INTELLIHUB

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
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Intellihub

MBIE consultation response

Measures for Transition to an Expanded and Highly Renewable Electricity System

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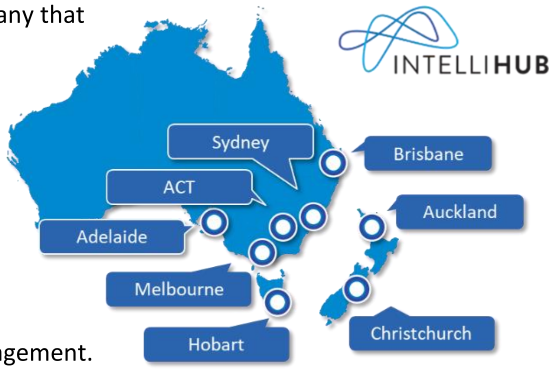
0.1 | About Us

Intellihub Group is an Australia and New Zealand utility services company that delivers innovative metering and data solutions to utilities to enable digital and new energy services with a focus on driving an exceptional customer experience. It is an experienced and leading provider of multi-utility services across electricity, gas and water networks for residential, commercial & industrial, embedded network, solar metering and distributed energy customers. Intellihub is a growing business with over 300 employees working across 8 ANZ office locations per Figure 1.



Intellihub currently has over two million advanced meters under management.

We are focused on creating business value for energy retailers through the best customer experience for installing advanced meters and afterwards maximising the digital and ‘new energy’ services that this technology can enable.

To achieve this, we have built a proven business model of partnering closely with our customers. The Intellihub business has created a distinctive culture based on blending the industry 'must haves’ on safe and reliable practises with the latest thinking in adopting new technology. Our technologies are designed to facilitate innovation across our whole business covering meters, communications, edge computing, IoT and cloud application hosting.

Our ‘Intelli-Suite’ enables broader innovation beyond-the-meter, and we believe it forms a strong basis for new products & services in the electricity industry – particularly where it relates to distributed energy resources (DER) including solar, batteries, hot water heaters and electric vehicle charging. Intellihub is the only ANZ metering provider that is developing and delivering these innovative metering and distributed energy resources services at scale. Since our inception, we have been investing in foundational infrastructure and capabilities to enable the transition to a decentralised and digitised energy system.

0.1.1 | DER Registration and verification platform

Intellihub’s recently acquired GreenSync and their Decentralised Energy Exchange (deX) platform, a proven DER registration and verification platform that is deployed across the world; from remote solar curtailment in South Australia, EV partnerships with Wellington Electricity in New Zealand, to providing a digital market place for distributed renewable energy as part of the world’s most advanced network control system in the United Kingdom.

GreenSync’s deX platform is designed as a DER registration and verification service that can then be controlled by a regulatory authority, retailer and/or network. Intellihub can provide this registration and verification service independently of our smart metering platform.

0.1.2 | EV Charging experience

0.1.2.1 | ARENA Street-Side charging pilot 2021

Intellihub is excited to lead an Australian first, public EV street-side charging pilot recently announced by the Federal Minister of Climate change and Energy, Chris Bowen in 2022. Intellihub is leading an Australian-first, electric vehicle (EV) street side charging project. This ARENA funded project includes installing 50, 7.5kW EV chargers on street side power poles within the Sydney metro area, in partnership with a consortium of partners and local councils. Once installed, the pilot will run for 12 months to achieve project objectives including technical, regulatory, engineering, community and commercial learnings. An ARENA report will be published with these findings. For further information, please see details on ARENA's website.

0.1.2.2 | *Destination Charging Across Victoria Program 2021*

Intellihub has been awarded funding from Victoria's Government Department of Environment, Land, Water and Planning to install and manage Destination Chargers across some of Melbourne's most iconic locations including but not limited to the National Gallery of Victoria, Melbourne Cricket Ground (MCG), The Royal Children's hospital, Queen Victoria Market and Melbourne Zoo. For further information, please see details on DELWP's website.

0.1.2.3 | EV Connect 2019

GreenSync partnered with Wellington Electricity to demonstrate technology and commercial capabilities for smart electric vehicle charging in 2019. By providing visibility and control of electric vehicle supply equipment to Wellington Electricity, EV Connect established the foundations required to support electric vehicle charging at scale on Wellington Electricity's network. The partnership delivered a roadmap for the wider adoption and application of the solutions, including market functionality for electricity retailers who will be able to utilise GreenSync's deX platform. For further information, please see case study on GreenSync's website.

0.1.2.4 |

MBIE consultation response

Measures for Transition to an Expanded and Highly Renewable Electricity System

INTELLIHUB

1 | MBIE paper response

1.1 | Introduction

1. Intellihub is delighted to submit on Part 4 of MBIE's August 2023 consultation paper '*Measures for Transition to an Expanded and Highly Renewable Electricity System*'[1].

2. Intellihub acknowledges the importance of MBIE recognising the crucial role that distributed flexibility will play in the energy transition as rates of increasing intermittent generation and electrification place increasing pressures on New Zealand's networks and power system.

3. Intellihub further supports MBIE reviewing policy settings to assess whether changes are needed to facilitate market making activities required to facilitate distributed flexibility at scale.

4. As a leading provider of metering equipment and data solutions, we understand the valuable insights and opportunities that can be unlocked through digitalisation in New Zealand. In particular, there are a number of participants in the electricity market that will be able to develop and utilise new data solutions to increase the efficiency and resilience of New Zealand's electricity infrastructure and, ultimately, deliver better outcomes for consumers.

5. We are excited to be able to further contribute towards bringing benefits to consumers in New Zealand, and we welcome the opportunity to work alongside MBIE and other participants in the electricity industry to support the development of distributed flexibility in New Zealand.

1.2 | Structure of this submission

6. This submission addresses the following questions in Part 4:
    a. Question 45: Would government setting out the future structure of a common digital energy infrastructure (to allow trading of distributed flexibility) support co-ordinated action to increase use of distributed flexibility?
    b. Question 46: Should central government see how demonstrations and innovation to help inform how trade of flexibility evolves in the New Zealand context, before providing direction to support trade of distributed flexibility? If yes, how else could government support the sector to collaborate and invest in digitalisation now?
    c. Question 49: Would measures to maximise existing distribution network use and provide system reliability (such as dynamic operating envelopes) help in New Zealand? If yes, what actions should be taken to support this?
    d. Question 50: What do you think of the approaches to smart device standards and cyber security outlined in this document? Are there other issues or options that should be looked at?
    e. Question 51: Do you think government should provide innovation funding for automated device registration? If not, what would best ensure smart devices are made visible?
    f. Question 54: Should further thought be given to making upfront money accessible to all household types, at all income levels, for household battery storage or other types of CER?

7. This submission is structured as follows:
    a. Paragraphs 8 to 9 set out some critical success factors that must be met for distributed flexibility to occur at scale in New Zealand.
    b. Paragraphs 10 to 27 discuss the role of digitalisation in ensuring the critical success factors are met.

[1] This paper is referred to as MBIE's consultation paper in the remainder of this submission.

i. Paragraphs 10 to 16 summarise relevant work the United Kingdom regulator (OFGEM) is progressing to explore digitalisation. This includes the rationale and vision for a common digital energy infrastructure and an ongoing feasibility study to explore automatic device registration to facilitate visibility of DER.

ii. Paragraphs 18 to 27 provide Intellihub's positions and recommendations on digitalisation.

c. Paragraphs 28 to 32 discuss the importance of regulating device standards to support distributed flexibility at scale. This section also touches on the importance of DOEs and the role standards will play in deploying DOEs at scale.

d. Paragraphs 33 to 36 discusses the importance of ensuring any consumer subsidies are directed towards devices with "smart" functionality.

e. Paragraphs 37 to 42 summarise Intellihub's recommendations and preferred positions.

1.3 | Critical success factors for distributed flexibility to occur at scale

8. Distributed flexibility will enable the optimised coordination of distributed energy resources (DER) (consumer energy resources (CER) and DER owned by small businesses) to provide power system and network services. This in turn will not only support decarbonisation incentives, but it will lower network and energy provisions costs to the end-consumer.

9. Distributed flexibility at scale will require the following critical success factors:

a. A deep pool of controllable DER in the right location that can be accessed by aggregators providing flexibility services. The role that device standards will play in ensuring sufficient capable DER is available for aggregators to recruit is covered in paragraphs 28 to 32.

b. Transparent and low friction processes to share accurate and credible information while ensuring customer consent is captured, and any customer data meets all regulated privacy requirements. The following information will be needed to drive efficient decision making:

i. What DER exists, where it exists and the functional capabilities of any DER. This will enable aggregators to recruit capable DER and can support compliance monitoring activities where standards are regulated.

ii. Customer consumption information including AMI meter data and device behaviour. This information will enable aggregators to create aggregation products to offer to consumers and develop baseline profiles which will be critical to measuring service delivery. Additionally, this information will be critical for financial settlement of flexibility services.

iii. Network and power system information about the prospect, timing and scale of network constraints and power system needs which could be managed using flexible resources; this will enable aggregators to confidently invest in DER aggregation.

c. Transparent and low friction procurement mechanisms.

d. A 'flexibility first' approach adopted by flexibility buyers such as electricity network and power system operators. In other words, flexibility must be a standard operational response.

e. Market design changes to integrate flexibility services including (but not limited to) standardised service specifications.

1.4 | Digitalisation is critical to attaining DER visibility and low friction processes to sharing data

10. MBIE has raised concerns that the critical success factors required to enable distributed flexibility at scale may not occur organically. This view has been echoed by OFGEM in their call for input to the Future of Distributed Flexibility paper. This paper notes four sources of potential market failure that pose a risk to distributed flexibility occurring at scale:

   a. Imperfect information and information asymmetries which leads to inefficient decision making as a result of not seeing the whole picture:

      i. Buyers do not have sufficient visibility of all sell-side options, so cannot meet the cost and reliability objectives of their market efficiently.

      ii. Sellers similarly do not have sufficient visibility of all buy-side options, so cannot efficiently maximise the value of their asset across multiple markets.

      iii. Consumers are not aware of the fact their CER can be valuable to the power system – and conversely that their 'parasitic' assets are increasing the costs of the system for others.

      iv. Sellers, and importantly regulators, do not have access to digestible historical and current market data on buyer decisions in all markets, which erodes trust.

      v. Investors cannot build accurate and optimised business cases for market entry without access to a wide range of historic market data.

      vi. Finally, regulators cannot effectively alleviate harms without adequate visibility of current and historical market data.

   b. Oligopsony market coordination of operations and access. Limited coordination across siloed markets dominated by a few large buyers can cause inefficient system (and market) operation overall. This includes coordinating procurement and dispatch operations and coordinated access to markets. The New Zealand market structure is similar to the United Kingdom, in that we have a single power system operator (Transpower) and multiple Electricity Distribution Business (EDB) operating in siloes. OFGEM notes the following challenges associated with lack of coordination:

      i. A lack of product standardisation makes it difficult for sellers to compare products and make efficient decisions to maximise asset value across multiple markets.

      ii. A lack of operational coordination across products, which leads to inefficient or insecure system operation by buyers, who lack primacy rules for conflict identification and subsequent notification/resolution proposal.

      iii. Reduced liquidity and competition as fewer sellers operate in any given market.

      iv. A lack of harmonised access to markets and common processes which creates such a 'transactional' burden for sellers that they simply never enter the market at all, which reduces liquidity and competition further.

   c. Structural lack of trust. A lack of transparency with respect to data availability and procurement will mean that sellers do not believe that markets are being operated impartially. This undermines seller motivation to participate reducing liquidity and competition.

   d. Contextual market specific issues.

11. The first three sources of market failure (10.a, 10.b and 10.c) map to the critical success factors set out in paragraphs 9.b and 9.c, while the fourth market failure (10.d) maps to paragraph 9.d. In relation to the first three market failures, OFGEM notes that a 'low friction' environment for distributed flexibility will not emerge organically as individual buyers are incentivized to improve their respective monopsonies. Given the magnitude of the challenges posed and the potential benefits that distributed flexibility at scale can bring to consumers, OFGEM advocates for public intervention including (but not limited to) specifying a single common digital solution or common digital infrastructure to address market failures 10.a, 10.b and 10.c.

12. OFGEM further notes that a common digital infrastructure will require the following functions to unlock the benefits of distributed flexibility:

    a. Digital registration of actors, assets and markets;

    b. Ensuring the visibility of assets, consent and positions;

    c. Enabling price discovery and liquidity across all markets;

    d. Delivering a digital contracting regime;

    e. Surfacing inter-market conflicts;

    f. Independent dispute resolution for common processes; and,

    g. Creating a rich data environment to assist settlement and meta-data analysis.

13. In addition to the above, Intellihub reiterates the importance of ensuring consumer data is managed in a manner that does not breach privacy regulations. Robust consent and permission management functionality will be critical components of any digital infrastructure.

14. Intellihub agrees with OFGEM's position as set out in paragraphs 11 and 6 and supports MBIE setting out a common digital infrastructure (Question 45 of MBIE's consultation paper) including digital registration of actors, assets and markets (Question 51 of MBIE's consultation paper).

15. Intellihub notes that there will be value in MBIE leveraging the comprehensive work OFGEM has already done in this area. OFGEM sets out three models or archetype for a common digital infrastructure:

    a. A Thin Archetype or a flexibility directory that would assist market buyers and sellers of distributed flexibility to understand the landscape of markets and assets available. Access to the directory is open, and common communication standards are established between all market participants. There is no common point of access to join markets, nor is there an established or governed coordination mechanism between markets. This effectively means that markets and participants are 'blind' to one another, unless they take specific action to establish bilateral data sharing agreements.

    b. A Medium Archetype or flexibility exchange or a singular and scalable digital location where multiple markets are visible and coordinated under a known governance framework, yet continue to retain their own market designs, platforms, and systems. This model would:

        i. provide a single source of truth for its energy markets, giving a common point of access, digitising contracting mechanisms, reducing friction, and increasing visibility across markets for buyers and sellers.

        ii. An exchange would allow buyers, including independent market operators and system operators, to procure, dispatch, and settle, but they would do so in a transparent and coordinated environment.

This model enables a various parties secure access to a wide variety of data as set out in paragraph 9.b which is accurate and has customer consent. In addition, the model provides for a common platform for sellers to register and accredit their assets while buyers have visibility of assets that meet their requirements.

c. A Thick Archetype or a central platform for the end-to-end delivery of distributed flexibility. The central platform encompasses all activities from exploration to settlement across all markets. In addition to having all the characteristics of the Medium Archetype, the Thick Archetype provides a common platform to enable co-optimised scheduling and dispatch of all markets.

16. While the Thick Archetype is theoretically ideal, it is not practical to implement due to the significant complexity of the required infrastructure. Moreover, co-optimisation of multiple products (energy, ancillary services and network flexibility services) will require high levels of visibility in distribution networks and fundamental and far-reaching changes to existing market mechanisms.

17. Intellihub recommends the Medium Archetype as a potential model for New Zealand. This option provides automatic device registration functionality and broader data sharing capabilities to support aggregator decision making and investment, EDB network operations and power system operations, and potentially, scheduling, dispatch and settlement of flexibility services.

1.4.1 | Digital infrastructure options for New Zealand

18. Intellihub notes that while 're-purposing' the Registry to provide a common digital solution might seem a low-cost solution prima facie, this is not an optimal solution. The Registry has certain functional limitations which may prevent New Zealand from taking full advantage of technology developments in this space and could give rise to unintended consequences if there is too much transparency, e.g., at the expense of consumer consent, privacy and incentives to invest.

19. Some challenges we have identified in repurposing the Registry are as follows:

    a. While the Registry currently provides some visibility of DER (namely distributed generation resources connecting to ICPs), the process is inefficient and subject to material inaccuracies. This is because accuracy of information provided depends on installers who have limited incentives to comply and use manual processes to input data which is then passed to EDBs to populate the Registry. Currently, very limited information about distributed generation is required by the Registry. In the future, the volume and complexity of data needed will increase as the uptake of DER accelerates and more devices (e.g., EV chargers, demand-flexible devices such as smart appliances) need to be made visible to multiple parties. The existing processes and systems will no longer be fit for purpose to meet varying information requirements for multiple parties with varying permissions. Particularly, collection of accurate information will require minimisation of manual input and the ability to validate data. As indicated above, distributed generation data in the Registry is subject to material error due, in part, to the manual processes used by installers. Moving forward, it will be important to ensure that data collection activities by installers are automated with the source of the data being the OEM back-office as opposed to manual entries.

b. While the Registry will provide some visibility of DER, we understand that it will not function as a platform which enables the transparent remote control of DER assets. The development of secure 'controllable DER' technology has created a significant opportunity to enhance the efficient operation of the New Zealand energy sector. In particular, controllable DER enables improved coordination and utilisation of DER across networks, reducing costs across the system. The ability to transparently and securely control DER will assist distributors to deliver peak demand reduction by balancing generation across the network. As the uptake of DER gains momentum, distributors will be able to take advantage of these tools to facilitate the aggregation and coordination of DER devices, to manage congestion and reduce the need for investment and augmentation of the network. Metering Equipment Providers (MEPs) like Intellihub also use the Registry to validate that a retailer has the consumer's consent to have access to consumption data. The Registry is updated to reflect the retailer that the end-customer has a contractual relationship with after they have entered into that agreement. Flexibility traders will need some mechanism to indicate to MEPs that they are entitled to receive the end consumers' meter data, potentially ahead of a contractual relationship being entered into. The Registry will need to be updated to record this permission.

c. Intellihub acknowledges the importance of making available data that allows consumers, retailers, distributors and other energy sector participants to encourage innovation and the development of new products and services. However, the opportunities enabled by smart metering raise questions about the protection of data and consumers' rights to privacy. As the granularity of energy consumption data being accessed increases, so do potential concerns regarding privacy and the sensitivity of the data[2]. As a result, access to granular consumption data by retailers, distributors and third parties such as flexibility traders will require active consumer consent. These requirements place the onus on the party seeking consent to communicate clearly with the consumer, highlighting the benefits that will arise from granting them access to the data.

d. Without having greater functionality than what the existing Registry system provides, there is a risk that excessive transparency could have unintended and adverse effect on competition and innovation. Putting aside privacy concerns, certain participants having open access to detailed DER information at ICPs could discourage innovation. For example, flexibility traders may be reluctant to invest in new technologies if commercially sensitive data about their services is available to their competitors (e.g., information on which customers are utilising those services could be used by other flexibility traders to promote competing products).

20. Intellihub recommends leveraging existing platform technologies to develop an automated data exchange that not only facilitates the registration and visibility of DER assets, but also manages consumer consent issues and enables remote control of DER to facilitate planning and operational requirements. In particular, there are existing specialist products that already offer key functionality, and which could be utilised to provide a more comprehensive solution for the New Zealand electricity industry.

21. For example, GreenSync[3], a global energy tech company, has established the Decentralised Energy Exchange (known as the 'deX') which is a software platform that creates a digital record of consumer consents to the transfer of smart meter data, register and enrol multiple DER devices at each ICP, and provide detailed visibility and control over distributed energy resources, at scale. This integrated

[2] Detailed energy consumption data from smart meters is likely to be 'personal information' for the purposes of the Privacy Act 2020 ('Privacy Act'). For this reason, the Electricity Authority will need to be mindful to ensure that any regulation introduced to address the processing of energy consumption data is designed to comply with the Privacy Act. We also consider that other smart metering data, such as power quality data and other data related to the ICP (eg, unique identifiers, and any data that can be linked to these identifiers and which relates to identifiable individuals), may also be considered personal information, and in these circumstances data processing must also be conducted in accordance with the Privacy Act.

[3] GreenSync is a subsidiary of CrescoNet, the technology development arm of the Intellihub Group

system enables networks to support more renewables faster, without compromising on important considerations such as the protection of sensitive data. It also simplifies the complexity of relationships in the electricity industry (commonly referred to as a 'many-to-many' problem) by facilitating transactions and communication between distributors, generators, retailers, flexibility traders and consumers, as well as DER devices.

22. Australia is a proven example of the capability of the deX platform. The technology has been deployed and stress tested to provide not only a DER registration function reaching around 3,000 DER systems registered per month by the end of 2022, but also to be used as a foundational tool to facilitate the secure exchange of data.

23. The UK has also established a feasibility study (Phase 1) between a consortium of key industry partners, including the Data Communications Company (or 'DCC', the centralised UK entity that oversees data transfers), to develop a solution for an automated, standardised, secure data exchange process for registering small scale energy assets. Phase 2 of the project will support a project to develop a solution for automatically registering small-scale energy assets and an accompanying Central Asset Register. The Phase 2 project ('LCT Connect') was selected from the Phase 1 winning projects.

24. The LCT Connect project leverages GreenSync's proven deX technology and experience in Australia, and will innovate on the existing deX software platform, tailoring and extending its capability to reflect the United Kingdom context. The core project team, led by GreenSync and guided by Energy Systems Catapult's regulatory advice, will be supported by a broad and diverse range of companies from across the energy sector. This includes LCT manufacturers, installers, distribution network operators, energy retailers and flexibility providers as well as cybersecurity specialists and innovators. Collectively, the team will develop and test in a real-world environment an innovative automatic asset registration and central asset register solution that enables LCTs to be digitally and securely registered and visible to all market participants with ease and accuracy.

25. The project will also identify and assess sustainable commercial and operating models that will best support implementation in the United Kingdom energy system; and will seek input and insights from other stakeholders such as end -consumers, local authorities and government institutions to explore the admissibility, regulation and policies, data privacy and other relevant requirements for building and managing a nationwide automatic asset registration and central asset register solution.

26. Intellihub supports a similar feasibility study in New Zealand to investigate:

    a. Automatic device/asset registration (Question 51 of MBIE consultation paper)

    b. Collection and secure exchange of DER data across multiple parties with varying permissions (Question 46 of MBIE consultation paper).

27. Per the UK approach described above, Intellihub supports innovation funding to investigate automated device registration (Question 51 of the MBIE consultation paper).

1.5 | Device standards

28. Digitalisation will support distribution at scale by enabling better visibility of network conditions and DER, efficient and secure data and information sharing, and control of and communications with DER. However, digitalisation on its own may not be enough. Distributed flexibility at scale will require devices that have the required functionality to meet various use cases while not having unintended adverse outcomes on network and power system operations.

29. Device standards are technical specifications that define the functionality of the device.

    a. Technical specifications may define minimum functionality required to ensure network and power system operators can operate their systems secure, reliably and safely.

        i. For example, the AS 4777.2 inverter standard enables secure reliable integration of distributed solar and battery storage through autonomous Volt-Watt and Volt-Var responses to network conditions and Voltage Disturbance Ride-through (VDRT) capability. This standard is mandatory in Australia.

        ii. Dynamic Operating Envelopes (DOEs) (refer to Question 49 of MBIE's consultation paper) will be a key tool required by EDBs to operate their network secure and reliably and at least cost:

            - Export DOEs (or flexible exports) will enable EDBs to operate their networks securely and reliably while maximising hosting capacity – thereby enabling more DER to connect and consequently lowering energy costs emissions. South Australia is implementing flexible exports in 2024, with all other Australian state following suit in the next two to three years. To date, research has been almost exclusively focussed on export DOEs in Australia by necessity.

            - Import DOEs (to manage consumption), in combination with network flexibility services, will become important as electrification of transport ramps up. Import DOEs can be used by EDBs to manage congestion and defer/avoid augmentation. Implementation of import DOEs will require capability and technology to estimate and control the non-discretionary component of consumer load to ensure consumer utility is not adversely affected.

        However, for devices to be subject to DOEs, they must have specific communication functionality.

    b. Technical specifications may also define functionality required to provide flexibility services. For example:

        i. Devices providing network flexibility services to EDBs must have communications functionality to enable aggregators to send instructions to devices.

        ii. Devices providing frequency response services to Transpower will require autonomous functionality that can detect system frequency and respond autonomously.

        iii. Devices providing market services will require measurement functionality to enable service verification and settlement.

c. Communications functionality is critical as it enables aggregators to communicate instructions to devices but also obtain both static and dynamic device data.

i. Communications functionality will necessarily introduce cyber-security risks. Device standards will need to cover such risks.

ii. Proprietary standards will be problematic as it will limit the parties/systems that devices can communicate with ultimately stifling innovation and competition. Interoperability of devices is therefore a critical requirement.

d. In their [2022 Green Paper](), EECA proposed core functionality for residential EV chargers that would enable EV chargers to be deployed to provide flexibility services and enable better visibility. This included proposals for:

i. 'Smart functionality' to mitigate the impacts of en-masse charging during peak periods and to enable vehicle to grid (V2G) capability.

ii. Power quality and control requirements

iii. Communications requirements covering cybersecurity and interoperability

iv. Functionality to enable monitoring the use and location of chargers and of electricity consumption.

30. There are currently no regulated standards pertaining regulating inverter connected systems or EV charging equipment to distribution networks in New Zealand. The lack of regulation means there is a risk of uncontrollable devices proliferating that:

a. Do not meet minimum requirements to ensure safe, secure and reliable operations of networks and the power system. While the risk is currently immaterial, as the uptake of technologies such as rooftop solar, battery storage and EV chargers increases, the risk will become more significant.

b. Do not possess functional requirements to provide flexibility services including lack of interoperability.

c. Pose cybersecurity risks.

31. Particularly, without regulation, there is a credible risk that consumer investment in DER will be misdirected towards devices that are not functionally capable of having their flexibility harnessed for the benefit of consumers in New Zealand as a whole. Worse still, there is a credible risk that the combination of high uptake of DER and lack of regulation can lead to serious network and power system operations risks.

a. For example, in Australia, the combination of favourable subsidies[4] and lack of regulated standards has resulted in unintended consequences of a legacy fleet of rooftop solar whose export cannot be controlled. This is causing security issues both for network operators and AEMO as power system operator. State governments in Australia have since mandated the AS 4777.2 inverter standard. The standard in combination with the adoption of the CSIP-AUS communication protocol will enable the deployment of DOEs with all Australian states having imminent plans for DOE implementation.

b. Additionally, the South Australian and Western Australian Governments have implemented solar curtailment schemes that enables the remote curtailment of rooftop solar systems if 'minimum demand' conditions create a material power system security risk. This is an 'emergency' measure and undesirable from customer utility maximisation and emissions minimisation perspective. Instead, regulating devices to ensure controllability coupled with measures to enable distributed flexibility to occur at scale will prevent the need for such draconian measures.

c.

[4] See paragraph 33 onward.

32. Intellihub therefore recommends a review of DER devices with a view to determining which devices should have regulated standards and what those standards should be. In the first instance, the regulation of standards for inverter connected systems to distribution networks and EV chargers should regulated should be prioritized. This should consider the type of functionality such devices will require to provide both flexibility services and respond to DOEs.

1.6 | Scope of device subsidies

33. In the previous section, we noted the lack of regulated standards can result in proliferation of 'dumb' devices. This can be exacerbated further though misdirected subsidies to consumers. The Australian experience is a cautionary example where misdirected subsidies and lack of regulated device standards have resulted in a fleet of 'dumb' (uncontrollable) behind-the-meter generation (BTM) that is larger than the largest generating system in a given state.

34. To avoid repeating a similar situation in New Zealand, Intellihub urges caution when determining the scope of subsidies or incentive payments. Particularly, Intellihub recommends that subsidies be directed at 'smart' devices. For example:

    a. Subsidising 'smart' EV chargers (with specific functionality that enables communication and control) instead of EVs will mitigate the risk uncontrollable charging.

    b. Subsidising BTM generation (solar and home storage) that meets technical specifications that ensure system and network security and reliability while also enabling the provision of flexibility services. Requirements may include (but is not limited to) the AS 4777.2 inverter standard, communication and control requirements and measurement requirements.

35. Appropriately directed subsidies will contribute to developing a fleet of 'smart' controllable devices that can:

    a. Securely communicate with multiple systems thereby enabling secure and reliable power and network operations (e.g., through autonomous Volt-Var and Volt-Watt responses, VDRT capability and ability to be controlled for the purposes of implementing DOEs).

    b. Provide aggregators with pool of controllable devices to provide a range of flexibility services.

36. The above should be implemented in conjunction with automatic device registration which enables remote verification that devices have been installed in compliance with all required standards.

1.7 | Summary of Intellihub recommendations

37. Intellihub supports MBIE setting out a vision and structure for a common digital energy infrastructure for New Zealand (Question 45).

    – Intellihub recommends leveraging the work OFGEM has done in this area given the similarities in market structure with New Zealand, particularly with respect to the challenges posed by oligopsony market coordination of multiple flexible purchasing parties.
    – Intellihub notes that the Medium Archetype structure set out in OFGEM's call for input to the Future of Distributed Flexibility paper is a potentially suitable and feasible model for New Zealand.

38. In considering digital options to facilitate device visibility and information sharing, Intellihub cautions against attempting to 're-purpose' the Registry and its functional limitations will prevent full benefits from being realised. Instead, Intellihub recommends leveraging existing platforms such as GreenSync's deX platform that has a strong track record delivering relevant use cases.

39. Intellihub also supports innovation funding for and exploration of automatic device registration as this supports the critical requirement for device visibility (Question 51). Intellihub further recommends exploring the collection and secure exchange of DER data across multiple parties with varying permissions (Question 46).

40. Intellihub supports the exploration of export and import DOEs in New Zealand (Question 49) as DOEs will be a critical tool needed by EDBs to maximise hosting capacity and mitigate congestion (in combination with the use of network flexibility services) as demand increases due to electrification.

41. Intellihub recommends mandating standards for DER as this will be critical to ensure:

    a. Aggregators have a deep pool of controllable DER to access to provide flexibility services.

    b. Consumer use of DER does not have adverse impacts on networks or the power system.

    c. Additional network measures such as DOEs can be introduced at scale.

42. Intellihub supports incentive payments in principle but recommends any subsidies to consumers should cover 'smart' devices that meet desirable functionality only (Question 54). In combination with automatic device registration and mandated standards, incentive payments for smart controllable devices will mitigate adverse power system and network risks and provide aggregators a pool of resources whose flexibility can be harnessed.