7th April 2022

Infratec New Zealand Ltd Submission

Transpower Renewable Energy Zones National Consultation 2022

General Commentary

Infratec NZ Ltd is pleased to contribute our initial comments and views on the development of Renewable Energy Zones (REZ's) designed to facilitate more efficient connection of new renewable projects into local regional networks and/or the transmission (Transpower) grid. Infratec is a developer and EPC contractor of solar and storage projects with 7 years operating experience integrating ground and roof mounted solar and batteries into Pacific and Asian "micro-grids". Infratec is currently seeking connections into regional networks for more than 100MW of new renewable projects across New Zealand.

Our New Zealand experiences thus far is that securing new connection agreements and undertaking the related technical and network studies generally will delay most project financial closures. We have ascertained current delays are attributable to:

- Lack of historical experience for both Networks and Consultants with the concurrent connection and operation of multiple distributed energy resources and embedded generation projects
- Lack of adequate resourcing for the current exponential growth in smaller projects within networks and aggregation of smaller projects.
- Compounding effects caused by exponential growth of household DER in Networks.
- Analysis of individual project connection studies are being drawn into wider Network or Grid risk assessments that are beyond the scope of a project developer's requirements.

The Renewable Energy Zone (REZ) concept, whilst addressing the multi-lateral party negotiations aspects, will not necessarily resolve these current resourcing and information sharing constraints, nor address the wider and compounding renewable and DER connections challenges for Network and Grid Owners. REZ should nevertheless inform those owners' internal planning processes and signal the resourcing and technology needs required to help streamline the Distributed Generation (DG) or Industrial connections processes. These process constraint issues need to be addressed across all Networks and the Grid, not just for nominated areas where activity is currently the highest and the squeaky wheels are loudest.

Infratec's view is there are a number of process overlaps between the REZ approach and the current Code-based planning and investment approvals process requirements that need to be further carefully considered before the scope of REZ is agreed, for example:

- Grid interconnection planning requires a set of GXP/GIP local demand and local supply assumptions. Almost by definition, the creation of an REZ re-defines these interconnection power flow assumptions (even if the REZ is on a grid Connection asset).

- Transpower has the option under TPM to develop a region for the Beneficiaries based modelling relating to benefit based charges (BBC) on power flow allocations for interconnected assets. One presumes a REZ falls into this same category of modelling so it would be in-step for Transpower to forecast REZ related grid upgrade costs and conceivable at least that REZ connections could be included into the same grid upgrade cost allocation mechanism so that all REZ beneficiaries are considered wherever they were located on the Grid.

- Network planning and forecasting processes would need to shift to “micro-grid” modelling for a REZ model that addresses both generation supply and new industrial demands at one new connection asset.

- Grid and Network Alternatives must also be included into the REZ model. For example, BESS and aggregated customer storage and DSR are all relevant connection considerations. Importantly these Alternatives could be added incrementally and more efficiently than a one-off REZ connection upgrade.

The market demand for REZ perhaps signals that current regulated infrastructure planning and investment processes are no longer adequate for the level of distributed connections required. Would it not be better to address those possible regulation shortfalls first before creating a new alternative process that might have unintended consequences?

For example, Infratec is concerned that the proposed REZ model could circumvent the requirement for Network and/or Grid owners to tender for competing alternatives to infrastructure upgrades and will not adequately address the contributing impacts of lower voltage connections for new EVs and rooftop solar and storage. Transpower’s 2019 investigation and report into distributed storage highlights the potential impacts of aggregated DER that should also be included in any future REZ modelling assumptions.

Finally, Infratec notes possible fundamental flaws in the proposed REZ processes, for example:

- Generation developers have a very low probability of aligning financial closure dates, so are very unlikely to sign-on to a single defined REZ financial commitment date/s.

- Most Network embedded DG and DER capacity will be emerging from aggregated customer sites, many of which will be located behind the customer ICP/Metered connection – reference Transpower’s 2019 BESS Storage Report solar/storage growth scenarios.

- Many DG or BESS Developers would prefer not to pay for extra Grid Connection costs, instead preferring to remain Network embedded and avoid the unnecessary fixed transmission costs. Those developers would likely reduce the size of their project or manage short-term production outputs to avoid export rather than pay higher fixed costs for peak grid access.

We would be very concerned if the REZ approach then either “crowded-out” legitimate smaller Developers by way of the proposed auction process, or “dragged-in” those same Developers because of a Network’s preference to only use the REZ connection. These outcomes would reduce competition in the energy market from local and innovative suppliers that are only selling DG offtake locally. Perhaps it would be better to co-ordinate the new REZ connection opportunities between Networks and Grid Owners, and then have an Opt-in or Opt-out option for Developers based on the REZ terms being offered? For those that Opt-out then current Part 6 DG Code options to connect to the Network/s should still apply.

Answers to the specific questions requested are included below.

Grant Smith

Infratec NZ

Subject: Are Renewable Energy Zones right for New Zealand?

Q1. Do you agree that the first mover disadvantage and high connection costs can be challenges for connecting new renewable generation and/or large electricity loads to the electricity network?

A1. Infratec NZ (INZ) agrees there are first mover and last mover disadvantages, and connection costs are an important component of new renewable investments. We believe these cost allocation issues are perhaps wider than for just new projects or loads, but are a general distributed energy planning challenge.

As Transpower highlights, the proposed new Transmission Pricing Methodology may include new rules to manage the first mover disadvantage for new connections on the interconnected grid. It's difficult to comment without knowing what the final TPM looks like but it may be more efficient to consider the approach to allocating interconnection costs to the problems the REZ is attempting to address before progressing further work on a REZ concept.

Q2. Do you think the concept of a Renewable Energy Zone could be beneficial in a New Zealand context?

A2. INZ thinks the concept has merit in a planning co-ordination context but perhaps has some fundamental flaws in the proposed execution. For example, there is a low probability of aligning Generation (or load) developers financial close dates to suit a connection commitment date and the issues being experienced are more general than just current "hot-spots" in the system. The REZ concept could be developed for specific regions in a planning context only to help inform the broader Network and Grid Planning processes.

We also query whether the proposed process could actually delay new connections of generation or load. For example, will a network company that is part of, or going to be part of, a REZ put an embargo on considering any connection applications (from generation or load) – no matter what size - until the formal REZ arrangements are in place?

Transpower's website indicates construction could commence in 2024 to enable the proposed 1GW capacity of the Northland REZ. It is public knowledge that Infratec is working to install solar capacity in the Northland region that is already consented and construction underway or due to begin well before 2024. Would projects already committed before 2024 then be required to change connection plans and costs as a consequence of the REZ decisions?

Q3. What region(s) do you think would be suited to Renewable Energy Zones?

A3. INZ thinks all regions are suited to what is essentially a "micro-grid" planning process whereby new local supply and demand opportunities are matched to optimise the Network costs. The issues seem to be more seated in current planning processes not being adequate for future distributed demands?

At this stage there does not appear to have been much consideration of the likely growth in electricity demand within a region as households and businesses invest to decarbonise and this demand 'soaks up' increasing generation output. Indications are being signalled by developers through connection enquiries which on the face of it appear higher and faster than envisaged in the 2017 Grid Futures scenarios assumptions. It would be useful to also retest those assumptions to better understand what the overall

impact of exponential growth in regional demand and DG will have on Transpower's grid plans and this would also inform developers of Grid Alternatives – one of which might be an REZ micro-grid. Infratec believes the REZ solutions is perhaps too narrowly focussed on larger generation and larger demand connections, rather than seeing the wider opportunity here to create local micro-grids to avoid expensive high voltage connection upgrades.

A network is already constructed and operating to cover the highest peak of demand at any point in time. Output from large scale generation projects would obviously exceed this maximum demand – and a direct connection with the transmission grid is probably the most efficient solution for these generation assets. There are numerous smaller scale proposals whose output would be less than AMD and the generation investors are incentivised to manage output to shift it to peak demand periods.

Q4. What benefits do you think should be considered in the decision-making process for Renewable Energy Zones in New Zealand?

A4. Essentially the same principles that are currently applied to Grid and Network investments. For example, a REZ model should also consider network and grid Alternatives as part of the local mix and ensure access to those Alternatives.

The renewable and zero carbon benefits are something of a red-herring outcome as these are already considered to be an investment pre-requisite for all new power projects.

Q5. Do you agree with the proposed guiding principles? Are there any that you would change or add?

A5. INZ believes these guiding principles need more work to more closely align with current Network and Grid planning and investment principles and processes.

Q6. Do you agree with the proposed criteria for selecting suitable regions for REZ development? Are there any that you would change or add?

A6. No, all regions in New Zealand have renewable and demand-side projects that face connection constraints. INZ supports the use of selected regions to inform the planning process and then apply the learnings generically to all regions.

Q7. Do you agree with using a tender process for committing projects in a REZ? Are there alternative processes that could be considered?

A7. No, the tender process is expected to expose what we believe are fundamental flaws in the proposal (refer A2 above). There is a real risk of "crowd-out" for smaller developers and/or getting "dragged-in" for smaller developers not wanting to connect to transmission grid services and not allowed to connect to local Networks that have a preference for the REZ defined connections. This potentially reduces market competition. An alternative would be for Networks and Transpower to agree on planning parameters and options and then ask if Developers want to Opt-in or Opt-out to the connection terms being proposed, including options for incremental Network Alternatives.

Q8. Who should be involved with co-ordinating and undertaking the various steps within a REZ development process?

A8. Networks and Transpower would run REZ scenarios and then provide REZ connection options and terms for Developers to consider.

Q9. Do you agree with the proposed project criteria? Are there any that you would change or add?

A9 INZ think it might be a bit premature to decide all criteria at this stage. We suggest work should be prioritised on resolving the potential overlaps of a REZ concept with current Grid, network and TPM planning processes and approvals first.

Q10. Do you agree with the challenges we have identified?

A10. INZ agree there are a number of challenges and changes are required to streamline and reduce connection costs. We would like to also better understand how the proposed REZ decision models and Causer Pays cost allocation outcomes might impact the new TPM Beneficiary Pays methodology for Grid connected generation. For example, if a small DG project that is not currently subject to BBC cost allocations for future interconnection upgrades is then connected to an REZ micro-grid is that DG plant now subject to allocation of Grid TPM Beneficiary charges?

Similarly, when does a connection asset for a REZ become an Interconnected asset subject to Benefit-Based Charges? Even if there is still only one, say 110kV, line if it is transporting ~1,000MW of electricity from the edge of one network company to load in other networks – the importance of or reliance on that asset means it must become part of the grid backbone. What does that mean for the allocation of Transpower's ongoing costs?

Q11. What are some of the ways to overcome these challenges and who should be involved?

A11. INZ believes the aggregated connections challenges are similar to how EVs will also require Network Upgrades and these are also going to be a challenge for Networks in a similar manner. If the rationale for REZ and other EV charging Network upgrades is "public good" outcomes like Net Zero Emissions then perhaps a new "public good" approach is required – as perhaps has occurred in other countries with similar REZ type initiatives. INZ is of the view that all options should be on the table rather than "baking" something in that addresses only the costs but not the wider benefits?

Further work is required. An industry working group could be a good approach to enable interactive discussion of the challenges and potential solutions. This initial consultation paper will reveal the level of interest in these concepts and could guide composition of the working group.

Q12. Do you see any other potential challenges that need to be considered?

A12 The current voltage thresholds for different generation scale allows smaller DG to connect at lower voltage and thus lower cost substations etc. Most of the identified generation opportunities in say Northland are larger scale wind, with higher voltage connections and higher cost substations. i.e. these

windfarms could never have connected to a typical medium voltage distribution network and would therefore be a new Transpower GIP grid connection. Is there not two asset classes of REZ? i.e. Voltage under 33kV and voltage over 33kV and therefore the incremental costs of a REZ need to be lower per MWh for under 33kV class generators than network connection to be more efficient and allow local competition to grid supplied power.

A12. The Battery Storage Project and proposals like Lake Onslow will have similar market structural issues on cost allocations and benefits, so REZ should be progressed at a planning only level until those other potential renewable market "distortions" are also on the table for mechanisms that enable 100% Renewable and Net Zero emissions outcomes.

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