

Chairman: Warren McNabb, warren.mcnabb@altimarloch.com
Secretary: David Inch, david@nzenergy.co.nz

28 March 2019

David Prentice
Chair
Interim Climate Change Committee
c/- Ministry for the Environment
P O Box 10362
Wellington 6143

By email:

Dear David,

Re: 100% renewables target

The Independent Electricity Generators Association Incorporated (IEGA) commends the Interim Climate Change Committee (ICCC) for holding workshops with the electricity sector in mid-February to share preliminary modelling of the electricity sector moving to using only renewable fuel.

The IEGA agrees with the ICCC approach to analyse how the electricity system can help reduce greenhouse gas emissions, including by assuming ambitious electrification of transport and process heat.

Belatedly, we would like to contribute the following to your analysis¹, noting that the IEGA did not attend the 14 March cross-sector forum when updated modelling of the electricity sector was probably presented. We assume the Committee's report to the Minister for Climate Change will include recommendations about regulatory interventions to achieve the most economically efficient level of renewable electricity or reduction in emissions using renewable electricity.

Forecast distributed generation capacity

The preliminary modelling assumes ~7% of connections install rooftop solar – that is, a focus on distributed generation behind a meter which is consumer owned.

There did not appear to be any assumptions about an increase in small commercial scale independently owned generation connected to distribution networks.

The benefits of distributed generation are it:

¹ The Steering Committee has signed off this submission on behalf of members

- already provides 10% of New Zealand electricity by output (including utility-owned distributed generation) which is equivalent to over twice the output of the Huntly power station
- introduces competition resulting in lower regional electricity prices for consumers as well as enabling new retailers to enter the market with Power Purchase Agreements
- assists with security of supply. Many of IEGA members' distributed generation plant supplied their local regional networks prior to the grid being built so have a proven track record of reliable supply as they are designed to run islanded from the grid in an emergency loss of transmission. Recently one of our member's distributed generation plant provided emergency power to Grafton hospital when Vector lost power
- avoids or defers distribution network and transmission investment
- is a price taker and therefore has no impact on wholesale spot prices as new capacity is introduced
- is complementary to consumer load management, These network connected services have been incentivised to flatten more than 20% of the New Zealand electricity system's peak demand.

As well as contributing to New Zealand's renewable energy target, distributed generation also improves New Zealand's energy productivity. Energy productivity includes the cost of producing and delivering electricity. Distributed generation can be built at an LRMC equivalent to grid connected generation. Distributed generation is usually located closer to electricity users than grid connected generation and uses only the local network to deliver electricity to users. Grid connected generation (by definition) uses the transmission grid and the local network to deliver electricity. Transporting electricity results in lost energy (due to resistance). Recent data shows 1,239GWhs (3.2% of total electricity injected) was lost while travelling over the transmission grid; 1,670GWh (6%) was lost while travelling over distribution networks.² This is equivalent to the output of the Huntly power station.

There are numerous investment opportunities for small commercial renewable distributed generation given a stable and predictable regulatory environment. IEGA members have options for new renewable generating capacity connected to local networks that are economic, have a smaller environmental footprint than grid-connected generation and provide an incremental increase in supply more aligned to growth in demand.

Forecast wholesale electricity prices

The preliminary modelling indicated the wholesale electricity price is likely to be below the LRMC of new generation for extended periods of time during 'normal' operating conditions (reflecting the low short-run marginal cost of renewable generating plant).

Workshop participants talked about the importance / criticality of the contract market to support new generation investment - that is, the ability to sign longer dated contracts at prices that reflect the LRMC of new generation. The IEGA is concerned that vertically integrated gentailers have instant access to their own 'contract' with their retail operations to support new investment. The ability of independent generators (with no retail) to secure long dated contracts for their output and to underpin new capacity investment may continue to be difficult.

² Top Energy took into account the economic value of lost energy (~6% in their case) when deciding to invest in distributed generation compared with investing in 110kV lines. Top Energy application for an exemption <http://www.ea.govt.nz/dmsdocument/21586>

The IEGA suggests a contract market that is a level playing field for all generators is essential to encourage / enable the substantial increase in new renewable generation capacity that is forecast to be needed. A successful contract market also enables participants to reduce their exposure to volatile spot prices.

Price volatility

The preliminary modelling also indicated increased price volatility with a shortage of renewable fuel relative to demand in each year to 2035. Demand response was assumed to be part of the solution – an additional 400MW available at \$2,000 to \$7,000 /MWh.

Consideration should be given to the design of New Zealand’s energy only market as the proportion of renewable generation increases.

The IEGA suggests the creation of a separate market for capacity or reserves that is contracted to be available during periods of high prices reflecting limited renewable fuel supply. The cost of this capacity should be less than the life cost of capital of investing in having excess utility scale wind capacity (at ~40% capacity factor) to cover the 15% variability in hydro inflows (and 7% variability in wind flows). (The preliminary modelling indicated ‘spill’ of wind of 30% at 1005 renewable.)

Participants in this market could be demand response, distributed generation, co-generation etc. These sources of capacity are all distributed throughout New Zealand, closer to load (with significantly lower losses) and on the right side of any constraints.

The structure of the electricity market must recognise the need for this reserve capacity to be economic (for example, by paying an availability fee as well as payments for units of energy).

Social licence for utility scale generation

The preliminary modelling assumed significant quantities of new utility scale generation capacity could be built, implying this investment would be supported by the public.

The IEGA suggested in its submission to the Electricity Price Review first discussion paper that It would be interesting to understand consumers’ perceptions of the ‘social licence’ to operate for small commercial scale DG relative to utility scale generation plant. We suggested the Electricity Price Review Panel or Ministry of Business, Innovation and Employment commission a study to evaluate the public’s preferences in relation to the scale of future renewable power schemes. This could identify the social cost of utility scale versus incremental smaller regional generation capacity and assist with identifying and addressing barriers to new generation investment.

IEGA members’ renewable distributed generation is embedded in the local network and is part of the local community. Some plant are owned by the community. Environmental concerns as well as some sense of control over investment outcomes appear to be a high priority for consumers – and renewable distributed generation investment addresses these concerns.

Growth in distributed generation, or the current catch phrase 'distributed energy resources', is a major focus overseas. These distributed systems involve local communities and consumer investment and predominately use renewable fuel. As a group the IEGA has practical experience in being a 'distributed energy source' and can contribute to the discussion about New Zealand's future energy sources.

Concluding comments

This is an exciting time for the energy sector. IEGA members are innovative, entrepreneurial and passionate about New Zealand's renewable advantage and potential. They have a portfolio of new economic renewable generation projects consented or under investigation which can meet growth in local demand.

In summary, our key messages are:

- Distributed generation is already playing an important role in NZ's renewable electricity system in competition with transmission and distribution infrastructure and providing numerous local benefits.
- There is a need for considerable capacity investment in the medium term. IEGA members have options for new generating capacity connected to local networks that are economic, have a smaller environmental footprint than grid-connected generation and provide an incremental increase in supply more aligned to growth in demand.
The IEGA suggests officials commission a study to evaluate the public's preferences in relation to the scale of future renewable power schemes. This could identify the social cost of utility scale versus incremental smaller regional generation capacity and assist with identifying and addressing barriers to new generation investment.
- Regulatory costs and interventions should be proportionate to the scale of investment. The IEGA's experience is that there are numerous barriers for new commercial scale independently owned distributed generation (between 0.5MW and 30MW), namely:
 - costs imposed by government agencies: for example, the cost of consenting or re-consenting a 0.5MW renewable hydro generating plant was ~\$0.5 million; concessions to access to Department of Conservation resources; ongoing monitoring and compliance costs
 - Electricity Authority rules and 'market' related costs: complicated rules that are designed by and for utility scale gentailers which are becoming more complex as the Authority plans to impose a 'market' framework on emerging technologies and 'consumer engagement'
 - financing is difficult given the above barriers and regulatory change. Debt funding is more limited for independent 'SME' investors.
- A level playing field in the contract market is critical to support new renewable generation investment. Independent generators do not have the advantage of an internal transfer price between generation and retail activities that vertically integrated gentailers enjoy.
- Consideration should be given to the design of New Zealand's energy only market as the proportion of renewable generation increases. A separate capacity or reserves market could

be designed to reduce the volatility in spot prices expected as the market is more exposed to hydro and wind variability.

A background on the IEGA is attached as an Appendix. The IEGA would welcome the opportunity to discuss this letter with you in more detail.

Yours sincerely

A handwritten signature in black ink, appearing to read "Warren McNabb". The signature is written in a cursive, flowing style.

Warren McNabb
Chair

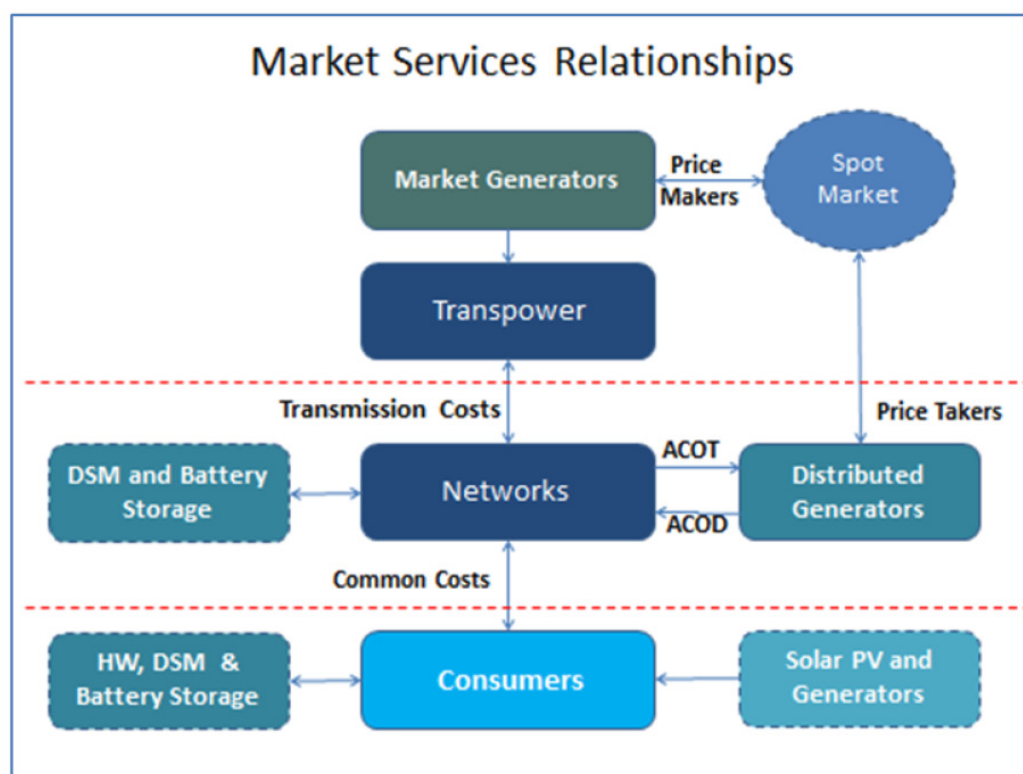
Appendix: Background on the IEGA

The IEGA comprises approximately 30 members who are either directly or indirectly associated with predominately small scale power schemes throughout New Zealand for the purpose of commercial electricity production.

Our members have made significant economic investments in generation plant throughout New Zealand that is embedded within local distribution networks. Our members are proud to contribute to achievement of New Zealand's 90% renewable electricity target with 95% of our electricity generated from renewable fuel compared with ~83% for the entire sector³. Combining the capacity of member's plant makes the IEGA the sixth largest generator in New Zealand and the combined portfolio benefits of this group to the energy market are material.

IEGA members are small, entrepreneurial businesses, essentially the SME's of the electricity generation sector, providing significant benefits to the regions in which we operate. Members are mostly not vertically integrated with retail. IEGA members' that do not bid their generation output into the wholesale spot market are therefore price-takers. This investment has to be as efficient as utility owned investment in order to be able to make an appropriate rate of return.

IEGA members own distributed generating plants that export electricity in to their local network and for the most part do not utilise transmission services but effectively compete with transmission services to deliver electricity to end users. The services provided by our sector assets differ from market generators and from consumer-owned DG predominately for own use, and the regulatory approach should be commensurately different. The following diagram demonstrates the relationship of distributed generation to other participants.



³ Source: http://www.emi.ea.govt.nz/Datasets/Wholesale/Generation/Generation_fleet/Existing