

## Submission to pricing review

October 2018

Key points:

- Major change coming to power system. Solar and batteries are now cost effective and will revolutionise the power sector.
- The economy will be electrified in terms of transport and industrial heat. Demand could increase by 50-100%.
- Solar and batteries provide benefits to the grid and distribution network by reducing peak load.
- The traditional approach of centralised generation and new grid/distribution infrastructure to meet this demand will be expensive – potentially \$5b for the national grid and possibly similar or more investment at the distribution level.
- A more cost-effective future will be decentralised generation; solar, batteries and distributed wind generation.
- The government needs to play an active role to guide the electricity industry to this new future. The industry is inherently conservative and is unlikely to embrace a new de-centralised future willingly.
- All government agencies need to align around the change to a low carbon economy and look at synergies between different government initiatives and the power sector, particularly transport and housing as sectors that use significant amounts of energy.

## Introduction

As identified in the Pricing Review Report, residential prices have risen by around 80% since 1990 and risen faster than most OECD countries since 2000, while commercial and industrial prices have declined. This residential price increase has caused real hardship to some sectors of society.

Major change is coming to the electricity sector driven by technology forces that are unstoppable. Policy in the electricity sector will determine whether these changes are fair and equitable or whether the changes increase the economic disparities. Further, policy will determine whether the new technology is used to best advantage or whether New Zealand creates costly stranded assets if the power sector fails to embrace and support this new technology.

The government needs to become active in electricity sector policy to help drive the sector to a low-carbon and cost effective future. This role is quite different to the aim of government since the 1990s which has been to increase efficiency in the sector.

## Solar and batteries

Globally some 40,000 solar panels are installed every hour of every day. Solar is now the largest form of new generation being installed globally. In 2018 it is predicted that some 100GW of solar generation will be installed around the world.

Battery production is increasing exponentially. A significant growth area is behind the meter storage as part of solar-battery systems.

Solar and batteries will introduce the first major change to the power system since it began some 100 years ago. The one-way power flow that has dominated the electricity is now changing and will change rapidly.

Substantial efficiencies can be created by the smart deployment of solar and batteries:

- Solar is generated on-site meaning that less power needs to be transmitted over large distances, reducing load on power systems.
- Batteries can shift load. With batteries the debate about “peak shaving” becomes a debate about “trough filling”.

The way solar and batteries can change household grid demand is shown in the figure below. The graphs show that a standard house on the Kapiti Coast can almost eliminate the power it uses from the grid during the day and only uses the power at night to charge the battery.



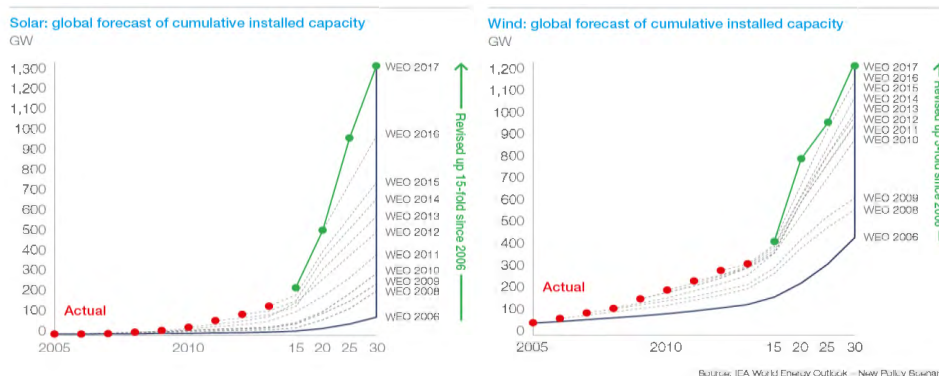
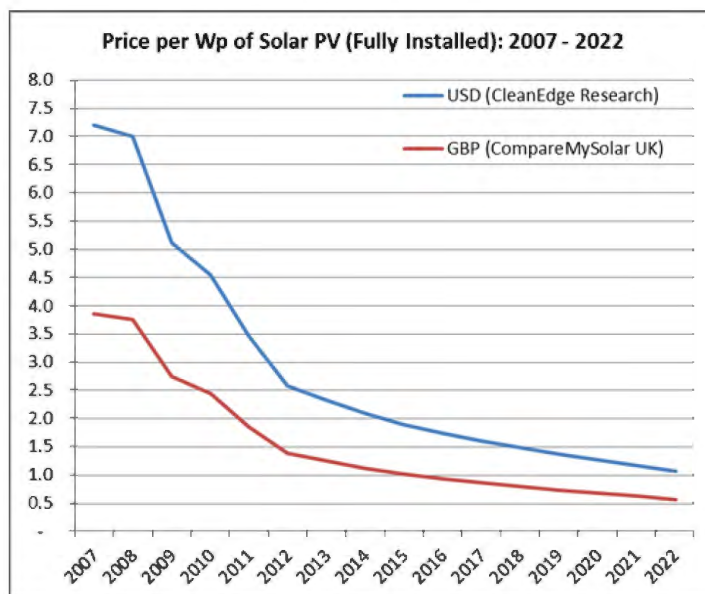
The battery charges from the grid in the early hours of the morning when energy and lines costs are low. The battery discharges to support load in the home from 7am (the start of local lines company peak pricing period) through to 11am. During the day solar generation works with the battery to support loads with any excess solar generation stored in the battery. The battery discharges to support load from 5pm for the rest of the evening.

Other than early morning battery charging and the heating of a secondary hot water cylinder between 6am and 7am (when lines and energy prices are cheap) there is very little energy required from the grid. During the lines company peaks of 7am to 11 am and 5pm to 9pm the house is predominantly running off the battery.

Data captured in 15 minute intervals

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Solar and batteries are cost-effective in the New Zealand power system now. Analysts predict that prices are set to decrease significantly over coming years as shown in the figure below. Generally analysts have under-estimated the growth in solar and batteries by more than an order of magnitude.



## Efficiently meeting increasing electricity demand – non wire solutions

The efficiencies in the power system that solar and batteries make possible are urgently needed, because electrification of the economy (e.g. transport, industrial heat) will result in electricity demand increasing by 50-100%<sup>1</sup>. Reports prepared for the Productivity Commission suggest that a massive amount of new investment in the grid and potentially distribution networks will be needed to meet this increased demand<sup>2</sup>.

There is a better way. Solar, batteries and distributed wind can increase the efficiency of the power sector substantially. With effective policy we believe that the growth in electricity demand can be met with existing grid and distribution infrastructure, saving the country billions of dollars.

<sup>1</sup> <https://www.transpower.co.nz/resources/te-mauri-hiko-energy-futures>

<sup>2</sup> <https://www.productivity.govt.nz/inquiry-content/3254?stage=4>

The current grid is built to meet a peak demand of around 6GW. If demand was flattened at 6GW that equates to an annual demand of around 52,000GWh, more than thirty percent the current electricity demand.

If New Zealand installed solar and batteries on 50,000 houses/businesses per year for the next 20 years, peak demand can be kept at current levels and no new upgrades of electricity would be required to meet peak demand.

For example:

- Let's assume that electricity demand doubles over the next 20-30 years as a consequence of electrification of transport. Peak demand is currently around 6 GW and could increase to 12 GW under the status quo electricity sector policy approach of building more transmission and distribution to meet demand.
- 50,000 solar systems at 4kW per system is 0.16% of the amount of solar panels that will be installed globally in 2018, or 12% of the amount of solar installed in Australia in 2017. 50,000/yr is clearly an achievable number of solar installations.
- 1,000,000 batteries (installed at the rate of 50,000/year over 20 years) would provide a peak capacity of around 5GW, assuming a 5kW inverter.
- Shifting load ("filling the trough") would reduce peak demand by around 30%; 2GW.
- Batteries and load shifting could result in a reduction in peak load (12GW-5GW-2GW = 5GW < 6GW), even as electricity demand doubles.

Under the status quo some \$5b could be invested in the national grid. Figures are not available for the cost of upgrading the distribution network. The Transpower network is valued at \$5b<sup>3</sup> and the distribution network assets at \$11b<sup>4</sup>. Conceivably, the cost of upgrading distribution networks could be \$5b, possibly more assuming there is a relationship between the capacity of the national grid and the capacity of distribution assets.

It is much more cost effective to use batteries and load shifting in a non-wire solutions approach than it is to double the capacity of the national grid and distribution networks:

- The investment needed to double grid and network capacity is around \$10+b.
- 1,000,000 batteries will cost around \$5b today, i.e. half that cost. With costs of batteries falling, the cost over 20-30 years could be one quarter of the cost of grid upgrades.

### **Government policy to drive efficient outcomes**

The government took the lead in bringing electricity to every part of New Zealand in the 20<sup>th</sup> century. Once the transmission and generation system was built the government focused on ensuring efficient management of the power system, through for example, development of the wholesale electricity market.

Transpower is predicting that demand for electricity could double between now and 2050 – thirty years. More generation in New Zealand will need to be built in the next 30 years than was built in the last 100.

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<sup>3</sup> <https://www.beehive.govt.nz/sites/default/files/2017-12/Transpower.pdf>

<sup>4</sup> Electricity Networks Chief Executive email to solarcity 17/10/2018

The government needs to become involved in the electricity sector and guide it towards an efficient, 100% renewable future. Without effective government oversight there is a real chance that poor investment decisions will be made resulting in stranded assets. Electricity prices will rise further and social inequities will worsen.

The government needs to strongly encourage the deployment of batteries and distributed generation, i.e. generation near to where the electricity is used. Policies to encourage the deployment of batteries and distributed generation include:

- Require lines companies to adopt time of use pricing and retailers to have a time of use option for customers.
- Reduce daily charges so that the consumers see their main costs as kWh charges and the time of use pricing.
- Ensure that lines companies do not put in place barriers to solar and batteries such as taxes.

### **Low user charge**

We note the report “Initial Analysis of Retail Billing Data” published on 15 October. The report states (P21): *“Overall, the analysis reinforces the observation from earlier studies that the low fixed charge regulations are not very effective at helping less well-off households”*. Yet the data in this report clearly indicate that the low user charge is effective in terms of reducing power costs of low income households. It is disappointing that the report has chosen to ignore the data it presents and continues the industry attack on the low user charge.

The report goes on to suggest that one of the main issues with the low user charge is that it creates more confusion on top of a confusing system. This line of argument is simply a disingenuous attempt to discredit the low user charge. The low user charge is one the simplest mechanisms in the electricity system.

Simply put, this report is yet another poorly veiled attempt to attack the low user charge. The data clearly show that the low user charge is an effective way of encouraging greater energy efficiency, which was one of its policy goals. Far from getting rid of the low user charge, the low user charge should be applied to all users, i.e. there should be no “higher” usage charge. The EA’s Retail Advisory Group reviewed the low user charge and that work is relevant to this report<sup>5</sup>.

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<sup>5</sup> <https://www.ea.govt.nz/dmsdocument/22611-work-plan-update>



# **ELECTRICITY PRICE REVIEW**

**SUBMISSION FORM**

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**SOLARCITY**

## How to have your say

We are seeking submissions from the public and industry on our first report into the state of the electricity sector. The report contains a series of questions, which are listed in this form in the order in which they appear. You are free to answer some or all of them.

Where possible, please include evidence (such as facts, figures or relevant examples) to support your views. Please be sure to focus on the question asked and keep each answer short. There are also boxes for you to summarise your key points on Parts three, four and five of the report – we will use these when publishing a summary of responses. There are also boxes to briefly set out potential solutions to issues and concerns raised in the report, and one box at the end for you to include additional information not covered by the other questions.

We would prefer if you completed this form electronically. (The answer boxes will expand as you write.) You can print the form and write your responses. (In that case, expand the boxes before printing. If you still run out of room, continue your responses on an attached piece of paper, but be sure to label it so we know which question it relates to.)

We may contact you if we need to clarify any aspect of your submission.

Email your submission to [energymarkets@mbie.govt.nz](mailto:energymarkets@mbie.govt.nz) or post it to:

Electricity Price Review

Secretariat, Ministry of Business, Innovation and Employment

15 Stout Street

PO Box 1473

Wellington 6140

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## **Use of information**

We will use your feedback to help us prepare a report to the Government. This second report will recommend improvements to the structure and conduct of the sector, including to the regulatory framework.

We will publish all submissions in PDF form on the website of the Ministry of Business, Innovation and Employment (MBIE), except any material you identify as confidential or that we consider may be defamatory. By making a submission, we consider you have agreed to publication of your submission unless you clearly specify otherwise.

## **Release of information**

Please indicate on the front of your submission whether it contains confidential information and mark the text accordingly. If your submission includes confidential information, please send us a separate public version of the submission.

Please be aware that all information in submissions is subject to the Official Information Act 1982. If we receive an official information request to release confidential parts of a submission, we will contact the submitter when responding to the request.

## **Private information**

The Privacy Act 1993 establishes certain principles regarding the collection, use and disclosure of information about individuals by various agencies, including MBIE. Any personal information in your submission will be used solely to help develop policy advice for this review. Please clearly indicate in your submission whether you want your name to be excluded from any summary of submissions we may publish.

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## Summary of questions

### Part three: Consumers and prices

#### Consumer interests

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

We agree with the assessment, for example, consumers are becoming more concerned about climate change.

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

The evidence is clear; 79% increase in electricity prices since 1990 and highest increases in the OECD since 2000. Consumers have not had an effective voice in the electricity sector.

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

The evidence provided in the report that New Zealanders generally trust the power companies and trust is much higher than Australia is questionable. First, in terms of international comparisons were the surveys comparable? Secondly, Consumer NZ, which undertook the survey, has become embedded in the power system that has seen power prices for households rise by nearly 80%. Consumer NZ's independence and advocacy on part of the consumer needs to be questioned; it is too closely connected to the power system.

#### Prices

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

It is clear that households have lost out and the large power companies have made big profits. At 5c/kWh the cost of retail appears an overly large proportion of costs to households.

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

New Zealand's electricity prices for households have risen faster than nearly every other OECD country.

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

Solar and wind are now the most cost effective form of generation internationally. The key to future prices lies to how transmission and distribution is handled moving forward. A significant build of transmission and distribution networks could result in further increases in power prices.

### **Affordability**

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

For some families affordability is clearly an issue. The paper accurately identifies the scale and seriousness of the issue.

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

As above, the report clearly identifies the affordability issue.

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

Solar coupled with batteries reduces peak demand and therefore improves affordability for everyone.

### **Summary of feedback on Part three**

10. *Please summarise your key points on Part three.*

### **Solutions to issues and concerns raised in Part three**

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

## Part four: Industry

### Generation

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

It is possible that the New Zealand electricity system is too small and has too many constraints to have a fully functioning wholesale market.

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

Not relevant to the solarcity's products and services.

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

The wholesale market price will tend towards zero as renewable generation (which has low marginal cost) tends to 100%. In many other jurisdictions PPA are an important part of the electricity system but do not seem to be a strong part of New Zealand's electricity system. The reason why PPA are not a significant feature of the NZ market needs to be investigated.

### Retailing

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

The system is confusing and it is hard to understand which power company offers the best deal. The nearly 80% increase in electricity prices for households since 1990 suggests that the retail sector has performed poorly.

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

The barriers appear significant.

### Vertical integration

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

Not directly relevant to solarcity.

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

Work by Dr Steven Poletti Auckland University would appear to challenge the findings of the Pricing Review Report:

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

## Transmission

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

The TPM process has been running for some years and the Pricing Review Report says there is no end in sight. The TPM debacle indicates that the electricity system is fundamentally broken.

## Distribution

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

Not directly relevant to solarcity.

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

Time of use pricing is critical for encouraging an efficient distribution and technologies such as solar and batteries that can improve efficiency in the distribution network.

Size of distribution company is not linked to innovation. What is critical is governance.

Free and open access to data is simply good practice.

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

Distribution costs need to be fairly and accurately attributed. Then the role of technologies such as batteries and solar for remote communities (for example) can be properly assessed and compared.

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

The report correctly identifies that distributed energy resources are set to massively increase. The report also identifies the main thinking internationally that distributed system operators will play an important role in managing power flows across networks.

Lines companies will need encouragement to look at new solutions, such as non-wire solutions. The question is what form that encouragement will take. The Commerce Commission should require lines companies to look closely at non-wire alternatives and only build new capacity when all other options have been thoroughly investigated. There is a real risk of building capacity in the next few years that becomes “stranded” as solar and batteries are deployed in large numbers across the network.

## Summary of feedback on Part four

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

The distribution network is going to be a key area of focus as distributed energy resources (DER) are deployed in increasing numbers, because DER will be embedded in networks. Lines companies will need an increased level of sophistication to realise the benefits that DER can offer in terms of reduced need for investment, greater benefits for consumers (e.g. increased resilience), a more efficient power system and reduced costs for consumers.

## Solutions to issues and concerns raised in Part four

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

The government has a key role:

- Supporting innovation at the distribution level (MBIE/EECA lead).
- Ensuring that DER are encouraged, not discouraged (MBIE/EA/ComCom)
- Ensuring that investment strategies maximise the value that DER can deliver to the distribution system (ComCom).

## Part five: Technology and regulation

### Technology

26 *What are your views on the assessment of the impact of technology on consumers and the electricity industry?*

The paper generally accurately captures the main points relating to DER.

27. *What are your views on the assessment of the impact of technology on pricing mechanisms and the fairness of prices?*

Time of use pricing is critical. Daily charges should be reduced to a minimum. These two initiatives will provide incentives to consumers to change their power usage patterns. In particular it will provide incentives for the uptake of solar and batteries which are now cost-competitive in the New Zealand market.

Solar and batteries will reduce household peak use and demand on the grid in general. These two aspects mean that solar and batteries create benefits for other households connected to the grid by reducing peak demand.

28 *What are your views on how emerging technology will affect security of supply, resilience and prices?*

The paper's summary is correct. New technologies such as solar and batteries will rapidly grow and they provide significant benefits to New Zealanders. These benefits include, a more cost effective, reliable and resilient power system.

### Regulation

29 *What are your views on the assessment of the place of environmental sustainability and fairness in the regulatory system?*

We agree with the paper's view that there needs to be a joined up approach to electricity sector management across government agencies. As part of this joined up approach addressing climate change should be part of all the agencies' mandates.

30 *What are your views on the assessment of low fixed charge tariff regulations?*

The low user charge should stay and its upper limit increased. Coupled with this initiative should be time of use pricing. A low daily charge coupled with time of use pricing provides an incentive to use electricity in the most efficient way.

The issue of energy poverty should be dealt with separately. The low fixed tariff has been confused with a way of addressing energy poverty. A key part of its design is to encourage energy conservation.

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



We agree that the access to distribution networks is an area of overlap/underlap between the Commerce Commission and the Electricity Authority. Access is a key issue for distributed energy resources and we would welcome further investigations in this area.

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

The pace of progress on some regulatory issues is glacial. Other electricity systems, such as PJM, seem to be able to move much more quickly than the EA. As new technology starts to become widespread it is inevitable that issues will be found with the code etc. A far more nimble approach is needed by both ComCom and the EA, how they work together, and how they work with Transpower. It is not clear whether the slow speed is due to the governing rules of the organisations or the culture.

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

Consumer groups have not been well represented on the EA. Mechanisms need to be looked at to get genuine representatives of the community involved in the governance of the EA. Compared to PJM, as an example, this lack of genuine consumer representation on the governance of the EA is to be a major gap.