Would exempting WEL Networks' solar farms and BESS from arms-length rules better achieve the Authority's objectives?

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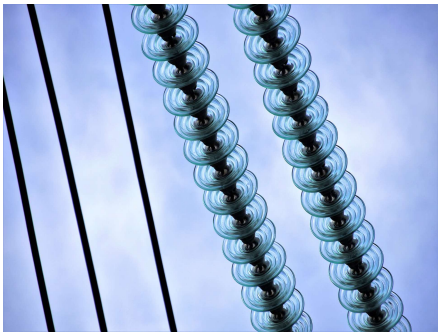

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Executive summary

WEL Networks Limited ("**WEL**") is constructing a network connected battery (known as a Battery Electricity Storage System or "**BESS**") with a capacity of 35MW which is expected to be completed by July / August 2023. WEL is also going through the resource consent process for two solar farms with capacities of 22.4MW ("**Te Ohaaki**") and 10MW ("**Rangimarie**") (together with the BESS described as the "**Assets**"). These Assets will be connected to WEL's distribution network in the Waikato region and will each be connected to the Huntly GXP. WEL's working assumption is that the total capacity of this new plant exceeds "50MW of generation", and hence may be caught by the corporate separation rules of clause 6A.3 of the Electricity Industry Participation Code (the "**Code**") if an exemption is not granted.

For the Electricity Authority (the "**Authority**") to grant WEL an exemption to the Code under section 11 of the Electricity Industry Act 2010 (the "**Act**"), it must be satisfied that:

a) it is not necessary, for the purpose of achieving the Authority's objectives under section 15 of the Act, for WEL to comply with clause 6A.3 of Part 6A of the Code; clause 6A.3 requires persons involved in a distributor and a connected generator to comply with the arm's-length rules; or
b) exempting WEL from the requirement to comply with clause 6A.3 would better achieve the Authority's objectives than requiring compliance.

Section 15 of the Act states that the main objective of the Authority is to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

Accordingly, we assess whether an exemption from the arms-length rules for WEL would promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

We assess the competitive effects of granting WEL an exemption relative to three hypothetical counterfactuals. The three counterfactuals are hypothetical scenarios describing the range of possible outcomes if an exemption is not granted; we do not express a view on the likelihood of any one of these counterfactuals occurring, and indeed, we understand from WEL that counterfactual 2 and 3 below are unlikely. Nevertheless, we address each potential counterfactual in the order of likelihood as described by WEL:

1. the sale of Te Ohaaki to an existing generator or to a new entrant to the wholesale electricity market
2. the sale of the BESS to an existing generator
3. WEL retaining ownership of the Assets and complying with the arms-length rules.

We assess the competitive effects of the factual against each counterfactual in respect of the following markets:

- the national wholesale market for electricity
- the North Island wholesale market for ancillary services other than voltage support

- an upper North Island wholesale market for voltage support
- the local network support services market supplying either Transpower or WEL.

We conclude that:

- WEL's ownership and operation of Te Ohaaki (as opposed to another generator's operation of Te Ohaaki) would promote competition to the extent that it matches Te Ohaaki with the BESS, because matching solar with battery increases the competitive rivalry of the solar farm.
- The ownership and operation of a BESS by WEL would promote competition in all relevant markets.
- An exemption would promote competition in the wholesale and ancillary services markets relative to the counterfactual of WEL complying with the arms-length rules.

Under all three of the counterfactuals, WEL has no incentive or opportunity to impede competition in any market, including local network support services markets.

Hence, as granting the exemption would promote competition in most markets, and not lessen competition in any market, the exemption would have the likely effect of promoting competition in the electricity industry.

There would also be no difference to the reliability of supply in the electricity industry between the factual and all three of the counterfactuals.

As granting an exemption would have the likely effect of promoting competition, the exemption could be expected to increase economic efficiency. Each of the counterfactuals would also result in higher costs, and therefore a less efficient market, than an exemption for WEL.

In summary, an exemption from the arms-length rules for WEL would promote competition in, and the efficient operation of, the electricity industry for the long-term benefit of consumers, and have no effect on the reliability of supply.

1. Introduction

WEL is constructing a BESS with a capacity of 35MW and two solar farms with capacities of 22.4MW and 10MW. The total capacity of this new plant may exceed "50MW of generation", and hence may be caught by the corporate separation rules of clause 6A.3 of the Code if an exemption is not granted.

WEL has advised us that it will seek an exemption from complying with the arms-length rules. This report assesses whether an exemption would better achieve the Authority's statutory objectives, or, in the alternative, whether such compliance is necessary for the purpose of achieving the Authority's objectives.

We structure our report into seven sections as follows:

1. Section 1, this section, introduces our report.
2. Section 2, sets out our approach and describes the WEL projects.
3. Section 3, defines the relevant markets for the analysis.
4. Section 4, describes the counterfactuals—what might happen if an exemption is not granted.
5. Section 5, assesses whether exempting WEL from the arms-length rules would promote competition in the relevant markets.
6. Section 6 considers whether exemption WEL from the arms-length rules would promote reliability in the supply by, and efficient operation of, the electricity industry.
7. Section 7 concludes.

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2. Our approach and WEL's projects

2.1 The test for an exemption

Clause 6A.3 of the Code requires persons involved in a distributor and a connected generator to comply with the arms-length rules. The Authority may grant an exemption from this clause if it is satisfied that:[1]

1. it is not necessary for the entity to comply with those provisions for the Authority to achieve its objectives; or
2. exempting the participant would better achieve the Authority's objectives than requiring compliance.

The main objective for the Authority is to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.[2]

The Authority has an additional objective to protect the interests of domestic consumers and small business consumers in relation to the supply of electricity to those consumers. The Assets being built by WEL would not supply services to domestic consumers and small businesses (the services provided by the Assets are discussed in section 2.3 below). Hence, this additional objective does not seem relevant to WEL's application for an exemption.

2.2 Our approach

We begin our assessment by considering whether an exemption would promote competition. We start with the competition limb of the Authority's objectives because:

1. the purpose of the arms-length rules is to promote competition[3]
2. the former test for granting an exemption to the arm's-length rules under section 90 of the Act assessed the expected impact of common ownership on competition
3. the Select Committee considering amendments to the Act unanimously recommended moving the arm's-length rules into the Code to allow flexibility for the Authority to target new competition-related problems as they arise (as opposed to seeking other, non-competition, outcomes).[4]

We understand that if the Authority considers a particular measure, consistent with one of the three limbs of section 15(1) of the Act, would achieve the long-term benefit of consumers, it is entitled to pursue that measure; there is no requirement for the Authority to promote all three limbs of section 15(1) equally or even at all (Manawa Energy Ltd v Electricity Authority, 2022, para. 71). However, in

[1] Section 11(2) of the Act.
[2] Section 15 of the Act.
[3] Ministry of Business Innovation and Employment, (2020), *Regulatory Impact Statement: Progressing the Electricity Price Review's Recommendations*, pages 24 -25.
[4] Electricity Industry Amendment Bill, as reported from the Economic Development, Science and Innovation Committee, page 3.

addition to the promotion of competition, we also assess the effect of the exemption on the reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

When considering applications for an exemption to the arms'-length rules under the previous section 90 test, the Authority adopted an approach consistent with that applied by the Commerce Commission in its competition assessments (Electricity Authority, 2017, paras. 2.12-2.14). This approach proceeded in three steps as follows:[5]

1. First, identify the services provided by the assets under consideration as well as other services that are substitutable for them in response to changing prices;[6] in the language of competition economics, this step is referred to as defining the relevant markets.
2. Second, describe what might happen if WEL owns the Assets with an exemption (referred to by the Authority as the 'factual') and what might happen if the exemption is not granted (referred to as the counterfactual).
3. Third assess whether ownership of the Assets by WEL would promote or inhibit competition relative to the counterfactual.

We follow this three-step approach, including drawing on our experience in assessing competition effects under Part 2 of the Commerce Act 1986. Competition authorities (and ultimately the Courts) regularly assess whether an activity would promote or inhibit competition and whether joint ownership of specific assets might create incentives and opportunities to inhibit competition. There is, therefore, a large body of academic literature, regulatory practice, and Court precedent on the required analysis.[7]

We add a further step to the analysis to consider the impacts on reliability and efficiency. This additional step utilises the same market definitions and counterfactuals as the competition assessment.

2.3 The WEL projects

2.3.1 The BESS

A network connected battery is a form of rechargeable battery. A rechargeable battery charges by extracting electrical energy from a network and then injecting energy back into the network at a different period in time. A network connected battery is a form of electrical energy storage.

Rechargeable batteries lose some energy when they charge and lose some more when they inject (known as round-trip efficiency); on average, batteries extract more energy than they inject. A BESS is a complicated installation. We provide a fuller, technical, description, in Appendix A.

[5] For a detailed discussion, see Commerce Commission, (2022), *Mergers and acquisitions guidelines,* Chapter 3.
[6] See Commerce Commission v New Zealand Bus Limited (2006) 11 TCLR 679 (HC), at para 123, citing Re Queensland Co-operative Milling Association Ltd (1976) ATPR 40-012 at 17,247.
[7] See for example, Commerce Commission, (2022), *Mergers and acquisitions guidelines*.

BESS have only recently become economic due to improvements in Li-ion battery technology, control systems, and the equipment (converters and inverters) required to make them work in a grid-connected application. While BESS are now economic, they are still relatively small in terms of energy output. For instance, a 35MWh BESS could, under certain operating conditions, discharge an output of 35MW for one hour if the BESS is fully charged (and assuming 35MWh is the net storage after losses). In practice, however, the 'full-load continuous rating' of a BESS (being the maximum output that a generating plant can sustain continuously, as designated by its manufacturer) is typically much lower due to physical constraints which limit its operational range (for example, we understand that the maximum continuous rating of WEL's BESS is only 15.8MW). To put that output in perspective, the largest single generator in New Zealand (Huntly unit 5 at 400MW) can generate 35MWh in just over five minutes.

2.3.2 Te Ohaaki and Rangimarie solar farms

The Te Ohaaki and Rangimarie solar farms are large scale collections of photovoltaic (PV) solar panels which absorb energy from the sun, convert it into electricity, and inject that electricity into the grid.

We understand that the Assets will be connected to the same GXP on the Huntly-Horotiu 33KV circuit.

3. Relevant markets

3.1 Market definition

In its competition analysis, the Authority adopted the definition of a market from section 3(1A) of the Commerce Act 1986 (Commerce Act): "the term market is a reference to a market in New Zealand for goods or services as well as other goods or services that, as a matter of fact and commercial common sense, are substitutable for them" (Electricity Authority, 2017, para. 2.14). We interpret the Authority's statement as meaning that it applies the same approach to defining markets within the electricity industry as the Commerce Commission takes when defining markets within New Zealand.[8]

The term 'market' is a technical term in competition economics to describe the field of actual and potential transactions between buyers and sellers. The High Court expressed the concept as follows (Commerce Commission v Air New Zealand, 2011, para 124):

> Without wishing to be definitive, while we see the heart of a market in economic terms as being the actual and prospective transactions between sellers and buyers, the broader ambit of a "market" looks to the rivalry between sellers for those who will buy their products, and encompasses the factors that directly shape and constrain that rivalry, as a matter of fact and commercial common sense.

A market, therefore, is the field of exchange (or potential exchange) in which the goods and/or services being considered are substitutable. It is this possibility of substitution in response to changing prices or output that limits the ability of a firm 'to give less and charge more' (re Queensland Co-operative Milling Association Ltd; Re Definance Holding Ltd, 1976).

French J said of the concept of market (Singapore Airlines Ltd v Taprobane Tours WA Pty Ltd, 1992):

> In any given application it describes a range of economic activities by reference to particular economic functions (e.g., manufacturing, wholesale or retail sales), the class or classes of products, be they goods or services, which are the subject of those activities and the geographical area within which those activities occur.

As this quote highlights, markets are multi-dimensional; markets are typically defined in terms of (Commerce Commission, 2022, para 3.14):

1. product dimension—the goods or services exchanged between buyers and sellers
2. functional dimension—where the goods or services sits in the production or distribution chain
3. geographic dimension—the area within which the goods or services are obtained or supplied
4. temporal dimension—markets might have a temporal dimension or timeframe within which the market operates

[8] See also the comment by the Authority that: "In order to assess how granting the requested exemption would affect competition in the electricity industry it is necessary to identify the relevant markets within the industry" (Electricity Authority, 2017, para 6.1).

5. customer dimension—markets may have a customer dimension, where different types of customers have different uses for or requirements of the goods or services.

The first step in defining a market is to identify the group of products or services that purchasers consider to be substitutable for each other. The greater the extent to which one good is substitutable for another, the greater the likelihood that those goods compete in the same market. Once the product dimension of the market is understood, the other dimensions can be assessed.

3.2 Product markets

3.2.1 Electricity

A BESS can charge when wholesale electricity prices are low and inject electricity when wholesale prices are high. In electricity markets this activity is often referred to as arbitrage, though it would more accurately be described as a time swap.

In charging the battery, the owner of the BESS competes with other purchasers of electricity; if the owner of the battery is not willing to pay the prevailing market price it would not be able to charge the battery. When injecting electricity, the owner of the BESS competes with generators; if it is not willing to inject electricity at the prevailing market price, it would not be dispatched.

The solar farms generate electricity to inject into the grid.

The energy sale and purchase by a BESS and a solar farm can also be matched. For example, some solar developers talk of matching a BESS to their solar farms. The BESS can be used to store solar energy when that energy is likely of low value, for instance during the middle of a sunny day (noting that, in the case of the Assets, the term 'matching' does not refer to the transfer of electricity directly between the Assets, given the solar farms will not be used to charge the BESS directly). The energy can then be injected at a time when wholesale prices are higher, for instance during the evening peak. The service the BESS is providing is still fundamentally a time arbitrage but as well as generating a profit for itself the BESS is also improving the value of the solar farm.

As these transactions involve the sale and or purchase of electricity, the relevant product market is the sale and purchase of electricity.

3.2.2 Ancillary services

A number of ancillary services are required for a power system to be able to transfer electrical energy reliably. These services include: instantaneous reserves; frequency control reserves; over-frequency arming; voltage support; and black start.

There is some supply-side substitutability between electricity generation and ancillary services. In the event of relative price changes, a generator may have an incentive to switch between offering generation capacity solely into the spot market, to offering it for ancillary services, such as instantaneous reserves. However, not all generators have plant that is sufficiently responsive to provide ancillary services, so supply-side substitutability may be limited.

Similarly, some large customers may offer to have their supply interrupted and therefore compete to provide instantaneous reserve. However, this demand-side substitutability is limited.

The Commerce Commission has previously placed ancillary services in a separate market to the sale and purchase of electricity (Commerce Commission, 2009, paras. 158-159). Consistent with the Authority's approach of defining markets in a way that best isolates the key competition issues, we define a separate product market for ancillary services (Electricity Authority, 2017, para. 2.14).

A BESS can potentially provide the following ancillary services:

1. instantaneous reserve (both fast instantaneous reserve and sustained instantaneous reserve)
2. over-frequency reserve
3. frequency-keeping
4. voltage support[9]

We provide a description of each of these ancillary services in Appendix B.

A solar farm would not participate in the market for ancillary services. While the reactive power output from the invertor is controllable (and hence it can provide voltage support within the distribution network discussed below), this reactive power will be too small, especially compared to Huntly power station, to provide ancillary services to the electricity market.

3.2.3 Network support services

The Authority considers that there is an emerging separate market for network support services (Electricity Authority, 2017, paras. 6.5 – 6.8). The Authority defines this product market to include:

1. maintaining supply when planned or unplanned outages occur that would otherwise interrupt supply
2. supporting the quality of supply; including, but not limited to, power factor correction and voltage support
3. reducing peak demand to defer the need for network investment.

Other than providing voltage support, a solar farm would not participate in a market for network support services as its generation output is not controllable.

In addition to voltage support, the BESS could potentially support network capacity and help maintain supply when planned or unplanned outages occur.

In an electricity network, the available supply capacity at all locations must be capable of meeting peak demand, or service will be curtailed. As demand grows, peak capacity needs to increase even though average consumption can be well below the peak.

A BESS can draw power when network capacity is lightly loaded and injected to support capacity when heavily loaded. Hence, a BESS can meet the peak without needing a higher capacity network at that

[9] Voltage support may be provided on either the transmission or distribution networks.

point. When used in this manner, a BESS can defer the need to upgrade network capacity. Such needs, or the ability for a BESS to make a difference, is dependent on both location and context.

A BESS can theoretically provide this service to Transpower for transmission by responding to a call for transmission alternatives when Transpower is investigating a transmission upgrade. If Transpower assesses that the transmission alternative is a better option, and obtains approval from the Commerce Commission, then Transpower can contract with a BESS as a transmission alternative.

Theoretically, a BESS provider can negotiate with a lines company to provide a distribution alternative. Lines companies can consider a BESS itself as a solution to a network capacity problem.

3.2.4 Summary: relevant product markets

In summary, the relevant product markets for assessing the competitive effects of the BESS and the solar farms are:

1. sale and purchase of electricity
2. ancillary services
3. network support services

The solar farms would provide services only in the product market for the sale and purchase of electricity, and potentially voltage support in the network support services market.

A BESS could not provide services in all product markets at the same time. The specifications and requirements for providing an ancillary service, for example, might preclude a BESS from discharging into the electricity market during periods of highest price. Generally, a BESS will be built to provide one or two key services and then might seek to capture others when it can, provided that these extra services do not compromise the primary services.

3.3 Functional markets

3.3.1 Wholesale electricity and ancillary services markets

The production, distribution and sale of a product typically passes through a series of levels in the supply chain. Generally, the Commerce Commission identifies separate markets at each functional level, based on the observed structures of seller-buyer relationships (Commerce Commission, 2022, p. 21).

Between generation and consumption, electricity passes through a number of functional levels. The Commerce Commission defines separate wholesale, transmission, distribution and retail functional markets (Commerce Commission, 2009).

The sale and purchase of electricity, and the supply of ancillary services occurs in the wholesale market. None of these services are provided to final consumers.

3.3.2 Network support services

The network support services market occurs at the transmission and distribution functional levels.

3.3.3 Solar farms and BESS would not participate in the retail market

A retail market involves selling electricity from retailers to their end use customers. Retail market interactions take place after retailers procure electricity from generators in the wholesale electricity market. Retailers provide this electricity to their contracted customers. The main participants in the retail market are therefore retailers and consumers.

Neither solar farms nor the BESS would provide goods or services in the retail electricity market. In workably competitive electricity markets, the benefits the solar farms and the BESS bring to the wholesale and network services markets could be expected to flow to consumers. However, this expected benefit to consumers should not impact *competition* in the retail markets (any benefit would be relevant to an assessment of efficient operation discussed in section 7 below).

3.4 Geographic markets

Markets may also have a geographic dimension; that is, the geographic area within which product exchanges occur.

The extent to which the location of either suppliers or customers is relevant in defining a market depends on the nature of the market (Commerce Commission, 2022, para 3.28 – 3.34). If customers must travel to a supplier's location to purchase a product, a market might be defined based on a supplier's location. Alternatively, if suppliers can feasibly price discriminate between customers based on their location, a market might best be defined in relation to the location of the customer.

3.4.1 National market for wholesale electricity

Electricity generators (above a minimum size) are required by the Electricity Code to offer their generation into the spot market where it is purchased by electricity retailers (typically owned by generators) and a small number of large electricity users at prices determined by supply and demand during each half hour period. The Commerce Commission has, unsurprisingly, taken the view that there is a national wholesale market for electricity (Commerce Commission, 2009, p. 42).

We agree that there is a national market for purchasing and selling electricity.

3.4.2 Geographically separate markets for ancillary services

Instantaneous reserves are procured separately for the North and South Islands. Geographically separated markets are required, as instantaneous reserve may be purchased to provide cover in case of an outage to the HVDC connecting the North and South Island grids. Over frequency reserve is similarly purchased separately in the South and North Islands for the same reasons. Instantaneous reserve can be a national market but only under certain HVDC operating conditions and where the HVDC is not a source of risk.

Frequency-keeping is also procured separately in the North and South Islands. Frequency is a characteristic of AC networks. The North and South Islands are AC networks, connected by a High

Voltage DC link. The HVDC can, under certain operating conditions, 'move' frequency between the islands making a national market. However, both islands must be capable of managing frequency separately.

Voltage support is contracted by Transpower on an as required basis. This ancillary service has only been required in the upper North Island and is only sporadically required.

Hence, there are:

1. North Island markets for instantaneous reserve, over frequency reserve and frequency-keeping
2. an upper North Island market for voltage support.

3.4.3 Locational network support markets

The ability for a BESS to provide network support services is dependent on its location; hence the relevant markets are local and defined by the boundaries of the relevant network.

3.5 Temporal and customer dimensions

In our view, except for voltage support, there are no temporal dimensions to the national wholesale market, the North Island ancillary services market, or locational network support markets. The markets operate continuously over time. A hypothetical sole supplier in one period would not be able to impose a price increase without inducing other suppliers to shift supply into that period.

Voltage support has a temporal dimension as it has only sporadically been required.

There are customer dimensions to the network support markets, as these services would either be provided to Transpower or to WEL.

3.6 Conclusion on competition markets

For the reasons set out above, we consider the following markets are relevant for the analysis of the effects of WEL ownership of the BESS and the solar farms:

1. a national wholesale market for electricity
2. a North Island wholesale market for ancillary services other than voltage support
3. an upper North Island wholesale market for voltage support
4. a local network support services market supplying either Transpower or WEL.

4. Counterfactual

4.1 Three potential counterfactuals

The established approach to assessing the effect on competition in a market, and the approach applied to date by the Authority (Electricity Authority, 2017), is to assess the likely state of competition if the proposal proceeds (known as "the factual") against the likely state of competition if it does not (known as "the counterfactual").

The test requires a degree of prediction or forecast; that is, what is likely. It is usually not possible to assess what will be the effect of a proposal on competition in a market, only what is "likely". The accepted test of "likely" is whether there is a "real and substantial risk" that the effect will happen. It is concerned with "probabilities and not possibilities". It involves more than a possibility but the effect does not need to be "more likely than not". Another way of putting it is that there must be a "real chance" that the effect will happen (Woolworths & Ors v Commerce Commission, 2008, para. 110).[10]

We have identified three potential counterfactuals which could theoretically occur if the Authority does not grant an exemption to WEL (noting that, while these counterfactuals are based on hypothetical scenarios which could arise, we do not express a view on the likelihood of any one of these counterfactuals occurring):

1. the sale of Te Ohaaki to an existing generator or to a new entrant to the wholesale electricity market
2. the sale of the BESS to an existing generator
3. WEL retains ownership of the BESS and the solar farms and complies with the arms-length rules.

We describe each of these counterfactuals below.

If in the factual, as compared with any of the relevant counterfactuals, competition is lessened then the exemption would have the likely effect of not promoting competition. Similarly, if granting the exemption would promote competition relative to one of the counterfactuals, and not lessened in any other scenario, then the exemption would have the likely effect of promoting competition (Commerce Commission, 2022, para. 2.32; Woolworths & Ors v Commerce Commission, 2008, para. 122).

4.2 Counterfactual 1 and 2: WEL could exit one project

If WEL were not granted an exemption from the arms-length rules, it could exit either Te Ohaaki or the BESS project. Either option would unequivocally reduce the aggregate generation held by WEL to below the 50MW threshold for corporate separation under section 76(3) of the Act.

[10] As the High Court explained, if the likelihood of an event occurring is remote it should be discarded as a counterfactual—the analogy given by the Court is that a person who holds a lottery ticket that has a very small chance of gaining a very high prize cannot be said to be "likely" to be very rich (Woolworths & Ors v Commerce Commission, 2008, para. 123).

A counterfactual whereby WEL exits one of the projects is, in theory, economically rational and consistent with our interpretation of the relevant markets, as discussed below.

We understand that the business case for the BESS is focused on providing a mix of wholesale electricity purchases and sales (energy arbitrage) and ancillary services. The solar farm would sell into the wholesale market.

The national wholesale market and the North Island instantaneous reserves markets are generally workably competitive but with periods of scarcity (discussed in our competition assessment below). The North Island has larger generating units and therefore, generally, higher instantaneous reserves requirements than the South Island. However, the North Island has a large number of interruptible load providers and several generating stations that can provide instantaneous reserve resulting in a workably competitive market.

As the wholesale electricity market and the markets for instantaneous reserves are workably competitive, suppliers in these markets can expect to receive a workably competitive price for their services. An efficient new entrant could expect to just cover its costs, including a normal risk adjusted return on capital.

If WEL were not granted an exemption, and wished to retain both Te Ohaaki and the BESS, it would have to comply with the 'arms-length rules'. Complying with these rules would necessitate WEL incurring additional costs not incurred by other suppliers—for example, duplication of governance and management—as well as denying it the ability to achieve synergistic efficiency gains by integrating the operations with its existing activities. These additional costs would be a 'barrier to entry' as defined by (Stigler, 1968, p. 67):

> A barrier to entry is a cost of producing that must be borne by firms seeking to enter an industry but is not borne by firms already in the industry.

If WEL were to incur costs in operating Te Ohaaki and/or the BESS that other providers would not incur it would make commercial common sense for WEL to sell the asset to an entity that would not incur those costs. In simple terms, another such entity would be prepared to pay the market value for the asset, whereas the value of the asset to WEL (absent an exemption) would be the market value less the additional cost of complying with the arm's-length rules.

4.2.1 Counterfactual 1: counterfactual owner of Te Ohaaki would be an existing or new generator

A number of entities, both existing generators and potential new entrant generators, are exploring or developing solar farm projects. For example, Lodestone is a relatively new entrant to the generation investment market and has built a portfolio of solar projects.

Hence, if WEL exits Te Ohaaki then the purchaser may be either an existing generator who can integrate the operation of the plant with its existing activity or a new entrant. Therefore, our first counterfactual compares the likely state of competition if Te Ohaaki is operated by WEL with the likely state of competition if Te Ohaaki were sold to an existing generator or to a new entrant to the wholesale electricity market.

4.2.2 Counterfactual 2: counterfactual owner of the BESS would be an existing generator

If WEL could not operate the BESS competitively on a standalone basis (because of the higher costs involved), it is reasonable to conclude that no other entity could profitably operate the plant on a standalone basis. Hence, if WEL exits the BESS project then the likely purchaser would be an existing generator who can integrate the operation of the plant with its existing activities.[11]

For example, obtaining value from arbitraging in the market utilising a BESS is challenging. A BESS can only charge if it is not already fully charged and can only discharge if it is not fully discharged. With only small storage, a BESS only has a short time where it can make use of cheap electricity to charge or high value services to discharge. It is easy to charge a BESS too early or too late, or to discharge too early or too late, and miss the highest value opportunities. Existing generators have sophisticated wholesale trading teams and would be expected to be able to absorb better the arbitrage function of a BESS.

Therefore, our second counterfactual compares the likely state of competition if the BESS is owned by WEL with the likely state of competition if the BESS were sold to an existing generator.

4.3 Counterfactual 3: WEL complies the arms-length rules

A third counterfactual would arise if WEL were to retain the Assets and comply with the arms-length rules.

[11] In concept, the 'existing generator' might include a new entrant that entered the market on scale. This expansion would not change the competition analysis as it would still involve comparing the likely state of competition if the BESS is operated by WEL with the likely state of competition if the BESS is operated by entity that would be in the market in any event.

5. Competition assessment

5.1 Meaning of competition

The first limb of the Authority's main objective is to promote competition. Competition is a process of rivalry between sellers (or between buyers) to win and retain sales (or supplies), analogous to a sporting competition. It implies independence of action and the absence of collusion or coordination, where the conduct of each rival affects and constrains the conduct of others. No participant in a competitive market can conduct themselves without regard to the behaviour of other participants.

Competition is essentially about conduct, as the analogy with sporting rivalry implies. The competitive process is the means by which market conditions are translated into the efficiency outcomes associated with competitive markets. It is the process by which firms try to undercut each other's prices, or improve their product range or service delivery relative to rivals, hence driving prices down to cost and delivering to consumers the products they want by the most efficient and convenient means. It is also the process by which additional resources are directed to the products and areas of greatest consumer demand.

Hence, we assess whether the factual would promote, or inhibit competition, relative to each counterfactual by evaluating whether rivalry would increase, remain the same, or decrease. We explicitly consider whether WEL would have an opportunity and incentive to inhibit competition.

5.2 Counterfactual 1: sale of Te Ohaaki to an existing or new entrant generator

If Te Ohaaki were sold to a new entrant, there would be little to no difference in rivalry in the wholesale market between counterfactual 1 and the factual, particularly as the output of solar farms is not controllable and therefore the owner is generally a 'price-taker' in the wholesale electricity market.

However, the potential for the owner of the solar farm to match its output to the BESS may be lost. Agreeing terms with an external owner of the solar farm would at a minimum raise transaction costs and make the arrangement less likely.

To the extent that matching solar with the BESS improves the competitive rivalry of the solar farm (because the matching essentially means some of the output of the solar farm is controllable), this competitive attribute would be lost or made more difficult to achieve under counterfactual 1.

5.3 Counterfactual 2: sale of the BESS to an existing generator

Rivalry for the provision of instantaneous reserves, and the other services potentially provided by the BESS, would unambiguously be greater if WEL entered the relevant markets compared with the scenario in which the BESS were operated by an existing generator. WEL would bring to the market its own perspectives and would compete against existing entities to win and retain sales of its services.

Further, there are currently times when the supply of instantaneous reserve can tighten significantly, such as when the North Island starts to run out of spare generation capacity or if a pole of the HVDC is out of service.[12][13] When this occurs then one or both of the instantaneous reserve markets can become much less competitive and will signal a scarcity price.[14][15] Any increase in marginal instantaneous reserve capacity, especially if it can be commercially separated from energy prices at the point of instantaneous reserve scarcity (as would occur if WEL operated the BESS rather than a generator), increases competition and reduces the chance of scarcity pricing.

This competitive pressure would increase in all the relevant markets, even if WEL elected to focus only on some markets, for instance the provision of instantaneous reserves. Once the BESS is operating, WEL could elect to change the focus of its activities should profitable opportunities arise. The prospect that WEL may alter the services provided by the BESS would exert a threat of entry across all of the relevant markets.[16]

In short, the ownership and operation of a BESS by WEL would promote competition in all relevant markets.

5.4 Counterfactual 3: WEL complies with arms-length rules

If WEL were to retain the Assets and comply with the arms-length rules it would incur higher costs in operating the plant due to:

1. higher governance and management costs as a result of having to employ individuals to undertake tasks that would otherwise have been undertaken by WEL personnel
2. loss of dynamic capability as the plant operators would no longer benefit from the specialised expertise and knowledge of WEL personnel; dynamic capability is especially important to innovation-based competition (Teece, Pisano, & Shuen, 1997)
3. loss of any synergies with its current operations.

With a higher cost structure (and costs not incurred by competitors in the workably competitive wholesale and ancillary services markets), WEL would be less competitive; rivalry would be reduced. Hence, an exemption would promote competition in the wholesale and ancillary services markets

[12] As generation instantaneous reserve is provided by spare capacity, if more generation is used to meet peak energy demand, less is available for reserve. Compounding these events, interruptible load sometimes also removes itself from the market to avoid high energy prices rather than take instantaneous reserve revenue.

[13] The HVDC link between the North and South Islands comprises of two 'paths' known as poles. When both poles are operating, one pole can quickly take up the power output from the other if one trips and so instantaneous reserve is not required. However, if one pole is out of service and high transfer is required from the other one then the instantaneous reserve requirement can be very high.

[14] Whether it is fast instantaneous reserve, sustained instantaneous reserve, or both that become constrained depends on power system conditions, the plant that is setting the risk, and the respective availability of fast instantaneous reserve and sustained instantaneous reserve.

[15] In New Zealand's electricity market design, we accept very high prices when supply becomes very tight. This is known as scarcity pricing and provides a dynamic signal to investors that it is worth considering investing in instantaneous reserve supply.

[16] The threat of entry is one of the '5 forces' identify by Porter for analysing industries and competitors (Porter, 1980 (republished 1988)).

relative to the counterfactual of WEL complying with the arms-length rules. We consider the network support services markets below.

5.5 WEL cannot use its network monopoly to inhibit competition

5.5.1 Incentive and opportunity

Prior to the arm's-length rules being moved from the Act into the Code, the Authority had the ability to grant an exemption to the arm's-length rules pursuant to section 90 of the Act. Under the requirements of section 90 test, the Authority would previously have considered whether the joint ownership of a distribution network and generation (in this case, the BESS and solar farms) would create incentives and opportunities to inhibit competition.

Competitors, of course, almost always have an incentive to gain an advantage on their competitors if they can. As competitors vie to offer consumers better products at cheaper prices and to adopt the most cost-effective means of delivery, individual firms may adopt different strategies. Some will succeed and others will fail. As the Australian High Court explained (Queensland Wire Industries Pty Ltd v Broken Hill Proprietary Company Ltd & Anor, 1989):

> Competition by its very nature is deliberate and ruthless. Competitors jockey for sales, the more effective competitors injuring the less effective by taking sales away. Competitors almost always try to 'injure' each other in this way.

The policy concern is whether WEL would have both the incentive and the opportunity to use its monopoly lines business to inhibit competition against its BESS or solar farms. In competition economics, this potential is referred to as 'foreclosure'.

5.5.2 Economics of foreclosure

Joint ownership of a network business with another businesses (in this case, the BESS and solar farms) can harm competition if the integrated entity could use its control over the monopoly network business to weaken its rivals. This harm could in concept arise either by denying the rival access to key inputs to compete with the BESS – "total foreclosure" – or by raising the price charged for that input – "partial foreclosure" (Shapiro, 2019, p. 7). From an economic perspective, total foreclosure is just a special (and extreme) case of partial foreclosure. For simplicity, we refer to both effects as "raising rivals' costs".

Economists and regulators refer to these key inputs as "bottlenecks"—inputs that must be obtained to compete in a downstream market, but which are controlled (typically) by a single entity. Ensuring access to 'bottleneck' facilities is the reasoning that led the government to separate electricity networks from retail and generation businesses.

5.5.3 WEL unable to raise rivals' costs

A mechanism for raising rivals' costs via vertical integration (joint ownership of a BESS and solar farms and its network business) is not available to WEL in almost all of the relevant markets—the possible

exception is the market for local capacity services supplying WEL which we consider separately below. In all other relevant markets, the rivals to WEL do not require an essential input from WEL to compete in providing the relevant services.

The rules for purchasing and selling electricity on the wholesale market—the activity of energy market arbitrage—are determined by the Electricity Authority. WEL has no ability to influence the price paid or received by other participants in the wholesale market. Indeed, the electrical capacity added by the BESS and the solar farms is tiny relative to the size of the market, making WEL a 'price taker' in the wholesale market.

In the markets for ancillary services, including voltage support, suppliers enter into contracts with Transpower. There is no action that WEL can take that would increase the costs to rivals in providing ancillary services or which would influence Transpower to choose WEL as a supplier over a more competitive alternative.

To provide local capacity services to Transpower, WEL would have to respond to a call for transmission alternatives when Transpower is investigating a transmission upgrade. It would be Transpower that assesses whether a BESS transmission alternative is a better option than investing in a transmission upgrade or a different transmission alternative. To proceed with the contract, Transpower would require approval from the Commerce Commission. There is no scope within this process for WEL to raise the cost of rivals offering alternative transmission solutions.

5.5.4 No incentive or opportunity to cross-subsidise

We are aware that in past applications for exemption, some submitters have raised the possibility that a network company might cross-subsidise its competitive market activities from its monopoly network business (Electricity Authority, 2017, para. 7.62). WEL would have neither the opportunity nor the incentive to do so.

Cross-subsidising would require WEL to:

1. charge more than its efficient cost to the customers of its network services, who are also its owners
2. use the extra profit earned from over charging its owners to subsidise services provided in the wholesale or ancillary services markets.

Parliament has already concluded that WEL does not have an incentive to over-charge its owners, which is why consumer trust owned networks are exempt from revenue control under Part 4 of the Commerce Act. We are not aware of any basis for concluding that Parliament erred in its assessment. In addition, WEL is subject to information disclosure regulations and the threat of further regulation.

Nor is there any logical reason for supposing that WEL's owners would forego a normal return on their investment to subsidise services to the wholesale and ancillary services markets. The economics literature has long shown that firms only have an incentive to price below cost if they are confident that (Carlton & Perloff, 2015):

1. competitors would exit the market, or reduce market share until they were ineffective as competitors, in response to the subsidised price

2. the firm could subsequently raise prices above competitive levels to recoup the losses
3. competitors would not re-enter or expand when the firm attempted to raise prices above competitive levels to recoup its losses.

There is no prospect that pricing by WEL would force competitors to exit either the wholesale electricity market or the ancillary services markets, nor could WEL expect to raise market prices in the future, nor can it deny re-entry to these markets. The claimed cross-subsidy would simply reduce returns to the owners of WEL for no benefit to WEL. As the Commerce Commission observes, a firm will only rationally foreclose competitors if it is profitable to do so (Commerce Commission, 2022, para 5.8).

5.6 Market for local network support services

The market for local network support services differs from the markets discussed above as WEL would be both the purchaser and supplier of the service. That is, in this scenario WEL would consider whether the BESS could be an alternative solution to a network capacity problem, compared with investing in a network capacity upgrade or an alternative solution. A BESS could also potentially provide voltage support and help maintain supply when planned or unplanned outages occur. A solar farm could potentially provide voltage support.

Our understanding is that the WEL BESS and the Te Ohaaki solar farm will be connected by an existing WEL owned high-capacity 33kV line to the Huntly power station. There is therefore no physical constraint on an alternative provider competing with the BESS or the solar farm to provide local network services to WEL.

To achieve a potentially uncompetitive outcome WEL would have to select one of its lines with restricted capacity. WEL would only do this if the primary purpose of the BESS was local capacity management. However, if WEL were to connect the BESS or Te Ohaaki to a line with restricted capacity, it would restrict the plant from competing in the wholesale and ancillary services markets. WEL has no incentive to restrict the markets in which the BESS and Te Ohaaki can complete, as evident from its decision to connect this plant with unrestricted capacity access to the national grid.

Furthermore, electricity distribution networks routinely undertake 'make' or 'buy' decisions of this nature. As discussed above, Parliament (rightly) has concluded that consumer trust owned networks have no incentive to choose higher cost alternatives over more efficient options and thereby charge higher than efficient costs to their owners.

5.7 Summary on competitive effects

We have assessed the competitive effects of granting WEL an exemption from the arms-length rules relative to the following three counterfactuals:

1. the sale of Te Ohaaki to an existing generator or to a new entrant to the wholesale electricity market
2. the sale of the BESS to an existing generator

3. WEL retaining ownership of the BESS and the solar farms and complying with the arms-length rules.

We assess the competitive effects of the factual against each counterfactual for the following markets:

1. the national wholesale market for electricity
2. the North Island wholesale market for ancillary services other than voltage support
3. an upper North Island wholesale market for voltage support
4. the local network support services market supplying either Transpower or WEL.

We conclude that:

- WEL's ownership and operation of Te Ohaaki (as opposed to another generator's operation of Te Ohaaki) would promote competition to the extent that it matches Te Ohaaki with the BESS, because matching solar with battery increases the competitive rivalry of the solar farm.
- The ownership and operation of a BESS by WEL would promote competition in all relevant markets.
- An exemption would promote competition in the wholesale and ancillary services markets relative to the counterfactual of WEL complying with the arms-length rules.

Under all three of the counterfactuals, WEL has no incentive or opportunity to impede competition in any market, including the local network support services markets.

Hence, as granting the exemption would promote competition in most markets, and not lessen competition in any market, the exemption would have the likely effect of promoting competition.

6. Reliability and efficient operation

6.1 Reliability

In the factual and in each of the counterfactuals the same plant would be constructed. The plant would compete in the workably competitive wholesale electricity and ancillary services markets. The plant would potentially be available to provide services in the local network services market. There would be no difference to the reliability of supply between the factual and counterfactuals.

6.2 Efficient operation

As concluded above, granting an exemption would have the likely effect of promoting competition. An increase in competition could be expected to result in an increase in economic efficiency; after all, the competitive process is the means by which market conditions are translated into efficiency outcomes.

Each of the counterfactuals would also result in higher costs, and therefore a less efficient market than an exemption for WEL. These costs would occur through:

1. higher governance and management costs as a result of having to employ individuals to undertake tasks that would otherwise have been undertaken by WEL personnel (counterfactual 3)
2. loss of dynamic capability as the plant operators would no longer benefit from the specialised expertise and knowledge of WEL personnel (all counterfactuals)
3. loss of any synergies with WEL's current operations (all counterfactuals).

7. Conclusion

We have assessed whether an exemption from the arms-length rules for WEL would promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

We conclude that:

- WEL's ownership and operation of Te Ohaaki (as opposed to another generator's operation of Te Ohaaki) would promote competition to the extent that it matches Te Ohaaki with the BESS, because matching solar with battery increases the competitive rivalry of the solar farm.
- The ownership and operation of a BESS by WEL would promote competition in all relevant markets.
- An exemption would promote competition in the wholesale and ancillary services markets relative to the counterfactual of WEL complying with the arms-length rules.

Under all three of the counterfactuals, WEL has no incentive or opportunity to impede competition in any market, including the local network support services markets.

Hence, as granting the exemption would promote competition in most markets, and not lessen competition in any market, the exemption would have the likely effect of promoting competition.

There would be no difference to the reliability of supply between the factual and counterfactuals.

As granting an exemption would have the likely effect of promoting competition, the exemption would result in an increase in economic efficiency. Each of the counterfactuals would also result in higher costs, and therefore a less efficient market, than an exemption for WEL.

In summary, an exemption from the arms-length rules for WEL would promote competition in, and the efficient operation of, the electricity industry for the long-term benefit of consumers, and have no effect on the reliability of supply.

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Appendix A A Battery Electrical Storage System (BESS)

A Battery Electricity Storage System (BESS) consists of the following components:

1. an array of high-capacity battery banks (usually lithium-ion – Li-ion – technology)[17]
2. a DC network, with associated switchgear, to connect the batteries and connect to the converter and inverter
3. an AC – DC converter that converts AC from the grid to DC to charge the batteries, with the associated control equipment
4. a DC – AC inverter that converts DC to AC to inject the stored electrical energy back into the grid, with the associated control gear (the converter and inverter can be a composite piece of equipment)[18]
5. a low voltage to high voltage transformer, with the associated control gear
6. either its own grid switchyard or substation or a connection to a grid switchyard or substation.[19]

The control gear mentioned above must also provide a number of functions. It must:

1. switch various components in and out of service, including isolating equipment so it can be worked on
2. automatically and safely disconnect and isolate equipment that has faulted and could damage itself, other equipment, or people
3. provide the standard functions to the equipment to enable it to function correctly
4. provide special functions to equipment to enable the BESS to provide network services, e.g. a time schedule for charging and discharging[20]
5. provide special equipment to enable certain network services to be provided: e.g. to provide instantaneous reserve would require special frequency measuring equipment
6. a telecommunications connection to enable remote control, with redundant communication paths.

[17] Each of these battery banks is a weather-proof enclosure containing a number of Li-ion cells.
[18] The inverters are also required to provide reactive power, which is discussed further under generators.
[19] A substation is a switchyard that also contains transformer(s) and enables the flow of electricity between two or more different voltages. A standard switchyard connects and switches power at a single voltage.
[20] Theoretically these special functions could be provided by a remote system rather than done locally. However, in electric power systems, we usually make sure that all functions can be provided on site so that equipment will continue to operate as expected if communications are lost.

Appendix B Ancillary services

The following ancillary services can potentially be provided by a BESS:

***Instantaneous Reserve (IR)*:** Electricity must be produced at the same time it is consumed. Our power system therefore needs to have sufficient reserve to replace the mismatch between supply and demand that would occur if a large generator or the HVDC trips out. If sufficient reserve is not available, consumers will lose supply.[21]

IR can be provided by having standby generation that ramps up quickly or by tripping out loads (Interruptible Load – IL) that participate in the ancillary service. BESS can provide IR by either reducing the extraction of electricity into storage (acting as IL) or increasing injection from storage (acting as a standby generator).

There are two IR products, Fast Instantaneous Reserve (FIR) and Sustained Instantaneous Reserve (SIR).

Over-Frequency Reserve (OFR) – OFR protects the system against a loss of a large load or a trip on the HVDC when it is sending power away from an island. OFR requires participating plant to have over-frequency trip relays that Transpower can arm by remote control. OFR will trip out selected plant that is injecting into the power system if the system frequency rises too high. OFR is tendered on annual basis.

Frequency Keeping (FK) – Power system frequency varies as there are small mismatches between supply and demand between market dispatches.[22] FK actively increases and decreases generation to manage frequency between dispatch. FK used to be restricted to a small number of competitors, however with the introduction of Multiple Frequency Keeping (MFK) smaller generators can offer smaller volumes to be controlled by central FK system.

Voltage Support (VS) – VS is generally provided by generators when dispatched. However, sometimes Transpower needs more voltage support than is available, or needs voltage service that provides more stability than the standard specification. As a BESS can provide reactive power over a greater operating range than a standard generating machine, and because the response is programmable and fast, then it could provide VS in excess of any Code requirements. VS is contracted on an as required basis. VS has only been required in the Upper North Island, which has a history of voltage problems, but is still only sporadically required.

[21] There is a back up to IR (AUFLS) that trips out customers to make up for a mismatch. If demand was not shed, the whole power system would black out.

[22] The electricity market is regularly cleared to ensure the cheapest mix of generation to meet supply. It is solved on no more than five-minute intervals. Once the market has cleared the individual generators are given their setpoints to generate for that period. This distribution of setpoints is called dispatch.

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