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Electricity Authority
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By email: submissions@ea.govt.nz

Dear Electricity Authority,

Enabling Mass Participation in the Electricity Market

Thank you for the opportunity to comment on the Electricity Authority's (**Authority**) consultation on enabling mass participation in the electricity market (**Mass participation paper**).

We agree with the Authority that opportunities and benefits may be being lost or not developed (to the long-term detriment of consumers) because the rulebook doesn't accommodate new ways of doing things. Accordingly Contact welcomes the Authority's initiative to look into the key mechanisms to promote innovation and participation in the electricity market.

We support projects on the Authority's work programme that promote mass participation and innovation. Whilst amendments to the Electricity Industry Act 2010 (**Act**) (and its associated regulations) and Electricity Industry Participation Code 2010 (**Code**) have attempted to keep abreast of the disruptive environment now facing the provision of electricity to consumers, we consider fundamental change to the regulatory settings is required. We recognise that a more holistic review sits within the remit of a number of regulators (not just the Authority) but we do not believe this should be a barrier and encourage the Authority to continue to work closely with the Ministry of Business, Innovation and Employment (**MBIE**) and the Commerce Commission (**Commission**).

Consumers must be at the heart of the market settings the Authority is seeking to implement. In order for policy and regulatory settings to promote the long term interests of consumers we believe:

1. Regulators, and policy makers, must seek alignment about the 'Big Picture' and agree to the fundamental structural issues;
2. There must be a level playing field for participants in network and wholesale markets where the dynamics of competition thrive.

We elaborate on these key points below and provide detailed comments on the Authority's questions at the back of this document.

1) The Big Picture

Technological innovations in the generation, transportation, management, and consumption of electricity are beginning to give consumers greater choice and control over their use of energy than ever before. The potential for even greater consumer control is immense. Sitting alongside this movement is a broader move towards a more de-carbonised and sustainable world. These two factors are changing electricity markets all over the world and it is no longer sufficient to consider one aspect of the electricity supply chain, without considering the wider impacts. Contact believes New Zealand's electricity regulatory settings need to adapt to be fit for purpose in a dynamic environment.

Contact has and continues to advocate for structural reform.[1] We consider the existing regulation has resulted in suboptimal system outcomes for the industry, and the Authority has a mandate to help resolve this. We have encouraged the Commission to reconsider its position that structural reform is not required[2] and to work with the Authority, MBIE, and Government Ministers to ensure we capture the opportunity to create fit for purpose regulatory settings. We believe it is imperative for policy makers/ regulators to recognise the importance of market structure issues, and to act now to protect the long term interests of consumers. Waiting for market failure before acting risks creating a self-fulfilling prophecy.

The World Energy Council has utilised a framework recognising the complex interwoven links required to create a sustainable electricity system. Considerations of energy security, equity, and sustainability (**Trilemma**) provide a useful tool to support the development of New Zealand's electricity regulation. Contact supports the Trilemma because it balances the interests of all stakeholders, and promotes a holistic approach to meet the myriad of interests which can deliver on economic, social, and environmental outcomes for consumers. While we applaud the Authority's initiative to look at detailed issues regarding the barriers to mass-participation, we consider broader structural issues need to be addressed to better achieve the Authority's statutory objective - *to promote competition in, reliable supply by, and efficient operation of the electricity industry for the long-term benefit of consumers*.

2) Competitive Markets over Regulation

Emerging technology is a competitive activity

Emerging technology[3] is a fundamentally competitive activity. Emerging technologies will provide maximum benefits to consumers when competitive markets are free to innovate and provide products and services that consumers value. A market-led approach is consistent with the statutory objectives of the Authority (and also the Commission) to only regulate where there is no, or little prospect of, competition.

The existing regulatory arrangements were designed without the changes which are now facing the market in mind. Under existing arrangements, networks have the ability to fund emerging technology assets through their regulatory asset base. We believe this approach will result in:

- Consumers of regulated electricity lines services being disadvantaged by higher lines charges as a result of less competition in the provision of network services;
- Consumers of emerging technology products and services being disadvantaged as a result of less competition, and less product and service innovation; and
- The distortion of competitive markets (including spot and ancillary services markets).

Contact supports networks obtaining the benefits of emerging technologies by contracting for network services from third parties (including ringfenced network affiliates), funded through regulated operational expenditure (**opex**) (for example, a third party aggregator of battery storage providing a peak demand service to networks).

Create a level-playing field and open-access to networks

An open-access framework is vitally important to the development of dynamic, efficient and competitive markets. Creating an open-access framework will provide third parties with the

[1] http://www.comcom.govt.nz/dmsdocument/14524.
[2] http://www.comcom.govt.nz/dmsdocument/14340 see page 354.
[3] Emerging technology is taken to include (but not be limited to) solar photovoltaics, batteries, demand response, electric vehicles and associated infrastructure, and other new energy technologies which can be provided by a competitive market.

confidence to invest in businesses which can supply network support services. Contact supports networks operating as a platform for services - acting as neutral facilitators providing the information, system operation, network infrastructure and management functions necessary to support the development and delivery of reliable and innovative products and services by competitive energy service providers. The International Energy Agency (**IEA**) has said the platform for services model would:[4]

> *"Support more efficient and transparent transactions between multiple market participants, thereby increasing competition and innovation, reducing transaction costs, and facilitating greater harnessing of benefits resulting from the more effective integration of a diverse range of suppliers and new technologies. Furthermore, it maintains a more effective separation of contestable and natural monopoly functions, resulting in a more coherent set of commercial incentives for distributors consistent with the principles of sound governance and efficient delivery of their core functions."*

Network transformation into a 'platform for services' model does not in itself prevent the network developing an arm of the business which competes in the provision of network services to the regulated entity. Given the existing development of the "value-added services" network model in New Zealand, and to ensure future network decision making on investing in the provision of "value-added services" is on the basis the business will need to operate as a standalone independent entity, ringfencing is required to support networks acting as *neutral* platforms for services. Contact acknowledges ringfencing involves administrative costs, but believes these will be greatly outweighed by the long-term benefits to consumers derived from competitive markets.

In the absence of a level playing field for network services it is possible that New Zealanders will pay more for network services than they otherwise could.

Pricing and network tariffs

Contact considers the Low User Fixed Charge regulations (**LFU regulations**) are ill-targeted, and lead to cross-subsidies from some consumers to others. There is widespread support[5] for the LFU regulations to be replaced with more effective measures to support low income consumers. We are particularly conscious of this as more flexible and efficient products for harnessing demand response and energy efficiency begin to emerge. It is estimated the retention of the LFU regulations combined with "cost reflective" pricing will cost New Zealand ~$200m/ year.[6] We welcome the opportunity to support the Authority and/or MBIE to develop potential solutions.

We consider controlled load network tariffs are a legacy of the state of technology at the time they were designed and implemented. We agree with the Authority's position in the Mass participation paper that more capable technology than that used to support network controlled load tariffs now exists, and it is no longer necessary for networks to own and control the assets that support network reliability. Networks monopolising the provision of load control through controlled load tariffs is incompatible with the development of competitive network services markets.

Contact supports the implementation of more "cost-reflective" network tariffs. However, we believe creating efficient incentives for demand response through network tariffs requires real-time dynamic pricing. This would involve significant complexity and a very long lead time, and we consider

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[4]*Energy Policies of IEA Countries: New Zealand 2017*, IEA, Paris; http://dx.doi.org/10.1787/9789264272354-en.

[5]Above n 4.

[6]Concept Consulting (2017). *Electric cars, solar panels, and batteries in New Zealand Vol 3: The socialimpact.*http://www.concept.co.nz/uploads/2/5/5/4/25542442/new_technologies_social_report_v3.0.pdf.

distribution demand response programs are a pragmatic and efficient alternative to send targeted pricing signals which incentivise investment and behavioural change to support network requirements.

Wholesale markets

The grid is becoming more dynamic as a result of intermittent renewables like wind and solar, changing synchronous inertia, and greater consumer participation through behavioural and technology response to wholesale and network price signals. These trends are expected to continue as further decarbonisation of the grid occurs and consumer technology uptake accelerates. Greater demand side participation will require market settings to evolve to maintain efficient wholesale markets, support a stable national grid and distribution networks, and promote the long-term interests of consumers.

We believe market settings require:

- Competitive neutrality between all forms of technology (large/small, generation/load)
- Markets which enable price discovery rather than mandatory provision of services
- A wholesale spot market with forecasting and visibility of consumer participation
- More flexible reserves and frequency keeping products
- The avoidance of cost or size barriers to entry for mass participation.

In our view the transition to new technologies presents real challenges to supply if back up generation is not supported during that process. Our response to question 13 discusses elements of the energy, reserves and frequency keeping market design which could support greater mass participation.

Summary

Contact supports the Authority's intention to look into key mechanisms to promote innovation and participation in the electricity sector. We strongly believe the promotion of more competition, particularly in relation to monopoly services, is in the best long-term interests of consumers. Increasing efficiency in the electricity system and lowering delivered electricity costs is also an important enabler of the continued decarbonisation of the New Zealand economy (through leveraging our plentiful renewable energy resources). We encourage the Authority to refine its work programme to include a holistic, system-wide approach to reduce structural barriers to mass participation. Contact is enthusiastic about the opportunities afforded by emerging technologies, and supports the Authority taking action now to ensure those benefits flow through to consumers.

It is incumbent on all participants in the industry to see if new technology can more effectively manage the growth and ageing of assets in NZ and ultimately deliver benefits to consumers. We believe this will be best served by open competitive markets and a sector that is well governed and operates with maximum transparency.

We look forward to continuing to engage with the Authority.

Yours sincerely

Louise Griffin
Head of Regulatory Affairs & Government Relations

Contact Energy's response to questions

Q1. What is your view of the potential competition, reliability and efficiency benefits of more participation?
We agree with the Authority that mass-participation is likely to deliver significant long-term benefits for consumers through more competition, a more reliable supply of and more efficient electricity industry. However, the transition to new technologies presents real challenges to supply if back up generation is not supported during that process.
Q2. What is your view of the opportunities to promote competition and more participation in the electricity industry?
We agree with the Authority that competition can bring very large benefits to consumers over the long term by promoting entry by innovative suppliers and efficient investment. We believe the dynamics of competition, not regulation, particularly as applied to new technologies, will deliver the best outcomes for consumers. A level playing field will ensure participants compete on equal terms to deliver products and services offering more certainty, choice, and control for consumers.
Q3. What other issues might inhibit efficient mass participation? Please provide your reasons
We agree with the areas identified by the Authority where changes to the Act, the Code, and associated regulations may achieve long-term benefits for consumers. We do emphasise, however, that in focusing on the minutiae of particular features of the electricity system, for example P2P, the Authority may miss an opportunity to meet its statutory objective through more fundamental structural changes. We discuss these opportunities throughout this submission.
Q4. What is your view of the opportunities for network businesses to obtain external help to provide aspects of the network service using competition or market mechanisms?
We agree with the Authority that a network support service will deliver significant benefits to consumers, and that adopting a market-based approach will foster competition between network support providers and encourage innovation. Further, we agree that dynamic aspects of competition will bring down the costs of providing network support, which will outweigh any loss of economies of scope benefits network businesses may have obtained. The Authority stated that distributors are planning on collectively spending an average of \$750m per year on network assets from 2016 to 2026; we note that if Transpower is included average spend is ~\$1b per year, or \$10b over the next decade. We believe exposing this spend to a competitive network support services market should deliver lower costs for distribution network consumers, and result in the development of a more innovative and valuable range of products and services for consumers in general. Reducing the cost of network services will also support the long term competitiveness of New Zealand's largely renewable electricity system, providing important opportunities to further decarbonise the New Zealand energy and transport sectors.
Q5. What do you think are the main challenges to be dealt with to increase the use of competition in supplying network services? What are your reasons?
Over the past 12 months Contact has commenced the development of a network services capability. During this time we have identified a number of potential areas where challenges exist and market development could support the establishment of a competitive network services market. Accordingly we see the main challenges as: • The use of network controlled load tariffs

- The interaction between network tariffs and network load control
- The development of network demand response programs

1) Network controlled load tariffs are not compatible with a competitive network services market

Contact has identified a number of legacy market settings in relation to network controlled load tariffs that are preventing the development of competition in a world where technology is enabling consumers or their agents to provide demand management services to a range of parties.

Networks currently offer uncontrolled and controlled tariffs to customers, and both are treated as part of the 'regulated service'. However, it is important to recognise the distinction between the tariffs:

- Uncontrolled tariffs reflect the cost of a network providing the monopoly lines service.
- Controlled tariffs are a form of demand management service. They procure load control from customers with the aim of reducing the cost of the monopoly lines service. These tariffs are used in connection with network company ripple control systems.

Because controlled load tariffs are structured as part of the regulated service, they effectively preclude the competitive provision of demand management. We believe controlled load tariffs are a legacy of the state of technology at the time they were designed and implemented. We agree with the Authority's position in the consultation paper that more capable technology now exists, and it is no longer necessary (nor desirable) for a network business to own and control demand response assets that support network reliability.

Ensuring network demand management services are contestable, rather than part of the monopoly service, will drive competition between third party service providers, spurring innovative and efficient service offerings which promote customer choice, as well as optimising and maximising value (including customer services, wholesale energy and ancillary services, and network services). This will help ensure the most efficient demand management solutions are developed, for the long term benefit of both networks and customers.

In the table below we have identified a number of issues with controlled load tariffs that may prevent the value of demand response being optimised for both consumers who own the demand response, as well as the broader energy system (which will ultimately benefit all consumers through lower delivered electricity costs).

Issue	Comment	Potential solution
Technology neutrality	Controlled load tariffs have traditionally involved the use of ripple control systems and ripple receivers to turn off load circuits in the home. For customers to access the available benefits of providing network demand response, they have had to utilise this technology. As the Authority has highlighted in the consultation paper, more capable technology is now available (and continues to rapidly be improved), which can enable consumers to achieve greater utilisation of their demand response. New technology not only enables granular control, but can provide valuable real-time telemetry information to consumers, networks and other market participants.	Network support incentives should be technology agnostic (subject to meeting appropriate service level standards).
Neutrality between types	Traditionally, controlled load tariffs have predominantly targeted mass market hot water heating. Continuing with this approach risks	Network support incentives should be equally available to all competing forms of demand

of demand response	networks "selecting" one form of load and/or technology over others, rather than allowing a competitive market to determine the most efficient and lowest cost form of demand response.	response (not just across asset type – hot water, batteries, electric vehicle charging etc., but across customer class – residential, SME, C&I etc.)
Efficiency of controlled load discounts	Controlled load tariffs tend to offer lower c/kWh network rates for distributor load control (through either a separate controlled supply or a combined tariff with uncontrolled load). This results in, for example, a consumer with a small load receiving much less of a benefit than a consumer with a large load, even when they provide a comparable load control service.	Network support incentives should be separate from network tariff rates and accurately reflect the value of the demand response being provided.
Creating "ACOT" issues in distribution networks	Controlled load tariffs are offered across an entire network region. As a result, new load control continues to be incentivised in areas where there is no foreseeable network requirement. Because the load control is not providing any network value, the discount that is provided to these customers is inefficient, over-rewarding some consumers and causing higher network charges to other network users.	Network support incentives should be efficiently targeted within a network region to ensure that the load control is actually reducing network charges to consumers.
Operational status of ripple systems	Controlled load tariff discounts continue to be provided in network areas where ripple systems are no longer operational, and hence the discounts that are provided to these customers result in higher network charges to all other network users. We believe the Authority should review this practice to understand the magnitude of the issue.	Network support incentive payments should only be made subject to appropriate measurement and verification to ensure that the load control is actually performing.
Value and optimisation of demand response	Controlled load tariffs have generally "locked up" usage of the customer's demand response (including through UoSA clauses specifying that if a consumer is on a controlled tariff no other party can use the demand response). This results in the network being responsible for optimising the value of the demand response by providing, for example, wholesale and ancillary services. Benefits obtained from providing these services flow to networks as unregulated income with no benefit provided to customers. We query whether these arrangements are resulting in overall optimisation of DER assets, whether regulated entities are best placed to generate unregulated income, and whether consumers are obtaining maximum benefit from demand response.	Network support incentives should be structured to only obtain benefits for the network service, and networks should not be responsible for the optimisation of customer demand response assets.

In addition to the issues identified above with controlled load tariffs, mandatory load control is likely to reduce competition. Competitive markets enable price discovery and will ensure the most efficient form of demand response is utilised, for the benefit of consumers.

2. The interaction between network tariffs and network load control is an important consideration

Network direct load control has functioned in an environment where "flat" network pricing structures have prevailed (noting that this predominately relates to mass market consumers). Distributor movement of load (for example, by turning off a hot water cylinder) in this flat tariff environment has generally not impacted the level of network charges payable by the individual consumer. With networks moving towards “cost-reflective” tariffs and retailers developing their systems to enable half-hourly network reconciliation by ICP, a number of issues are arising in how to structure load control alongside cost-reflective tariffs.

Where network charges are based on cost-reflective tariffs, distributor direct load control can result in, for example, the heating of hot water during a period in which customer load materially influences their network charges. This could have adverse outcomes for a consumer, or for the consumer’s retailer (depending on the consumer’s tariff preference and who bears the risk of the network charge). We have identified two potential methods of resolving this issue, which are discussed in the table below. Additionally, some networks appear to be dealing with this issue by requiring controlled load to be on a separate supply, and we also discuss this approach in the table below.

Potential solution	Comments
1. Dynamic, localised network tariffs	This solution would alleviate the need for network direct control of load or for network demand response programs, by providing all price signals through the tariff. For this to be successful, tariffs must be sufficiently granular both temporally and geographically to provide a targeted signal to facilitate efficient investment and demand response. Network prices must be dynamic, as event based tariffs like Transpower’s RCPD charge will likely result in all demand response being provided at the same time, which may create grid stability issues. Advantage • Could enables networks to “fine-tune” demand response for network operations through the adjustment of prices in real-time • Prevents having separate incentives through a network tariff and network demand response program • Economically efficient pricing would encourage or discourage load at specific times in specific locations thus significantly reducing cross-subsidisation Disadvantages • Very complex, and introduces complexity to 100% of network load, which isn’t necessarily required if demand response can target certain areas • Developing new network tariff structures is challenging, Victoria’s experience in Australia with demand charges is an example • Relies on having real-time network information at the medium and low voltage level, information which is unlikely to be available for some time • “Markets” at the distribution level (especially at the medium and low voltage level) may be illiquid and easily influenced by a small number of participants • Unclear whether can provide sufficient certainty for network operations or for providers of demand response • More of a “stick” than a “carrot” approach for consumers • Regressive pricing policy that could negatively impact those least able to afford technology to manage complex and changing price signals Summary • Whilst this may be a long term solution, we believe it is likely to remain impractical within the next decade, and an interim solution is required.
2. Structured network tariffs alongside demand response programs	This solution relies on implementing more cost-reflective network tariffs than currently exist, and structuring network demand response programs that separately reward demand response behaviour in targeted zones, alongside the tariff. Consideration of different “cost-reflective” tariff types:

	• Capacity charges will likely work in this scenario, but provide little or no signal to a customer on the cost of providing the network service.
	• Demand charges may work depending on the actual structure. For example:
	  • Taking a customer's average peak over 4pm-8pm weekdays results in demand charges being based on response over ~1000 hours pa. This may not prevent the development of competitive network demand response programs alongside the tariff, which are likely to require 20-100 hours of participation per year, as customers underlying network tariff charges are unlikely to be materially influenced by DR participation.
	  • On the other hand, a network charge based on targeted control periods for 100 hours per year will likely be a barrier to the development of competitive network demand response programs alongside the tariff. From a customer perspective there will be a large risk that participation in the demand response program will materially impact their underlying network tariff charges.
	• TOU charges seem to be the approach being favoured by distributors, which in this context we support as we believe this type of charge will not prevent competitive demand response markets from developing alongside the TOU network tariff, as consumer demand response won't materially impact the overall level of network TOU charges payable.
	
	Advantages
	• Tariff can send general signals about the cost of using the network to consumers without "over-incentivising" demand response
	• Rollout of tariffs is more achievable than "real-time" tariffs
	• Real-time complexity is managed through demand response programs rather than through the tariff, making implementation more achievable and targeted
	• Demand response program can send targeted signals to support efficient investment and operation of demand response
	• Demand response program can provide more certainty for networks and enable dynamic control of demand response
	• Provides a distinct, monetary incentive for consumers to participate and can provide more price, volume and tenor certainty to providers of demand response
	• For TOU pricing, customers understand the pricing structure and can change behaviour to respond to the TOU price signals
	
	Disadvantages
	• Separate incentives through a network tariff and network demand response program rather than one signal to consumers
	• Reduced dynamic efficiency - trade off required to deliver investment certainty to enable innovation
	
	Summary
	• We believe this is a pragmatic, efficient solution which can lower the cost of network services without introducing undue complexity on the industry. It can also be implemented now as a step towards a possible long term objective of dynamic, locational network pricing.

3. Separate metering and wiring for network controlled load tariffs	This solution is being progressed by a number of networks as a method of retaining direct control of demand response assets, whilst rolling out more cost-reflective tariffs.

	Advantages • Network direct load control doesn't impact broader network charges Disadvantages • Risk perpetuating the issues with controlled load tariffs identified above including preventing the development of competitive demand response markets • Imposes additional costs on the industry in bespoke metering configurations and wiring behind the meter, creating an unnecessary barrier to accessing the system efficiency that competitive demand response can deliver (developing appropriate measurement and verification methods can present a more durable and cost-effective approach) • Solutions that require a specific meter or meter configuration or specialised wiring to a meter, which is typically installed externally, limit flexibility and have practical limitations and the majority of DERs are developed with telemetry as an intrinsic function that can be connected to an external management platform at low cost • Likely to be unsustainable as networks look to implement more sophisticated demand management which involves a range of distributed energy resources (such as batteries and electric vehicles) • Prevents consumer from integrating loads behind the meter – for example using battery storage from an energy storage solution or electric vehicle (which might be on a separate network controlled load supply) to power uncontrolled home loads without exporting and re-importing power. Summary • We don't believe this solution is in the long-term interest of consumers. The approach imposes unnecessary additional cost on the electricity system and imposes a barrier to demand management of a wide range of devices, stifling development of competitive network services markets.

In summary we support the implementation of cost-reflective tariffs without the complexity and long lead time of introducing real-time dynamic pricing, and complementary distribution demand response programs are a pragmatic and efficient alternative. We also believe network tariffs should be based on a single supply without distributor load control, and tariffs should be technology agnostic.

3. Demand response programs can be used to establish a competitive network services market

Distribution demand response programs have the potential to significantly lower the cost of network services. We have identified a number of key elements which we believe are essential to the development of demand response programs.

Element	Comments	Requirement
Price and volume risk	Participants in the Transpower demand response program take both price and volume risk on the amount of network support revenue they will generate (as does Transpower). We question whether this structure, at least in the short term while network service markets develop and become more liquid, can support investment in demand response capacity by participants and avoided network spend by networks. Certainly at the distribution level, where demand response markets	Firm contracts with price and volume certainty are likely to be required to support the development of network services markets. Non-network alternatives should be treated equally with

	will be even more illiquid with in some cases possibly only one service provider for a particular network requirement, we think more price and volume certainty is required. To highlight a couple of examples of this issue: • A network may have two energy storage service providers to supply capacity to a distribution transformer, and both may be required at times of peak demand. In the absence of contractual obligations, the network service providers have unconstrained pricing power. • In a warm winter where little demand response is required, a demand response provider may earn little to no revenue, whereas if the network had invested in traditional infrastructure, consumers would have continued to pay for a return on network's assets.	traditional network spend.
Contract duration	Participants in the Transpower demand response program are offered short term (even <1 year) demand response contracts. Whilst this is fine for a trial, we don't believe this duration of contract can support investment in demand response capacity – not just "new" energy assets like batteries but also smart controls for existing energy assets, and query whether it can support the deferral or avoidance of network spend. Network infrastructure continues to earn a return throughout the "capex cycle" as spare capacity increases with further network spend and decreases with demand growth. Non-network alternatives to transmission should receive the same level of revenue certainty as traditional transmission investments to ensure a level playing field approach and to optimise transmission system efficiency, as they can form part of an integrated transmission or distribution network.	Longer duration contracts are likely to be required to support the development of network services markets. Non-network alternatives should be treated equally with traditional network spend.
Network direct device control	We believe networks contracting for a demand response outcome is preferable to networks contracting for direct device specific control. This approach will: • Create a more flexible, competitive demand response market • Put a degree of control separation between network demand response and the potential impact on network charges • Enable third party providers the flexibility to manage the network support within a portfolio by optimising which network support assets are best placed to provide the service at any point in time • Enable third party providers to co-optimise the network support with other services which the portfolio may be able to provide at the same time, rather than have device dispatch controlled by the network	Networks should contract for an outcome (ie 1MW of demand response capacity at specified times/locations/shapes) rather than direct device control.

	• Allow for providers to create programs that encourage participation while accommodating the flexibility requirements expected by consumers	
Medium and low voltage network information	Real-time network information with appropriate rules requiring making this data available to competitive market participants is important for the identification and development of network support opportunities and the delivery of efficient network management solutions. We support measures to facilitate greater network investment in data collection and publication, including the inclusion of power quality targets at the medium and low-voltage level. We also support the development of rules around the standardised, transparent disclosure of this data to competitive market participants.	Ensure networks are better incentivised to invest in real-time network information at the MV and LV level and to make this available to competitive market participants
Standardisation, transaction costs and barriers to entry	Developing network support opportunities on a bespoke basis can be resource intensive, which contributes to the overall competitiveness of non-traditional network solutions. Structured demand response programs can provide networks with a mechanism to bring opportunities "to market", for the benefit of both networks and network support providers. Standardisation across all distribution network regions will lower barriers to entry and help network support providers achieve economies of scale to reduce the cost of services.	Standardise demand response programs across distribution networks
Service delivery verification	Contracting demand management services through DERs controlled by a third party service provider over a cloud-based control platform using wireless communications methods (and not via direct-wired and separately metered DERs) creates an element of service delivery and service verification uncertainty for networks. Controlled DERs typically have intrinsic measurement, logging information and telemetry that can be transmitted over existing communications channels, enabling verification of the service delivered. DER data, transmitted in real-time, at sub-5 minute intervals will become increasingly critical to estimate and provision services within acceptable service levels and at sufficiently granular levels, a requirement that existing metrology deployments are not designed to handle or accommodate.	Common, commercial standards are likely to develop amongst industry participants around verification levels necessary to support a network paying for the delivery of third part demand management services.

Q6. What is your view on whether open access is required and what would be the elements for an effective open access framework?

Open-access is vitally important. Creating open-access will provide third parties with the confidence to invest in businesses which can supply network support services.

We identify below a number of key elements to the establishment of an effective open-access framework. These have been raised previously through the Commerce Commission's Input Methodology Review.

Element	Comments

Network ownership of contestable distributed energy resource (DER) assets including batteries should not be included in regulated asset bases	DERs have the potential to provide value in a number of points across the electricity system value chain, including delivering customer services (resiliency, bill management, distributed generation optimisation), network support services and wholesale energy and ancillary services. Although DERs can be used to support the management of a network, these assets are not "natural monopoly" assets like traditional poles and wires. The provision of DERs, whether at the grid level or behind the meter, can now be undertaken by a growing number of participants. This growth in technology and provider choice shows that DER assets are fundamentally contestable, meaning their deployment will be most efficiently delivered through competitive markets. To treat the deployment of DER as regulated monopoly assets would be perverse, likely leading to materially less efficient outcome than enabling DER rollout through competitive markets. The greater the proportion of network spend which can be subjected to competitive market forces rather than economic regulation, the greater the long-term benefits to consumers will be. An example is the development of grid-scale batteries which is underway by numerous networks in New Zealand. Our own experience suggests we could have delivered at least one of these projects at a materially lower cost and with higher customer value through the aggregation of small-scale customer located batteries than the grid-scale project costs which were reported through publically available media. This would have reduced costs to consumers of regulated lines services and added additional electricity system value by delivering to customers electricity resiliency, bill management and distributed generation optimisation benefits. In our view the lack of competitive tension in the supply of these network service has already resulted in networks making technology decisions on behalf of lines consumers who pay for the service, rather than competitive markets determining the lowest cost method of providing the network service. We have commented extensively on this topic within various Commerce Commission Input Methodologies review submissions. We have also stated a view that Parliament's original purpose with the input methodologies was to regulate monopoly services and not services which are subject to competitive market activity. Various definitions within the relevant legislation, which were drafted prior to DERs emerging as competitive assets which can provide network support, have resulted in the current environment where DERs, at grid level or behind the meter, can arguably be treated as regulated assets by network monopolies. We believe rectifying this situation, through well-considered legislative change, is essential to the development of an effective open-access framework.
Network ownership of other load control assets including smart meters and ripple receivers should not be included in regulated asset bases	There has been little commentary to date on the same legislative provisions which enable batteries to be included in network regulated asset bases, also enabling other load control assets to be included. Using hot water control as an example, networks can include ripple receivers, smart meters with integrated load control, or any other device (including one that responds to a long-wave radio signal as mentioned by the Authority in the consultation paper) which is used to control the hot water cylinder, in the regulated asset base. The same technology can be used to control other customer demand response assets including, for example, electric vehicles and space heating.

	Similar to batteries, these load control assets are fundamentally contestable, and enabling networks to leverage regulated funding to compete with parties who need to commercially recover the cost of supplying these assets, risks crowding out third party investment and is a barrier to the development of a competitive network services market. With respect to metering specifically, we note that in Australia metering is considered a contestable service, and the ring-fencing guideline introduced by the AER in 2016 prevents networks from providing metering services. This is in contrast to New Zealand, where a number of smart meter assets have been rolled out through network regulated asset base funding. This regulated asset base funding approach has the potential to distort the development of a competitive network services market, as networks look to leverage regulated metering assets by providing load control services to other parties, including electricity retailers. We believe metering assets should be owned by metering service providers who own assets independent of network regulated asset bases. In support of this position, Contact is currently working with a metering provider to trial a product which enables real-time telemetry and demand response integrated within the smart meter. We also note that the metering infrastructure in The Lines Company network region provided by FCLM is currently providing a dual-service to both retailers and the network, which is reducing the cost of the service for both parties. By providing a service to both the network and retailer, this model prevents the potential for consumers to pay for two sets of metering infrastructure (which is happening in one network region in New Zealand). We believe creating a market where metering providers compete to provide standard metering, load control and other services to a range of parties will enable the industry to maximise the benefit metering and communications infrastructure can provide to consumers and the electricity system.
Network regulated assets prevented from participating in competitive markets	This element of an effective-open access framework would not be required if networks were not able to utilise regulated funding to own contestable assets. However currently networks can own and leverage contestable assets by participating in competitive markets and generating unregulated income. Grid-scale batteries provide an example. We understand at least one regulated network battery is participating in the Transpower demand response program. Contact also participates in the Transpower program, and as a result our privately funded assets are competing with regulated funding to generate revenue. In our view, this is not a level playing field as regulated investments are lower risk with lower funding costs, creating an effective barrier to the development of a competitive network services market. We also understand networks are looking at providing wholesale services from regulated battery assets, and we share the concerns raised by the Authority in a letter to the Commerce Commission in June 2016, about the implications of these activities for long term competition in the wholesale spot and ancillary markets. We believe the dynamics of competition are more likely to result in the use of contestable assets being optimised to maximise the value to multiple parties, which will reduce the cost to distributors of acquiring network services, and as a result will ultimately reduce the cost of lines services to consumers, for their long term benefit.

Network use of contracted load control is for network management purposes only and not for competitive markets	We have previously commented in a Commerce Commission submission on network businesses using regulated funding to contract hot water load control (through the form of controlled load tariffs and an accompanying UoSA clause which prevents other parties from using the already-controlled load control asset), and then utilising the control to generate other unregulated income in the form of reserves revenue. Contact is a participant in the reserves market and as a result our privately funded assets are competing with regulated funding to generate revenue. More importantly, customer-owned DERs are being leveraged by network companies to participate in these markets and generate non-regulated revenues – which customers do not benefit from. In our view, this is not a level playing field, is not conducive to the development of a competitive network services market, nor is it a fair use of customer DERs. Other examples we are concerned about include the potential for: • Distribution networks contracting load control / demand response and using it to participate in the Transpower demand response program • Transpower contracting load control / demand response and using it to provide network support services to distribution networks We note that the AEMC published a Distribution Market Model draft report in June 2017 which focused on the "*key characteristics of a potential evolution to a future where investment in and operation of distributed energy resources is 'optimised' to the greatest extent possible*". The AEMC describes the optimising function as "*responding to signals that inform how to invest in or operate a distributed energy resource in a way that delivers the most value at a particular point in time.*" In terms of who provides the optimising service, the AEMC *"considers that well-functioning markets are the best means to manage the complex task of optimising investment in, and operation of, distributed energy resources".* Further, the AEMC formed a view that *"The interests of a party who is responsible for providing common distribution services (i.e. a DNSP) are [therefore] unlikely to be independent from the function of optimising the various services that can be provided by distributed energy resources*" and concluded that "*the Commission does not consider it appropriate for the party who is responsible for providing common distribution services (i.e. a DNSP) to take on the function of optimising investment in and operation of distributed energy resources and the services that they provide".* We agree with the AEMC's position, and believe a critical element of an effective open-access framework is to require that when networks contract demand response, the use of the demand response must strictly be for their own network management purposes only.
Network regulated spend on DER control systems is for network management purposes only and is designed to facilitate competitive network services markets	We understand that some networks appear to be proposing to spend tens of millions of dollars of regulated funding on distributed energy resource control systems. Consistent with the section above, in our view it is essential that these systems are designed and operated for network management purposes only, and not for broader energy market optimisation including wholesale spot and ancillary services. Where regulated funds are spent on network DER control systems, the systems should not be used to provide competitive market services to other parties, including customers, in other network regions. Allowing this over-spill into competitive markets will crowd out independent network service providers,

	who are required to spend private capital to develop DER control systems, to compete with networks who are leveraging control systems paid for by regulated consumers. It is also important that network DER control systems are designed from the outset to integrate demand response provided by third party network service providers into network operations. An example is the current Transpower demand response platform which provides event signals to program participants at times of high transmission network demand. We believe this area warrants close attention from the Authority. In our view, as a result of the current market settings, there is a risk that networks proceed with costly implementation of control systems which focus on direct control and optimisation of network owned or contracted DERs, rather than the use of third party network support providers. This approach to designing network control systems may not only become a barrier to the development of competitive network services markets, but may become an entrenched position which becomes challenging for regulators to overcome as networks inevitably increase investment in DER control systems and assets.
Regulatory investment tests to govern network growth and replacement capex spend	The current network monopoly regulatory regime was (by definition) developed at a time when there was no competition, and little prospect of competition, in the supply of the network service. Technological change and associated cost decline is making non-network solutions increasingly viable alternatives to new and replacement traditional network assets. As a result, it is in consumers' long term interests that a new and more rigorous, transparent decision making process by networks is created to ensure that lowest cost solutions are deployed for consumers. A method of achieving this is the use of regulatory investment tests, which have the purpose of ensuring networks use appropriate measures to identify the most economic investments among all possible alternatives, including non-network alternatives. Currently in New Zealand, investment tests are only utilised by Transpower for major capex which involves investment greater than \$20m. On average, this equates to ~5% of total network capex spend each year in New Zealand, and hence the majority of network capex spend is not subject to external scrutiny through an investment test. In Australia all transmission capex spend above \$6m, and all distribution capex spend above \$5m, is subject to a regulatory investment test. Further, in April 2017 the AEMC published a draft rule determination to extend the investment test to all network replacement and refurbishment capex. Because of these arrangements, a far higher proportion of network capex spend is subject to an investment test in Australia than New Zealand. Further, as we noted in a recent Commerce Commission submission, the Australian Energy Council (AEC) recently submitted a rule change request to the AEMC which included to *"lower the regulatory investment test for distribution (RIT-D) threshold to \$50,000, with some form of shortened RIT-D process applying to these investments"*. The rationale for the rule change request included "*this lower threshold of \$50,000 is set to capture activities such as distribution substation (transformer) upgrades where either small scale or BTM (behind the meter) generation or storage may represent an equivalent technical and superior financial alternative to any asset upgrade"*.

	We believe a rigorous and transparent decision making process by networks is essential to an effective open-access framework, and encourage the Authority and other regulators to review investment test tools which are being developed in other jurisdictions, assess the costs and benefits of greater transparency in determining suitable investment test thresholds, and to work with stakeholders on the implementation of tools suitable for the New Zealand market.
Network information disclosure must support the development of network service markets	Contact appreciates that networks currently disclose an extensive amount of information in asset management plans and other network disclosures. However, in the experience we have had to date, these materials are generally not designed to efficiently convey the network location and potential value of network service opportunities to third party network support providers. Discussion on "network alternatives" in these materials is also usually limited to the network's own consideration of alternatives, such as installing grid-scale batteries as a regulated asset, rather than the potential to leverage third party investment and control of distributed energy assets. As a result, identifying and progressing network support opportunities can become a very resource-intensive process, which raises barriers to entry and as a result may hinder the development of competitive network services markets. We note that in Australia, the National Electricity Rules require that if a distribution project is subject to the regulatory investment test, the distributor must prepare and publish a non-network options report. The report must include, amongst other requirements, a description of the need, the annual deferred augmentation charge associated with the need, and the technical characteristics that a non-network solution would be required to deliver, including the location, size of load reduction or additional supply, and the operating profile. The report must also provide information for network support service providers including how to submit a non-network proposal for consideration by the distributor. In our view, requiring networks in New Zealand to publish non-network options reports would certainly assist network support providers in developing credible solutions for consideration by networks. We encourage the Authority and other regulators to review tools which are being developed in other jurisdictions to achieve equal access to information between networks and third party service providers, and to work with stakeholders on the implementation of tools suitable for the New Zealand market.
Network incentives must be neutral between capex and opex regulatory spend	We recently commented in a submission on the Transpower Capex input methodology review that regulators should consider whether any regulatory provisions incentivise networks to spend capex over opex solutions. Two areas we believe are critically important to the development of competitive network services markets, and worth consideration by regulators, include: • Ensuring networks can substitute capex for opex within a DPP period. For example, if three years into a DPP period a third party solution emerges as more efficient than a capex solution, networks must have the flexibility to substitute that option without being financially disadvantaged. We have previously raised the use of a "totex" allowance, rather than separate capex and opex allowances, as an option which could be considered. • Ensuring network regulated WACCs do not incentivise networks to favour capex over opex solutions. Currently a 67th percentile WACC is used in setting allowable network revenues, which by definition provides excess

	returns to networks on capex spend. We believe regulators should review whether in an environment where non-network alternatives are increasingly competitive with traditional network infrastructure, a 67th percentile WACC remains justified.
Ringfencing between networks and affiliates to govern involvement in contestable activities	We consider the elements of an open-access framework we have discussed above to be fundamental to the establishment of a level playing field between networks and third party network service providers. Further, we believe that ring-fencing is fundamental to the establishment of a level playing field between network affiliates and third party network service providers. Networks have a large amount of information about their electricity network, and if networks choose to participate in contestable services such as demand response, this should be done through ring-fenced affiliates to ensure the network affiliate does not have any advantages over competing providers. In our view ring-fencing can achieve the following objectives: • Prevent the risk of networks cross-subsidising contestable services with revenue earned through the provision of monopoly distribution services, by ensuring market based operational and contractual terms are developed between networks and third party network support providers • Prevent the risk of networks favouring their own network affiliates by ensuring equal access to network service opportunities for all competing providers, and ensuring information asymmetry between network affiliates and third party network support providers • Prevent the ability of network affiliates to leverage people and internal systems which are funded through regulated capex and regulated opex by the regulated network entity, to ensure a level playing field with third parties who must privately fund people and systems for their business We have previously noted in a Commerce Commission submission that the AER has supported the use of ring-fencing in Australia to promote the long term interests of consumers, and a draft guideline was published in November 2016 requiring all distribution networks to comply with the requirements by January 2018. The guideline requires networks to separate the legal, accounting and functional aspects of monopoly distribution services from any other services provided by the network or a related affiliate. This includes any contestable activities such as metering and energy storage services. In our view, ring-fencing is required as part of legislative change to restrict network monopoly ownership of contestable assets including energy storage within the regulated asset base. We encourage the Authority and other regulators to assess the costs and benefits of implementing ring-fencing as soon as practicable, as maintaining the status quo is enabling networks to continue building competitive energy services businesses which leverage people and systems from within the regulated network monopoly. There is a risk that separating these businesses will become a more difficult regulatory task as the businesses become more entrenched over time. The implementation of ring-fencing would also provide confidence to third parties to invest in building network services businesses, which is critical to the development of competitive markets.
Electricity Industry Act 2010 – separation of distribution, generating and retailing safe harbours	We consider it appropriate to revisit the safe harbours created for distributors enabling them to be involved in an electricity generator and an electricity retailer, in light of likely increased roll out of distributed, scalable non-network alternative technologies. Currently these safe harbours are 'one size fits all' – they have no regard to the scale of the operations of the individual distributor.

	The appropriate size of the safe harbours needs to be considered in light of all of the open access settings described above; the level of additional competition delivered by enabling distributors to be involved in an electricity generator and an electricity retailer is materially influenced by their underlying ability to leverage their monopoly power to compete in competitive markets.

Q7. How effective are the existing arrangements for open access? What are the problems?

We don't believe the existing arrangements for open access are as effective as they can be to promote an efficient electricity industry for the long term benefit of consumers. Under the existing arrangements, if networks choose to compete in the provision of energy and network services, they have material advantages over non-regulated competitors. We have discussed what we believe are the elements of an effective open access framework in the table above, and highlight below a number of existing problems based on network activity, including:

- Rolling out grid-scale and behind-the-meter energy storage a) using regulated funding, and b) without third parties being offered the opportunity to provide credible, lower cost/higher value alternatives;
- Utilising the deployment of regulated battery storage assets at customer premises as an opportunity to generate income through retailing solar to the customer at the same time;
- Utilising regulated grid-scale energy storage to participate in competitive markets including the Transpower demand response program;
- Utilising controlled load tariffs and leveraging monopoly infrastructure for:
    - Commercial gain through participation in competitive reserves markets
    - Commercial gain through offering load control services to other parties; and
- Use of regulated funds to support people and systems involved in the development of energy storage and other contestable activities.

Q8. What type of distributor behaviours and outcomes should the Authority focus on to understand whether changes are required to support open access?

We consider the Authority should focus on understanding whether changes are required to support open access. We believe the Authority should be focused on each of the two models described below:

- Where distributors pursue a "value added services model" - in our view, regulatory changes to support open access are critically important, and should be implemented as soon as possible to prevent 'regulatory catch-up' once business models become entrenched;
- Where distributors pursue a "platform for services model" (acting strictly as an open-access platform) - in our view significant regulatory change may not be required at this stage. In this case we support the removal of controlled load tariffs, the use of regulatory investment tests, greater information disclosure and neutral incentives between network capex and opex spend to support the development of competitive network services markets.

There is a wide range of distributor behaviour in New Zealand. We are encouraged by numerous networks that, from our perspective, are pursuing the "platform for services model", and as part of this transformation have begun collaborating with multiple third party service providers. However, we are also seeing rapid development of the "value added services model", and therefore believe regulatory change to support open access, including the key elements outlined in response to question 6, is required as soon as practicable.

We note, the IEA released a review of New Zealand's energy sector in 2017,[7] which included a focus on the electricity distribution sector. The report noted that:

[7] *Energy Policies of IEA Countries: New Zealand 2017*, IEA, Paris; http://dx.doi.org/10.1787/9789264272354-en.

- *…an array of new products, services and technologies [which] have the potential to fundamentally change the nature of distribution system operation, use and development. These changes also have the potential to transform the role and function of distributors, with a greatly increased focus on real-time, active system management and operation. They also raise a range of challenges for distributors, and for policy makers, around the nature of their evolving role and the extent to which they can and should participate in the emerging product and service markets associated with this transition, especially given their natural monopoly nature and the public good characteristics of some of the services they provide.*

The IEA noted that in response to these challenges, two distinct business models appear to be emerging:

- *"The value-adding services model whereby utilities seek to exploit new and emerging technologies to provide additional revenue streams to supplement their regulated cash flows. Examples include distributors branching into ownership of rooftop solar panels, energy efficiency, retailing and electric vehicle plug-in stations…*

- *The platform for services model whereby distributors act as neutral facilitators providing the information, system operation, network infrastructure and management functions necessary to support the development and delivery of reliable and innovative products and services by competitive retailers and aggregators."*

The IEA provided a view on the implications of these two distinct business models:

- *"Concerns have been raised about the competitive neutrality implications of the value-adding services model, and its potential to unduly distort timely and efficient retail market development. In particular, allowing distributors to compete to provide retail products and services without effective regulatory constraints could open the way for abuse of their natural monopoly position, possibly reflected in various forms of discrimination, market foreclosure and cost-shifting. It could also slow and limit the degree of retail-level innovation given the generally weaker incentives for natural monopolies to pursue potentially risky business activities…*

- *By comparison, the platform for services model could support more efficient and transparent transactions between multiple market participants, thereby increasing competition and innovation, reducing transaction costs, and facilitating greater harnessing of benefits resulting from the more effective integration of a diverse range of suppliers and new technologies. Furthermore, it maintains a more effective separation of contestable and natural monopoly functions, resulting in a more coherent set of commercial incentives for distributors consistent with the principles of sound governance and efficient delivery of their core functions. It is also likely to strengthen the effectiveness of the regulatory regime and simplify its ongoing application and development."*

We agree with the IEA's position and support the platform for services distributor business model.

Q9. What changes to existing arrangements might be required to enable P2P electricity exchange?
Please see our response to Question 3.
Q10. What are the costs and the benefits of enabling peer-to-peer electricity exchange?
Contact considers the system benefits of enabling P2P trading need to be assessed before significant effort is spent on determining implementation options. Our analysis suggests the establishment of mechanisms enabling the 'exchange' of electricity between peers or customers on the electricity system does not alter any physical flows on the electricity system and are unlikely therefore to contribute to any lowering of electricity system costs (unless a mechanism of temporally-coordinated exporting and matching sink loads is utilised, in which case some system benefit may be realised). This lack of system value generation means P2P is likely to layer additional costs into the industry through multiple billing systems being required per ICP (which will ultimately be paid for by consumers), and the P2P market is reliant on P2P buyers paying a premium or sellers accepting a discount to wholesale market or retailer feed in tariff prices. As noted above, Contact sees little system benefit and efficiency flowing from P2P trading. The costs of P2P trading will be driven by the implementation mechanism. Contact will need to review any implementation proposals the Authority has in this regard. Enabling multiple retailers to effectively trade on a single ICP will though likely bring complexity, uncertainty and increased risk for the retailer supplying the non-P2P part of a customer's electricity requirements.
Q11. What is your view of the possibility for, and impact of, any current or future blurring of participant type? What are your reasons?
No comment.
Q12. What types of participation are or might be prevented because the party is not recognised as a participant? What are the potential impacts?
No comment.
Q13. What challenges might new forms of generation, such as virtual power plants, or small and dispersed generators, face in entering the market?
The grid is becoming more dynamic as a result of intermittent renewables like wind and solar, changing synchronous inertia, and greater consumer participation through behavioural and technology response to wholesale and network price signals. These trends are expected to continue as further decarbonisation of the grid occurs and consumer technology uptake accelerates. Greater demand side participation will require market settings to evolve to maintain efficient wholesale markets, support a stable national grid and distribution networks, and promote the long-term interests of consumers. We believe market settings require: • Competitive neutrality between all forms of technology (large/small, generation/load) • Markets which enable price discovery rather than mandatory provision of services • A wholesale spot market with forecasting and visibility of consumer participation • More flexible reserves and frequency keeping products • Avoid imposing cost or size barriers to entry for mass participation A lack of clarity and rules that allow cross-subsidies of one technology by another will not enable mass participation. Risk management by all participants during this period of transition will be a key challenge. For some time now parties have assumed that during the transition owners of thermal kit will remain in the market

to support those periods of intermittency. As has been demonstrated recently through the decommissioning of Otahuhu, that assumption is wrong.

We have identified a number of elements of wholesale market design which could support greater mass participation, and these are discussed in the table over the page. We note that some of these elements are currently on the Authority's work programme.

Element	**Comments**
Energy market Real Time Pricing	More actionable 5 minute pricing would enable consumers to make demand response (and generation) decisions with more confidence. This will encourage new participants and maintain competition in the market, and we believe, be in the best interests of consumers. Contact has previously supported further investigation by the Authority into the look-ahead 5 minute dispatch-based price option (option B from the Authority's information paper published in April 2016). Given batteries and demand response can respond to pricing near-instantaneously, ensuring look-ahead 5 minute pricing is accurate (through better forecasting etc) will be essential for overall system efficiency.
Energy market Dispatchable Demand	We believe it is important to differentiate between consumer 'participation' and 'response' in relation to wholesale market prices: • Participation: Consumers (or their agent on their behalf) participate in the dispatch process and provide visibility to the System Operator (for example through the dispatchable demand process). • Response: Consumers respond to electricity prices without participating in the dispatch process, providing no visibility to the System Operator. An example could be a consumer on a spot electricity tariff utilising a battery to simply respond to spot prices. Currently one of the reasons consumers are incentivised to participate in the dispatchable demand regime is due to the potential variance between dispatch prices and final prices. If look-ahead 5 minute dispatch-based pricing is implemented, there may be less incentive for consumers to participate in the dispatchable demand regime. We believe this warrants consideration by the Authority on whether additional incentive or reward is required to promote demand side participation (as opposed to response) in the dispatch process, effectively putting a value on the 'dispatchability' of demand side participation (especially for smaller users who are price takers and will not influence the forecast schedules), which will assist the System Operator in effectively forecasting demand, and in turn ensure additional strain is not placed on frequency management. In addition to incentives to promote demand-side participation, appropriate thresholds should be in place to ensure large loads participate in the dispatch process. Currently generation plant with a capacity greater than 10MW must submit market offers (noting embedded generation with a capacity greater than 10MW (single unit or aggregated) does not need to submit offers unless directed by the System Operator). As the generation mix evolves (for example through aggregated embedded energy storage batteries), the appropriate threshold level may warrant consideration by the Authority. Consideration should also be given to whether the same thresholds and rules should apply for: • Generation and demand response • Grid-connected and embedded generation/demand response • Single unit and aggregated generation/demand response at the same GXP

	An additional consideration is the treatment of Transpower and distribution network demand response (acquired through demand response programs or controlled load tariffs). Currently demand response (unless registered as a dispatch-capable load station under the Code) is not required to provide visibility to the System Operator. Network demand response can amount to 50MW+ within network regions, which can result in material variance between forecast, dispatch and final prices, and result in adverse generation dispatch requirements which drive additional wear and tear and maintenance costs on generation plant. Network demand response can be expected to increase as more options become available for networks to manage peak demand, and we believe the Authority should assess whether forecasting and visibility of network load control could result in more efficient wholesale market operations. Other potential improvements to the existing dispatchable demand regime which could facilitate greater participation include: • Co-optimising dispatch bids and interruptible load to remove the need for participants to pay close attention to forecast schedules and potentially revise energy offers or IL bids in order to avoid a conflict in real-time • Block dispatch would enable aggregation across GXPs rather than within a GXP, such as over large urban areas where the price differential between GXPs is minimal, reducing the administrative burden for participants • Including dispatch-capable load station information in the real-time dispatch schedule will result in more accurate dispatch for the benefit of all market participants including existing generation plant Finally we note that the current dispatchable demand regime places a large number of requirements on dispatchable load purchasers, and has not been designed for mass market participation (as evidenced by participation which is limited to one large industrial site). We encourage the Authority to undertake a broad review of the regime and consider measures to make it more suitable for small and medium business, as well as residential participation.
Energy market Forecasting	We have previously supported the Authority undertaking further research into how more accurate forecasting would benefit the predictability of final prices. Accurate demand and intermittent generation forecasting, as well as visibility of demand response, will help to ensure efficient energy and ancillary services market outcomes.
Energy market 5-min trading interval	Aligning the trading period interval with the intervals used for dispatch and pricing would make prices more actionable and efficient for demand side participation. It would also support efficient use of thermal generation, as well as supporting a greater penetration of battery storage and demand response as part of a further decarbonisation of the grid. Implementation of five-minute trading intervals would require extensive (and costly) changes to current systems and processes for almost all market participants, including retailers, generators, networks and the System Operator. We believe a staged approach to possible implementation should be considered, including firstly implementing real-time pricing, and then reviewing market performance and undertaking a cost-benefit analysis to assess whether the introduction of five-minute trading intervals is warranted.
Reserves market AUTC	Contact supports the work that was undertaken by WAG and reported in its January 2015 recommendations paper, including: • The long-term benefits of revising instantaneous reserve procurement arrangements appear to outweigh the likely implementation costs

	• Distinction between FIR and SIR is largely a result of technical computing constraints from the 1990s when the NZ electricity market was established • An Area Under The Curve (AUTC) approach, taking into account the speed of response of instantaneous reserve providers, should be further considered The development of reserves products which incentivise faster response would support a more reliable power system for consumers by acting sooner to arrest system frequency falling further following an event, which will become more important with further renewables integration on the grid. It would also reduce costs for consumers by enabling less reserve to be procured overall as a result of faster response and more efficient procurement based on system needs. There is a risk that large industrial loads which currently supply interruptible load may leave the market over the next decade as a result of continued competitive pressure on many industries. This reserve would need to be replaced, and the current FIR and SIR products are not designed to incentivise greater mass participation in reserves markets due to not rewarding the ability of batteries and demand response to provide a much faster response, with a high level of resiliency through the aggregation of a large number of distributed participants. The development of revised reserve products should take into account barriers to entry for mass participation. As an example the requirement for certified metering at a site level imposes a cost barrier that in many cases will make mass participation uneconomic. Alternative measurement and verification methods should be considered to reduce barriers to entry, including aggregated measurement at, for example, a distribution feeder or substation level, or utilisation of intrinsic measurement and communications within distributed energy resource assets rather than separate metering infrastructure.
Reserves market RMT	Further to our comments above, a revised Reserve Management Tool (RMT) would be required if revised reserves products were implemented. We also support running the reserve management tool every 5 minutes to align with dispatch and pricing. This will result in more efficient dispatch of reserves (and energy) and ultimately lower costs to consumers.
Frequency keeping Governer response	We note that the Authority is currently reviewing governer response arrangements. We encourage the Authority to consider the potential for mass participation, including through energy storage batteries, in the design of frequency keeping markets. Greater participation will increase competition and reduce costs for consumers. We also reiterate previous comments that the method of cost allocation needs to be determined before decisions are made on the market settings for governer response.
Frequency keeping MFK	A further decarbonisation of the grid will involve a higher penetration of intermittent renewables like wind and solar and changing synchronous inertia. This will provide an opportunity for new sources of frequency control to assist in maintaining system security. Additionally, frequency markets should maintain a technology-agnostic approach to service provision, which enables new forms of frequency control such as energy storage to compete with existing providers. We support the retention of the Multiple Frequency Keeping (MFK) regime as it provides a market which can incentivise and facilitate mass participation, and help to identify the least-cost providers of frequency control services which will ultimately lower costs for consumers. We encourage the Authority to ensure participation requirements do not present barriers to entry, such as expensive control signalling equipment as noted by the Authority. This should also involve consideration of whether the MFK market is most suited to facilitating mass

	participation, or whether new forms of frequency control such as energy storage could more efficiently provide governer response. Other potential improvements to the existing MFK regime which could facilitate greater participation and lower costs to consumers include: • Removal of the existing 4MW minimum threshold which provides a barrier to entry for mass participation • Development of a national MFK market which enables selection of the lowest cost alternatives from one pool of MFK providers • Co-optimising energy, reserves and MFK dispatch to allow the lowest overall cost selection of alternatives

Q14. What changes might be required to the rule book to facilitate the emergence of virtual power plants or demand response?
Please see response to Q13 above.
Q15. Would the functioning of the market for hedges and PPAs and the availability of finance be improved if there were greater transparency of long-term prices and greater standardisation of terms and conditions for long-term contracts?
No comment.