ERANZ SUBMISSION TO THE COMMERCE COMMISSION ON INPUT METHODOLOGIES FOR EMERGING TECHNOLOGY

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Executive Summary

Fundamental of New Zealand electricity market design – competitive & natural monopoly separation

The rationale for vertical separation of the electricity market in New Zealand has not changed, even as new technologies have emerged. Technological advances, such as in battery storage, are allowing new ways to deliver more value for business and consumers. However, the old challenge of making sure that, wherever possible, competition drives technology and service choice remains the same. Investments made by monopolists guaranteed to recover their costs (through the principle of Financial Capital Maintenance) will always require external oversight.

With respect to new technologies, it is easy to get caught up in the excitement and promise, and to think that investment in such technologies, regardless of whether it stands the test of competitive market or not, is a good thing. It is not. Inefficient investment made possible by cross subsidisation and spreading risk across captive customers is exactly that: inefficient investment.

Boundaries must be preserved – legal basis as well as policy basis

ERANZ has obtained legal advice (see Attachment "A") which further supports our view that the Input Methodologies (IMs) need to make a clear distinction between competitive and non-competitive services. In essence, while the Commerce Commission (Commission) regulates the service provided by the Electricity Distribution Businesses (EDBs), this service is defined through the physical assets used by the lines businesses. Parliament has chosen to focus that Part 4 regime on the physical line assets because these are the assets that cause the natural monopoly to arise rather than the function of distributing electricity itself.

Level playing field required for all participants to utilise these technologies

In a competitive market, with a level playing field for all participants, new technologies and new business models will be tested and those that offer real value and benefit will flourish, and those that do not will be surpassed. Just because a business is utilising emerging technology does not mean it is a sound investment, or that consumers should bear the responsibility for the risks of that deployment.

Emerging technologies, such as battery storage, represent potentially competitive markets in New Zealand. Storage of energy is not a natural monopoly exercise – competition must be encouraged so that choice and advances in technology are enhanced. If nothing is done, and lines companies

are able to shape this market now through the ability to apply inefficient cross-subsidies across customers who have no choice, then other entrants will be dis-incentivised, leading to forestalled competition in emerging technologies to the long-term detriment of consumers. The potential impacts of this can be seen in the costs associated with the smart meter roll-out in Victoria Increased regulation will be needed to monitor this process, and substitute for competitive market signals, rewards and punishments. We know from international experience, that this prospect is a real and growing one.

The ERANZ proposal does not restrict networks from utilising the technology

In stating that we want a level playing field, ERANZ is most certainly not saying that we wish to preclude EDBs, or any other parts of the sector, from investing in emerging technologies. There are many reasons to welcome the opportunities that these technologies could bring to the sector for the benefit of New Zealanders. However, we want to make sure that the fundamental principles of market design are preserved and market distortions are not engrained in the policy framework. The ERANZ position is that EDBs can utilise this technology through affiliates, but they should not be regulated services. This is the best way to enable benefits across the supply chain, and for dynamic efficiencies to result for the benefit of the consumer.

Risk of inefficient cross-subsidisation and inefficient investment – borne by customers that have no choice

The regulatory instruments, such as the IMs, were introduced in the context of a clearly articulated approach to the separation of natural monopoly and competitive elements of the electricity sector. Natural monopolies were vertically separated precisely because they have the ability and the incentive to lessen competition - through discrimination against competitors and through inefficient cross-subsidisation of competitive business activities. New technology does not in any way change the fundamental logic of market design. Protecting competition in relation to new technologies will allow consumer preferences to drive how the sector develops.

Doing nothing now does not defer the issue: it is an active decision to regulate new technology in the electricity sector

The Commission has a clear choice: put in place safeguards to ensure that the Part 4 regime does not lead to distortions in nascent, competitive markets, or allow natural monopolies, armed with considerable power and advantages over other participants, to potentially dominate those markets - despite the fact that these firms clearly have sub-optimal incentives to invest prudently and efficiently in emerging technology. There is a risk of regulatory lock-in if there are incentives to

adopt sub-optimal technology. Doing nothing now is not a way to defer this choice. It is an active decision to place new technologies within the monopoly part of the sector. Further, inappropriate policy settings in relation to emerging technologies can see significant, inefficient, market changes as observed in New South Wales' experience with solar cross-subsidies.

The Commission has the ability and the responsibility to preserve competition

ERANZ believes that the Commission has both the ability and the responsibility to preserve competition through the IMs. The Commission has acknowledged the concerns raised by ERANZ, but has proposed to 'kick the can' toward future changes in the legislation and regulations. We believe this is not appropriate. IMs are a valid regulatory instrument and are an essential part of the regulatory regime. Moreover, the Commission has already addressed similar issues in relation to transmission through the IMs.

The costs of using affiliates is lesser than the effects on competition

We acknowledge that there is a risk in ring-fencing options, and that the Commission needs to balance the benefits of ring-fencing and transactions costs. We believe that it is possible to preserve competition in relation to new technologies without incurring undue transactions costs. Using affiliates or ring-fencing can occur by various means – each carries a different cost and impacts the potential to realise the economies of scope to a greater or lesser degree – but overall this course of action remains the most economically viable option. Experience with similar models, such as for procurement of ancillary services, shows that any transactions costs are manageable and are well below the benefits of preserving effective competition. In fact, evidence suggests that serious harm can be done if the regulatory treatment constrains or forestalls the development of competitive market solutions.

This is a critical juncture

The Commission faces a critical decision with this aspect of the IMs Review. The coming years will likely see rapid developments in the field of emerging technologies. We cannot adopt a wait and see stance until the next IMs review in the early 2020s. ERANZ considers that the Commission currently has the tools to address our concerns with the treatment of emerging technologies within the context of the Part 4 regulatory regime and the current input methodologies review process. We agree with the Commission that emerging technology holds huge promise to improve consumer welfare over the long term. Whether that promise is fully realised depends on having regulatory frameworks, including input methodologies, that support efficient investment in, and operation of, these technologies.

Introduction

1. Since its submission to the Commerce Commission's (Commission) pre-workshop paper on 4 February, 2016, ERANZ has listened, discussed and analysed the issues around the input methodologies for emerging technologies. We stand by the concerns we had about the impact of the path the Commission is charting on the development of the market for this technology, for the framework that guides the development of the electricity sector, and ultimately the consequent impact on the New Zealand consumer. We have listened to the criticisms and questions about the electricity retailer position in this debate and we seek to address these in the following submission and further strengthen the case for the Commission to reconsider its approach.

2. Retailers have a keen interest in this consultation because the Input Methodologies (IMs) generally, and the Cost Allocation IM in particular, are key instruments which not only set the regulatory principles, but also define the interaction between the regulated and the competitive components of the electricity supply chain. The Commission observes that:

> *"the potential for significant change to arise from the combination of falling costs, improving performance and increasing capabilities of some new technologies, new business models (especially in the space currently occupied by EDBs and electricity retailers), and evolving consumer preferences"* [and that] *"these developments present opportunities and challenges for EDBs, and have the potential to deliver significant benefits to consumers".*[1] *… "It is not clear how EDBs will respond to these changes and opportunities but it seems that the boundaries between participants in different vertical segments of the electricity market may be blurred, which may require changes to legislation or regulations".*[2]

3. ERANZ respectfully submits that the Commission not only has the ability, but also an obligation, to address the challenge posed by new technologies in the regulatory instruments it implements: the IMs. Moreover, past experience with meeting the challenge of co-optimisation in the transmission network shows that the Commission has tools that it can apply.[3]

[1] Commerce Commission, "Input methodologies review draft decision - Topic paper 3: The future impact of emerging technologies in the energy sector", 16 June 2016, para X4.
[2] Input methodologies review draft decision; para X5.
[3] By co-optimisation we are referring to the challenge of ensuring efficient investment in both monopoly lines assets and competitive generation, when these segments of the electricity industry are co-dependent but regulated in very different ways.

4. In this submission, we first discuss the fundamental principle of separation of competitive and monopoly activities, which is behind the design of the New Zealand electricity market, and how this principle affects the Commission's responsibilities and powers.

5. We then briefly go over the way the Commission has dealt with the same type of issue in relation to transmission alternatives, and show how the lessons of maintaining the required separation between the competitive and monopoly activities in relation to transmission are directly relevant to distribution.

6. The third step in our logic is to explain how the IMs—whether through the Commission's action or inaction—can influence the outcomes in the competitive market. We contend that it is not sufficient for the Commission to wait until the problem presents itself. Consumers should not bear the risk of technology deployment at the expense of competition and the risk of cross-subsidisation.

7. In Part IV, we explain that the ERANZ proposal will allow the market to develop and there will be less risk for the consumer, and draw on international experience to support that contention. We are in no way contending that distribution businesses, or any others, should not make use of emerging technologies. Market arrangements should promote consumer choice while providing a level playing field for all market participants and avoid cross-subsidisation.

8. The fifth and final part of our submission covers the specific parts of the Commission's proposals. We discuss the need to reduce the revenue threshold for the application of the ACAM Avoidable Cost Allocation Method (ACAM), the need to improve the disclosure of use of proxy allocators, and whether the proposal to allow the shortening of economic lives is justifiable.

Summary of the ERANZ Proposal

9. Fundamentally, ERANZ believes the IMs need to include safeguards that prevent Electricity Distribution Businesses (EDBs) from entering competitive markets for emerging technology through cross-subsidisation. We do not believe the Commission's draft decision adequately addresses our concerns.

10. In our earlier submission, we proposed that the Commission revise the IMs to ensure that assets that can be provided competitively do not enter into an EDB's Regulatory Asset Base (RAB) unless the value for inclusion is zero. The IM would contain a list of criteria for assessing whether a technology can be provided by the market. The regulated service provider is thereby incentivised to procure the services of these assets on an arm's length basis. It also does not preclude the regulated service provider acquiring those contestable

services that benefit delivery of the regulated service. This could from either an arm's length related party or from a third party, and including those costs as operating costs of providing the regulated service.[4]

11. We stand by our proposal in our submission on the pre-workshop paper. However, we do acknowledge that there are different approaches to separating ownership of emerging technology assets from regulated lines assets, with varying transaction costs. As identified in the Castalia Report attached to this submission (see Attachment "B"), there are different options available for moving emerging technologies and EDBs on to a more arm's length basis.[5]

12. Overall, ERANZ does not believe that arm's length transactions will limit the ability of EDBs to access economies of scope, nor will transaction costs be material. Experience with similar models, such as for procurement of ancillary services, shows that any transactions costs are manageable and are well below the benefits of preserving effective competition. In fact, evidence suggests that serious harm can be done if the regulatory treatment constrains or forestalls the development of competitive market solutions.

13. ERANZ stresses that its position is not intended to preclude EDBs from investing in emerging technologies when such investment is efficient. ERANZ wants to ensure that the most appropriate changes are made to the input methodologies so that emerging technologies can be adopted and developed in the way that best benefits consumers. Accordingly, in this submission, ERANZ wishes to reiterate and clarify its concerns, its understanding of the legislative constraints and options available to the Commission, and to provide further potential solutions the Commission can consider.

14. If the Commission still chooses not to take steps to maintain the separation between monopoly lines assets and the competitive market for emerging technology in its IM, ERANZ submits that the Commission should at the least do the following:

    - commit to undertaking a review of market developments within the next two or three years as part of a co-ordinated programme of work by the appropriate policy and regulatory bodies (such as, the Ministry of Business, Innovation and Employment (MBIE), the Electricity Authority and the Commission)
    - remove ACAM as a separate methodology option. ACAM would still be available to regulated suppliers, as the absolute limit by which regulated suppliers can vary from the

[4] See ERANZ Submission on the Emerging Technology Workshop Paper, accessible here: http://www.comcom.govt.nz/dmsdocument/14029.

[5] Castalia "Getting the Policy and Regulatory Settings Right for Emerging Technologies in the Electricity Sector

Accounting Based Allocation Approach (ABAA) when using the Optional Variation to the Accounting Based Allocation Approach ("OVABAA"). Use of ACAM would require explicit justification that it was necessary to avoid an undue deterrence situation

- if ACAM is retained, reduce the revenue threshold for using ACAM to a lower level, for example, five percent of regulated revenue, to ensure that ACAM is only applied in circumstances where the unregulated activity is insignificant both to the EDB and to competitors operating in unregulated markets.
- reduce the thresholds in clauses 2.1.2(4) (a) and (b) of the input methodology (which allow ACAM to be used for operating cost and asset value, respectively, when unregulated revenue is above the revenue threshold)
- require Schedules 5f and 5g (which contain information around cost and asset allocations) of the Information Disclosures to be publicly disclosed
- review information disclosure requirements. For example, the Asset Management Plan should make it clear to stakeholders how EDBs are making decisions to invest in certain technologies in preference to others and enable stakeholders to understand the extent to which those technologies contribute to the regulated service (for which they are paying) and to unregulated activities
- abandon its proposal to allow the shortening of asset lives. If the Commission proceeds with its proposal to allow shortening of asset lives, this should only relate to future investments and not affect the recovery of investments that have already been made.

Part I: New Zealand Electricity Market Design: Back to first principles – the separation of the natural monopoly and competitive activities

15. The design of the vertically unbundled electricity market critically depends on a clear separation of the competitive and monopoly components of the electricity supply chain. Since both generation and load have some discretion over location decisions (generation more than load), right from the start of the electricity sector reform, it was obvious that this separation is not as conceptually clear as it may appear at first instance. Electricity generation and the delivery of electricity over power lines are both complements and substitutes. The design of the electricity market rules and regulatory mechanism for monopoly lines businesses inevitably has to recognise that complexity and promote co-optimisation across the entire supply chain.

16. Until recently, the co-optimisation challenge was largely seen as the problem of regulating electricity transmission. For this reason, a careful approach to considering transmission alternatives had to be built into the regulatory regime: the approach had to take care to preserve competition in electricity generation, while ensuring that the benefits of generation location decisions could be incorporated into the costs of the transmission service, including the opportunity to socialise these costs across the users of the grid.

17. The emergence of distributed generation, and now, in particular, the equally rapid emergence of new energy storage technologies, have shifted the co-optimisation challenge from the transmission grid to the distribution grids. While the technical detail of the co-optimisation challenge is different, the fundamental issue is exactly the same: how the regulatory mechanism for the monopoly infrastructure should interact with the rules of the competitive market to achieve optimal system-wide outcomes.

18. The New Zealand electricity market is designed so that there is clear separation between the competitive and non-competitive parts of the sector. There are sound reasons for this division, which should inform the Commission's approach to controlling monopoly involvement in contestable markets.

Structural separation was based on the premise of separating competitive and non-competitive activities

19. The underlying rationale for structural separation is to facilitate competition in the New Zealand electricity market:[6]

> *The Electricity Industry Reform Act 1998 required full ownership separation between electricity lines businesses, which are considered natural monopolies, and electricity generation and retailing, which are contestable. The objectives of the reforms were to:*
>
> - *facilitate competition in retailing and distributed (local) generation. The concern was that vertically integrated lines and generation/retailing businesses had the ability and incentives to discourage new entrant retailers and local generation by restricting access to lines*
> - *preclude cross subsidies from lines businesses to their generation and retailing businesses. The concern was that lines businesses, as natural monopolies, had the ability to take excess profits from captive lines customers to subsidise other businesses.*

20. It is important that the IMs form a coherent part of a regulatory framework where structural separation is seen as the best approach to maximising the performance of the electricity industry for the long term benefit of consumers.

21. In particular, Parliament was clearly concerned that natural monopolies—if they were allowed to participate in competitive activities—would have the ability and the incentive to lessen competition. This could occur through discrimination or through inefficient cross-subsidisation.

22. The rationale for vertical separation has not changed, even as new technologies have emerged. The concerns expressed by government in 1998 apply equally to natural monopoly involvement in the provision of new technologies. ERANZ recognises that new technologies pose a challenge in that they cut across the relatively clear-cut distinction between generation and transport of electricity that has existed until recently. For example, battery storage can be both a participant in the generation market (as a substitute for a peaking plant) and a component of an electricity transport network (as a substitute for transformer capacity). However, this challenge cannot be avoided and the need to find efficient solutions must

[6] New Zealand Government "Cabinet Paper - 2006 Electricity Market Review: Investment in Generation by Lines Companies" http://www.mbie.govt.nz/info-services/sectors-industries/energy/previous-reviews-consultations/electricity-market-review-2006/Cabinet%20Paper%20-%20Investment%20in%20Generation%20by%20Lines%20Companies.pdf

inform all regulatory decisions, including the work undertaken by the Commission under Part 4 of the Commerce Act.

23. Emerging technologies, such as battery storage, represent potentially competitive markets. If nothing is done, and lines companies are able to shape this market through inefficient cross subsidies, then competition in emerging technologies will be forestalled to the long-term detriment of consumers. In this context, it is important not to confuse more rapid introduction of new technologies with the benefit to consumers. For example, if they are able to socialise the risk across a wide customer base, EDBs may be more willing to undertake early investment in emerging technologies compared to competitive service providers. However, as we explain later in our submission, such subsidised early adoption would not be in consumers' interests.

24. The Australian Energy Market Commission (AEMC) has acknowledged the importance of market design in concluding that behind the meter storage needs to be strictly ring fenced from monopoly providers:[7]

> *The AEMC is therefore of the view that for the purposes of network regulation, storage should be considered a contestable service. This conclusion is based on a number of principles that are at the foundation of energy market development in Australia. Market arrangements should promote consumer choice while providing a level playing field for market participants. Consumer choice based on clear price signals then drives innovation, with costs minimised by each service provider seeking to provide a compelling value proposition to the consumer. Finally, it is only in instances where competitive forces cannot deliver these consumer benefits that economic regulation should be contemplated.*
>
> *…The current regulatory frameworks in the NEM encourage market-based solutions to these sorts of control and optimisation issues. This sort of approach may not mean a measured, controlled deployment of storage, but the regulatory frameworks are in place to reconcile the needs of networks with the desire for consumer-led decisions on technology deployment.*

25. ERANZ believes that Part 4 of the Commerce Act requires the Commission to implement the IMs in a way that reconciles both the need to allow networks to use emerging technologies to reduce their costs, with the need to preserve competitive markets.

[7] AEMC, "Integration of Energy Storage: Regulatory Implications", October 2015, pp ii-iii.

Boundaries must be preserved

26. The Electricity Industry Act 2010 recognises that generation and lines services are complements and substitutes in allowing EDBs to own generation within certain thresholds. For example, this approach allows for generation alternatives in rural areas where local generation may be cheaper than lines services.

27. Similarly, the overlap between retailing and distribution may not always be clear-cut. Decisions around ownership of smart meters were made in recognition of potential benefits to different parts of the supply chain, but in the knowledge that there was a competitive (or potentially competitive) market for metering services. As a result, competition between retailers has driven a successful roll out of smart meters across New Zealand.

28. Therefore, judgements must be made where regulated and competitive markets meet and overlap. These judgements should be focused on the long term benefits to consumers by ensuring competitive markets are as open and level to potential participants as possible.

29. Indeed, the presumption in favour of competition underpins New Zealand's approach to regulating economic behaviour.

The IMs have a crucial role in preserving boundaries

30. The IMs set the rules for:

    - ensuring alternative options to traditional lines investment are considered
    - establishing the kinds of activities that regulated lines businesses are able to invest in and recover the costs of, any conditions of investment, and how income from different activities will be treated
    - disclosing of the drivers of investment, options considered, and transactions with interested parties.

31. Overall, The IMs are a crucial tool for incentivising lines business behaviour. It is important that they establish clear rules relating to lines business behaviour in potentially competitive activities in order to maximise long-term benefit to consumers, and ensure outcomes are consistent with those that would occur in workably competitive markets.

This view is consistent with our legal advice

32. ERANZ has obtained legal advice that further supports our view that the IMs need to make a clear distinction between competitive and non-competitive services. Particularly, the advice disagrees with the Commission's proposed approach and interpretation of electricity lines service. We refer to the attached legal opinion which sets out in detail an analysis of the relevant provisions in the Electricity Industry Act and the Electricity Act. It is clear from the legislation that batteries behind the meter cannot fall within the scope of the regulated lines service because they are located beyond the 'point of supply', storage is expressly excluded and they are appliances. This is notwithstanding that they may somehow be used in association with the conveyance of electricity. Accordingly, it is the ERANZ view that the Commission has fundamentally misunderstood the legal scope of a regulated network service and to this end their interpretation is an error of law.

33. Further, the Commission states that "… we regulate electricity lines services as defined by Parliament".[8] However, by adopting the position that residential storage devices (as one example of emerging technology) can form part of the regulated lines service, the Commission is extending the scope of regulation beyond that defined by Parliament, i.e. beyond the scope of Part 4 of the Commerce Act by:

    - applying regulation to competitive activities contrary to ss52 and 52A, that is regulation is to apply to markets where there is *"little or no competition and little or no likelihood of a substantial increase in competition";* and
    - applying regulation to activities that fall outside the definition of the regulated service in subpart 9 (of Part 4) of the Commerce Act. The definition of "lines" as set out in the Electricity Act explicitly excludes storage beyond the physical boundary of the network as part of the explicit exclusion of "works".

34. The Commission's approach leaves the definition of the regulated service in a more, rather than less, ambiguous state. ERANZ legal advice includes the observation:[9]

[8] Commerce Commission, "Input methodologies review draft decision - Topic paper 3", para 48.1
[9] Alan Lear, Barrister, 2 August 2016, paras 24 and 20.

… the problem with the Commission's approach is that by not restricting the scope to the lines assets as defined, begs the very question as to what is the regulated service that assets have to be "used for" if no boundary is set as to where those assets may be located or of their nature. In other words, by being able to include service related assets that are specifically excluded (such as customer storage and generation) will, overtime, blur the business boundaries and facilitate regulatory creep away from the core monopoly lines distribution service.

35. The advice concludes:[10]

Customer storage batteries (including those in EVs) located "behind the meter" are not included as forming part of the electricity conveyance services that are regulated under s54E of the Act even where they are used in association with the conveyance of electricity

36. Accordingly, ERANZ's position remains that the regulatory treatment of emerging technologies is a fundamental challenge to the regulatory regime. The current IMs review needs to ensure that the extant IMs or any proposed amendments to the IMs do not harm the potential for the provision of services under competitive market conditions.

An asset-based approach to the service definition is more workable and is used elsewhere

37. Technology neutrality, regulation of 'the service', and of the 'provider of the regulated service' should be common ground. However, the workable definition of the service and the nexus between the service and the underlying assets that provide the service have, in ERANZ's view, been too lightly dismissed by the Commission.

38. Aside from, but consistent with the legal advice provided in the Attachment "A", ERANZ finds that similar issues have been successfully addressed in Australia and that characteristics, such as the geographic location (of the asset) and the ability (of the asset) to provide unregulated as well as regulated services, are important aspects in robustly defining the regulated service (and, of equal importance, services that should remain unregulated).

39. Examples of assets, such as chairs and ripple control relays, in the Commission's draft decision provide little value when other possibilities, such as meters, home insulation, LED lighting, and smart appliances, provide for further ambiguity.

[10] Above, para 5.

40. The Commission is also concerned that the ERANZ proposal (and perhaps its wider analysis and articulation of the emerging technologies issue) is asset based rather than service based. The Commission states "… we regulate services, not assets or technologies. … we regulate electricity lines services as defined by Parliament."[11]

41. However, Parliament has defined lines services in terms of assets, such as the conveyance of electricity by line. Moreover, in respect of the all-important boundary issue, the extent of what constitutes the regulated service is defined in terms of assets. This is, the service ceases to be regulated when the assets cease to provide shared services, are geographically located beyond the property boundary and/or reaches a physical point of connection.[12]

42. Clearly the service that is being regulated is difficult to define. Electricity transmission and distribution involves an intangible product. Not only is the 'thing' itself nebulous, but it is generally the nature of the assets delivering the service that underpins the need for regulation in the first place. The requirement for large scale investment in setting up the network, resulting in high fixed costs and low marginal costs - essentially strong economies of scale such that minimum efficient scale is not reached - explain why the 'service' is regulated. ERANZ does not see these same characteristics in relation to residential scale batteries (for example). The characteristics of the assets are an unavoidably important consideration in what should and what should not be regulated.

43. Despite its anathema to asset-based solutions, it is not clear that the Commission can satisfactorily define the regulated service without some reference to the assets involved. The definition seems unreasonably permissive and flexible, providing significant discretion to the EDB and the regulator.

44. With reference to AEMC's consideration of electricity storage devices in the Australian context, AEMC is clear that it, like the Commission, is technology neutral:[13]

> *When considering how regulatory frameworks accommodate new technologies, it is the functions they perform that need to be the focus, not the technologies themselves.*

45. The AEMC also confronts similar definitional issues to those faced by the Commission in New Zealand:

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[11] Commerce Commission, "Input methodologies review draft decision - Topic paper 3; para 48.1.

[12] Albeit that the point of connection can be redefined by agreement on the basis of specifying a different physical point in the asset chain.

[13] AEMC, "Integration of Storage: Regulatory Implications, Final report", 3 December 2015, p i

The current definitions of the … distribution networks and of network services do not lend themselves to a spatial or asset-based restriction on network businesses from providing services behind the meter.

46. In Australia, distribution services are currently very broadly defined as a service provided by means of, or in connection with, a distribution system. The words 'in connection with' appear to imply that the service does not itself need to utilise assets that fall within the scope of the 'distribution system' (defined as a distribution network and related connection assets), but can be provided by any assets or other means provided that the service is being provided 'in connection with' a distribution system. In Australia, this potentially allows for services provided behind the meter to be defined as a distribution service.[14]

47. Notwithstanding this lack of clarity in the definition of the service, AEMC:[15]

recommends that services provided by DNSPs behind the meter be treated as contestable services … Network businesses should not provide such services except through a ring-fenced business.

48. AEMC have regarded residential scale batteries in the same way as they consider advanced metering, where the nature of the services and the location of the asset are important:[16]

Under the AEMC's 2015 rule on Expanding Competition in Metering and Related Services, if a DNSP wants to provide advanced metering services to a competitive segment of the market, the service will be non-regulated and the DNSP will not be able to place metering assets in its regulatory asset base. The DNSP will also need to comply with ring-fencing guidelines developed by the AER – which may prevent a DNSP from owning metering assets as part of its regulated business. … We maintain that a similar policy should exist to any energy services behind the customer's meter. By 'behind the meter' we mean the provision of energy services from an asset, or data acquired from an asset, on site provided as part of a direct relationship with the consumer located at that site. That is a competitive segment of the market whose development should be led by customer choices among offers from retailers and other non-monopoly energy service providers.

49. Location is also important. As reflected in the earlier extract from the AEMC, location 'beyond the meter' is a critical factor. The Australian Energy Regulator (AER) considers that a Network Service Provider (NSP), in addition to the option of purchasing network support services from

[14] Above, page 13
[15] Above, page 14
[16] AEMC, "Integration of Storage: Regulatory Implications, Final report", pp. 12-13

a third party provider, has two ownership-based options in respect of batteries (or distributed energy resources in general).

50. First, the NSP can acquire a battery and use it only as an input to provide a standard control network service. The AER says that "an NSP might argue that no ring-fencing is required because the Distributed Energy Resource (DER) device forms part of a standard control service. Consistent with all assets used to provide standard control services, the asset would be added to the RAB."[17] However, in the context of the Australian regulatory view, "if the asset was used to provide a service that is offered in a contestable market, the NSP would be in breach of its ring-fencing obligations."[18] The AER also observes that under this option the asset would likely not be fully utilised (as it cannot be used for contestable services) and the NSP is unlikely to "maximise the efficient use of DER".[19]

51. Secondly, the NSP could operate the asset via a ring fenced affiliate that uses the asset to provide services into contestable markets. "The regulated NSP could buy the service for network purposes (as needed), using part of its opex allowance."[20] The asset would not be added to the RAB. The New Zealand equivalent is that the asset would have zero value in the allocated RAB.

52. Also consistent with the legal advice, ERANZ notes that the Electricity Industry Participation Code 2010 takes an asset approach to defining the transmission service in clause 1.1 as:

> *grid means the system of transmission lines, substations and other works, including the HVDC link used to connect grid injection points and grid exit points to convey electricity throughout the North Island and the South Island of New Zealand.*

53. This definition then facilitates the concept of transmission alternatives:

> *transmission alternative means an alternative to investment in the grid, including investment in local generation, energy efficiency, demand-side management and distribution network augmentation set out in Part 12.*

54. This definition is used in clause 35 of schedule 12.4 of the Code to facilitate Transpower's contracting for transmission substitutes where this is economically and operationally sensible, which is discussed in Part II of this submission.

55. In addition to the legal advice, ERANZ believes that a better approach (from a market design perspective) to the regulatory treatment of residential scale batteries (and potentially other emerging technologies) is to regard the service they provide as a potential distribution

[17] Electricity Ring-Fencing Guideline Preliminary positions, AER, April 2016, p. 22
[18] Above, p. 22
[19] Above, p. 22
[20] Above, p. 22

substitute, rather than being part of the distribution network. This would then be the basis of a market, in which a number of parties, including EDBs (but not as the regulated service provider), could participate.

56. In ERANZ's view the service that a residential scale battery provides to the network (network support) is a service in its own right. As far as the network is concerned, a residential scale battery provides the intermittent injection of stored energy. Distributed generation can also provide injections of energy, but these are excluded from being part of the RAB. ERANZ considers this is just a different technology providing the same service.

57. The Commission cites examples of assets that are not directly involved in the conveyance of electricity, or are beyond the meter, as examples that undermine an asset (and geographical) definition of the service.

58. For example, the Commission discusses how chairs may be included in the RAB, even though they are not "lines". ERANZ does not find this example helpful. It seems reasonable to accept that things required for the administrative support of the regulated service are included in the RAB and allocated to the regulated service on an appropriate basis. It is important to identify that in this case it is key that chairs are not connected to the network, but are inert assets. Also, if a regulated service provider were to add chairs to its RAB, include the recovery of capital (and return on capital) in charges to regulated service consumers, and then leased the chairs to other businesses; then chair retailers and office furniture rental businesses might well have cause for concern and complaint.

59. The Commission also refers to load control assets (such as ripple relays) as an example of a 'beyond the meter' asset that supports the regulated services and is included in the RAB. The inclusion in the RAB of assets, such as load control relays, which are dedicated for load control purposes seem to be covered in the b(iii) "in association" exception to "electrical installations. The same does not hold for:

    - LED lighting, which reduces peak load
    - EV charging units
    - house insulation, which improves energy efficiency
    - meters, that provide information for revenue and billing
    - any smart appliance that might allow the EDB to 'manage' the appliances performance.

60. The Commission's approach could characterise such assets as supporting the regulated service. The definition of the regulated service taken by the Commission is, therefore, open to absurdity when taken to its logical conclusion. This suggests a narrower, asset-based interpretation is far more appropriate.

Part II: Lessons from the Co-optimisation Solution in Transmission

61. Transmission alternatives are both substitutes and complements to transmission network services. To avoid inefficient bias towards investment in the transmission network and inefficient monopoly participation in the competitive sectors of the electricity industry, a sophisticated regulatory control regime has been established to ensure transmission alternatives are considered, and that these alternatives are selected where these represent the best outcome for consumers.

62. In the case of transmission, the Commission has addressed non-transmission solutions through the IMs. ERANZ strongly contends that the issues of managing the boundary between regulated and competitive services are the same for transmission as for distribution. It is inappropriate for the Commission to suggest that it cannot address the same type of issue in relation to distribution.

Issues posed by transmission alternatives and demand response are conceptually similar to the issues posed by new technology in distribution

63. New technology is emerging that can complement and substitute electricity lines services at both the distribution and transmission level. Indeed, both Transpower and EDBs are looking to alternative services to support the maintenance and development of their networks.

64. Whether it is Transpower procuring distributed generation to defer a transmission upgrade, or an EDB installing batteries to manage peak load, the issues raised are the same:

    - How should monopoly participation in contestable markets be managed so as to ensure a level playing field for all participants?
    - Is it in the long-term interests of consumers to allow assets to earn regulated revenue when they are also used to provide competitive services?

65. Given the issues raised are conceptually similar, ERANZ would expect the IMs to also address these issues in a similar way at both the transmission and distribution level.

The Commission has already addressed this class of issues in its IMs

66. The Commission has acknowledged that consideration of non-transmission solutions is important and requires through the Capex IM that they be given due consideration by Transpower:[21]

> *Making use of transmission alternatives may be an economically efficient decision where it avoids or defers expenditure on transmission investment. For this reason, reducing expenditure on transmission investments in this manner is an appropriate consideration and is consistent with s 54Q.*

67. Transpower is not permitted to include non-transmission solutions as part of base capex.[22] All non-transmission solutions have to go through the major capex approval process. This process requires Transpower to seek information on non-transmission solutions before submitting a major capex proposal:[23]

> *Early consultation on the need for investment, actively engaging with interested persons, and inviting proposals for non-transmission solutions, is important to ensure transparency and to ensure appropriate solutions are considered. The consultation framework established in the Capex IM will encourage full consideration of non-transmission solutions at an early stage in Transpower's Major capex proposal development. These requirements are consistent with promoting innovation and investment and encouraging the provision of services that reflect consumer demands (s 52A(1) and (b)).*

68. In the case of transmission, the problem that the IM was solving was apparent reluctance by Transpower to invest in more efficient alternatives to traditional physical assets. However, the solution that emerged would be equally applicable if concern was about the risk of cross-subsidisation and reduction in competition: the IMs lead to transparency, enable consumer and Commission scrutiny and ensure that all non-transmission solutions are currently procured in a competitive manner, creating a level playing field.

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[21] Capex IM Final Decision Paper, para X13.

[22] See definition of Base Capex in Re Transpower Capital Expenditure Input Methodology Determination [2012] NZCC 2, p 7.

[23] Above, para 6.3.6.

Experience with Transpower's Demand Response (DR) Programme is particularly relevant

69. It is clear that Transpower's expansion into competitive markets through its DR programme to help support its monopoly network service is accompanied by safeguards to minimise distortions to those markets. These include transparent and competitive procurement processes, as well as clear behavioural expectations from the regulators.

70. Transpower operates a nationwide DR programme, which was first approved in 2010 for the Upper North Island as part of a Major capex proposal and then expanded nationwide in 2013. It is now funded through its 2015 to 2020 IPP Determination as Base opex.

71. As noted by the Electricity Authority:[24]

> *Transpower's demand response programme is based around a market. Consumers, embedded generators and aggregators bid to provide demand response and Transpower can select the most competitive options.*

72. When Transpower applied to expand the DR programme in 2013, both the Electricity Authority and EnerNOC (a commercial load aggregator) raised concerns that Transpower's DR programme could distort competitive markets. These concerns were acknowledged and addressed by the Commission in its approval of the DR programme extension:[25]

> *However, a potential concern was raised by EnerNOC around Transpower gaining competitive advantage by using their intellectual property and systems, developed for regulatory purposes, in more general demand response markets that are not regulated.*
>
> *While we recognise the potential for concern, we note that this issue is not directly applicable to the amendment that we are required to assess. However we note:*
>
> *D5.1 Our cost-allocation input methodology addresses any issues that may arise in relation to regulated assets that may be used for any non-regulatory purpose.*
>
> *D5.2 The programme is only a testing programme. Transpower is limited to testing the potential for this market.*

[24] Electricity Authority, "Demand response guiding regulatory principles: Information Paper", 11 August 2015, para 3.1.8.

[25] Commerce Commission, "Amending the outputs for Transpower's demand response programme in the Upper North Island"Decision and reasons paper", 8 November 2013, para D5.

D5.3 Transpower has signalled in its cross-submission that it is not considering becoming a market participant outside of regulatory markets. It plans to establish demand response capability to be used as a transmission alternative.

D5.4 Transpower will have to apply for approval should it wish to use further regulatory funding to continue operating in the demand side market once the testing programme has finished.

73. Transpower has itself stated that "*Transpower, the Grid Owner, has no role in developing DR* products *for the wholesale electricity market."*[26]

74. Transpower has adopted a set of guiding principles to mitigate concerns:[27]

Our goal is to deliver consumer benefits by improving access to operable, efficient and competitive demand response for use as a transmission alternative for developing the transmission grid. Operating principles

- *Our DR development will be open and transparent – we will regularly publish updates of programme plans and results.*
- *We will always consider the use of transmission alternatives in our investment decision making.*
- *We will endeavour to contract for transmission alternatives in a manner that limits unintended impacts on the wholesale electricity market.*
- *We will work to ensure that transmission alternative costs are as competitive as possible.*
- *We will work to lower barriers of entry for potential transmission alternatives proponents to participate in the transmission alternatives market.*
- *The DRMS will not be used for any market based DR programmes unless agreed with the Electricity Authority.*

75. The Commission itself acknowledged, in approving Base opex for the DR programme, that Transpower has committed to several actions to address the Authority's competition concerns. The Commission even outlined expectations for Transpower:[28]

[26] Transpower, "Development of Demand Response as a Transmission Alternative: RCP2 Proposal", June 2014, p.4.

[27] Above, pp.8-9.

[28] Commerce Commission, Setting Transpower's individual price-quality path for 2015—2020 [2014] NZCC 23", para 5.184.

We, along with the Authority, expect Transpower to act in good faith regarding the development of DR. This applies in the application of DR in electricity market, and as a developing area in its business operations. We encourage Transpower to continue to work with the Authority and other stakeholders to develop a programme for the development, consultation and finalisation of a DR protocol as set out by the Authority

76. Further to this, Transpower has entered into an operational protocol with the Authority designed to ensure that DR does not adversely affect the wholesale market and has published commercial information on the DR programme, including price points.[29]

Relevance to distribution

77. In reminding the Commission about the way it has addressed the boundary issues between monopoly and competitive activities in transmission, we do not wish to comment on whether the particular regulatory solution has worked well or not. Rather, we want to emphasise that the issues the Commission has already addressed in relation to activities such DR are exactly the kinds of regulatory issues posed by the emerging technologies with respect to electricity distribution.

78. Transpower is an SOE with a profit maximising objective and explicit mandate under its Statement of Corporate Intent to leverage its core capabilities into competitive markets.[30] Transpower has similar incentives to the EDBs to invest in technologies that can be provided in competitive markets, including emerging technologies. However, under its Capex IM and IPP Determination, Transpower faces considerable scrutiny if it wishes to procure transmission alternatives, let alone own them.

79. The Capex IM and IPP Determination both demonstrate that the Commission has the capacity to develop measures that encourage and manage efficient adoption of network alternatives, including processes to ensure transparent procurement and disclosure of pricing information.

80. The DR Programme foreshadows the complex issues that arise when regulated revenue is applied to procuring services from contestable markets. The Commission has helped develop a solution that allows the DR programme to proceed, is transparent and considered, involves

[29] Transpower, 2013 Demand Response Programme Report, April 2014.

[30] Transpower "Statement of Corporate Intent".

multiple-stakeholders and has clear safeguards in place to prevent Transpower distorting competitive markets.

81. These measures could be adapted to the IMs and Price-Quality and Information Disclosure Determinations for EDBs. For example, in ERANZ's view, EDBs are equally capable of conducting fair and transparent procurement processes for network alternatives, with transparency and oversight over how such procured services are treated for the purpose of recovering the costs from consumers.

Relevance of Input Methodologies to Efficient Market Solutions

82. In its draft decision, the Commission concluded that ERANZ has not made the case that its proposal better promotes the long term benefits of consumers.[31] We strongly disagree with this view. In the absence of clear delineation between the competitive and monopoly parts of the electricity market, there is a real prospect of monopoly behaviours coming to dominate and distort the market to the long-term detriment of consumers. This position is supported by the Castalia Paper attached to this submission,[32] and, as noted in our earlier submission, by the AEMC in Australia and Ofgem in the United Kingdom.[33]

Effect of Input Methodologies on the Market

83. The Commission rightly summarises the objective of ERANZ's proposal [discussed further at Part IV of the submission] to be establishing a mechanism that allows the value of the services, provided by an emerging technology to the regulated service, to be reflected in a "price". ERANZ believes that this means not only that consumers of the regulatory service bear the appropriate cost, but that the price can be transparently available to all potential, competing providers.

84. One of the Commission's concerns with the ERANZ proposal is that it will impose transaction costs and complexity that will outweigh the benefits the proposal could deliver to the consumers of the regulated service.[34] In particular, the Commission is concerned that the

[31] Commerce Commission, "Input methodologies review draft decision - Topic paper 3, para 163.
[32] See Castalia "Getting the Policy and Regulatory Settings Right", pp 4-6.

[33] See ERANZ "Submission on Emerging Technologies - Workshop and Pre-workshop paper".
[34] Commerce Commission "Input methodologies review draft decision - Topic paper 3", para 170.

requirement for arm's length transactions risks undermining the incentive on EDBs to benefit from economies of scope that would arise from diversification.[35]

85. Indeed, ERANZ would not wish to have transaction costs imposed where these outweigh the overall welfare benefits. However, it is not evident why the transaction costs would be any more material than those in other markets that have been created in the electricity industry over recent years and decades, such as ancillary services and demand side response markets put in place by Transpower.

86. In any case, there may be different ways of achieving the separation ERANZ believes is appropriate, involving lower transaction costs. The Commission seems not to have considered what these options might be.

87. The Commission puts considerable emphasis on the benefits of economies of scope being available to EDBs. This is despite the regulator in Australia putting little weight on possible economies of scope and preferring to formally ring fence emerging technologies from the regulated activity.

88. The Commission identifies that s53T(3) of the Commerce Act requires that the cost allocation input methodology must not unduly deter investment by a regulated supplier in the provision of regulated or unregulated services. "EDBs should be able to benefit from their existing assets and activities when providing new services."[36] In footnote 113, the Commission contends that, while the ERANZ proposal does not alter the cost allocation input methodology, it does "[restrict] EDBs' ability to benefit from their existing assets when providing new services, by implicitly not allocating asset-related common costs to the regulated business (refer s 52T(1)(a)(iii))".

89. The conclusion that the ERANZ proposal truly inhibits legitimate access to economies of scope seems a stretch. The consequence of the ERANZ proposal is little different to the effect of an EDB operating its maintenance/construction contracting activity at arm's length (as a number of EDBs do). The ERANZ proposal does have the effect of promoting the arm's length relationship. However, there are options under the related party transactions (clause 2.3.6) of the Information Disclosure determination that could be used for pricing the service in that relationship, similar to EDBs with other related party transactions.[37]

90. To this point, the ERANZ proposal is not intended to prevent EDBs from investing in emerging technologies and thereby preventing them benefiting from economies of scope. The proposal is simply aimed at ensuring that a level playing field is maintained for any party to own,

[35] Above, para 164.
[36] "Input methodologies review draft decision - Topic paper 3", para 166.
[37] Electricity Distribution Information Disclosure Determination 2012; Commerce Commission; consolidated in 2015

operate and provide services from emerging technologies. ERANZ believes that it is only from this position that the most sustainable and welfare enhancing business models will be able to evolve. In other words, ERANZ is concerned to ensure that options for business models, other than integrated provision by a regulated monopoly, are not foreclosed by current regulatory settings or purposed changes to those settings.

91. The Commission makes reference to the report on the potential impacts of distributed energy resources produced by the Lawrence Berkeley National Laboratory (the Lawrence Berkeley report).[38] The Lawrence Berkeley report provides a useful analysis of the relevance of economies of scope in the context of provision of Distributed Energy Resources [DERs] by utilities (i.e. EDBs). In essence, the preference for integrated provision of DERs by the EDB exists when the cost advantages of integration allow for the provision of network and DER services at a lower cost than having the EDB provide network services and multiple independent firms provide DER services to consumers and the EDB.

92. If the cost advantage from economies of scope exists, then the EDB should be able to set the 'price', in an arm's length relationship for the provision of network benefits from the DER to the regulated service, at a level that enables the EDB to capture the economies of scope benefit and also competitively price the unregulated (and non-network support) services to consumers of those services. This approach would also ensure that the benefits of the EDB investing in unregulated activities (i.e. the economies of scope) were passed onto consumers of the regulated service.

93. The Commission relies on the Lawrence Berkeley report in support of the likely increasing importance of economies of scope and integration in the context of emerging technologies. In this regard, the Lawrence Berkeley report is not at odds with the report by Synergies Consulting Group and George Yarrow (also quoted by the Commission).[39] However, the Lawrence Berkeley report explores a range of possible futures for the ownership of DERs and the associated developments in both regulatory arrangements and markets. In particular, while clearly seeing the importance of coordinated activity between DERs and the network, the Lawrence Berkeley report includes the option of "virtual integration" as a means of achieving the benefits of integration and co-ordination where various assets may be under the ownership of a number of parties.

[38] Input methodologies review draft decision - Topic paper 3: The future impact of emerging technologies in the energy sector; Commerce Commission; 16 June 2016; para 167. The report is: Electric Industry Structure and Regulatory Responses in a High Distributed Energy Resources Future; Lawrence Berkeley National Laboratory; November 2015

[39] "Input methodologies review draft decision - Topic paper 3", para 167

94. Where virtual integration achieves co-ordination "… the grid serves as a platform for competitive DERs to operate and create value, both for the networks themselves and for customers".[40] In other words, contracts and rules (such as connection standards) can deliver the benefits of co-ordination where other drivers result in multiple firms' participation in emerging technologies rather than a single EDB.

95. The Lawrence Berkeley report identifies that:[41]

> *… as distribution utility economies of scale are undercut by new technologies capable of being offered by multiple firms, economies of scope and coordination among these technologies will become increasingly important". This will lead to an evolution in business models. The Lawrence Berkeley report goes on to say: "… that evolution may occur in different directions. One points towards a major utility presence in sourcing, financing and optimizing DERs for customers. The other points towards a major role for competitive firms in not only providing DERs through competitive channels, but also in competing to tailor DERs' performance and optimize the total value they can create in this emerging, three-sided market comprised of customers, distribution utilities and the grid itself.*

96. The Lawrence Berkeley report then explores these different evolutionary pathways, with both being seen as possible, but with co-ordination remaining a major theme.

97. In respect of the effectiveness of co-ordination, the Lawrence Berkeley report stresses that "Specifically, what matters is the coordination between DERs' role of (a) creating value for individual customers and (b) their separate but parallel roles of improving the operation and scope of a distribution system, while also (c) contributing to the reliability and efficiency of the grid itself."[42] Where these assets are designed and built for consumer use and located on consumers' premises, the benefits to the consumer is critical to the nature of the emerging business model.

98. The Lawrence Berkeley report illustrates this with a simple example based on smart thermostats:[43]

[40] Lawrence Berkeley report, page 24
[41] Lawrence Berkeley report, page 1.
[42] Lawrence Berkeley report, page 23
[43] Above, page 23.

… consumers can buy smart thermostats to save money while maintaining a comfortable temperature at home or work. Aggregating a large number of such smart thermostats together and using them in a coordinated way can provide thermal load management for the distribution system and demand response-based capacity products for the wholesale electricity market. However, if the aggregator's primary focus is on distribution and grid management rather than on saving customers money while maintaining a comfortable temperature in their homes and businesses, the resulting customer discomfort and lack of savings is likely to stymie the adoption of smart thermostats. If instead the aggregator's primary mission is to save customers money on their electric bills while keeping them comfortable, and only secondarily to optimize the distribution system and provide demand response to the wholesale market, the adoption of smart thermostats could be accelerated while meeting all of these objectives. This would especially be the case if customers are paid a share of the value created by optimisation of the distribution system and through wholesale market demand response.

99. Overall, while the Commission considers that consumers of regulated services will be the ultimate beneficiaries of the economies of scope realised by regulated suppliers from engaging in new activities, ERANZ is less convinced, given the operation of the cost allocation input methodologies.[44] ERANZ notes the changes the Commission proposes to make in respect of the thresholds for applying ACAM. These proposed changes are welcomed, although ERANZ considers that they should go further and makes proposals in that respect later in this paper.

100. Current arrangements allow cross-subsidisation by EDBs, which will pose a significant barrier to entry and innovation by other firms. EDBs also possess monopoly power and information advantages over other firms, further raising barriers to entry and innovation.

[44] Above, para 166.

Part III: Inaction is not a solution: The risk of Regulatory Lock-in

The Commission's cost-allocation determination risks creating incentives to adopt, and thereby lock-in, sub-optimal technologies

101. Unless these issues are addressed now, over time, the ability of EDBs to cross-subsidise potentially competitive new technologies across their captive customer base are likely to result in less consumer choice, potentially inefficient solutions, and higher prices for consumers. It is clear that over the coming years, emerging technology will play an increasingly significant role in the New Zealand electricity industry. The AEMC has observed that:

> *We have already seen a number of players entering the Australian storage market and there is nothing to suggest this market is not able to deliver the sorts of products and services required by consumers, network businesses and large-scale generators*.

102. Cost-recovery arrangements allow EDBs to de-risk their investment decisions at the potential expense of competition and innovation, with consumers ultimately bearing the cost of sub-optimal decisions.

103. With de-risking. there is real risk that EDBs will be incentivised to inefficiently adopt new technology. Early adoption can lead to inefficiencies if it locks in sub-optimal technologies at the expense of subsequent innovation. The perverse incentives of risk transfer are illustrated by the smart meter roll-out in Victoria, Australia. In Victoria, distributors were charged with installing smart meters at all customer premises, with costs recovered by consumers. The incentives this created led to cost-overruns, increasing costs by around $2 billion, reducing benefits to consumers by $0.6 billion. This contrasts sharply with New Zealand's successful smart meter roll out, which was driven by the competitive sector.[45]

104. Similarly, it is not clear that EDBs are incentivised to make the most efficient and prudent decisions when it comes to investment in battery technology. For example, the shape of the electricity industry market going forward is unclear. A recent report into emerging technology by Concept Consulting identifies that the economies of scale for large, utility scale batteries could deliver the exact same benefits as residential battery systems, but at a lower cost. Moreover, even utility-scale batteries may be more expensive than utilising batteries from

[45] Castalia "Getting the Policy and Regulatory Settings Right", p.4.

EVs at peak times.[46] Bundled and PV solar systems also present potential efficacy issues as well.[47]

105. The best way to figure out what works in the New Zealand context is to let markets work out what technology to adopt, and when. As noted by Concept:[48]

> *What this points to is the need to ensure that price signals to consumers, and incentives on utility companies, are appropriately designed so that such parties invest in technologies that are genuinely least cost.*

106. However, it is likely that the decisions made by EDBs today will potentially foreclose the efficient adoption of emerging technologies in New Zealand. EDBs already have considerable influence over emerging technology adoption into the future:[49]

> *Because early adoptions influence later ones, long-term behaviour is determined largely by early events, whether accidental or strategic. In theory, at least, fully sequential adoption achieves the efficient outcome if it is best for all adopters, but more generally early adopters' preferences count for more than later adopters': this is "excess early power".*

107. The AMEC has been attuned to the risks of regulatory lock-in. Therefore, it has emphasised the need for competitive markets to lead the adoption of new technologies:[50]

> *Utilising the competitive market frameworks currently in place will allow consumer preferences to drive how the sector develops. New business models will be tested and those that offer value to consumers will thrive while those that do not will vanish. The way consumers value storage and associated services will determine the deployment of this technology and competition between providers will keep costs low. A consumer-led deployment is not necessarily orderly – but consumers are generally in the best position to decide what works for them. <u>We are wary of proposals that seek to impose solutions or particular technologies on consumers at the expense of competition, especially where they result in consumers bearing the risks of the technology deployment</u>.* [emphasis added]

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[46] Concept Consulting, Electric cars, solar panels, and batteries in New Zealand Vol 2: The benefits and costs to consumers and society", June 2016, p.57.

[47] Above, pp.62-63.

[48] Above, p 58.

[49] Paul Klemperer "Network Effects and Switching Costs: two short essays for the new New Palgrave" http://www.nuff.ox.ac.uk/users/klemperer/NewPalgrave.pdf

[50] Australian Energy Market Commission, "Integration of Energy Storage: Regulatory Implications", October 2015, pp ii.

Market arrangements should promote consumer choice while providing a level playing field for market participants. Consumer choice based on clear price signals then drives innovation, with costs minimised by each service provider seeking to provide a compelling value proposition to the consumer. *Given the current technology development curve for battery system, first mover advantage is significant and current.*

108. Cross-subsidies for solar energy provide an illustrative example of how technology uptake can change rapidly, illustrating the importance of getting policy settings right at the outset. For example, there was rapid uptake of solar PV in New South Wales as the result of the use of inefficient cross-subsidies. Ultimately, these cross-subsidies were politically and economically unsustainable.

Part IV: The ERANZ Proposal: allow the market for emerging technology to develop with less risk to consumers

109. ERANZ's proposal is fundamentally aimed at ensuring that investment in emerging technology is driven by market forces. We believe that it is critical that all market players compete across a level playing field. A competitive market is the best mechanism for ensuring efficient deployment of emerging technology over time. In contrast, picking winners or cross-subsidisation is likely to lead to sub-optimal choices over the medium to long term.

110. Therefore, IMs can and should put in place measures to ensure there are no distortions to competitive markets. Given the consequences of getting it wrong could cost consumers dearly, choosing inaction is simply not a credible option.

Our proposal

111. As we have identified earlier in our submission, a key risk of allowing EDBs to use and earn regulated revenue for emerging technology is that it incentivises early adoption of nascent technologies through cross-subsidisation. In a workably competitive market, firms each face the full cost of their decisions, thereby inducing the efficient allocation of resources as firm's balance risk and return. However, if EDBs are able to earn regulated revenue on emerging technology, then risk transfers to the consumer. This effectively allows EDBs to de-risk their investment decisions, which could credibly lead to regulatory lock-out of competitors and lock-in of sub-optimal technology.

112. To address this, we submit that the IMs should preclude EDBs from earning regulated returns on assets capable of providing contestable services. Our proposal is summarised below:

    (i) amending clause 2.2.11(1) by adding an additional sub-clause that confirms, in respect of the "value of commissioned assets", the value of an asset: "that is an asset, the service delivered from which is deemed to be, or capable of being, provided under workable competition and is included as such in Schedule H, shall be zero."

    (ii) a new schedule H is added to the IMs. Schedule H will include:

        (a) the Commission's criteria for assessing if an asset and/or the service benefits provided by the asset are or could be provided through workable competition,

        (b) the process by which interested parties may propose additions or amendments to the list, and

(c) the current list of assets/services identified as meeting the requirements for having a "value of commissioned assets" of zero. This approach avoids inclusion in the regulated asset base of assets, which could be provided competitively (unless the value for inclusion is zero).

113. This approach avoids inclusion in the regulated asset base of assets, which could be provided competitively, such as residential and grid connected batteries (unless the value for inclusion is zero). The regulated service provider is incentivised to have these services provided on a basis at arm's length from the regulated service. It also does not preclude the regulated service provider acquiring the services that benefit delivery of the regulated service, from either an arm's length related party or from a third party, and including those costs as operating costs of providing the regulated service.

114. For a more complete analysis of our proposals, please see our submission on the workshop and pre-workshop emerging technologies paper.[51]

We want to support competition, not preclude EDB participation

115. Our proposal is aimed squarely at ensuring that the Part 4 regime does not distort competitive markets. We do not think Parliament could have intended that natural monopolies would be able to use the advantages of economic regulation to support expansion into competitive markets.

116. Of course, emerging technology as capable of providing significant benefits to consumers by reducing the costs of network expansion (amongst other benefits). We think EDBs should be able to harness the benefits of emerging technology in a manner that is fair to all market participants and that does not lead to inefficient investment decisions. Therefore, our proposal does not preclude an EDB for procuring services that support the delivery of the regulated service, from either an arm's length related party or from a third party, and including those costs as operating costs of providing the regulated service.

There are several options available

117. The only way to ensure a level playing field is to have a degree of separation between the provision of lines assets, and the provision of assets that can be used for both regulated and unregulated services. Transparency is also critical given monopoly information advantages.

[51] Accessible here: http://www.comcom.govt.nz/dmsdocument/14029.

118. If the Commission is concerned about the transaction costs of our proposal, we would draw the Commission's attention to the Castalia report. This report notes that the cost of ring-fencing can be right-sized through different reporting, management, ownership and governance arrangements.[52]

119. The Commission can and should do more by making better use of these levers to manager EDB participation in contestable markets.

120. For instance, Castalia's "Option 3" would require EDB ownership of emerging technology to be through affiliates. The EDB would have to contract with the affiliate, which would be subject to the existing rules on related party transactions, ensuring market prices and information diffusion to competitors.[53]

121. Castalia's "Option 2" would require EDBs to disclose certain information so other providers could identify opportunities. This approach could be supported by default agreements to minimise transaction costs and by tightening up rules around cost-allocation to reduce the prospect of cross-subsidisation. In contrast, Castalia's "Option 4" would restrict ownership of assets capable of emerging technology assets to ring-fenced entities, as is the case for residential batteries in Australia.[54]

122. We strongly encourage the Commission to consider whether more can be done to improve incentives on monopolies to procure contestable services in a fair and transparent way. In our view, the Castalia report clearly illustrates that more can be done through the IMs.

We question whether transaction costs are a real barrier

123. One of the Commission's concerns with the ERANZ proposal is that it will impose transaction costs and complexity that will outweigh the benefits the proposal could deliver to the consumers of the regulated service.[55] ERANZ disagrees with this view and notes that significant harm may be done to consumers of the regulated service (and consumers in general) if there is not an effective definitional separation between the services provided by emerging technologies and those provided by monopolies as the regulated service.

[52] Castalia "Getting the Policy and Regulatory Settings Right for Emerging Technologies in the Electricity Sector", July 2016, p.13.

[53] Castalia "Getting the Policy and Regulatory Settings Right", p. 8.

[54] Castalia "Getting the Policy and Regulatory Settings Right", p. 8.

[55] Commerce Commission, "Input methodologies review draft decision - Topic paper 3", para 170.

124. The AER identifies that the purpose of ring fencing in respect of residential scale batteries is:[56]

> *to limit the ability of a regulated service provider to confer an unfair advantage when it or one of its affiliates operates in a contestable market. As noted by the AEMC, the following types of behaviours by NSPs result in* ***harm*** *that ring-fencing aims to avoid:*
>
> - *cross-subsidising the affiliate's services in the contestable market with revenue derived from its regulated services*
> - *discrimination in favour of an affiliate operating in a contestable market*
> - *providing the affiliate with access to commercially sensitive information acquired through the provision of regulated services*
> - *restricting the access other participants in the contestable market have to the infrastructure services provided by the regulated entity, or providing access on less favourable terms than its affiliate."* [**emphasis** added]

125. ERANZ sees no evidence that this harm would not also arise in New Zealand.

126. The Commission is particularly concerned that the requirement for arm's length transactions risks undermining the incentive on EDBs to benefit from economies of scope that would arise from diversification.[57] The Castalia report similarly identifies that the trade-off between the benefits of economies of scope available to EDBs and the transaction costs arising from arm's-length, market style transactions is an important trade-off.[58]

127. ERANZ would not wish to have transaction costs imposed where these outweigh the overall welfare benefits. However, it is not evident why the transaction costs would be any more material than those in other markets that have been created in the electricity industry over recent years and decades, such as ancillary services and demand side response markets put in place by Transpower.

128. While the Commission considers that consumers of regulated services will be the ultimate beneficiaries of the economies of scope realised by regulated suppliers engaging in new activities, ERANZ is less convinced, given the operation of the cost allocation input methodologies.[59] ERANZ notes the changes the Commission proposes to make in respect of the thresholds for applying ACAM. These proposed changes are welcomed although ERANZ considers that they should go further and makes proposals in that respect later in this paper.

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[56] AER "Electricity Ring-Fencing Guideline Preliminary positions", AER, April 2016. p 10.
[57] AER "Electricity Ring-Fencing Guideline Preliminary positions", para 164.
[58] Castalia "Getting the Policy and Regulatory Settings Right", p.13.
[59] AER "Electricity Ring-Fencing Guideline Preliminary positions", para 166.

Part V: Further steps for the Commission's Proposals

129. ERANZ acknowledges that the Commission may choose to pursue a different approach to our proposal, and allow EDBs to include emerging technology in their RABs. While we believe this decision would have profoundly negative consequences, the Commission could take some steps to mitigate the effects.

130. Therefore, we propose a series of further changes to the Commission's draft proposal, which overall have contained some welcome changes. However, we believe our proposed modifications would allow for better transparency over EDBs choices, and better protect consumers from poor investment selection by EDBs relative to the status quo.

131. This section covers the Commission's specific proposals to:

- reduce the revenue threshold for application of ACAM, which we feel should be further reduced if it is to be retained
- improve disclosure of the use of proxy allocators, which should go further still
- allow the shortening of asset lives, which we do not support.

132. In addition, we believe the Commission should commit to undertaking a review of market developments within the next two or three years as part of a co-ordinated programme of work by the appropriate policy and regulatory bodies.

Reduce revenue threshold for application of ACAM

133. The Commission identifies that the revenue threshold for the application of ACAM is no longer delivering the policy intent of the cost allocation IM as well as it could, when applied by some suppliers.[60]

134. ERANZ believes that it is appropriate to remove ACAM as a separate methodology option, given some of the shortcomings of the cost allocation IM identified by the Commission (that is, not adequately delivering the policy intent). The requirement in s 52T(3) of the Commerce Act that any methodology for the allocation of common costs must not unduly deter investment by a supplier of regulated goods or services in the provision of other goods or services is met through the OVABAA option. In ERANZ's view, ACAM's only relevance should be as the absolute limit to which regulated suppliers can vary from ABAA in order for a non-regulated investment to not be unduly deterred. Under this approach, ACAM would still

[60] Input methodologies review draft decision - Topic paper 3: The future impact of emerging technologies in the energy sector; Commerce Commission; 16 June 2016; para 14.2.1

be available to regulated suppliers, but would require explicit justification that it was necessary to avoid an undue deterrent situation.

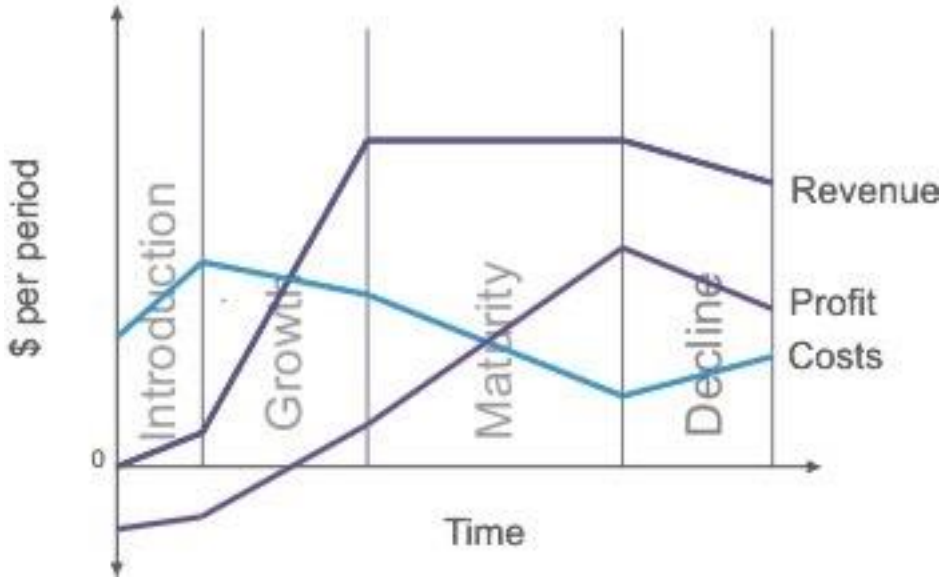
135. If ACAM is retained as a separate allocation option, then ERANZ agrees with the proposal to reduce the threshold for application of ACAM. While the Commission's proposal is to reduce the threshold from 20 percent to 10 percent of regulated revenue, ERANZ believes that this should be reduced to a lower level, for example 5 percent of regulated revenue, to ensure that ACAM is only applied in circumstances where the unregulated activity is insignificant both to the EDB and to competitors operating in the unregulated market.[61] ERANZ also questions whether the thresholds in clauses 2.1.2(4) (a) and (b) of the input methodology (allowing ACAM to be used for operating cost and asset value, respectively, where unregulated revenue is above the threshold) should also be reduced.

136. Furthermore, ERANZ notes that, where EDBs are using the ACAM cost allocation methodology and are allocating a very small (and possibly nil) value of operating costs and asset value to the unregulated activity, the EDB has discretion in that unregulated activity to offer low prices. There is an incentive on the EDB to keep its prices in the unregulated business as low as possible for as long as possible to prolong its ability to use the ACAM cost allocation.

137. A competitor in the unregulated market may similarly offer low prices while it is establishing its operation and some market presence. The difference between the competitor and the EDB is that the competitor is losing value (negative profits) during this stage (see figure 1 below).[62] This is not the case for the regulated EDB, as consumers of the regulated service are covering the "costs" of the unregulated activity.

[61] Table B1 in the draft decision paper is misleading where EDBs undertake regulated activities other than electricity line services. This issue applies to the two largest EDBs at least.
[62] Source: Mindtools; https://www.mindtools.com/pages/article/newSTR_80.htm

Figure 1: A Typical Product Lifecycle



Improve disclosure of use of proxy allocators

138. The Commission identified concerns with the use of proxy allocators when EDBs are allocating not directly attributable operating costs and asset values under the ABAA. The Commission notes that "suppliers can have an incentive to allocate as much cost as possible to the regulated service, which means that the regulated service may bear a greater proportion of costs than it should".[63] ERANZ has sympathy with this view as it is a fundamental to ERANZ's concern over the impact of the treatment of emerging technology costs on the competitive market for emerging technologies in the electricity sector (i.e. not just in respect of allocations under ABAA, but the choice of allocation method in the first instance).

139. Accordingly, ERANZ supports the Commission's proposal to strengthen the disclosure requirements and requiring a management declaration. ERANZ also supports the Commission giving more attention to these compliance issues.[64] it is noted that disclosure in relation to cost allocation are sometimes quite poor, especially the disclosures required in schedule 14 from which it can be difficult, if not impossible, to determine the allocation methodology the EDB is using.

[63] Commerce Commission, "Input methodologies review draft decision - Topic paper 3: The future impact of emerging technologies in the energy sector", 16 June 2016, para 14.2.2.
[64] Above, para 132

140. ERANZ also queries the ongoing need to have schedules 5f and 5g of the Information Disclosures released confidentially to the Commission only and submits that these schedules should now be required to be publicly disclosed.

141. Given the expected impact of emerging technologies that might support both unregulated and regulated activities it is also worth considering if the requirements for information disclosure and the execution of those requirements is satisfactory. For example, stakeholders should be in a position to understand how EDBs are making decisions to invest in certain technologies in preference to others and be able to understand the extent to which those technologies contribute the regulated service (for which they are paying) and unregulated activities.

142. It would also be useful if there was a clear requirement for and transparent reporting of the EDBs consideration of options to network investment. This might resemble consultation in respect of a statement of opportunities or a requirement to "meaningfully analyse and respond to information" as applies to airports. The current level of EDB disclosure, and the asset management plan in particular, fall well short of evidencing that sensible and robust decision making process are taking place. If that was acceptable in a world where the investment decisions were straight forward (such as poles and wires), it cannot be acceptable as emerging technologies erode the natural monopoly characteristics of the distribution network.

143. Ultimately, EDBs should be accountable for delivering the service in the least cost manner. Greater transparency may be a necessary corollary to the technological changes the industry is currently experiencing.

Allow shortening of economic lives

144. ERANZ does not support the Commission's proposal to allow a shortening of economic lives.

145. The Commission is concerned the EDBs may face only a partial recovery of their asset investments. This concern arises because emerging technologies may enable greater deployment of distributed generation or greater distributed electricity storage. This may enable more consumers to generate and store their own electricity and/or new competitors to enter the market and bypass distributors' networks. The increasing deployment of emerging technologies potentially changes the risk to EDBs' ability to fully recover their invested capital, under existing physical asset lives assumptions set out in the IMs. This is

because an EDB's network may be used by fewer consumers and the EDB may not be able to fully recover the costs of its historic investment from its remaining consumers.[65]

146. The Commission says that "If EDBs did not expect to recover their return of and on capital, it would be inconsistent with our principle of ex-ante financial capital maintenance (FCM)."[66]

147. The Commission explains the concept of real FCM principle as "… providing regulated suppliers the expectation ex-ante of earning their risk-adjusted cost of capital (that is, a 'normal return'), which provides suppliers with the opportunity to preserve their financial capital in real terms over timeframes longer than a single regulatory period."[67]

148. To address this concern, the Commission proposes allowing EDBs the option of a more rapid time profile of capital recovery.[68] This would constitute a discretionary NPV-neutral shortening of their remaining asset lives.[69]

149. It is not clear to ERANZ that the case is made that the risk of "economic stranding" is significant. The Commission's own evidence in Appendix A of the draft determination identifies that the same factors driving the increased competitiveness of network alternatives (for example, photovoltaic cells and residential scale batteries) and also drive the growth in the uptake of electric vehicles.

150. EDBs have expressed a diverging range of views on the potential risk to the network of emerging technologies. The Rocky Mountain Institute projects that:[70]

> *.. customer well-being will be enhanced more by adoption of smaller battery and solar PV systems and remaining connected to the grid, than by adoption of larger battery and solar PV systems and defecting from the grid.*

151. ERANZ is concerned that the Commission's approach will significantly dampen the incentives on EDBs to adapt and innovate in terms of providing services and developing or supporting business models that prove compelling for consumers to remain connected to the network.

152. Furthermore, the proposal the Commission has made will result in higher prices in the near term. This would seem to exacerbate the risk of standing (economic or otherwise) by bringing forward the point of economic parity. This is contrary to the behaviour that would be expected in a competitive market, where a competitive firm would likely reduce prices to maintain market share.

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[65] "Input methodologies review draft decision - Topic paper 3", paras 73 - 74
[66] Above, para 76
[67] Above, footnote 58
[68] Above, para 89
[69] Above, para 86
[70] Lawrence Berkeley report, page 14 referencing "The Economics of Load Defection", Rocky Mountain Institute, 2015. Available at www.rmi.org.

153. The Commission identifies that it is responding to a potential future risk. To use the Commission's own logic, it seems that the Commission is proposing certain higher costs on consumers as a result of shortened asset lives in response to an uncertain future risk.

154. The *ex-ante* expectation of financial capital maintenance (FCM) is important for confidence in investment decision making. ERANZ is concerned that the Commission's proposal will relate to investments that have already been made. In that context it is no longer an *ex ante* FCM principle, but an *ex post* FCM principle. Accordingly, if the Commission proceeds with the shortening asset lives option, ERANZ believes that this should only relate to future investments and not affect the recovery of investments that have already been made.

A review will be needed

155. ERANZ is sympathetic to any real barriers in the legislative construct that constrain the Commission in implementing an effective response to the impact of emerging technologies in the electricity sector. However, ERANZ regards the extent to which divided accountabilities across the policy/regulatory spectrum could lead to sub-optimal outcomes as highly unsatisfactory. If the right steps cannot be partially or fully implemented as part of the input methodology review, then ERANZ believes that a more co-ordinated approach is required from the respective policy and regulatory bodies.

156. The Commission views the ERANZ proposal, along with some other proposals, as representing structural interventions and considers that Part 4 regulation is not the vehicle to introduce structural remedies.[71] In its letter to the Commission, the Electricity Authority identifies that it "can create markets and provide for broader participation in existing markets."[72] However, the Commission's review of the input methodologies is a process that is on foot and one in which ERANZ hopes to ensure that the input methodologies, as they currently function or as they may be amended as a result the review, assist rather than inhibit the development of the most appropriate business models for the adoption emerging technologies.

157. ERANZ acknowledges that there may be limitations on what can be achieved by the Commission within its statuary framework and that other regulatory and policy bodies also may have a role in ensuring the best structures and rules are in place. In that light, ERANZ is gratified to see that the Electricity Authority has explicitly engaged on the issue, outlined it

[71] Above.; para 181
[72] Implications of regulatory treatment of cash flows for emerging technologies; letter to the Commerce Commission from the Electricity Authority; 1 June 2016

concerns and wants to understand how the "overlap of … interests [might be worked through] in order to achieve the greatest benefit for consumers".[73] The concerns expressed by the Electricity Authority seem strongly aligned to those held by ERANZ.

158. ERANZ would like to work with all the regulatory institutions to help achieve the appropriate structures to deliver long term benefits to consumers. If the Commission holds to its view that the appropriate business models will arise in due course and that the current (or amended) input methodologies are not an impediment, ERANZ would like the Commission to commit to undertaking a review of market developments within the next two or three years. The various regulatory bodies may also wish to consider whether the definition of the regulated service is fit for purpose in a technologically changing world and whether the intent of s52T(3) remains appropriate. Ideally, this review would form part of a co-ordinated programme of work by the appropriate regulatory and policy bodies (i.e. MBIE, the Electricity Authority and the Commission). The timing of such a review should allow any recommendations to be put into effect in time for the next EDB price reset in 2020 at the absolute latest.

Conclusion

159. ERANZ respectfully disagrees with the Commission's draft decision. In our view, the Commission fails to correctly characterise the issues associated with the adoption of emerging technologies for the provision of network benefits and for the provision of wider benefits to consumers and other stakeholders.

160. In our post-workshop submission, ERANZ provided a concrete proposal to address our concerns. While ERANZ is open to alternative means of addressing the issues raised by this review, we believe that the Commission should look carefully at our proposals, and at whether the Commission's approach is consistent with the logic behind the current regulatory regime. This logic provides for clear separation between competitive and non-competitive activities.

161. For the avoidance of doubt, ERANZ's position is not intended to preclude EDBs from investing in emerging technologies. ERANZ wants to ensure that the most appropriate changes are made to the input methodologies so that emerging technologies can be adopted and developed in the way that maximises benefits to consumers. Accordingly, in this submission, ERANZ has reiterated and clarified its concerns, its understanding of the legislative constraints and options available to the Commission. We have provided further potential solutions for the Commission to consider.

[73] Above.

162. In terms of the specific input methodology changes proposed by the Commission, ERANZ provides conditional support for some of these changes, without prejudice to its preferred solution. In the event the Commission does not adopt a more appropriate solution (as outlined by ERANZ), ERANZ provides conditional support for the types of measures proposed in respect of amending thresholds for the use of the avoidable cost allocation methodology (ACAM) and improving transparency through greater information disclosure. Furthermore, ERANZ believes that some of the elements of the Commission's draft decision should go further. However, ERANZ does not believe allowing for shortening of economic lives to be necessary.

163. Overall, the Commission faces a critical decision with this aspect of the IMs Review. The coming years will likely see rapid developments in the field of emerging technologies. We agree with the Commission that emerging technology holds huge promise to improve consumer welfare over the long term. Whether that promise is fully realised depends on having regulatory frameworks, including input methodologies, which support efficient investment in, and operation of, these technologies.

Alan Lear
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2 August 2016

Electricity Retailers Association of New Zealand
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Input Methodologies Review: Treatment of Emerging Technologies in the Electricity Industry under Part 4 of the Commerce Act 1986: legal definition and interpretation of *electricity lines services*

Background

1. On 16 June 2016, the Commerce Commission released draft decisions on its review of input methodologies for consultation. Included among those draft decisions are its proposals on how the impact of emerging technologies in the energy sector will be treated under the Input Methodologies (IM) which are set out in "Topic paper 3: The future impact of emerging technologies in the energy sector" (TP3).

2. I have been asked to review the Commission's intended approach to the legal definition and interpretation of *electricity lines services* under s54E of the Commerce Act (the Act) as set out in TP3 and provide independent advice on whether that approach is correct in relation to certain emerging technologies, particularly for fixed storage batteries and electric vehicles (EVs).

3. I understand the approach has implications in terms of whether assets such as storage batteries can, under the Act, properly be included in the Regulated Asset Base (RAB) if owned by an electricity distribution business (EDB). The Commission is proposing that where an EDB can show that the batteries are being used by it to support the *conveyance of electricity by lines*, those batteries can form part of the RAB (subject to any cost allocations set out in the IM if they are only being used partly this way) notwithstanding that they be located on property owned by consumers, or are batteries installed in electric vehicles.

Summary

4. The question posed for me is whether the Commission's proposed approach and interpretation of *electricity lines services* under s54E of the Act are correct in relation to certain emerging technologies, particularly customer storage batteries and EVs?

5. It is my conclusion that the proposed approach and interpretation are not correct for the following reasons:

    (a) Customer storage batteries (including those in EVs) located "behind the meter" are not included as forming part of the electricity conveyance services that are regulated under s54E of the Act even where they are used in association with the conveyance of electricity. This is because:

    - The electricity conveyance service regulated by s54E is defined as comprising the monopoly part of a distribution lines network that ends at customers' *points of supply*;

- *Fittings* that store electricity (i.e. batteries) located after the *point of supply* are specifically identified as an *electrical installation.* Accordingly they are not *works* and do not form part of *lines,* as those terms are defined in the Electricity Act 1992 (EAct);

- Customer and EV batteries may also be regarded as *electrical appliances*, which is an exception to *electrical installations.* However, in the context of the EAct, *electrical appliances* are not *fittings* for the purposes of *works* (and therefore do not come within the meaning of *lines*) under the EAct;

- The "in association" exception to *electrical installations* is limited to electricity conveyance related fittings, and not storage fittings such as batteries, nor to electrical appliances.

(b) This interpretation is consistent with the context of Part 4 of the Act. This is because customer storage and EV batteries are/ will be positioned in the competitive part of the electricity market which should be allowed to develop without any distorting effects from the regulated/monopoly part.

(c) My conclusion does not undermine the inclusion of "non line" assets otherwise used by EDB's to provide regulated services "up to the meter" in the RAB. This is because they are not specifically excluded as batteries are.

6. Moreover, my conclusion does not prevent EDB's from investing in customer batteries as they see fit in an open market but with the knowledge such will not be included wholly or in part in their RABs.

7. The reasons for my conclusions are discussed in more detail below

Discussion

Storage Batteries

8. I understand from the background documents that the batteries attracting most attention in the context of emerging technologies in the electricity industry are the domestic 'Powerwall' or similar designed batteries that are designed to be installed in residential premises. These batteries can be charged during off-peak periods (and from PV solar panels) and be available for households to draw from during peak periods (when prices are higher) and also potentially have spare capacity to discharge electricity back into the network/grid. Either way, they can reduce the load that might otherwise be required to service that location during peak periods and thereby reduce or postpone the need to invest in reinforcing the network servicing that area. There is also mention of EV batteries being similarly used from being plugged into residential wiring systems. Intuitively EV batteries give rise to greater complications (e.g. they may out "on the road" or "flat" during peak periods and they come packaged with the vehicle used primarily for travel). However, If they can be used the same as for fixed batteries, then the analysis below for domestic batteries would apply similarly to them.

Outline of Relevant Provisions

9. ERANZ and its members are reasonably conversant with subpart 9 of Part 4 of the Act which regulates *electricity lines services*[1] and the issues being discussed. Therefore, I have not to set out the relevant sections in full or explained them in detail.

10. *Electricity lines services* are regulated under Part 4 of the Act by virtue of section 54E. For EDBs, *electricity lines services* is defined as meaning "the conveyance of electricity by line in New Zealand"[2] but excludes certain small scale systems and situations where competition is present (none of which are relevant to the issue here)[3].

11. The "lines" component of the definition is further defined in s54C(4) of the Act as having the same meaning in s2(1) of the EAct unless the context otherwise requires. Under the EAct, *lines* are defined as meaning "works that are used or intended to be used for the conveyance of electricity". As this reads very similar to meaning of *electricity lines services,* the purpose of *lines* being incorporated into subpart 9 of Part 4 logically centres on the meaning of *works*.

12. *Works* is defined in the EAct as *fittings* that are or could be used in the conveyance of electricity, but also for generation, conversion or transformation. (The references to generation, conversion and transformation are not relevant as *lines* are restricted to the conveyance of electricity and their presence is because the EAct applies to other parts of the industry.) In other words, what is being regulated is a service described as the conveyance of electricity on *works*. However, expressly excluded from *works* are those fittings that come within the definition of *electrical installations*.

13. The definition of *electrical installations* sets a boundary or demarcation at the customers' end of the network, beyond which *fittings* employed do not form part of the conveyance of electricity on *works* (*lines*). Relevantly *electrical installation* means:

> "in relation to a property with a point of supply, all *fittings* beyond that point of supply that form part of a system that is used to convey electricity to a point of consumption, or used to generate or store electricity"

14. The demarcation being set is both by physical location and by type of the *fittings*. *Fittings* are relevantly defined as everything used, or designed etc in connection with the conveyance of electricity.

15. The definition also refers to the situation of properties without a point of supply and to fittings that are excluded from being *electrical installations.* Two exceptions are potentially relevant in terms of storage batteries. They are:

    - Electrical appliances (b)(i): These are defined as any appliance that uses electricity or is designed or intended to do so. These are excluded from being *electrical installations* because different exemptions and testing provisions apply to appliances elsewhere in the EIAct.[4] In that context, by being an exception to *electrical installation* does not result in appliances becoming *works*[5] (and therefore not becoming part of *lines*). It would be nonsensical to treat items such as household toasters as *works*. This exception has not previously been referred to that I am aware of. Domestic storage batteries appear to come within the appliance definition because they use electricity but that does not bring them inside the scope of regulated lines services as they are not *works.*[6]

[1] s54E of the Act
[2] s54C(1) of the Act
[3] s54C(2) of the Act
[4] See s80 and s82 of the EAct
[5] *Works* describe network type assets over which certain powers are afforded to EDBs under the EAct; see Part 3
[6] Energy efficient lighting discussed at footnote 131 of TP3 would also come within the meaning of appliances.

- Fittings used in association with the conveyance of electricity (b)(iii): The Commission, in TP3, has referred to this exception to *electrical installation* as supporting its approach to the treatment to storage batteries.[7] For the reasons set out below in paragraphs 19-22, I do not agree that this exception applies to storage batteries.

16. Finally, *point of supply* is defined as the point on the boundary of a property that consumes electricity where fittings exclusive to that property are located. I understand that the industry uses the concept "behind the meter" as a proxy to mean the *point of supply*, but it does not appear to be strictly accurate.[8] I note *points of supply* to a property can also be set by specific agreement with the consumer or property owner.[9]

The Commission's Approach

17. At paragraphs 184 to 199 of TP3, the Commission sets out arguments contained in earlier submissions (made on its preliminary views set out in the earlier pre-workshop paper[10]) for and against its approach to allow RDB's to include customer storage batteries they own in their RABs, where they are used for the conveyance of electricity in their networks. The Commission reaffirmed its approach as being appropriate and put forward three grounds in support which is summarised as follows:

    - What is being regulated is a "service" (and not specific assets) and so long as the asset is used in a way that supports that service, its costs can be attributed to the regulated service, subject to any cost allocation IMs if it is also used for non-regulated services;[11]

    - The context of Part 4 when applied to the definition of *lines,* makes it unlikely that certain classes of assets are excluded to restrict the scope of the regulated service under Part 4 (as all "non-lines" assets such as office chairs would be excluded too);[12] and

    - Even if assets are excluded from the definition of *lines* they can be brought into the RAB where they are used "in association with" the conveyance of electricity by distribution line by virtue of the (b)(iii) exception to *electrical installations.*[13]

Analysis

18. Applying the legal definition of *electricity lines services* to how assets such as storage batteries should be treated is not without complication because the underlying definitions are used for multiple purposes. Nevertheless, the definitions of *works* and *electrical installation* were inserted on 1 November 2010 by the Electricity Industry Act 2010 (EIAct). This means they were consciously intended by Parliament to apply in the context of subpart 9 of Part 4 of the Act that had been enacted a few years earlier.[14] The EIAct also uses the same definitions of *lines* and *works* for the

[7] See Paragraph 199 of TP3

[8] For example Vector defines point of supply to be the isolating fuse located either on the boundary of the property or on the pole nearest to the property. The property owner owns the service line between the point of supply and the meter.

[9] s2(3)(d) of the EAct. I anticipate that moving the *point of supply* to the location of the battery will require the EDB to take ownership of the wiring system etc up to the battery installation.

[10] Input Methodologies Review: Emerging technology pre-workshop paper dated 30 November 2015

[11] TP3 at paragraphs 194-195

[12] TP3 at paragraphs 197-198

[13] TP3 at paragraph 199

[14] ERANZ has been advised by MBIE that the policy intent in amending the definitions of *electrical installations* and *works* in 2010 – to provide for certain types of generators (e.g. industrial co-gen) to be treated as 'works', and ensuring there is a clear distinction between works and installations, for the purposes of promoting electrical safety. This is consistent with the Select Committee's report to Parliament.

purposes of that Act so there would be consistency between the three statutes that regulate the industry.

19. While I agree with the Commission that the focus of what is being regulated is a "service" (and not the other alternative which are goods) that service is clearly proscribed by statute through the setting of physical (location) boundaries and by the nature of certain equipment/assets. In particular assets (*fittings*) used for services related to the storage (and generation) of electricity that are located beyond the *point of supply* are expressly not included in the definition of *lines* which forms the base upon which the regulated service is defined.

20. The problem with the Commission's approach is that by not restricting the scope to the *lines* assets as defined, begs the very question as to what is the regulated service that assets have to be "used for" if no boundary is set as to where those assets may be located or of their nature. In other words, by being able to include service related assets that are specifically excluded (such as customer storage, generation and appliances) will, overtime, blur the business boundaries and facilitate regulatory creep away from the core monopoly lines distribution service.

21. This exclusion of assets is consistent with the context of Part 4 of the Act as s54E regulates a monopoly service whereas such storage (and generation) of electricity do not have those attributes (but are nevertheless connected to monopoly networks as are consumer premises beyond the *point of supply*). Consequently, I do not agree that the context of Part 4 favours the Commission's interpretation; in fact arguably quite the opposite.

22. The Commission has referred to the (b)(iii) exception to the *electrical installation* exclusion to *works* as allowing customer located batteries to be treated as forming part of the regulated service, where they are used *in association with the …..conveyance of electricity by distribution…lines*. Aside from batteries being more in the nature of appliances (as opposed to network type *works* equipment – see above at paragraph 13), on close examination, this other exception does not apply to *fittings* used to store (or generate) electricity located beyond the *point of supply*. This is because the definition of *electrical installation* refers to *fittings* used for the conveyance, generation and storage of electricity, whereas the (b)(iii) exclusion is limited to the conveyance (and conversion and transformation – which are not relevant) of electricity and not to storage or generation. *Fittings* are defined as "*everything used, or designed …in connection with generation, conversion, transformation, conveyance, or use of electricity*". Moreover, I am instructed that batteries do not "convey" electricity in distribution or in private networks but are designed and used specifically to store electricity to be made available when required and conveyed using wiring systems or lines or both as the case may be.

23. This interpretation is consistent with why *fittings* that "store" electricity were added to the definition of *electrical installations* in 2010 by the EIAct. Prior to that amendment being made, *electrical installations* were confined to the conveyance and generation related fittings located beyond the point of supply. Customer batteries would not be included within the ordinary meanings of *fittings* that "convey" or "generate" electricity and hence storage was specifically added to the definition of *electrical installation*. However, the more limited definition of *fittings* remained unaltered.

24. The (b)(iii) exception would foreseeably apply to assets such as ripple control devices located beyond the point of supply, as these are especially designed and used for load control in association with the conveyance of electricity. In my opinion, this exception would not apply to appliances that are designed primarily for other purposes (e.g. a refrigerator or an EV charging unit) that also incorporate technology that enabled a EDB to turn it off or on, depending on network requirements. Moreover, customer storage batteries fall outside the exception to the exclusion to *works* that the *electricity lines services* definition relies on, notwithstanding that they could be used in an indirect sense "in association" with the conveyance of electricity by distribution lines.

25. I have attached a diagram which sets out the steps to the definition of *electricity lines services* as described above.

26. The reasons for excluding beyond the meter storage batteries from the regulated services does not affect the practice of accepting "non lines" assets (such as office chairs, printers and telephones) as part of the RAB where they are used by EDBs to carry on their business of conveying electricity up to their customers' *points of supply*. This is because they are not specifically excluded by statute from the regulated service as certain storage batteries are. As noted, I agree that focus is on the service (not the assets) but the service being regulated has set boundaries which exclude certain equipment beyond customers' *points of supply*, and consequently services related to that equipment.

27. My interpretation is also consistent with s108(4) of the EIAct. That section expressly requires the Commission to treat all costs related to EDBs discharging their obligation to supply a place from an alternative source (namely other than from a distributor's network) as if they were costs of providing *electricity lines services*. If the Commission's approach was correct, making such a direction was unnecessary.

28. A summary of this advice is provided at paragraphs 4 to 6 above. Please contact me if any further advice is required.

Yours faithfully

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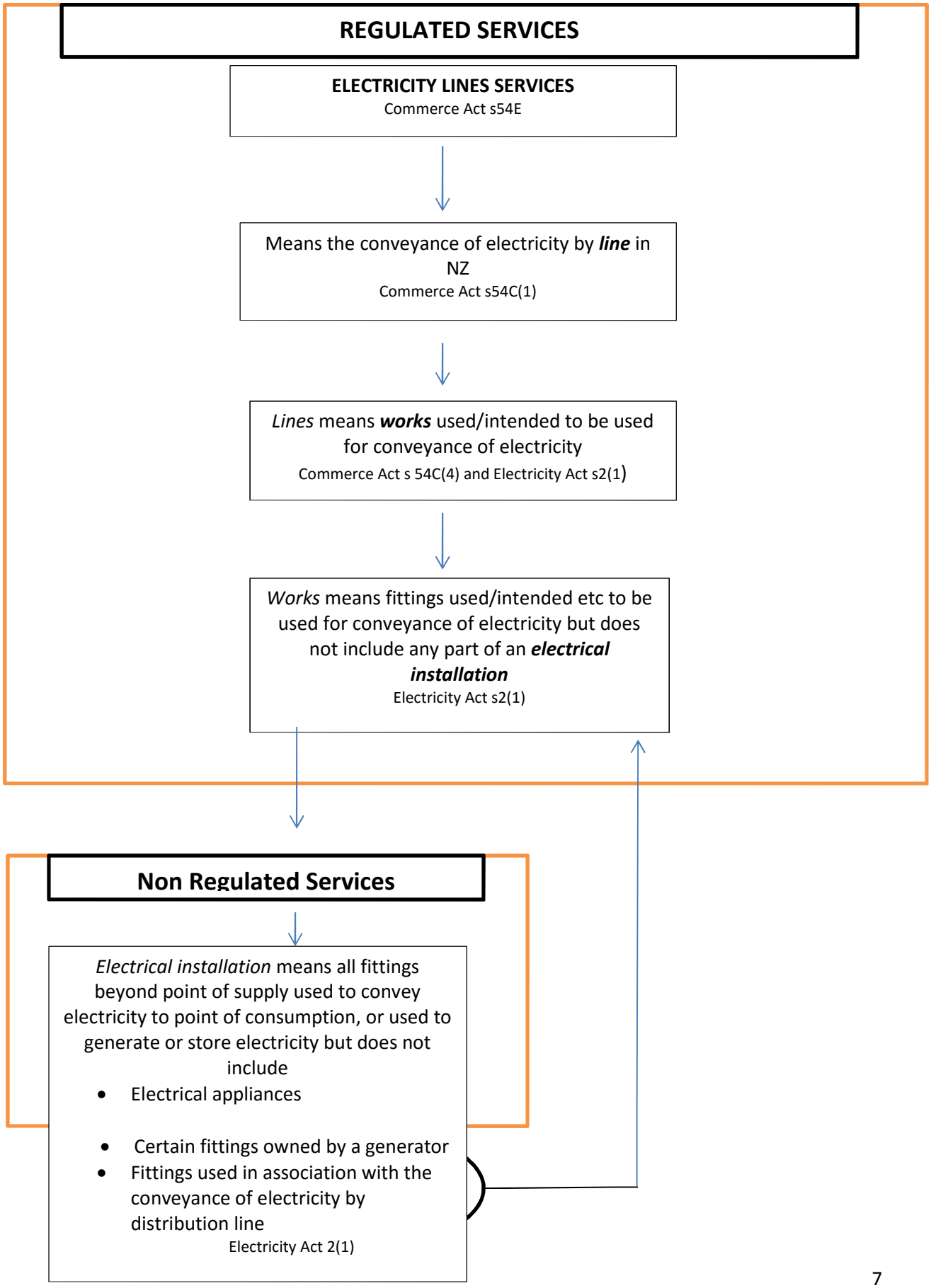
Definition of Electricity Lines Services



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Getting the Policy and Regulatory Settings Right for Emerging Technologies in the Electricity Sector

Report to the Electricity Retailers' Association of New Zealand

August 2016

Acronyms and Abbreviations

AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
DNO	Distribution Network Owner
DPP	Default Price-quality Path
DSO	Distribution Service Operator
EECA	Energy Efficiency and Conservation Authority
EIA	Electricity Industry Act 2010
ERANZ	Electricity Retailers Association of New Zealand
IDs	Information Disclosures
IDRs	Information Disclosure Requirements
IMs	Input Methodologies
IPP	Individual Price-quality Path
NEM	Australia's National Electricity Market
RIT-D	Regulatory Investment Test for Distribution

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Executive Summary

A number of government agencies have an interest and role in how the market for emerging technologies develops. These include the Ministry for Business, Innovation and Employment (MBIE); the Electricity Authority (the Authority); and the Commerce Commission (the Commission).

Given these different roles and perspectives, the Electricity Retailers' Association of New Zealand (ERANZ) has asked Castalia to evaluate potential options for the policy and regulatory settings for emerging technologies.

We identify five broad options, two of which would adequately address material problems with the status quo. The preferred option, ring-fencing activities related to emerging technologies from regulated services, places greater emphasis on the dynamic efficiencies that come from appropriately allocating risks. This requires accessing economies of scope that might be available to distributors through joint ownership and management through alternative means (primarily through contracts with related parties).

The preferred option needs to address identified problems with the status quo

The following problems inhibit a perfectly competitive market for emerging technologies:

- **Information asymmetries**: would-be investors have little information on where emerging technologies provide the greatest network benefits. Yet in some circumstances investing in emerging technology may be more efficient than lines investment, such as remote rural areas.
- **Imperfect price signals**: network prices reflect a focus on cost-recovery rather than efficient price signals reflecting underlying costs.
- **Transaction costs**: there are costs associated with contracting with potentially multiple different entities (particularly given the above problems).

Drawing on international evidence, there appear to be five broad options for how emerging technologies are treated:

- **Option 1**: Distributors can compete in emerging technologies and allocate costs to regulated services.
- **Option 2**: Distributors can compete in emerging technologies and allocate costs to regulated services, but must disclose certain information; also, actions are taken to minimise transaction costs, and rules around cost allocation are tightened.
- **Option 3**: Distributors are able to use emerging technologies, but ownership of these assets must be through affiliates (not involved in regulated services), and contracts with affiliates are subject to the existing related-party rules under Information Disclosure Requirements[1]
- **Option 4**: Distributors are able to use emerging technologies, but ownership of these assets must be through ring-fenced affiliates (not involved in regulated services) similar to the corporate separation and arms-length rules in the Electricity Industry Act 2010.

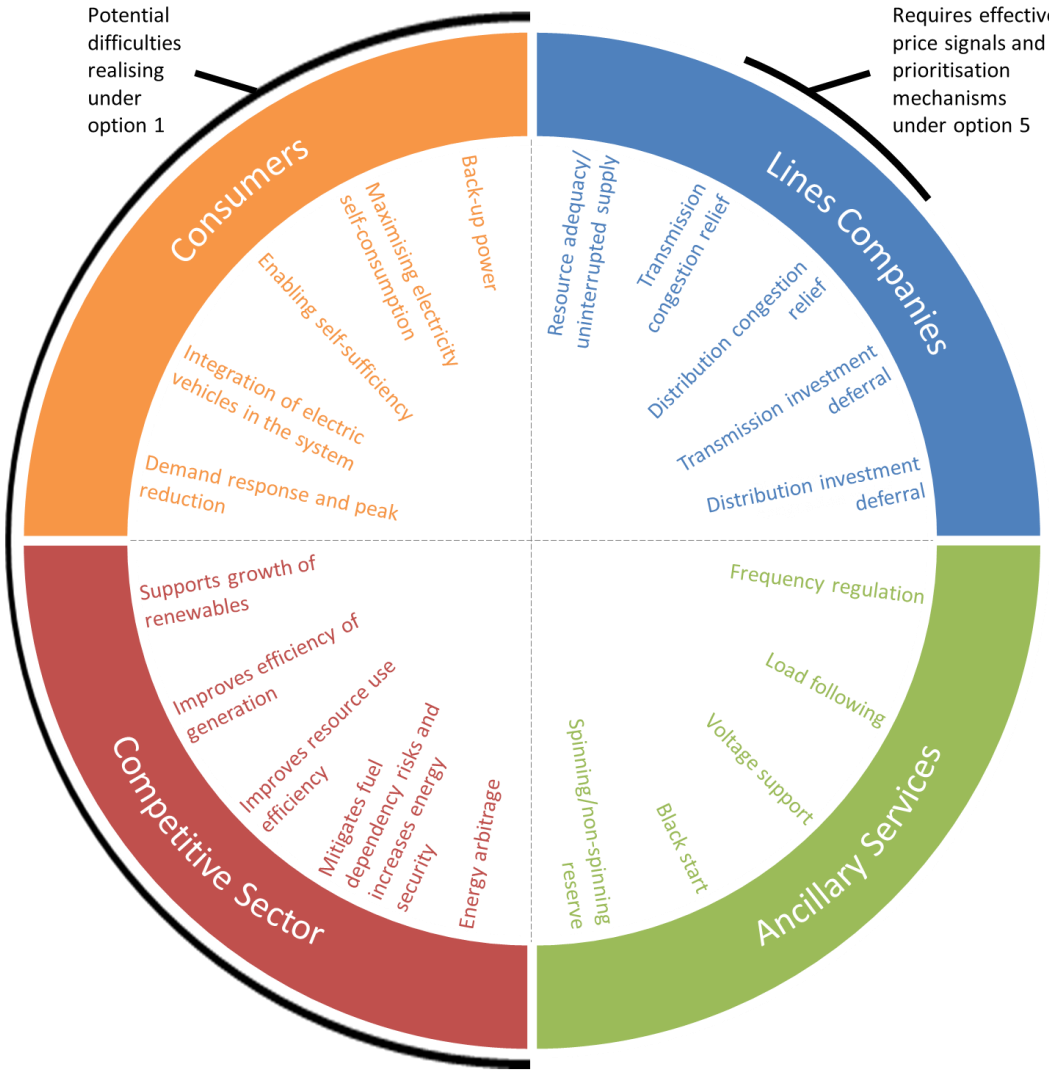
[1] Note these disclosure requirements are currently under review by the Commerce Commission under the Input Methodologies Review.

- **Option 5**: Emerging technologies are treated as competitive functions and distributors are restricted from direct involvement.

We distinguish between these approaches as moving from more "utility-style regulation" to more "market-led regulation". This picks up on Professor Yarrow's idea of "calibrated regulation" regulatory models that balance encouraging scope economies and managing monopoly power depending on the particular business model in order to ensure competition and innovation.

Of the five broad options identified, the options 3 and 4 specifically address the underlying problems with the status quo. Options 3 and 4 are also most likely to enable benefits across the supply chain to be realised. Option 2 would require efficient network pricing in order to realise these benefits but also risks missing the dynamic efficiencies that would result from options 3 and 4. Option 5 requires the development of price signals and mechanisms to prioritise benefits across the supply chain. While option 1 has the highest risk that benefits across the electricity supply chain missed (as illustrated in Figure E.S.1, and discussed in this report).

Figure E.S.1: Potential Benefits Across the Supply Chain from Battery Storage



Out of Options 2, 3 and 4, Option 3 and 4 (allowing competitive market) better ensures dynamic efficiencies associated with appropriately allocating risks

The key benefits of more market-led regulation (Option 3 and 4) compared with a more utility-style regulation (Option 2) are in ensuring competition, avoiding technology lock-in, and allocating risks (and costs) to those best placed to manage them. This should enable dynamic efficiencies for consumers. However, this comes at the potential expense of some economies of scope, although scope economies may still be realised by third parties who are able to be contracted by distributors to provide a range of network-support services.

The best approach really comes down to weighting the impacts of economies of scope and improved risk allocation. Problems of misallocation of risk are likely to be more serious in our view, as observed in the Victorian experience with smart meter roll-outs (described in this report).

There are actions Government agencies can take to address the underlying problems

Regulating emerging technologies appropriately is important given the potential benefits across the supply chain. It is also pressing to get these arrangements right given the pace of change and tipping points involved with technology uptake.

We therefore recommend that:

- The Commission:
  - Addresses concerns relating to cost-allocation between regulated and unregulated activities, information disclosure, and ring-fencing activities while continuing to monitor the market focusing on benefits to consumers
  - Examines: 1) whether current incentives on distributors, and procurement rules, are sufficient to enable scope economies to be traded off against efficiencies available to third-party owners of existing assets capable of providing network support services (via contract), and 2) whether dynamic efficiencies are given sufficient consideration in ensuring regulatory arrangements support the long term interest of consumers.
- The Authority examines how it can help address identified market failures and also monitor the development of emerging technologies (with a focus on the impact on the competitive sector)
- MBIE: 1) amends the Commerce Act so that Part 4 is nested within the purpose of the Act, ensuring competition is the primary focus, and 2) examines whether battery ownership (and demand response assets more broadly) should be regulated assets, and 3) examines the need for ring-fencing of lines company activities in potentially competitive markets.

1 Introduction

Emerging technologies offer benefits across different functions in the electricity sector. As a result, various policy and regulatory agencies have an interest in the role of emerging technologies. These agencies include:

- **MBIE,** which is responsible for electricity policy and legislation, as well as initiatives such as the SmartGrid Forum and research on the roles of emerging technologies.
- **The Authority,** which is responsible for overseeing and regulating the competitive parts of the electricity supply chain under the Electricity Industry Participation Code
- **The Commission,** which is responsible for regulating parts of the electricity sector where there is no competition, and little prospect of competition, under Part 4 of the Commerce Act. This includes regulating electricity lines businesses

Existing regulatory arrangements were not designed with emerging technologies in mind

The current regulatory settings reflect the underlying division of roles and responsibilities associated with the functional separation that has existed since the electricity sector was liberalised in the late 1990s. This regulatory paradigm was designed for an environment prior to the potential for emerging technologies to deliver significant benefits to consumers. In light of this context, ERANZ has asked Castalia to evaluate potential options for the policy and regulatory settings for emerging technologies.

We examine how problems under the current arrangements can best be addressed

In order to achieve this, this report examines:

- Problems with the current arrangements and objectives of policy options (Section 2)
- The range of policy options and which could deliver the best outcomes for consumers (Section 3)
- Recommendations for government agencies in order to maximise the benefits to consumers from emerging technologies (Section 4).

We use battery storage as an example throughout our analysis when considering how examples might work in practice.

Appendix A summarises the roles and responsibilities of the different agencies with an interest in emerging technologies in the electricity sector. It also identified the objectives these parties have when considering different policy initiatives and regulatory approaches.

2 Problem Definition and Objectives

In order to identify and evaluate options for dealing with emerging technologies, we first identify the:

- Problems that exist with the current arrangements
- Importance of addressing these problems in the immediate future
- Objective for assessing different policy options.

Each of these is discussed in turn.

2.1 Problems to Address

We examine the context to the current regulatory arrangements, the conditions needed to maximise benefits to consumers, and the problems with the current regulatory settings.

Competition is the primary means of delivering long-term benefits to consumers

There is a general consensus that competition provides long-term value for consumers, and that regulatory interventions are a second-best solution that should only be pursued when competition is unlikely to deliver the best outcomes. This is particularly true for activities that involve innovation and investment, where the nature, timing, and location of investment can drive very different outcomes for consumers.

Conceptually, the best policy settings will start with competition to maximise benefits to consumers, and will only place restrictions where these are justified. This was the case as New Zealand (and Australia's) electricity settings evolved. In New Zealand, statutory electricity monopolies were opened to competition and subjected to targeted information disclosure, ownership separation, and price controls as appropriate.[2]

The electricity sector in New Zealand currently has two forms of regulation that address market access and natural monopoly pricing and quality:

- **The Electricity Industry Act 2010** (EIA) restricts and limits investment by regulated lines businesses in competitive parts of the supply chain (generation, retail, and metering). These limits are justified by concerns about the risk of discrimination and cost-shifting by network monopolies
- **Part 4 of the Commerce Act 1986** (Part 4) regulates the price and quality of network monopoly services. These regulations are justified in order to promote outcomes that are consistent with the outcomes produced in competitive markets in the absence of competition (and with little or no likelihood of competition).

These restrictions have evolved since they were first put in place through the reforms of the late 1990s. However, these restrictions substantially reflect the same underlying division of roles and responsibilities between sector participants.

The division of roles and related regulation needs to be reconsidered in light of emerging technologies

Now is the time to revisit this regulatory paradigm. Technology shifts mean that decisions made now will impact how consumer interests are served in the future. There are clear risks that consumers will not benefit from investments in new technologies to the extent

[2] See:http://www.mbie.govt.nz/info-services/sectors-industries/energy/electricity-market/electricity-industry/chronology-of-new-zealand-electricity-reform/chronology-of-nz-electricity-reform.pdf and http://www.ena.asn.au/competition-policy-and-network-regulation-changing-energy-markets

that they otherwise would if policy makers and regulators are passive and take a hands-off approach.

Investments in emerging technologies occur at the boundary of regulated firms and have the potential to provide benefits across the sector. Therefore, in order to maximise benefits to consumers, these investments should occur with a context of certain conditions of (near) perfect competition:

- **Access to information.** Investors in new technologies would need to be able to ascertain where to invest to best serve market needs (considering network benefits, retail benefits, and consumer benefits).
- **Service based and cost-reflective prices.** Prices would help to direct investment in ways that ultimately benefit consumers. For example, network pricing signals would provide value in ensuring investments of the right nature, timing, and location. This could include market-set prices.
- **Limited transaction costs.** The interactions between market participants (and participants and regulators) would occur in ways that manage administrative and compliance costs. Regulatory settings would also be indifferent to the party investing in or managing new technologies, treating costs for similar services equally regardless of who these go to.

If these conditions are present, then policy and regulatory decisions will have less importance. Indeed, participants could largely be left to their own interactions to figure out where consumer value lies across the supply chain, and to negotiate arrangements that maximise consumer benefits.

These conditions do not currently hold in New Zealand

The current arrangements in New Zealand's electricity sector diverge from the conditions described above in important ways:

- Would-be investors have very little information on where batteries would provide the greatest network benefit. While information asymmetry can never be completely overcome, consumers would benefit from having greater contestability on the best solutions for overcoming network constraints and deferring investment.
- Network prices reflect a much greater concern for cost-recovery than efficiency or price-signalling. Prices are typically simple flat rates that are not time or location specific. The Electricity Authority has acknowledged the fact that distribution prices are not cost reflective as part of the review of distribution pricing.[3]
- Transaction costs may be significant. For example, the Electricity Authority has decided to introduce default distribution agreements in order to enhance retail competition and lead to more efficient operation of the electricity industry.[4] Further, concerns have been raised about cost allocation between regulated and unregulated services under the current input methodologies.[5]

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[3] See: https://www.ea.govt.nz/development/work-programme/transmission-distribution/distribution-pricing-review/development/results-of-distribution-pricing-review/

[4] See: https://www.ea.govt.nz/development/work-programme/retail/more-standardisation-of-use-of-system-agreements/

[5] See: http://www.comcom.govt.nz/regulated-industries/input-methodologies-2/input-methodologies-review/

These market imperfections and market failures can result in substantial missed benefits to consumers as illustrated in relation to the smart meter roll-out in Victoria, Australia, discussed in Box 2.1.

Box 2.1: Smart Meter Roll-Out Experience in Victoria, Australia

New Zealand and Victoria's experience with the roll-out of smart meters have differed significantly. In New Zealand, the switch to smart meters has been optional and was largely driven by retailers (seeking cost or service advantages), while in Victoria the roll-out of smart meters was mandated by the state government. Key differences between the approach in New Zealand and Victoria are summarised in the table below.

	Victoria	**New Zealand**
Framework overview	Distributors are charged with installing smart meters at all customer premises.	No mandate to install smart meters. Retailers can choose to switch to smart meters and whether or not the customer can opt out.
Service level and functionality	The Government has prescribed a standard minimum service level and functionality.	Individual retailers determine the required services and service levels to be received.
Costs	Costs passed directly to customers. The costs are reviewed by the Australian Energy Regulator annually and range from AU$109 to $226 for 2015 (per meter per annum)	Costs are generally not identified on customer bills. Retailers have signed 8 to 10 year service agreements with metering service providers with annual fees of around $60 to $120 per year.
Risks	Risks of meter deployment and system cost overruns and technology risk are borne by customers. The distributors have already recovered portions of the cost overruns from customers, and will continue to recover the costs.	Metering service providers or retailers, depending on their agreement, carry the risk of meter deployment and system cost overruns and the risks that their technology is superseded, or that their meter is switched out by a new retailer.

The Victorian Government's decision to regulate the state-wide smart meter rollout has been found to have cost more and delivered fewer benefits than anticipated, in essence destroying value relative to New Zealand's market-led approach. In Victoria, the lack of competition and transfer of risk to consumers led to less innovation and less drive for efficiency, which increased meter costs by around $2 billion, and decreased the benefits of the roll-out by around $0.6 billion. In essence, consumers in Victoria faced and continue to face the cost (and technology risk), without the choice of meter or service. Distributors are simply able to pass on costs through their regulated business (including cost overruns).

Source: http://www.mbie.govt.nz/info-services/sectors-industries/energy/electricity-market/nz-smart-grid-forum/meeting-6/case-study-victorian-smart-meter-rollout.pdf

Regulated businesses have an ability to shift cost and risk to regulated customers

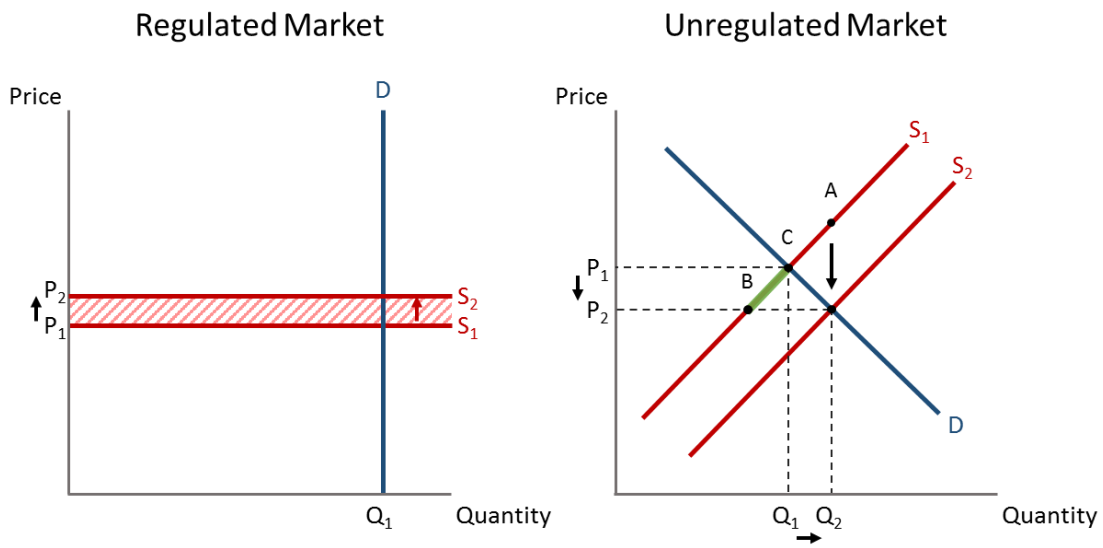
Electricity distributors are effectively able to cross-subsidise investments in new technologies as a result of these failures. In particular, the cost allocation rules allow for distributors to transfer costs and risks associated with new technologies to regulated customers (as occurred in the Victorian smart meter example).

The potential implications of this, as illustrated in Figure 2.1, are:

- Inefficient production in the unregulated market (producers with pre-subsidy costs of supply above equilibrium costs produce and clear in the market)
- Dynamic inefficiency in the unregulated market (producers can make bad decisions and still produce at the expense of lower cost options)
- Allocative inefficiency in the regulated market (prices are higher than they otherwise would be).

The left of Figure 2.1 shows the market for regulated lines services, while the right shows the unregulated market for emerging technologies, such as battery storage. In the absence of cost sharing, the prices and quantities demanded in each market would be P_1 and Q_1. For illustrate purposes, we have assumed that the regulated lines business would not supply unregulated services in this case because its cost of supply is at point A (above P_1). However, given the ability to shift some of the costs to the regulated services market, the price for regulated services increases to P_2 and the supply curve in the unregulated market shifts down resulting in a reduction in price to P_2 and an increase in quantity to Q_2. In this example, the distributor is now a supplier and previously lower cost providers lying between points B and C on the supply curve now no longer supply these unregulated services (assuming the lines company can supply sufficient scale at price P_2 as illustrated by the shift in the supply curve rather than a movement of point A on the supply curve).

Figure 2.1: Impact of Regulated Entities Operating in Regulated and Unregulated Markets



We note that Figure 2.1 is illustrative only. As discussed below, the problems associated with this transfer of cost and risk also need to be considered relative to potential economies of scope that may be able to be realised by allowing assets used for regulated services to also be used for unregulated services.

Left to play out this risks foreclosing competition in emerging technologies

This ability to cross-subsidise unregulated activities through charging regulated customers risks inefficient investment and cost allocation. In essence, costs are shifted from consumers of unregulated services to consumers of regulated services. As a result, network companies may be able to access value streams as a result of (cross-subsidised) lower unregulated prices that are not available to third parties that would otherwise compete.

This ability to shift costs, and obtain unregulated revenues resulting from this practice, risks foreclosing competition for these unregulated services. Cost (and risk) shifting is also different to the economies of scope envisaged in allowing regulated assets to be used for unregulated services. Current arrangements risk technology lock-in and inefficient risk management (even if regulated entities are the lowest cost providers at a given point in time). This result would be detrimental to consumers (through reduced choice and higher cost in future).

Once technology uptake reaches a tipping-point it would be difficult to subsequently open up to competition. This is a result of the way uptake increases as technology improves and costs come down. At a certain point, uptake typically increases exponentially. If the market is not competitive at this stage, potential entrants will be locked out. As a result, if distributors are able to gain an early advantage by shifting costs to regulated customers, alternative providers risk being shut out of the market once uptake exceeds a certain point. With low consumer engagement in electricity, consumers risk being locked into sub-optimal solutions in relation to emerging technologies if competition is not present at an early stage. This highlights the dangers of taking a wait and see approach.

2.2 Objective for Policy Options

The objective for policy options is to maximise the long term interest of consumers by:

- Addressing the identified market failures:
  - **Information asymmetries** as would-be investors have little information on where emerging technologies provide the greatest network benefits.
  - **Imperfect price signals** as network prices reflect a focus on cost-recovery rather than efficient price signals to contain costs.
  - **Transaction costs** given the costs associated with contracting with potentially multiple different entities.
- Allowing for benefits across the electricity supply chain to be realised and prioritised
- Trading off dynamic and static efficiencies. That is, considering the impacts on long term market outcomes relative to the optimal allocation of resources given the existing cost structures now.

Enabling benefits across the supply chain

Figure 2.2 shows the potential benefits across different functions in the sector from investments in battery storage. Direct consumer benefits are only possible from behind the meter solutions. Benefits to other parts of the supply chain should indirectly flow through to consumers in terms of the price they pay or quality of service they receive. In practice these benefits may be shared, as is envisaged under the Commission's regulatory framework for Transpower and electricity distributors, in order to provide these parties with incentives. While a greater portion of the benefits in competitive aspects of the supply chain would be expected to be passed on.

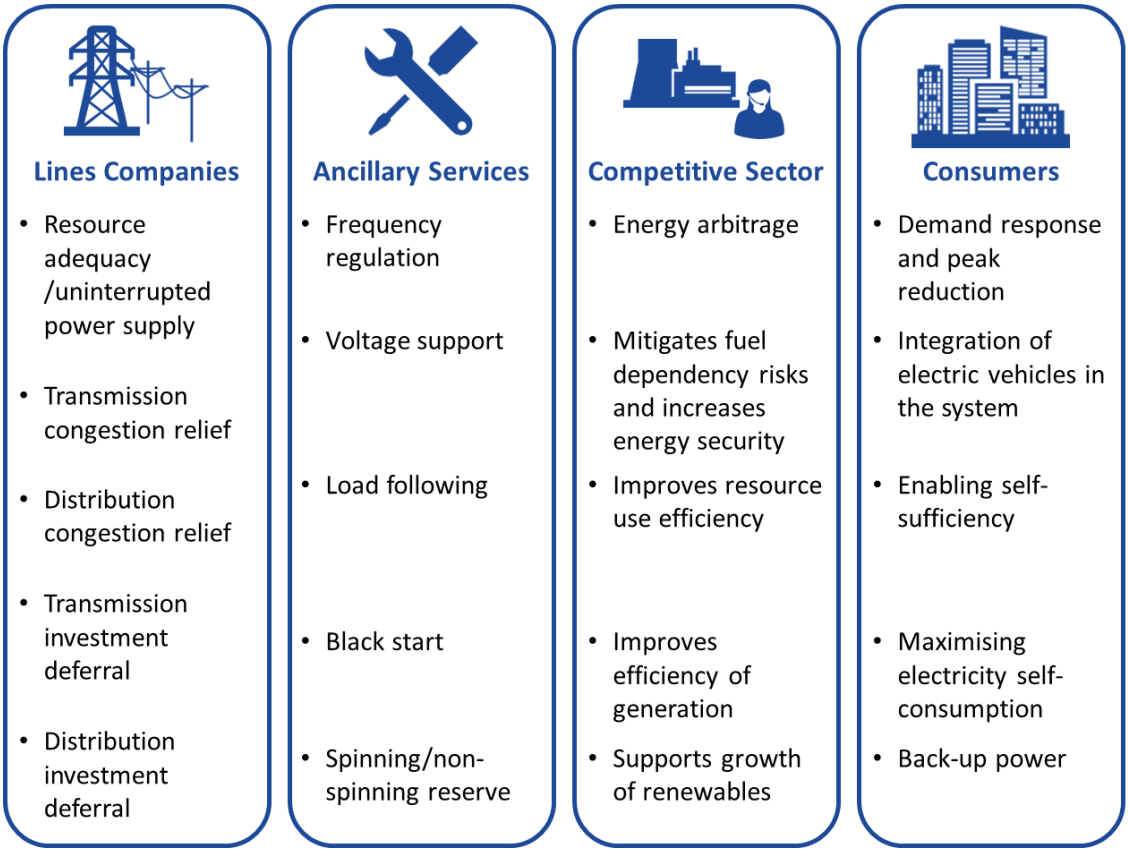
The market failures identified above could be addressed if:

- Networks published plans identifying the parts of their networks where emerging technologies would be most valuable
- Customers faced prices that reflected the value to networks, and

- There were limited costs in a third party actually making the investment and equal treatment of costs regardless of who undertook or managed the investment.

In the presence of these conditions, the likelihood of investment (given the potential benefits) would be high and there would be no policy concern with the party undertaking the investment.

Figure 2.2: Sources of Benefit Across the Sector from Battery Storage



Source: Adapted from http://www.rmi.org/Content/Files/RMI-TheEconomicsOfBatteryEnergyStorage-FullReport-FINAL.pdf and http://www.europarl.europa.eu/RegData/etudes/STUD/2015/563469/IPOL_STU(2015)563469_EN.pdf

Considering both dynamic and static efficiencies

To select the approach with greatest net benefits to consumers, we must consider not only benefits under the current market arrangements, but also how options would impact the development of the market, incentives to invest, and the allocation of risk.

3 Analysis of Options

We identify the spectrum of regulatory options, drawing on international experience, and assess these against the components of our 'Objective for Policy Options' as set out in Section 2.2.

We have identified broadly five potential options

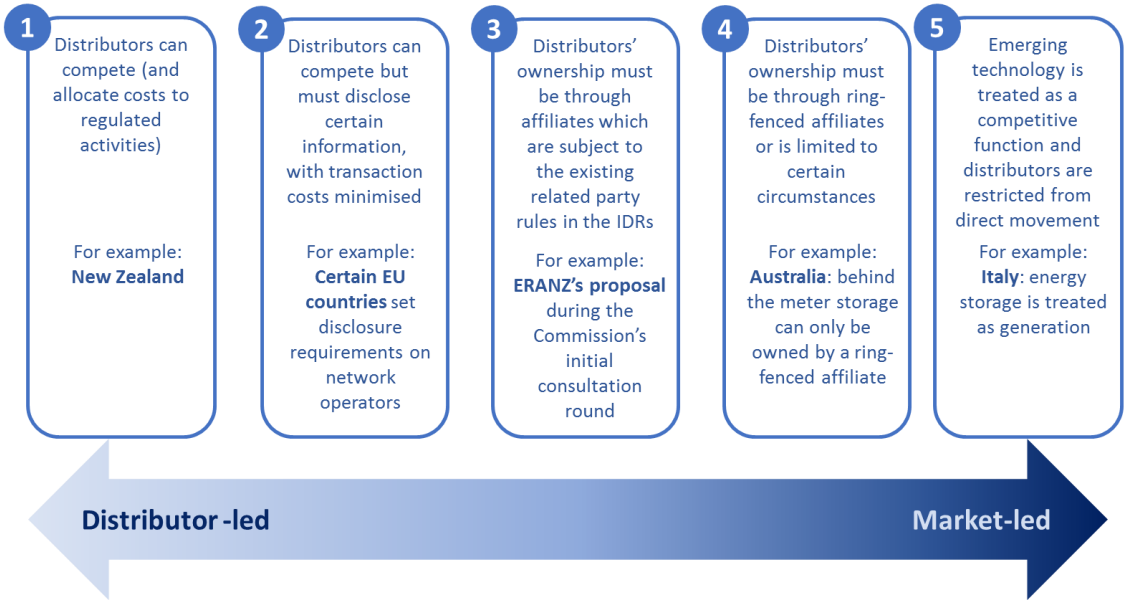
Figure 3.1 illustrates five options for addressing the concerns that the current regulatory arrangements may not maximise the benefits to consumers from emerging technologies. The options range from a utility service model to a market-led service model. As illustrated, in:

- **Option 1** distributors can compete in emerging technologies and allocate costs to regulated services. This is the current approach in New Zealand, with the input methodologies the main mechanism for determining how costs are allocated.
- **Option 2** distributors can complete in emerging technologies, but must disclose certain information (to allow other providers to identify opportunities), actions are taken to minimise transactions costs (such as default agreements), and rules around cost allocation are tightened up to ensure a level playing field. This is similar to the approach taken in certain European Union countries, which for instance set disclosure requirements on network operators to ensure knowledge diffusion.
- **Option 3** distributors are able to use emerging technologies, but ownership of these assets must be through affiliates (not involved in regulated services), and contracts with affiliates are subject to the existing related-party rules in the Information Disclosure Requirements (IDRs). The related-party rules will govern the price of contracts between EDBs and affiliates (for example for load control services), and the disclosure requirements on those contracts.
- **Option 4** distributors are able to use emerging technologies, but ownership of these assets must be through arms-length arrangements with ring-fenced affiliates (not involved in regulated services) or is limited to particular circumstances. Australia takes this kind of approach in limiting behind the meter battery storage, which can only be owned by a ring-fenced affiliate (see Box 3.1).
- **Option 5** emerging technologies are treated as competitive functions and distributors are restricted from direct involvement. This would be consistent with the decision in Italy to treat energy storage the same as energy generation (see Box 3.1). Under a similar decision the structural separation of lines businesses and generation would mean lines businesses could only have direct ownership of emerging technologies up to a limited capacity (this capacity could also be reduced compared to allowed generation capacity given the smaller scale of typical battery capacity).

We distinguish between these approaches as moving from more "utility-style regulation" to more "market-led regulation". This draws on Professor Yarrow's idea of "calibrated regulation" regulatory models that balance encouraging scope economies and managing monopoly power to ensure competition and innovation. Yarrow suggests that the regulatory approach applied should depend on the particular business model.[6]

[6] See: http://www.ena.asn.au/competition-policy-and-network-regulation-changing-energy-markets

Figure 3.1: Spectrum of Potential Regulatory Options



Box 3.1: Regulatory Treatment of Emerging Technologies Internationally

We describe the regulation arrangements relating to emerging technologies in Australia and Europe, including Italy.

Australia

The Australian Energy Regulator (AER) requires network businesses to consider non-network solutions as an alternative to investment in networks. The Regulatory Investment Test for distribution (RIT-D) requires distribution network businesses to consider all credible network and non-network options. The preferred option is that which maximises the economic benefit to all those who produce, consume, and transport electricity in the National Electricity Market (NEM).[7] The RIT-D applies when a distribution company identifies a need to enhance the capacity of the network and the cost of the most expensive credible option exceeds AU$5 million. The RIT-D aims to promote "efficient distribution network investment in the NEM for the long term interests of consumers."

On the other hand, the Australian Energy Market Commission (AEMC) has recommended preventing regulated lines businesses from owning battery storage "behind the meter", unless through a ring-fenced affiliate.[8] This comes together with a number of more stringent safeguards against cross-subsidisation in Australia.[9]

The recent AEMC report on battery storage found that, for the purposes of network regulation, storage (including batteries and pumped hydro units) should be considered a contestable (or competitive) service. In reaching this decision, the AEMC referred to several supporting principles:[10]

[7] See: www.aer.gov.au/system/files/AER%20Better%20Regulation%20factsheet%20-%20Regulatory%20investment%20test%20for%20distribution_2.pdf

[8] AEMC, Integration of Energy Storage: Regulatory Implications, Final Report, 3 December 2015.

[9] These are discussed in greater detail in our earlier paper to Contact Energy available at: http://www.comcom.govt.nz/dmsdocument/14045

[10] See Australian Energy Market Commission, "Integration of Energy Storage – Regulatory Implications", October 2015.

- Market arrangements should promote consumer choice, while providing a level playing field for market participants
- Consumer choice based on clear price signals drives innovation
- Service providers seeking to provide an attractive value proposition to consumers will minimise costs.

The AEMC concluded that regulation should only be considered where competitive forces cannot deliver these benefits to consumers. It recommended that network businesses should only be allowed to own storage behind the meter through a ring-fenced affiliate that separated the activity from the provision of regulated network services. This could be done through commercial arrangements with other service providers.

Europe

The Electricity Directive requires unbundling of transmission system operators (TSOs), distribution system operators (DSOs) and the electricity generation and supply functions in European Union member states. The Directive also states that a TSO cannot "directly or indirectly exercise control or exercise any right over any undertaking performing any of the functions of generation or supply" of electricity. The Directive does not explicitly mention energy storage, and so it is not clear how storage should be treated under the unbundling requirements. Storage is generally regarded as part of the generation function.

The European Network of Transmission System Operators state in its latest Ten Year Network Development Plan (ENTSO-E, 2014, p 485) that it is an 'open question' which players (private market operators contributing to system optimisation or regulated operators) are allowed to own and manage electricity storage systems.[11]

Approaches differ across EU countries, with TSOs having different roles in owning, managing, or contracting energy storage for electricity. In Italy, the Italian network regulator AEEGSI passed a decision (574/2014/eel) defining energy storage as power generation. The decision also made energy storage subject to connection, dispatching and metering obligations.

Source: Various (as referenced)

Options 3 and 4 target the problem and appear most likely to realise benefits across the supply chain

We have identified already that option 1, New Zealand's current approach, is not optimal and risks foreclosing the market in favour of regulated businesses. This will fail to maximise long-term consumer benefits by stifling competition, innovation, and consumer choice. In contrast, option 5, restricting lines businesses from direct involvement, may prevent networks from taking advantage of scope economies.

Options 2, 3 and 4 directly address the market failures and attempt to ensure that market participants can compete on a level playing field. Option 2 attempts to add protections to the existing arrangements, including changes to cost-allocation rules to prevent cross-subsidisation. Option 3 provides a more structural solution by restricting EDB ownership of battery assets and more broadly business activities at the boundary of the regulated firm. While option 4 extends on option 3 by requiring ring-fencing to ensure a level playing field between EDBs and non-regulated providers of services to EDBs (rather than relying on the related party rules in the IDRs to govern EDB activities in competitive markets). These solutions share important elements of suggestions posed by work commissioned by the Electricity Networks Association in Australia, where Professor Yarrow argues for treating

[11] See: www.europarl.europa.eu/RegData/etudes/STUD/2015/563469/IPOL_STU(2015)563469_EN.pdf

a regulated distribution network owner (DNO) separately to an unregulated distribution service operator (DSO).[12]

Options 2 - 4 attempt to address these market failures by delivering:

- **Better information**. Value that is currently kept internal within the regulated business would be made transparent so that a DSO could deliver the best solutions (which may be for it to invest in batteries, or to contract with a third party to do so). Option 2 includes specific ex-ante information disclosure to try to achieve this, while option 3 achieves this through ring-fencing arrangements.
- **Better pricing**. In order for a DSO to deliver the best solution, the value to distributors of different options would need to be clearly signalled and accessible to third parties (under any of the options). To do this, improvements to existing price signals are required.
- **Lower transaction costs**. These solutions reflect the reality that in the future, contracts between networks and energy service providers (including retailers) will be critical. This puts the sector onto a path where those agreements are struck on a level-playing field basis – rather than through the exercise of market power. Option 2 attempts to achieve this through standard contracts (and requirements to select the optimal solution), while options 3 and 4 achieve this through DSO incentives to minimise costs. The confidence in being able to achieve this outcome sufficiently under option 2 needs to be assessed relative to the costs associated with related-party rules or ring-fencing (noting there are different levels, with differing costs, of ring-fencing to consider).

The long term benefits to consumers should be maximised under options 2,3 and 4 (so long as underlying problems are able to be addressed and benefits are passed on or shared) by incentivising the highest value to be gained across the sector. Figure 3.2 illustrates this using battery storage as an example. As already noted, options 2-4 rely on improving pricing-this is particularly important for option 2 as without efficient price signals, no market will develop. In contrast, under options 3 and 4 there would be stronger incentives to develop appropriate price signals (or contracting arrangements).

As shown in Figure 3.2, under option 1 there is less incentive (and some cost) for lines companies to try to contract with other parts of the supply chain for potential benefits they may receive from battery storage, meaning benefits to the competitive sectors and consumers may be missed (particularly if pricing issues remain). Where lines companies are able to benefit from ancillary services, this may represent unregulated revenue while costs may fall to regulated customers (resulting in the cross-subsidy concerns identified with the status quo).

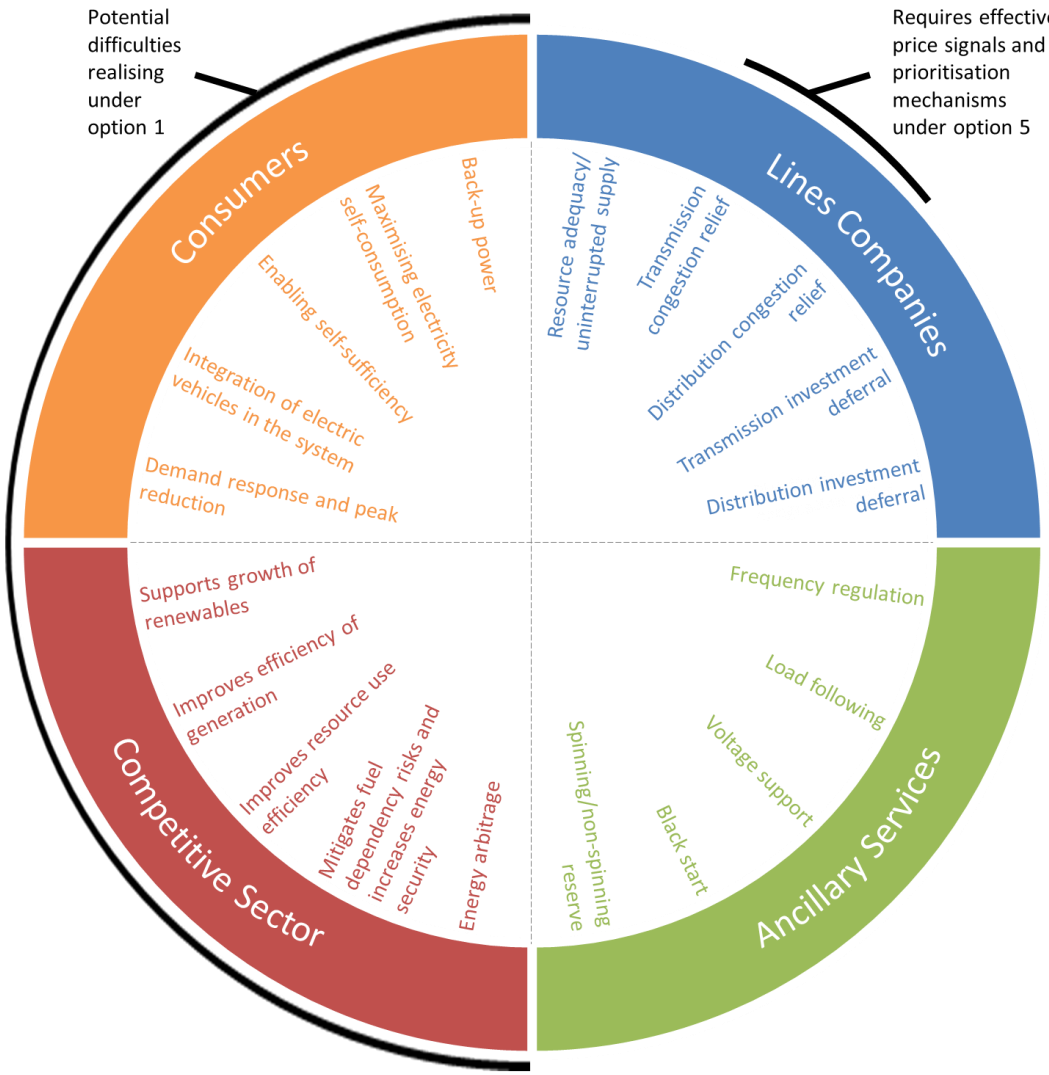
Under options 2,3 and 4 all potential benefits are achievable as there are greater incentives to share information, price effectively, and minimise transaction costs. However, option 2 also chiefly relies on addressing the failing effective price signals (which is not directly addressed under any of the options). Therefore, option 3 and 4 may be the best ways to ensure these signals develop (through necessity).

Under option 5, with lines companies prohibited from owning battery storage directly (beyond a threshold), in order to realise benefits to line companies where they are of sufficient value, there would need to be:

[12] See: http://www.ena.asn.au/competition-policy-and-network-regulation-changing-energy-markets

- Effective price signals across the supply chain for the value of emerging technologies
- Mechanisms for prioritising which party benefits and for sharing these benefits.

Figure 3.2: Potential Benefits Across the Supply Chain from Battery Storage



Source: Adapted from http://www.rmi.org/Content/Files/RMI-TheEconomicsOfBatteryEnergyStorage-FullReport-FINAL.pdf and http://www.europarl.europa.eu/RegData/etudes/STUD/2015/563469/IPOL_STU(2015)563469_EN.pdf

A more market-led approach is more likely to ensure dynamic benefits

We want to maximise the long term net benefits to consumers when choosing between options 2, 3 and 4. In doing so, we must consider both static and dynamic efficiencies.

Table 3.1 therefore identifies the key cost and benefit trade-offs between more utility-style and more market-led regulation. These trade-offs are specifically relevant to choosing between option 2 and either of options 3 or 4 along the spectrum, given these all focus on

addressing underlying problems (though options 3 and 4 are most likely to enable benefits across the supply chain to be realised under current pricing arrangements).

Table 3.1 shows that the more market-led approach, options 3 and 4 (and also option 5) has the relative benefits of encouraging dynamic efficiencies, competition, and innovation and allocating costs and risk to those best placed to manage them. In contrast, the more utility-style approach, option 2 (and also option 1) better encourage economies of scope but run the risk of cross-subsidising, misallocating risks, and foreclosing competition.

Table 3.1: Key Benefits and Costs of Market-led Regulation (Options 3 and 4) Compared with Utility-style Regulation (Option 2)

Benefits	Costs
▪ Competitive discipline to decisions (procurement decisions, technology-neutrality, risks allocated to those best placed to manage them) ▪ Avoids regulatory problems associated with costs and risk being shifted to regulatory customers, and these leading to a foreclosure of a competitive market	▪ Potential for economies of scope to be missed, although ability to contract with third parties for relevant value streams will mitigate this risk

As a result of this analysis, options 3 or 4 seem most likely to achieve the overall objective.

The costs of ring-fencing can be right-sized

Ring-fencing can occur by various means. These range from different reporting, management, ownership, and governance arrangements. Each carries a different cost and impacts the potential to realise economies of scope to a greater or lesser degree.

Option 3 aims to minimise cost and utilise existing information disclosure requirements. However, option 4 places further emphasis on encouraging competition, by picking up ring-fencing and arm's length requirements under the EIA, including requiring a different corporate structure, reporting, and governance.

These options (3 and 4) aim to ensure that emerging technology investment decisions are considered on their own merits. This avoids concerns of cross-subsidisation and the misallocation of risk. Option 2 is still subject to risk of this occurring (though this is lower than under option 1). Options 3 and 4 would also allow for some costs to be shared between affiliates and for commercial arrangements to ensure that the distribution benefits are adequately shared.

The problem of inefficient pricing has been identified to the Authority and is being considered as part of the distribution pricing review. However, absent pricing adjustments to ensure efficient price signals, requiring the use of affiliates or imposing ring-fencing/arm's length arrangements may be the only way of forcing this to occur in relation to the potential role and lines company benefits of emerging technologies. The balance between options 3 and 4 depends on a judgement about whether to focus on minimising costs or to strongly ensure that discrimination does not occur through ring-fencing and arm's length arrangements such as those set out under the EIA.

4 Recommendations

Given the importance of getting these regulatory arrangements right, and the various interested parties, we specify recommendations for each agency in Table 4.1. The roles of different stakeholders are outlined further in Appendix A.

We structure our recommendations by agency. Agencies are ordered by expected timing necessary to address the respective issues, ranging from short-term to longer-term. We wish to highlight the importance of starting on each soon however, given the pace of technological development (as discussed in Section **Error! Reference source not found.**).

Table 4.1: Recommendations

Agency	Recommendation
Commerce Commission	▪ Tighten the cost allocation rules to minimise inefficient cross-subsidisation so that costs and risk are appropriately allocated ▪ Expand the information disclosure requirements, including ex-ante disclosure on key information necessary to realise network benefits, to ensure that opportunities to apply emerging technologies are open to all parties ▪ Examine whether current incentives on distributors, and procurement rules, are sufficient to enable scope economies to be traded off against efficiencies available to third-party owners of existing assets capable of providing network support services (via contract) ▪ Examine the need for ring-fencing of lines company activities in potentially competitive markets as well as conditions under which they are able to invest in these activities.
Electricity Authority	▪ Encourage competition in emerging technologies in order to support the long term interests of consumers ▪ Address market failures relating to: – Access to information, by helping coordinate access to information through online content or different fora/channels – Service based and cost-reflective pricing, which provides incentives for behaviour change by consumers, as part of its review of distribution pricing – Transaction costs, by working with the industry to develop standard/default contracts or channels/mechanisms (such as Transpower's demand response scheme and other market-based solutions) to contract for emerging technologies ▪ Undertake a review looking at what market structure ensures battery use is optimised and consumers obtain the greatest value.
Ministry for Business, Innovation and Employment	▪ Amend the Commerce Act so that Part 4 is nested within the purpose of the Act, ensuring competition is the primary focus (in order to maximise the long term interests of consumers) ▪ Clarify the respective roles of the Electricity Authority and the Commerce Commission in relation to activities on the boundary of regulated services or that have the potential to provide benefits to both regulated and competitive parts of the sector

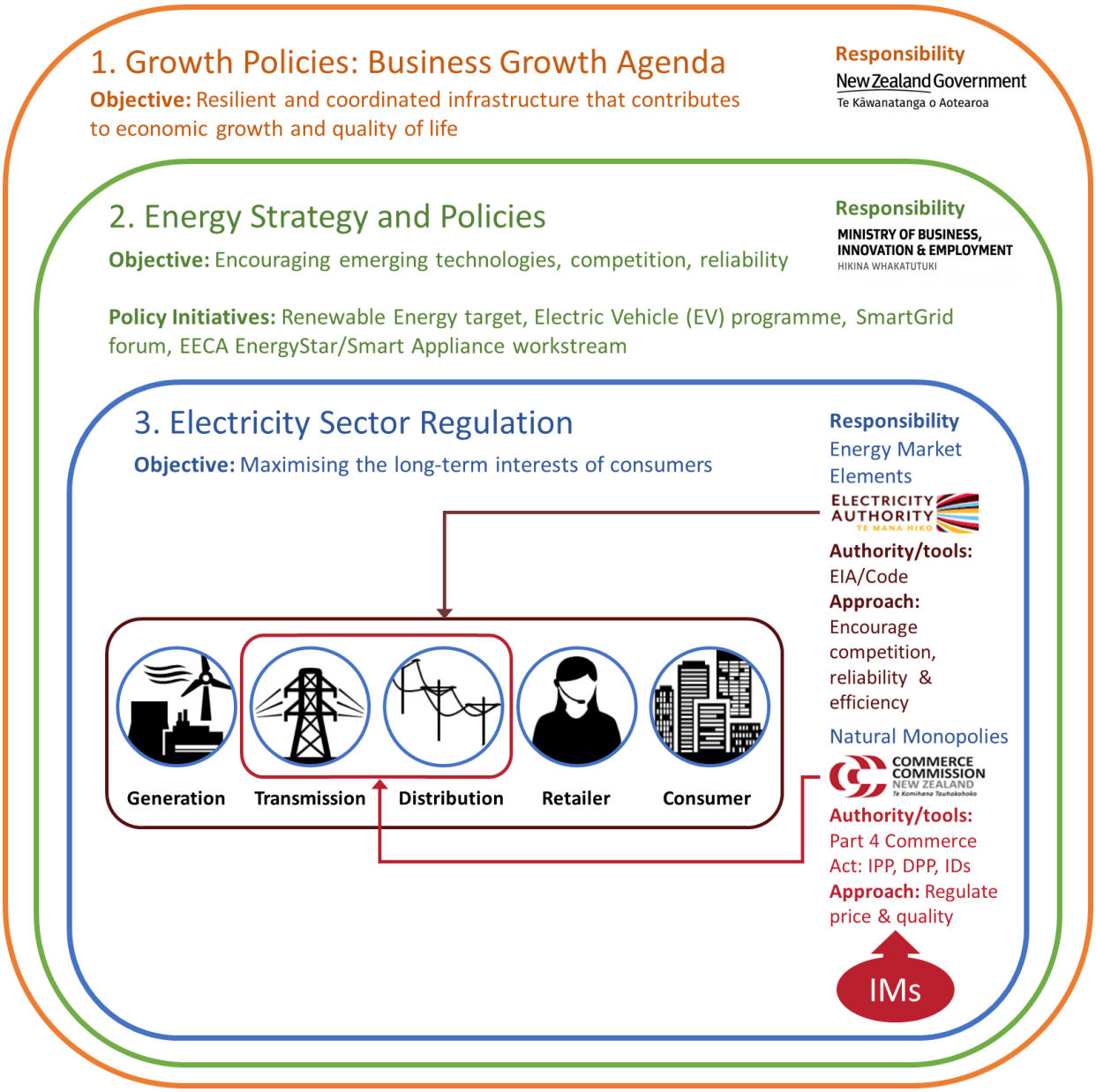
- Examine whether current incentives on distributors, and procurement rules, are sufficient to enable scope economies to be traded off against efficiencies available to third-party owners of existing assets capable of providing network support services (via contract)
- Examine the need for ring-fencing lines company activities in potentially competitive markets as well as conditions under which they are able to invest in these activities. This could be part of a wider review of Part 3 of the EIA
- Determine whether emerging technologies such as battery storage should be considered as generation and whether thresholds for corporate separation are fit for purpose (given, for example, it would take a very significant number of battery investments to reach the current limits)
- Identify mechanisms for regulators to use for case-specific issues or unforeseen circumstances to provide for evolution to changing circumstances. These should factor in:
  - Optimal risk-allocation
  - The relative merits of regulatory certainty versus the need for flexibility in certain circumstances

Appendix A: Overview of Policy Interests in Emerging Technologies

There are multiple parties with interests in the development of emerging technologies. Figure A.1 illustrates the responsibilities of relevant agencies; their respective objectives, approaches and initiatives; and the tools available to the regulators in particular.

Our recommendations reflect the relative responsibilities across the sector and the contributions made by each agency.

Figure A.1: Overview of Interests in Electricity Sector Emerging Technologies



Note: EIA refers to the Electricity Industry Act, EECA is the Energy Efficiency and Conservation Authority, IPP refers to Transpower's Individual Price-quality Path, DPP Default Price-quality Path, IDs Information Disclosures, and IMs Input Methodologies.

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