ECOTRICITY SUBMISSION

ACCELERATING RENEWABLE ENERGY AND ENERGY EFFICIENCY

Hon Dr Megan Woods – Minister of Energy and Resources

Energy Markets Policy
Ministry of Business, Innovation and Employment
PO Box 1473
Wellington 6140

RE: Ecotricity Submission - Accelerating renewable energy and energy efficiency

27 February 2020

Dear Minister and Energy Transitions Team,

We commend MBIE on the quality of the Accelerating renewable energy and energy efficiency discussion paper and appreciate the opportunity to submit.

This is one of the most important pieces of policy to be developed for New Zealand in recent times.

We support the Government target of achieving a 2030 emission reduction target under the Paris Agreement, and a net zero carbon economy by 2050.

We believe a goal of 100% renewable electricity by 2035, is fully achievable.

Indeed a goal of 110% or more should be targeted to achieve this and allow for new industry to thrive in New Zealand and at the same time providing a strong renewable backbone to the country.

In short, we absolutely agree with the statement in the brief that "Renewable energy and energy efficiency is critical in the transition to a low emissions economy, and ensuring all New Zealanders have access to affordable and reliable energy."

Speed and boldness is of the essence. Reducing emissions globally, and in New Zealand is critical to ensure we have a bright future for current and future generations.

Introduction

Ecotricity operates under strict carboNZero certification rules that require accurate measurement of sales and purchases of electricity from carboNZero certified renewable generation such as Wind, Hydro and Solar.

carboNZero certification is in compliance with internationally recognised and accepted Product Category Rules for the measurement of emissions from renewable energy: United Nation Statistics Division. [1]

For every 100 kWh we sell each year, we are required to source through a hedge or purchase of 100 kWh of certified carboNZero electricity in the same year with wind, hydro or solar generators.

Ecotricity is also a leader in solar generation and electric vehicle charging. We supply the two largest rapid EV charger networks throughout New Zealand and we have the highest proportion of solar customers in New Zealand.

Long term, we firmly believe solar can supply over 40% of all electricity generation in New Zealand and that our land transport fleet can achieve a 100% migration to electrification.

There are a number of other electricity providers similar to Ecotricity in other countries which we have noted in Appendix 1 – Overseas Renewable Providers and Renewable programmes. Ecotricity is now in its sixth year of operation which shows that 100% certified renewable electricity is possible and can be adopted by a much larger segment of the New Zealand electricity market.

How we have responded to the discussion document

We have attempted to cover as many topics in the discussion document which we have either expertise or experience in. Topics we are not expert in or have no exposure to we have highlighted as such or provided no answer.

Main topics

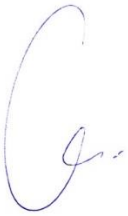
In summary our submission covers a number of topics including:

- Longer term electricity hedge markets
- Supporting renewable uptake through large scale long term PPAs supported either by government or large scale energy users
- Require electricity retailers to publish emissions figures per kWh, ensuring Carbon is directly attributed to the generation source to ensure Renewable Energy is encouraged
- Requiring councils to pre-wire new builds or renovations to allow for pre-wiring of solar, static battery, electric vehicle charging and controllable hot water installations and
- Adopt nationwide consenting rules for councils large scale renewables and electric vehicle rapid charging infrastructure (Auckland council rules)
- Demand Side Management (DSM)
- Ban new gas use installations and phase out existing gas except where there is no lower emission alternative
- Set a target of 110% renewable, consider new interruptible industrial load 100% renewable energy target is met

[1] A full Product and Service Carbon Footprint Report (PFR) for Hydro, Wind and Solar is available. The PFR follows international best practice. The PFR has been prepared in accordance with the requirements of ISO 14025 and is designed to assist organisations applying for product certification to comply with PAS 2050:2011 and the ISO/TS 14067:2013. The PFR has also been independently reviewed by an international technical expert in additional to Enviro-Mark Solutions themselves. The PFR is in compliance with internationally recognised and accepted Product Category Rules for the measurement of emissions from renewable energy: United Nation Statistics Division – Classification Registry Central Product Classification (CPC) code: 171 Electrical Energy, 173 Steam and Hot/Cold Water Generation and Distribution Version 2.0.2 (2008). http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=9&Lg=1
https://ecotricity.co.nz/carbonzero/

- Request councils review resource consent for maximum hydro levels such that peak levels are able to be maintained year around.
- Cease all subsidies for fossil fuel development

Kind regards
Ecotricity Limited



Al Yates
Chief Executive Officer

Ecotricity Response to Discussion Documents

Part A: Encouraging energy efficiency and the uptake of renewable fuels in industry

Section 1: Addressing Information Failures

Q1.1 Do you support the proposal in whole or in part to require large energy users to report their emissions and energy use annually publish Corporate Energy Transition Plans and conduct energy audits every four years? Why?

We agree in whole per the discussion paper that large energy users report their emissions. Where applicable this should include carbon intensity per unit delivered which is easily quantifiable for the consumer.

This allows consumers and commercial supply chains to benchmark products offered on the market.

We support entirely the concept of Corporate Energy Transition plans. We also support the introduction of a mandatory (comply-or-explain) disclosure regime for NZX listed issuers, banks, general insurers, asset managers and asset owners.

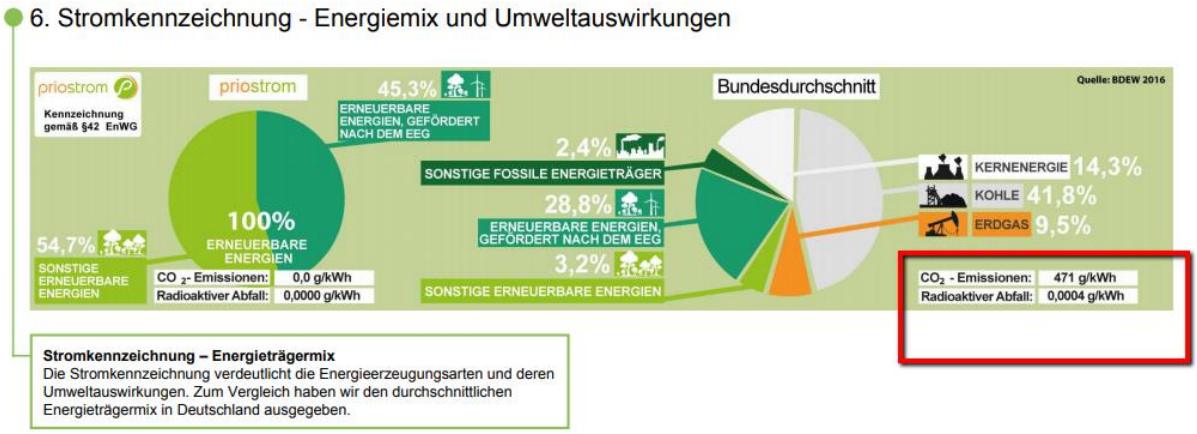
Q1.2 Which parts (set out in Table 3) do you support or not? What public reporting requirements (listed in Table 3) should be disclosed?

Electricity Retailers report Emissions Intensity per kWh

There is a growing number of electricity providers similar to Ecotricity around the globe which are providing renewable certified electricity. It is a platform that is already operating and can be introduced into the New Zealand in a short space of time.

In some European countries, such as Germany, electricity retailers are required to state the carbon emissions of the electricity they have supplied on their invoice. This requirement is easily calculated through hedging arrangements that retailers have with generators, and the general market. This would allow consumers to make informed decisions based on not only price but emissions emitted.

An example of this in Germany is shown below where emissions are stated based on where the retailer sources their electricity from.



Once consumers have access to emission profiles of each retailer, and can make informed decisions based on emissions, then this will further support the uptake of renewable energy.

Q1.3 In your view, should the covered businesses include transport energy and emissions in these requirements?

Most definitely. Transport emissions over the coming decade will be the lowest hanging fruit in terms of reducing emissions, hence we support transport energy as a priority to be included.

Ecotricity is the supplier of carboNZero certified electricity to the two largest nationwide electric vehicle public rapid charging networks,

Ecotricity is also heavily involved in transport electrification for a number of transport modes, from private vehicles, through to electric trucks, buses, aviation and boats, and provides much information through various media on a weekly basis.[2]

It is very clear that the electrification of transport will be occurring rapidly in the coming year.

Q1.5 In your view, what would be an appropriate threshold to define 'large energy users'?

Our recommendation are that:

- after 5 years companies with energy costs of $1m or more per annum are included
- after 10 years companies with energy costs of $500,000 or more per annum are included, by which stage renewables will be playing a much large part in New Zealand's energy mix

[2] Ecotricity EV YouTube channel https://www.youtube.com/playlist?list=PLc2R_K1wuSWiRK2Wi8C2z5CzSKNJnSOEn
NZ EV buyers guide https://buyersguide.ecotricity.nz/
NZ EV Savings calculator https://ecotricity.co.nz/electricvehicles/calculator/#ev-savings

Q1.6 Is there any potential for unnecessary duplication under these proposals and the TCFD disclosures proposed in the MBIE-MfE discussion document on Climate-related Financial Disclosures?

In the event that a business has emissions reporting requirements under both proposals, the means of compliance would be the same (i.e. annual reports). The only difference would be who the report is received by, in which case it would be two parties instead of one.

Section 1.2: Electrification information package and feasibility studies

Q1.7 Do you support the proposal to develop an electrification information package? Yes

Do you support customised low-emission heating feasibility studies? Yes

Would this be of use to your business?
Ecotricity is already carboNZero certified and has electrified its complete transport fleet and comprises EV's and eBikes.

Q1.8 In your view, which of the components should be scaled and/or prioritised?

In many situations, and before taking into account the cost of carbon there are cheaper low or zero emission alternatives[3].

Ecotricity has a useful consumer calculator developed for the purposes of allowing consumers to make better decisions around the use of gas in the home or small business[3]. In most cases, due to the efficiency of heat pump technology for heating spaces or water, or induction cooking, electricity is better both financially and environmentally.

In terms of specific applications where case studies can be put together (in addition to the components discussed in the discussion paper), we suggest adding a small number of case studies that cover the following relatively easy to cover topics on gas use.

These case studies (if not already available through EECA) would be invaluable for residential through to large scale industrial heat users and the financial data would most likely be made available free of charge from existing providers;

- Conversion of coal to wood chip at an industrial level, for instance a dairy factory or other large industrial user[4].
- Conversion of swimming pools (public and private) from gas to hot water heat pumps[5].
- Conversion of commercial hot water systems in the hotel industry from gas to hot water heat pumps[5].
- Conversion of gas cooking to induction cooking, targeted at the home and restaurant trade.

Are there any components other than those identified that could be included in an information package?

We believe components should include all relevant topics which business can find useful but not limited to;

[3] Ecotricity electricity versus gas savings calculator https://ecotricity.co.nz/get-off-the-gas/
[4] Example; Pioneer Energy http://pioneerenergy.co.nz/assets/Uploads/PE-Wood-Energy-Brochure-FINAL.pdf
[5] Example: Hot Water Heat Pumps Ltd https://www.waterheating.co.nz/

- energy cost savings cf investment require
- efficiency rating comparison
- carbon savings, and carbon cost savings

Q1.9 Do you support benchmarking in the food processing sector?

Yes. We have no expertise in this area however other than;

- the use of waste food products which can be converted to an energy source / high quality fertiliser source[6].
- In the latest Colmar Brunton poll found that 90% of Kiwis agreed with the statement ""If I heard about a company being irresponsible or unethical, I'd stop buying their products or using their services"[7].

  Consumers, including commercial and residential, would likely want to know the carbon component of their food products.

Q1.10 Would benchmarking be suited to, and useful for, other industries, such as wood processing?

We believe as noted in Q1.8 above that the electricity retail, and therefore the electricity generation, sectors should be included as it covers ~15% of New Zealands non-agricultural energy emissions[8].

Q1.11 Do you believe government should have a role in facilitating this or should it entirely be led by industry?

Yes, we agree with the concept that, while carbon prices are a good trigger, extra oversight / impetus is required for companies to make the move to a lower emission future. We therefore support government having a role in facilitating change.

[6] Ecogas - Food waste energy and fertiliser recovery https://www.ecogas.co.nz/

[7] Colmar Brunton – Better Futures report https://static.colmarbrunton.co.nz/wp-content/uploads/2019/05/Colmar-Brunton-Better-Futures-2019-MASTER-FINAL-REPORT.pdf

[8] New Zealand 2018 non-agricultural carbon emissions https://ecotricity.co.nz/news/carbon-knowledge/

Section 2: Developing markets for bioenergy and direct geothermal use

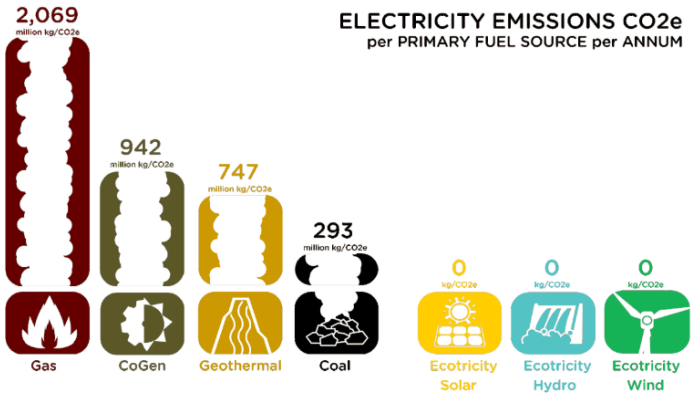
Q2.1 Do you agree that councils have regional air quality rules that are barriers to wood energy? If so, can you point us to examples of those rules in particular councils' plans?

Wood chip / biomass

We agree that reducing barriers for consent should be reduced to allows for more use of biomass, including wood chip, as a renewable fuel source. This of course needs to take into account minimum air quality standards.

Geothermal

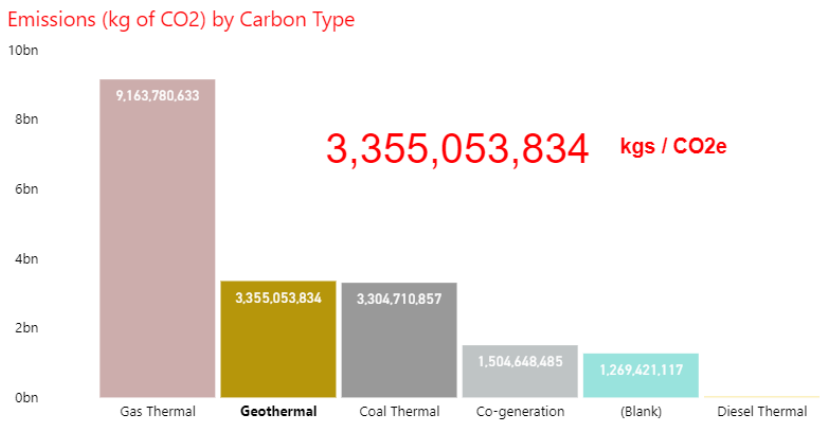
We do not however support the use of drilling for geothermal energy as an industrial scale heat source as the emissions are substantial. In the electricity generation market alone, geothermal emissions have increased to an extent their total emissions (but not emissions intensity) are regularly above that of coal emissions[9].



In the 5 years to 2019, total geothermal emissions were similar to that of coal[10] and totalled 3,355,053,834 kg/CO2.

Geothermal emissions vary between ~40 (binary) and 700 (open cycle) grams/CO2e/kWh, however when compared to wind at 6 – 7 grams/CO2e/kWh and solar of 30 – 40 grams/CO2e/kWh, hydro, wind and solar options are preferable.

[9] Ecotricity blog https://ecotricity.co.nz/is-geothermal-really-renewable-geothermal-emissions-are-now-higher-than-coal-in-the-electricity-sector/
[10] Electricity emissions by generator type https://app.powerbi.com/view?r=eyJrIjoiZDI2ZjkxYTctOThkMC00MTVhLWFjNzktMjY1ODRlZTdhZDNlIiwidCI6ImI3Y2FjNTdkLWYyZTQtNDE0Ny1hMDNhLTUzMWQ1M2VjNWE5ZSJ9



Q2.2 Do you agree that a NESAQ users' guide on the development and operation of the wood energy facilities will help to reduce regulatory barriers to the use of wood energy for process heat?

Yes.

Q2.4 Please describe any other options that you consider would be more effective at reducing regulatory barriers to the use of wood energy for process heat.

We would be interested to see a public document around converting one or more coal fired boilers in Huntly to wood chip and what capacity charges would be needed to allow it to be available for dry year events in a 100% renewable electricity option[11].

Q2.6 In your view, could the Industry Transformation Plans stimulate sufficient supply and demand for bioenergy to achieve desired outcomes? What other options are worth considering?

Yes, we would support Industry Transformation Plans for biomass.

Q2.7 Is Government best placed to provide market facilitation in bioenergy markets?

In combination with existing industry.

[11] https://www.usewoodfuel.org.nz/documents/admin/WWE24-4-FAQ-Converting-coal-fuel-boiler-to-WoodFuel.pdf

Q2.9 In your view, how can government best support direct use of geothermal heat? What other options are worth considering?

As noted in Q2.1 we do not support the use of geothermal energy for industrial heat use.

Section 3: Innovating and building capability

Q3.1 Do you agree that de-risking and diffusing commercially viable low-emission technology should be a focus of government support on process heat? Is EECA grant funding to support technology diffusion the best vehicle for this?

Yes, we agree on both counts.

Further, seeking large scale manufacturing projects should take into account a 110% renewable electricity generation target with the ability to curtail production or a part or full own state asset to ensure security of supply for the national grid.

Further existing technologies could be considered for this to apply once New Zealand reaches 110% renewable

- Atmospheric Carbon sequestration
- Another aluminium smelter
- Electric arc steal mills
- Data centres
- Solar Farms

Q3.2 (and through to Q3.5) For manufacturers and energy service experts: would peer learning and on-site technology demonstration visits lead to reducing perceived technology risks? Is there a role for the Government in facilitating this?

We agree on the proposal in Option 3.2 for collaboration and support between industry and government.

Our suspicion however is that some industries, where known lower carbon options are known to exist, will move forward before government has a chance to get involved to gain a competitive advantage which is also a positive outcome.

Section 4: Phasing out fossil fuels in process Heat

Q4.1 Do you agree with the proposal to ban new coal-fired boilers for low and medium temperature requirements?

Yes.

Q4.2 Do you agree with the proposal to require existing coal-fired process heat equipment for endues temperature requirements below 100 degrees Celsius to be phased out by 2030? Is this ambitious or is it not doing enough?

Yes, we do agree with the requirement to phase out coal boilers below 100 degrees Celsius but suggest the time frame is brought forward to 2025. Five years is ample time to phase out such boilers. The technology is here and now and in some cases will be economic already with a rising carbon price.

Q4.4 Could the Corporate Energy Transition Plans (Option 1.1) help to design a more informed phase out of fossil fuels in process heat? Would a timetabled phase out of fossil fuels in process heat be necessary alongside the Corporate Energy Transition Plans?

Yes, we think Corporate Energy Transition Plans are necessary. We think guidelines to phase out fossil fuels in process heat are required. However provide a final phase out date given so businesses can plan within these time frames.

Q4.5 In your view, could national direction under the RMA be an effective tool to support clean and low GHG-emitting methods of industrial production? If so, how?

Yes, by requiring any future resource consents that require process heat to include their energy plans which are embracing low or no carbon emission process heating. This would apply to both new and renovation scenarios.

Section 5: Boosting investment in energy efficiency and renewable energy technologies

Q5.1 Do you agree that complementary measures to the NZ-ETS should be considered to accelerate the uptake of cost-effective clean energy projects?

We agree that a higher price carbon price / NZ-ETS should be considered as first the step.

That said we believe to drive change in industrial energy, on the assumption the carbon price will hit a certain level, industry specific policies are required in addition.

Competitive loans could be usedwhere required: in some industries to migrate for entities who may not have the capital to do so.

Q5.2 If so, do you favour regulation, financial incentives or both? Why?

Both. Some industries have technology available today to solve large scale emissions.

Focus should be given to overseas markets where low carbon emission transitions has happened already industrywide.

Q5.3 In your view what is a bigger barrier to investment in clean energy technologies, internal competition for capital or access to capital?

In our limited experience, both, but internal competition for capital would rate as a bigger barrier. Past experiences have shown blocking moves by buying into new technology by large companies has eliminated competition with more carbon friendly technology. So progressively increasing carbon pricing needs to intrinsically linked as both a “carrot and stick”.

Q5.4 If you favour financial support, what sort of incentives could be considered? What are the benefits, costs and the risks of these incentives?

The carbon price / NZ-ETS should be considered as first the step.

Beyond that, and in our limited experience, we believe are likely the best financial drivers;

- Grants funded by coal and gas levies (see following section)
- Low interest loans
- Accelerated depreciation rates.
- Progressively increasing minimum carbon price

Section 6: Cost recovery mechanisms

Q6.1 What is your view on whether cost recovery mechanisms should be adopted to fund policy proposals in Part A of this document?

Absolutely, yes.

Q6.2 What are the advantages and disadvantages of introducing a levy on consumers of coal to fund process heat activities?

We see no disadvantages to introduce a substantial levy on coal.

A levy on coal should absolutely be introduced and at a substantial rate so activities, as noted in **Q5.4** to fund the transition of process heat activities to low carbon alternatives are funded abundantly.

Raising levies in one sector to support another sector is common. We note in particular that;

- **Public Transport**
  Road user charges and fuel levies, a large portion of which are funnelled into public transport, are a substantial means to support alternatives to private vehicle use.

- **Cigarette tax**
  A tobacco or cigarette tax is imposed on tobacco products by governments around the globe to fund healthcare programs. The tax mainly contributes to cancer research and smoking prevention and cessation programs.

Substantial Increase in Gas Levy

We note that the Levy on gas of $1.1 million per annum is far too low and recommend this be increased substantially. Note, some countries, cites around the globe are now considering banning the use of gas for heating[12].

[12] UK Gas heating ban for new homes from 2025 https://www.bbc.com/news/science-environment-47559920

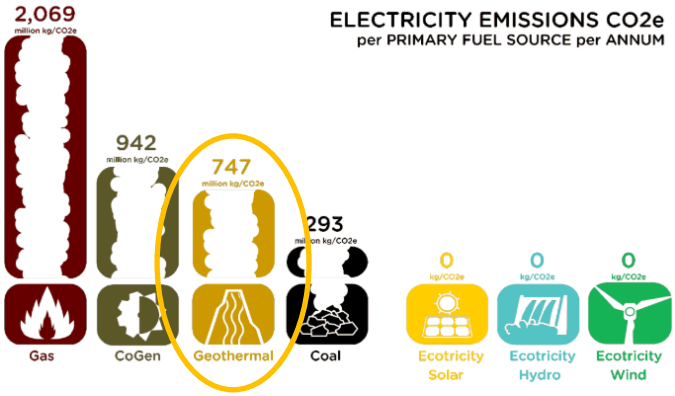
Part B: Accelerating renewable electricity generation and infrastructure

Introduction Clarification

We agree with all notes on wind, solar, transport electrification and demand side response, including the use of batteries.

However, we firmly believe geothermal needs to be reconsidered as non-renewable thermal. In 2018, emissions from electricity generated from geothermal sources were higher than emissions from electricity generated from coal, albeit at a lower carbon intensity[13].

Emissions from some geothermal sites exceed those of gas generation[14] and range anywhere from 40 grams to 597 grams/CO2e/kWh.



We appreciate the need for baseload generation provided in the short to medium term from geothermal.

However, we believe geothermal should only be consented under the RMA where it is low emission binary plant and even binary plant should only be consented if it can be proven to emit 40 grams CO2e /kWh or less.

Note, wind (7 grams / CO2e / kWh) and hydro (6 - 17 grams / CO2e / kWh) have markedly lower emission factors than geothermal. Solar ranges from 18 - 33 grams CO2e / kWh depending on the source and type of panel manufacturing.

Over the long term, we recommend the replacement of high emission geothermal with low emission generation such as wind, solar and hydro. Ultimately, a high carbon price will make these geothermal plant unviable as well.

[13] Emissions in 2018 of coal, compared with geothermal https://ecotricity.co.nz/news/carbon-knowledge/
[14] Geothermal emissions now exceed coal in the electricity sector 2016
https://ecotricity.co.nz/is-geothermal-really-renewable-geothermal-emissions-are-now-higher-than-coal-in-the-electricity-sector/

Section 7: Enabling development of renewable energy under the Resource Management Act 1991

Q7.1 Do you consider that the current NPSREG gives sufficient weight and direction to the importance of renewable energy?

No. The NPSREG, when conceived, had the right intention but not enough weight was given to its importance for councils to adopt.

The cost, time and complexity of consenting for REG projects is a major barrier.

Minor adjustments, as recommended in the Discussion Document and supported below will help with the RMA process of large and community scale projects.

Some councils, for instance the Auckland Council, have been pro-active in adopting the NPSREG intent. However require more weight to support the NPSREG intentions which would require only minor adjustments.

Smaller councils should be provided template rules and assistance in following the NPSREG. We again re-iterate that Auckland Council provides a robust template for other councils to consider.

Q7.2 What changes to the NPSREG would facilitate future development of renewable energy? In particular, what policies could be introduced or amended to provide sufficient direction to councils regarding the matters listed in points a-i mentioned on page 59 of the discussion document?

a. How to consider the national benefits of renewable energy generation when making decisions on renewable energy consent applications;

Yes. Renewable energy consent applications should be given more weight with regards to national importance.

b. How to locate and plan strategically for renewable energy resources — for example, the amended NPSREG could set out policies and/or directives that would require councils to:

i. Identify potential areas for renewable energy resources in their planning framework (e.g. existing and potential wind and solar farm sites and geothermal sites);

Yes. Auckland Council, for instance, has followed this directive.

ii. Develop specific strategies or policies for renewable energy development; and/or

Yes.

iii. Identify areas where facilities for certain types of renewable energy (e.g. wind energy) definitely should not be developed (for purposes such as aviation and conservation);

Yes.

c. The relationship of the NPSREG to freshwater management decisions (note: Policy E2 of the NPSREG relates to hydroelectricity resources and the preamble of the NPSREG states that "This national policy statement does not apply to the allocation and prioritisation of freshwater".);

We have no experience in this area.

d. Facilitating upgrades of new and existing renewable energy facilities;

Yes. Consents required for the upgrade of new and existing renewable projects should be made much simpler and cheaper. For instance, if a wind farm development applies for the increase in size of wind turbines then only certain aspects such as noise and shadow flicker should be considered, not cultural or visual aspects.

e. Facilitating renewal of lapsing consents for renewable energy projects that would require updated technical specifications, which would allow the latest, most efficient technologies to be deployed;

In general we agree efficient technologies should be used, but they must be economic for the developer.

Only in the case of geothermal, should lapsing consents require updated technical specifications to reduce emissions. In the case of open cycle geothermal plant (up to 597 grams / CO2e / kWh), consent should only be renewed where binary geothermal plant is introduced (40 grams grams / CO2e / kWh).

f. Facilitating renewal of existing consents for existing renewable energy facilities;

Only in the case of geothermal, should lapsing consents require updated technical specifications. In the case of open cycle geothermal plant (up to 597 grams / CO2e / kWh), consent should only be renewed where binary geothermal plant is introduced (40 grams grams / CO2e / kWh).

g. Catering for the need to develop transmission and distribution networks for connection to REG facilities, e.g. clarifying the linkage between the NPSREG and the NPSET and NESETA by setting out more specific policies for such networks in the NPSREG and cross-referencing the NPSET and NESETA;

We agree that priority be given for transmission to support REG projects.

h. Enabling or facilitating development of small-scale renewable energy facilities; and

We agree.

i. Acknowledging community benefits or local and social impacts of renewable energy projects.

Not all projects have community benefit options and where options are available, should be at the discretion of the developer. Otherwise projects may be left incomplete.

Q7.3 How should the NPSREG address the balancing of local environmental effects and the national benefits of renewable energy development in RMA decisions?

Simply put, if REG projects are not developed rapidly, the local environmental will no longer exist.

Local environmental effects need to be considered but limited substantially to the absolute minimum where possible.

Q7.4 What are your views on the interaction and relative priority of the NPSREG with other existing or pending national direction instruments?

We have no specific further comment to add other than to note that, if REG projects are not developed rapidly, the local environmental will no longer exist.

Local environmental effects need to be considered but limited substantially to the absolute minimum where possible.

Q7.5 Do you have any suggestions for how changes to the NPSREG could help achieve the right balance between renewable energy development and environmental outcomes?

Simply put, if REG projects are not developed rapidly, the local environmental will no longer exist.

Local environmental effects need to be considered but limited substantially to the absolute minimum where possible.

Q7.6 What objectives or policies could be included in the NPSREG regarding councils' role in locating and planning strategically for renewable energy resources?

Councils should consult industry experts (and NIWA) with regards to resources, for instance wind resource.

Q7.7 Can you identify any particular consenting barriers to development of other types of renewable energy than REG, such as green hydrogen, bioenergy and waste-to-energy facilities? Can any specific policies be included in a national policy statement to address these barriers?

Our experience is limited to wind consenting.

Wind farms in general carry too high an investment required to get projects consented. Hence the rapid strengthening of the NPSREG is absolutely necessary.

Three reasons we do not support Hydrogen;

- Green Hydrogen is reliant on an abundant source of green electricity. The Electricity sector currently emits 4.6 Million tons of CO2 annually. The focus should be on cleaning this up first and not burning Natural Gas to generate electricity to produce hydrogen.
- Hydrogen is very difficult to store, it is the smallest molecule known to man so it escapes easily.
- For vehicle propulsion, it takes 3 times as much electricity to create, compress and store hydrogen as it does to charge a battery with an equivalent storage.
- The vast majority of hydrogen created to date is from natural gas. This is not a low carbon alternative.

Q7.8 What specific policies could be included in the NPSREG for small-scale renewable energy projects?

Solar should be a permitted activity regardless of location, excluding national parks where resource consent should be required.

Wind RMA rules should follow the existing NPSREG across all councils, which Auckland Council, for example has followed and could provide a template for.

Q7.9 The NPSREG currently does not provide any definition or threshold for "small and community-scale renewable electricity generation activities". Do you have any view on the definition or threshold for these activities?

No.

However, we recommend referring to Auckland Council rules which has specific rules for wind.

As noted earlier, solar should be a permitted activity in all situations except in sensitive natural reserves.

Q7.10 What specific policies could be included to facilitate re-consenting consented but unbuilt wind farms, where consent variations are needed to allow the use of the latest technology?

We agree that re-consenting existing wind farm consents should allow automatically for larger wind turbines, but still have regard to;

- Noise regulations
- Shadow flicker regulations

A number of resource consents have been allowed to lapse because the developer could not maintain the costs of holding those consents. We recommend these lapsed consents should also be allowed to be reconsented.

Q7.11 Are there any downsides or risks to amending the NPSREG?

Not to our knowledge.

The benefits are substantial however in reducing emissions and also reducing the long term cost of electricity for consumers.

Q7.15 What renewables activities (including both REG activities and other types of renewable energy) would best be suited to NES?
For example:
What technical issues could best be dealt with under a standardised national approach?
Would it be practical for NES to set different types of activity status for activities with certain effects, for consenting or re-consenting? For example, are there any aspects of renewable activities that would have low environmental effects and would be suitable for having the status of permitted or controlled activities under the RMA?

All solar installations should be explicitly included in the NES (and NPSREG) as being a permitted activity except in sensitive natural reserves.

Q7.16 Do you have any suggestions for what rules or standards could be included in NES or National Planning Standards to help achieve the right balance between renewable energy development and environmental outcomes?

All solar installations should be explicitly included in the NES (and NPSREG) as being a permitted activity except in sensitive natural reserves.

Q7.17 Would National Planning Standards or any other RMA tools be more suitable for providing councils with national direction on renewables than the NPSREG or NES?

We believe it is enough for both the NPSREG and NES to recognise the importance of and support the development of renewables.

Q7.18 Are there opportunities for non-statutory spatial planning techniques to help identify suitable areas for renewables development (or no go areas)?

We support the Auckland Council format and rules relating to spatial planning, including go and no go areas for wind.

Q7.19 Do you have any comments on potential options for pre-approval of renewable developments?

The concept of pre-approvals for renewable projects we support in general. However, in reality and in particular for wind farm developments, would be fraught with nationwide issues for the government and would be hard to manage.

With regards to solar, as noted earlier, should be a permitted activity in all situations except in sensitive natural reserves.

Section 8: Supporting renewable electricity generation investment

Introductory Comments

Before we answer specific questions in relation to Section 8, we believe that it is important to outline the background for barriers to entry for independent renewables and resetting New Zealand's Renewable target to 110%.

Barriers of Entry for Independent Renewable Development

Demand for electricity will grow substantially over the coming years due mainly to process heat, and transport electrification. It is imperative the renewable development pipeline to support this transition to electrification is active, competitive and absolutely focuses on ultra-low emission renewables such as solar, wind and hydro.

Electricity, already a substantial component of New Zealands of GDP[15] at 3%, will be playing a larger role in years to come due to the electrification of heat processes and transport.

We agree with the concept of the government supporting, in various forms, A – D outlined in the Discussion Paper to accelerate the uptake of renewable generation.

As has been seen in other markets, as more renewables enter the generation market, wholesale prices drop. This benefits the consumer long term, as it should. But certainty is also required for investors into renewable generation to ensure new renewable projects go ahead.

In overseas markets, independent developers have generally been responsible for ~50% of new renewable generation developments. This keeps the incumbent generators competitive and, where polices are correctly set, supports the decarbonisation path for electricity.

In New Zealand however, close to 100% of new large generation has been developed by or supported by gentailers[16] which has restricted new entrant renewable development.

The general barriers facing independent renewable generation development market in New Zealand are as follows;

- **High Vertical Integration**
  The wholesale futures electricity market is dominated by highly vertically integrated gentailers who control how much new generation enters the market, as they have control over their own customer portfolio. Gentailers are on average 85% internally hedged using their own generation[17].

  Gentailers generally have access to their own hydro storage which can, to large extent, mitigate the hedging risks of new intermittent renewable generation such as wind or solar. Because of this, independent suppliers of PPA's carry a higher risk.

  If the EPR successfully bans transfer prices between generators and their own retail books, this will force gentailers to offer all generation onto the futures market and allow all retailers and large users

[15] $9 billion electricity revenue divided by $300 billion GDP https://www.stats.govt.nz/information-releases/gross-domestic-product-june-2019-quarter
[16] Only New Zealand Wind Farms has been successful in large scale renewable development. Even so the company has struggled at times to survive given the wholesale market settings. We do not consider the Tilt Wind Farm Development in Waverly to be independent as this is supported by Genesis.
[17] EMI vertical integration Index
https://www.emi.ea.govt.nz/Wholesale/Reports/BLKL4U?DateFrom=20050101&DateTo=20181031&Include=All_NZAS&_rsdr=ALL&_si=tg|reconciliation,v|3

to better manage hedges, at a lower cost. It should be noted that the EA has introduced an Urgent Code Amendment to improve Mandatory Market Making in the interim until an enduring wholesale market structure is achieved however the extent of this will unlikely to have a substantial effect in the short term.

Solution: Ban transfer prices, force gentailers to sell all generation onto the futures market.

- **Length of ASX Contracts**

The length of standard contracts offered on the ASX, of three years, is too short because

- It does not provide long enough terms to support long term investment horizons required of renewables
- Favours thermal generation and therefore fluctuating spot prices
- Is too volatile over the medium term to allow retailers to compete at the same wholesale level as gentailers.

Solution: Increase the length of ASX contracts from 3 years to 10 years[18].

- **Cost of Debt**

There is an inherent disadvantage in terms of cost of debt for independent developers when compared to gentailers. Gentailers rely upon their balance sheet and the fact they have their own retail book of customers for security of off take.

With this in mind, and on the current Reserve Bank interest rates of 100 basis points, gentailers are able to access wind farm debt finance interest rates of between 2.5 and 2.75%.

Independent developers, by contrast are likely to receive a higher interest cost likely closer to 3.5%. A 0.75% difference in interest costs, has a massive impact on the long run marginal costs of renewable generation for independent developers, in the order of over 20% difference in financing costs.

As noted earlier, Gentailers have had little incentive to build cheaper renewable generation given this will

A. render their existing thermal plant uneconomic and
B. gradually lower wholesale electricity costs

It is for these reasons that we believe Government should be actively offering government backed project finance to financially viable projects.

This will mean more projects could be financed sooner than later.

Solution: Offer government back project finance packages for independent developers.

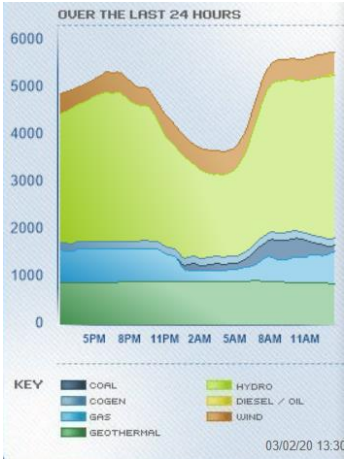
This is low level risk, but at the same time is critical to continue to make New Zealand cost of energy competitive internationally and drop our country's emissions in line with our objectives and international commitments.

[18] This would also require the adjustment of hedge prudentials across longer periods.

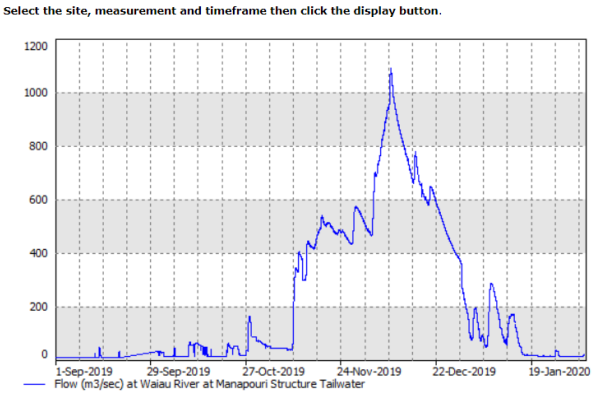
Reset New Zealands Renewable target to 110% Renewable
Solar and wind are needed to increase seasonal hydro storage

Renewables such as wind and solar are intermittent.

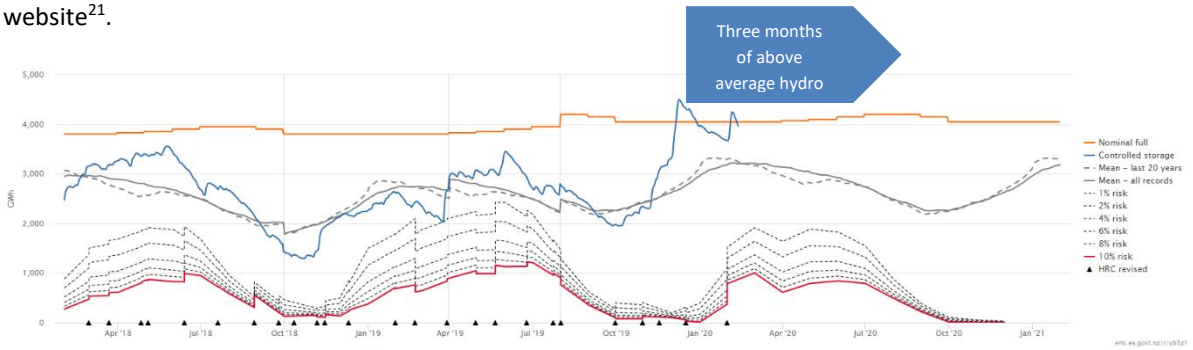
However, a substantial amount of hydro in New Zealand can be stored over short or medium periods. Hydro is the largest peaking and storage plant in New Zealand and will continue to be used as such going forward[19].



Between the 7th of November 2019 and the start of January 2020[20], substantial amounts of hydro inflow occurred, and hydro levels changed from being below average levels on the 7th of November to historic storage levels. Other south island dams, including Clyde and Pukaki experience similar inflow and spill levels.



What is relevant is that above average levels of hydro storage will likely continue for another 2 months because of two concurrent high inflow events in November 2019 and January 2020 as shown on the EMI website[21].



[19] EM6 Live generation https://www.em6live.co.nz/Default.aspx
[20] Example of Manapouri outflows http://envdata.es.govt.nz/?c=flow&tab=graph
[21] National hydro levels https://www.emi.ea.govt.nz/Environment/Reports/3UN1KD

This event highlighted the fact that, when other forms of generation (or in this case abundant hydro inflows) are operating to compliment hydro, the country can store substantial amounts of hydro for extended periods of time, beyond the 6 weeks storage noted.

Hydro currently supplies 62% of New Zealand's electricity supply. Marginal hydro spilt has a cost of zero.

For this reason we propose the renewable target should be set at 110%.

This would lead to more spill events during peaks inflow events, but hydro storage levels can, and should be maintained at higher levels more often and allow other renewables including wind and solar to provide a much more resilient renewable portfolio.

In simplistic terms, to achieve this, hydro will need to be spilled, on average by 0 - 10% each year. To achieve that hydro storage levels would need to be maintained at no less than 95% of peak storage levels (95% of ~4,195 GWh of hydro storage) at all times.

The benefits of increasing wind and solar generation

The benefit of wind and solar of all scales is that for every kW of wind or solar installed, it also increases the ability for thermal generation to be displaced and ultimately for hydro to be stored and held back for diurnal and seasonal[22] peaks as shown above, or spilled if necessary.

Less reliance on hydro inflows will occur if wind is located correctly[22], and more solar in general is installed and paired with batteries or EV vehicle to grid solutions.

Further, because wind and solar are now both the cheapest form of new renewable generation, the more that is installed will reduce the long term average cost of generation for all New Zealanders.

Less reliance on coal and gas generation peakers will also over time reduce the link between fossil fuel pricing variable pricing which New Zealand is highly exposed to.

Q8.1 Do you agree there is a role for government to provide information, facilitate match-making and/or assume some financial risk for PPAs?

Yes, absolutely.

As noted above, a government backed platform is required that provides a long term hedge market for independent renewables, and in the case of wind or solar, to be incentivised where possible in regions, such as the upper North Island where wind output is anti-correlated to low South Island lake inflows.

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[22] **Diurnal**

The current diurnal demand profile will change dramatically over the coming years for the following reasons;

- The majority of networks are introducing time of use (TOU) network prices which will substantially alter peak demand profiles for residential, and over time some commercial demand.
- Solar, battery and electric vehicle home and business installations will increase substantially over time. These are loads that are able to be moved to invert current peak times.
- As the climate warms, winter peak loads are likely to diminish although this will also diminish summer hydro storage trough snow melt.

Seasonal

Seasonal, and in particular winter peaks, will continue for some time and will always require seasonal peaking loads. Wind however, and in particular in the upper North Island, is anti-correlated to low hydro inflows in the south island so can be used to minimise the massive low inflow years.

Given the intermittent nature of renewables, it is difficult, except for Gentailers with an existing hydro generation portfolio, to support a true market based PPA structure for independents without being discounted to the market.

We therefore would support the government assuming some financial risk to support fixed priced PPA's for 15 years on a transparent ROI basis for new independently developed wind and solar projects.

Volumes purchases or financial risks made by the Government (and in collaboration where necessary with industry or corporates) on PPA's could either be dispatched at spot or bundled into a bigger portfolio. As these projects are de-risked by the Government then new projects could be supported.

Q8.2 Would support for PPAs effectively encourage electrification and new renewable generation investment?

Yes. As noted above, securitisation of long term hedge agreement for new independently developed renewables is needed outside of, and in addition to, the current gentailer model.

All large wind farms that have recently been announced have been reliant on gentailers using their own existing generation or retail position as follows;

- Mercury issued an RFP for its **Turitea wind farm** by offering a number of different offtake CFD profiles including
    A. Baseload (all trading periods) preferred OR
    B. Generation following bids (at LTN2201) will be considered OR
    C. Quarterly price shaping will be considered

  While we support this type of offer, it is important to note independent wind farm developers are not able to reasonably provide options A or C.

  Mercury is likely to be relying upon its other generation assets to be able to provide baseload products at a substantial premium to option B. Generation following bids. It is important to note when wind farms are generating at above average capacity in the Manawatu spot prices drop, so the of selling power for independent developers at spot is not realistic.

- Genesis recently entered into a 20 year for the **Waverly Wind Farm**[23] we assume at a highly competitive rate compared to the ASX futures.

  This also is a gentailer play which allows Genesis to manage other generation including hydro, gas and coal alongside the Waverly wind farm output, but also relies upon Genesis substantial generation and retail portfolio.

Q8.3 How could any potential mismatch between generation and demand profiles be managed by the Platform and/or counterparties?

[23] Genesis and Tilt Renewables move forward with the 130MW Waverley Wind Farm
https://www.genesisenergy.co.nz/about/media/news/genesis-and-tilt-renewables-move-forward-with-the

As noted in our introduction, diurnal demand profiles will flatten and more storage capacity in the form of batteries, EV batteries and demand side management will allow for a much higher penetration of renewables.

However, substantial counterparties to independent renewable generation are still required for independent developers to receive fair prices in line with those received by Gentailers in Q8.2 above.

It is for this reason either a managaed PPA market, or large scale government PPA's are required.

Q8.4 What are your views and preferences in relation to different options A to D above?

Option D is our preferred option as it essentially rolls all functions of A to C into one solution.

Note, industry have started to enter into the same PPA market, as noted with regards to MEUG, so the Government could provide a competitive option for independent renewable developers. While we support MEUG entering into long term PPA's, MEUG alone is not enough long term buying power to shift renewable development into a more rapid adoption.

Q8.5 For manufacturers: what delivered electricity price do you require to electrify some or all of your process heat requirements? And, is a long-term electricity contract an attractive proposition if it delivers more affordable electricity?

We can't answer this suffice to say that the current high prices have been driven by and large the price of gas and not the long run marginal cost of new renewables into the New Zealand. This is costing our country dearly.

The more large scale renewables built the cheaper electricity will get for New Zealand.

Q8.6 For investors / developers: what contract length and price do you require to make a return on an investment in new renewable electricity generation capacity? And, is a long-term electricity contract an attractive proposition if it delivers a predictable stream of revenues and a reasonable return on investment?

Ecotricity was established because of our experience in Wind Farm Group due to the lack of fair PPA support for independent renewable developers.

Our experience in the wind sector is that a 15 year PPA is the minimum term to establish a wind farm, however a 20 year PPA is desirable, and indeed reduces the cost of the PPA to the counter party.

Long term contracts are absolutely necessary to get large scale wind and solar projects up and running.

We believe a transparent cost up model for the Government and Industry should be deployed. This allows for small percentage project cost risks,and allows for a reasonable investor return.

Independently verified financial models are required for banks for large scale project financing, providing these to Government or Industry should be a requirement.

Q8.7 Do you consider the development of the demand response (DR) market to be a priority for the energy sector?

Yes, in conjunction with the development of renewable energy projects.

Q8.8 Do you think that DR could help to manage existing or potential electricity sector issues?

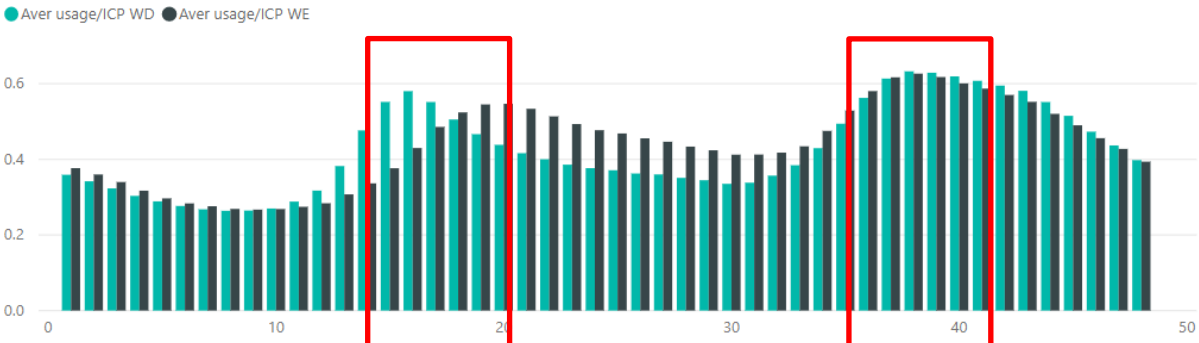
Yes.

Over 40% of Ecotricity customers have solar, and a very high proportion of those solar customers now have batteries and / or electric vehicles. With the right price signals, we are seeing a massive shift in the diurnal demand profile such that peaks are essentially avoided and off peaks maximised.

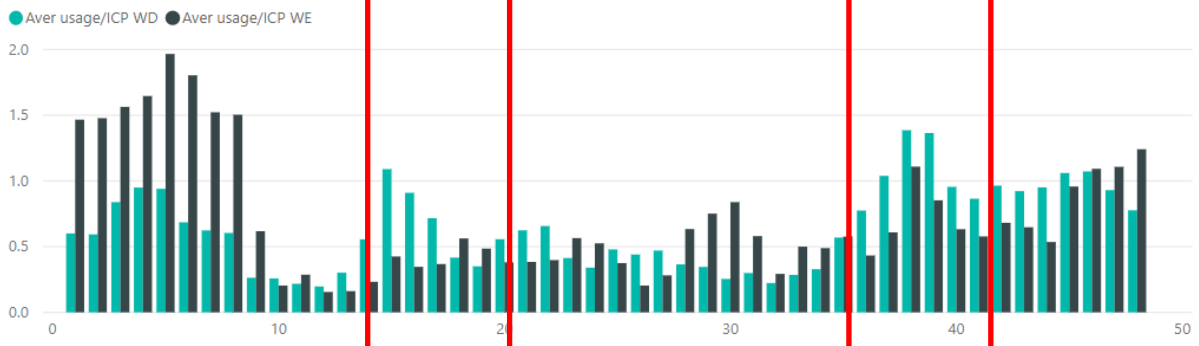
Owners of electric vehicles with vehicles that have ranges over 300 km only charge off peak, therefore have little affect on peak demand. Over time we expect these vehicles to participate in vehicle to grid (V2G) supply back onto the grid if the price signals are set correctly.

Below are customer profiles. Note in particular the last customer profile which shows diminished consumption in the peak demand periods where solar, batteries and an EV are present.

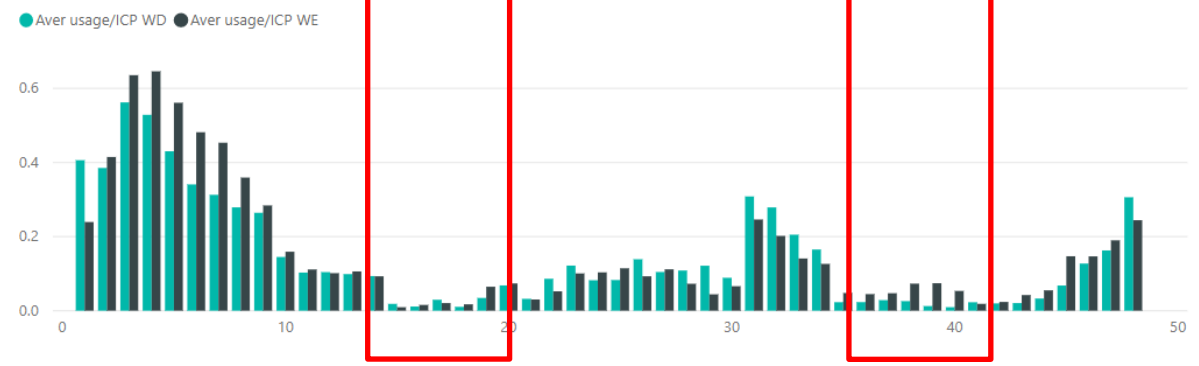
Standard residential



Two EVs, no solar / battery



Solar, batteries and EV



Q8.9 What are they key features of demand response markets? For instance, which features would enable load reduction or asset use optimisation across the energy system, or the uptake of distributed energy resources?

The main incentives for asset use optimisation across the energy system and increase the uptake of distributed energy are:

- Distributor Time of use price plans that provide Peak and Off Peak prices;
- Demand response price signals for distributed storage or renewable generation.

Q8.10 What types of demand response services should be enabled as a priority? Which services make sense for New Zealand?

- **Local Network Time of use price plans that provide Peak and Off Peak prices;**
  This is already happening across a growing number of networks from the 1st April 2020 for residential customers and some commercial price codes. This should however be rolled out as a priority for the reminder of networks and made available for all customers including businesses.

  Time of Use network prices, which are passed onto customers, will have the biggest overall impact at minimal cost and should be prioritised.

- **Demand response price signals for distributed storage or renewable generation;**
  We support an open and transparent market for demand response for distributed storage including for stationary batteries and electric vehicle batteries.

  Renewable generation such as hydro, wind or solar however do not require demand response price signals and the wholesale market profiles already provide these signals. W

  Wind and solar however should be allowed to be dispatched at all times when generating, and as a priority over hydro.

Q8.11 Would energy efficiency obligations effectively deliver increased investment in energy efficient technologies across the economy? Is there an alternative policy option that could deliver on this aim more effectively?

We agree Energy efficiency is important not just from an investment decision making perspective but also from an emissions reduction investment.

We agree energy efficiency is not a stand alone measure and should be adopted in conjunction with all the other measures highlighted in this discussion paper.

Q8.12 If progressed, what types of energy efficiency measures and technologies should be considered in order to meet retailer/distributor obligations? Should these be targeted at certain consumer groups?

We believe the three main measures should be applied as follows and overall could be cost neutral;

Ban on the sale of inefficient devices.
We think a ban should be applied to an array of appliances in residential and industrial situations such as but not limited to below.

- Incandescent light bulbs
- Gas heaters all types — Heat pumps are up to 5 x more C02 efficient[24]
- Gas hobs — Induction cookers are up to 9 x more CO2 efficient[24]

[24] Get off the Gas – The Facts https://ecotricity.co.nz/get-off-the-gas/

- Gas water heaters Hot water heat pumps are up to 5 x more C02 efficient[24]

Gas appliances are already starting to be banned in some countries like the UK[25] and Europe.

We would otherwise include petrol or diesel vehicles but believe there is policy already being created already in these areas to accelerate their uptake.

Subsidies

In addition to continue home insulation subsidies, extra revenue provide through the above Levy's can be applied to the following efficient devices;

- Home EV charger installations
- Solar and battery installations

Q8.13 Do you support the proposal to require electricity retailers and/or distributors to meet energy efficiency targets? Which entities would most effectively achieve energy savings?

Yes. Energy retailers who are reselling gas into the home or commercial sites when electric and heat pumps can do a better, cleaner and cheaper job should pay an increasing Levy per year per kWh/gas.

Energy Retailers should be involved in regular promotions to their gas customers noting the inefficiency of gas appliances and where to source electric zero or low emission alternatives.

Q8.14 Could you or your organisation provide guidance on the likely compliance costs of this policy?

We don't have experience with compliance costs but would be similar to requirements of electricity retailers and their requirements to promote Low User options to residential consumers and should be done bi-annually.

We believe a simple calculator and promotional material could be provided to Energy Retailers with regards to the energy efficiency ratings similar to the Ecotricity calculator here: https://ecotricity.co.nz/get-off-the-gas/

Q8.15 Do you consider the development of an offshore wind market to be a priority for the energy sector?

No. Onshore wind in New Zealand is much cheaper as is solar. Further, because the population density is New Zealand is much lower there is no need to go offshore.

[25] UK bans gas appliances from 2025 https://www.bbc.com/news/science-environment-47559920

Q8.16 What do you perceive to be the major benefits and costs or risks to developing offshore wind assets in New Zealand?

If 1 GW of offshore wind is required to make it semi competitive, this decreases geographical dispersion in particular if located in Taranaki with its close proximity to the Manawatu. More geographical dispersion of wind is needed throughout New Zealand to lower generation risks and reduce transmission constraints.

Renewable electricity certificates and portfolio standards

Q8.17 This policy option involves a high level of intervention and risk. Would another policy option better achieve our goals to encourage renewable energy generation investment? Or, could this policy option be re-designed to better achieve our goals?

This does not involve a high level of intervention nor risk. It's rather simple and elegant and is being done overseas (refer Appendix 1).

Further, there are existing renewable certifications available in New Zealand including carboNZero and NZECS.

Q8.18 Should the Government introduce RPS requirements? If yes, at what level should a RPS quota be set to incentivise additional renewable electricity generation investment?

Yes.

Currently non thermal renewable generation, which excludes geothermal, accounts for 63% of generation as noted in the table below. We believe 80% should be a target for non-thermal generation from 2025 and reducing to 100% (110%) over the next 15 years.

	1/01/2019
To	31/12/2019
Total Generation MWh	Total
Gas Thermal	4,584,202
Coal Thermal	1,419,333
Diesel Thermal	2,706
Geothermal	7,773,650
Co-generation	1,211,109
Wind	1,703,750
Hydro	24,687,975
Total	41,382,726
Annual t/CO2 Emissions	Total
Gas Thermal	1,863,676
Coal Thermal	1,308,563
Diesel Thermal	2,031
Geothermal	795,586
Co-generation	599,727
Wind	0
Hydro	0
Total	4,569,584
Geothermal gCO2/kWh	
Average gCO2/kWh	110.4
Thermal Percentage	36%

Data provided by EnergyLink NZ Jan 2019

Carbon Intensity gams CO2e / kWh

Gas Thermal gCO2/kWh	407
Coal Thermal gCO2/kWh	922
Diesel Thermal gCO2/kWh	751
Geothermal gCO2/kWh	40 to 597
Co-generation gCO2/kWh	495
Wind gCO2/kWh	0
Hydro gCO2/kWh	0
Average gCO2/kWh	110

Note, high emission geothermal above 50 grams CO2/kWh should be incentivised to be the first geothermal generation to be retired within the geothermal generation fleet.

Q8.19 Should RPS requirements apply to all retailers and/or major electricity users? What would be an appropriate threshold for the inclusion of major electricity users (i.e. annual consumption above a certain GWh threshold)?

Yes.

RPS Requirements

A RPS should be applied to both retailers and large users where load can be split across multiple ICPs. The only exceptions being New Zealand steel and the Tiwai smelter which operate off single ICPs.

However if a large industrial user claims to be receiving 100% renewable electricity, this needs to be certified and withdrawn from the general pool of generation. The Tiwai smelter for instance claims to be powered by 100% hydro from Meridian, therefore their renewable consumption needs to be withdrawn from the pool of energy available to other users in the same way retailers would certify renewables.

Retail and Wholesale Carbon Intensity Reporting

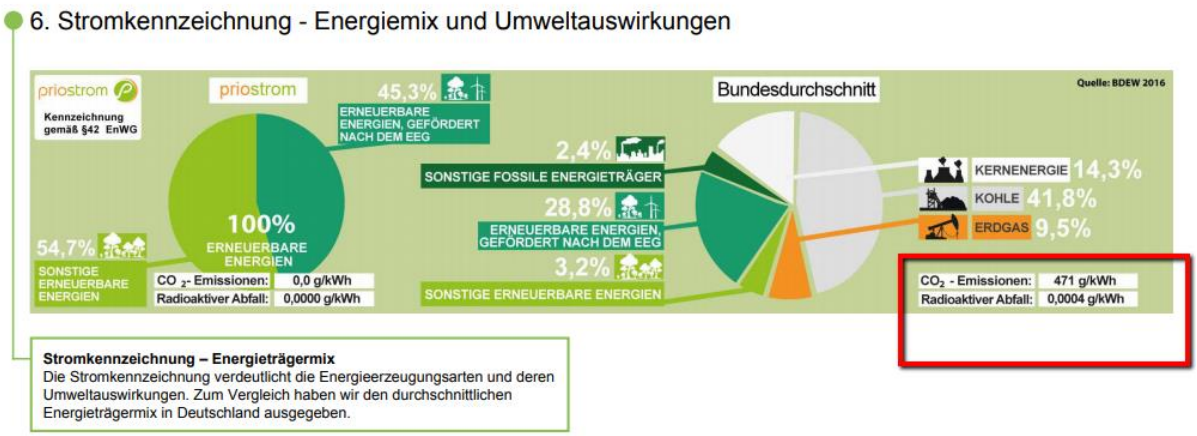
In addition to the RPS requirements, we believe all energy retailers should be reporting their carbon intensity of electric (and gas) purchased and supplied to their customers.

Ecotricity already does this with its carboNZero reporting and offsets the remainder of emissions from wind, hydro and solar installations.

It is a simple process and would be operated through the electricity futures markets, such that all hedges offered by generators would need to have a carbon intensity amount offered with that hedge. Anything left over that is not hedged would be put into the general generation pool.

This further incentivises retailers to choose renewable generation over thermal as they would then be required to report that to the consumer.

This is being done in a growing number of markets. An example of a European bill is below.



Q8.20 Would a government backed certification scheme support your corporate strategy and export credentials?

There are existing renewable certifications available in New Zealand including carboNZero and NZECS.

carboNZero certification of electricity is being run by Toitu EnvrioMark which is a government owned entity.

We recommend that retailers publish their emission figures per delivered kWh per Q8.19 above.

Q8.21 What types of renewable projects should be eligible for renewable electricity certificates?

All existing and new wind, hydro and solar projects or any new renewable technology that appears which does not emit during operation.

Geothermal is not emission free renewable therefore should not be counted as renewable. On average geothermal emits 14 x more emissions than wind including all cradle to grave lifecycle emissions. Indeed, annual geothermal emissions are frequently above coal emissions, albeit with much lower emissions intensity.

Q8.22 If this policy option is progressed, should retailers and major electricity users be permitted to invest in energy efficient technology investments to meet their renewable portfolio standards? (See option 8.3 above on energy efficiency obligations).

Only as noted, with regards to gas education programmes and Levies noted in Q8.13.

Q8.23 Could you or your organisation provide guidance on the likely administrative and compliance costs of this policy?

Yes. We have been involved in carboNZero certification over the last 5 years.

Phase down thermal baseload and place in strategic reserve

We do not agree with the following comments from the Electricity Authority on the current market's ability to deliver firm capacity:

> "For over 20 years the spot market has operated effectively in providing signals for efficient generation investment.... This has been supported in more recent years by well-functioning hedge and futures markets that provide parties with the means to enter into forward contracts … without the prescription of a formal capacity mechanism that can be readily gamed."

Quite the opposite is true. The Electricity Authority has effectively been put on notice by independent retailers, consumers, large energy users and the Minister for non-performance.

The findings of the recent Electricity Price Review and the resulting Energy Ministers recommendations have found the wholesale market and futures markets are broken and consequently this has not allowed competing new entrant renewable generation to enter the market.

Q8.24 This policy option involves a high level of intervention and risk. Do you think that another policy option could better achieve our goals to encourage renewable energy generation investment? Or, could this policy option be re-designed to better achieve our goals?

We agree with the policy option described in the discussion paper with the following enhancements:

- Set a renewables target of 110%, supported by hedge structures discussed earlier in this submission, such that hydro levels are maintained at a much higher level more often[26].
- This may require storage / capacity payments are paid to hydro schemes which are able to maintain above average storage levels. This would also help mitigate lower dispatch costs on the spot market.
- We agree that thermal capacity should be available but only as a last resort to the market and only if powered by biomass, for instance return the Huntly coal burners to full capacity but run on wood chip. This is not cheaper and may mean some wood based industry may also require capacity payments to ensure fuel is made available on a regular or emergency basis. However, this capacity payment could be spread across all retailers.
- Bring forward HVDC upgrades such that the South Island, and Manapouri hydro can be dispatched north more often without spilling.

Q8.25 Do you support the managed phase down of baseload thermal electricity generation?

Yes.

[26] Seasonal nominal hydro peak is largely driven by Tekapo. Genesis can draw the lake lower in winter under normal operating conditions. In summer the lake is required to be full for tourism and recreational activities. The regional councils are trying to balance competing needs for users. However the consents are hugely valuable to the hydro generators and they are continually pushing for more access.

Q8.26 Would a strategic reserve mechanism adequately address supply security and reduce emissions affordably during a transition to higher levels of renewable electricity generation?

Yes, as noted in Q8.24

Q8.27 Under what market conditions should thermal baseload held in a strategic reserve be used? For example, would you support requiring thermal baseload assets to operate as peaking plants or during dry winters?

We would only support thermal baseload assets to be operated on a dry winter basis if they were operating on biomass or wood chip.

Q8.28 What is the best way to meet resource adequacy needs as we transition away from fossilfueled electricity generation and towards a system dominated by renewables?

To mitigate the risk of low hydro inflow in the South Island we recommend

- Geographic dispersion of wind generation, in the upper north island;
- Nationwide policy for all new buildings, above a certain square meter size, to include solar generation to minimize consumption for the household or business for buildings of 3 levels or less;
- Capacity payments to maintain high levels of hydro storage;
- All households above a certain square meter size, require solar, electric vehicle charging, water heating and thermal mass heating pre-wiring is pre-installed and has the ability to be demand side managed; and
- A 110% renewable generation target.
- Request councils to review resource consent for maximum hydro levels, such that peak levels are able to maintained all year around.
- Bring forward HVDC upgrades such that the South Island, and Manapouri hydro can be dispatched north more often without spilling.

Q8.29 Should a permanent capacity market which also includes peaking generation be considered?

We agree that thermal capacity should be available but only as a last resort to the market and only if powered by biomass, for instance return the Huntly coal burners to full capacity but run on wood chip. The biomass market is about to expand substantially therefore we would expect higher volume biomass products to be more readily available.

This may require some wood-based industry capacity payments to ensure fuel is made available on a regular or emergency basis. However, this capacity payment could be spread across all retailers.

On the assumptions renewables are generating 100% of the time, wholesale prices will be substantially cheaper than they are today, driven largely due to fossil fuel prices. Thermal capacity payments therefore

would have a small overall impact on the total cost of energy when considering a lowered renewable cost to deliver energy.

Q8.30 Do you have any views regarding the above options to encourage renewable electricity generation investment that we considered, but are not proposing to investigate further?

We believe the government should explore all options, including long term PPA with independent developers, or investing directly in renewable generation plant.

The time for being sensitive about who owns what plant is over.

We need to hit 110% renewable sooner rather than later and drop our transport fleet emissions to zero by moving to electric.

Section 9: Facilitating local and community engagement in renewable energy and energy efficiency

Our overarching comment regarding local community engagement in renewable energy is that we absolutely support it.

As noted in the opening section, established vertically integrated utilities have dominated the generation and retail market to the detriment of new renewables being built and consequently the New Zealand public paying a higher price because renewables have not been developed fast enough.

Community projects should, like independent developers, have access to long term PPA's to finance local generation projects.

Q9.1 Should New Zealand be encouraging greater development of community energy projects?

Yes.

Q9.2 What types of community energy project are most relevant in the New Zealand context?

Wind, solar and hydro, peer to peer.

Q9.3 What are the key benefits and downsides/risks of a focus on community energy?

Benefits are proud local ownership, and flowing from that, energy conservation.

We see no downsides if there are clear governance requirements placed on community owned projects.

Section 10: Connecting to the national grid

Q10.1 Which option or combination of options proposed, if any, would be most likely to address the first mover disadvantage?

We support all options put forward in the discussion paper but in particular support option 10.1 which would take into account the avoided emissions of renewable plant. This not only supports the uptake of renewables at a faster rate but disincentivises new thermal plant being installed.

Q10.2 What do you see as the disadvantages or risks with these options to address the first mover disadvantage?

As noted earlier in this document, in order to achieve a 100% electricity grid, either 110% renewable generation is required to allow for dry year winters, or through targeted transmission cost allocation, for instance favouring wind in the upper north island which is more able to mitigate dry year risk may mean a 110% target is more realistic and therefore cheaper for the country as a whole.

Geographic dispersion of grid scale wind and solar farms is therefore absolutely critical

Embedded solar is naturally dispersed through nationwide embedded generation.

Q10.3 Would introducing a requirement, or new charge, for subsequent customers to contribute to costs already incurred by the first mover create any perverse incentives?

We would support this policy as well to share costs for first movers with subsequent customers.

Q10.4 Are there any additional options that should be considered?

As noted above, we believe promoting geographic dispersion favouring wind in the upper north island is the most favoured option.

Q10.5 – Q10.14 Information sharing regarding resources and requirements / costs of grid connection

Our general comment to this section from renewable resources is that from a wind and biomass perspective, most developers already know the local energy resource options. Each site of course needs to quantified individually. Further Wind Farm Group, a shareholder in Ecotricity, shared wind data with EECA 10 years ago to confirm the cross correlation coefficients of each region.

From a solar perspective, this is readily available per region.

There is merit however in terms of providing more information regarding national grid connection options.

Section 11: Local network connections and trading arrangements

Q11.1 Have you experienced, or are you aware of, significant barriers to connecting? Are there any that will not be addressed by current work programmes outlined above?

Solar

Over 40% of Ecotricity's customer base has solar and or batteries installed. We believe most networks are heading in the right direction with regards to introducing time of use pricing.

However here are some barriers that could be improved including;

- Some networks charge customers for solar export which is a disincentive to install distributed generation and battery storage.
- Conversely, some networks including Orion provide incentives for customers to export during peak periods which we support and would like to see more networks provides as a standard item.
- Standardisation of rules and regulation across all networks in terms of what is required before metering can be installed. This includes Record of Inspection (ROI) and Code of Compliance (COC).

Wind

Distributed generation such as wind needs more support.

We suggest including option 10.1 put forward in the discussion paper relating to Transpower which would take into account the avoided emissions of renewable plant. This not only supports the uptake of renewables at a faster rate but disincentivises new thermal plant being installed.

Where the funding for such support comes from would have to be discussed but we would suggest this would need to be funded outside of the distributors as it is a national benefit.

Q11.2 Should the section 10 option to produce a users' guide extend to the process for getting an upgraded or new distribution line? Are there other section 10 information options that could be extended to include information about local networks and distributed generation?

We would support a users guide for getting an upgraded line.

Q11.3 Do the work programmes outlined above cover all issues to ensure the settings for connecting to and trading on the local network are fit for purpose into the future? Are there things that should be prioritised, or sped up?

Yes. As noted in Q11.1, we suggest including option 10.1 put forward in the discussion paper relating to Transpower which would take into account the avoided emissions of renewable plant.

Q11.4 What changes, if any, to the current arrangements would ensure distribution networks are fit for purpose into the future?

We believe **time of use** network charges should be mandated across all networks for residential and commercial customers.

Congratulations on getting to the end and thanks for reviewing our submission!!
AL Yates
CEO
Ecotricity

Appendix 1 – Overseas Renewable Providers and Renewable programmes

- **Smart Energy – UK Carbon Trust**

  Smart Energy not only claim to supply renewable energy but specify the source, be it wind, hydro or solar and what percentage each source represents.

  https://smartestenergy.com/info-hub/corporate-ppa-report-2019/A very informative video can also be found at;
  www2.smartestenergy.com/renewable#lightbox-video1

- **US Environmental Protection Agency (EPA)**

  The US EPA are one of the largest government agencies that are actively supporting the uptake of renewable electricity. They actively do so by allowing resellers of renewable electricity to recognise the percentage of REC's (Renewable Energy Certificates) to their customers. In particular:

  > *"RECs serve the role of laying claim to and accounting for the associated attributes of renewable-based generation. The REC and the associated underlying physical electricity take separate pathways to the point of end use (see diagram). As renewable generators produce electricity, they have a positive impact, reducing the need for fossil fuel-based generation sources to meet consumer demand. RECs embody these positive environmental impacts and convey these benefits to the REC owner."*

  www3.epa.gov/greenpower/gpmarket/rec.htm

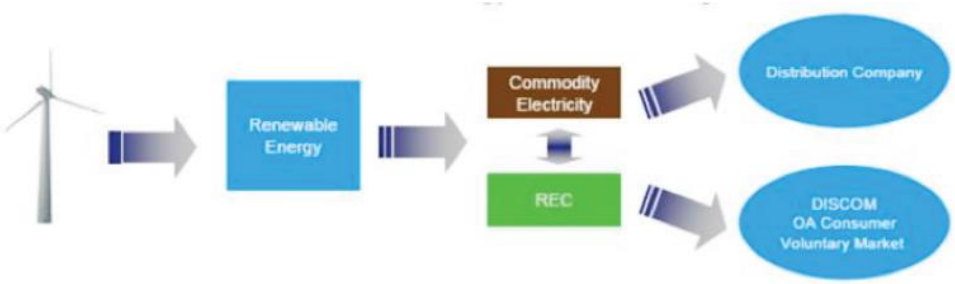
- **Green-e**

  This is a similar programme to carboNZero in New Zealand, however what is relevant in addition to the EPA reference above is how they explain renewable energy certificate.

www.youtube.com/watch?v=opJMrzNauFQ&feature=youtube

- **Japan's Green Power Certificate**

  Japan's Green Power Certificate is a successful scheme to publicise, attract and monitor individual and corporate efforts for environmental protection in the renewable energy sector. Launched and managed by a private business but with certification from a public facility, the scheme emphasises the supporting role of governments in influencing corporate and private behaviour.



www.unescap.org/sites/default/files/27.%20CS-Japan-Green-Power-Certificate-Scheme.pdf

- **Ecotricity UK**

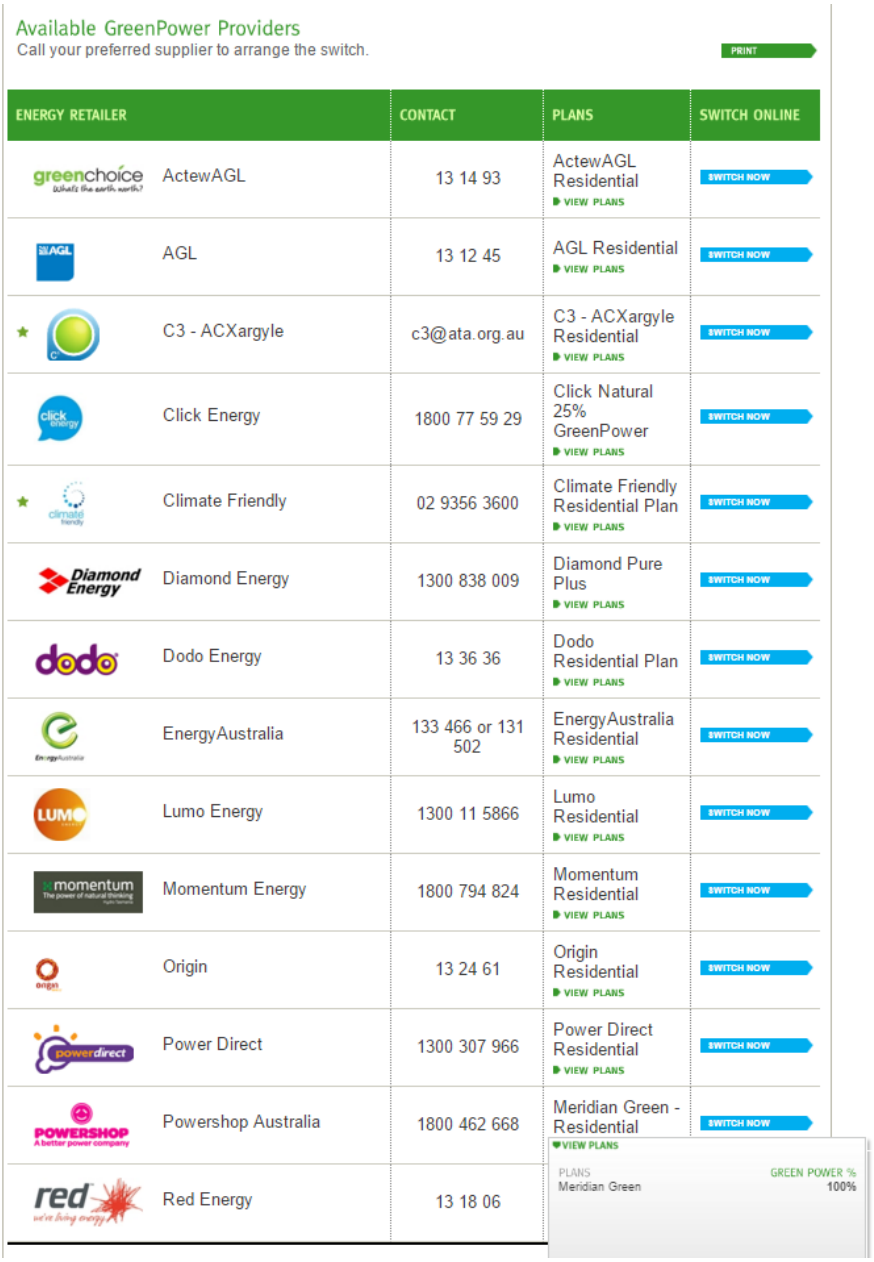
  https://www.ecotricity.co.uk

  Note, Ecotricity UK is completely independent of Ecotricity in New Zealand.

- **Green Power Australia**

Green Power is an Australian Government programme that certifies retailers of renewable electricity. The brand clearly shows electricity can be sold exclusively as renewable energy if certified by Green Power. Companies provide different electricity plans based on 10% - 200% renewable electricity components.
www.greenpower.gov.au/#

Some providers of renewable electricity include:



Available GreenPower Providers
Call your preferred supplier to arrange the switch.

PRINT

ENERGY RETAILER	CONTACT	PLANS	SWITCH ONLINE
ActewAGL	13 14 93	ActewAGL Residential VIEW PLANS	SWITCH NOW
AGL	13 12 45	AGL Residential VIEW PLANS	SWITCH NOW
C3 - ACXargyle	c3@ata.org.au	C3 - ACXargyle Residential VIEW PLANS	SWITCH NOW
Click Energy	1800 77 59 29	Click Natural 25% GreenPower VIEW PLANS	SWITCH NOW
Climate Friendly	02 9356 3600	Climate Friendly Residential Plan VIEW PLANS	SWITCH NOW
Diamond Energy	1300 838 009	Diamond Pure Plus VIEW PLANS	SWITCH NOW
Dodo Energy	13 36 36	Dodo Residential Plan VIEW PLANS	SWITCH NOW
EnergyAustralia	133 466 or 131 502	EnergyAustralia Residential VIEW PLANS	SWITCH NOW
Lumo Energy	1300 11 5866	Lumo Residential VIEW PLANS	SWITCH NOW
Momentum Energy	1800 794 824	Momentum Residential VIEW PLANS	SWITCH NOW
Origin	13 24 61	Origin Residential VIEW PLANS	SWITCH NOW
Power Direct	1300 307 966	Power Direct Residential VIEW PLANS	SWITCH NOW
Powershop Australia	1800 462 668	Meridian Green - Residential VIEW PLANS	SWITCH NOW
Red Energy	13 18 06		

PLANS Meridian Green
GREEN POWER % 100%

Note, Powershop Australia is owned by Meridian New Zealand.

- **Amazon, Microsoft, Google, and Procter & Gamble**

As noted in the article below these are global brands that are claiming to receive renewable electricity only for their operations. It is important commercial and residential customers have the ability to say that they are only purchasing renewable electricity.

- **Other related renewable electricity product programmes include**

  UK – Energy Saving Trust, Buying Green Electricity
  www.energysavingtrust.org.uk/domestic/buying-green-electricity

  UK – Certified Green Energy Scheme
  www.greenenergyscheme.org/

  Germany - Grüner Strom Certified Green Electricity
  www.gruenerstromlabel.de/english/gruener-strom-certified-green-electricity/

  Lithuania – Certified Green Electricity -
  www.datainn.lt/en/data-logistics-center-uses-the-certified-green-electricity-green-lithuanian-energy/

The above programmes and companies underline the ability for electricity retailers globally to claim they are reselling renewable electricity.

We firmly believe therefore that Ecotricity is in line with international best practice because we are purchasing all electricity through a Power Purchase Agreement from carboNZero certified renewable resources. Further, through our accredited carboNZero certification and annual audit, we are being independently verified as purchasing from renewable sources.

Similar System – The Banking System

We thought the following article would be of interest as it explains clearly the concept that electrons on the grid are fungible.
www.aweablog.org/anti-renewable-energy-special-interests-attack-businesses-growing-american-wind-power/ .

Coal generation is no different. If you have contracted the generation of coal generation through a hedge, and you order when it is produced, you effectively own the end generated product.

Appendix 1 – Meridian confirms hedge arrangement for Genesis coal plant

Genesis extends life of Rankine units

Kate Barker - Thu, 28 Apr 2016

Genesis Energy has extended the life of its coal-fired Huntly units until December 2022.

The firm says recent changes to the market with the closure of other thermal plant, and continued uncertainty over the future of Tiwai Point, “has indicated that a longer transition period than originally expected is required”.

Genesis announced in August that it would retire the two 250 MW Rankine units in late 2018 unless the market came up with other commercial arrangements.

Now the generator-retailer has entered into four-year bilateral commercial arrangements with other market participants that will keep the units available until late 2022.

Meridian Energy has signed a four-year swaption with Genesis to replace its current arrangement which expires in December 2018.

“The new contracts will cover the operational and capital costs of keeping the units in the market,” Genesis says in a statement.

Outgoing chief executive Albert Brantley says the wholesale electricity market had changed significantly since the company’s initial announcement.

“It has become clear that the Rankine units are required longer than we previously anticipated.”

Brantley says the commercial arrangements will help reduce electricity supply risk while uncertainty around the Tiwai smelter remains.

“It can be expected that during this period Genesis Energy and other generators will explore the development of a range of lower cost and lower emitting generation options.”

Arrangements

Meridian Energy and Contact Energy, the two largest South Island hydro generators, have both previously argued that keeping the coal-fired capacity longer is the cheapest option for the industry to maintain dry-year cover and to meet rising demand.

Meridian’s swaption agreement, beginning on January 1, 2019, will allow for 100 MW to be available year-round, with an additional 50 MW available from April 1 to October 31 in each year of the contract.

Meridian chief executive Mark Binns says the arrangement will help ensure security of supply and he is pleased the company and other market participants have collectively been able to achieve this.

“It ensures that there is sufficient capacity out there to meet peak winter loads and it provides insurance when the country experiences drought conditions in the hydro lakes.”

Late last year Mighty River Power closed its 140 MW Southdown plant. Contact stopped generation from its 400 MW Otahuhu B station in September.

Tiwai Point owners Rio Tinto have until July 29 to give 12 months’ notice of its intention to reduce its contracted purchases from Meridian to 400 MW from 572 MW, should it choose to do so.

Forsyth Barr yesterday said keeping the Rankines open would make more sense with the smelter – the country’s largest electricity user – staying in the market.

Coal use

In the three months to March 31, Genesis burned about 100,000 tonnes of coal at the units. Its coal stockpile was down to 500,085 tonnes, according to quarterly numbers released yesterday.

Following the August announcement, Genesis cancelled its coal contract with Solid Energy.

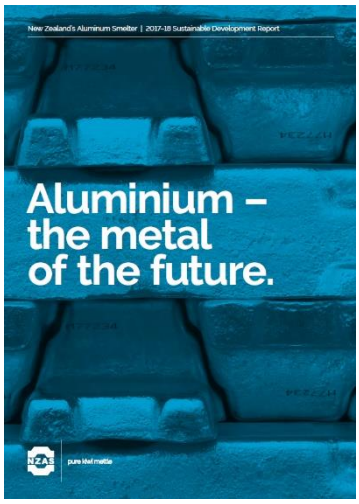
Genesis spokesperson Richard Gordon says the company has “a number of options” regarding fuel use for the units.

He says there have been several days in the last few months where the units have run purely on gas.

“At this stage it’s far too early to say what fuel we may purchase,” he says.

“We’ve definitely got coal and gas options.”

Appendix 2 - New Zealand Aluminium Smelter (NZAS) claims it is powered by hydro only.



We refer you to the NZAS promotional material which confirms Meridians statements that they are supplied by hydro
https://www.nzas.co.nz/files/2598_20180706114606-1530834366.pdf

Page 1.

Powered by renewable hydro-electricity, NZAS is well-placed to provide low carbon aluminium to meet the growing demand for the lightweight metal in the automotive industry.

Page 2.

we will once again begin producing metal from Line 4 and look to even further maximise the advantages that producing some of the world’s purest aluminium from New Zealand’s renewable hydroelectricity delivers to our business.

Introduction

We did all this, with one of the lowest carbon footprints of a smelter anywhere in the world.

Appendix 3 – Meridian rejects 100% renewable target during Climate Change Commission

Climate body must be free to reject power target - Meridian

Gavin Evans - Mon, 18 Jun 2018

The proposed Climate Change Commission must have the freedom to form its own view of the country's long-term climate challenges and the best options for meeting them, Meridian Energy says.

The country's biggest hydro generator says a successful transition to a low-emission economy will require stable and enduring laws and institutions that establish clear emissions targets. Firms also require certainty as to the frameworks that future governments will operate within when developing and implementing long-term policies to mitigate climate change.

Meridian says tensions are already apparent in climate policy between "politicised" and independent, evidence-based advice. It cited the Labour-Green coalition agreement that requires the Interim Climate Change Committee to plan the transition of the electricity sector to 100 per cent renewable generation by 2035 and to investigate the role of solar panels of school roofs as part of that.

"The Interim Climate Change Committee is a ministerial advisory committee, directly appointed by and reporting to Ministers on a task that is inherently about achievement of a political goal.

"While this is understandable for the Interim Climate Change Committee, the eventual Climate Change Commission needs sufficient independence to fulfil long-term functions and provide objective advice – it should not be directed to report on the political goals of the Minister of the day."

Targets

Meridian makes its comment in a 27-page submission on the Productivity Commission's draft report on ways for the country to transition to a low-emission economy by 2050.

In April the commission recommended a focus on afforestation and the electrification of transport and industrial process heat as the most cost-effective route to reduce emissions.

The commission also questioned the Government's targets for 100 per cent renewable electricity generation, citing the cost of doing so, and the expected reliance – at least in the near-term - on gas-fired generation to provide dry-year back-up to an increased solar, wind and geothermal fleet.

Meridian says its own analysis suggests that the market, with an effective emissions trading scheme, can deliver a 95 per cent renewable generation industry by 2028. It could get to 97 per cent by 2035.

But, like the Productivity Commission, it says power prices may need to rise "substantially" if the policy intent is to have all on-call generation coming from renewable supplies as well.

Independence

Meridian endorsed the commission's advice for the Government not to set stringent electricity sector targets and instead rely on emissions pricing and improving technology to deliver those options as they become economic.

But it says the Climate Change Commission needs to be able to take that option if it chooses to.

"Driving towards 100 per cent renewable electricity generation is not likely to be the most efficient way for New Zealand to meet its emissions objectives – phasing out the last few percentage points of thermal generation would likely drive up electricity prices and limit emissions reductions in other sectors such as transport.

“The Climate Change Commission must therefore have the option to advise against a goal of 100 per cent renewable electricity generation and instead recommend economy-wide goals, despite any political agreements and initial work undertaken on the subject by the ministerial advisory committee.”

Most of the country’s generators support the commission’s focus on renewable energy targets across the economy, rather than just the power sector.

Generator submissions generally called for the Government to toughen up the national policy statement on renewable generation, and improve its utility by extending the consent terms for long-lived hydro generation projects, and providing greater flexibility on the timing of developments to take advantage of the latest available technologies.

Investment

Mercury NZ says the scale of generation build indicated by Transpower in its Te Mauri Hiko paper earlier this month, suggests a $20 billion investment by 2050.

For that to happen, it says investors are going to need stability across a range of policy areas.

Should the Government’s review of electricity pricing result in wide-ranging reform of the country’s highly efficient wholesale electricity market, that could stifle capital flows and increase the cost of carbon abatement, it says.

Proposals to bring fresh water quality into the Resource Management Act, or make water users subject to environmental taxes, could also increase the cost of hydro-electricity and carbon abatement in turn.

And Mercury says hydro will remain critical to meet the Government’s climate change objectives, especially given the recent ban on offshore exploration will mean gas-fired generation “will become uneconomic”.

Genesis Energy, the country’s largest thermal generator, endorsed the commission’s warning not to subsidise renewable technologies.

It particularly noted the experience of the UK, Spain and Germany, where it said subsidies of some renewable projects and technologies had come at a “high cost for consumers”.

Thermal options

Genesis has already committed to ending its use of coal at Huntly by 2025 unless required for emergency or dry-year supply.

There is no current “silver-bullet” that can economically replace the coal and gas used to meet the country’s peak winter demand and dry-year events.

And it says that challenge will be exacerbated in coming years as decarbonisation of industry and transport adds to electricity demand.

While batteries are being added to networks, Genesis estimates that trying to use them for managing seasonal storage could cost more than $2 trillion.

Retaining some form of gas-peaking will also be challenging given the need for flexible gas contracts and increased gas storage, and the economics of maintaining plant that may be used only occasionally.

“These are not simple challenges that can be solved overnight so it is essential that as a sector we get past the rhetoric and work towards the creation of a plan that allows the sector to undertake the next steps to decarbonisation.”