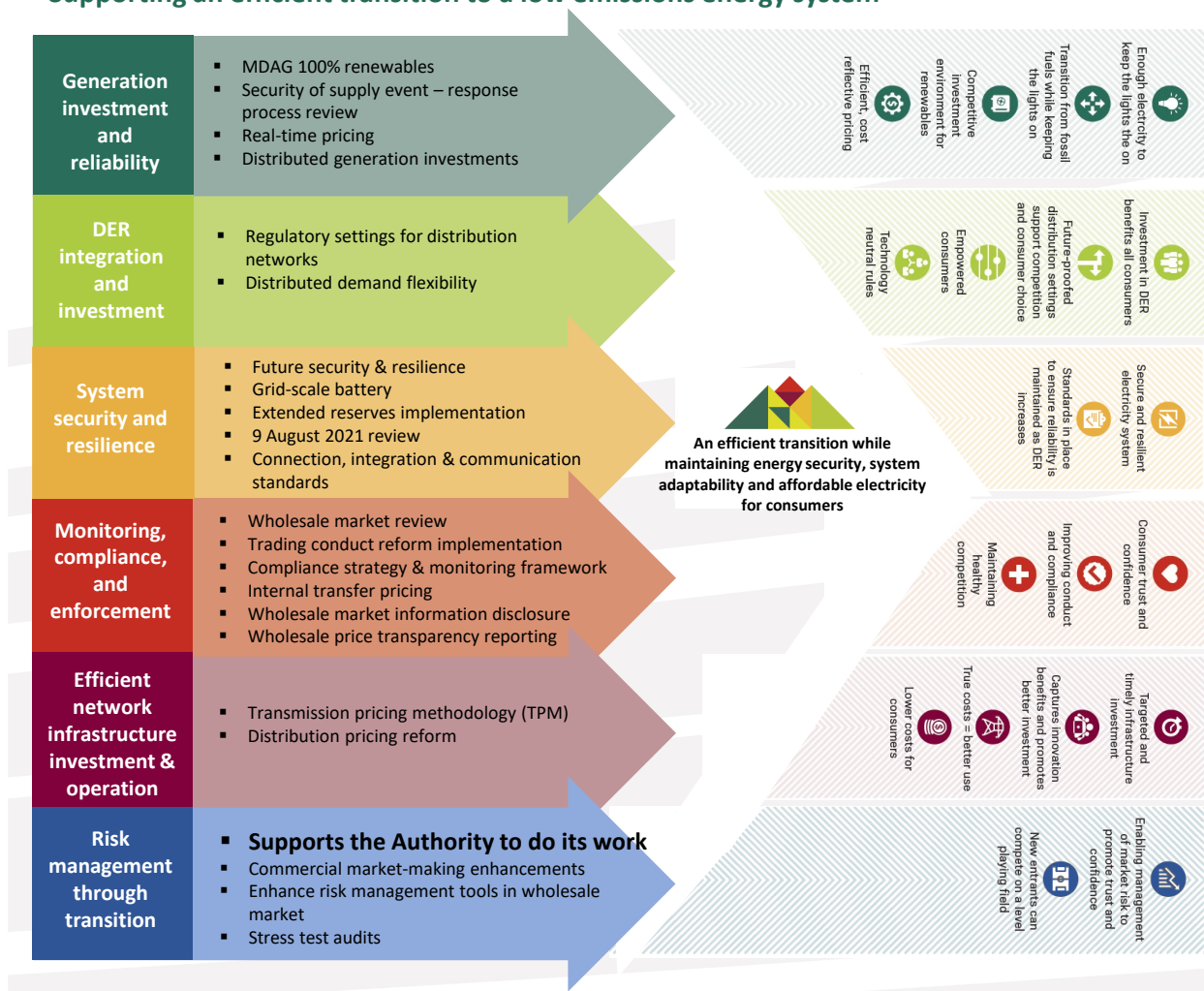


Promoting competition in the wholesale electricity market in the transition toward 100% renewable electricity

Issues Paper

Submissions close: 5pm, 30 November 2022

Supporting an efficient transition to a low emissions energy system



Executive summary

Market monitoring review found some evidence of market power being used

The electricity market served consumers well over the decade prior to mid-2018. It delivered increased retail competition and stable prices, secure and reliable supply, and in 2017 reached ~86% renewable electricity sources based on capacity. Wholesale electricity prices were mostly determined under competitive conditions, and average prices tracked the cost of new supply.

Since mid-2018, following the Pohokura gas field outage, electricity spot prices rose and have generally remained well above the average levels that prevailed prior to the gas field outage. The persistently high prices are linked to (among other things) gas supply uncertainty. But, in a market that is dominated by a few large firms, they may also indicate the use of market power.

The Authority's *Market Monitoring Review of Structure, Conduct and Performance in the Wholesale Market* (WMR) from 2019 to mid-2021 concluded that prices over the review period had, at least to some extent, reflected underlying supply and demand conditions – a sign of a competitive market. But it also found that the sustained upward shift in the average price level was not fully explained by gas supply uncertainty or other underlying demand and supply conditions being controlled for.¹

Further, the Authority found that the pipeline of new supply was thin. This is notable as (the credible threat of) new entry or expansion by competitors is generally seen as a key discipline on market power.

Having considered submissions on its WMR, the Authority has not changed its initial conclusion that generators may have been exercising market power during the review period.²

The transition toward 100% renewable electricity may increase market power

The Government's goal for 50 percent renewable energy by 2035 and its aspiration of 100% renewable generation by 2030 require accelerated development of new renewable electricity generation and a wholesale electricity market that can support a high level of renewables.

The transition toward 100% renewable electricity may increase market power of generators with storable fuel, especially at those times that the electricity market relies on flexible generation – periods of still, cloudy and cold weather. Contact, Genesis, Meridian, and Mercury own most of the stored hydro capacity and are often needed to meet demand. Meridian's hydro generation is needed most of the time.

Whether competition will weaken during this transition depends on the speed and amount of investment by independent developers in alternatives to gas and coal generation (eg, renewables, green peakers fuelled by biomass or green hydrogen, batteries) and in market innovations that enable increased participation by flexible demand.

¹ The contracts between Meridian, Contact and NZ Aluminium Smelters were presented as one example of generators potentially using market power to conduct inefficient price discrimination (with efficiency losses estimated to be of the order of \$57m-\$117m per year). On 18 August 2022, the Authority announced an urgent Code amendment to prohibit very large contracts over 150 MW that cannot be shown to be efficient, together with a voluntary clearance process.

² See *The Authority's response to submissions on the 2021 Market Monitoring Review of Structure Conduct and Performance in the Wholesale Electricity Market* at <https://www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2022/wholesale-market-competition-review>.

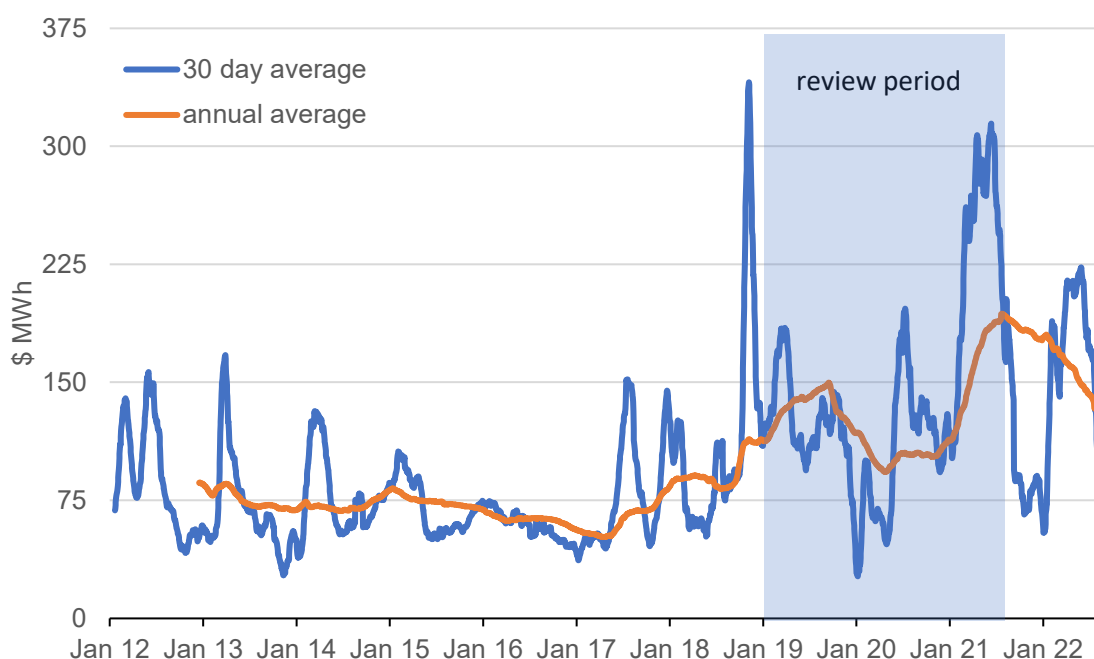
The amount of new intermittent generation that is now in the development pipeline is encouraging, but so far there are few signals of flexible alternatives becoming available to improve competition in that part of the market.

This may reflect (temporary) technological constraints, but also raises questions about whether reliance on conduct measures and competitive entry by new supply is sufficient for promoting wholesale market competition during the transition, for the long-term benefit of consumers.

Wholesale market prices remain elevated, but changes are mostly explained

Since the review period, spot prices have been volatile, but on average remained elevated (Figure 1). *Changes* in spot prices since mid-2021 appear to be explained mostly by underlying demand and supply factors. Higher prices reflect gas supply disruptions and uncertainty, low hydro inflows, rising carbon prices, the supply chain impacts from Covid-19, and the effect of war in Ukraine on fuel costs. Prices fall during periods of favourable hydro conditions.

Figure 1 Average daily spot prices have been well above their long run average



Source: www.emi.ea.govt.nz, demand-weighted average daily prices

The new trading conduct rule appears effective

The new trading conduct rule came into effect at the end of the review period on 30 June 2021. The post implementation review found that the rule appears to be resulting in offer prices that more closely reflect underlying conditions and economic costs compared to past years.³

Compliance will be supported by increases in the maximum penalties for breaches of the Code.

³ The Post Implementation Review is available at <https://www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2022/wholesale-market-competition-review>.

Investment intentions in new generation are promising

The (threat of) entry or expansion by competitors is one of the most powerful forces to mitigate the exercise of market power. It is a crucial complement to conduct-based regulation of market power, and the Authority's approach to promoting competition for the long-term benefit of consumers.⁴

The persistence of high spot and forward prices, well above the cost of new renewable supply, raises questions about whether there are impediments (including anticompetitive barriers) to entry by new supply. If there are, then entry may not be able to be relied on to help constrain the exercise of market power.⁵

The WMR observed that the investment pipeline was thin (but improving), and that this could well reflect incentives on incumbent generators to slow down investment to avoid new projects reducing prices and cannibalising revenues from existing assets. The ability to profitably act on that incentive depends on there being barriers to entry or expansion by competitors.

A recent Authority-commissioned survey of the investment pipeline indicates renewable generation development has accelerated.⁶ Committed investment is now ~2.5 times the average rate achieved in the last decade. And there is a substantial ~8,000 GWh/year of actively pursued renewable generation that could be in service by 2025. Most of those projects are solar farms, a large share of which are large overseas developers.

Investors are experiencing impediments, slowing down development and price relief

Developers did report several impediments to faster development:

- uncertainty about gas supply, the timing and manner of the exit of fossil-fuelled generation, the NZ Battery project and, earlier, questions about the future of the Tiwai Point smelter
Uncertainty creates option value – making it worthwhile to delay investment decisions until more is known about risks and whether expected returns stack up
- consent requirements under the Resource Management Act, which have a significant effect on the pace at which wind projects can be developed
- the Overseas Investment Act's requirements, which were mentioned as a key concern for large overseas solar developers
- availability of offtake agreements, though this does not appear to be an impediment for large, mostly overseas developers, at least during the build phase
- access to firming products – an emerging issue for independent developers of solar/wind generation
- delays in and apparent duplication of transmission grid and local network connection studies
- supply chain issues and elevated costs, which impact on the timing and viability of projects. Developers will not invest unless they expect to make an appropriate return.

⁴ Electricity Authority, 2011, *Interpretation of the Authority's statutory objective*, paras A.30-31. See also Commerce Commission 2009, *Electricity investigation Report*, para 215.

⁵ Commerce Commission, 2009, para 220. Entry and expansion must be 'likely, of sufficient extent, and timely'.

⁶ Concept Consulting, 2022, *Generation Investment Survey 2022*, available at: <https://www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2022/wholesale-market-competition-review>

These impediments are contributing to the long lag between price signals and new investment – ASX contracts for 2025 are still priced above (but converging with) the cost of new supply. But, based on the scale of new investment being actively pursued and interviews with developers on the investment pipeline, there is currently no evidence that is suggestive of anti-competitive behaviour by incumbents aimed at discouraging entry.

A further potential reason for the persistence of prices above the cost of new supply is that developments currently in the pipeline may not yet be a credible substitute for flexible fossil-fuelled generation (eg, during extended periods of low wind and sun). Forward prices above the cost of new supply thus may reflect the ongoing use of fossil-fuelled flexible generation (forecast to become more expensive to run due to rising carbon prices) and the market's perception of continued supply scarcity relative to forecast demand.

Promoting wholesale market competition in the transition

The Authority does not expect competition in the wholesale electricity market to be perfect. Few markets are. Recognising this, and the benefits that competition brings to consumers, the Authority's statutory objective includes promoting competition for the long-term benefit of consumers.

The Authority currently relies on open access, half hourly auctions for supply, trading conduct rules, monitoring and enforcement, and (the threat of) competitive entry and expansion to constrain the exercise of market power.

Given the risk of increases in market power, the Authority has considered whether market design, structure, and conduct arrangements require change to promote competition.

Noting the effectiveness of the new trading conduct rule and the scale of actively pursued new investment by independent developers, the Authority considers that reliance on the current conduct-based measures remains broadly appropriate for the transition toward 100% renewable electricity.

However, there are opportunities to strengthen those settings, and speed up the supply response.

Table 1 sets out a summary of the package of actions the Authority proposes be taken forward to constrain the exercise of market power and facilitate investment in new renewable generation.

Longer term, the market may or may not deliver on generation or demand flexibility solutions at a scale that provides sufficient competition for stored hydro in providing flexible generation during extended periods of low wind and sun. This issue can be revisited later with the benefit of more information, including the government's Gas Transition Plan and decisions on its NZ Battery project. MDAG is currently investigating such competition issues under 100% renewable electricity after 2035.

The Authority's current assessment is that more fundamental structural options are currently not justified by the available evidence. Further, they would: take considerable time and cost to implement and may not be available during the transition, may or may not be effective in fundamentally improving competitive conditions, and would add uncertainty that would stymie investment. Any structural options (such as virtual asset separation) would need to be extensively tested to ensure they would in fact improve competition compared to alternatives. That would also depend on other government decisions such as on Lake Onslow or its Gas Transition Plan.

Table 1 Proposal to strengthen settings to promote wholesale market competition

Steps the Authority is taking or proposing
<p>To constrain the exercise of market power the Authority proposes it would:</p> <ul style="list-style-type: none"> • continue proactive monitoring and enforcement of trading conduct in the spot market, and investigate the application of trading conduct rules to the forward market • investigate mechanisms to accelerate the development of the demand response market (in addition to its current work programme directed at this, eg, real time pricing and empowering consumers to participate in the electricity system in new ways) • conclude the current consultation on the proposal to prohibit inefficient price discrimination in very large contracts and, following the consultation process, determine whether to implement a disclosure, monitoring, and voluntary clearance regime • clarify disclosure requirements (and consider amending the Code to provide certainty about such requirements) about current or expected constraints that could impact generation capacity, and arrange a centralised location for disclosure • explore better information sharing processes and obligations with the Commerce Commission on any information the Authority collects that may raise concerns about restrictive trade practices, collusion, or misuse of market power
<p>To facilitate investment in new renewable generation the Authority proposes it would:</p> <ul style="list-style-type: none"> • undertake regular monitoring of progress on generation investments, and an annual update of the investment pipeline and impediments • regularly collect information on offtake and ‘firming’ agreements (and if feasible declined requests) to understand and build the evidence base about the nature and scale of current and emerging access issues reported by developers of new generation • improve the Electricity Hedge Disclosure System⁷ to improve its functionality and make contract details more transparent • investigate and test the case for providing or requiring longer-dated futures (for instance products traded on the ASX) • analyse thermal generation transition risks in the context of demand to 2030, its role in hydro firming and more prevalent solar and wind generation, and options to mitigate transition risks
Options that other government entities could progress
<p>To constrain the exercise of market power, the Authority proposes to invite:</p> <ul style="list-style-type: none"> • MBIE to progress work to improve disclosure of information on availability of gas for electricity supply, in particular an amendment to the Electricity Industry Act 2010 so that section 46 powers include parties in industries critical to security of electricity supply, and in particular the gas industry

⁷ <https://www.electricitycontract.co.nz/>

To facilitate investment in new renewable generation, the Authority proposes to invite:

- MBIE to bring forward the completion of the Gas Transition Plan, Energy Strategy, and NZ Battery project, as reduced uncertainty would contribute to more renewable generation investment, and so lower prices, sooner
- MBIE to produce an *Annual Electricity Generation Investment Opportunities* report, targeting international developers, with input from NZ Trade & Enterprise, Transpower, the Electricity Authority, Overseas Investment Office, and Ministry for Environment
- MBIE to investigate the merit of a providing a one-stop shop for overseas investors in renewable electricity generation, to help navigate and streamline the regulatory requirements and agencies, and advice on relevant stakeholders they should engage with
- the Overseas Investment Office to publish, before the end of 2022, guidance for overseas investors in renewable electricity generation, and consider providing a helpdesk to support developers to navigate the Act's requirements
- MBIE and the Ministry for Environment to bring forward their work to strengthen national direction for renewable electricity to inform local planning and resource management consenting. This should reflect the government's 100% renewable electricity aspiration, electrification and renewable energy goals, and the implications for the amount of investment in renewable generation that needs to occur
- MBIE and the Ministry for Environment to investigate the evidence for, and the merits and feasibility of, applying pro-competitive conditions on consents for renewable generation (eg, use-it-or-lose it)
- Transpower to publish connection enquiries and connection studies and to streamline the application processes

Next steps

The Authority would value market participants' input to and feedback on the content provided in this document, before the Authority concludes its consideration of the problem definition and which, if any, of its proposed package of actions to progress. To guide submissions, Chapter 8 contains a table that summarises the set of consultation questions.

Submissions close on 5pm, 30 November 2022. For details on how to make submissions, see Chapter 1.

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1 Promoting competition in the transition toward 100% renewable electricity

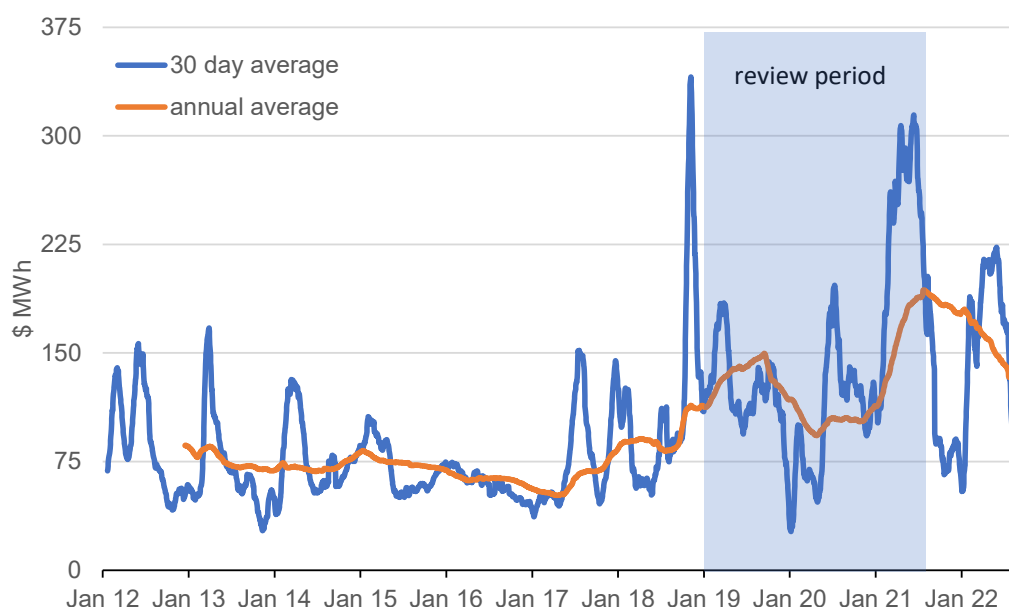
Purpose of this consultation document

- 1.1 This consultation paper considers and seeks feedback on whether and what changes to the wholesale electricity market settings are required to promote competition for the long-term benefit of consumers in the transition toward the aspirational goal of 100% renewable electricity generation by 2030.
- 1.2 The paper is a forward-looking response to the observations made in the Authority's 2021 *Market Monitoring Review of Structure, Conduct and Performance in the Wholesale Electricity Market* (WMR). This raised questions about whether electricity spot prices were determined in a competitive environment between January 2019 and June 2021 – a period of sustained high spot prices.
- 1.3 The transition toward 100% renewable electricity will change the profile of generation and the sources and nature of market power. This raises questions about whether settings are right for wholesale market competition during the transition. That is, will active monitoring and enforcement of trading conduct rules, and the (threat of) entry of new investment be sufficient to constrain the exercise of market power by stored hydro as the role of fossil-fuelled thermal generation reduces over time? ⁸

Sustained increase in prices raised questions about competition

- 1.4 Following a decade where prices averaged \$67/MWh, wholesale electricity prices rose in 2018 after the Pohokura gas field outage. Prices have been persistently above those that prevailed before the gas field outage. See Figure 2.

Figure 2 Wholesale market prices 2012-2022



⁸ The Market Design Advisory Group (MDAG) is currently looking at the implications for price discovery and competition in a world of 100% renewables, that is, from ~2035 onward. See also MDAG, 2022, *Price discovery under 100% renewable electricity supply*, available at: <https://www.ea.govt.nz/assets/dms-assets/29/01-100-Renewable-Electricity-Supply-MDAG-Issues-Discussion-Paper-1341719-v2.4.pdf>

- 1.5 The WMR found that “prices over the review period have, at least to some extent, reflected underlying supply and demand conditions, which is a sign of a competitive market.” (p ii) That is, demand was up, supply down, and fuel costs were rising.
- “Since the Pohokura outage in 2018, the spot market has experienced high prices, higher demand, continuing uncertainty surrounding future gas supply from Pohokura and other fields, and high gas spot prices. The climate has also generally been drier, with periods of quite low storage. The cost of carbon emissions has also increased significantly.” (p 3)*
- 1.6 Spot and forward prices have remained above price levels that prevailed before the period covered by the WMR.⁹ The main price drivers have remained as before:
- underperforming gas fields and extended outages
 - dry year conditions, and below average lake levels in the winter of 2020, much of 2021, and leading into the winter of 2022, and then the recent rain events
 - rising carbon prices from ~\$20 per tonne of carbon in early 2018 to \$40 in early 2021 and ~\$75 mid 2022 (potentially adding up to ~\$1.5 billion to wholesale market payments compared to pre-2018 levels)
 - rising coal prices from an average of around US \$80 per tonne over 2017-2020 (and as low as US\$50 in late 2020) to US\$323 in June 2022.
- 1.7 But the WMR also found there was an uplift in prices over the review period that was not explained by demand and supply factors controlled for. The Authority noted that it was not clear whether this uplift was due to uncertainty surrounding gas supply or the exercise of market power (or both, or some other factor not accounted for in the model).
- 1.8 Taken together, the suite of structure, conduct and performance indicators did not allow the Authority to reach a conclusive view, but the WMR did state there was “some evidence to suggest that generators have an increased incentive and ability to exercise market power, and may have been doing so over the review period.” (p ii)
- 1.9 The WMR noted previous instances where the Authority had been concerned about the exercise of market power (p iii, p 79). These covered:
- a period of high prices on 2 June 2016 as an example of possible economic withholding
 - high final prices for energy and reserves in the North Island on 8 December 2016 due to a withdrawal of reserves
 - an undesirable trading situation (UTS) during November and December 2019.
- 1.10 Further, the WMR also observed the 2021 contracts between NZ Aluminium Smelters, Meridian, and Contact (the Tiwai contracts) raised a concern about the way the market is operating, by striking a contract with one large consumer that potentially caused a sustained increase in wholesale spot and future prices for other consumers. The Tiwai contracts were estimated to result in potential efficiency losses of \$57m-\$117m per year.¹⁰

⁹ <https://www.ea.govt.nz/about-us/media-and-publications/market-commentary/market-insights/authority-insight-whats-behind-current-forward-prices/>

¹⁰ See also Electricity Authority, 2021, *Inefficient Price Discrimination in the Wholesale Electricity Market – Issues and Options*, www.ea.govt.nz

- 1.11 The Authority has recently made an urgent Code amendment prohibiting materially large contracts that cannot be shown to be efficient under the specified test and providing for a voluntary clearance process for materially large contracts. The Authority is consulting on a proposed permanent Code amendment.¹¹
- 1.12 Chapter 3 provides a summary of the Authority's assessment of submissions on the WMR. A detailed assessment is provided in the companion paper.¹² Having considered submissions, the Authority has adjusted its analysis slightly, but this did not cause the Authority to change its initial observations about the review period.

Investment in new generation appeared to be lagging

- 1.13 In a competitive market, entry by new suppliers or an expansion by existing generators occurs when prices exceed, or are expected to exceed, the cost of new electricity supply for a sustained period. This would then put downward pressure on prices until they reflect the cost of new supply.
- 1.14 The WMR observed that the pipeline of build-ready generation appeared thin. Potential reasons provided included:
- economic and regulatory uncertainty
 - a lack of viable solutions to firm intermittent supply
 - factors that cause long lead-times, such as getting consents and grid connections
 - incentives on incumbent generators to delay investing, as additional capacity would reduce profits on their existing plant (though the Authority also notes they risk this outcome and a loss of market share anyway if competitors invest instead).
- 1.15 Even now, ASX contract prices for 2025 remain well above the cost of new supply, which indicates that the market does not expect the imbalance between demand and supply to resolve soon. We discuss our updated view of the investment pipeline and factors that may be impeding investment in Chapter 4.

Transition to 100% renewable electricity creates new challenges

- 1.16 The potential barriers to investment set out in para 1.14 are not new.¹³ The benefits to consumers of addressing such barriers are now much more pertinent, given the amount of generation investment that is projected to be required to meet increased demand as part of the transition toward 100% renewable electricity.
- 1.17 The Government has a goal for 50 percent renewable energy by 2035, and an aspirational goal to achieve 100% renewable generation by 2030.¹⁴ To achieve these goals there is a need to accelerate development of new renewable electricity generation and ensure the electricity system and market can support high levels of renewables.

¹¹ <https://www.ea.govt.nz/assets/dms-assets/30/Special-Market-Brief-18-August-2022.html>

¹² Available at <https://www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2022/wholesale-market-competition-review>

¹³ For example, they were also discussed in Murray K and T Stevenson, 2004, *Analysis of the state of competition and investment and entry barriers to New Zealand's wholesale and retail electricity markets*, Report to Electricity Commission, at <https://www.ea.govt.nz/assets/dms-assets/5/512802competition-report.pdf>

¹⁴ See: <https://www.beehive.govt.nz/speech/speech-throne-3> The goal is subject to review of the 2025 emissions budget.

- 1.18 There are also implications for competition during the transition. The very large amount of investment that is expected particularly in wind and solar generation, and potential growth in demand response services, would likely strengthen competition.
- 1.19 But competition could reduce during extended periods of low wind and cloud. At those times stored hydro would be the primary fuel source. As ownership of relevant reservoirs is concentrated, market power increases, unless alternative flexible generation enters. Given the associated risks, the question is whether current regulatory settings remain fit for purpose.

Next steps

- 1.20 The following chapters define the potential problems for competition in the transition toward 100% renewable electricity and consider options to promote competition in the wholesale electricity market. The Authority seeks feedback from stakeholders on the contents of this paper.

Making a submission

How to make a submission

- 1.21 The Authority's preference is to receive submissions in electronic format. Submissions in electronic form should be emailed to reviewconsultation2022@ea.govt.nz with **Wholesale Market Competition Review** in the subject line.
- 1.22 Please note the Authority intends to publish all submissions it receives. If you consider that we should not publish any part of your submission, please:
- indicate in a cover note which part/s should not be published
 - explain why you consider we should not publish that part
 - provide a version of your submission that we can publish (if we agree not to publish your full submission).
- 1.23 If you indicate there is part of your submission that should not be published, the Authority will discuss with you before deciding whether to not publish that part of your submission. However, please note that all submissions we receive, including any parts that we do not publish, can be requested under the Official Information Act 1982. This means we would be required to release material that we did not publish unless good reason existed under the Official Information Act to withhold it. The Authority will consult with you before releasing any material that you said should not be published.

When to make a submission

- 1.24 Please deliver your submissions by **5pm on 30 November 2022**.
- 1.25 This deadline allows **six weeks** for submissions. The Authority will acknowledge receipt of all submissions electronically. Please contact reviewconsultation2022@ea.govt.nz if you do not receive electronic acknowledgement of your submission within two business days.

Further information

- 1.26 Background information on the wholesale market competition review can be found on the Authority's website at <https://www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2021/wholesale-market-competition-review-2/>. Weekly market monitoring reports and related resources can be found at <https://www.ea.govt.nz/monitoring/market-performance-and-analysis/monitoring-trading-conduct/>.
- 1.27 Please direct any specific questions or queries to: reviewconsultation2022@ea.govt.nz.

2 Competition for the long-term benefit of consumers

- 2.1 The purpose of this chapter is to provide context about the important role of wholesale market competition, and the current regulatory approach to managing market power.

Competition is most likely to get best outcomes for consumers

- 2.2 The Authority's main statutory objective is to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.¹⁵
- 2.3 Consumers benefit from competition in the wholesale electricity market. Competition puts pressure on generators to set their prices close to their cost of supply (including opportunity cost) and to find ways to keep their costs down and get more out of their generating plants.
- 2.4 The wholesale electricity market is also a very effective way to discover and coordinate dispersed information about demand and supply – including what prices different consumers are willing to pay and prices that different generators are willing to supply at – to guide their actions, and to encourage efficient investment and innovation.
- 2.5 This discovery process results in important outcomes to the benefit of consumers:
- lowest-priced offers to generate are dispatched first, before more expensive generation is used, balancing generation with demand at least cost
 - when demand grows and prices rise, it encourages investment in more generation when the expected returns get high enough
 - innovation and tailoring are rewarded – new technologies (including alternatives to electricity) can push out higher-cost generation or offer consumers more choice
 - when there are supply constraints, prices allocate scarce electricity to consumers who value electricity the most; those with more flexible demand use less or wait.

Competition is not perfect or constant

- 2.6 The state of competition in the wholesale electricity market is not perfect or constant.¹⁶ As in many markets, the presence of market power is a reality.
- 2.7 Its exercise though can cause harm to consumers. If generators exercise their market power, they could profitably raise offer prices above competitive levels (marginal cost).
- 2.8 Even small actions to withhold supply can have significant price impacts because of relatively inelastic demand in the short run and the shape of the offer curve. This leads to inefficient outcomes that are not in the long-term interest of consumers.

¹⁵ The Electricity Industry Amendment Act 2022 adds an additional objective which is to protect the interests of domestic consumers and small business consumers in relation to the supply of electricity to those consumers. The additional objective applies only to the Authority's activities in relation to the dealings of industry participants with domestic consumers and small business consumers.

¹⁶ Para A.26 of Electricity Authority, 2011, *Interpretation of the Authority's statutory objective*.

- 2.9 Prices should *reflect* short run marginal cost, inclusive of any scarcity rents and judgements about the opportunity cost of fuel. The Authority does not apply a perfect competition benchmark. This is discussed in the companion paper responding to submissions on the WMR (paras 4.6-4.14).¹⁷
- 2.10 Further, the trading conduct rule requires generators (and ancillary service agents) to ensure that all their offers are consistent with offers they would have made in a market where no party could exercise *significant* market power. Market power becomes significant when its exercise would have a net adverse impact on economic efficiency, which includes productive, allocative and dynamic efficiency.¹⁸
- 2.11 In assessing the state of competition, the Authority also considers whether average spot prices over time reflect long run marginal cost (the cost of bringing additional capacity from the lowest cost source), which is likely the case if there are no material impediments to entry or expansion, alongside other indicators of its SCP framework.

Industry structure is relatively concentrated

- 2.12 Electricity generation is relatively concentrated. Four large vertically integrated generator-retailers supply over 80% of generation to the market (Table 2). There has been little change to concentration in the past 8 years.¹⁹

Table 2 Generation in New Zealand: key characteristics 2022

	Contact	Genesis	Meridian	Mercury	Manawa	Other	Total
Total capacity MW	2,023	2,023	2,784	1,565	658	1,050	10,100 MW
Thermal MW	801	1203	-	-	-	398	2,402 MW
Stored hydro MW	760	185	2350	1105	-	0	4,400 MW
Market share generation	19.5	18.1	30.2	18	6.1	8.1	100%
Market share retail	19.7	21.6	16.3	25.9	0.6	15.9	100%
Vertical integration	76.5	86.4	78.6	92.1	-	-	

Source: Electricity Authority

Notes: 'Stored hydro' refers to Lakes Taupo, Waikaremoana, Tekapo, Pukaki, Hawea, Te Anau and Manapouri. Generation units downstream of these lakes are classified as stored hydro. Market share of generation is based on injection. Market share of retail is based on number of ICPs as of May 2022. Vertical integration is mean value for year ended May 2022. Vertical integration is based on sales and purchases of MWh, ignoring derivative markets. https://www.emi.ea.govt.nz/Wholesale/Reports/BLKL4U?_si=v|3

- 2.13 In addition, these four generator-retailers are frequently gross pivotal – that is, demand in a trading period would not be able to be met without their supply. Meridian is gross pivotal most of the time (historically around 77%, though it increased to 90-95% in the review period). While short-term incentives depend on generators' position net of retail and contracts, long-term incentives are to use market power to increase future prices for contracts and retail customers.

¹⁷ For a clear exposition see also <https://www.ea.govt.nz/assets/dms-assets/29/09-Fundamentals-of-Efficiency-in-Electricity-Prices-Annex-3-of-MDAGs-discussion-paper-on-the-High-Standard-of-Trading-Conduc-v2.pdf>

¹⁸ See paras 59-64 of MDAG, 2020, *Review of the trading conduct provisions – recommendations paper*, at <https://www.ea.govt.nz/assets/dms-assets/27/MDAG-review-of-trading-conduct-provisions-recommendations-paper.pdf>

¹⁹ The Herfindahl-Hirschman index, a measure of concentration, has hovered around 2000 since 2014.

- 2.14 A concern is that gross pivotal and other concentration measures will increase further during the transition, due to the concentration of storable hydro generation.
- 2.15 More concentrated markets are generally suggestive of greater market power. However, of themselves, the various market concentration indicators are not definitive or even reliable predictors of consumer harm (from reduced output and higher prices). Market concentration can also be beneficial (eg, providing consumers with lower prices and more choice), and an outcome of competition.
- 2.16 Market concentration is somewhat inevitable in New Zealand with its small population, though the current configuration is also a legacy of historic government decisions, including the building of hydro schemes, the break-up of the Electricity Corporation NZ and the asset swaps under the Electricity Industry Act 2010.
- 2.17 Even so, concentrated markets are more susceptible to the exercise of market power. It gives suppliers greater ability to unilaterally raise prices or to coordinate on prices or quantity, whether through explicit agreements or tacitly. And with demand and capacity relatively inelastic in the short run, and with transmission constraints, even generators with a small market share could exercise market power at least in the short run.²⁰
- 2.18 Recognising markets are not perfect, one of the limbs of the Authority's statutory objective is to promote competition for the long-term benefit of consumers.

Competition is not constant over time

- 2.19 The state of competition is not necessarily constant over time. Sometimes market conditions are relatively favourable to consumers, for example when input costs are falling or when there is ample generation capacity. Generation investments in the 2000s and expansion in transmission capacity, followed by flat demand in the 2010s, led to about a decade of relatively flat average wholesale market prices.
- 2.20 But there will also be times when conditions are relatively unfavourable to consumers, for example, when input costs are rising, and when generation fuel supply is constrained (eg, gas shortages while demand started to grow).
- 2.21 In a sellers' market, competition can appear weak, with firms charging "prices above competitive levels until new suppliers enter the market or consumers find ways to reduce demand..."²¹ This process will continue until demand and supply are more closely matched and prices more closely reflect the cost of new supply.
- 2.22 In other words, price cycles are expected in markets, with prices giving important signals to supply and demand to adjust. Adjustment is not an instantaneous or even orderly process. High prices can thus reflect tight supply or scarcity.²² Within limits, extended periods of high spot and forward prices (relative to the cost of new supply) are thus not sufficient evidence of the exercise of significant market power.
- 2.23 For consumers to be able to be confident that these dynamics are at work for their long-term benefit, however, does rely on there being appropriate market structures, unimpeded entry and exit by firms, effective market conduct rules, and the capacity to monitor and enforce compliance with the rules.

²⁰ Borenstein S, 2002, *The trouble with electricity markets: understanding California's restructuring disaster*. Journal of Economic Perspectives, Vol 16:1, pp191-211

²¹ Para A.26, Electricity Authority 2011, *Interpretation of the Authority's statutory objective*.

²² Market participants can purchase products that protect them from the risk of price volatility.

Structures and rules to promote competition

- 2.24 Some of the features of the electricity market (market concentration, information asymmetries such as about the opportunity cost of stored hydro, and the lack of substitutes in the short run) can impede competition.
- 2.25 The Authority's role is to promote competition by providing for industry-specific market rules and institutions that promote appropriate conduct among participants, facilitate access to information, and reduce impediments to enter or exit the market.
- 2.26 Examples of features of the New Zealand electricity market design that promote competition for the long-term benefit of consumers are:
- repeated auctions for supply which provide incentives for generators to make offers that reflect their short run marginal cost²³
 - the trading conduct rule in the Code which seeks to prevent unilateral conduct that causes inefficient prices (see Box 1 on the latest evidence on the impact of this rule)
 - clearing settlement and prudential security regime for the spot market to limit the extent to which non-payment risk presents a barrier to entry for small generators
 - contracts markets to provide a robust forward price curve and opportunity for market participants (including new entrants) to manage future price risks and locational price risks
 - open-access grid and distribution networks, so any generator can connect to networks provided there is sufficient capacity and connection requirements are met, and restrictions on distributors from owning electricity retailing or generation businesses
 - information disclosure to provide transparency about trades and activities in the wholesale electricity market (including the proposals around very large contracts – see paras 1.10 – 1.11), and access to information that participants can use to make decisions about when to use or produce electricity and to invest
 - monitoring and enforcement.

²³ This is consistent with the requirement that generators also recover their fixed and overhead costs and does not rely on market power rents. Inframarginal producers will recover such costs through competitive rents (producer surplus). If the marginal supplier does not earn enough over time to cover such costs, then it would exit. Reduced supply may then result in higher prices (eg, including scarcity rents), and this process will continue until all generators can cover their fixed and overhead costs over time. See pp138-139 of Commerce Commission, 2009, *op cit*.

Box 1: Post implementation review of new trading conduct provisions

The Code at clause 13.5A sets out a standard of trading conduct to regulate the behaviour of suppliers when they make offers for supply of generation and instantaneous reserves.

The rule is to give all market participants, and especially consumers, confidence that prices are efficient even when competitive pressures are relatively weak.

The new trading conduct provisions came into effect on 30 June 2021. Generators and ancillary service agents must ensure their offers are consistent with offers they would make in a market where no party could exercise significant market power.

The Authority has recently completed a post implementation review of the new provisions, by comparing conduct and market performance since 1 July 2021 against that observed in previous years.

The evaluation covered the 13-month period between 1 July 2021 and 31 July 2022. It found an increase in the frequency of very low prices, more pronounced price separation, and a reduction in very high-priced offers.

The review found that offer prices have tended to reflect underlying conditions and economic costs more closely since the rule was introduced. Prices were more consistent with competitive outcomes under the new provisions, compared to offer behaviour during the period covered by the WMR.

The Authority identified 22 issues for further analysis (covering 1540 trading periods across 153 days in the 13-month period, or 19,008 trading periods). In 12 of these cases this led to requests for further information from participants.

Three cases are still being analysed by Market Monitoring, while three cases were referred to the compliance team. One was closed after some initial fact-finding. The Authority's Compliance Committee declined to take action on the second case as no prima facie case was established. The third instance is still at the fact-finding stage.

The Authority also considered allegations made by some stakeholders of breaches of trading conduct on 9 August 2021. Both cases were referred to the Compliance Committee who declined to take further action as it considered it was not warranted.

While not definitive, these findings are encouraging. However, as the Authority also noted at paragraph 2.4 in its post implementation review:

“While the new rule is designed to address both transitory and sustained exercise of market power, the nature of any sustained exercise of market power alongside the data available for the wholesale market may mean that the only impact of the new rule may be to temper extreme behaviour. That is, the new rule may have no effect on the exercise of market power that occurs at the margin, as it is difficult to detect this. What we can observe however is general trends and assess whether these are consistent with competition. Combined with the Authority's regular monitoring this may be sufficient to ensure that no *significant* transitory or sustained exercise of market power is occurring”

Electricity Authority 2022, Post Implementation Review: <https://www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2022/wholesale-market-competition-review>

Commerce Act

- 2.27 The industry-specific regulation and facilitation by the Electricity Authority complement the functions of the Commerce Commission. The Authority and Commission have a Memorandum of Understanding that recognises their common interests and how the agencies intend to work together.²⁴
- 2.28 The Commerce Commission enforces the Commerce Act 1986 and prohibits restrictive trade practices including cartel behaviour, misuse of market power, and mergers and acquisitions that substantially lessen competition. The Commerce Act applies to the electricity industry also.
- 2.29 The amendment to s36 of the Commerce Act, effective from April 2023, strengthens the prohibition against the misuse of market power by significantly reducing the cost and complexity of enforcing s36.²⁵ The new s36 would no longer focus on whether companies are ‘taking advantage of’ market power, but will focus on whether their conduct has the purpose, effect, or is likely to have the effect, of substantially lessening competition in a market. This may serve to strengthen the constraint on the exercise of market power in the electricity industry, by encouraging stakeholders to raise any alleged breaches of s36 with the Commission.²⁶
- 2.30 The Authority will explore better information sharing processes and obligations with the Commerce Commission on any information the Authority collects that may raise concerns about restrictive trade practices, collusion, or misuse of market power.

Proactive monitoring and bigger consequences

- 2.31 The presence of market power requires constant and highly sophisticated monitoring, and follow-through on potential issues.
- 2.32 The Authority monitors the performance of the wholesale market, including spot prices and their underlying drivers to assess whether there are trading periods that require further analysis with respect to conformance with the trading conduct rule, and possibly referral for a compliance investigation. It also investigates potential undesirable trading situations, and monitors compliance with the Electricity Industry Act, Regulations and Code.

²⁴ See <https://www.ea.govt.nz/assets/dms-assets/8/8957Commerce-Commission-MOU-2010.pdf>

²⁵ Having a substantial degree of market power or offering services at high prices is not in itself illegal under the Commerce Act 1986. But it is illegal for a business to substantially lessen competition through restricting entry, deterring competitive conduct, or eliminating competition. Examples of such conduct include exclusive dealing, refusal to supply a competitor with an input it needs to compete in downstream markets, or predatory pricing

²⁶ See MBIE Cabinet paper at <https://www.mbie.govt.nz/dmsdocument/11263-review-of-section-36-of-the-commerce-act-and-other-matters-policy-decisions-proactiverelase-pdf> and the Final Report of the Economic Development, Science and Innovation Committee on the Commerce Amendment Bill, 2021, p1, at https://www.parliament.nz/resource/en-NZ/SCR_115852/48191474b94d770dff2d7670b28d29db35bbb920

- 2.33 Monitoring has its limits as a tool for mitigating the exercise of market power. Regulators must work with imperfect information. Traders have very strong incentives to design ever more sophisticated trading strategies²⁷ and, as noted earlier, even small changes in offers can have a large effect on prices. For example, economic withholding and conserving high opportunity cost water can look the same. Opportunity cost is essentially subjective, as people can take different views on what the future will bring and apply different risk preferences.
- 2.34 The Authority has in the past year increased its investment in proactive monitoring of market performance, to ascertain if observed market performance is consistent with a well-functioning and disciplined market and therefore for the long-term benefit of consumers. This includes publishing more market data, weekly trading conduct reports, and quarterly market reviews.
- 2.35 Close monitoring of some 60,000 final offers in a typical week (as well as pre-dispatch offers and offer changes) and ‘please explain’ follow-ups is resulting in pricing outcomes that seem more consistent with competition.²⁸ The Authority will continue this.
- 2.36 The Authority has also expanded the scope of its compliance activities to include the audit regime, compliance education, and responding to alleged breaches of the Code. The Authority recently published its Compliance Strategy to align with its organisational strategy reset of 2020, and a framework for proactively monitoring compliance with the Code. This sets out the intent and structure for the Authority to proactively focus its resources on the highest risk of harm.
- 2.37 The Electricity Industry Amendment Act 2022 increases the consequences for breaches of the Code, by increasing the maximum penalty of \$200,000 to a maximum of \$2,000,000 plus a further amount not exceeding \$10,000 for every day during which the breach continues.

Promote entry by new generation and more demand flexibility

- 2.38 As noted above, there are good reasons why sectors end up with a few large, dominant firms – through economies of scale or scope or some other source of advantage like a unique idea or knowledge that consumers value.
- 2.39 There are also good reasons for high prices in a competitive market, if there are mismatches between demand and supply. Prices rise in times of scarce generation supply relative to demand, adding scarcity rents to marginal cost to reduce demand to match the available capacity (and to induce entry).
- 2.40 But the same structures and pricing conduct could also be indicating the exercise of market power. This makes it difficult to make a firm diagnosis. It means the rational regulation of market power is an extremely delicate problem.²⁹
- 2.41 It is also the case that the exercise of market power sows its own seeds of destruction. The threat from new technology, resources, or ideas is recognised as a powerful

²⁷ Léautier T-O, 2018. *Imperfect markets and imperfect regulation. An introduction to the microeconomics and political economy of power markets*, MIT Press, pp100-101.

²⁸ See the Authority’s Post implementation review of the new trading conduct rule, *op cit*.

²⁹ Schumpeter J A, 1942, *Capitalism, socialism and democracy*, First Harper Perennial Modern Thought, NY, 2008 edition.

constraint on market power, as well as an engine for giving consumers choice and access to innovations.³⁰

- 2.42 Reflecting that competitive entry and innovation can result in very large benefits to consumers over the long-term, the Authority has previously emphasised that promoting competition take into account long-term opportunities and incentives for efficient entry, exit, investment and innovation...³¹

Energy Transition Roadmap: entry of new technology and more flexible demand

- 2.43 In December 2021, the Authority published its *Energy Transition Roadmap*. This figure is replicated on the cover page of this Issues paper.³²
- 2.44 The *Energy Transition Roadmap* sets out key workstreams aimed at ensuring electricity market and regulatory arrangements provide a platform to accommodate the significant increase in demand for electricity to achieve net zero emissions – as this will require large quantities of new renewable electricity generation, increased use of distributed energy resources, and new ways for consumers and their agents to participate.
- 2.45 The focus of much of this work is about addressing barriers to entry and innovation, and the Authority considers these therefore remain highly relevant to the promotion of wholesale market competition in the transition toward 100% renewable electricity. For example, the Roadmap covers work on:
- MDAG's work on market operation and investment with 100% renewable electricity
 - the entry of new technologies (like batteries to participate in the reserves market)
 - barriers to connection and operation of renewable generation
 - addressing first mover disadvantages (via the TPM)
 - the implementation of real time pricing and enabling the participation of flexible distributed demand
 - the Innovation and Participation Advisory Group's (IPAG) advice on flexibility trading and equal access
 - review of the range of risk management tools available to purchasers and sellers in the wholesale market.

Consultation questions

1. Do you agree that a key competition issue in the transition is that it weakens competition in extended times when intermittent generation cannot run?
2. Do you have any comments on the contents of this chapter?

³⁰ Schumpeter, *op cit*, p84, argues competition is a dynamic process, and that observing that firms have market power at any point in time also needs to be done in the context of the ever-present threat from the eventual entry by new supply, innovation, and substitution (the perennial gale of creative destruction).

³¹ Electricity Authority 2011, *Interpretation of the Authority's statutory objective*, para A.30. Para A.11 states that long-term benefit to consumers means promoting dynamic efficiency is the Authority's primary focus. Léautier, 2018, p101, echoes the role of competitive entry and further suggests that increasing the share of customers who can respond to wholesale spot prices is "probably the most effective approach to permanently and durably reducing the exercise of market power.

³² See <https://www.ea.govt.nz/development/why-we-work-on-developing-the-electricity-market/roadmap-transition-to-low-emissions-energy-system/>

3 The 2021 review of wholesale market performance

- 3.1 The Authority received 31 submissions in response to the WMR.
- 3.2 This chapter briefly summarises our analysis of the submissions. A fuller response to submissions is documented in the information paper that accompanies this Issues paper.³³ The Authority's response is only for information, and no submissions are sought on that paper (or the summary of it in this chapter).

Submissions did not cause the Authority to change its initial observations

- 3.3 Submissions were broadly consistent within categories of stakeholder – generators generally considered the wholesale market to be competitive and supported the status quo, whereas independent retailers and industrial users thought the market is not working and advocated for structural reform.
- 3.4 While we have adjusted our analysis somewhat in light of submissions received, none of the points raised in submissions, or additional analysis we undertook as a result, caused us to change our initial observations made in the review paper.
- 3.5 That is, the Authority still considers that prices over the review period reflected, at least to some extent, underlying supply and demand conditions, but there was also some evidence to suggest generators may have exercised market power over the review period.

Gas uncertainty contributed to higher offers, but market power not ruled out

- 3.6 The WMR set out that the Pohokura outage in 2018 appeared to cause a sustained step change in electricity prices that was not explained by observed increases in gas prices. The Authority acknowledged it could not confirm whether this reflected uncertainty or the use of market power, but the latter could not be ruled out.
- 3.7 Submissions differed on this point. Contact, Meridian and Mercury argued the step change was explained by gas supply uncertainty, caused by outages and reduced gas field production. Axiom and Nova argued competitors could have taken advantage of higher gas prices to raise their offer prices without being displaced by thermal generation. MEUG argued that, as gas and thermal generation levels returned to normal after three months, gas supply uncertainty cannot explain the prolonged increase in prices.
- 3.8 The Authority included different measures in its modelling, as suggested in submissions, to further account for gas market uncertainty, but these did not change its key findings.

³³ This paper is available at <https://www.ea.govt.nz/monitoring/enquiries-reviews-and-investigations/2022/wholesale-market-competition-review>

Focus on competition in the wholesale electricity market is appropriate

- 3.9 A number of submissions said that the Authority ought to widen the focus of its analysis to include, for example, the retail market (eg Flick, Electric Kiwi, Octopus), secondary markets (BEC, Energy Link), impacts on different consumer groups (MEUG), and wider considerations such as the environment (eg, Entrust, Electric Kiwi), the energy trilemma (Contact, Mercury), and more holistic considerations (NZ Steel).
- 3.10 The Authority agrees that competition in the wholesale market is important for outcomes in the retail market. However, the issues that led to the review concerned competition in the wholesale electricity market, and the retail market was not in scope.
- 3.11 In terms of wider considerations, while the Authority recognises these considerations, the Authority is ultimately guided by its statutory objective. As such, the WMR focused primarily on whether wholesale electricity market settings were promoting competition in that market for the long-term benefit of consumers.

Analysis covering 2.5 years does give insight into competition over time

- 3.12 Some submissions argued that the Authority's analysis that covered January 2019 to June 2021 was static and too short-term in focus.
- 3.13 In particular, Meridian argued that competition is a process that occurs over time, and rivalry takes time to organise and have a material effect. Contact submitted the Authority had not considered the link to long term market outcomes. Trustpower said a long-term perspective on the investment environment was needed in the context of the transition away from fossil fuels. Electric Kiwi and Haast thought that the Authority should not assume that pre-2019 the market was competitive.
- 3.14 The Authority agrees that competition is a dynamic process. But it is not inconsistent to analyse market structures, behaviours and outcomes at a point in time, and understand the implications for, and of, change over time. The Structure, Conduct, Performance framework explicitly considers incentives for, and barriers to, entry (and exit) and dynamic efficiency.
- 3.15 Two and a half years seems an ample period for a 'deep-dive' into generator offer behaviour and whether the market is achieving competitive outcomes. While offer behaviour (and investment plans) may take some time to fully adjust to new information, the timeframe seems well long enough for offer behaviour to fully reflect generators' updated expectations of costs

No conceptual conflict between testing against short- and long-run marginal cost

- 3.16 Submissions by Axiom, EGR Consulting, and Mercury thought comparison of prices to the long-run cost of entry was a more useful or conventional test of the state of wholesale market competition, given the difficulty of measuring or interpreting short run marginal cost.
- 3.17 The Authority sees no conflict between asking whether prices are competitive in that they reflect short run marginal cost (provided these include opportunity cost and scarcity rents) and asking whether prices will converge to a long run cost of entry. Efficient price signals are needed in the short run, and the long-run is a succession of short-run outcomes.

Prices remain persistently higher than the cost of new supply

- 3.18 The WMR noted that forward prices were well above the cost of new supply, for longer than we would expect, and that the pipeline of build-ready investment projects appeared thin. Potential reasons for this are outlined earlier in this document.
- 3.19 Submissions presented conflicting views on whether the market will correct the divergence between prices and cost of new supply. BEC, Meridian, Mercury, Nova, and Trustpower, for example, argued investment would eventually bring prices back to the cost of new supply. Meridian suggested a range of reasons for the lag (such as consenting and construction times, demand uncertainty due to NZAS, transmission costs due to TPM reform, and Government policy), but that much of the uncertainty had diminished. It suggested at p78 of its submission that ‘the race is on and competition is fierce to secure and develop options’. Mercury suggested streamlining consenting processes.
- 3.20 Axiom argued that a prolonged period of prices above long run marginal cost may indicate barriers to entry. Independent Retailers submitted the exercise of market power undermines confidence in the market which in turn undermines investment and further consolidates the incumbents.
- 3.21 The Authority commissioned a further assessment of the investment pipeline and any factors that may hinder investment. The Authority is now more confident about the amount of investment that is committed or actively pursued but also noted there are impediments to address. This assessment is discussed in detail in the next chapter.

Our observations on the Structure Conduct Performance indicators remain unchanged

- 3.22 The SCP framework remains as our framework of choice for analysing the state of competition. The Authority observed that, taken as a whole, the indicators provide an overall impression but do not tell us definitively whether prices have been determined in an environment as competitive as we would like.
- 3.23 Submissions offered different views on the framework and indicators, and some challenged the Authority’s assessment of specific indicators. Feedback by indicator is discussed in greater detail in the companion paper. However, submissions did not cause us to re-evaluate which indicators to use, or our observations about each indicator.

4 Investment in net new renewable generation

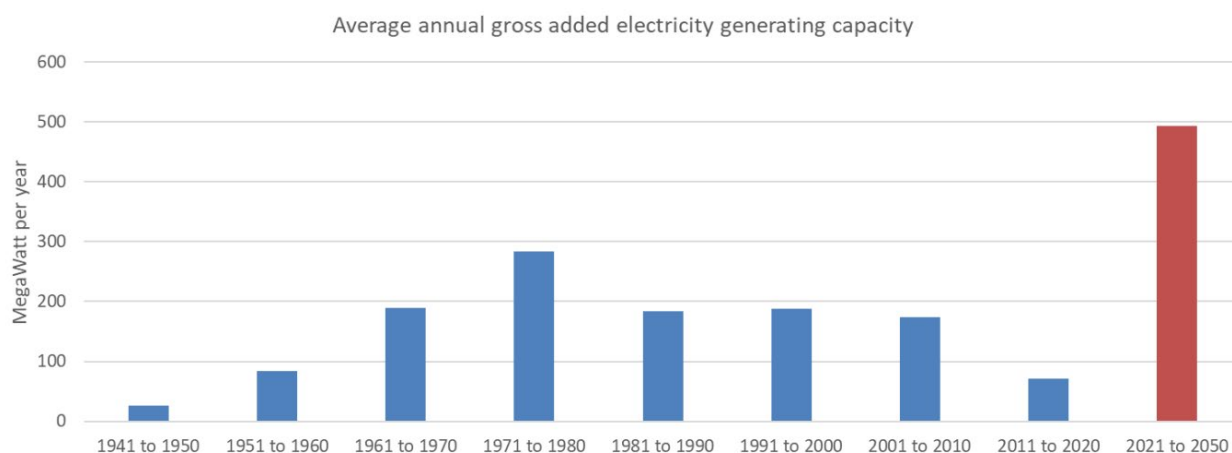
- 4.1 As noted earlier in this paper, the entry by new generation is, alongside increasing the flexibility of demand, the most powerful constraint on market power. This chapter considers whether this is likely to be the case in practice.
- 4.2 The WMR found that forward prices had been above the cost of new supply by about 50 percent and for longer than expected in a competitive market. The pipeline of ready-to-build projects had become very thin, and there were factors impeding investment.
- 4.3 The Authority commissioned Concept Consulting to undertake a detailed assessment of the pipeline of new investment out to 2030, compared to the quantity of new generation needed to meet projected increases in demand and to replace thermal generation. We also asked Concept to determine what conditions exist that may potentially prevent, impede, or slow entry into the market.³⁴

³⁴ Concept Consulting, July 2022, Generation Investment Survey 2022, prepared for Electricity Authority

Massive investment in new generation is being anticipated

- 4.4 To meet demand from electrification and to replace fossil-fuelled generation with renewable electricity, MDAG reports that investment of 400-500MW of new supply or demand response is needed every year until 2050.³⁵
- 4.5 The average annual investment required is much greater than past experience, and 6 times greater than in the last decade. However, Te Waihanga (2022) also notes that, when adjusted for GDP, the amount of investment is in fact not as great as in the past.

Figure 3 Investment required each year 1941-2050



Source: Te Waihanga-Infrastructure Commission, 2022, *Leveraging our energy resources*. Concept estimated that in the decade to 2020, gross new supply averaged 320 GWh per year offset by retirements.

- 4.6 MDAG simulations indicated that most of the additional capacity would come from solar and wind generation (so that the share of intermittent generation would increase from 6% in 2020 to 47% in 2050), that resource constraints would limit the expansion of geothermal, that there would be no changes in hydro generation (so that the share of flexible hydro generation declines from 50% in 2020 to 40% in 2035 and 30% in 2050 (pp37-38)), and that there would be bio-fuelled green peakers by 2035 (p42). Its reference case also assumes that flexible demand would increase from 8% of peak demand in 2020 to 25% by 2050 (p39).

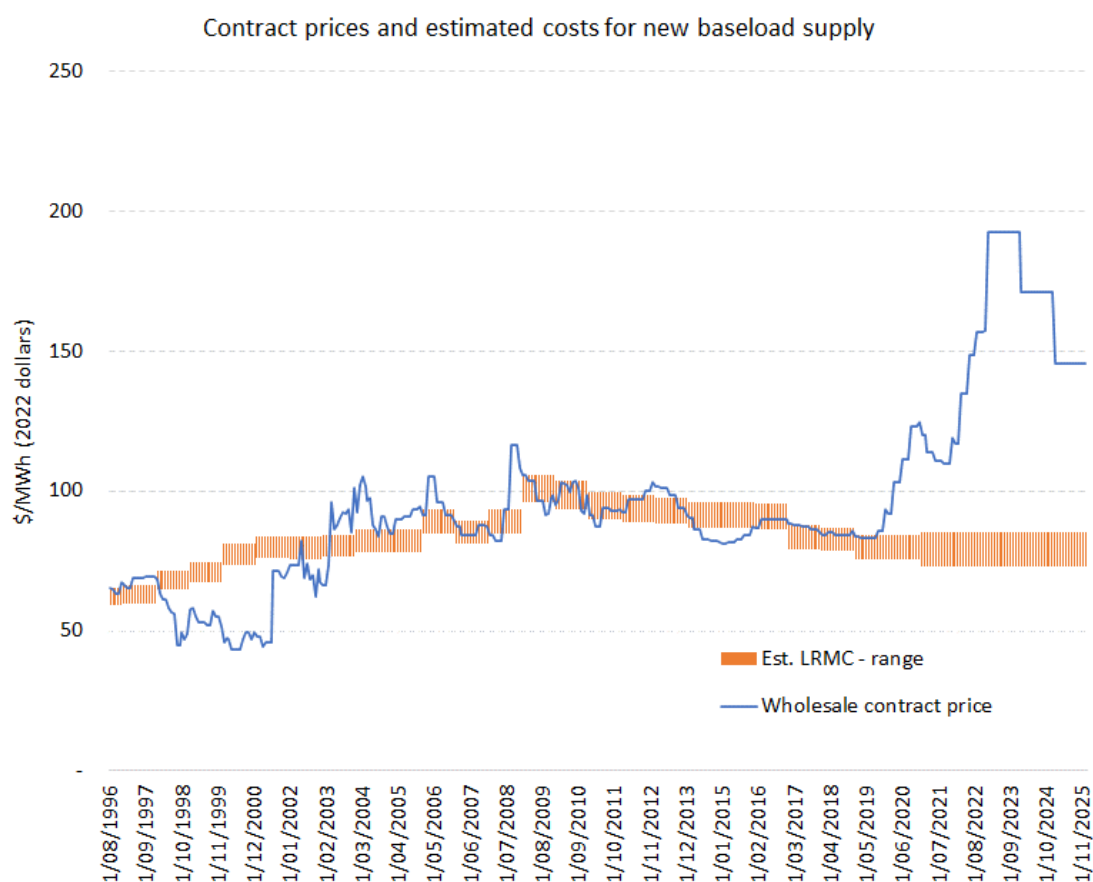
Prices signal the case for more investment

- 4.7 Wholesale electricity prices have in the past generally moved in line with the cost of adding new capacity. This suggests that, in the past at least, competition is disciplining costs and prices, and that investment kept capacity in line with demand.
- 4.8 Figure 4 shows the historic pattern broke down in 2019. ASX contract prices have been well above the cost of new supply since then, and this looks to persist beyond 2025.
- 4.9 This raises the question about the nature of impediments to investment, whether these indicate anti-competitive practices by incumbents to slow or deter entry and expansion, and whether competitive entry is an effective constraint on the exercise of market power. As Littlechild stated: “Arguably, only if generators persistently secure prices that exceed this long run new entry cost should there be a significant concern about market power”.³⁶

³⁵ MDAG, 2022, *Price discovery under 100% Renewable Electricity Supply*.

³⁶ Littlechild S, 2005, *Beyond Regulation*, Beesley Lectures on Regulation series XV, p7.

Figure 4: 2022-2025 contract prices well above cost of new supply



LRMC estimates.xlsx

Source: Concept Consulting 2022

Note: The estimated long run cost of new supply is ~\$80/MWh (\$76-\$92). The cost of wind and solar generation is converted to firm terms. Contemporary costs may be higher due to, eg, supply chain issues.³⁷

Investment prospects to 2025

- 4.10 Concept estimates that approximately 6,200 GWh/year of new generation will be needed by 2025 to meet projected demand growth and to displace thermal generation, where this is economic.
- 4.11 It found the development pipeline to be large, with the potential for 57,000 GWh/year by 2030 having been identified, though not all will proceed to development. See Table 3.

³⁷ Forsyth Barr recently estimated a current LRMC of \$106/MWh, See its NZ Equity Research Note 6 July 2022, *Electricity Sector Wholesale Changes*.

Table 3 Pipeline indicates most of the investment will be available after 2025

GWh/year	2023	2024	2025	2026+	Total
Committed	1,822	762	6	19	2,609
Actively pursued	3,073	2,639	2,402	14,521	22,634
Other	526	451	165	30,351	31,492
Total	5,421	3,852	2,572	44,890	56,735

Source: Concept Consulting July 2022

- 4.12 Table 4 indicates that the four major incumbent gen-tailers account for 90% of the committed projects, and 22% of the actively pursued projects. Other investors make up 78% of the actively pursued (but not yet committed) projects. This pattern seems consistent with incumbents having consented projects 'on the shelf', ready to activate once market conditions are right – as it is now, following a decade of flat demand, with supply broadly in balance with demand.

Table 4 78% of 'actively pursued' projects are by independent investors

GWh/year	2023	2024	2025	2026+	Total
Major four gentailers					
Committed	1,807	542	-	-	2,349
Actively pursued	-	693	708	3,626	5,027
Other	-	-	-	10,361	10,361
Total	1,807	1,235	708	13,987	17,737
Other investors					
Committed	15	220	6	19	260
Actively pursued	3,073	1,946	1,694	10,895	17,607
Other	526	451	165	19,990	21,131
Total	,614	2,617	1,864	30,903	38,998
Grant total	5,421	3,852	2,572	44,890	56,735

Source: Concept Consulting July 2022

- 4.13 Solar and wind projects make up most of the pipeline (Table 5).

Table 5 Before 2026, solar projects dominate; wind projects take longer

GWh/year	2023	2024	2025	2026+	Total
Biofuel			283	546	828
Geothermal	1,437		446	1,298	3,180
Hydro	15	5	11	168	199
Solar	3,504	2,775	1,439	17,808	25,526
Wind	465	1,072	394	18,052	19,983
Offshore wind			-	7,019	7,019
Grand Total	5,421	3,852	2,572	44,890	56,735

Source: Concept Consulting July 2022

Forward prices indicate impediments and technical constraints

- 4.14 Projects built since 2021 or committed to be on stream by 2025 will cover about 3,000 GWh/year of the 6,200 GWh/year identified as needed in this timeframe. The 3,000 GWh/year is likely sufficient to meet electrification-related projected demand growth to 2025.
- 4.15 To align prices with the cost of supply, an additional 3,200 GWh/year would need to be completed by 2025 to displace fossil-fuelled generation, where it is economic to do so. In round numbers, this is a conversion rate of 40% of the ~8,100 GWh /year of 'actively pursued' generation projects that could be completed by 2025.
- 4.16 Figure 4 above indicates that the market does not expect that enough investment will happen by 2025 to displace higher cost thermal generation and bring prices back to the long run cost of new generation. Assuming the market has a good view of the amount of investment being pursued, the 2025 contract prices imply the market expects just 25% of the 8,100 GWh/year of actively pursued projects would be in place in 2025. In other words, more fossil-fuelled generation will continue to be present than project economics might suggest.
- 4.17 This raises the following questions: 'what are the causes of the slower than economic displacement of fossil-fuelled generation' and 'what would help to achieve a higher conversion of projects from actively pursued to committed'?
- 4.18 It may be that projects currently in the pipeline are not a credible substitute for flexible fossil-fuel generation (eg, during extended periods of low wind and sun, when battery storage depletes). If this is so, then the Authority can be more confident that the gap between forward prices and the cost of new supply (intermittent renewable generation) is not due to the exercise of market power to hinder entry, but due to other impediments or technical limitations.

Impediments to entry by new supply

- 4.19 Impediments to entry can delay the convergence of electricity prices to the long run cost of new supply.³⁸
- 4.20 Concept Consulting's interviews with generators, developers, and other key informants identified several factors that could be discouraging or delaying entry or the conversion of opportunities into firm commitments to invest.

Impediments to investment within the electricity sector

- 4.21 **Uncertainty** – one to two years ago, the uncertainty about the future of the Tiwai Point smelter was adversely affecting development of new generation. In recent interviews, developers appeared much less concerned about this now.
- 4.22 Uncertainty around gas supply, the timing and manner of the exit of fossil-fuelled generation, and the NZ Battery project are other areas that weigh on investors' decisions.
- 4.23 Uncertainty creates option value – making it worthwhile to delay investment decisions until more is known about risks and whether expected returns stack up. In other words, it would add to (lift) the cost of new supply that is indicated in Figure 4.
- 4.24 **Access to offtake and firming arrangements** – having an offtake agreement has historically been a pre-requisite for new entrants to proceed with a project. More recent data indicates this is not the case for overseas investors, who are more willing to take the risk and make offtake arrangements once the project is built (Concept, 2022). Overseas investors make up a material share of generation projects that are in the pipeline and are being actively pursued.
- 4.25 Access to 'firming' arrangements have been identified as an emerging issue for intermittent generators like wind and solar. If this becomes an issue, it could make it harder for intermittent generators to put together a supply agreement with a buyer, and this could then impede investment.
- 4.26 **Network connections** – developers expressed frustrations with delays in and potential duplication of studies for connection to the grid or local networks. In future, the long lead time for developing network capacity may become a bottleneck to generation expansion.
- 4.27 Transpower notes that a large complex connection might take over 3 years while simpler connections might take less than 18 months.³⁹ It commenced a consultation process on improving its queue management given the increased volume of grid connection enquiries. Enquiries have increased from around 5 per year historically to 21 in FY20, 45 in FY21 and 82 in FY22 to May.⁴⁰
- 4.28 Developers suggested there are opportunities to streamline processes and requirements. Increased volumes of enquiries also suggest more capacity may be needed to deal with connection investigations.

³⁸ Carlton 2004 notes that adjustment costs (which are not a barrier, but just a cost that tends to be ignored) together with industry characteristics will influence the speed of convergence. Further, barriers are not necessarily socially undesirable. Carlton DW, 2004, "Why Barriers to Entry Are Barriers to Understanding", *American Economic Review*. Apr 2004, Vol. 94, No. 2: Pages 466-470.

³⁹ <https://www.transpower.co.nz/our-work/getting-you-connected/our-connection-process>

⁴⁰ <https://www.transpower.co.nz/sites/default/files/plain-page/attachments/Queue%20Management%20System%20consultation%20-%20For%20publication.pdf>

- 4.29 As a way to address these concerns, the Authority invites Transpower to find solutions to any barriers to publishing connection enquiries and connection studies, and to publish them, and to streamline the application processes.
- 4.30 While it is beyond the scope of this paper, the Authority also notes that volume of growth in generation capacity and the implications for the delivery of grid and local network services and alternative options makes a whole-of-system view critical when considering options to enable electrification and the connectivity of generation capacity. These questions may warrant further consideration of the interface between system operator, grid owner and local network functions.
- 4.31 **Awareness** – There has been a step up in interest from large and experienced overseas developers. Half of the active projects that could be developed by 2025 are in the hands of overseas parties who are new to New Zealand in the last 12-24 months.
- 4.32 Discussions with overseas developers suggested New Zealand has a low profile as providing investment opportunities for renewable electricity. This is of note given New Zealand has to compete for finance, expertise, and materials with the rest of the world, and US and Europe in particular are ramping up their investment in renewable electricity.

External factors

- 4.33 **Overseas Investment Act 2005 (OIA)** – Concept 2022 reports that overseas developers of solar projects rated the OIA as the greatest impediment to faster development. Solar projects tend to trigger sensitive land provisions.⁴¹
- 4.34 International solar developers account for ~50% of new potential energy supply by 2025.
- 4.35 Wind developments do not have the same footprint as solar farms, and if built on farmland, the land can still be used for farming. Hence investors could lease only that smaller portion of land and use easements for access.⁴² However, the OIA can still apply if the investment is over \$100m.⁴³
- 4.36 **Resource Management Act 1991 (RMA)** – Concept 2022 reports that wind projects take 3+ years to obtain RMA consents, in part because of the need to collect ecological data over multiple seasons prior to making an application. Concept considers this is a key reason why wind projects account for a low share of projects that can be developed prior to 2025.
- 4.37 Developers are currently reporting solar projects can obtain RMA consents in 6-12 months. Concept notes that getting consents could become more difficult when solar farms become more common (and thus may increasingly being proposed to be built in areas where they might compete with other community values and preferences considered under the RMA).
- 4.38 **Strained supply chains** – supply chains are under stress because of Covid-19 and the war in Ukraine. This has been resulting in problems accessing materials and rising costs. Developers also report local labour shortages. As a consequence, final investment decisions and the delivery of projects are delayed.

⁴¹ This includes buying and leasing sensitive land for more than 10 years (<https://www.lin.govt.nz/overseas-investment/discover/find-out-if-you-need-consent>)

⁴² The New Zealand Wind Energy Association estimates 1-3% of total land in a wind farm might be used for turbines, buildings, tracks etc, so that land can be used for normal farming operations. See https://www.windenergy.org.nz/store/doc/Considering_a_wind_farm.pdf

⁴³ See for example, <https://www.lin.govt.nz/overseas-investment/decision-summaries-statistics/2012-08/201210092>

Is entry sufficiently timely and large to constrain market power?

- 4.39 The persistence of ASX contract prices for 2025 being significantly above the cost of new supply, to an extent not seen in the prior 25 years, raises the following questions:
- is the continued mismatch due to some impediment to investment or anti-competitive behaviour that seeks to deter or slow entry?
 - is entry insufficiently timely or large enough or of the right type to constrain market power, in combination with trading conduct regulation and other measures?
- 4.40 The WMR raised whether incumbents were acting on an incentive to slow down investment, as new supply reduces prices and cannibalises revenues from existing assets. Incumbents might act on such an incentive by tying-up and then going slow on consented development sites to avoid oversupply; or announcing (but not following-through on) large works to discourage entry or expansion by competitors. Countering this incentive, generators need to consider that they may lose market share if they go slow while competitors invest.
- 4.41 Neither the scale of new investment being actively pursued as indicated by the new data discussed above, nor the majority of qualitative comments from interviews, are suggestive of anti-competitive behaviour to discourage entry – if such behaviour does occur, it does not seem particularly effective.
- 4.42 However, as noted above, the Authority is aware of access to purchase agreements or other contracts to manage price risk being raised as an issue by some investors in new generation. It is not currently clear this is a competition issue, rather than simply an incumbent advantage.⁴⁴
- 4.43 These risks exist nevertheless, and the Authority thus considers ongoing monitoring is warranted of the pace of investment, the conversion of actively pursued investments, and impediments.
- 4.44 The acceleration of investments in the pipeline, particularly by new parties, suggests that the investment response is consistent with competitive entry under uncertainty and a sequence of events:
- investors could initially not be sure whether price rises in 2018 and 2019 linked to unexpected gas field outages would persist
 - there was also uncertainty about the future of the smelter, so that investment could mean a period of oversupply in case of the smelter exiting, until demand recovered
 - the economic case to invest in renewable generation was boosted more recently by material increases changes in fossil fuel costs and carbon prices (see Box 2)
 - there remains considerable uncertainty and this increases option value⁴⁵ – that is, investors have an incentive to wait-and see:
 - NZ Battery decisions could reduce future wholesale electricity prices, which would destroy the business case for certain investments

⁴⁴ Carlton 2004, op cit.

⁴⁵ Option value is not reflected in the estimates of the long run cost of new supply, such as set out in Figure 4. (Nor are short term cycles in input costs.)

- the timing of exit of fossil-fuel generation and the firmness of the government's aspiration on 100% renewable electricity, the answers to which will affect future wholesale prices
 - the ongoing supply-chain issues and elevated input costs, which delay completion and may cause projects to be shelved until economics improve
 - how quickly demand will in fact rise in response to climate policies, after an extended period of flat demand.
- 4.45 The observed quantity of investment response is encouraging. But, by standard competition benchmarks, entry or expansion should be within two years following a price increase to be regarded as sufficiently timely to constrain the exercise of market power.⁴⁶
- 4.46 This benchmark will be difficult to meet in the electricity sector, noting the nature of investments and regulatory requirements that impede speed. The Commerce Commission noted in its 2009 investigation into electricity markets that, based on typical RMA consenting timeframes alone, entry and expansion was unlikely to be sufficiently timely to offset market power concerns.⁴⁷
- 4.47 This means that, to the extent significant market power is being exercised, the timeframe over which this can persist is extended by wider regulatory requirements that slow down competitive entry. If those instruments are working as intended, then any higher electricity prices linked to slower entry may be regarded as a legitimate cost of the objectives of those wider regulations, like the RMA or OIA. However, that does put greater responsibility on trading conduct monitoring and enforcement.
- 4.48 We also note that the type of development in the pipeline may not be a good substitute for thermal generation (and as noted above such technical constraints may explain the gap between forward prices and the cost of new supply).
- 4.49 Thus, while current investment patterns suggest entry by new generation is strengthening competition in renewable electricity, this still leaves open the question of how it is firmed. The Authority considers the associated competition effects should be a consideration in the Gas Transition Plan.
- 4.50 In the medium to long term, the market may or may not deliver on generation or demand flexibility solutions at a scale that provides sufficient competition for stored hydro in providing flexible generation during extended periods of low wind and sun. This issue can be revisited later with the benefit of more information, including the government's Gas Transition Plan and decisions on its NZ Battery projects. MDAG is currently investigating such competition issues under 100% renewable electricity after 2035.

⁴⁶ See Commerce Commission, 2022, *Mergers and acquisitions guidelines* at https://comcom.govt.nz/__data/assets/pdf_file/0020/91019/Mergers-and-acquisitions-Guidelines-May-2022.pdf

⁴⁷ Commerce Commission, 2009, op cit. para 390.

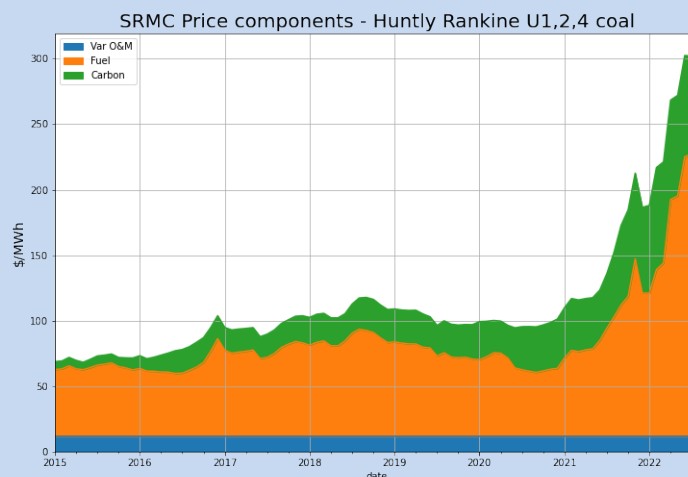
Box 2: Impact of carbon prices on electricity prices and generator earnings

Emissions pricing is a central part of the strategy to reducing carbon emissions. It provides a market-based mechanism to set the economy onto a least-cost path to reduce emissions.

The government sets the supply of emission units to meet emissions reduction targets. Businesses captured by the regime must surrender an emission unit for every tonne of carbon they emit. Carbon prices balance the demand for and supply of units.

The carbon price makes it more expensive to use fossil fuels in electricity generation (see chart). This provides efficient incentives to use less electricity, choose low emissions alternatives, invest in renewable generation, and to innovate and find new technologies to replace gas-, coal-, and diesel-powered generation.

Carbon prices are no different to other costs of production. For context, the price of coal rose by ~\$335/tonne, compared to ~\$35/tonne CO₂ in the last year.



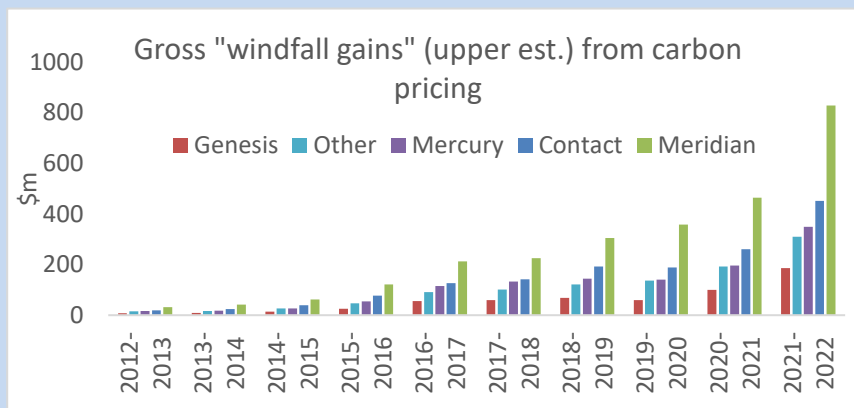
Marginal pricing means that when fossil-fuelled generation sets the spot price renewable generators also get this carbon-cost inclusive price. As renewable generators do not emit carbon, this provides them with extra earnings. This is an incentive to invest in renewables. But it may also be seen as a 'windfall gain' for existing renewable generation.

The amount of extra earnings for existing renewable generation has grown in recent years as carbon prices have risen from ~\$20 per tonne of carbon in early 2018 to \$40 in early 2021 and ~\$85 in August 2022 (and as more coal has been used due to, for example, disruptions in gas supply). That is, a share of the increased wholesale electricity market revenues is because of higher carbon prices.

It is not a clear-cut exercise to determine how much of this should be counted as 'windfall gains'. Such an estimate depends on generators' retail and contract and hedge positions. Further, for some existing renewable generation plant, the business case for past investments in renewable generation will have relied on an expectation of rising carbon costs (and the extra earnings are thus not a windfall gain but a return on investment).

To illustrate the potential order of magnitude of associated transfers from consumers to producers, a top-end estimate (that excludes adjustments for the above caveats

and which in the extreme assumes Huntly Rankines running coal throughout) is that carbon pricing may have added up to \$0.5b-\$1.2b to spot market revenues in 2020-21 and \$0.9b-\$2.1b in 2021-22. If this were passed through to household bills, it would add up to ~\$170-\$395 per year to an average household bill.



The Climate Change Commission’s July 2022 advice on the emissions budget indicates carbon prices will increase further and may track to \$150/tonne of carbon by 2030 (in 2022 dollars), or more. It estimated this will increase earnings of existing renewable generators by \$1.6b over 2023-2027, depending on retail and contract positions.

The Climate Change Commission also projects the impact of carbon pricing on electricity prices to fall away as the share of renewable generation increases.

Nevertheless, the Climate Change Commission suggested that: “The Government could also consider whether these earnings are needed for reinvesting into the energy system to ensure the grid is ready to meet future needs, or whether they should be passed through as savings to consumers.”

The Authority notes that the potential size of the windfall contributes to incentives of incumbents to inefficiently delay investment or retirement of fossil-fuelled generation. But the scale of the investment pipeline by independent developers suggests this incentive may not be effective.

Carbon prices provide an important signal to attract renewable generation investment (including alternative flexible generation) and innovative demand-based alternatives to generation. Such investments are key for the transition and for competition.

Overall, the acceleration in the renewable generation investment pipeline suggests that carbon pricing is doing what it is meant to do, even if the adjustment is taking some time. The trade-off is an increased cost to consumers in the ‘short run’, that is during the time that carbon pricing facilitates the transition of electricity generation out of coal and gas. This trade-off is subject to debate around the world, and highlights the pay-off of getting through the transition fast.

Note: See Climate Change Commission, <https://www.climatecommission.govt.nz/our-work/advice-to-government/topic/nz-ets/our-advice-on-the-nz-ets/nz-ets-unit-limits-and-price-control-settings-for-2023-2027/>
 Note: For a review of the evidence on the impact of emission pricing see: <https://environment.govt.nz/assets/Publications/Files/Innovation-and-competitiveness-review-FINAL.pdf>

Consultation questions

3. Do you have any comments on the impediments to generation investment?
4. Do you agree that the lag in investment is not due to anticompetitive behaviour to slow down investment and discourage entry, or can you provide instances or other evidence to the contrary?
5. Do you have any other comments on the role and impact of carbon pricing on investment and wholesale market competition or the other content of this chapter?

5 Implications and options

Bringing the key findings together

- 5.1 The WMR concluded that, while wholesale electricity prices were largely explained by underlying supply and demand conditions, there was also some evidence that market power may have been exercised over the review period.
- 5.2 With other major factors at play, such as ongoing uncertainty about gas supply, the Authority was not able to reach a conclusive view about the extent to which the uplift in prices during the review period indicated the exercise of market power.
- 5.3 The evaluation of the new trading conduct rule indicates that the rule and the associated proactive monitoring is resulting in offering behaviour that more closely follows underlying supply and demand conditions, compared to the past. However, monitoring may not be able to detect more subtle exercises of significant market power.
- 5.4 It would give the Authority comfort if there was timely and material entry or expansion by competing generators in response to high prices, to complement conduct monitoring. The situation is mixed. The time lag between signal and sufficient entry is longer than standard benchmarks. This weakens the near-term discipline on market power.
- 5.5 At the same time, the sheer quantity of actively considered investment by new parties is encouraging. The current pipeline suggests increasing competition among renewable generation and this may provide some discipline on incumbent generators. But the Authority considers the outcome is less clear-cut for competition at times when the system relies on pricier flexible generation – during extended periods of low wind and sun.
- 5.6 Under current structures, market power of generators with stored hydro may increase when fossil fuelled generation exits, unless and until viable green-peaker type solutions (eg fuelled by biomass) emerge.⁴⁸ The impact may depend on the ownership of future investments made in generation competing with stored hydro.
- 5.7 Forward prices remain significantly above the cost of new supply, though they are converging. The persistent gap seems to be the result of the current absence of viable supply alternatives to increasingly expensive gas and coal, and impediments to entry that, if eased or streamlined, could increase overseas investor interest and speed up the development of the projects. Clarity on the government's plan for gas and decisions on the NZ Battery Project will also help reduce a material source of uncertainty.

Implications of these findings

- 5.8 The Authority has considered a range of market structure and conduct options to promote competition in the wholesale electricity market, and on which it seeks stakeholder feedback.
- 5.9 In light of the apparent effectiveness of the new trading conduct rule and increased investment in monitoring, compliance and enforcement, as well as the scale of actively pursued new investment by independent developers, the Authority currently considers that reliance on the current conduct-based measures plus entry by new supply to mitigate the exercise of market power remains broadly appropriate in the transition

⁴⁸ MDAG noted this could include what it termed an “overbuild” of intermittent generation, which may have a low utilisation rate but may nonetheless be efficient compared to the cost of alternative technologies, if combined with cost-effective very large energy storage solutions that can ‘generate’ over extended periods.

toward 100% renewable electricity. However, there are opportunities to strengthen those settings, and speed up the supply response. These are summarised in Table 6.

- 5.10 Longer term, the market may or may not deliver on generation or demand flexibility solutions at a scale that provides sufficient competition for stored hydro in providing flexible generation during extended periods of low wind and sun. This issue can be revisited later with the benefit of more information, including the government's gas transition plans and decisions on NZ Battery projects. MDAG is currently investigating such competition issues in a future with 100% renewable electricity after 2035.
- 5.11 The Authority's current assessment is that more fundamental structural options are currently not justified by the available evidence. Further, they would: take considerable time and cost to implement and may not be available during the transition, may or may not be effective in fundamentally improving competitive conditions, and would add uncertainty that would stymie investment. Any structural options would need to be extensively tested to ensure they would in fact improve competition, compared to alternative options. That would also depend on other government decisions such as on Lake Onslow or its Gas Transition Plan.
- 5.12 The Authority wants to hear stakeholders' views on whether its proposed package of actions (including proposed recommendations to other agencies) would provide the settings necessary to promote competition in the wholesale electricity market during the renewable energy transition and whether any particular actions should or should not be progressed.

Objective

- 5.13 In considering any interventions that are consistent with the Authority's statutory objective, the Authority suggests that, in the context of this Issues Paper, the objective of any action being considered is to promote competition in the wholesale market during the transition toward 100% renewable electricity, for the long-term benefit of consumers.

Evaluation criteria

- 5.14 The Authority, in considering whether potential actions are consistent with its statutory objective, has applied the following criteria:
- Effective – promotes competition / constrains the exercise of market power in a material way, for the long-term benefit of consumers
 - Efficient – provides clear price signals to consumers and generators and incentives for entry (and exit) and innovation, or reduces transaction costs
 - Timely – is capable of having an impact in the near term (between now and 2030), for the long-term benefit of consumers
 - Durable – promotes confidence in wholesale electricity market outcomes, and that it is operating for the long-term benefit of consumers
 - Value – is expected to result in benefits exceeding costs over time.
- 5.15 The analysis is preliminary, subject to feedback and some options may require more detailed regulatory assessment and cost benefit analysis.

Summary assessment of proposals and recommendations

- 5.16 Table 5 below sets out a summary of the package of actions the Authority is proposing to take forward to constrain the exercise of market power and facilitate investment in new

renewable generation. The following chapters expand on these and also cover other options the Authority has identified but which it considers do not perform well against the above criteria or are not appropriate at this time (but could be re-considered later).

Table 6: Summary of proposed package of actions

Steps the Authority is taking or proposing
<p>To constrain the exercise of market power the Authority would:</p> <ul style="list-style-type: none"> • continue proactive monitoring and enforcement of trading conduct in the spot market, and investigate the application of trading conduct rules to the forward market • investigate mechanisms to accelerate the development of the demand response market (in addition to its current work programme directed at this, eg, real time pricing and empowering consumers to participate in the electricity system in new ways) • conclude the current consultation on the proposal to prohibit inefficient price discrimination in very large contracts and, following the consultation process, determine whether to implement a disclosure, monitoring, and voluntary clearance regime • clarify disclosure requirements (and consider amending the Code to provide certainty about such requirements) about current or expected constraints that could impact generation capacity, and arrange a centralised location for disclosure • explore better information sharing processes and obligations with the Commerce Commission on any information the Authority collects that may raise concerns about restrictive trade practices, collusion, or misuse of market power <p>To facilitate investment in new renewable generation the Authority would:</p> <ul style="list-style-type: none"> • undertake regular monitoring of progress on generation investments, and an annual update of the investment pipeline and impediments • regularly collect information on offtake and 'firming' agreements (and if feasible declined requests) to understand and build the evidence base about the nature and scale of current and emerging access issues reported by developers of new generation • improve the Electricity Hedge Disclosure System⁴⁹ to improve its functionality and make contract details more transparent • investigate and test the case for providing or requiring longer-dated futures (for instance products traded on the ASX) • analyse thermal generation transition risks in the context of demand to 2030, its role in hydro firming and more prevalent solar and wind generation, and options to mitigate transition risks

⁴⁹ <https://www.electricitycontract.co.nz/>

Options that other government entities could progress

To constrain the exercise of market power, the Authority would invite:

- MBIE to progress work to improve disclosure of information on availability of gas for electricity supply, in particular an amendment to the Electricity Industry Act 2010 so that section 46 powers include parties in industries critical to security of electricity supply, and in particular the gas industry

To facilitate investment in new renewable generation, the Authority would invite:

- MBIE to bring forward the completion of the Gas Transition Plan, Energy Strategy, and NZ Battery project, as reduced uncertainty would contribute to more renewable generation investment and so lower prices sooner
- invites MBIE to publish an *Annual Electricity Generation Investment Opportunities* report, targeting international developers, with input from NZ Trade & Enterprise, Transpower, the Electricity Authority, Overseas Investment Office, and Ministry for Environment
- invites MBIE to investigate the merit of a providing a one-stop shop for overseas investors in renewable electricity generation, to help navigate and streamline the regulatory requirements and agencies, and advice on relevant stakeholders they should engage with
- the Overseas Investment Office to publish, before the end of 2022, guidance for overseas investors in renewable electricity generation, and consider providing a helpdesk to support developers to navigate the Act's requirements
- MBIE and the Ministry for Environment to bring forward their work to strengthen national direction for renewable electricity to inform local planning and resource management consenting. This should reflect the government's 100% renewable electricity aspiration, electrification and renewable energy goals, and the implications for the amount of investment in renewable generation that needs to occur
- MBIE and the Ministry for Environment to investigate the evidence for, and merits and feasibility of, applying pro-competitive conditions on consents for renewable generation (eg use-it-or-lose it)
- Transpower to publish connection enquiries and connection studies and to streamline the application processes.

Consultation questions

6. Do you agree with the Authority's overall conclusion that it currently considers that continued reliance on the current conduct-based measures and (the threat of) entry of new supply to mitigate the exercise of market power remains broadly appropriate in the transition toward 100% renewable electricity?
7. Do you agree with the objective and evaluation criteria set out in this chapter?
8. Do you have any comments on the contents of this chapter?

6 Options to address market power

Options that could be progressed by the Authority

Monitor and enforce compliance

- 6.1 The Authority proposes that monitoring of trading conduct will remain one of the main approaches to constrain the exercise of significant market power.
- 6.2 The Authority has in the past year increased its investment in proactive monitoring of trading conduct and market performance. This is discussed at paras 2.31-2.37 and Box 1 above on the post-implementation review of the new trading conduct rule.
- 6.3 Under the Electricity Industry Amendment Act 2022 the maximum penalties for breaches of the Code increased ten-fold to \$2m, providing a greater deterrence effect.
- 6.4 Information asymmetries do limit the effectiveness of monitoring in constraining market power, but monitoring performs well on the other evaluation criteria set out above.

Increase demand response participation

- 6.5 Market power is in part due to demand being relatively unresponsive to price in the short run. Approaches that empower consumers by enabling demand to be more responsive to price can be very effective at mitigating market power.⁵⁰
- 6.6 The proposed implementation of Real Time Pricing in November would enable the participation of smaller purchasers as dispatchable demand (ie, enable smaller purchasers to participate in the wholesale market and respond to market conditions in a similar way as generators).
- 6.7 Demand flexibility services would also support increased demand response participation – these reward consumers for allowing a service provider to remotely control their electricity-intensive equipment and batteries to shift or reduce electricity use in response to market, grid, and local network conditions. As noted at paras 2.43-2.45, the Authority's work-programme includes key workstreams aimed at enabling innovative solutions to promoting competition and empowering consumers to participate in the electricity market in new ways.
- 6.8 The Authority will investigate what other mechanisms may be needed to accelerate the development of an efficient demand response market.⁵¹ Conceptually, increasing demand participation looks to be capable of providing solutions that are consistent with the evaluation criteria, though that would need to be determined based on specific proposals.

Address inefficient price discrimination

- 6.9 As noted in Chapter 1, the Authority has recently made an urgent Code amendment prohibiting materially large contracts that cannot be shown to be efficient under the specified test and providing for a voluntary clearance process of materially large contracts.

⁵⁰ See Léautier, *op cit*.

⁵¹ This will draw on past advice, such as the Innovation and Participation Advisory Group's report on flexibility services (<https://www.ea.govt.nz/assets/dms-assets/28/Transpower-DR-programme-review-slide-pack.pdf>), and the Authority's current project on updating the regulatory setting for distribution networks, for example.

- 6.10 At the same time the Authority separately issued a consultation paper on a proposed permanent Code amendment to provide an enduring solution to the issues it has identified.⁵² Following the consultation process the Authority will determine whether or not to implement and administer a permanent disclosure, monitoring and voluntary clearance regime for such contracts.

Improve access to information on generation capacity

- 6.11 As set out in Appendix C, the Authority has identified information gaps concerning the availability of generation capacity, which can affect risk assessments, offers, and responses to security of supply concerns. The issue is that it is not always clear if disclosure is required or where it should be disclosed if the information does not fit the System Operator's Planned Outages Co-ordination Process (POCP) format.
- 6.12 The Authority would clarify disclosure requirements and consider amending the Code to provide certainty, and to arrange a centralised location for disclosure about current or expected constraints that could impact generation capacity.
- 6.13 Better information would support more efficient offers and better security of supply, and more effective market monitoring. The potential benefits will be weighed against any administration and compliance costs when making any recommendations for change.

Price caps were considered but do not seem an efficient response

- 6.14 Various jurisdictions have instituted price caps to avoid high prices that may be caused by the exercise of market power.
- 6.15 A range of designs are available. Examples include a cap on spot market prices (as in Australia's National Electricity Market), a cap on the maximum price that generators can offer (such as short run marginal cost, possibly with a scarcity rent component), or offer price caps on generators with market power or on generators' stations where they have market power (identified by whether a provider is pivotal in the relevant market, for example).
- 6.16 Price caps can seem attractive as they are effective at limiting prices which may be appealing to consumers, at least in the short term. The main challenge is to determine an efficient level for price caps, if they are to be for the long-term benefit of consumers
- 6.17 The risk is that the cap is set at too low a level – that is, that the cap does not allow prices to rise high enough at times of scarce supply to efficiently dampen demand to match available supply. This would leave a demand-supply imbalance in the short term. If set too low it also distorts the investment signal, dampening efficient investment which in turn increases costs and reduces security of supply in the long term.
- 6.18 Price caps were at the core of recent shortages in, and then the temporary suspension of, the National Electricity Market in Australia. The administered price cap of \$AU 300/MWh, which was triggered by AEMO in response to, among other factors, planned and unplanned outages, was below the cost of fossil-fuel generation, making it irrational for those generators to offer in, worsening the shortfall.
- 6.19 This highlights a related challenge. The efficient level for price caps – whether at the market level or offer caps that require working out short run marginal costs (including

⁵² <https://www.ea.govt.nz/assets/dms-assets/30/Inefficient-Price-Discrimination-in-very-large-electricity-contracts-Consultation-paper.pdf>. The Authority is not seeking separate submissions on that in this paper but notes it would form part of the package of responses should the Authority ultimately decide to proceed with that proposal.

opportunity cost of fuel and scarcity rents) – will not be constant across time or space. This makes the setting of efficient caps an administratively intense and fraught task.

- 6.20 For these reasons, the Authority does not currently consider price caps to be an effective, efficient or durable response to market power, nor an efficient or effective way to provide consumers relief from high electricity prices.
- 6.21 The Authority is aware that extended periods of high prices may cause hardship for some consumers. At this stage, the Authority considers that its best contribution is to ensure that prices are determined in a competitive environment, and that there are appropriate risk management tools so consumers can manage through volatile prices. That will deliver the best outcomes for consumers in the long term.
- 6.22 Other agencies have a mandate, tools and expertise to address hardship, and the Authority will continue to engage with relevant agencies about specific interventions that may be needed as New Zealand moves towards a highly renewable electricity system.

Changes to the pre-dispatch process do not seem warranted

- 6.23 New Zealand's spot market is preceded by a pre-dispatch process that creates and adjusts forecast prices for each trading period 36 hours ahead of dispatch.
- 6.24 This process improves the matching of supply and demand, as more information about the state of the electricity system (eg, expected weather conditions, the availability of slow-start generation or dispatchable demand) becomes available. It fosters competition, as generators will compete to cover their load obligations. But it also supports the exercise of market power and collusion (as generators can observe and react to offers being made by others).
- 6.25 The risk that market power is exercised could be reduced by limiting the number of adjustments that can be made to pre-dispatch offers. If generators could make, say, only a single pre-dispatch offer, it may be that they are more likely to offer at marginal cost. However, this would then forego the benefit of generators being able to react to new information.⁵³
- 6.26 Yarrow and Decker are ambivalent about the net value of pre-dispatch processes.⁵⁴ They suggest that late re-bids are less valuable and enable generators to take advantage of a situation in which competitors or demand cannot easily adjust. They therefore suggest a shelf-life approach where generator bids close early but demand can continue re-bidding. In New Zealand, gate closure for grid connected generators is 1 hour before dispatch, and for demand bids it is 30 minutes.
- 6.27 EPOC in its submission to the WMR thought that the auction design may be an impediment to competitive outcomes, but also notes that an increase in intra-day volatility that comes with more intermittent generation capacity could result in there being greater efficiency benefits from being able to adjust pre-dispatch offers.
- 6.28 A study is currently in train to evaluate the trade-off between the market power effect and efficiency effect in New Zealand's pre-dispatch process, using New Zealand electricity

⁵³ This option raises day-ahead markets, which come with a balancing market to re-distribute overs and unders to address departures in available generation and load from their forecasts. Such a design, not assessed here, comes with its own trade-offs. For example, it has led to arbitrage concerns in other markets.

⁵⁴ Yarrow G and C Decker, 2014, *Bidding in energy-only wholesale electricity markets*. Report for the Australian Energy Markets Commission.

market data prior to 2018.⁵⁵ Preliminary conclusions are that the two effects tend to cancel each other out. Prices between the first and last pre-dispatch offers tend to rise slightly (and price dispersion narrows); arguably, this upward bias is suggestive of the exercise of market power. Data for 2019-2021 indicate a greater difference between first and last prices, though the difference is still not large.⁵⁶

- 6.29 The Authority does not consider changes to pre-dispatch processes should be considered at this stage. It is currently not clear that the efficiency gains from changing the pre-dispatch process to mitigate the exercise of market power would be material. Effectiveness may be limited also, as generators can turn to different ways to learn about their competitors' offer strategies. We would also need to better understand whether the pre-dispatch process becomes more valuable with more intermittent generation. This option is unlikely to be a timely intervention, given the associated policy, system design, and implementation processes that are likely to be needed.

Options that other agencies could progress

Improve disclosure of gas information

- 6.30 Incomplete, unreliable information about gas supply is hindering security of supply assessments, dry year risk management, and monitoring of trading conduct.
- 6.31 Clause 13.2A of the Electricity Industry Participation Code 2010 (Code) requires participants to disclose information they hold about themselves that they expect, or ought reasonably to expect, if made available to the public, will have a material impact on prices in the wholesale market.
- 6.32 The Authority can use its powers under section 46 of the Electricity Industry Act 2010 to acquire information about thermal fuel supply from the thermal generators,⁵⁷ given they are also electricity market participants. But these provisions do not extend to the broader availability of gas outside the electricity sector, for example, where the gas supplier or major user is not also an electricity market participant.⁵⁸ This limits visibility of the allocation of gas to different consumers when a gas producer cannot meet contracted volumes.
- 6.33 The Gas Industry Company (GIC) has recently consulted on new gas governance rules for the disclosure of planned and unplanned gas storage and production facility outage information.⁵⁹ However, while the rules may be suitable for the purposes of the gas industry, they do not go far enough in providing all the information needed for the purposes of the electricity industry. The information needed goes beyond outages and reserve and production forecasts, to cover information on supply agreements with

⁵⁵ This study, supported by the Electricity Authority, is being undertaken by Estelle Cantillon (Université Libre de Bruxelles), Mar Reguant (Northwestern University), and Stefan Bergheimer.

⁵⁶ This analysis does not tell us whether the initial prices offered under uncertainty, or the final prices for that matter, are consistent with competition, just that the impact on means and medians do not change much. Initial offers are likely to be placeholders intended to be adjusted closer to real time.

⁵⁷ Subject to the proviso that any request must be for one of the purposes specified in section 45.

⁵⁸ The availability of gas, in the medium and long term, is also closely linked to gas supply agreements with Methanex, as it consumes approximately 45% of the gas supply.

⁵⁹ Final rules recommended to the Minister are contained in the summary of submissions <https://www.gasindustry.co.nz/assets/CoverDocument/Gas-Facilities-Outage-Information-Disclosure-summary-and-analysis-of-submissions.pdf>

parties outside the electricity sector, how delivery between customers is prioritised when supply is constrained, and storage infrastructure limitations.

- 6.34 The lack of visibility on such matters means that the electricity sector has incomplete, unreliable information about gas supply. This makes it more difficult to manage dry year risk or to monitor trading conduct. It means the Authority has to be more circumspect than it would like to be in its trading conduct monitoring and market reviews.
- 6.35 The resulting uncertainty increases the opportunity cost of stored hydro and raises supply risk curves. That means less stored water is available to compete in the wholesale market before thresholds are reached that indicate shortages and trigger actions by the System Operator. Beside raising electricity prices, the uncertainty also affects longer-term use and investment decisions about gas or alternative fuels by consumers and generators.
- 6.36 The Authority invites MBIE to progress policy work to amend the Electricity Industry Act 2010 so that section 46 powers include parties in industries critical to security of electricity supply, such as the gas industry.⁶⁰ Better information will facilitate monitoring and compliance and improve security of supply settings.

Structural options

- 6.37 If arrangements to shape market conduct and the discipline provided by (the threat of) competitive entry or expansion are assessed as being insufficient to manage market power in the transition, then structural options may need to be considered – for example, the ownership of generation assets (or decision rights about their use) identified as creating significant market power.
- 6.38 In principle, getting the structure right can get to the root of market power. That would be more effective than relying on conduct measures when information is imperfect and interpretation of data and indicators can be subjective.
- 6.39 However, structural options could be very expensive and take a long time to implement, may not be as effective as intended and could have costly unintended consequences, and could be costly to reverse. Further, breaking-up a company to address market power likely requires a high standard of proof of significant harm to consumers, which because of imperfect information may be difficult to establish.
- 6.40 Consideration of changes to industry structure and ownership rules is a complex undertaking and might require legislation to implement. At the least, it is likely to require the Authority to work closely with relevant government agencies to fully develop proposals. At this point, the Authority only sets out its current general views on what the likely considerations would be.

General views on structural options for stored hydro generation

- 6.41 This paper (and the WMR) has described a concentrated market where the four gen-tailers are frequently gross pivotal (and Meridian is most of the time).⁶¹ The WMR concluded that prices tended to reflect underlying conditions but that there was also evidence that generators may have exercised market power.

⁶⁰ See <https://www.ea.govt.nz/development/work-programme/risk-management/wholesale-market-information-disclosure/development/decision-paper-on-wholesale-market-information-disclosure-review-of-thermal-fuels/>

⁶¹ As discussed earlier in this document, while those generators are only infrequently *net* pivotal, which limits short-term incentives to exercise market power, the gross pivotal position is relevant with respect to considering longer term incentives to exercise market power.

- 6.42 The decreasing role and eventual exit of fossil-fuelled generation likely increases the market power of hydro generators during times that the electricity market relies on flexible generation. There are no indications of alternatives, such as green-peakers or battery storage, being available at scale to provide effective competition any time soon.
- 6.43 Meridian has both the largest generation market share by quite some margin and most of the flexible storage. Since it is pivotal most of the time it carries little risk of not being dispatched. A major consideration is that without fossil-fuel generation or some green alternative to firm water values, its market share and market power will increase.
- 6.44 As such, a restructure of ownership of main stored hydro generation assets is one option that ought to be considered as a potential solution.
- 6.45 However, evidence of sustained exercise of significant market power is not conclusive, the new trading conduct provisions appear to be having an impact on conduct, and the investment pipeline is an encouraging signal of competitive entry, though not yet by flexible generation (or innovative demand-side approaches to disciplining the exercise of market power). Further, the government is yet to consider and make decisions on a Gas Transition Plan and the NZ Battery project which all have the potential to change the competitive landscape, and which should be considered in detail as part of considering structural options.
- 6.46 There are also other approaches to strengthen competition – the building of a large generation unit in the South Island that is not owned by one of the four gen-tailers or additional HVDC capacity would materially reduce concentration measures and the estimated time that Meridian would be gross pivotal. This is illustrated in Table 7.

Table 7 Illustration of different approaches reducing market concentration

Scenario	HHI 2025	HHI 2030+ (assumes thermal displaced)	Est. time Meridian is gross pivotal 2025
Base: The four gentailers develop all their committed and intended projects, and independent developers make up rest	1940	1290	80-95%
Manapouri split off	1770	1110	20-40%
Large new independent generator built in South Island	1830	1190	40-55%
Tiwai closes	1930	1180	40-55%
Additional HVDC capacity	1940	1290	50-60%

Source: Electricity Authority calculations

Note 1: Market concentration and Herfindahl Hirshmann Index (HHI) values will be higher when the market is defined as flexible generation

Note 2: 2021 HHI was 2021; Meridian was gross pivotal ~75% of the time since 2009-2018, and higher after.

- 6.47 The Authority considers it would be inappropriate and premature for it to put forward specific structural proposals at this point. However, we note that the likely effectiveness of structural options is uncertain and would need thorough testing. The literature indicates it is unclear if going from a small number of competitors to a somewhat larger, but still small, number would improve competition. It might, but it might not.⁶² Structural options and their impact on offer behaviour would need to be modelled in detail, such as whether offer behaviour with respect to specific generation assets would change if because of any particular options Meridian was no longer gross pivotal as often.
- 6.48 There are also important practical issues to consider. With the likely exception of Manapouri, it would not be easy to divide hydro generation assets further without disrupting coordination on the river chain because of the interconnected nature of the Waitaki water system and the size of Lake Pukaki relative to other storage. The need for more complex coordination could even neutralise competition effects and enable collusion, while increasing transaction costs.
- 6.49 In summary, the Authority considers that restructuring of ownership of stored hydro generation should only be contemplated if it would:
- increase competitive conditions, by materially increasing the number of competitors with flexible generation
 - not result in material operational inefficiencies in, say, the management of connected water systems
 - be timely, that is, able to have an effect in the near-term as competing fossil-fuelled generation is displaced by renewables, and alternatives are still being developed
 - not cause undue regulatory uncertainty that could chill investment in generation.
- 6.50 In particular, the Authority emphasises the significance of the latter risk, given:
- the need to attract large amounts of investment to meet the aspiration of 100% renewable electricity and electrification objectives
 - the role of (the credible threat) of new entry generation in mitigating the exercise of market power.

Virtual separation options could be investigated

- 6.51 Instead of a physical divestment, a similar improvement in competition or mitigation of market power of dispatchable hydro may be able to be achieved via virtual re-allocation of capacity (with or without decision-rights over its dispatch). Virtual asset separation would likely be simpler, less costly and risky, and more readily reversible.
- 6.52 Hypothetically, virtual asset separation could overcome limitations of physical structural options. For example, it could involve slices of storage, separated control of stations or generators within stations, separation of river chains, etc. The objective would be to reduce incentives or ability to exercise market power. Depending on the approach, some of the practical issues around coordination noted above may apply.
- 6.53 New Zealand has experience with such virtual instruments with the existing virtual asset swaps (between Meridian and Mercury, and Meridian and Genesis) as an outcome of

⁶² As EPOC (p.7) noted in its submission to the 2021 Review, "Breaking large entities into smaller entities will improve these indices, but in a small market like NZ, with economies of scale in generation technologies, there is a limit to how much competition can be improved by these means."

the 2009 Ministerial Review of the electricity market and enabled by s117 of the Electricity Industry Act 2010 which gave shareholding Ministers power to direct (before 1 November 2011) the State generators to enter into long-term agreements with each other for financial hedges for the purpose of improving competition and security of supply.

- 6.54 At the time the asset swaps were stated to be for the purpose of promoting retail competition, rather than wholesale market competition. It gave Genesis, Meridian, and Mercury a larger retail base outside their then 'home' island.⁶³ See Appendix A for further information.
- 6.55 As noted above, consideration of changes to industry structure and ownership rules is a complex undertaking and might require legislation to implement – including virtual separation options. At the least, development and consideration of such options is likely to require the Authority to work closely with relevant government agencies.
- 6.56 Further, design features and an assessment of costs and benefits of virtual asset separation options also need to be considered in the context of the Gas Transition Plan and NZ Battery decisions, which may lead to an assessment that arrangements to shape market conduct and the discipline provided by (the threat of) competitive entry or expansion are assessed as being insufficient to manage market power in the transition.
- 6.57 As such, the Authority considers the option of virtual asset separation has some merit, but also carries material risk of unintended consequences, including that it may not improve but rather chill investment. The pursuit of this option currently does not appear to be justified by the available evidence.
- 6.58 It may be an option for MBIE to reconsider in future if investments in generation and innovations on the demand side are not forthcoming or monitoring raises issues with the exercise of significant market power.

Restricting market share seems an inefficient response

- 6.59 A large amount of new generation investment is expected due to the transition to 100% renewable electricity and the anticipated electrification of the economy.
- 6.60 Competitive entry is a powerful way to reduce, or constrain the exercise of, market power. But this depends on who ultimately ends up owning new generation investment, particularly flexible generation (batteries, green-peakers, other flexible generation technologies, rights to curtail demand).
- 6.61 One option might be to restrict certain generators with a large share of the available flexible generation to invest in or acquire more flexible generation, as an approach to increase competition in the segment identified as at risk of weakening competition.⁶⁴

⁶³ See the 2010 release by then Minister for Energy and Resources at <https://www.beehive.govt.nz/release/virtual-asset-swaps-benefit-consumers#:~:text=The%20asset%20swaps%20are%20made%20possible%20by%20the,purpose%20of%20the%20virtual%20and%20physical%20asset%20swaps%3F>

⁶⁴ Restrictions on market share are used in some other jurisdictions, restricting expansion by incumbents to the growth of the sector once they hit the specified market share.

- 6.62 However, this approach is vulnerable to unintended consequences. Such a restriction could result in insufficient investment in flexible generation, which could act against security of supply objectives. It also risks being inefficient to the extent that artificial constraints on growth could in effect result in protecting or supporting inferior operators or investments. That would not be for the long-term benefit of consumers. It seems counterproductive to restrict much needed investment. The Authority considers it better to rely on proactive monitoring of conduct and the investment pipeline, and (the threat of) entry to promote competition.⁶⁵

Consultation questions

9. Are there any other options that would promote wholesale electricity market competition in the transition that you consider would be more effective and efficient?
10. Do you have any comments on the contents of this chapter?

⁶⁵ While the electricity industry is relatively concentrated, market share measures are not outside 'benchmarks' used to flag potential competition concerns when a merger would result in a more concentrated market. The Commerce Commission would consider that competition concerns are less likely where after a merger the three largest firms in the relevant market have a combined share of less than 70% and the merged firm's market share is less than 40%, or where post-merger the three largest firms in the relevant market have a combined share of 70% or more and the merged firm's market share is less than 20%. See Commerce Commission, May 2022 https://comcom.govt.nz/__data/assets/pdf_file/0020/91019/Mergers-and-acquisitions-Guidelines-May-2022.pdf

7 Options to facilitate the entry by new generation

Options that could be progressed by the Authority

Monitoring the investment pipeline and impediments

- 7.1 A strong pipeline of new generation projects that are committed or being actively pursued is important for confidence that the wholesale electricity market is responding to price signals and is subject to competition.
- 7.2 Given the quantity of generation investment required to meet climate policy objectives, the Authority will keep progress on investment under review, through regular monitoring of progress on generation investments and an annual update of the investment pipeline and impediments.

Build an evidence base on access to offtake and firming agreements

Access to offtake agreements

- 7.3 Having an offtake agreement or Power Purchase Agreement (PPA) has historically been a pre-requisite for new entrant developers to proceed with a project.
- 7.4 Some stakeholders report they experience difficulties with accessing such agreements. However, the nature of the problem remains unclear – is the problem an absence of willing counterparties, and is that lack rational or anticompetitive, or is it that it is difficult to agree on a price over such a long term?
- 7.5 Some submissions on the WMR argued that gen-tailers could provide themselves with better terms than the contracts they offer non-integrated retailers. The Authority introduced new provisions in the Code mandating disclosure of mass market internal transfer prices by gen-tailers, giving transparency on this issue and data to monitor and test for evidence of such issues.
- 7.6 The Authority proposes to regularly collect information on offtake agreements (and if feasible declined requests) to understand and build the evidence base about the nature and scale of the issue, and potential responses. This seems a relatively low cost and low risk way to progress in absence of strong information on the problem. Stakeholders are also encouraged to contact the Authority with evidence on the causes of problems with securing PPAs.
- 7.7 In terms of the type of responses that could be considered if warranted, some submissions on the WMR suggested that generators with significant market power should be required to auction a share of their future generation (Octopus); this connects with the virtual asset separation option discussed above. Others suggested there could be a market platform for power purchase agreements, or at least more disclosure (Mercury). The Authority could also consider certain process requirements around such agreements to improve transparency about conduct.

Access to firming or 'shaped' products

- 7.8 Concept 2022 also reported that access to firming arrangements may be an emerging issue for new intermittent generation.
- 7.9 Depending on requirements, such arrangements can be bilateral/OTC agreements, or ASX traded products.

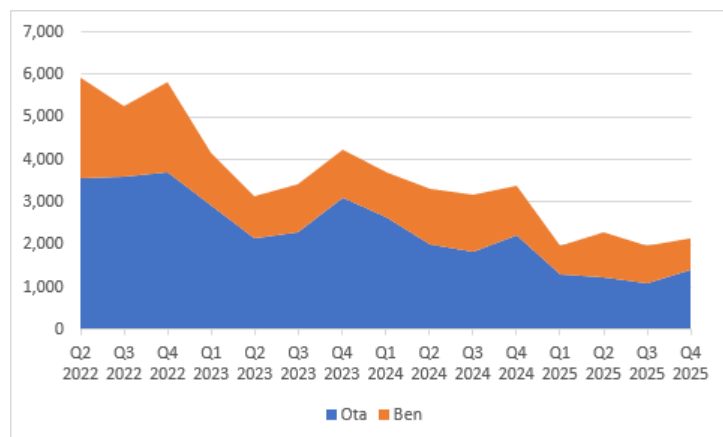
- 7.10 Currently, the most frequently traded ASX products are baseload, which assume a constant profile 24/7 across the duration of the contract. But ASX also hosts ‘peak’ contracts that cover 7am to 10pm Monday to Friday in New Zealand. These contracts are not market made and trade rarely (no trades in last 12 months).
- 7.11 The ASX peak products appear to be a better match to solar output (for a standardised contract) than a baseload product, which is 24/7. However, such a peak product still leaves many price and volume risks. For example, past 5pm there is little solar generation, and there is no price cover provided over weekends. ASX peak products are less suited to firming wind generation given the less certain nature of wind generation compared to solar.
- 7.12 Shaped products are common in the OTC market, and these can be negotiated to ‘firm’ whatever type of intermittent generation exists. A common contract is a ‘super peak’ which covers the morning and evening peak of residential consumption.
- 7.13 However, in all cases there needs to be a willing counterparty and often a controllable source of either generation or demand to manage the physical risks. And at this point, the nature, source and scale of the potential issues with respect to access to shaped products are unclear.
- 7.14 The Authority proposes to regularly collect information on firming agreements (and if feasible declined requests) to understand and build the evidence base about the nature and scale of the emerging access issues reported by developers of new generation. If this produces evidence of issues, then responses could be considered, such as those outlined in para 7.7. MDAG is also looking more closely at this issue as part of its work on pricing under 100% renewable electricity.
- 7.15 Again, stakeholders are also encouraged to contact the Authority with evidence on the nature and causes of problems with firming arrangements. And if a developer believes that its problem with getting access to a firming arrangement is due to a generator misusing its market power to deter entry, then it should discuss the matter with the Commerce Commission.

Investigate the case for longer-dated futures traded on ASX

- 7.16 The futures market provides a useful signal to potential investors about the expected track of spot prices, and whether investment in capacity will pay off. Its information signal is valuable if it is traded and updated frequently. It may also provide an avenue to address reports that independent developers have trouble accessing PPAs.
- 7.17 Market participants may value longer-dated traded products, particularly new generation entering the market, as generation assets are long-lived. Investors would value credible signals of longer-term price expectations and products to manage long term price risks.
- 7.18 However, traded contracts are focused on the near term. The ASX trades the current calendar year, plus the next three calendar years, which is a relatively short period in the context of long-term investments.
- 7.19 The absence of longer-dated products was not raised in Concept’s 2022 survey of the investment pipeline as a particular issue. This may be because bilateral / over the counter contracts can accommodate timeframes other than those offered by ASX.

- 7.20 But Figure 5 does suggest that there is some untapped demand for ASX products beyond the duration of the existing listed products. That is, open interest (a measure of the number of contracts that parties have outstanding) declines over the period, but some remains in the final year, in this case 2025.

Figure 5 Volumes of quarterly ASX futures open interest, June 2022



- 7.21 A liquid long-dated exchange traded contract would provide a public good – namely, information about future prices, against which PPA pricing can be referenced.⁶⁶
- 7.22 But there are also costs associated with forward trading. Traders are required to hold margin at the ASX on open positions. The cost rises with duration. In other words, for longer dated products, holding margin at the exchange would represent a significant cost of capital over a long period of time.
- 7.23 The cost of providing market making services (as a proxy for providing the liquidity needed for frequent trades) is significant and likely to rise non-linearly with duration, ie, if market makers were asked to provide services for a longer period. This might result in longer-term product substituting for existing open interest in the nearer term.
- 7.24 As discussed above, parties can also use PPAs to help de-risk generation investment. These can be longer-term. As they can be bespoke, they may be of more value to these parties than an exchange-traded product.
- 7.25 The Authority will investigate whether there is a viable case for longer-dated hedge products, and whether this should be required to provide public good information about future prices to inform investors and PPA pricing.

Improve the Electricity Hedge Disclosure System

- 7.26 The disclosure of hedge contract information system provides a source for interested parties to view and compare hedge contract details and produce historic contract curves for comparison with other market data. This may assist parties when negotiating their own hedge contracts.⁶⁷

⁶⁶ If a barrier to signing a PPA is that neither party can agree on what a 'fair' price will be for the next 15 years, then one option would be to have ASX list contracts 15 years out, and to regulate/procure market makers to make offers for those contracts. Market making on a very long term will be expensive. Another option is for the parties to agree that the PPA price will be adjusted each year based on the three-year horizon of the ASX forward price curve (the approach used in the Mercury/Trustpower CfD when Mercury purchased Trustpower's residential customer accounts).

⁶⁷ <https://www.electricitycontract.co.nz/>

- 7.27 This function will become more valuable with the accelerated investment in generation, especially by new independent investors. The current platform has various limitations, and the Authority will make improvements to the platform to improve transparency on aspects of different types of products, and functionality.

Options that other agencies could progress

Take steps to provide greater regulatory certainty

- 7.28 There is currently considerable regulatory and economic uncertainty that may reduce appetite for making investments.
- 7.29 Uncertainty increases investors' option value. That is, there is value to investors in delaying making decisions on investments in large, sunk-cost generation assets until there is more clarity about the future and thus about expected returns.⁶⁸
- 7.30 Key areas of relevant regulatory uncertainty relate to the NZ Battery project, the firmness of the 100% renewable electricity by 2030 target (currently an aspiration) and the timing and manner of the exit of fossil-fuelled generation.⁶⁹
- 7.31 The exit of fossil-fuelled generation is currently managed through the electricity market responding to increasing carbon prices (see Appendix B). The main area of uncertainty is whether government policy will force this change quicker than the market.
- 7.32 The government is currently working on a Gas Transition Plan⁷⁰, an Energy Strategy, and next stage decisions on the NZ Battery project. These processes take time, but also increase option value – delaying investments and contributing to higher spot and forward prices.
- 7.33 The Authority therefore would emphasise the importance of providing as much clarity and certainty to developers, in particular by bringing forward the completion of the Gas Transition Plan, Energy Strategy, and NZ Battery project. Reduced uncertainty would contribute to more renewable generation investment sooner, and so lower prices sooner.
- 7.34 The Authority is currently undertaking an analysis of fossil-fuelled generation transition risks in the context of: demand to 2030; the role of fossil-fuelled generation in hydro firming; and more prevalent solar and wind generation. This will also identify options open to the Authority to mitigate any transition risk and contribute information to the Gas Transition Plan.

Resource Management Act 1991

- 7.35 Investors in renewable electricity generation are expressing concerns about the consenting process, and whether the reforms to the Resource Management Act 1991 (RMA) will mean it becomes more difficult to get consents, or to get existing consent renewed. The suggestion is that the settings lack an appropriate balance between renewable generation and climate change goals, and other environmental and societal objectives (eg, land use, fresh water).

⁶⁸ This option value is distinct from general uncertainty, which is already reflected in projects' risk premiums.

⁶⁹ Signals about the future have an immediate impact on investment decisions. For example, Enerlytica (Energy Weekly 27 June 2022) reported that Nova Energy decided to not develop the 360MW Otorohanga peakers for which it held consents since 2017, when the government brought forward its 100% renewable electricity target from 2035 to 2030 and announced the NZ Battery project.

⁷⁰ <https://www.mbie.govt.nz/dmsdocument/21381-managing-the-phase-out-of-fossil-gas-and-opportunities-to-repurpose-infrastructure-for-renewable-gases-report-back-and-proposed-next-steps-proactiverelase-pdf>

- 7.36 The Authority understands that the typical requirements for wind projects to get RMA consents can take 3+ years, and so delay the entry of wind farms. This weakens the competitive constraint of entry on the exercise of market power.⁷¹
- 7.37 The purpose of the RMA is to promote the sustainable management of natural and physical resources in a way which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety (s5).
- 7.38 However, it may be that the weights given to different competing objectives (eg local amenity values, biodiversity, fresh water, etc) do not reflect the recent articulation of government objectives on renewable energy and renewable electricity. The risk is that the regulatory environment could stand in the way of the large amount of investment in renewable generation that is projected to be required to meet climate change objectives and bring electricity prices down toward the cost of new supply.
- 7.39 A National Policy Statement for renewable electricity generation⁷² has been in place since 2011 to recognise the importance of renewable energy and the government's renewable energy targets, in local government plans and in considering resource consent applications.
- 7.40 However, a 2016 joint evaluation by the Ministry for the Environment and MBIE found that the requirement that local authorities have regard to the statement did not have much impact on time, cost or consistency in treatment of applications.⁷³
- 7.41 In 2018 the New Zealand Productivity Commission also noted in its Low-Emissions Economy report⁷⁴ that submissions suggested the RMA unduly constrains investment in renewable generation (p401), and that the National Policy Statement was not sufficiently directive to give weight to renewable electricity generation. It recommended the Government should review the Statement and issue a new National Environmental Standard for Renewable Electricity Generation "to increase the speed, and lower the cost and uncertainty for obtaining resource consents for a significant proportion of renewable electricity generation projects that have only minor environmental and social impacts."⁷⁵
- 7.42 In 2019 the Interim Climate Change Commission in 2019 recommended that the National Policy Statement be reviewed to resolve issues relating to lapsing and varying consents for wind generation, and to develop National Environmental Standards to enable timely consenting of wind generation (and transmission and distribution infrastructure).⁷⁶

⁷¹ A 2021 study for Te Waihangā found the average consenting timeframe is 12-14 months for projects with any complexity, and that, internationally, New Zealand is at the upper end of approval costs.
<https://www.tewaihanga.govt.nz/policy/reports/the-cost-of-consenting-infrastructure-projects-in-new-zealand>

⁷² <https://environment.govt.nz/acts-and-regulations/national-policy-statements/national-policy-statement-for-renewable-electricity-generation/>

⁷³ <https://environment.govt.nz/publications/report-of-the-outcome-evaluation-of-the-national-policy-statement-for-renewable-electricity-generation/>

⁷⁴ NZ Productivity Commission 2018, *Low-emissions economy final report*.
https://www.productivity.govt.nz/assets/Documents/lowemissions/4e01d69a83/Productivity-Commission_Low-emissions-economy_Final-Report_FINAL_2.pdf

⁷⁵ NZ Productivity Commission 2018, Recommendation R13.3 and R13.4, page 404

⁷⁶ <https://www.mbie.govt.nz/dmsdocument/5963-proposed-response-to-interim-climate-change-committee-recommendations-on-accelerated-electrification-proactive-release-pdf>, para 55-60.

- 7.43 The Ministry for the Environment (MfE) notes on its website that the “Government is exploring options to strengthen national direction for renewable electricity.”⁷⁷ The current RMA reform process seeks to provide for greater mandatory national direction and mandatory use of combined local government plans, which may also assist in providing a clearer, more consistent environment for investment in renewable electricity generation, though comments by some investors in renewable generation suggest requirements may get more difficult to meet.
- 7.44 MBIE and MfE are currently progressing work on how national direction tools can better enable renewable electricity and transmission to support decarbonisation, for example by strengthening the language and direction to assist with planning and consenting processes, and to assist with reconsenting. The current intent is to have a new direction in place mid next year, to align with the resource management reforms and the associated development of a National Planning Framework.
- 7.45 The Authority invites MBIE and the Ministry for Environment to bring forward their work to publish a strengthened national direction for renewable electricity to inform local planning and resource management consenting. This should reflect the government’s 100% renewable electricity aspiration, electrification and renewable energy goals, and the implications for the amount of investment in renewable generation that needs to occur. Increased investment will support competition in the wholesale market.
- 7.46 The Authority also invites MBIE and MfE to investigate evidence for, and the merits and feasibility of, applying pro-competitive conditions on consents for renewable generation (eg, use-it-or-lose it conditions).

Make it easier for investors to navigate the Overseas Investment Act 2005

- 7.47 Overseas developers of solar projects rated the Overseas Investment Act 2005 (OIA) as the greatest impediment to faster development.
- 7.48 The OIA requires overseas investment to get a consent when the investment is in sensitive land (eg, non-urban land exceeding 5 hectares), or a significant business asset generally valued at or above \$100m (though other thresholds are prescribed in certain Free Trading Agreements). The OECD has previously rated New Zealand’s regime as the 7th most restrictive out of 68 countries.⁷⁸
- 7.49 Overseas investors reported the consenting process creates uncertainty because of:
- (a) the ‘Benefits to New Zealand test’
 - (b) the requirement to offer land on the open market prior to an overseas purchase.⁷⁹
- 7.50 The Overseas Investment Office considers that reported difficulties in applying for consents may relate to unfamiliarity with the regime, and that changes to the Act made in late 2021 significantly simplify and streamline the tests to assess applications.

⁷⁷ <https://environment.govt.nz/acts-and-regulations/national-policy-statements/national-policy-statement-for-renewable-electricity-generation/>

⁷⁸ Treasury 2019, *Reform of the Overseas Investment Act 2005 - Facilitating productive investment that supports New Zealanders’ wellbeing*, consultation document at <https://www.treasury.govt.nz/publications/consultation/reform-overseas-investment-act-2005-html>

⁷⁹ Concept 2022, *op cit*.

- 7.51 In particular, a revised ‘Benefits to New Zealand’ test – with factors like ‘economic benefits’, ‘benefits to the natural environment’, and ‘give effect to or advance significant government policy’ – would likely make it easier for large solar investments to be consistent with the OIA and get approval to purchase land.
- 7.52 Further, new statutory timeframes would mean that assessments should be quicker than in the past. For example, the statutory timeframe for an application for a consent under the ‘Benefit to NZ – farmland’ test is 100 working days, and a ‘significant business assets’ test 35 working days.⁸⁰ Previously it had been reported that it took more than 100 days *on average* for such applications to be processed and that the process could take a year.⁸¹
- 7.53 The Overseas Investment Office intends to release a technical guidance note on renewables investment later in 2022. This could usefully include information on the availability of exemptions from the farmland advertising criterion, likely conditions of consent for renewable energy projects, and post consent issues (on-sale of a development to another overseas investor, restructuring, etc).
- 7.54 The Authority notes that the OIA (s61C) provides for regulations to exempt a class of transactions from the requirement for consent.⁸² A class exemption could be considered for all renewable energy projects, or for projects intended for any renewable energy zone, given the crucial role of investment in renewables to meet the Government’s decarbonisation and electrification objectives, and the benefits of overseas investment in promoting competition in the wholesale electricity market.
- 7.55 However, such benefits would need to be weighed against risks that a precedent of an industry-specific exemption might create, inconsistencies with international obligations, and the potential impact on the effectiveness in managing the types of risks that are subject of the OIA.
- 7.56 The Authority would invite the Overseas Investment Office to publish, before the end of 2022, guidance for overseas investors in renewable electricity generation, and to consider providing a helpdesk to support developers to navigate the requirements. (This could be part of a one-stop shop for investors in renewable generation; see below.)

Promoting investment opportunities

Annual Electricity Generation Investment Opportunities report

- 7.57 Concept’s survey of the generation investment pipeline and impediments noted that international developers had mentioned that they previously had limited awareness of the opportunity for renewable generation in New Zealand. Taking steps to raise international awareness of New Zealand’s demand for renewable generation investment could be a low-cost way to feed the investment pipeline and strengthen competition.

⁸⁰ <https://www.linz.govt.nz/overseas-investment/discover/our-assessment-process/assessment-timeframes>

⁸¹ Treasury 2019, op cit.

⁸² A Member’s Bill (Damien Smith ACT) was introduced to the House in 2021 seeking an amendment to the Act to exempt investments from OECD countries from the OIA (except for investment in residential land); this is at the first reading stage.

- 7.58 NZ Trade & Enterprise (NZTE) has Renewable Energy as one of its ‘sectors of strength’ in promoting international investment⁸³, to support expansion of large-scale green and brown field developments in renewable generation (eg, offshore wind) and ‘future fuels.’ It has also published resources for New Zealand landowners on how to deal with enquiries from international investors.
- 7.59 There is an opportunity for New Zealand to be clearer about what it wants in terms of renewable generation investment. While relevant information exists on locations with grid capacity, grid expansion plans, projected demand, electricity market settings, and relevant government policies, it is dispersed and not presented with (international) developers in mind.
- 7.60 The Australian Electricity Market Operator produces an annual ‘Electricity Statement of Opportunities’, which “provides technical and market data for the National Electricity Market (NEM) over a 10-year period to inform the planning and decision-making of market participants, new investors, and jurisdictional bodies.”⁸⁴
- 7.61 The Authority proposes it would be useful for an Annual Electricity Generation Investment Opportunities report to be published, targeting international developers in particular.
- 7.62 The Authority suggests this function sits best with MBIE – it complements the type of information already produced by MBIE (eg, generation stack updates, electricity demand and generation scenarios (EDGS)) and Transpower (eg, Transmission Planning Report). NZTE, Transpower, the Overseas Investment Office, and the Electricity Authority would provide input as needed. The Authority is interested in stakeholders’ views on where the responsibility for such a report best sits.

One stop shop

- 7.63 The Authority understands from discussion with NZTE’s investment team that overseas developers face challenges in navigating different regulatory and consenting pathways, and engagement with stakeholder groups (eg local government, iwi). This acts as an impediment to successful entry.
- 7.64 As such the Authority also proposes to invite MBIE to investigate the merit of providing a one-stop shop for overseas investors in renewable electricity generation, to help navigate and streamline the regulatory requirements and agencies, and advice on relevant stakeholders they should engage with. This is akin to functions performed by ‘international relationships’ teams in local governments and economic development agencies.

Consultation questions

11. Are there any other options that would better facilitate efficient investment in renewable generation to promote wholesale electricity market competition in the transition?

12. Do you have any comments on the contents of this chapter?

⁸³ <https://www.nzte.govt.nz/page/renewable-energy>

⁸⁴ See <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/nem-electricity-statement-of-opportunities-esoo>

8 Next steps

- 8.1 The Authority has identified that while the scale of investment in renewable generation will likely increase competition in the wholesale electricity market as part of the transition toward 100% renewable electricity, it also notes that competition faced by storable hydro may weaken during extended periods when intermittent generation cannot run.
- 8.2 The Authority currently considers that reliance on the current conduct-based measures to mitigate the exercise of market power remains broadly appropriate in the transition toward 100% renewable electricity. However, there are opportunities to strengthen those settings, and speed up the supply response.
- 8.3 The Authority wants to hear stakeholders' views on whether its proposed package of actions (including proposed recommendations to other agencies) would provide the settings necessary to promote competition in the wholesale electricity market during the renewable energy transition and whether any particular actions should or should not be progressed.
- 8.4 The Authority invites comments from stakeholders. The deadline for submissions is 5pm, 30 November 2022. Chapter 1 set out instructions and other relevant information on how to make submissions.
- 8.5 For convenience, the following table repeats the consultation questions set out in various places in this document.

Table 8 Consultation questions

Chapter 2

1. Do you agree that a key competition in the transition toward 100% renewable electricity is that it weakens competition during extended times when intermittent generation cannot run?
2. Do you have any comments on the contents of this chapter?

Chapter 4

- 3 Do you have any comments on the impediments to generation investment?
4. Do you agree that the lag in investment is not due to anticompetitive behaviour to slow down investment and discourage entry, or can you provide instances or other evidence to the contrary?
5. Do you have any comments on the role and impact of carbon pricing on investment and wholesale market competition or the other contents of this chapter?

Chapter 5

6. Do you agree with the Authority's overall conclusion that it currently considers that continued reliance on the current conduct-based measures to mitigate the exercise of market power remains broadly appropriate in the transition toward 100% renewable electricity?
7. Do you agree with the objective and evaluation criteria set out in this chapter?
8. Do you have any comments on the contents of this chapter?

Chapter 6

9. Are there any other options that would promote wholesale electricity market competition in the transition that you consider would be more effective and efficient?
10. Do you have any comments on the contents of this chapter?

Chapter 7

11. Are there any other options that would better facilitate efficient investment in renewable generation to promote wholesale electricity market competition in the transition?
12. Do you have any comments on the contents of this chapter?

Appendix A Background to the virtual asset swaps

Background

- A.1 The virtual asset swaps were an outcome of the 2009 Ministerial Review of the electricity market. The Electricity Industry Act 2010 s117 gave shareholding Ministers power to direct (before 1 November 2011) the State generators to enter into long term agreements with each other for financial hedges for the purpose of improving competition and security of supply.
- A.2 A Cabinet decision on 7 December 2009 provided for ‘virtual asset swaps’ involving one-off long-term (15 year) contracts as follows:
- Meridian to sell 1,000 GWh/year of ‘South Island’ energy to Mighty River Power, and buy 1,000/year of ‘North Island’ energy from Mighty River Power
 - Meridian to sell 450 GWh/year of ‘South Island’ energy to Genesis, and buy 450 GWh/year of ‘North Island’ energy from Genesis.⁸⁵⁸⁶
- A.3 The reason for the difference between the volumes for Genesis and Mighty River Power (now Mercury) were because Meridian was also required to transfer Tekapo A and B to Genesis.
- A.4 The virtual asset swaps have since been extended, but start to decline in volume from 1 January 2023 and expire on 31 December 2025.
- A.5 The virtual asset swaps likely require Ministerial direction, and the lead agency is likely to be MBIE. (The Ministerial directions to the SOE Boards in 2009 requiring the virtual asset swaps were from the Ministers of Finance and State-Owned Enterprises.)

Advantages and disadvantages

- A.6 The 7 December 2009 Cabinet paper listed the following advantages and disadvantages of virtual assets swaps:⁸⁷
- A.7 “The main advantages of a virtual asset swap of this nature are that:
- It allows all three SOEs to become truly national retailers – whereas the viable physical swaps by themselves would not improve Mighty River Power’s position (it currently has no South Island generation, and more than 95% of its customers are in the North Island)
 - It provides for SOEs to have a larger retail base outside their existing ‘home’ island, as compared to physical restructuring alone
 - It avoids nearly all the costs and risks of physical asset swaps and would be quicker to implement. (The costs to the companies of putting contracts in place are estimated at \$2m to \$3m)

⁸⁵ See:
[https://www.dia.govt.nz/Pubforms.nsf/NZGZT/Supplement_GeneMeri177Dec10.pdf/\\$file/Supplement_GeneMeri177Dec10.pdf](https://www.dia.govt.nz/Pubforms.nsf/NZGZT/Supplement_GeneMeri177Dec10.pdf/$file/Supplement_GeneMeri177Dec10.pdf)

⁸⁶ A subsequent statement by the then Minister for Energy and Resources indicates Meridian selling 450 GWh/year to Genesis and 750 GWh/year to Mighty River Power in the South Island and the same volumes from Genesis and Mighty River Power in the North Island.

⁸⁷ Minister of Energy and Resources, *Ministerial Review of the Electricity Market*, Cabinet Economic Growth and Infrastructure Committee, 7 December 2009.

- There would be no change in relative sizes of the three SOE businesses
 - It would help improve liquidity and competition in the hedge market.
- A.8 “The disadvantages of a virtual asset swap, compared to a physical asset swap, are that:
- It is less permanent and may have fewer dynamic effects on competitive behaviour
 - There is a risk that the SOEs may re-trade their contracts to restore the status quo, although the motivation for doing this should be limited
 - There would be no benefits in terms of additional wholesale market competition.”
- A.9 The review concluded that that “a long-term ‘virtual asset swap’ contract of the nature outlined above offers net benefits, especially because it covers all three SOEs and has a larger volume (and therefore offers greater retail competition benefits) than the viable physical asset swap options by themselves.”⁸⁸

Contribution to competition

- A.10 The virtual asset swaps have had three main benefits:
- They have facilitated retail competition, particularly in the South Island, as seen with the fall in the fall in retail market concentration since the virtual asset swaps came into effect since late 2010
 - They have supported liquidity in the ASX futures market by enabling the SOE generators to market make in the island where they had limited physical capacity
 - They have allowed the SOE generators to offer over-the-counter hedge products across New Zealand, supporting hedge market competition.
- A.11 The main reason that the virtual asset swaps provided these benefits is that, for the volume supplied by the virtual asset swaps, they eliminate the SOEs’ inter-island basis or locational price risk – the price difference between those applying at their generation nodes in their ‘home’ island and nodes in the other island. As a consequence, the virtual asset swaps provide the SOEs with a similar financial outcome to having generation equal to the volume of the asset swaps in what would otherwise be the main receiving island for their generation.
- A.12 The situation since the virtual asset swaps were introduced has changed materially because of a range of market and regulatory developments since they were put in place. In particular:
- Meridian has expanded its wind generation in the North Island – West Wind was completed in 2009 and since that time Te Uku and Mill Creek have also been completed, and construction is underway on Harapaki
 - Liquidity in the ASX market has improved materially and the Authority is introducing commercial market making, which can reduce or eliminate the burden on SOEs to market make in the island receiving most of their generation
 - FTRs were introduced between Benmore and Otahuhu in 2011, and since then have been extended to other main generation and load nodes across New Zealand

⁸⁸ *Ibid.*

- The SOEs have established material retail positions throughout New Zealand, including at locations remote from their generation
- Transmission capacity has increased materially, including both inter-island and intra-island capacity - so the magnitude of basis risk has fallen overall
- The TPM changes have reduced the disincentive to invest in South Island generation.

A.13 As a result, the net benefits from requiring extension of the virtual asset swaps are likely to have fallen substantially. Further, arguably, some of the 'new' tools such as FTRs have not been utilised by the SOEs as much as they could have been, eg there has been limited acquisition of sending direction FTR obligations by the SOEs (and other generators) even though the downside risk for them is little different from a CfD. At least a partial explanation for this has been access to the energy volumes provided by the virtual asset swaps.

Appendix B The shift away from fossil-fuelled generation

- B.1 Fossil-fuelled thermal generation (ie coal and gas) contributes much of the system's flexible generation, offsetting fluctuations in rainfall, wind, demand etc.
- B.2 Fossil-fuelled generation has accounted for ~15% of supply (on average) in recent years. The Climate Change Commission projects the share to fall to ~1.5% by 2035 due to rising carbon charges.⁸⁹
- B.3 The Government has a goal for 50 percent renewable energy by 2035, and an aspirational goal to achieve 100% renewable generation by 2030.⁹⁰ To achieve these goals there is a need to accelerate development of new renewable electricity generation and ensure the electricity system and market can support high levels of renewables.
- B.4 Three factors are causing displacement of fossil-fuelled generation by renewables:
- falling investment costs of wind and solar to the point that the LRMC of both wind and solar PV are now well below gas and coal⁹¹
 - increasing fuel costs for gas and coal – for domestic gas due to uncertain and dwindling supply, while for coal it is mainly reflective of international markets
 - increasing carbon costs through the NZ ETS.
- B.5 The displacement with renewable sources is progressing as follows (given current technologies and associated costs):
- Baseload operation: fossil-fuelled baseload generation becomes increasingly uneconomic to run as more renewables enter the market (including some geothermal baseload generation) and run whenever there is wind and sun; some baseload fossil-fuelled generation has already retired (eg, Otahuhu) and more is expected to exit in the next couple of years
 - Some portion of flexible generation: renewables are starting to displace some flexible fossil-fuelled generation. Rising carbon prices are making renewables increasingly economic even if some output is spilled. Diversity (technology, location) of the new renewable generation helps with the loss of fossil-fuelled generation
 - Firming generation: likely to be the last segment to decarbonise as fossil-fuelled generation's higher operating costs pose less of a handicap for seldom-used plant. It is likely to continue to be economically viable for some time as a source of back-up generation for managing extended duration scarcity events such as droughts or extended periods of low wind and sunshine.
- B.6 In other words, the principal mechanism for fossil-fuelled generation to exit is currently the market.

⁸⁹ See www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-aotearoa/

⁹⁰ See: <https://www.beehive.govt.nz/speech/speech-throne-3> The goal is subject to review at 2025 emissions budget. See <https://www.labour.org.nz/release-renewable-electricity-generation-2030>

⁹¹ The Climate Change Commission assumed the 2021 levelized cost of entry was \$61-\$84 \$/MWh for wind and \$86-\$121 \$/MWh for utility solar compared to \$269-295 for a gas peaker. See: <https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-aotearoa/modelling/>

- B.7 Increasing entry and operation by low short run marginal cost renewable alternatives means fossil-fuelled thermal generators will operate less frequently, and so need increasingly higher prices to cover short run costs (which makes other renewable generation viable), while ending up receiving lower average revenue. Eventually this revenue is insufficient to recover their operating and maintenance costs to the point that they are no longer profitable and need to exit.
- B.8 This raises two issues. One is whether prices in the electricity market are allowed to rise to reflect the full cost of scarcity, as this allows generators to earn sufficient revenue to remain operating even if they only operate infrequently. The introduction of real-time pricing includes the extension of scarcity pricing to each node, which in principle should encourage prices to rise to scarcity levels under scarcity. MDAG is investigating this issue as part of the 100%RE project.
- B.9 It also presents a risk of 'premature exit' with potential adverse security and price consequences. The Authority will undertake further research to better understand the nature of the risk, and how this could be managed. The Minister of Energy and Resources is developing a Gas Transition Plan to manage the phase-out of fossil gas.⁹²

⁹² <https://www.mbie.govt.nz/dmsdocument/21381-managing-the-phase-out-of-fossil-gas-and-opportunities-to-repurpose-infrastructure-for-renewable-gases-report-back-and-proposed-next-steps-proactiverelase-pdf>

Appendix C Disclosure of information that impact offers

- C.1 In addition to the disclosure rule in the Code (clause 13.2A), Schedule 8.3 of Technical Code D requires participants to disclose planned outages to the system operator, which the system operator must then publish. This happens on the system operator's Planned Outages Co-ordination Process website (POCP). Other relevant disclosure rules include the NZX listing rules, which apply to listed participants.
- C.2 Despite these various disclosure rules and locations, information on the availability of effective generation capacity is only available anecdotally, or not available in an easy to access or timely manner. This can affect risk assessments and offers, and limits participants ability to efficiently respond to security of supply concerns.
- C.3 Examples of such information includes:
- (a) current or expected constraints on thermal fuel which could impact generation
 - (b) a need to run flushing flows down a river to clear didymo, reducing the generation capacity of hydro plant
 - (c) faults that reduce generation capacity (such as the recent fault for one of the Huntly Rankine units that contributed to the 23 June 2022 Grid Emergency Notice)
 - (d) machine defects restricting a unit's operating hours until repairs are made
 - (e) restrictions on plant running – such as operating constraints when lake levels are high or low or due to changes in ambient temperature.
- C.4 It is also not always clear if disclosure of the types of information listed above are in fact required under clause 13.2A, or whether exclusions apply or the information falls outside the Code. Even if disclosure is required by the Code, it is not clear where participants should disclose information that does not neatly fit the POCP format.
- C.5 Following its review of wholesale market information disclosure, in 2021 the Authority amended the Code to require quarterly reporting of disclosure activity, updated information disclosure guidelines, and created a disclosure platform to enable participants to meet their reporting obligations.
- C.6 The Authority had previously decided to expand this platform to enable disclosure of thermal fuel information where current or expected constraints could impact generation.⁹³ However, some submissions to the Authority suggested the scope of the expanded disclosure platform should be broader than thermal fuels, for example covering some of the items mentioned above.
- C.7 An approach to address information gaps and lack of clarity set out above include:
- (a) review the Code to determine whether disclosures of the type listed above are likely to be included within clause 13.2A. If not, consider expanding the scope of the Code or narrowing the application of the exclusions; and
 - (b) create a centralised location to enable participants to disclose information about current or expected constraints that could impact generation capacity, ahead of time or as close to real time as possible;

⁹³ The GIC now hosts a website for the gas market which enables disclosure of related information on production, consumption, storage, and outages. This information complements, but does not directly address, the information required to understand whether and how any thermal fuel constraints affect electricity generation capacity.

- (c) in the first instance limit the scope to thermal fuel information discussed above, but consider widening it to support disclosure of the broader set of information, on a voluntary or mandatory basis depending on the outcome of (a).⁹⁴
- C.8 This approach would give participants clarity on what to disclose, make it easier for them to disclose, and improve transparency for all participants of factors that affect generation capacity. Better information will support more efficient offers and better security of supply. It would also support more effective and timely monitoring of the market by the Authority, including monitoring of compliance with disclosure obligations. These benefits would need to be weighed against any cost of compliance.

⁹⁴ The platform could be hosted by the Authority or by Transpower as an extension of POCP, or somewhere else.