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Contributing to the Green Paper on a Decentralised Electricity System

Introduction

1. Bluecurrent welcomes the Electricity Authority's (the Authority) green paper on a decentralised electricity system, *Working together to ensure our electricity system meets the future needs of all New Zealanders* (the Green Paper), dated 30 April 2025.

2. We broadly agree with the Authority's description of the ongoing decentralisation of the electricity system, its potential benefits to New Zealand communities and consumers, and how the challenges of decentralisation can be addressed by working with others in the sector and beyond.

3. As a smart metering and data services provider, Bluecurrent is highly aware of the critical role that smart meters play in the transition to, and in support of, a decentralised electricity system. Smart meters provide the digital foundation for the decentralisation process – enabling consumers and communities to address the energy trilemma of affordability, resilience, and sustainability.

4. We welcome the Authority initiating a conversation with stakeholders regarding New Zealanders' journey to a decentralised electricity system. In this submission, we provide our initial views on the various opportunities and challenges that decentralisation presents and how we are collaborating with others to develop solutions to address consumers' unique needs. We also identify trends and factors the Authority can consider for future discussions with stakeholders. These include the regulatory settings we believe are likely to facilitate decentralisation that can deliver the desired outcomes for consumers and communities.

5. Bluecurrent is happy to contribute to the further development of the Green Paper to find new and innovative ways of working together so that New Zealand consumers and communities can thrive as the decentralisation of the electricity system unfolds.

Contributing to the initial discussion on a decentralised electricity system – responses to the consultation questions

Question 1: Do you agree with the description of decentralisation? If not, why not?

6. Bluecurrent broadly agrees with the Green Paper's description of the ongoing process of electricity system decentralisation and the forces driving it, and what a decentralised electricity system could look like.

7. As a provider of data services which collaborates with various parties, our thinking on electricity system decentralisation is also informed by the following mega trends:

    a. **Consumer and community expectations**: Consumers – individually and as part of their communities – are embracing their roles in a decentralising electricity system. As the penetration of solar, battery storage, EVs, and energy efficient 'smart home' applications

increases, the demand for greater control (direct or indirect), and therefore information on consumption (aggregate and for relevant controllable demand or production), is expected to increase. Like other transformations that have a profound impact on society, electricity system decentralisation is influenced by the 'revolution of rising expectations'. Decentralisation lends itself very well to meeting rising expectations for more customised services at individual and local levels.

b. **Connectivity and storage**: Advances in communications and storage capabilities are enabling more efficient and affordable data management across all aspects of human endeavour, including the delivery of smart metering services. We carefully assess this together with the significant increases in demand for data and insights services. While unit costs are expected to reduce over time, these are offset by the significant increases in the quantity of data expected to be sent across the electricity system.

c. **Connected appliances**: The proliferation of connected home devices (e.g. Wi-Fi and Bluetooth-enabled) is increasing the data points available for more comprehensive electricity consumption insights. Smart metering capabilities are responding to capture these additional collection points, adding supporting connectivity options. In addition, APIs and protocols are becoming more standardised, enabling smart meters to 'talk' to these appliances.

d. **Technology advancements**: Advancements such as AI and advanced data mining tools are bridging the gap between data collection and actionable insights, allowing stakeholders to transform raw data into valuable information for decision making. Significant investments in data storage and insights platforms are underway and will be required for the foreseeable future.

8. While smart metering providers such as Bluecurrent play an important role, especially in the provision of remote data services and technology solutions, a collaborative ecosystem involving retailers, networks, consumer energy resource (CER) providers, and other technology and energy stakeholders is essential to maximise data's potential for consumers and communities.

Question 2: Do you agree with the articulation of the potential outcomes and benefits from decentralisation for consumers? If not, why not?

9. Bluecurrent generally agrees with the potential outcomes and benefits from decentralisation for consumers identified in the Green Paper. Smart meters enable the achievement of these outcomes, as exemplified below.

a. **Enhanced energy affordability and equity**: Data generated by smart meters can be used to provide individual consumers and energy communities greater control over how and when they use and produce electricity. Granular smart meter data enables the development of innovative tariffs that allow consumers to shift load to times of the day when the network is less congested and tariffs are lower/at their lowest. This allows consumers to make better decisions around participation in demand response programmes that could benefit them. Remote services, enabled by smart meters, reduce costs for multiple parties across the electricity system, including those who do not own CER such as solar PVs, EVs, and battery storage.

b. **Enhanced security of electricity supply**: Granular smart meter data provides networks and consumers greater clarity on the availability and use of discretionary demand. This improves distributors' visibility of the CERs that are connected to their low-voltage (LV) network, allowing them greater visibility of the potential opportunities for distributed flexibility. Distributors can then make appropriate and timely demand response decisions/actions, e.g. shift load away from peak periods on the network, reducing or delaying the need for new network investment. This also improves distributors' ability to detect faults on the network and local outages, improving their ability to recover from emergencies in a timely manner – minimising supply disruptions on the network.

c. **Enhanced resilience to climate change impacts and other hazards**: Smart meters enable an orderly, rather than a disruptive, transition to a highly digitalised and low-carbon energy future. More granular and timely smart meter data is necessary to orchestrate processes in an increasingly complex electricity system.

d. **Accelerated decarbonisation and electrification**: Smart meter data enables the efficient integration of more CERs that use renewable energy (such as solar PV, EVs and batteries) into the grid and electricity markets, supporting long-term decarbonisation.

e. **Empowered communities and local economies**: Bluecurrent supports the timely introduction of a well-designed and cost-effective Consumer Data Right (CDR) in the electricity sector. CDR will make it easier for consumers to access their data and for accredited third parties to provide new and innovative services that benefit consumers. Third parties could include aggregators that provide consumers, via a demand response programme, the ability to shift load to where and when the cost of electricity is lower – helping ensure energy affordability.

Question 3: Do you agree with the articulation of the possible challenges to unlocking the benefits of decentralisation? If not, why not?

10. Bluecurrent generally agrees with the articulation of the possible challenges to unlocking the benefits of decentralisation in the Green Paper. We provide initial comments on these challenges and identify where smart meters could be used to assist in addressing some, or aspects, of these challenges.

a. **Governance design**: Decentralisation devolves decision making that would shape New Zealand's energy future to more individual consumers and communities, promoting local and regional resilience. While multiple scenarios of the future of the electricity system have been drawn, there is uncertainty which of these scenarios will eventually ensue in a highly dynamic environment with multiple moving parts and a growing number of active actors. Ensuring that benefits are unlocked and optimised during this journey requires a regulatory strategy that sufficiently provides flexibility/optionality to accommodate any of the likely scenarios. George Yarrow of the Regulatory Policy Institute and Emeritus Fellow at Oxford University describes such a strategy:

> …A regulatory strategy based only on one view of the future is unlikely to survive for long and its demise will tend to add to commercial uncertainties.
>
> Good regulatory strategy, directed at a long-term aim, requires…that institutional arrangements be 'resilient' or 'robust', meaning that they can handle unpredictable and unpredicted environmental change without collapsing or giving rise to major dysfunctions…**Such a regulatory approach tends to be simpler than the prescriptive alternative**, because it entails **devolution of more of the adaptive work to other economic agents**.
>
> [Emphasis added.]

b. **Understanding future consumer and stakeholder needs and expectations**: As a data services provider, it is important that we clearly understand our customers' needs (or use cases) and ensure data and insights are provided according to those needs to the parties that can deliver net benefits to consumers. It is also important that consumers are not overwhelmed or do not face significant cost increases for data they do not need or desire. For example, the customer use case for solar or EV is significantly different from the general understanding of energy consumption over a period. The appropriate solutions for these consumers could differ both in returns and costs from the generic solution. We expect the availability of consumers' solutions to simplify and automate decisions and optimisations to rapidly expand.

c. **Local electricity sharing and markets**: Bluecurrent supports collaboration with other relevant parties in developing technical solutions that would support emerging models for delivering and sharing electricity. There is a need to refine technical requirements and understand the cost implications of different technology/technical solutions. We are committed to working closely with metering suppliers and the wider sector to develop practical solutions that meet consumers' unique needs – enhancing access to, and optimising the use of, smart meter data.

d. **Grid and system operations complexity**: A centralised electricity system is inevitably a highly digitalised system. Data generated by smart meters enables the already complex electricity system and its users to 'cut through' increasing complexity and help them make informed investment and operational decisions. This helps ensure that the integration of CER and orchestration processes can deliver system and consumer benefits cost effectively – including to non-CER owners.

e. **Including an intergenerational perspective in decision making**: Smart meters enable greater visibility of consumers' electricity consumption, which promotes transparency and comparability of costs and benefits over time.

f. **Equitable access to benefits**: Smart meter data enables service providers to identify those most in need, e.g. those having difficulty paying their power bills. It enables providers to develop more targeted support services to these customers in a timely manner. There are several pathways to accessing data, potentially including the proposed CDR for the electricity sector. Some pathways may prove more cost-effective for specific consumers and energy communities.

g. **Barriers to funding and finance and capability development**: FlexForum, of which Bluecurrent is a member, recently published an insights paper which recommends actions to fill the holes in the flexibility value stack that will "let people and their flexibility do more".[1] Of particular note are the recommendations on how a digitalised electricity system can maximise the value of flexibility, including the capabilities that need to be developed so that 'cash signals' can be created and sent to motivate a dependable flexible response to unpredictable conditions. This would incentivise people to easily and routinely say yes to more flexible customer propositions, e.g. value maximising retail product and price. This enhances consumer choice and affordability and contributes to electricity system flexibility. We suggest that the Authority explore these FlexForum recommendations in the further development of the Green Paper.

Question 4: Do you agree with the articulated opportunity statement for a more decentralised electricity system? If not, why not?

11. Bluecurrent generally agrees with the opportunity statement for a more decentralised electricity system articulated in the Green Paper, which identifies areas of opportunity for facilitating decentralisation. These include: making full use of our electricity system; adopting available and emerging technologies; developing local energy markets; empowering local councils, iwi and communities; unlocking new sources of capital; building trust, engagement and authentic collaboration; and creating flexible, locally optimised energy systems.

12. Smart meters enable technology solutions that unlock value in many of the above areas and other applications mentioned in our responses to Questions 2 and 3. Remote meter reading, enabled by smart meters, reduces retailers' meter reading and transport costs. Network operational data generated by smart meters provides distributors greater visibility of the CERs connected to their LV network, allowing them to more efficiently manage their network and implement demand response programmes. Smart meter data is used by CER/new energy service providers to develop new and innovative services for consumers. Importantly, smart meter data enables end consumers to have

[1] https://flexforum.nz/filling-holes-in-the-value-stack-will-let-people-and-their-flexibility-do-more/, pages 14 - 15

greater control of how and when they use and produce electricity, and make informed CER investment decisions.

13. A less tangible benefit of services enabled by smart meters is the confidence it instils in consumers in existing and emerging electricity markets. For example, the superior experience from more frequent billing, which removes the need for estimates, results in fewer consumer complaints. This also increases consumer willingness in switching to innovative market offerings that benefit them. In this manner, smart meters also contribute to the success of innovative tariffs that better reflect consumer preferences and the real cost of providing electricity on the decentralising system.

Question 5: What other feedback would you like to provide to input into the discussion on, for example:

a) what a more decentralised electricity system might look like,
b) how this might benefit consumers, and
c) what might be needed to unlock these benefits.

14. In line with the view that the appropriate regulatory strategy in a decentralising system (as described in section 10.a.) is one that is resilient, robust, and simple rather than prescriptive, Bluecurrent believes that the regulatory settings that can help facilitate orderly decentralisation are those that:

    a. promote innovation – this includes the development of new and innovative models for delivering affordable electricity, including at community level;

    b. enhance market competition and consumer choice – we believe the benefits of smart meter data in a decentralising electricity system are best delivered in a competitive market. We agree with the recent assessment of the Australian Energy Market Commission that metering providers do not hold an inherent advantage in the delivery of real-time data services;

    c. reduce risks that can chill investment and avoid the stranding of long-lived assets – the increasing decentralisation of the electricity system requires continued investment, while minimising total system costs, which smart meters enable. This also means there are clear pathway(s) to recovering costs;

    d. instil confidence in electricity markets through regulatory predictability (clear and timely signals) and consistency over time while maintaining optionality in response to future opportunities and challenges;

    e. avoid unintended consequences such as the unfair/inefficient allocation of costs or unreasonable increase in the regulatory burden that unnecessarily raises costs for service providers, individual consumers, and communities; and

    f. importantly, avoid harm to end consumers and communities, e.g. ensure electricity is affordable during the decentralisation journey.

15. Bluecurrent understands the importance of balancing affordability with future investment, i.e. managing data costs associated with upgrading smart metering infrastructure. We support flexible cost recovery mechanisms that balance affordability for consumers with the need for sustainable investment in metering services. We believe that mechanisms such as reopener clauses or deferred decisions on long-term cost structures (e.g. 15-year sunset clause) will provide the necessary flexibility to adapt to rapidly evolving technical requirements, market conditions, and rising consumer expectations. A staged implementation, such as prioritising meter replacements at end-of-life with higher functionality meters, represents a cost-effective strategy. This approach reduces upfront costs compared to wholesale retrofitting, ensuring a smooth and affordable transition for consumers and communities.

16. As the demand for data (including real-time data) increases, a more standardised framework for data exchange would prevent technology/vendor lock-in and lock-out (that stifles market entry and exit, and innovation) and ensure interoperability between smart meters and consumer devices. We

anticipate that the use of widely recognised standards would further promote competitive electricity markets and enhance consumer choice.

17. We note the Authority's work programme includes addressing barriers to efficient connection and enabling multiple trading relationships (MTR). From our experience deploying smart metering services, we see opportunities to ensure technical specifications and data access arrangements keep pace with innovation. We would be interested in participating in any technical working groups to ensure regulatory frameworks enable rather than constrain the smart metering capabilities essential for decentralisation.

Question 6: What are other emerging case studies we could learn from?

18. Bluecurrent is currently an active participant in multi-party trials that aim to unlock and optimise the value of data for our customers and their communities, e.g. dynamic load control, provision of high-frequency power quality data, and outage detection and management solution. We will continue to collaborate with other parties to meet their and their customers' current and future energy needs – supporting decentralisation in the process. We will also continue to provide updates to the sector of any significant developments relating to our trials and other work that deliver significant benefits for New Zealand consumers and communities.

Dynamic Load Control service

19. One of our ongoing collaborations on demand flexibility is with Meridian Energy, considered to be a game-changer for the decentralising electricity system. Demand flexibility is a powerful tool that helps smooth out demand, lowering costs for consumers and reducing the need for carbon-intensive fuels like coal and gas. While adding more renewable energy resources is essential, it makes our power grid more weather-dependent and volatile. We need smarter ways to manage electricity consumption and keep it affordable and reliable.

20. We are partnering with Meridian Energy to roll out our ground-breaking Dynamic Load Control (DLC) service for Meridian customers. Meridian's Smart Hot Water programme, powered by Bluecurrent, will enable the shifting of electricity use by managing hot water heating loads. During peak times, hot water heating can be remotely turned on and off at an individual customer's premises (if the customer has joined the programme), helping to reduce reliance on non-renewable fuels and smooth out electricity demand. Customers on the programme will get lower bills and $120 of value back each year, by way of $10 credit each month. It's a win-win for Meridian customers, who benefit from cheaper power with no impact on their usage, and any reduction in non-renewable fuel is a win for New Zealand. For the decentralising electricity system, this programme is a cost-effective alternative to replacing aging ripple relay systems – ensuring a stable and efficient power grid.

21. This partnership with Meridian is just the beginning. We are trialling our DLC service with other New Zealand and Australian organisations, paving the way for broader adoption of demand side flexibility.

High-frequency power quality data service

22. Bluecurrent is also piloting a high-frequency power quality data service with Vector, New Zealand's biggest electricity distribution network. This new service delivers batches of five-minute power quality data reads every 20 minutes – up to 72 times a day – an innovation that provides electricity distributors unprecedented visibility of their LV network.

23. Greater LV network visibility gives distributors the ability to more proactively manage faults on their network and more quickly respond to, and recover from, outages and emergencies – improving local resilience. This enables distributors to more efficiently manage their network, reducing the need for costly network investment and helping reduce overall system costs and cost to consumers. Importantly, this improves the quality of electricity supply to the network's customers and the communities it serves.

24. It is in the LV network where electricity system decentralisation is mainly unfolding. As more New Zealanders adopt EVs, solar panels, and batteries, traditional one-way power flows are giving way to dynamic, two-way exchanges. Electricity distributors need near real-time insights – which is what our high-frequency data service delivers – to enhance predictive maintenance and optimise electricity distribution. This helps improve overall grid reliability and efficiency as the electricity system decentralises.

25. Bluecurrent is currently the only provider of this high-frequency power quality data service in New Zealand, which will soon become available in Australia. We expect to make this service available to other New Zealand distribution networks in three to six months' time through pilots that will enable distributors to make a robust business case. In the future, we will work with customers to make the delivery of critical services even faster.

26. Several leading network companies across New Zealand and Australia already harness the power of Bluecurrent's network operations data service, which has traditionally been delivered once a day (or in some cases every four to six hours) for network planning and optimisation.

Outage detection and management solution

27. In addition, Bluecurrent is planning to produce an outage detection and management solution (ODM solution) later this year (2025). Traditional outage detection relies heavily on customer complaints, creating significant delays between fault occurrence and restoration response. This reactive approach results in extended outage durations, reduced customer satisfaction, and increased operational costs.

28. Bluecurrent's ODM solution represents a transformative approach to power network monitoring, specifically targeting LV networks at customer properties. This intelligent system integrates three critical data streams to create a comprehensive picture of 'network health', which provides unprecedented visibility into network performance and outage events:

    a. Smart meter heartbeats in 5-minute intervals – provides continuous connectivity status from customer premises;

    b. Power quality monitoring – includes real-time voltage, current, and phase angle measurements at 5-minute intervals received every 15 minutes along with key alerts; and

    c. Weather data in 10-minute intervals – provides timely information on the environmental conditions affecting network performance.

29. The ODM solution will enable networks and retailers to respond to adverse weather events and restore services more quickly. It can focus on areas most in need through its ability to pinpoint meters that are offline and direct technicians to the site – promoting local resilience.

Concluding comments

30. Bluecurrent will continue to collaborate with others in finding smarter ways to help facilitate electricity system decentralisation so that New Zealand consumers and communities can better navigate this transformation and realise its benefits.

31. We are happy to discuss any aspects of our submission with the Authority and the important role of smart meters in the decentralisation of the electricity system. Please contact Matt Bostwick (Chief Customer Officer NZ) at [redacted] and/or Luz Rose (Senior Regulatory and Policy Partner) at [redacted]

32. No part of this submission is confidential, and we are happy for the Authority to publish it in its entirety.

Yours sincerely

Neil Williams
Chief Executive