship through income supplements such as the Winter Energy Payment, but more targeted.

Instead, energy efficiency measures should be the first response to an energy-deprived household, even if it "eats the lunch off the company's table" (as Wellington Electricity's CEO once said on national radio, referring to improved efficiency of street lights).

PRICE LEVELS - FAIR? OR EXCESS PROFITS?

The question of whether gentailers or distribution companies are making excess profits has been extensively analysed, for example by Geoff Bertram[5] and by Stephen Poletti[6]. I do not presume to elaborate on their conclusions, the short answer is, yes. Merger and takeover activity since Bradford's reforms jacked up network asset values, which are now entrenched within the regulatory rules.

Poletti's recent finding has been widely quoted, that generators made some $5.4 billion of excess profits (market rents) from 2010 to 2015. Earlier calculations by Professor Wolak of market rents from 2000-2007 showed excess profits of $4.3 billion[7]. That finding was much-criticised, yet the calculation followed standard economic practice. Wolak had remarked that such excess profits would be regulated away in other countries, but are perfectly legal in New Zealand. Poletti remarks that market power rents can enable building of excess capacity.

On the wholesale market, true competition would drive spot prices down to short-run marginal costs – the cost of the most expensive generator actually dispatched. New Zealand's most expensive generator is the oil-fired peaker, Whirinaki, at 27c/kWh. Yet spot prices have exceeded $1/kWh many times this year, compared to very rarely in previous years.

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[3] http://www.concept.co.nz/uploads/2/5/5/4/25542442/options_for_electricity_focussed_social_measures_final.pdf

[4] https://www.pce.parliament.nz/media/1721/summary-report-energy-related-carbon-abatement_.pdf

[5] http://www.geoffbertram.com/fileadmin/publications/Asset%20revaluations,%20price%20gouging,%20and%20barriers%20for%20website.pdf

[6] https://cdn.auckland.ac.nz/assets/business/about/our-research/research-institutes-and-centres/energy-centre/reports/Market%20Power%20in%20the%20NZ%20wholesale%20market%202010-2016.pdf

[7] http://motu-www.motu.org.nz/wpapers/environment/Browne.pdf

The Review takes the long-run cost of new generation, not the short-run marginal cost, as the efficient price. Given recent excess profits, it is no wonder that new power projects are now being announced – a $100m peaking station in Taranaki[8] and a new wind farm in Waverly[9].

Just as significant but little recognised is the excess profits realised in night hours in wet years when the short-run cost of hydro is very close to zero. Yet night-time spot prices in a recent very wet year averaged almost 3 c/kWh – a pure windfall to generators.

PRICE STRUCTURES: ARE THEY EFFICIENT?

The structure of New Zealand's electricity prices – that is, how prices differ by time of day, by type of consumer etc. – is set by the Electricity Authority. Price structure has a profound impact on the choices made by customers, utilities, and other electric market participants, according to the U.S. consultancy, the Regulatory Assistance Project, which has advised many European countries and also China on how to design electricity regulation for efficient and fair pricing during a time of rapid technological change.

> "Utilities face unprecedented changes in the way power is generated and delivered. With the ramp-up in distributed generation, energy efficiency and demand response, electric vehicles, smart appliances, and more, the industry must rethink its rate structures to accommodate and encourage these innovations. Progressive rate design can make the difference in cost-effectively meeting public policy objectives—to use electricity more efficiently, meet environmental goals, and minimize adverse social impacts—while ensuring adequate revenue for utilities."[10]

The report quoted above, "Smart Rate Design for a Smart Future", describes time-of-use pricing, critical peak pricing, real-time pricing, and other elements of modern pricing systems designed to encourage a consumer to adapt their demand to reflect actual cost of supply. This is surely efficient pricing.

The report contrasts these strategies with a "not so smart future" in which high fixed charges provide utilities with stable revenues, but punish lower-usage customers and discourage efficiency improvements and adoption of distributed renewables, and over time can lead to an unnecessary increase in consumption, or increasing disconnections from the grid.

> "Such rates are economically inefficient and inequitable and are not justified by any fundamental principle of neoclassical economic theory. They are, in fact, nothing more than a government-sanctioned exercise of monopoly power. The adverse impacts on electric consumers and public policy goals for electricity regulation include skewed incentives against energy efficiency, customers looking to go totally off the grid, and higher bills for most low-income households. . . Regulators . . . should strive to avoid expensive mistakes based on defense of the legacy structure of the industry. Instead, regulators will need to focus on identifying costs and benefits of alternative strategies and seek to maximize the net value to customers and society."

[8] https://www.stuff.co.nz/business/105362914/taranakis-new-100-million-natural-gasfired-plant-set-to-open-in-2020
[9] http://www.scoop.co.nz/stories/BU1808/S00915/tilt-says-waverley-among-key-near-term-projects.htm

[10] http://www.raponline.org/document/download/id/7680

Those remarks apply precisely to the evident campaign to repeal the Low Fixed Charge regulations[11], led by the Electricity Networks Association and supported by a succession of publications by Concept between March and November 2017.[12] The Review's analyses are taken mostly from the work that led to that group of publications.

The Rocky Mountain Institute has published a separate report with very similar conclusions – that price-responsive demand is an essential part of modern pricing strategy.[13]

New Zealand consumers can opt for spot-price contracts, first offered by Flick, now also by other retailers. Spot prices are said to be typically higher during winter, and weekdays at breakfast and dinner time, so it should be efficient for consumers to shift their demand away from such times. This is called "price-responsive demand", and is widely advocated in publications on efficient pricing in the new commercial environment. Price-responsive demand should reduce costs of the whole electricity system, and thus benefit all consumers.

Unfortunately this year spot prices rose to over $1/kWh an unprecedented number of times in winter, and averaged over 50c/kWh on the day this is being written October 23, due to a gas outage in New Zealand's biggest gas field, Pohokura[14]. Averaged over the week, spot prices were just 7.5c/kWh in mid-September, but around 35c/kWh in mid-October. This is NOT efficient pricing – the spot-price consumer is facing the full dry-year risk. In contrast the main retailers typically buy at the spot price only 10% or less of the electricity that they re-sell, and hedge around 90% of the rest at a fixed price. Flick customers, if they had realised, could have switched to their "Fixie" energy price contract, which even in mid-October was just 7.8c/kWh all day (exclusive of network and other costs) in all hours.

What was missing this year was the consumer information – the outage at Pohokura seems to have been treated as a commercial secret and not reported in the public media for at least two weeks. Companies such as Electric Kiwi are no longer accepting customers wanting to switch away from Flick. Efficient pricing requires full and timely information!

## THE ELECTRICITY INDUSTRY – OUTLOOK FOR GENERATION

The Review states: "The key challenge is the potential need to build a lot of new generation." It predicts "a retreat of most non-electricity sources of energy in all areas of the economy." This is indeed the conclusion of recent scenario reports by Transpower[15], and one utilised by the Productivity Commission[16] [17]– heavily influenced by the strategies of both Government and market participants to grow the outputs and asset values of the electricity sector.

I disagree with that view, which puts the interests of electricity suppliers and their shareholders far ahead of the interests of residential consumers and even more so, suppliers of distributed energy services. A morass of interlocking obligations - laws, regulations, the Electricity Code, financial obligations, and (importantly) previous legal decisions - protects

[11] http://www.electricity.org.nz/news-and-events/news/why-the-low-fixed-charge-regulations-should-be-removed/
[12] http://www.concept.co.nz/publications.html
[13] https://rmi.org/wp-content/uploads/2017/04/2014-25_e
[14] http://www.scoop.co.nz/stories/BU1810/S00381/high-power-prices-to-persist-with-pohokura-outage.htm
[15] https://www.transpower.co.nz/resources/te-mauri-hiko-energy-futures
[16] https://www.productivity.govt.nz/sites/default/files/Productivity%20Commission_Low-emissions%20economy_Draft%20report.pdf

[17] https://www.productivity.govt.nz/sites/default/files/Transitioning%20to%20zero%20net%20emissions%20by%202050.pdf

the interests of the major electricity suppliers. The Electricity Authority is in effect accountable to the Market Participants through an annual consultation process. Long experience shows that concerns of residential consumers are sidelined, and the interests of solar and energy efficiency businesses are generally overridden.

The Review says that today's regulatory system is "predictable and helps maintain a low-risk investment environment for a capital intensive industry". Indeed so - it creates incentives and opportunities to drive competing energy businesses into retreat. The system was set up with the formation of the electricity state-owned enterprises, later fully or partially privatised. It was progressively revised to entrench monopoly profits, which are now treated as a "long-term benefit to consumers" because they enable expansion of power generation assets almost at will.

The underlying driver for this expansion is described in the 2011 New Zealand Energy Strategy – "The government's goal is for the energy sector to maximise its contribution to economic growth"[18]. The accompanying NZ Energy and Efficiency Strategy was revised in 2017[19] to minimise residential efficiency programmes, and to expand initiatives for industrial heat and electric vehicles. Both are designed to expand electrification of the NZ economy.

TECHNOLOGY and INNOVATION

The Review identifies "innovation" as including solar energy, batteries, and electric vehicles. Those are indeed the focus areas of Concept's three-part New Technologies Study. In contrast, the Productivity Commission's final report[20] recognises that the omission of biomass energy from its draft report had lost sight of a very cost-effective way of reducing carbon emissions from the energy sector.

"Emerging technology" therefore needs to be broadened to include biomass energy, deployed at scales ranging from household, to commercial and industrial – and even to power generation itself. The need is to provide extra energy during winter peaks and especially dry years. Research, development and commercialisation of ultra-clean wood burning must take the highest priority in New Zealand, where early developments are already promising.

The down-draft burner designed by Roger Best has been demonstrated to yield particulate emissions a tenth or less of the new standard for "ultra-clean", acceptable in polluted airsheds such as Christchurch. It is also far more convenient than conventional burners as the tall narrow firebox is filled to the top, and the wood is "conditioned" as it falls towards the incandescent charcoal at the bottom. The moisture and smoke are gasified into hydrogen and carbon monoxide, which burn cleanly. Once the system is hot, poorly seasoned wood or even a proportion of green wood can be added.

A gasifier burner being developed by Ian Cave goes a big step farther. The fuel bin is sealed and heated to as high as 500 degrees, and preheated air is introduced to the combustion chamber at the desired rate. The resulting gases are burned in a separate chamber where there is no flame at all, only a uniform glow at 700-1000 degrees, capturing all the available energy but too cool to form nitrogen oxides or other polluting gases. It can burn a single 20 kg log of

[18] https://www.mbie.govt.nz/info-services/sectors-industries/energy/documents-image-library/nz-energy-strategy-lr.pdf - see its foreword

[19] https://www.mbie.govt.nz/info-services/sectors-industries/energy/documents-image-library/NZEECS-2017-2022.pdf

[20] https://www.productivity.govt.nz/sites/default/files/Productivity%20Commission_Low-emissions%20economy_Final%20Report_FINAL_2.pdf

green pine, lasting a full day without further attention. However it requires an experienced operator - and further development to become idiot-proof.

Both types of burner are ideal for community-energy development, where firewood can be grown on-site or nearby, and harvested and utilised exactly when needed. Natives and bee-friendly exotics burn as easily as pine. The burners could be pre-heated by electricity for easy starting, and could store excess energy as hot water in large insulated buffer tanks thus covering morning and evening peak loads. Storing heat is far, far less capital-intensive than storing electricity in batteries. And the burners could even be fitted with thermoelectric generators, providing enough electricity for lighting and "devices" during electricity outages. Thus maraes, schools, and such centres could provide for community needs during disaster events.

This last refinement provides the missing link to enable truly carbon-zero end-use energy services. All the scenarios described in recent electricity reports require extra thermal generation for winter peaks, and stored fossil fuel – even coal - to cover for dry hydro years. Their alternative is to build excess wind and possibly geothermal generation, which will spill to waste when hydro energy is excess to needs. At least seven new gas turbine stations are proposed in MBIE's low-carbon scenarios - these will cost at least $100m each and require further investment in gas supply and electricity networks.

Instead, clean wood burning at household or preferably at community level could provide water and space heat at 100% carbon-zero using local labour, while use of their electric pre-heat system could absorb any surplus wind or solar generation thus saving firewood. Adding thermoelectric generators (whose costs will decrease as their use increases, like solar) makes for a far more resilient system than the increasingly all-electric future envisaged in official reports today.

One new power station technology, the Allam Cycle, is strictly carbon-zero; it burns methane and captures all its CO2 at high pressure ready to be pumped underground. Its first trial is a 25 MW pilot plant in Texas,[21] which is expected to generate power soon; the combustion itself went live in May. It is as efficient as today's combined cycle plants, but much smaller in physical size as its working fluid is liquid carbon dioxide under 300 atmosphere pressure, instead of the hot gases that drive today's gas-turbine power stations. It doesn't require a second steam turbine to generate further electricity from the turbine's waste heat. Experimental technology is nothing new to Taranaki, where the world's first synthetic petrol plant was built and run successfully (it was shut down only because the price of petrol dropped rapidly soon after it was built). New Zealand is not short of experienced power and combustion engineers. It would be ideal for taking Allam Cycle generation to a new level by running it on pyrolysis gas from wood, and pumping the CO2 from its combustion into depleted reservoirs. This would be truly carbon-negative generation, while maintaining the security of electricity supply that makes thermal generation so valuable.

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[21] https://qz.com/1292891/net-powers-has-successfully-fired-up-its-zero-emissions-fossil-fuel-power-plant/

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