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Collector:	Final submissions link (Web Link)
Started:	Friday, February 28, 2020 11:13:12 AM
Last Modified:	Friday, February 28, 2020 12:11:30 PM
Time Spent:	00:58:17

Page 1: Introduction

Q1 Name (first and last name)

EPECentre

Q2 Email

info@epecentre.ac.nz

Q3 Is this an individual submission, or is it on behalf of a group or organisation?	**On behalf of a group or organisation**
Q4 Which group do you most identify with, or are representing?	**Research institute / academia**

Q5 Business name or organisation (if applicable)

University of Canterbury

Q6 Position title (if applicable)	**Respondent skipped this question**
Q7 Important information about your submission (important to read)The information provided in submissions will be used to inform the Ministry of Business, Innovation and Employment's (MBIE's) work on Accelerating renewable energy and energy efficiency.We will upload the submissions we receive and publish them on our website. If your submission contains any sensitive information that you do not want published, please indicate this in your submission.The Privacy Act 1993 applies to submissions. Any personal information you supply to MBIE in the course of making a submission will only be known by the team working on the Accelerating renewable energy and energy efficiency.Submissions may be requested under the Official Information Act 1982. Submissions provided in confidence can usually be withheld. MBIE will consult with submitters when responding to requests under the Official Information Act 1982.We intend to upload submissions to our website at www.mbie.govt.nz. Can we include your submission on the website?	**Yes**

Q8 Can we include your name?	**Yes**
Q9 Can we include your organisation (if submitting on behalf of an organisation)?	**Yes**
Q10 All other personal information will not be proactively released, although it may need to be released if required under the Official Information Act. Please indicate if there is any other information you would like withheld.	**Respondent skipped this question**

Page 2

Q11 Where are you located?	**Respondent skipped this question**
Q12 In what region or regions does your organisation mostly operate?	**Canterbury / Waitaha**

Page 3: Areas you wish to provide feedback on

Q13 Part A relates to process heat.Please indicate which sections, if any, you would like to provide feedback on.	**Respondent skipped this question**
Q14 Part B relates to renewable electricity generation. Please indicate which sections, if any, you would like to provide feedback on.	**Section 7: Enabling renewables uptake under the Resource Management Act 1991** **,** **Section 8: Supporting renewable electricity generation investment** **,** **Section 9: Facilitating local and community engagement in renewable energy and energy efficiency** **,** **Section 10: Connecting to the national grid,** **Section 11: Local network connections and trading arrangements**

Page 4: Section 1: Addressing information failures

Q15 Option 1.1 would require large energy users to report their emissions and energy use annually, publish Corporate Energy Transitions Plans and conduct energy audits every four years.Do you support this option?	**Respondent skipped this question**

Q16 Please explain your answer	**Respondent skipped this question**
Q17 Which parts (set out in Table 3) do you support?	**Respondent skipped this question**
Q18 Please explain your answer	**Respondent skipped this question**
Q19 What public reporting requirements (listed in Table 3) should be disclosed?	**Respondent skipped this question**
Q20 In your view, should businesses be expected to include transport energy and emissions in these reporting requirements?	**Respondent skipped this question**
Q21 For manufacturers: what will be the impact on your business to comply with the requirements?	**Respondent skipped this question**
Q22 Option 1.1. Suggests that requirements to publish Corporate Energy Transition Plans should apply to large energy users, and propses defining large energy users as those with an annual energy spend (purchased) of greater than $2 million per annum.Do you agree with this definition?	**Respondent skipped this question**
Q23 If you selected no, please describe what in your view would be an appropriate threshold to define ‘large energy users’.	**Respondent skipped this question**
Q24 Is there any potential for unnecessary duplication under these proposals and the disclosures proposed in the MBIE-Ministry for the Environment discussion document Climate-related Financial Disclosures – Understanding your business risks and opportunities related to climate change, October 2019?	**Respondent skipped this question**

Page 5: Section 1 - Option 1.2: Electrification information package and feasibility studies

Q25 Do you support the proposal to develop an electrification information package?	**Respondent skipped this question**
Q26 Would an electrification information package be of use to your business?	**Respondent skipped this question**
Q27 Do you support customised low-emission heating feasibility studies?	**Respondent skipped this question**
Q28 In your view, which of the components should be scaled up and/or prioritised?	**Respondent skipped this question**

Q29 Would a customised low-emission heating feasibility study be of use to your business?	**Respondent skipped this question**
Q30 Please describe any components other than those identified that could be included in an information package.	**Respondent skipped this question**

Page 6: Section 1 - Option 1.3: Provide benchmarking information for food processing industries

Q31 Do you support benchmarking in the food processing sector?	**Respondent skipped this question**
Q32 Would benchmarking be suited to, and useful for, other industries, such as wood processing?	**Respondent skipped this question**
Q33 Do you believe government should have a role in facilitating this or should it entirely be led by industry?	**Respondent skipped this question**
Q34 Please explain your answer	**Respondent skipped this question**

Page 7: Section 2: Developing markets for bioenergy and direct geothermal use

Q35 Do you agree that some councils have regional air quality rules that are barriers to wood energy?	**Respondent skipped this question**
Q36 Please provide examples of regional air quality rules that you see as barriers to wood energy. Please also note which council's plan you are referring to.	**Respondent skipped this question**
Q37 Do you agree that a National Environmental Standards for Air Quality (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?	**Respondent skipped this question**
Q38 What do you consider a NESAQ users' guide should cover? Please provide an explanation if possible.	**Respondent skipped this question**
Q39 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.	**Respondent skipped this question**

Q40 In your opinion, what technical rules relating to wood energy would be better addressed through the NESAQ than through the proposed users' guide (option 2.1)?	**Respondent skipped this question**

Page 8: Section 2 - continued: Developing markets for bioenergy and direct geothermal use

Q41 In your view, could the Industry Transformation Plans stimulate sufficient supply and demand for bioenergy to achieve desired outcomes?	**Respondent skipped this question**
Q42 What other options are worth considering?	**Respondent skipped this question**
Q43 Is Government best placed to provide market facilitation in bioenergy markets?	**Respondent skipped this question**
Q44 How could Government best facilitate bioenergy markets?Please be as specific as possible, giving examples.	**Respondent skipped this question**
Q45 In your view, how can government best support direct use of geothermal heat?	**Respondent skipped this question**
Q46 What other options are worth considering?	**Respondent skipped this question**

Page 9: Section 3: Innovating and building capability

Q47 Do you agree that de-risking commercially viable low-emission technology should be a focus of government support on process heat?	**Respondent skipped this question**
Q48 Do you agree that diffusing commercially viable low-emission technology should be a focus of government support on process heat?	**Respondent skipped this question**
Q49 Is Energy Efficiency and Conservation Authority (EECA) grant funding to support technology diffusion the best vehicle for this?	**Respondent skipped this question**
Q50 For manufacturers and energy service experts: would peer learning and lead to reducing perceived technology risks?	**Respondent skipped this question**
Q51 For manufacturers and energy service experts: would on-site technology demonstration visits lead to reducing perceived technology risks?	**Respondent skipped this question**

Q52 Is there a role for the Government in facilitating this?

Respondent skipped this question

Page 10: Section 3 (continued): Innovating and building capability

Q53 For emissions-intensive and highly integrated (EIHI) stakeholders: What are your views on our proposal to collaborate to develop low-carbon roadmaps?

Respondent skipped this question

Q54 Would low-carbon roadmaps assist in identifying feasible technological pathways for decarbonisation?

Respondent skipped this question

Q55 What are the most important issues that would benefit from a partnership and co-design approach?

Respondent skipped this question

Q56 What, in your view, is the scale of resourcing required to make this initiative successful?

Respondent skipped this question

Page 11: Section 4: Phasing out fossil fuels in process heat

Q57 Do you agree with the proposal to ban new coal-fired boilers for low and medium temperature requirements?

Respondent skipped this question

Q58 Do you agree with the proposal to require existing coal-fired process heat equipment for end-use temperature requirements below 100 degrees Celsius to be phased out by 2030?

Respondent skipped this question

Q59 Referring to Question 56 - is this ambitious or is it not doing enough?

Respondent skipped this question

Q60 For manufacturers: what would be the likely impacts or compliance costs on your business of a ban on new coal-fired process heat equipment?

Respondent skipped this question

Q61 For manufacturers: what would be the likely impacts or compliance costs on your business of requiring existing coal-fired process heat equipment supplying end-use temperature requirements below 100°C to be phased out by 2030.

Respondent skipped this question

Q62 Could the Corporate Energy Transition Plans (Option 1.1) help to design a more informed phase out of fossil fuels in process heat?

Respondent skipped this question

Q63 Would a timetabled phase out of fossil fuels in process heat be necessary alongside the Corporate Energy Transition Plans?	**Respondent skipped this question**
Q64 In your view, could national direction under the Resource Management Act (RMA) be an effective tool to support clean and low greenhouse gas-emitting methods of industrial production?	**Respondent skipped this question**
Q65 If yes, how?	**Respondent skipped this question**
Q66 In your view, could adoption of best available technologies be introduced via a mechanism other than the RMA?	**Respondent skipped this question**

Page 12: Section 5: Boosting investment in energy efficiency and renewable energy technologies

Q67 Do you agree that complementary measures to the New Zealand Emissions Trading Scheme (NZ-ETS) should be considered to accelerate the uptake of cost-effective clean energy projects?	**Respondent skipped this question**
Q68 Would you favour regulation, financial incentives or both?	**Respondent skipped this question**
Q69 In your view what is a bigger barrier to investment in clean energy technologies, internal competition for capital or access to capital?	**Respondent skipped this question**
Q70 If you favour financial support, what sort of incentives could be considered?	**Respondent skipped this question**
Q71 What are the benefits of these incentives?	**Respondent skipped this question**
Q72 What are the risks of these incentives?	**Respondent skipped this question**
Q73 What are the costs of these incentives?	**Respondent skipped this question**
Q74 What measures other than those identified above could be effective at accelerating investment in clean energy technologies?	**Respondent skipped this question**

Page 13: Section 6: Cost recovery mechanisms

Q75 What is your view on whether cost recovery mechanisms should be adopted to fund policy proposals in Part A of the Accelerating renewable energy and energy efficiency discussion document?

Respondent skipped this question

Q76 What are the advantages of introducing a levy on consumers of coal to fund process heat activities?

Respondent skipped this question

Q77 What are the disadvantages of introducing a levy on consumers of coal to fund process heat activities?

Respondent skipped this question

Page 14: Section 7: Enabling development of renewable energy under the Resource Management Act 1991

Q78 Do you agree that the current NPSREG gives sufficient weight and direction to the importance of renewable energy?

Respondent skipped this question

Q79 What changes to the NPSREG would facilitate future development of renewable energy?

A NOTE ON CHOICE OF RENEWABLE ELECTRICITY GENERATION TO ACCELERATE
The ICCC's analysis cited in the discussion document shows that electricity demand could increase by about 11.2 terawatt-hours (TWh) by 2035 if we focus on accelerating the electrification of transport and process heat, as well as encouraging energy efficiency improvements and battery and demand response uptake. To reach the energy-related emissions reductions estimated in the ICCC's analysis, at least 5,500 megawatts (MW) of new generation would need to be built by 2035.
This implies the use of a capacity factor of 0.23. If this includes only wind (capacity factor of about 0.3) and solar (capacity factor of 0.2), then this is a reasonable factor. However, geothermal plants lead in the capacity factor for renewable energy at a factor of 0.7. Thus, if all the required extra energy was to be provided by developing only geothermal resources, only about 1800 MW of new geothermal capacity would be required instead of the 5,500 MW estimated in the ICCC analysis. The 5,500 MW, if mostly implemented by wind or solar, would substantially impact the NZ landscape. On the other hand, the 1800 MW of geothermal generation would be baseload and not create problems and costs associated with the intermittency of wind and solar renewables. The NZ Geothermal Association states that the total geothermal resource amounts to 3600 MW of generation, using only existing technology. Almost 1,000 MW is currently installed, so existing development represents about 30 % of the total high temperature resource, and 2600 MW of new generation can be developed.
Global renewable power generation costs for 2018 are published by IRENA (see https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/May/IRENA_Renewable-Power-Generations-Costs-in-2018.pdf?la=en&hash=99683CDDBC40A729A5F51C20DA7B6C297F794C5D). This shows globally, that onshore wind (0.056 USD/kWh) is cheaper than geothermal (0.072 USD/kWh). The costs and impacts of both forms of generation in the NZ environment need to be carefully weighed, but commercial decisions made appear to be creating a useful mix of both.

Q80 What policies could be introduced or amended to provide sufficient direction to councils regarding the matters listed in points a-i mentioned on pages 60-61 of the discussion document?

Respondent skipped this question

Q81 How should the NPSREG address the balancing of local environmental effects and the national benefits of renewable energy development in RMA decisions?

Respondent skipped this question

Q82 What are your views on the interaction and relative priority of the NPSREG with other existing or pending national direction instruments?

Respondent skipped this question

Q83 Do you have any suggestions for how changes to the NPSREG could help achieve the right balance between renewable energy development and environmental outcomes?

Respondent skipped this question

Q84 What objectives or policies could be included in the NPSREG regarding councils' role in locating and planning strategically for renewable energy resources?

Respondent skipped this question

Q85 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?

Respondent skipped this question

Q86 Can any specific policies be included in a national policy statement to address these barriers?

Respondent skipped this question

Q87 What specific policies could be included in the NPSREG for small-scale renewable energy projects?

Respondent skipped this question

Q88 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?

Amswer to Q7.9 - "Small and community-scale renewable electricity generation activities" where there is connection to the distribution network are distributed generating activities and could be defined following the Electricity Industry Code 2010 Part 1 definition for distributed generation, but with the words in italics added to the definition:
Renewable distributed generation means generating plant having a source of renewable energy that is connected, or that a distributed generator proposes to connect, to a distribution network or to a consumer installation that is connected to a distribution network, …
In Part 6 of the Electricity Industry Participation Code 2010 (Code), the Electricity Authority (EA) describes the regulatory processes for connecting distributed generation to a local network, defining a threshold capacity of 10 kW or less for Schedule 6.1 Part 1A and Part 1 applications. For distributed generation greater than 10 kW, the Schedule 6.1 Part 2 application process applies. The EA has also published guidelines describing the framework and process for connecting distributed generation above and below this threshold. In the Guideline for distributed generation above 10 kW, it refers to distributed generation with a capacity of 10 kW or less as small-scale (see https://www.ea.govt.nz/dmsdocument/24761-guidelines-for-connection-of-dg-greater-than-10kw). To be consistent with the regulator, it would make sense to describe renewable distributed generation of 10 kW or less as small-scale, and this would typically cover the capacity of a single domestic generator. Clearly, a community scale scheme will be larger than this, and the capacity could vary greatly. An upper threshold of 10 MW could be used, in line with the US Department of Energy's article (http://www.nrel.gov/docs/fy02osti/31570.pdf) which describes distributed energy resources (DERs) as typically producing less than 10 MW of power. DERs are described as energy generation and storage technologies.

Q89 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?

Respondent skipped this question

Q90 Are there any downsides or risks to amending the NPSREG?

Respondent skipped this question

Page 15: Section 7 - continued

Q91 Do you agree that National Environmental Standards (NES) would be an effective and appropriate tool to accelerate the development of new renewables and streamline re-consenting?

Respondent skipped this question

Q92 What are the pros of using National Environmental Standards as a tool to accelerate the development of new renewables and streamline re-consenting?

Respondent skipped this question

Q93 What are the cons of using National Environmental Standards as a tool to accelerate the development of new renewables and streamline re-consenting?

Respondent skipped this question

Q94 What do you see as the relative merits and priorities of changes to the NPSREG compared with work on NES?

Respondent skipped this question

Q95 What are the downsides and risks to developing NES?

Respondent skipped this question

Q96 What renewables activities (including both REG activities and other types of renewable energy) would best be suited to NES?

Respondent skipped this question

Q97 What technical issues could best be dealt with under a standardised national approach?

Respondent skipped this question

Q98 Would it be practical for NES to set different types of activity status for activities with certain effects, for consenting or re-consenting?

Respondent skipped this question

Q99 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? Please provide details.

Respondent skipped this question

Q100 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?

If a National Environmental Standard for Renewable Energy Facilities and Activities (NESREFA) is necessary, and if inclusion of standards for shadow flicker from wind turbines is really necessary, might it be better to include shadow flicker in an enlarged version of NZS 6808:2010 Acoustics – Wind farm noise?

Q101 Compared to the NPSREG or National Environment Standards, would National Planning Standards or any other RMA tools be more suitable for providing councils with national direction on renewables ?	**Respondent skipped this question**
Q102 Please explain your answer	**Respondent skipped this question**

Page 16: Section 7 - continued

Q103 Are there opportunities for non-statutory spatial planning techniques to help identify suitable areas for renewables development (or no go areas)?	**Respondent skipped this question**
Q104 Do you have any comments on potential options for pre-approval of renewable developments?	**Respondent skipped this question**
Q105 Are the current National Policy Statement on Electricity Transmission (NPSET) and National Environmental Standards for Electricity Transmission Activities (NESETA) fit-for-purpose to enable accelerated development of renewable energy?	**Respondent skipped this question**
Q106 What changes (if any) would you suggest for the NPSET and NESETA to accelerate the development of renewable energy?	**Respondent skipped this question**
Q107 Can you suggest any other options (statutory or non-statutory) that would help accelerate the future development of renewable energy?	**Respondent skipped this question**

Page 17: Section 8: Supporting renewable electricity generation investment

Q108 Do you agree there is a role for government to provide information, facilitate match-making and/or assume some financial risk for PPAs?	**Respondent skipped this question**
Q109 Would support for PPAs effectively encourage electrification?	**Respondent skipped this question**
Q110 Would support for PPAs effectively encourage new renewable generation investment?	**Respondent skipped this question**
Q111 How could any potential mismatch between generation and demand profiles be managed by the Platform and/or counterparties?	**Respondent skipped this question**

Q112 Please rank the following variations on PPA Platforms in order of preference.1 = most preferred, 4 = least preferred.	**Respondent skipped this question**
Q113 What are your views on Contract Matching Services?	**Respondent skipped this question**
Q114 What are your views on State sector-led PPAs?	**Respondent skipped this question**
Q115 What are your views on Government guaranteed contracts?	**Respondent skipped this question**
Q116 What are your views on a Clearing house for PPAs?	**Respondent skipped this question**
Q117 For manufacturers: what delivered electricity price do you require to electrify some or all of your process heat requirements?	**Respondent skipped this question**
Q118 For manufacturers: is a long-term electricity contract an attractive proposition if it delivers more affordable electricity?	**Respondent skipped this question**
Q119 For investors / developers: what contract length and price do you require to make a return on an investment in new renewable electricity generation capacity?	**Respondent skipped this question**
Q120 For investors / developers: is a long-term electricity contract an attractive proposition if it delivers a predictable stream of revenues and a reasonable return on investment?	**Respondent skipped this question**

Page 18: Section 8 - continued

Q121 Do you consider the development of the demand response (DR) market to be a priority for the energy sector?	**Yes,** Please explain your answer: There is scope to further develop the DR market, but note that DR is already widely utilized in many forms across NZ as, for example, described in: https://www.canterbury.ac.nz/media/documents/epecentre/UC-GG-14-C-RS-01_EEA_Systems-to-Implement-Demand-Response-in-NZ_RStrahan_18-20-June-2015_CS1.2.8.pdf
Q122 Do you think that demand response (DR) could help to manage existing or potential electricity sector issues?	**Respondent skipped this question**

Q123 What are the key features of demand response markets?

Respondent skipped this question

Q124 Which features of a demand response market would enable load reduction or asset use optimisation across the energy system?

Respondent skipped this question

Q125 Which features of a demand response market would enable the uptake of distributed energy resources?

Respondent skipped this question

Q126 What types of demand response services should be enabled as a priority?

As is mentioned in the paper cited under Q8.7, ripple control to shed household hot water heating load has been used for many decades in New Zealand to very successfully improve the utilization of generation, transmission, and distribution assets. Transpower charges distribution companies for the use of the national grid by including a Regional Coincident Peak Demand (RCPD) charge. There are two regions in each island. All regions price on the top 100 RCPD peaks. A distribution company may respond by using ripple control to minimize their portion of their region's charge. However, in order to fully minimize the RCPD charge and to more fully enable deferred transmission and distribution investments and contain peak wholesale prices, ripple control co-ordination between the distributors within a RCPD region is required.
The Transmission pricing methodology is currently under review. As regional load management is a potentially large demand side resource, the question arises as to whether or not this would ultimately benefit consumers if it was pursued in the future across NZ?

Q127 Which services make sense for New Zealand?

Respondent skipped this question

Page 19: Section 8 - continued

Q128 Would energy efficiency obligations effectively deliver increased investment in energy efficient technologies across the economy?

Respondent skipped this question

Q129 Is there an alternative policy option that could deliver on this aim more effectively?

Respondent skipped this question

Q130 If progressed, what types of energy efficiency measures and technologies should be considered in order to meet retailer/distributor obligations?

Respondent skipped this question

Q131 Should these be targeted at certain consumer groups?

Respondent skipped this question

Q132 Do you support the proposal to require electricity retailers and/or distributors to meet energy efficiency targets?

Respondent skipped this question

Q133 Which entities would most effectively achieve energy savings?

Respondent skipped this question

Q134 What are the likely compliance costs of this policy?

Respondent skipped this question

Page 20: Section 8 - continued

Q135 Do you agree that the development of an offshore wind market should be a priority for the energy sector?

Disagree

Q136 What do you perceive to be the major benefits to developing offshore wind assets in New Zealand?

Respondent skipped this question

Q137 What do you perceive to be the major costs to developing offshore wind assets in New Zealand?

There is considerable consented but unbuilt onshore wind resource available, which could be built at a lower cost than off-shore wind.

Q138 What do you perceive to be the major risks to developing offshore wind assets in New Zealand?

Respondent skipped this question

Page 21: Section 8 - continued

Q139 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?

No

Q140 Could the proposed policy option be re-designed to better achieve our goals?

Yes (please specify):
As stated on page 86, the ICCC's modelling assumes that thermal baseload power plants will retire or convert to peaking plant by 2035 under a business-as-usual (BAU) scenario without intervention. The BAU scenario reaches 93 per cent renewables. Given that even the BAU scenario reaches 93% renewable, a scheme such as Renewable Portfolio Standards should not be necessary as nearly all electricity will become renewable.

Q141 Should the Government introduce Renewable Portfolio Standards (RPS) requirements?

Respondent skipped this question

Q142 At what level should a RPS quota be set to incentivise additional renewable electricity generation investment?

Respondent skipped this question

Q143 Should RPS requirements apply to all electricity retailers?

Respondent skipped this question

Q144 Should RPS requirements apply to all major electricity users?	**Respondent skipped this question**
Q145 What would be an appropriate threshold for the inclusion of major electricity users (i.e. annual consumption above a certain GWh threshold)?	**Respondent skipped this question**
Q146 Would a government backed certification scheme support your corporate strategy and export credentials?	**Respondent skipped this question**
Q147 What types of renewable projects should be eligible for renewable electricity certificates?	**Respondent skipped this question**
Q148 If this policy option is progressed, should electricity retailers be permitted to invest in energy efficient technology investments to meet their renewable portfolio standards? (See option 8.3 on energy efficiency obligations).	**Respondent skipped this question**
Q149 If this policy option is progressed, should major electricity users be permitted to invest in energy efficient technology investments to meet their renewable portfolio standards? (See option 8.3 on energy efficiency obligations).	**Respondent skipped this question**
Q150 What are the likely administrative and compliance costs of this policy for your organisation?	**Respondent skipped this question**

Page 22: Section 8 - continued

Q151 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?	**Respondent skipped this question**
Q152 Could this policy option be re-designed to better achieve our goals?	**Respondent skipped this question**
Q153 Do you support the managed phase down of baseload thermal electricity generation?	**Respondent skipped this question**
Q154 Would a strategic reserve mechanism adequately address supply security, and reduce emissions affordably, during a transition to higher levels of renewable electricity generation?	**Respondent skipped this question**
Q155 Under what market conditions should thermal baseload held in a strategic reserve be used?	**Respondent skipped this question**

Q156 Would you support requiring thermal baseload assets to operate as peaking plants or during dry winters?

Respondent skipped this question

Q157 What is the best way to meet resource adequacy needs as we transition away from fossil-fuelled electricity generation and towards a system dominated by renewables?

Respondent skipped this question

Page 23: Section 8 - continued

Q158 Do you have any views regarding the options to encourage renewable electricity generation investment that we considered, but are not proposing to investigate further? (See pages 90 - 92 of the Accelerating renewable energy and energy efficiency discussion document).

Respondent skipped this question

Page 24: Section 9: Facilitating local and community engagement in renewable energy and energy efficiency

Q159 Should New Zealand be encouraging greater development of community energy projects?

Yes

Q160 What types of community energy project are most relevant in the New Zealand context?

The discussion document does not make a convincing economic case for this. However, for communities that do wish to develop energy projects, the failed Blueskin Energy wind turbine Environmental Court application suggests that the RMA can be a substantial impediment. EA work programme initiatives such as Open Networks should hopefully assist community projects.

Q161 What are the key benefits of a focus on community energy?

Respondent skipped this question

Q162 What are the key downsides or risks of a focus on community energy?

Respondent skipped this question

Q163 Have we accurately identified the barriers to community energy proposals?

Respondent skipped this question

Q164 Which barriers do you consider most significant? You may select more than one answer.

Respondent skipped this question

Q165 Are the barriers noted above in relation to electricity market arrangements adequately covered by the scope of existing work across the Electricity Authority and electricity distributors?

Respondent skipped this question

Q166 What do you see as the pros of a clear government position on community energy?	**Respondent skipped this question**
Q167 What do you see as the cons of a clear government position on community energy?	**Respondent skipped this question**
Q168 What do you see as the pros of government support for pilot community energy projects?	**Respondent skipped this question**
Q169 What do you see as the cons of government support for pilot community energy projects?	**Respondent skipped this question**
Q170 Are there any other options you can suggest that would support further development of community energy initiatives?	**Respondent skipped this question**

Page 25: Section 10: Connecting to the national grid

Q171 Please select the option or combination of options, if any, that would be most likely to address the first mover disadvantage.	Other (please specify): A question needs to be addressed first: is a significant first mover disadvantage problem likely in the future? Can this be quantified? With an Emissions Trading Scheme priced correctly, market forces should facilitate efficient selection of new transmission & generation signalled via wholesale electricity prices.
Q172 What do you see as the disadvantages or risks of Option 10.1?	**Respondent skipped this question**
Q173 What do you see as the disadvantages or risks of Option 10.2?	**Respondent skipped this question**
Q174 What do you see as the disadvantages or risks of Option 10.3.1?	**Respondent skipped this question**
Q175 What do you see as the disadvantages or risks of Option 10.3.2?	**Respondent skipped this question**
Q176 Would introducing a requirement, or new charge, for subsequent customers to contribute to costs already incurred by the first mover create any perverse incentives?	**Respondent skipped this question**
Q177 Are there any additional options that should be considered?	**Respondent skipped this question**

Page 26: Section 10 (continued): Connecting to the national grid

Q178 Do you think that there is a role for government to provide more independent public data?	**Yes,** Why or why not?: From a generation perspective, this may depend on whether there is already enough consented renewable generation approaching, for example, the ICCC's 2035 target of 5,500 MW. The EA generation update for September 2019 https://emidatasets.blob.core.windows.net/publicdata/Datasets/Wholesale/Generation/Generation_fleet/Proposed/20190924_Proposed_generating_plant_update.pdf shows that there is 3,456 MW of renewable generation under various consent, on hold, or under construction categories. This excludes confidential information supplied by generators.
Q179 Is there a role for Government to provide independent geospatial data (e.g. wind speeds for sites) to assist with information gaps?	**Respondent skipped this question**
Q180 Should MBIE's Electricity Demand and Generation Scenarios (EDGS) be updated more frequently?	**Respondent skipped this question**
Q181 If you said yes, how frequently should they be updated?	**Respondent skipped this question**
Q182 Should MBIE's EDGS provide more detail, for example, information at a regional level?	**Respondent skipped this question**
Q183 Should the costs to the Crown of preparing EDGS be recovered from Transpower, and therefore all electricity consumers (rather than tax-payers)?	**Respondent skipped this question**
Q184 Would you find a users' guide (on current regulation and approval process for getting an upgraded or new connection) helpful?	**No,** Please add a comment: No. This is regarding the proposal to produce a user's guide on the current regulations and approval processes relating to getting an upgraded or new connection to the grid. Transmission information should already be available from Transpower. Entities requiring transmission and grid connection are likely to have sufficient resources to not need such a guide. For distribution connections, sufficient information should be available from the local distributor.
Q185 What information would you like to see in such a guide?	**Respondent skipped this question**
Q186 Who would be best placed to produce a guide?	**Respondent skipped this question**

Page 27: Section 10 (continued): Connecting to the national grid

Q187 Do you think that there is a role for government in improving information sharing between parties to enable more coordinated investment?	**Respondent skipped this question**
Q188 Is there value in the provision of a database (and/or map) of potential renewable generation and new demand, including location and potential size?	**Respondent skipped this question**
Q189 If so, who would be best to develop and maintain this?	**Respondent skipped this question**
Q190 How should it be funded?	**Respondent skipped this question**
Q191 Should measures be introduced to enable coordination regarding the placement of new wind farms?	**Respondent skipped this question**
Q192 Are there other information sharing options that could help address investment coordination issues? What are they?	**Respondent skipped this question**

Page 28: Section 11: Local network connections and trading arrangements

Q193 Have you experienced, or are you aware of, significant barriers to connecting to the local networks? Please describe them.	**Respondent skipped this question**
Q194 Are there any barriers that will not be addressed by current work programmes outlined on pages 118 - 122 of the discussion document?	**Respondent skipped this question**
Q195 Should the option to produce a users' guide (see Option 10.6 on page 110) also include the process for getting an upgraded or new distribution line?	**Yes,** Please add a comment: This could be useful, but maybe not unless procedures are standardized across the 29 distributors.
Q196 Are there other Section 10 information options that could be extended to include information about local networks and distributed generation?	**Respondent skipped this question**

Q197 Do the work programmes outlined on pages 118 - 122 cover all issues to ensure the settings for connecting to and trading on the local network are fit for purpose into the future?

No,

Please explain your answer.:

The work programmes outlined address important issues. With regard to the technical and regulatory aspects of connecting distributed generation to local networks, the Electricity Engineers' Association (EEA) has been active in developing a guideline for the connection of small-scale distributed generation (see https://www.eea.co.nz/tools/products/details.aspx?SECT=publications&ITEM=2917) This Guide has been written for distributors with the aim of providing a standardized and stream-lined process for assessing connection applications. It outlines technical requirements, standardized inverter settings suitable for NZ conditions, and provides a process for assessing network congestion. This enables the distributor to determine in a stream-lined manner, what technical capabilities the inverter requires in order to approve a connection application. The Electricity (Safety) Regulations 2010 (ESRs) govern electrical safety. These have a significant impact on the electricity industry and consumers. They refer to many standards directly and indirectly, both international and local, that must be complied with. Specific versions of standards are referred to. In many cases, the versions of the standards referred to are not the latest versions. This impedes the adoption of the latest technologies and practices. One such example is the latest inverter standard AS/NZS 4777.2 (2015) described in the EEA guide above. The ESRs currently refer to an earlier version of this standard, which may mean that the installation of the latest inverter technology certified to this new standard is illegal in domestic installations. We understand that MBIE is in the process of updating its references to standards in the ESRs. However, this has been slow, and will not solve the problem of standards referenced becoming outdated again following the review. We recommend that government allow automatic referral in the ESRs to the latest version of a cited standard – however this would require MBIE to trust the various (Australasian) standards committees with regard to safety requirements.

Q198 Are there things that should be prioritised, or sped up?

Respondent skipped this question

Q199 What changes, if any, to the current arrangements would ensure distribution networks are fit for purpose into the future?

Respondent skipped this question

Page 29: Additional comments

Q200 Do you have any additional feedback?

Respondent skipped this question

Q201 You may upload additional feedback as a file.File size limit is 16MB. We accept PDF or DOC/DOCX.

UC-EPEC-20-R-RS-01_Submission_to_MBIE-discussion-document-accelerating-renewable-energy-and-energy-efficiency.pdf (750.8KB)

MBIE DISCUSSION DOCUMENT ACCELERATING RENEWABLE ENERGY AND ENERGY EFFICIENCY

Submission – Electric Power Engineering Centre (EPECentre), University of Canterbury

SECTION 7: ENABLING DEVELOPMENT OF RENEWABLE ENERGY UNDER THE RESOURCE MANAGEMENT ACT 1991

A NOTE ON CHOICE OF RENEWABLE ELECTRICITY GENERATION TO ACCELERATE

The ICCC's analysis cited in the discussion document shows that electricity demand could increase by about 11.2 terawatt-hours (TWh) by 2035 if we focus on accelerating the electrification of transport and process heat, as well as encouraging energy efficiency improvements and battery and demand response uptake. To reach the energy-related emissions reductions estimated in the ICCC's analysis, at least 5,500 megawatts (MW) of new generation would need to be built by 2035.

This implies the use of a capacity factor of 0.23. If this includes only wind (capacity factor of about 0.3) and solar (capacity factor of 0.2), then this is a reasonable factor. However, geothermal plants lead in the capacity factor for renewable energy at a factor of 0.7. Thus, if all the required extra energy was to be provided by developing only geothermal resources, only about 1800 MW of new geothermal capacity would be required instead of the 5,500 MW estimated in the ICCC analysis. The 5,500 MW, if mostly implemented by wind or solar, would substantially impact the NZ landscape. On the other hand, the 1800 MW of geothermal generation would be baseload and not create problems and costs associated with the intermittency of wind and solar renewables. The NZ Geothermal Association states that the total geothermal resource amounts to 3600 MW of generation, using only existing technology. Almost 1,000 MW is currently installed, so existing development represents about 30 % of the total high temperature resource, and 2600 MW of new generation can be developed.

Global renewable power generation costs for 2018 are published by IRENA (see https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/May/IRENA_Renewable-Power-Generations-Costs-in-2018.pdf?la=en&hash=99683CDDBC40A729A5F51C20DA7B6C297F794C5D). This shows globally, that onshore wind (0.056 USD/kWh) is cheaper than geothermal (0.072 USD/kWh). The costs and impacts of both forms of generation in the NZ environment need to be carefully weighed, but commercial decisions made appear to be creating a useful mix of both.

Q7.9

THE NPSREG (NATIONAL POLICY STATEMENT FOR RENEWABLE ELECTRICITY GENERATION 2011) 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?

"Small and community-scale renewable electricity generation activities" where there is connection to the distribution network are distributed generating activities and could be defined following the Electricity Industry Code 2010 Part 1 definition for distributed generation, but with the words in italics added to the definition:

> *Renewable* distributed generation means generating plant *having a source of renewable energy* that is connected, or that a distributed generator proposes to connect, to a distribution network or to a consumer installation that is connected to a distribution network, …

In Part 6 of the Electricity Industry Participation Code 2010 (Code), the Electricity Authority (EA) describes the regulatory processes for connecting distributed generation to a local network, defining a threshold capacity of 10 kW or less for Schedule 6.1 Part 1A and Part 1 applications. For distributed generation greater than 10 kW, the Schedule 6.1 Part 2 application process applies. The EA has also published guidelines describing the framework and process for connecting distributed generation above and below this threshold. In the Guideline for distributed generation above 10 kW, it refers to distributed generation with a capacity of 10 kW or less as *small-scale* (see https://www.ea.govt.nz/dmsdocument/24761-guidelines-for-connection-of-dg-greater-than-10kw). To be consistent with the regulator, it would make sense to describe renewable distributed generation of 10 kW or less as small-scale, and this would typically cover the capacity of a single domestic generator. Clearly, a community scale scheme will be larger than this, and the capacity could vary greatly. An upper threshold of 10 MW could be used, in line with the US Department of Energy's article (http://www.nrel.gov/docs/fy02osti/31570.pdf) which describes distributed energy resources (DERs) as typically producing less than 10 MW of power. DERs are described as energy generation and storage technologies.

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?

If a National Environmental Standard for Renewable Energy Facilities and Activities (NESREFA) is necessary, and if inclusion of standards for shadow flicker from wind turbines is really necessary, might it be better to include shadow flicker in an enlarged version of NZS 6808:2010 Acoustics – Wind farm noise?

SECTION 8: SUPPORTING RENEWABLE ELECTRICITY GENERATION INVESTMENT

Q8.7

DO YOU CONSIDER THE DEVELOPMENT OF THE DEMAND RESPONSE (DR) MARKET TO BE A PRIORITY FOR THE ENERGY SECTOR?

There is scope to further develop the DR market, but note that DR is already widely utilized in many forms across NZ as, for example, described in:

https://www.canterbury.ac.nz/media/documents/epecentre/UC-GG-14-C-RS-01_EEA_Systems-to-Implement-Demand-Response-in-NZ_RStrahan_18-20-June-2015_CS1.2.8.pdf

Q8.10

WHAT TYPES OF DEMAND RESPONSE SERVICES SHOULD BE ENABLED AS A PRIORITY? WHICH SERVICES MAKE SENSE FOR NEW ZEALAND?

As is mentioned in the paper cited under Q8.7, ripple control to shed household hot water heating load has been used for many decades in New Zealand to very successfully improve the utilization of generation, transmission, and distribution assets. Transpower charges distribution companies for the use of the national grid by including a Regional Coincident Peak Demand (RCPD) charge. There are two regions in each island. All regions price on the top 100 RCPD peaks. A distribution company may respond by using ripple control to minimize their portion of their region's charge. However, in order to fully minimize the RCPD charge and to more fully enable deferred transmission and distribution investments and contain peak wholesale prices, ripple control co-ordination between the distributors within a RCPD region is required.

The Transmission pricing methodology is currently under review. As regional load management is a potentially large demand side resource, the question arises as to whether or not this would ultimately benefit consumers if it was pursued in the future across NZ?

Q8.15

DO YOU CONSIDER THE DEVELOPMENT OF AN OFFSHORE WIND MARKET TO BE A PRIORITY FOR THE ENERGY SECTOR?

No. There is considerable consented but unbuilt onshore wind resource available, which could be built at a lower cost than off-shore wind.

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?

As stated on page 86, the ICCC's modelling assumes that thermal baseload power plants will retire or convert to peaking plant by 2035 under a business-as-usual (BAU) scenario without intervention. The BAU scenario reaches 93 per cent renewables.

Given that even the BAU scenario reaches 93% renewable, a scheme such as Renewable Portfolio Standards should not be necessary as nearly all electricity will become renewable.

SECTION 9: FACILITATING LOCAL AND COMMUNITY ENGAGEMENT IN RENEWABLE ENERGY AND ENERGY EFFICIENCY

Q9.1 SHOULD NEW ZEALAND BE ENCOURAGING GREATER DEVELOPMENT OF COMMUNITY ENERGY PROJECTS?

The discussion document does not make a convincing economic case for this. However, for communities that do wish to develop energy projects, the failed Blueskin Energy wind turbine Environmental Court application suggests that the RMA can be a substantial impediment. EA work programme initiatives such as Open Networks should hopefully assist community 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?

A question needs to be addressed first: is a significant first mover disadvantage problem likely in the future? Can this be quantified? With an Emissions Trading Scheme priced correctly, market forces should facilitate efficient selection of new transmission & generation signalled via wholesale electricity prices.

Q10.5 DO YOU THINK THAT THERE IS A ROLE FOR GOVERNMENT TO PROVIDE MORE INDEPENDENT PUBLIC DATA? WHY OR WHY NOT?

From a generation perspective, this may depend on whether there is already enough consented renewable generation approaching, for example, the ICCC's 2035 target of 5,500 MW. The EA generation update for September 2019
https://emidatasets.blob.core.windows.net/publicdata/Datasets/Wholesale/Generation/Generation_fleet/Proposed/20190924_Proposed_generating_plant_update.pdf

shows that there is 3,456 MW of renewable generation under various consent, on hold, or under construction categories. This excludes confidential information supplied by generators.

Q10.10 WOULD YOU FIND A USERS' GUIDE HELPFUL? WHAT INFORMATION WOULD YOU LIKE TO SEE IN SUCH A GUIDE? WHO WOULD BE BEST PLACED TO PRODUCE A GUIDE?

No. This is regarding the proposal to produce a user's guide on the current regulations and approval processes relating to getting an upgraded or new connection to the grid. Transmission information should already be available from Transpower. Entities requiring transmission and grid connection are likely to have sufficient resources to not need such a guide. For distribution connections, sufficient information should be available from the local distributor.

SECTION 11: LOCAL NETWORK CONNECTIONS AND TRADING ARRANGEMENTS

Q11.2

SHOULD THE SECTION 10 OPTION TO PRODUCE A USERS' GUIDE EXTEND TO THE PROCESS FOR GETTING AN UPGRADED OR NEW DISTRIBUTION LINE?

This could be useful, but maybe not unless procedures are standardized across the 29 distributors.

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?

The work programmes outlined address important issues. With regard to the technical and regulatory aspects of connecting distributed generation to local networks, the Electricity Engineers' Association (EEA) has been active in developing a guideline for the connection of small-scale distributed generation (see https://www.eea.co.nz/tools/products/details.aspx?SECT=publications&ITEM=2917)

This Guide has been written for distributors with the aim of providing a standardized and stream-lined process for assessing connection applications. It outlines technical requirements, standardized inverter settings suitable for NZ conditions, and provides a process for assessing network congestion. This enables the distributor to determine in a stream-lined manner, what technical capabilities the inverter requires in order to approve a connection application.

The Electricity (Safety) Regulations 2010 (ESRs) govern electrical safety. These have a significant impact on the electricity industry and consumers. They refer to many standards directly and indirectly, both international and local, that must be complied with. Specific versions of standards are referred to. In many cases, the versions of the standards referred to are not the latest versions. This impedes the adoption of the latest technologies and practices. One such example is the latest inverter standard AS/NZS 4777.2 (2015) described in the EEA guide above. The ESRs currently refer to an earlier version of this standard, which may mean that the installation of the latest inverter technology certified to this new standard is illegal in domestic installations. We understand that MBIE is in the process of updating its references to standards in the ESRs. However, this has been slow, and will not solve the problem of standards referenced becoming outdated again following the review. We recommend that government allow automatic referral in the ESRs to the latest version of a cited standard – however this would require MBIE to trust the various (Australasian) standards committees with regard to safety requirements.