HIRINGA

The energy to change. Together.

ELECTRICITY AUTHORITY

UPDATING THE REGULATORY SETTINGS FOR DISTRIBUTION NETWORKS

IMPROVING COMPETITION AND SUPPORTING A LOW EMISSIONS ECONOMY

HIRINGA ENERGY SUBMISSION

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Context of Hiringa Energy and Responses

Hiringa Energy is a vertically integrated green hydrogen company, dedicated to the production and supply of green hydrogen and providing hydrogen solutions for industry, the public sector, and transport operators.

Hiringa's main source of green hydrogen will be produced by consuming renewable electricity and water through Hiringa's electrolysers, a process called electrolysis.

Hiringa is deploying 10 MWs of electrolyser capacity across the North Island and building 24MWs of distribution connected wind generation in 2022. The green hydrogen produced from these assets will be used to decarbonise heavy transport fleets and urea production.

Under Hiringa's base case scenario, we will be operating 100 MW of distributed electrolyser capacity across New Zealand by 2025.

Electrolysers are extremely responsive and can be ramped up and down within 1 second, this is a key feature that contributes to a global conclusion that green hydrogen will play a key role in accelerating the deployment of renewable generation and decarbonising sectors such as heavy transport and industrial chemicals.

Hiringa will operate their electrolysers in a way the minimises the delivered cost of electricity while meeting health and safety requirements and contractual offtake obligations. This will include load following of renewable generation, avoidance of running during times of higher electricity prices and minimising lines charges.

Electrolysers are already being used for demand response to support reliability of electricity systems and efficient investment in non-network solutions in other countries, however New Zealand's transmission pricing methodologies, network distribution charges and connection agreements do not support or value electrolysers demand-side response and flexibility to integrate with, store and export intermittent renewable electricity and avoid inefficient investment in networks.

Response to consultation questions

Q.1 Have you experienced issues relating to a lack of information or uneven access to information?
Yes, Hiringa is currently installing electrolysers and hydrogen storage assets across multiple distribution networks. These assets can provide a range of flexibility services and non-network solutions. Hiringa requires information such as available capacity, potential congestion, estimated CAPEX for upgrades, indicative pricing, flexibility services available and long-term price certainty. Often this information is only available on request and can come at a significant cost. It can require our business spending a material amounts of time and money to conduct studies and acquire the relevant information at the feasibility stage of a project. Many projects will not have these funds available until after a final investment decision, as such this information may not be complete during the feasibility/assess phase which can prevent a project from considering or offering flexibility services.

Flexibility services will often be an afterthought rather than a key revenue stream for projects, this results in missed opportunities to utilise flexibility service

Distributors have a greater access to information so project developers with flexible assets such as Hiringa are often in a very weak position to negotiate with distributors or flexibility traders for flexibility services.

Q.2 What information do you need to make more informed investment and operation decisions?

- Congestion data
- CAPEX upgrade costs
- Value of flexibility (currently zero other than avoiding peak periods, most peak periods are retrospective)
- Future planned network upgrades or decommissioning
- Planned large connections or disconnections
- Areas of future anticipated demand
- Stranded generation assets or constrained generation areas

Q.3 What options do you think should be considered to help improve access to information?

This is a significant issue preventing the full benefit of DERs to be realised, the EA should not spend time on interim solutions and instead set the market up for a future where DERs are ubiquitous.

The following solutions should be considered:

- Shared data through API
- Central meter data store information including at distribution feeder level.

Q.4 Have networks experienced issues from the connection or operation of DER?

Not applicable

Q.5 Do the Electrical (Safety) Regulations require review? If so, what changes do you think are needed (a) in the near term and (b) in the longer term?

Electricity (Safety) Regulations themselves do not pose many constraints for the green hydrogen industry. However, the importation of international hydrogen production packages to international standards versus bespoke New Zealand design has a significant impact on the cost and business case associated with green hydrogen particularly in its infancy.

In general, these packages are built to European standards which is generally acceptable and then confirmed to Part 1 of ASNZS3000 via a certified design process. For hydrogen systems specifically, Clause 60 of the Electricity (Safety) Regulations 2010 states that an installation of part installation in a hazardous area: AS/NZS 60079:14 must comply to part 2 of ASNZS3000. This creates some confusion when referring to the switch room of an electrolyser package which may have some ELV circuits that enter a Hazardous Area and can be a barrier to certification, even though the individual circuit itself may be compliant to part 2.

Q.6 Does Part 6 remain fit for purpose? If not, what changes do you think are needed (a) in the near term and (b) in the longer term?
Whilst Part 6 allows for connection agreements to be established with reasonable ease, the interaction with retailers, or lack thereof, can create some commercial issues and confusion. In particular for larger distributed generators that wish to be a market participant and not use a retailer to sell their power. This needs to be addressed.
Q.7 Is there a case to be made for minimum mandatory equipment standards for DER equipment, specifically inverter connected DER?
Not applicable
Q.8 What standards should be considered to help address reliability and connectivity issues?
Standards regarding controlling network interactive appliances is a key area that needs to be considered in the short term. In the hydrogen generation space, the electrolyser can play a key role in demand response and time shifting the electrification of transport and process heat to align with network demand. There are currently no clear guidelines on how these network interactive appliances are controlled or interact with the distributor. Standards and guidelines should look to take advantage of Internet of Things (IoT) technologies, or similar, rather than rely on historical control measures that require significant infrastructure and cost. Whilst an IoT network may not have the reliability and redundancy of traditional systems, the ease of connection to appliances of all sizes could allow for significant portfolios of appliances to be connected. These could range from consumer appliances to large scale hydrogen facilities of which the benefit to the network would be significant, even at a reduced control reliability. Control could be established via simple APIs from the distributors. These standards should also explore guidelines, standards and incentives, for appliances to self-monitor network frequency and interact in such a way to reduce load but not create large steps when frequencies return within a prescribed range. Education in the domestic market can also go a long way to reduce peak demand. Whilst most domestic consumers do not get any financial benefit for deferring loads during the peak, an education program and a sense of social responsibility can start to drive behavior change. Take for example the association with nonrenewable energy to the peak periods of demand. Society is more likely to avoid unnecessary load during the peak periods if they knew it was contributing to nonrenewable generation, and therefore carbon emission, and there was social pressure around this.
Q.9 Is there a case to look at connection and operation standards under Part 6 with a view to mandating aspects of these standards?
Hiringa is installing hydrogen production and refueling equipment across New Zealand and connecting to different distribution companies. Every distribution company has different requirements to connect, each with different lead times and costs. These lead times and costs are very difficult to ascertain during project financing and site screening as distribution companies typically only engage when a connection request is generated, which requires details of sites to be

confirmed. They also all require a retailer to be assigned to initiate these discussions which begins to become an inefficient use of third partiy time. T

his process needs to be streamlined via standards simplifying the process to get initial screening information.

Q.10 What flexibility services are you pursuing?

Hiringa Energy will operate their electrolysers in a way that minimises the delivered cost of electricity, as electricity is the main fuel cost for hydrogen production.

This can be realized through several tools such as turning off during peak periods to avoid high spot prices and lines charges, through to creating additional revenue streams such as participating in flexibility markets and providing ancillary services.

Hiringa has incorporated sufficient hydrogen storage solutions such that our electrolyser demand can be interrupted daily for multiple hours if required.

Hiringa intends to become a flexibility trader.

Q.11 Are flexibility services being pursued through a competitive process?

No. Hiringa has engaged with multiple networks and made clear our ability and intention to provide flexibility services at our electrolyser locations.

Initially most distributors are interested in the idea of these services however once it comes time to enter a connection agreement there is no appetite to treat our flexible assets any different to standard consumers. All distributors to date have defaulted to standard pricing terms, standard agreements and network upgrade solutions rather than non-network solutions. We have also not been advised to speak to existing flexibility traders to facilitate these services.

As distributors have uneven access to information it is difficult to negotiate beyond the standard pricing and agreements.

Hiringa was not aware of the case studies referred to in Box 1: Case studies of flexibility services.

A number of distributors currently push any flexibility services ‘behind the meter’ for an asset owner to realise the value of a flexible assets. This means the flexibility asset owner must look for customers with spare capacity (a higher maximum annual demand than their usual operating demand), then negotiate with that consumer to embed the flexible asset behind the meter and manage loads together to maximize the capacity being paid for. This is limiting the potential use of flexible assets and gives the network operator little control or visibility, resulting in inefficient and less reliable outcomes for all.

Q.12 What options should be considered to incentivise non-network solutions?

In Hiringa’s experience, distributors are aware of flexibility solutions, however there is little appetite or

incentive for the distributors to implement non-network solutions over network/CAPEX heavy solutions.

This adds to the current evidence that this is a 'medium to significant' issue, as such the following solutions should be considered.

- Fund trials
- Distributors required to prove that they have fully explored flexibility
- Link distributors' regulated revenue to their progress in developing the use of flexibility services

Q.13 What options would encourage competitive procurement processes for flexibility services?

Realizing the true value of flexibility services for an asset owner is complex given the multiple markets electricity assets can operate in (spot, reserve, ancillary, RCPD etc), it is therefore essential to enable multiple trading relationships for owners of flexible assets, as most retailers will favour the flexibility service in one market, like spot energy for example.

Ease of access to flexibility markets is crucial to encouraging competition and reducing third party costs for asset owners. The following solutions are most appropriate to support this.

- Enable multiple trading relationships is key to removing barriers to flexibility services and encouraging competition
- Competitive tenders for flexibility services

Q.14 Have you experienced difficulties with negotiating operating agreements for flexibility services?

Yes. Hiringa has not yet been able to negotiate a flexibility service agreement with any distributor despite offering multiple flexibility solutions. Refer to Q11 for further info. We have also not been advised of any flexibility traders who we could engage with also.

Q.15 Are the transaction costs of developing contracts a barrier to entering the market for flexibility services?

From our experience there is no option to develop a contract for flexibility services with distributors.

Q.16 Would an operating agreement help lower transaction costs and level negotiating positions?

Yes

Q.17 What kind of operating agreement would address the issues described in this chapter?

This is a significant issue, however given the pace of change and different types of flexibility assets and non-network solutions being developed, standard terms could limit emerging technology's ability to participate in flexibility markets. Establishing a 'DDA style' agreement which parties can opt in to is likely the best balance between standardization and flexibility.

NZ should draw on international examples with more mature flexibility markets for guidance.

Q.18 What are distributors doing to ensure their network can efficiently and effectively manage the transformation of networks?
Hirnga is establishing flexible demand assets across multiple distribution networks, each network is at different stages on the flexibility market journey. This is extremely inefficient, costly and a major barrier to operating flexible assets distributed across the country.
Q.19 How are distributors currently working together to achieve better outcomes for consumers?
Based on Hiringa's experience there is little collaboration between distributors to offer better outcomes for consumers, or any ability to align flexibility services across different distributors.
Q.20 Could more coordination between distributors improve the efficiency of distribution?
Yes