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"HIGH STANDARD OF TRADING CONDUCT" PROVISIONS: A REVIEW BY THE MARKET DEVELOPMENT ADVISORY GROUP

DISCUSSION PAPER

MARKET DEVELOPMENT ADVISORY GROUP

Note: This paper has been prepared for the purpose of the Market Development Advisory Group. Content should not be interpreted as representing the views or policy of the Electricity Authority.

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MDAG would also like to acknowledge the contribution to the review of the trading conduct provisions in the Code by previous members of MDAG during the period of their membership.

"High standard of trading conduct" provisions: A review by the Market Development Advisory Group

Executive summary

Background

i. For electricity markets to work effectively for the long-term benefit of consumers[1], they need to produce efficient price signals about production and consumption of electricity. High prices are essential for this when they reflect genuinely tight supply but can undermine efficiency if they are caused by suppliers misusing situations where competitive pressure is weak. High prices arising from weak competitive pressure can undermine confidence in pricing outcomes and cause efficiency losses as parties take actions to reduce their price exposure. Well-functioning electricity markets incorporate mechanisms to prevent abuse of market power but allow prices to rise to signal scarcity, while also ensuring that effective mechanisms are available to manage exposure to high prices, such as liquid hedge markets.

ii. The high standard of trading conduct (HSOTC) provisions were introduced into the Electricity Industry Participation Code 2010 (Code) in 2014 "to improve confidence in the efficiency of prices when competitive pressures in the wholesale market are weak"[2].

iii. To date, there has been only one substantive enforcement action under the HSOTC provisions—the high price event of 2 June 2016 which was caused (or at the least contributed to) by Meridian using its South Island pivotal position as a mechanism to manage basis risk.[3] The Authority held that Meridian's offers breached the HSOTC for the primary reason that "the [Authority's] Board would have expected Meridian to have covered its North Island exposure using other available risk management products or, if it chose not to do that, then to bear the cost of the risk if it eventuates." This is expanded in the Authority's market performance review of the 2 June 2016 event.

iv. In November 2017, the Electricity Authority (Authority) asked the Market Development Advisory Group (MDAG) to review the HSOTC provisions and advise whether they are "adequate to promote the Authority's statutory objective, or whether changes are required to better promote outcomes consistent with workable competition".[4] The Authority noted that this review is "in light of events that have tested these provisions" and that it should "take into account any findings from case studies, performance reports and compliance reports".[5]

[1] The objective of the Authority is to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers – s.10, Electricity Industry Act 2010.
[2] Letter from Authority to WAG Chair, 22 June 2012, WAG work plan
[3] The Authority pointed out that "[f]or a vertically integrated generator-retailer that typically runs a close-to-neutral hedge position…, the primary hedging "instrument" is their physical generation portfolio. Hence, in the New Zealand context, basis risk concerns the difference between the price received for generation compared to the price paid for purchases; the locational price risk" - EA, Aug 2016 at 10.1
[4] Market Development Advisory Group work plan for 2017/18 – request to undertake Review of spot market trading conduct provisions project, letter from Carl Hansen, Chief Executive, Electricity Authority, to James Moulder, Chair, MDAG, 20 November 2017, available at https://www.ea.govt.nz/dmsdocument/22983-letter-to-mdag-2017-18-work-plan-request-to-add-trading-conduct-project
[5] Electricity Authority, "High Prices on 2 June 2016: Market performance review", 18 December 2017 at 1.9

v. With the assistance of Concept Consulting, MDAG looked for any empirical evidence of the parties changing their behaviour to give effect to the Authority's findings, including whether we have seen an end to the practice of using pivotal power to manage basis risk across a transmission constraint, and whether we have we seen an end to high prices in local pivotal situations. Our overall conclusions are that, based on the available empirical evidence, neither the HSOTC provisions nor the Authority's enforcement actions to date have had any appreciable effect on participants' behaviour or market outcomes, positive or negative.

vi. Further, MDAG has identified seven inter-related sets of problems with the design of the HSOTC provisions, which are outlined in Part C below.

vii. Based on this analysis, MDAG considers that the HSOTC provisions are unlikely to be effective in achieving their purpose.

viii. From the various papers leading up to the HSOTC rule and the Authority's application of it in the case relating to the high price event of 16 June 2016, it seems clear that that "high standard of trading conduct" is intended to mean that offer conduct should be consistent with an orthodox economic efficiency framework in which the central question is whether the relevant offer would have occurred if the market in the relevant trading periods had been effectively competitive.

ix. In a nutshell, MDAG is proposing that the Code should be changed to properly reflect this economic test, rather than continuing to rely on the current nebulous HSOTC formulation.

MDAG proposal

x. MDAG's proposal is to delete existing clauses 13.5A, 13.5B and the definition of "pivotal" in the Code and replace those provisions with the following:

13.5A Conduct in relation to generators' offers and ancillary service agents' reserve offers

(1) Where a **generator** submits or revises an **offer** for a **point of connection** to the **grid**, that **offer** must be consistent with **offers** that the **generator** would have made where no **generator** could exercise significant market power in relation to that **point of connection** to the **grid** for that **trading period**.

(2) Where an **ancillary service agent** submits or revises a **reserve offer** for a **point of connection** to the **grid** (including an **interruptible load group GXP**), that **offer** must be consistent with **reserve offers** that the **ancillary service agent** would have made where no **ancillary service agent** could exercise significant market power in relation to that **point of connection** to the **grid** for that **trading period**.

(3) The purpose of this clause 13.5A is to promote offer behaviour and efficiency outcomes consistent with competitive markets, in particular so that—

(a) the prices of **offers** or **reserve offers** do not exceed, by too much or for too long, the associated economic costs to the **generator** or **ancillary service agent** respectively, assuming a market in which no **generator** or **ancillary service agent** has significant market power;

(b) with the effect that **offers** or **reserve offers** made by **generators** or **ancillary service agents** promote efficient:

(i) consumption decisions by **consumers**; and

(ii) production decisions by suppliers (including **generators** and providers of **electricity** services); and

(iii) innovation and investment by suppliers and **consumers** (including the location of their investments); and

(iv) risk management and risk management markets,

in relation to the **point of connection** to the **grid** (including an **interruptible load group GXP**) at which the **generator** or **ancillary service agent**, as applicable, submits or revises an **offer** or a **reserve offer**, and any **node** in respect of which the **offer** or **reserve offer** may have a material influence on efficiency outcomes of the kind referred to in subparagraphs (i) to (iv);

(c) where, for the purposes of paragraph (a) "economic costs" in clause 13.5A(3)(a):

(i) when assessed in relation to short-run costs, includes scarcity rents and the opportunity cost of generating **electricity** or of providing **instantaneous reserve**, as applicable;

(ii) when assessed in relation to long-run costs, includes recovery of capital costs with a suitable premium for risk.

[Drafting note: The use of the long dash (em dash) in the above drafting ("in particular so that—") signifies that paragraphs (a) to (c) which follow are essentially one continuous sentence]

xi. Like the current HSOTC mechanism, our proposal would apply to all generators and ancillary service agents. Also like the current HSOTC mechanism, our proposal would apply to all offers into the electricity spot market (including reserve offers) at all times.

xii. Unlike the current HSOTC provisions, our proposal does not include safe harbours, which are specific behaviours deemed to comply with the provisions. The existing safe harbours would be deleted.

xiii. In addition, MDAG intends to recommend that the Authority increase resourcing of both its monitoring and compliance functions.

Key rationale

xiv. Our proposal reflects a basic tenant in the design of our wholesale electricity market; namely, that economic efficiency outcomes for the long-term benefit of consumers are best delivered by effective rivalry among market participants. In law and economics, this notion of competition is characterised by an absence of significant market power which, in turn, is characterised by prices tending to closely reflect efficient costs. It is also recognised that perfect competition does not exist, and that competition is a dynamic process.

xv. This is reflected in the standard we propose in replacement clauses 13.5A(1) and (2) above[6], in which a party's offer is compared to a hypothetical counterfactual in which no party has significant market power. This approach is adapted from a well-established test in competition law and economics.

xvi. Clause 13.5A(3) above sets out the framework and rationale for our proposed standard in a statement of purpose. Consistent with the Acts Interpretation Act 1999, the legal meaning our proposed standard would have to be ascertained from its text and in the light of that purpose statement.

xvii. Clause 13.5A(3)(a) above conveys that the counterfactual in our proposed standard[7] is intended to assume a strongly competitive market[8] in which and there is sufficient rivalry between sellers to push offer prices close to their associated efficient costs.[9]

xviii. Under our proposal, costs are 'economic costs'[10]. Our clause 13.5A(3)(c) makes it clear that short run costs includes scarcity rents and the opportunity costs of generating[11]; and that long run costs includes recovery of efficient capital costs with a suitable premium for risk. In a competitive market with free entry, the scarcity rents will on average equal the cost of new capacity over time.[12]

xix. Our proposal is not therefore intended or expected to adversely affect incentives to provide capacity. On the contrary, our proposal recognises that in an energy-only market, spot prices need to be able to reach high levels at times properly reflecting efficient economic costs.[13]

xx. While perfect competition does not exist and therefore offer prices may never exactly reflect efficient costs, offer prices in strong competition are not expected to exceed economic costs by too much or for too long.[14]

xxi. Offer prices exceeding associated costs "by too much" or "for too long" should be disciplined by effective rivalry. If this does not happen, it would indicate significant market power that the competitive process is not countering. In turn, this would indicate that the standard in our proposed rule has not been satisfied.

[6] The same standard applies to generators and ancillary service agents
[7] That is, proposed clauses 13.5A(1) and (2)
[8] It is well established in law and economics that "the outcomes to be pursued are the outcomes produced by the more strongly competitive markets"- see for example, *Wellington Airport* [2013] NZHC 3289 at [24(h)], which is set out in Annex 2
[9] This is adapted from *Wellington Airport* [2013] NZHC 3289 at [15], which is set out in Annex 2
[10] Economic costs in relation to wholesale electricity production are described further in Annex 3, including "short run marginal cost" and "long run marginal cost"
[11] or of providing instantaneous reserve, as applicable
[12] Bushnell, J, Flagg, M, Mansur, E, Electricity capacity markets at a crossroads, DEEP WP 017, UC Davis Energy Economics Program, page 11.
[13] For example, our proposal is intended to allow a thermal generator to signal, through a high offer price, that its opportunity cost of generating in the relevant period were high when referenced to a preferred future period, based on start-up costs and the opportunity cost of the fuel. In other words, the thermal generator expects to get higher value from burning its fuel in the future when scarcity is greater, even if its plant runs less frequently, and this opportunity cost of generating supports a high offer price in the current trading period. Similarly, our proposal is intended to allow a hydro-generator to offer at a high price when it expects its water to have that high value in a future period . For the avoidance of doubt, our proposal is not intended to allow the transient exercise of market power – this is explained further in Annex 2, paras 215 and 216 below
[14] This is adapted from *Wellington Airport* [2013] NZHC 3289 at [15], which is set out in Annex 2

xxii. What is "too much" or "for too long" is unavoidably a matter of judgement – there is no mathematical algorithm or black and white boundary. However, a key benefit of our proposal is that the boundary judgements to be made (as to whether the standard has been satisfied) sit within an established and coherent economic framework that gives effect to the Authority's statutory objectives. By contrast, "high standard of trading conduct" invites justifications for offer behaviour that are unrelated to normal efficiency measures associated with competition.

xxiii. Further, a critical point of calibration is whether the assumptions and yardsticks in the counterfactual[15] give rise to the efficiency outcomes referred to in clause 13.5A(3)(b) above.

xxiv. It is well established in law and economics that the purpose of strong competition, which puts downward pressure on costs and pushes prices close to efficient costs, is to drive economic efficiency outcomes. In the context of the wholesale electricity market, this means efficiency in consumption decisions by consumers; production decisions by suppliers; innovation and investment by both suppliers and consumers; and risk management and risk management markets. These efficiency outcomes, which are set out in clause 13.5A(3)(b) above, were in concept central to the Authority's analysis in its decision and market performance assessment in relation to the high price event of June 2016.

Scope of coverage

xxv. The HSOTC provisions apply to all generators in all trading periods. This scope is narrowed somewhat by various codified safe-harbours. We consider that those safe-harbours are problematic and not consistent with established efficiency outcomes.

xxvi. The existing safe harbours were provided to compensate for the uncertainty about what HSOTC means and how to comply with it.[16] We consider that it is better to replace HSOTC with a clearer standard reflecting an established economic framework.

xxvii. Some parties may question whether our proposed rule should apply to all generators in all trading periods. Our proposed standard would apply whether the degree of competitive rivalry in the market is weak or strong. As explained above, offer prices exceeding associated economic costs should be disciplined by effective rivalry. If this does not happen, it would indicate significant market power that the competitive process is not countering, which, in turn, would indicate that our proposed standard has not been satisfied.

xxviii. Some may argue that our proposed standard should be restricted to just pivotal, or even just net pivotal, situations. A wider question needs to be considered in this regard: why should an orthodox efficiency and competition standard, which underpins the market's purpose, apply only to those more limited supply situations? Why should it not apply to the spot market as a whole? The safe-harbour in our proposal is available by simply offering on the basis that no party has significant market power. This also recognises that offers should reflect both scarcity rent and the supplier's opportunity cost of generating[17], which of course the supplier is best placed to quantify and explain in any review process.

xxix. Further, on a practical level, it can be difficult for a supplier to determine in real-time whether it is pivotal and, if so, whether it is net pivotal.

[15] in clauses 13.5A(1) and (2) above
[16] EA, Feb 2014 at 4.3.2(a)
[17] or of providing instantaneous reserve

xxx. However, while we consider that our proposed standard should apply to all offers, we seek feedback on adopting this approach relative to limiting its application to pivotal or just net pivotal supply.

Cost-benefit analysis

xxxi. We have assessed the benefits of the proposal relative to the status quo on a mainly qualitative basis as assessing the likely outcomes from both the existing Code and the proposed Code is influenced by subjective judgements about participant behaviour, so it is difficult to meaningfully quantify estimates of the benefits.

xxxii. The cost-benefit analysis assesses that, by more tightly targeting more efficient prices when competitive pressures in the wholesale market are weak and significantly reducing the legal and economic definitional problems under the status quo, the proposal will lead to a reduction in the occurrence of inefficiently high spot prices (that is, high spot prices absent high opportunity cost and/or scarcity). The efficiency improvements consist of greater:

a. Productive efficiency – in particular, purchasers not diverting resources into managing risks of inefficiently high prices;

b. Allocative efficiency – in particular, a reduction in price distortions associated with pivotal supplier situations (that is, a reduction in 'dead-weight losses'); and

c. Dynamic efficiency – in particular, innovation and efficient investment over time from greater confidence in competition and lessening the perception of wholesale market price risk.

xxxiii. The cost-benefit analysis also considers an illustrative example of a local pivotal supplier situation that affects a 50MW load and involves a $6/MWh uplift in mean spot prices in that region.

xxxiv. This example estimates (upper bound) productive and allocative efficiency gains from the proposal totalling $7.64m in present value terms plus unquantified dynamic efficiency benefits. This is just for a single local pivotal supplier situation. Total benefits from the proposal are likely to be much greater.

xxxv. The cost-benefit analysis assesses that the costs of the proposal relative to the status quo are expected to be negligible because direct costs are near-zero and we expect no increase in indirect costs. Our recommendation for additional monitoring and enforcement would also apply if the status quo was retained, so this element is not included in the cost-benefit analysis. Overall, then, the proposal is expected to have significant net benefits.[18]

Conclusion

xxxvi. For the reasons set out in this paper, we consider that, compared to the HSOTC provisions, our proposal better achieves the Authority's key objective of "improving confidence in the efficiency of prices when competitive pressures in the wholesale market are weak"[19].

[18] This view does not depend on the qualitative analysis in the cost-benefit analysis

[19] Letter from Authority to WAG Chair, 22 June 2012, WAG work plan

Part A – Preliminary

Introduction

1. In November 2017, the Electricity Authority (Authority) asked the Market Development Advisory Group (MDAG) to review the "high standard of trading conduct provisions" (HSOTC) in the Electricity Industry Participation Code 2010 (Code) and advise whether they are "adequate to promote the Authority's statutory objective, or whether changes are required to better promote outcomes consistent with workable competition".[20] This paper sets out MDAG's assessment of the HSOTC, and proposes new provisions to address deficiencies MDAG has identified with the existing provisions. We seek feedback on this paper to help us formulate recommendations to the Authority on the HSOTC.

How to respond to this consultation

2. We encourage submissions on this discussion paper and, in particular, your responses on the following topics:

    a. whether we have correctly defined the problems (regarding the potential problem of pivotal behaviour *and* potential problems with the current provisions);

    b. whether we have correctly characterised the possible options to address the problems;

    c. your opinion on the MDAG's preferred option;

    d. whether the proposal should apply to all offers at all times, as proposed, or should be restricted to pivotal supply and, if so, whether it should apply only to net pivotal supply; and

    e. any comments on the cost benefit analysis.

3. There may be aspects of the proposal that we have not considered and we would welcome your comments if this is the case. We have not, for example, considered competition in offers relating to frequency keeping or dispatchable demand.

4. Please email submissions to MDAG@ea.govt.nz with *"High standard of trading conduct provisions – Discussion paper"* in the subject line. The closing date for submissions is **5pm 6 April March 2020**.

5. Please note we want to publish all submissions we receive. If you consider that we should not publish any part of your submission, please:

    a. indicate which part should not be published;

    b. explain why you consider we should not publish that part; and

    c. provide a version of your submission that we can publish (if we agree not to publish your full submission).

[20] Market Development Advisory Group work plan for 2017/18 – request to undertake Review of spot market trading conduct provisions project, letter from Carl Hansen, Chief Executive, Electricity Authority, to James Moulder, Chair, MDAG, 20 November 2017, available at https://www.ea.govt.nz/dmsdocument/22983-letter-to-mdag-2017-18-work-plan-request-to-add-trading-conduct-project

6. If you indicate there is part of your submission that should not be published, we will discuss with you before deciding whether to not publish that part of your submission.

7. 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. We would normally consult with you before releasing any material that you said should not be published.

8. We will acknowledge receipt of all submissions electronically. Please contact MDAG@ea.govt.nz if you do not receive electronic acknowledgement of your submission within two business days.

Next steps in process

9. MDAG will carefully consider all submissions and, subject to undertaking any further analysis, will then make its recommendation to the Authority on the nature of any changes to clauses 13.5A and 13.5B of the Code.

10. The Authority Board has noted to MDAG that section 39(3)(c) of the Electricity Industry Act 2010 (the Act) provides for the Authority to proceed directly to change the Code, without undertaking its own consultation, if it is satisfied on reasonable grounds that there has been adequate prior consultation, such as by an advisory group. We have therefore prepared this discussion paper to allow the Authority to proceed on this basis should it consider the statutory test is met.

11. This paper includes legal drafting for Code changes to implement MDAG's proposal and an assessment of the proposal against the Authority's objectives in section 15 of the Act. It also includes the different elements of the regulatory statement ordinarily required for a proposed Code amendment under section 39(2) of the Act, including a cost-benefit analysis of the proposal. This is not intended to pre-empt or predetermine the Authority's own consideration of the matter, but simply positions the Authority to better minimise duplication of effort as appropriate.

High standard provisions in the Code

12. The current provisions in the Code that are the subject of this review are as follows:

> **13.5A Conduct in relation to generators' offers and ancillary service agents' reserve offers**
>
> (1) Each generator and ancillary service agent must ensure that its conduct in relation to offers and reserve offers is consistent with a high standard of trading conduct.
>
> (2) Subclause (1) applies when—
>
> (a) a generator submits or revises an offer; or
>
> (b) an ancillary service agent submits or revises a reserve offer.
>
> **13.5B Safe harbours for clause 13.5A**
>
> (1) A generator complies with clause 13.5A if—

(a) the generator makes offers in respect of all of its generating capacity that is able to operate in a trading period; and

(b) when the generator decides to submit or revise an offer, it does so as soon as it can; and

(c) in the case of a generator that is pivotal,—

(i) prices and quantities in the generator's offers do not result in a material increase in the final price at which electricity is supplied in a trading period at any node at which the generator is pivotal, compared with the final price at the node in an immediately preceding trading period or other comparable trading period in which the generator is not pivotal at that node; or

(ii) the generator's offers are generally consistent with offers it has made when it has not been pivotal; or

(iii) the generator does not benefit financially from an increase in the final price at which electricity is supplied in a trading period at a node at which the generator is pivotal

(2) A generator does not breach clause 13.5A only because the generator does not comply with subclause (1)

(3) An ancillary service agent complies with clause 13.5A if—

(a) the ancillary service agent makes reserve offers in respect of all of its capacity to provide instantaneous reserve that is able to operate in a trading period; and

(b) when the ancillary service agent decides to submit or revise a reserve offer, it does so as soon as it can; and

(c) in the case of an ancillary service agent that is pivotal,—

(i) prices and quantities in the ancillary service agent's reserve offers do not result in a material increase in the final reserve price in a trading period in an island in which the ancillary service agent is pivotal, compared with the final reserve price in the island in an immediately preceding trading period or other comparable trading period in which the ancillary service agent is not pivotal; or

(ii) the ancillary service agent's reserve offers are generally consistent with reserve offers it has made when it has not been pivotal; or

(iii) the ancillary service agent does not benefit financially from an increase in the final reserve price in a trading period in an island in which the ancillary service agent is pivotal.

(4) An ancillary service agent does not breach clause 13.5A only because the ancillary service agent does not comply with subclause (3).

13. Part 1 of the Code defines ‘pivotal’ as follows:

a. in relation to a generator, that the total demand in a trading period at any 1 or more nodes would not have been met if the generator had not submitted offers for all or any of its generating plant; and

b. in relation to an ancillary service agent, that the total demand in a trading period for an ancillary service supplied by the ancillary service agent in an island would not have been met if the ancillary service agent had not submitted reserve offers for all or any of its capacity to provide instantaneous reserve in the island.

Part B – Key issues and context

Authority's questions and crux issue

14. The questions to be addressed are:

    a. how well are the high standard of trading conduct (HSOTC) provisions achieving their objectives? and

    b. what changes, if any, should be made to better achieve those objectives?

15. The Authority's objectives in introducing the HSOTC provisions were twofold:

    a. to improve the efficiency of prices in pivotal supplier situations;[21] and

    b. to improve efficiency by providing confidence to consumers about the efficiency of pricing in pivotal supplier situations and so not incur a retreat in trading activity in the wider market.[22]

16. The policy issue at the centre of these questions is, how best to discipline offers by generation and instantaneous reserve[23] when competitive pressures are relatively weak? Or more precisely, how to mitigate the risks of prices rising above their efficient level due to the exercise of market power?

17. The Authority noted that it is a review "in light of events that have tested these provisions" and that MDAG should "take into account any findings from case studies, performance reports and compliance reports".[24]

18. In order to address these questions, we need first to recap the:

    a. size of the pivotal pricing risk;

    b. origins and rationale for the current HSOTC provisions;

    c. Authority's approach to the high price event of 2 June 2016; and

    d. what impacts (if any) the Authority's approach to the 2 June 2016 event may have had on the market.

19. This background information is spread across a wide range of papers and reports reaching back to at least 2011. The aim of Part B below is to distil it succinctly so that we have a common understanding of why the current HSOTC mechanism was promulgated and how it has been applied, before considering whether it is working effectively and what if any alternatives may be better. Given the range of material, sources are footnoted extensively.

[21] Letter of 8 May 2017 from the Authority to Mark Binns of Meridian Energy and EA, May 2017, page 2
[22] EA, Feb 2014 at 5.3.1 and 5.5.2 -- see also 1.1.1, 4.2.2, 4.9.3, 5.1.1
[23] The trading conduct provisions apply to both generators and ancillary service agents in relation to generation and reserve offers. See clauses 13.5A and 13.5B of the Code.
[24] EA, Dec 2017 at 1.9

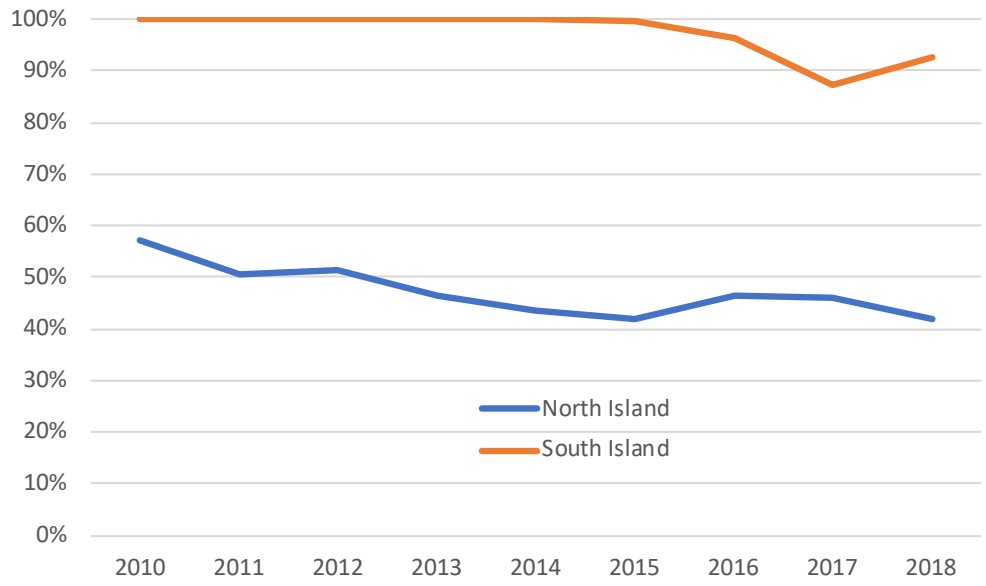
Scope and scale of risk

Gross pivotal

20. A supplier is gross pivotal if, without at least some of the supplier's production, demand cannot be met.[25] It does not consider whether or not any of the supplier's volume is covered by hedge or retail contracts. The definition of "pivotal" in the Code reflects this gross pivotal approach.[26]

21. Figures 1 and 2 below show the Electricity Authority's estimate of gross pivotal situations. They are relatively common, particularly in the South Island.[27] The frequency of pivotal situations has reduced slightly over time. The decrease from 2012 to 2015 is primarily due to increased transmission grid capacity.

Figure 1: Proportion of time large generators are gross pivotal at an island level across all trading periods (Source: Electricity Authority)



[25] This applies to generation or instantaneous reserves

[26] Note that the HSOTC provisions do not use the terms *gross* or *net* pivotal. Rather, the term "pivotal" is defined to reflect the concept of *gross* pivotal – see the definition of "pivotal" in clause 1.1 of the Code

[27] In its 2014 consultation paper (at 2.1.8), the Authority referred to markedly lower gross pivotal frequencies of 5% at the national level, 5% at a North Island level and 9% at a South Island level. This was the result of different modelling assumptions. The frequency of pivotal situations is influenced significantly by modelling assumptions regarding how much generation is must-run, how much generation can be feasibly withheld, and the nature and degree of HVDC constraints. The estimates set out in this paper use actual generator offers and actual grid configuration. No generation is considered must run, except as required to meet frequency keeping requirements. This analysis reflects a "no-warning" pivotal situation in which other participants are not able to adjust their behaviour by reducing demand or increasing their offer quantities.

Figure 2: Proportion of time large generators are gross pivotal at an island level across all trading periods (Source: Electricity Authority)

Proportion of time supplier is gross pivotal at an island level					
North Island	**2010**	**2018**	**South Island**	**2010**	**2018**
Mercury	37%	33%	Meridian	100%	93%
Genesis	52%	33%	Contact	17%	8%
Contact	36%	32%	Genesis	0%	0%
Meridian	0%	0%	Mercury	0%	0%
North Island	**57%**	**42%**	**South Island**	**100%**	**93%**

22. While a *gross but not net* pivotal supplier may not profit from raising prices in the short term, it may have incentives to raise prices (or create greater volatility) to increase hedge and/or retail returns over the longer term.[28]

Net pivotal

23. Net pivotal is where a supplier is *gross* pivotal *and* some or all of the supply for which it is pivotal is not covered by hedge or retail contracts – that is, a supplier is *net* pivotal for the proportion of its pivotal generation volume that exceeds its hedging and retail commitments.

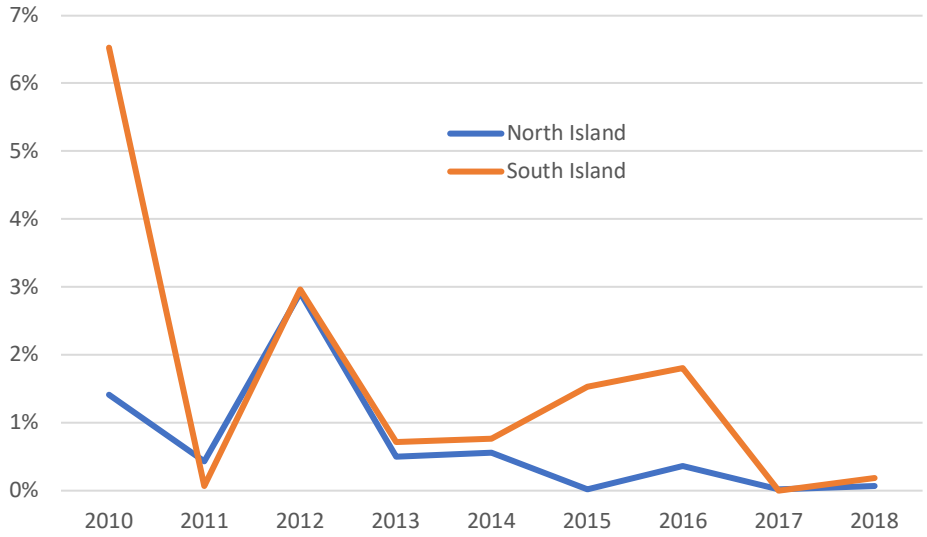
24. Whether a generator is net pivotal may depend on a myriad of decisions made by third parties.[29] With a relatively liquid contracts market, contract positions can change quickly. Offering incentives can therefore change quickly too.[30]

25. A *net* pivotal supplier is likely to profit in the short term by raising the offer prices on the net pivotal proportion of its supply.[31] Its returns on that supply depend on the spot market clearing price, which it can set or strongly influence in the face of no or only weak countervailing competitive pressure.

26. As Figure 3 shows, net pivotal situations seem to be relatively rare and the Authority estimates they have had a frequency of between 0 and 1 percent at a national and island levels in recent years.[32]

[28] Clearly, the terms on which contracts are struck is heavily influenced by expectations of future spot prices. Whether a *gross but not net* pivotal supplier exercises its ability to raise or lower prices for medium to longer term gain will depend (among other things) on how sensitive (elastic) demand is to price, and on how much the supplier is likely to face competition from entry or substitutes.
[29] "Improving the efficiency of prices in pivotal supplier situations: Decision paper", Electricity Authority, 4 June 2014 at 67
[30] Yarrow and Decker, Nov 2014 at section 6, page 20. This was acknowledged by the Authority its "Improving the efficiency of prices in pivotal supplier situations: Decision paper", Electricity Authority, 4 June 2014 at 67
[31] EA, Feb 2014 at 2.1.7
[32] WAG estimated for 2009-11 that net pivotal situations occurred 39% of the time in the South Island (see WAG, May 2013 at B.3.17, Table 11). However, this percentage was calculated on a different basis, and the Authority's estimate is expected to be more accurate because it has better access to non-public data

Figure 3: Proportion of time large generators are net pivotal at an island level across all trading periods (Source: Electricity Authority)



Efficiency effects

27. In 2014, potential efficiency gains from deterring inefficient prices in (gross) pivotal situations were estimated to range from zero to $140m in net present value.[33] Using the same assessment framework with updated assumptions, potential efficiency gains today are estimated to range from $30m to $129m in net present value.[34]

28. While it is still the case that local pivotal situations have the potential to cause material productive efficiency losses, the more significant potential benefits still relate to deterring the use of market power in widespread pivotal situations. Those gains come from market participants not inefficiently diverting resources into managing risks of high prices.[35]

Local pivotal

29. For completeness, we detail our findings in relation to 'local' pivotal supplier situations, which are events affecting an area smaller than an island. These range from highly localised events affecting a small geographic area, through to events affecting a sizeable portion of an island.

30. Concept Consulting reviewed the local pivotal situations identified by WAG in 2014 to see if they still apply, and also looked for possible new situations identified by recent instances of high within-island price separation.

31. Some pivotal situations from 2014 have been largely removed by changes in capacity: at Cobb, by an additional transformer in 2019; at Karapiro, by a single circuit between Hangatiki and Te Awamutu in mid-2016; and at Coleridge and Kumara, by improved reliability on the connection.

[33] EA, Feb 2014 at paragraph 5.4.8. These figures were derived from mid-point estimates from WAG May 2013, Appendix B.
[34] Quantifying the potential efficiency effects of pivotal power risks is difficult. To some degree, it relies on high level qualitative judgements which, while informed by some evidence, are still broad-brush.
[35] The potential benefits and costs are discussed further below under 'Costs and benefits'.

32. Six identifiable local pivotal situations continue (see Annex 4):

    a. "Kinleith-Arapuni 1" for ~88MW, where Mercury is often pivotal

    b. "Mangahao" for ~149MW, where King Country Energy is pivotal for about an hour each year

    c. "Waikaremoana 1" for ~156MW, where Genesis is pivotal. Price separation with prices over 200 $/MWh has occurred for about 15 hours a year

    d. "Waikaremoana 2" for ~52MW at Fernhill and ~50 MW at Tuai. High prices at Tuai and low at Redclyffe occur in about 5 hours a year

    e. "Tekapo A" for ~4 MW, where Genesis is pivotal about 200 hours per year

    f. "Waipori" for ~81 MW, where Trustpower is pivotal infrequently (<10 hours a year).

33. Following the introduction of the HSOTC provisions in 2014, offer behaviour at Tekapo A changed and price separation did not occur during pivotal supplier events for a few years. However, that seems to have changed recently. Especially since 2018, price separation events have occurred more frequently, with prices in excess of $500/MWh on six occasions when Tekapo A was pivotal. These prices are significantly lower than prices seen in 2012 but were still many times the price in the rest of the South Island.

34. The pattern of prices at Waikaremoana is similar to the prices seen at Tekapo A. High prices ($5,000/MWh) occurred in 2012/3, before dropping to much lower levels. Since 2018, higher prices have occurred from time to time.

35. Concept Consulting concludes that these examples indicate that significant price separation is sometimes occurring during local pivotal supplier situations, despite the Code change in 2014 – indeed, there are indications that the magnitude of price separation may have increased in recent times.

36. However, while local pivotal events may have increased, their efficiency effects are still assessed to be relatively limited at up to $20m in present value for potential productive efficiency losses.

37. As Concept Consulting points out, this is a "snapshot" of current market outcomes, which will change over time as demand, supply and transmission capacity alters due to growth and investment. Concept Consulting also notes that for its analysis of local pivotal supplier situations, they have focused on the recent historic data where a supplier was *actually* pivotal – and they did not include areas which may become subject to pivotal suppliers in the future.

Origins and rationale for HSOTC provisions

38. The current HSOTC provisions emerged from a relatively conventional five stage policy and rule-making process, which started in mid-2012 with the Authority asking the Wholesale Market Advisory Group (WAG) to provide advice on measures "to improve confidence in the efficiency of prices when competitive pressures in the wholesale market are weak"[36]. The Authority had become concerned that pivotal conduct at a local level[37] could inefficiently discourage retail competition and business investment in the general economy[38].

[36] Letter from Authority to WAG Chair, 22 June 2012, WAG work plan
[37] "Pricing in Pivotal Supplier Situations", WAG Discussion Paper, 27 May 2013 at Executive Summary: "This paper focuses mainly on 'local' pivotal supplier situations as this type of event triggered the Authority's request for advice"
[38] EA, Feb 2014 at Executive Summary

39. Given the uncertainty of potential benefits, WAG viewed any regulatory action to mitigate pivotal power as "precautionary in nature"[39], and therefore it should be flexible, easily reversed and have a low risk of unintended consequences.[40]

40. The HSOTC obligation was drawn from the NZEM Rules which applied until 2003. It had not been carried forward to the successor Electricity Governance Rules or the Code. WAG's report stated, based on anecdotal advice by some individuals familiar with the NZEM period, that a HSOTC obligation had the effect of checking excessive pivotal prices.[41]

41. WAG correctly observed that the effectiveness of a conduct obligation would depend on how tightly it targets the underlying economic principles.[42] However, we have not found in the public papers any consideration of whether the HSOTC mechanism would, in its legal interpretation, map onto the economic framework and criteria assumed to be appropriate for assessing pivotal pricing. (This is a key issue, which is discussed further below).

42. In the end, a majority of WAG recommended the HSOTC measure. The majority expected that it would assist in addressing local pivotal situations,[43] even though the main potential gains related to widespread pivotal situations, and even though "there may be some local pivotal supplier situations where it would not be effective"[44].

43. A key factor in the case for introducing the HSOTC provisions seems to have been that its economic costs were expected to be "close to nil"[45], so there was an expectation of no downside even in a worst case scenario of no benefits.[46] A further key factor was that the safe harbour provisions[47] were intended to provide a high degree of certainty for suppliers and therefore limit compliance costs[48] and reduce the risk of unintended adverse consequences that could arise with no codification of what constitutes acceptable market conduct.[49]

44. The Authority viewed the HSOTC proposal as "lighted handed" and "appropriate in the [then] current situation".[50] With the support of "a rigorous monitoring programme", the Authority considered that it could be effective.[51]

[39] WAG, May 2013 at 3.4.4 and 3.4.5
[40] WAG, May 2013 at 3.4.4 and 3.4.5 and WAG, Sept 2013 at 5.1.1
[41] WAG, May 2013 at para 4.5.25 – "While these were worded in a fairly broad manner, a number of parties familiar with that period have suggested that they provided a check on offer behaviour during pivotal supply situations"
[42] WAG, May 2013 at 4.5.40 and 4.5.41
[43] WAG, Sept 2013 at 6.5.7 and 6.8.6. Also note that the focus was on "temporary" pivotal situations – see EA, Feb 2014 at 5.3.5. See also 5.1.1, 4.10.2, 2.1.8, 2.1.9. However, as set out above, Meridian in the South Island is gross pivotal around 93% of the time, and Mercury, Genesis and Contact are each gross pivotal in the North Island around 32% of the time – which is more than "temporary". As noted above, the incentives of a *gross but not net* pivotal supplier to raise prices (or create greater volatility) to increase hedge and/or retail returns over the longer term are material.
[44] EA, Feb 2014 at Table 3, page 36
[45] EA, Feb 2014 at 5.4.11. The idea of "no harm" from a conduct provision was also central to WAG's rational: "the WAG reached a consensus that there is no harm, and possibly some merit, in pursuing a conduct provision. While a minority were sceptical about the effectiveness of a conduct provision, the balance of the group considered the provision could be effective and the risk of adverse unintended consequences precluded greater intervention" – WAG, Sept 2013 at 6.1.6
[46] EA, Feb 2014 at 5.4.14(b)
[47] Clause 13.5B of the Code
[48] EA, Feb 2014 at 5.3.14-5.3.17
[49] EA, Feb 2014 at 4.3.2
[50] EA, Feb 2014 at 3.3.3
[51] EA, Feb 2014 at 3.3.2

High price event of 2 June 2016

Overview

45. To date, there has been only one substantive enforcement action under the HSOTC – namely, the high price event of 2 June 2016, which was caused (or at the least contributed to) by Meridian using its South Island pivotal position as a mechanism to manage basis risk.[52]

46. In short, Meridian raised its South Island offer prices to reduce the risk of inter-island price separation, which (if it had occurred) would have resulted in Meridian having to buy at a high price in the North Island while selling at a low price in the South Island.

47. This event gave rise to three regulatory processes:

    a. An investigation as to whether the relevant trading periods amounted to an undesirable trading situation (UTS) under Part 5 of the Code. The Authority held that they did not.

    b. An investigation into whether Meridian had breached clause 13.5A of the Code (the HSOTC provision). The Authority held that it was in breach and outside the clause 13.5B safe harbours. However, the Authority decided not to lay a formal complaint with the Rulings Panel but issue a letter of warning to Meridian.

    c. A market performance review relating to the same event. In effect, this set out the Authority's analysis of what happened, why it happened, and why it was a problem from a market efficiency perspective.

48. This review by MDAG is also an outcome of the Authority's investigation into whether Meridian breached the HSOTC provisions. At the conclusions of its decision finding Meridian in breach, the Authority observed that the Meridian case represented the first serious test of the HSOTC provisions, there are disparate opinions on what a high standard is and how to apply the safe harbours[53], and so some refinement and clarification may assist market participants.[54]

Decision on breach of HSOTC

49. The Authority's decision in the Meridian HSTOC case is brief. It gives no explanation of how the Authority interprets the provisions as a matter of law, what the relevant legal or economic benchmarks are, or how other relevant factors are to be evaluated. Its primary reason for finding a breach was simply: "the Board would have expected Meridian to have covered its North Island exposure using other available risk management products or, if it chose not to do that, then to bear the cost of the risk if it eventuates."[55]

[52] The Authority pointed out that "[f]or a vertically integrated generator-retailer that typically runs a close-to-neutral hedge position…, the primary hedging "instrument" is their physical generation portfolio. Hence, in the New Zealand context, basis risk concerns the difference between the price received for generation compared to the price paid for purchases; the locational price risk" - EA, Aug 2016 at 10.1

[53] Meridian said the safe harbour provisions were not well framed to deal with Meridian's circumstances, where it is pivotal in the South Island for a large proportion of the time but needed to take market actions in context of its overall NZ market position – see EA, Aug 2016 at 9.6(h). Meridian further argued that its offers came with clause 13.5B(1)(c)(i) as they did not "result" in a material increase in the final price

[54] EA, May 2017

[55] EA, May 2017

Market performance review

Purpose and scope

50. The Authority's market performance review was undertaken to gain "a deeper understanding" of the 2 June 2016 event, and "to assess whether this short term event may have problematic implications for the longer term".[56] The Authority was particular to point out that it "was not constrained by any interpretation of the trading conduct provisions"[57]. On its face then, the market performance review does not necessarily explain the Authority's approach to the law or economics that gave rise to its decision that Meridian had breached the HSOTC provisions.

Adequacy of financial risk products

51. The performance review considered whether the range of financial products was sufficient to manage the risk of price separation. The Authority found (and Meridian agreed) that it was adequate.[58]

52. This is an apparent change from the Authority's view in its UTS decision 18 months earlier, which found that financial and other risk management tools may not have been sufficient for Meridian to manage the basis risk.[59]

53. The Authority did, however, acknowledge that the flow of rentals in the current financial transmission right (FTR) market give it "relative poor hedging properties"[60], and that the Authority intended to carry out a review of the FTR market in 2017/18.[61] The review of the FTR market is under way at present.

Stop use of pivotal power to manage basis risk

54. Using market power in a pivotal situation to manage basis risk had been a longstanding practice by a variety of participants.[62] For Meridian, it had been used on a reasonably regular basis as a standard approach to mitigate the risk of price separation between the islands during times of high HVDC transfer.[63] Indeed, the Authority had earlier described analogous pivotal pricing conduct as a "logical reaction".[64]

55. The Authority was clearly concerned that market participants may view Meridian's conduct on 2 June 2016 as consistent with previously accepted commercial behaviour and therefore within bounds.[65]

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[56] EA, Dec 2017 at 2.1
[57] EA, Dec 2017 at 2.1(a)
[58] EA, Dec 2017 at 7.4 and 7.7. Further, it appears that Meridian conceded in the trading conduct investigation that then currently available financial risk management products are adequate. However, the Authority did note that the flow of rental in the current FTR market give it "relatively poor hedging properties", and that the Authority intended to carry out a review of the FTR market in 2017/18 - EA, Dec 2017 at 7.11 and 7.17. The view was that the hedge market options were sufficient was a change of view by the Authority. In its UTS decision, the Authority observed that financial and other risk management tools available to Meridian to manage basis risk may **not** have been sufficient for its purposes – see EA, Aug 2016 at 9.6(b) and 10.13.
[59] EA, Aug 2016 at 9.6(b) and 10.13
[60] EA, Dec 2017 at 7.11
[61] EA, Dec 2017 at 7.17
[62] EA, Aug 2016 at 10.6 – 10.8, and 10.10 ("longstanding activity"). See also EA, Dec 2017 at Section 6
[63] EA, Aug 2016 at 9.6(d)
[64] EA, Aug 2016 at 10.8. This reference continues: "However, it does mean that it is a known, and not unexpected, behaviour. It becomes harder to assert that, in the absence of other factors, an instance of the behaviour threatens, or may threaten confidence in, or the integrity of, the wholesale market when this has not been the case for previous occurrences"-
[65] The Authority put it more formally as "the salient observation" that participants "may consider that Meridian's offer approach was consistent with the Authority's statutory objective" - EA, Dec 2017 at 5.3 and 8.1

56. In its UTS decision, the Authority observed that a pattern of past behaviour does not necessarily mean it is consistent with the Authority's statutory objective, or that it meets Code requirements.[66] Ten months later, the Authority held in its HSOTC decision that Meridian should have covered its North Island exposure using financial risk products or its balance sheet, but gave no explanation.[67] Eight months on, the market performance review sought to describe why, in the Authority's view, Meridian's offer approach was not consistent with the Authority's statutory objective.

57. Looking across the Authority's three responses – the UTS decision, the HSOTC decision and the market performance review – it seems clear that the Authority's overall purpose was to reset boundaries; in particular, to bring to an end[68] the relatively common practice of using pivotal power to manage basis risk across a transmission constraint,[69] and to make it clear that pivotal parties are now expected to cover basis risk using hedging markets or their balance sheets.[70]

58. The Authority looked past Genesis' late spike in its offer price in the 2 June 2016 event, even though it was likely an exploitation of its pivotal position.[71] The Authority also took no action against Contact, which did not explain its late high price increase in the light of its contract position.[72]

59. The longer term implication[73] of concern to the Authority focused on risk sharing efficiency[74]. The Authority's central idea was (and presumably still is) that:[75]

    a. Hedge markets are a key component of a well-functioning electricity market;

    b. Using a pivotal market position to manage basis risk across a constraint adversely impacts on the normal functioning and development of hedge markets; in particular, by suppressing demand for risk products, which has implications for other parties' ability to efficiently manage their risk position and for security of supply; and

    c. Preventing pivotal players from using their market power to manage basis risk would increase demand for financial risk products which, in turn, would provide more hedging options which, in turn, would reduce incentives to raise spot prices which, in turn, would result in more efficient prices, and fewer and less extreme price spikes – in short, a "virtuous cycle" (to quote the Authority).

[66] EA, Aug 2016 at 10.15
[67] EA, May 2017
[68] In its market performance review, the Authority refers to "**eliminating** the offer approach" and "if participants were **prevented** from managing basis risk by spot offers"- EA, Dec 2017 at 8.13 and 8.18 respectively
[69] The Authority is quite pointed in its market performance review that market participants should understand that Meridian's offer approach should not be viewed as consistent with the Authority's statutory objective – see EA, Dec 2017 at 5.3 and 8.1. See also the Authority's reference to "eliminating" and "preventing" this practice, and how it would cause parties to use financial risk instruments instead, which would stimulate more efficient hedging markets - EA, Dec 2017 at 8.13, 8.18. 8.22 and 8.24
[70] The Authority held that Meridian should "have covered its risk using other available risk management products or, if it chose not to do that, then to bear the cost of the risk if it eventuates" – see EA, May 2017; and the Authority's letter to Meridian of 8 May 2017
[71] In the Authority's words: "more likely an attempt to raise spot prices in order to exploit a pivotal position" - EA, Dec 2017 at 4.14
[72] EA, Dec 2017 at 4.16 - 4.21
[73] As noted above, the Authority's market performance review was undertaken "to assess whether this short term event may have problematic implications for the longer term" – see EA, Dec 2017 at 2.1
[74] Though the Authority did not frame it in this way, risk sharing efficiency is the essence of the Authority's focus. Risk sharing efficiency is mentioned as a distinct branch of economic efficiency in the following paper: Yarrow and Decker, Nov 2014 at top of p.6
[75] EA, Dec 2017 at 8.13, 8.18, 8.22, 8.24 and Executive Summary para 4

Efficiency of pivotal spot prices

60. From an economic perspective, the crux question relating to a pivotal situation is whether spot prices are efficient. In concept, the orthodox measure is whether they diverge from a competitive counterfactual; and, if so, to what degree and why? (This central issue is examined further in Annex 3).

61. In the public materials, the Authority compared the high prices of 2 June 2016 with the lower prices in adjacent periods. The Authority does not appear to have undertaken any quantitative or qualitative analysis of what prices would (or should) have occurred in the relevant trading periods in a competitive market counterfactual. Rather, the Authority seems to have taken it as self-evident the clearing prices in question would not have occurred observing that:

    a. They were inconsistent with workable competition because they did not provide a useful price signal to potential entrants, and were not the result of innovation or superior performance.[76]

    b. Meridian had resorted to "moving prices away from workably competitive levels".[77]

    c. Linking the prices in both islands caused South Island prices to increase to levels that reflected North Island scarcity, which was at odds with the South Island supply/demand situation and therefore gave an inefficient signal for demand and capacity.[78]

Impact of Authority's findings

62. In the period since 4 May 2017 (when the Authority issued its decision that Meridian had breached the HSOTC provisions), have we seen a change in market behaviour or outcomes that can be attributed to the Authority's findings?

63. MDAG commissioned Concept Consulting to assist in this analysis.[79] Overall, the analysis is not conclusive. The key questions we explored are as follows:

    a. Have we seen an end to the practice of using pivotal power to manage basis risk across a transmission constraint? We have seen no evidence to support this. The frequency of inter-island price separation has not changed substantially. Since the Authority's decision finding Meridian to have breached the HSOTC requirement, we have seen six instances of price separation where high North Island prices have been nearly matched by high prices in the South Island when there is no apparent shortage in the South Island. This is similar to the frequency observed before the Meridian decision.[80]

    b. Have we seen an end to high prices in local pivotal situations? As noted in Part B above, significant price separation is sometimes occurring during local pivotal supplier situations, despite the Code change in 2014 – indeed, there are indications that the magnitude of price separation may have increased in recent times.

    c. Have we seen pivotal parties making greater use of financial products to manage basis risk? The available public data does not show any material change in behaviour in this regard.

[76] EA, Dec 2017 at 9.1.
[77] EA, Dec 2017 at 8.14
[78] EA, Dec 2017 at 5.2 and 8.3-8.6
[79] Refer: https://www.ea.govt.nz/dmsdocument/25623-review-of-impact-of-trading-conduct-enforcement-action-on-spot-prices-concept-consulting
[80] See Annex 1

d. Have we seen reduced levels of use on the HVDC so as to lower the risk of inter-island price separation? The analysis suggests some minor reduction. The HVDC has been reserve limited[81] during northwards flow less often since the letter to Meridian. However, this measure is highly influenced by hydro storage and other system conditions making it difficult to draw any firm conclusion.

e. Have we seen a subtle increase in spot prices from pivotal parties seeking to 'smear' in higher prices with a view to achieving an equivalent financial outcome to that which would have occurred if prices had been spiked for short periods? This is not apparent from the analysis, however such behaviour would be difficult to detect because of the small increase in prices needed to achieve this effect. A "June 2nd" event every two years would increase mean spot price by about 20 cents per MWh.

f. Have we seen a change to South Island offer behaviour? Offers are heavily influenced by external factors, so it can be difficult to identify whether offer changes are because of changes to behaviour or simply in response to market conditions. The main change observed for South Island offers is how they are revised leading into gate closure. In recent years, the quantity of generation offered below a price has tended to *increase* over time, whereas the opposite was true prior to 2016.

64. Matt Rowe of Enel-X (and former MDAG member) advanced a thesis that the Authority's trading conduct enforcement action may have had "the unintended consequence of [causing] ongoing higher prices".[82] If this were so, it would amount to the Authority's enforcement action imposing a significant cost on the market as a whole, which would clearly be of major importance.[83] MDAG therefore commissioned Concept Consulting to evaluate whether the evidence supported Matt's thesis.

65. Concept concluded that the Authority's enforcement action in May 2017 did not cause a structural shift in electricity spot prices or generator offers. Rather, the evidence strongly indicates the increase in spot prices observed since May 2017 is explained by physical factors – especially changes in hydro storage and gas prices over the period. [84] It is important to emphasise that this analysis does not express an opinion on whether market power has been exercised. Further, it is not MDAG's role to assess whether market power has been exercised or not. Accordingly, this paper does not express an opinion on whether market power is a problem in the present market.

66. Our overall conclusion is that, based on the available empirical evidence, neither the HSOTC provisions nor the Authority's enforcement actions to date have had any appreciable effect on participants' behaviour or market outcomes, positive or negative.

[81] Flow on the HVDC does not reach its physical capacity limit often, because at high levels of transfer the HVDC is the largest risk in the North Island. This means that increasing flow on the HVDC will not result in more reserve-adjusted capacity in the North Island.
[82] Matt Rowe, 'The lakes are near full, the gas fields are back operating, so why are New Zealand's electricity prices still so stubbornly high?', *Energy News,* 2 July 2019
[83] It would have some adverse allocative efficiency effects, however the major cost impact would distributional.
[84] In a letter to MDAG of 2 December 2019, Haast Energy Trading disputed aspect's of Concept Consulting's analysis of Matt Rowe's thesis. On 12 December 2019, the Chair of MDAG, EA staff and Concept Consulting discussed Haast's critique with Haast representatives, following which Concept undertook further work to analyse the matters raised by Haast. Concept provided a follow up report to MDAG in late January 2020 which concluded that "we believe the core pricing conclusions set out in Concept's August 2019 report continue to apply – i.e. the enforcement action by the Authority in May 2017 did not cause a structural shift in electricity spot prices, and the higher spot prices observed between May 2017 and June 2019 are explained by physical factors – especially changes in hydro storage and gas prices over the period." The materials referred to in this footnote are available on MDAG's page on the Authority's web site

Part C – Problems with HSOTC provisions

Overview

67. Seven interrelated problems stand out in relation the HSOTC provisions:

    a. The root legal meaning of "high standard of trading conduct" does not relate to abuse of market power. Further, what it means is somewhat amorphous. (This is discussed further in paragraphs 68 to 78).

    b. To the extent that coverage of pivotal situations is derived in the legal interpretation of HSOTC, the legal tests of compliance do not necessarily map across to a coherent economic efficiency framework.

    c. If an economic efficiency framework were to be derived by the courts for HSOTC:

        i. It would not necessarily use the assumptions and benchmarks assumed by the Authority; and

        ii. It would not necessarily be exclusive of other non-efficiency criteria in assessing compliance.

    d. If the benchmark for HSOTC were to reflect the Authority's interpretation of its statutory objective with respect to its competition limb, which is workable competition with prices tending in the long term toward competitive levels, such a counterfactual is not necessarily useful in assessing the efficiency of high short term prices in a pivotal situation.

    e. As with any rule, its effectiveness depends on monitoring and enforcement. In its genesis, the Authority acknowledged that "a rigorous monitoring programme" would need to be part of the HSOTC package,[85] and WAG noted the importance of frequency of enforcement.[86] It could be argued the HSOTC provisions provided effective deterrence, which is reflected in only three enforcement actions being required to date. On the other hand, it could be seen as an indication of under resourcing in compliance monitoring.

    f. Like most conduct mechanisms, a rule requiring a "high standard of trading conduct" in pivotal situations runs counter to the underlying ability and incentives of pivotal parties to exercise market power to advance their economic interests. On a first-principles analysis, HSOTC is much less likely to be effective than incentive-aligned measures. This is discussed further below.

    g. The HSOTC provisions have a range of specific problems relating to the safe harbours, which are discussed further in paragraphs 80 to 101 below.

Legal meaning of current provisions

68. To understand the legal meaning of "high standard of trading conduct", we must first put aside what we assume it means or, indeed, what we think it should mean. What ultimately counts is how the courts would interpret it.

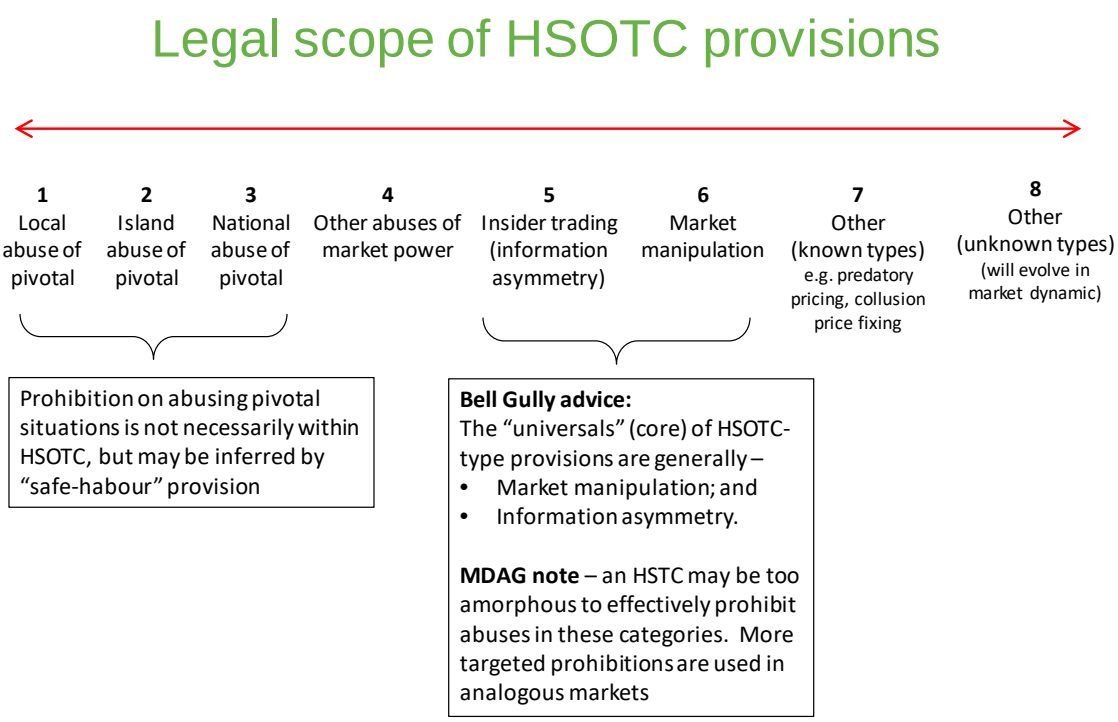
[85] EA, Feb 2014 at 3.3.2
[86] WAG, May 2013 at 4.5.40 and 4.5.41

69. Under the rules of statutory interpretation, the starting point is the plain and ordinary meaning of the words in their particular context, interpreted to give effect to the overall purpose of the legislation. Then we factor in the way courts and other authoritative bodies may have interpreted like words in a similar context – this can be persuasive, even binding. We then look at extrinsic material leading up to a rule's promulgation that may explain the purpose and rationale for the rule's wording.

70. Applying these rules of interpretation to HSOTC in this case, we find (in summary) that:

    a. As shown in Figure 4 below, HSOTC typically covers insider trading and market manipulation[87] (which were not central to the Authority's purpose in introducing the HSOTC provisions). It does not ordinarily cover abuses of market power.

Figure 4: Legal scope of HSOTC provisions



    b. Reading HSOTC with reference to the Code's statutory parameters[88], HSOTC should be read as requiring offer conduct that promotes competition, reliable supply, and efficient operation, for the longer-term benefit of consumers. Clearly some degree of balancing among these objectives is required in determining a threshold for HSOTC.

    c. Further, in applying HSOTC to a given situation, it is open to a court to find a benchmark based on generally accepted norms of sound commercial behaviour, or behaviour that is generally considered to be reasonable in all the circumstances. These are entirely typical judicial approaches in applying formulations like HSOTC.

[87] Including trading with an improper purpose, misleading trading and misleading conduct more generally. These are described as "universals" by Belly Gully in its report for MDAG of 27 August 2018: "Interpretations of Trading Conduct Provisions", at para 4.6
[88] Section 32 of Electricity Industry Act 2010 requires the contents of the Code to be consistent with the Authority's statutory objective and necessary or desirable to promote competition, reliable supply, efficient operation of the electricity industry, or performance of the Authority's functions

d. Abuses of market power are covered by HSOTC only by implication and derivation:

i. It is implied by the safe harbours[89], which protect certain categories of conduct by parties that are pivotal. It follows that some pivotal conduct not protected by the safe harbours could be in breach of the HSOTC obligation.

ii. It is derived from various Authority and WAG papers leading up to the promulgation of the current HSOTC provisions, which make it clear that the Authority's purpose in introducing the HSOTC provisions was to deter inefficient pricing by pivotal generators.

71. In summary, the legal meaning of HSOTC is somewhat amorphous -- akin to a semi-opaque emulsion with different layers of potential meaning. Its application to pivotal offers is only an implied subset of a wider legal umbrella.

72. If the main policy objective is to deter abuses of pivotal market power, it is fair to say that the current provisions are, from a legal point of view, an indirect and relatively obtuse formulation for doing so.

73. Further, the idea that an amorphous, single sentence HSOTC requirement may be effective in capturing unwanted behaviours beyond pivotal abuses is likely to be somewhat illusory. More targeted prohibitions, similar to those used in analogous markets, are likely to be necessary to effectively capture complex categories of behaviour such as insider trading and market manipulation and the like. (This is discussed further in Part E below).

Efficiency benchmark

74. In the Authority's interpretation of its statutory objective, the underlying competition benchmark is workable competition in which prices tend[90] over time toward long run marginal cost (LRMC).[91]

75. Workable competition as a benchmark would, no doubt, inform the legal interpretation of HSOTC. However, it is not necessarily the only relevant criterion at law that the courts may use to assess compliance. As noted above, the words "high standard" could include consideration of generally accepted norms and standards of good conduct of a wider nature. The scope of these is not entirely predictable.

76. Further, it does not follow that prices tending to LRMC would necessarily be the counterfactual for HSOTC.

77. It is also the case that prices tending to LRMC as a benchmark is not necessarily useful in assessing the efficiency of high short term prices in a pivotal situation. A short run marginal cost (SRMC) benchmark could be adopted by the Rulings Panel or courts.

78. Clearly, the choice of counterfactual has the potential to make a major difference to boundaries of price efficiency. (This is discussed further in Part E below).

[89] In clause 13B(1)(c) of the Code
[90] As in "tendency", which is the expression used by the courts – see *Wellington International Airport Ltd and others v Commerce Commission* [2013] NZHC 3289 at [18 to [23]
[91] EA, Dec 2017 at 9.4

Problems with the safe harbours

Safe harbour provisions

79. Under the current provisions, trading conduct by pivotal suppliers is, in effect, deemed[92] to satisfy the HSOTC requirement [13.5A] if:

    a. They offer all available capacity [13.5B(1)(a)] and any changes to offers are made as soon as possible [13.5B(1)(b)] *and*

    b. Its offers do not result in any material increase in final prices at a node at which it is pivotal compared with when it was not pivotal [13.5B(1)(c)(i)] *or*

    c. Its offers are generally consistent with offers it has made when not pivotal [13.5B(c)(ii)] *or*

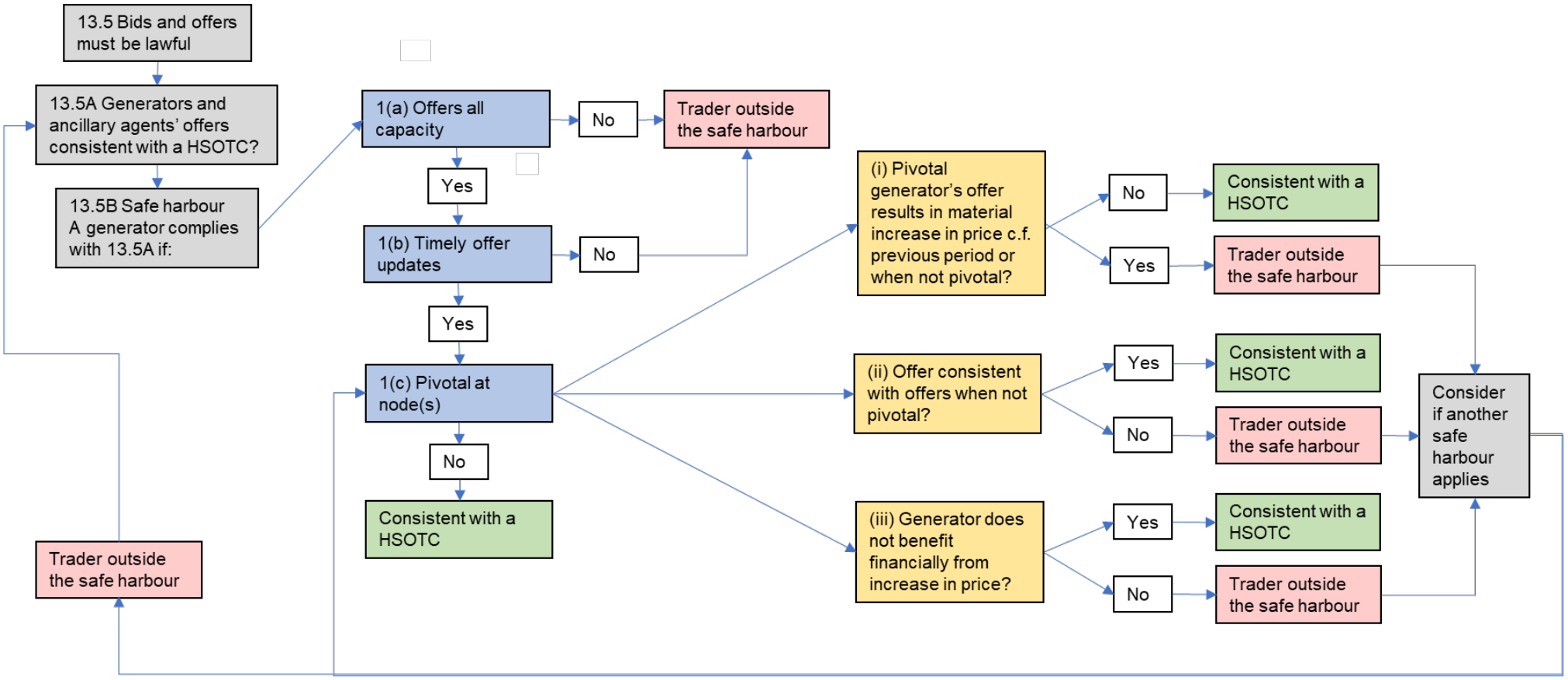
    d. It does not benefit financially from an increase in final prices at a node at which the party is pivotal [13.5B(c)(iii)].

80. Collectively these provisions are referred to as the safe harbours.

81. The overall scheme of the current trading conduct provisions, including the safe harbours, are illustrated in Figure 5.[93]

[92] EA, Feb 2014 at 5.2.2
[93] Adapted from Sapere presentation to MDAG, 15 March 2018

Figure 5: Existing trading conduct provisions including safe harbours



82. The safe harbour provisions were clearly crucial to the Authority's adoption of a broad relatively undefined "high standard of conduct" benchmark. As noted in Part B above, the safe harbours were intended to provide a high degree of certainty for suppliers and therefore limit compliance costs[94] and reduce the risk of unintended adverse consequences that could arise with no codification of what constitutes high standard of market conduct[95].

83. Further, the Authority recognised that a pivotal supplier may try to circumvent the intent of the conduct provision while maintaining strict compliance with the safe harbour itself. The Authority's position was that, if this occurred, it could consider a further revision to the Code.[96]

84. In MDAG's view, the safe harbours are problematic for at least five reasons – namely, that the safe harbours:

    a. shelter and facilitate behaviour inconsistent with a HSOTC;

    b. are not available to some plant;

    c. are difficult to apply in practice;

    d. are legally uncertain;

    e. are too lax for non-pivotal parties even if their offering behaviour is inefficient; and

    f. use an odd regulatory design.

85. We elaborate on each in turn below.

Safe harbours may shelter and facilitate unwanted behaviour

86. While the safe harbours may provide some clarity to suppliers about expectations for behaviour, the safe harbours do not necessarily promote efficient outcomes. Pivotal suppliers[97] can be sheltered if they comply with only one of the safe harbours available to pivotal suppliers – clauses 13.5B(1)(c)(i), (ii) or (iii). However, the safe harbours can be contradictory. For example, a pivotal supplier is not sheltered under 13.5B(1)(c)(i) if it makes offers that result in prices increasing compared with when it is not pivotal. It can still be sheltered though under 13.5B1(c)(ii) if its offers do result in such a price increase. In particular, if it makes a standing offer that applies when it is and isn't pivotal it would be sheltered. This is irrespective of whether it would result in a material increase in prices when it is pivotal, and regardless of whether the price is efficient.

87. Further, offers by always-pivotal suppliers that result in a material price increase may be sheltered. This is because the test addressing material price increases [clause 13.5B(1)(c)(i)] compares offers/prices in a trading period when the supplier was not pivotal, so is not available for always-pivotal suppliers. Nor is it possible to apply the test under 13.5B(1)(c)(ii) since this also requires comparison with offers when the supplier is not pivotal. In theory, 13.5B(1)(c)(iii) exposes always-pivotal suppliers to enforcement action if their offers mean they financially benefit from price increases at the node(s) they are pivotal. However, this assessment requires examining their costs of supply, which may not be straightforward. This makes enforcement more complex, so may undermine promotion of efficient trading conduct.

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[94] EA, Feb 2014 at 5.3.14-5.3.17
[95] EA, Feb 2014 at 4.3.2
[96] EA, Feb 2014 at 4.3.3
[97] The safe harbour for generators is in clauses 13.5B(1) and (2). The safe harbour for ancillary service agents is in clauses 13.5B(3) and (4)

88. Further, comparison with offers when a pivotal supplier is not pivotal is not necessarily comparing to a competitive market counterfactual. The non-pivotal offer may have been high for a range of reasons which do not provide a reference point for the efficient price that should have been expected for the pivotal offer under scrutiny.

89. In addition, the safe harbours can be 'gamed' in a variety of ways. They further incentivise pivotal parties to 'massage' their behaviour to fit within the safe harbours, which, while offering benefits to the pivotal party, may well be distortionary and inefficient for the market as a whole.

90. We note, of course, that high prices or increases in prices are not necessarily inefficient. High prices are appropriate when there is scarcity and the means for suppliers to signal this is through higher priced offers that reflect their cost of supply.

Safe harbours are not available to some suppliers

91. As noted above, always-pivotal suppliers cannot access 13.5B(1)(c)(i) and (ii) – which require that offers must either not result in material price increases when pivotal [(c)(i)] or offers must be consistent with offers when the supplier is not pivotal [(c)(ii)]. Always-pivotal suppliers can, however, potentially access 13.5B(1)(c)(iii). It is not necessarily the case that all suppliers should have access to the same safe harbours.

92. The key question is whether the safe harbour that is available to always-pivotal suppliers promotes efficient behaviour. It is not readily apparent that a requirement to not financially benefit from an increase in prices necessarily does this. In particular, whether it does will depend on the particular circumstances of the trading conduct. For example, an always pivotal supplier might not financially benefit from a sustained period of low prices but if this drives another competitor (e.g. a retail competitor) from the market, this would be to its long-term benefit. However, it would not be efficient overall.

Safe harbour can be difficult to apply in practice

93. As noted above, clauses 13.5B(1)(c)(i) and (ii) require comparison of offers for when a supplier is pivotal and not pivotal, but this is not possible for always-pivotal plant. Note that plant can be always pivotal at certain locations (e.g. because it is the only generator or accounts for most of the generation at that location) and/or in certain conditions (e.g. during periods of peak demand).

94. In addition, 13.5B(1)(c)(i) requires the pivotal supplier to consider not just the price of its offers but the effect of its offers on price. While the supplier is in control of its offers, it is not always in control of the resulting nodal price. This is because the price is determined by other factors, including the level of demand and what other suppliers are able to operate and are supplying to the market. As a result, prices can potentially rise at the pivotal supplier's node because of circumstances outside its control. Having said that, the pivotal supplier is still able to influence what the price is at its node through its offer and can consider whether the resulting price would be efficient.

95. Related to this, when high prices do occur, demonstrating that a party is outside the safe harbour under clause 13.5B(1)(c)(i) would entail showing that the offers in question "resulted in" a material increase in the final price. There is considerable scope for legal argument about the meaning of "result in" in this context. For example, whether it means primary direct cause, or positive causative correlation, or a key contributing factor (and if so, what degree of proximity and contribution is required); also whether possible causation comes within "results in" and, if so, how is this assessed.

96. In the decision on the Meridian investigation relating to 2 June 2016, the Authority held that the safe harbour in clause 13.5B(1)(c)(i) did not apply as "there were offers Meridian could have made that would have resulted in the prices being lower".[98] This was viewed by some parties as an over-reach of the trading conduct provisions.

97. Two key points are apparent. First, the boundaries of the safe harbour are uncertain and ripe for legal and technical dispute in court with defending parties seeking to rely on apparently analogous legal tests of "effect" and "causation" that could lead to outcomes not expected by the Authority when it inserted the current clauses into the Code. Second, these issues are a distraction from the fundamental economic question that MDAG considers should be addressed; namely, whether the offer in question was consistent with offers that the generator would have made where no generator could exercise significant market power.

Easy safe harbour for non-pivotal parties

98. Non-pivotal parties are deemed to meet the HSOTC requirement simply by complying with 13.5B(1)(a) and (b). While HSOTC is not likely to be particularly effective at law as a mechanism to prosecute non-pivotal conduct under HSOTC (which is generally market manipulation and insider trading), simply offering all capacity [13.5B(1)(a)] and submitting an offer or revised offer as soon as it can [13.5B(1)(b)] alone is not likely to be sufficient to prevent any market manipulation or insider trading.

Odd regulatory design

99. More broadly, it is a curious regulatory design to set an extremely wide and nebulous legal benchmark ("high standard of trading conduct") – which no one really knows the meaning of – but to mitigate its uncertainty and lack of focus by offering in tandem a safe-zone that partially relates to economic efficiency.

100. As a rough metaphor, the HSOTC standard is like a very diffuse field of light cast across a very broad area, which is accompanied by a relatively concentrated spot light (the safe harbours) pointing to a narrow area within the diffuse field of light, and the rule is if you stand in the spot light you will be safe. It would be better to make the broad field of light less diffuse and more focused on the area of concern.

[98] EA, May 2017

Part D – High level alternatives

Options considered by WAG

101. In the process leading to the HSOTC provisions, WAG considered seven options, in no particular conceptual structure, which were developed in consultation with the Board:[99]

    a. A conduct provision -- of which six variations were considered:

        i. Prohibition on fraudulent activity or prohibition on deceitful acts;

        ii. Prohibition on market manipulation;

        iii. Prohibition on abusing dominant position;

        iv. Requirements to observe ethical standards;

        v. Requirement to act in good faith; or

        vi. Requirement to observe high standards of trading conduct.

    b. A declaration when single generators are expected to be net pivotal and apply earlier gate closure for net pivotal generators' offers (proposed by the Board[100]);

    c. Improve incentives on the grid owner to mitigate pivotal supplier risk via changes to the outage protocol;

    d. Making the grid owner accountable for increased spot market costs caused by pivotal suppliers during outages (proposed by Board[101]);

    e. A general cap on offers or spot prices in all trading periods;

    f. A temporary capping mechanism on pivotal supplier offers in a pivotal region; and

    g. Contract offer obligations on pivotal suppliers.

102. Some of these options were evaluated by WAG in more detail than others. WAG's assessment of pros and cons has been considered in MDAG's evaluation below.

103. WAG also considered the Commerce Act and concluded that it is unlikely to be effective in addressing most pivotal supplier situations as it only applies to coordinated action of two or more parties, or to a party acting with a clear anti-competitive purpose beyond simply raising prices.[102]

[99] WAG, May 2013 at 4.3
[100] The Board also proposed that this option 3 should include advanced publication of the offer prices of pivotal generators that are subject to early gate closure – see WAG, Sept 2013 at 3.1.4(a)(iii)
[101] The Board's aim with this option was to encourage Transpower to contract with generators for pivotal generation during outages - see WAG, Sept 2013 at
[102] WAG, May 2013 at 4.1.1

104. In addition, WAG considered the undesirable trading situation (UTS) provisions.[103] WAG observed that, in principle, these might be used to address pivotal supplier situations. However, WAG raised two concerns. First, that the UTS thresholds are relatively high and it was not clear whether a localised pivotal supplier situation would meet this test. Second, that the effects of individual events on efficiency may be cumulative, whereas the UTS test is event specific. WAG therefore preferred a more targeted approach to provide participants with greater certainty.[104]

First principles perspective

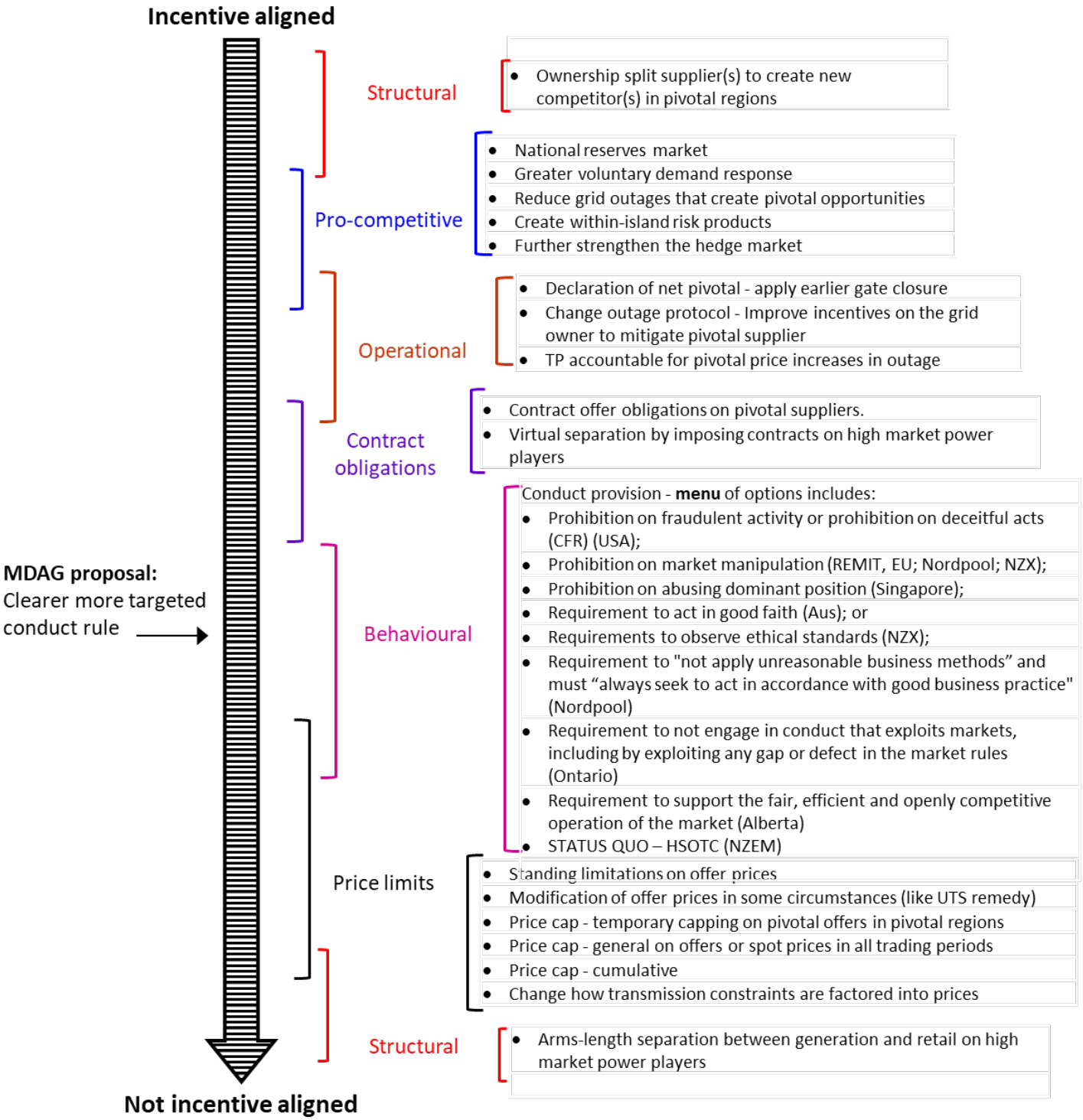
105. It is helpful to consider options for addressing the potential exercise of market power from a first principles perspective. Figure 6 below approximates how well measures align (when in place) with the economic incentives of market participants. It is only broadly indicative.

[Go to next page]

[103] WAG, May 2013 at 4.2.2 and 4.2.3

[104] Note that the UTS definition was amended to make it clear that the HSOTC provisions do not preclude also using the UTS provisions for situations that may be covered by the HSOTC provisions – see EA, Feb 2014 at 4.11. See also the clause (b) in the definition of UTS in the Code

Figure 6: Spectrum of options for addressing market power in an electricity spot market



106. From first principles, measures that seek to require parties to act in a way that is contrary to their underlying capacity and incentives tend not to work so well. Typically, conduct provisions tend to be not well aligned to participants' incentives and so tend to be comparatively ineffective.

107. As Prof Paul Joskow observed: "Market power is a significant potential problem in electricity markets, but the cure can be worse than the disease. Try to deal with potential market power structurally ex ante rather than ex post."[105] Likewise, Prof Stephen Littlechild opines that, given the difficulties of satisfactorily defining and proving anti-competitive conduct, it is better to focus on structure and incentives in designing remedies (new entry, enforced divestment, contracts markets and the like), rather than on conduct.[106]

108. The HSOTC provisions come within the behavioural category of options. To the extent that it relates to pivotal situations, HSOTC amounts to a nebulous exhortation calling on pivotal parties to act in a manner that is at odds with their capacity and incentives. At a qualitative level, this lack of incentive alignment would suggest that, over time, the HSOTC may be comparatively ineffective. This is compounded by uncertainties as where the courts will set the boundaries.

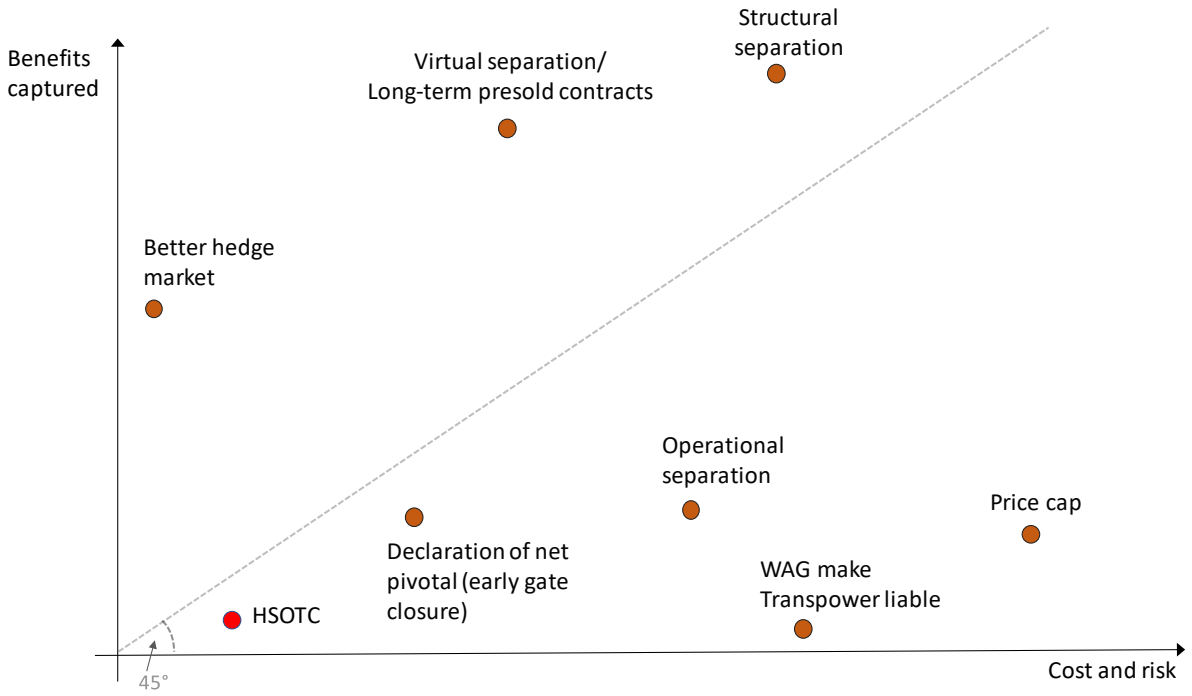
Evaluation of high level alternatives

109. Factors previously considered by WAG and the Authority have been taken into account, including their four assessment criteria, which were consumer confidence in pricing outcomes, investor confidence in last resort plant or demand response, implementation costs and timeframes, and unintended adverse impacts.[107]

110. Figure 7 below shows MDAG's high level view of the degree to which key options would capture benefits relative to the costs.

[105] Joskow, 2007, Lessons Learned from Electricity Market Liberalization, page 12 - http://econwww.mit.edu/files/2093 cited in Investigation Report: Commerce Act – Electricity Investigation", Commerce Commission 21 May 2009 at 665
[106] Littlechild, 2001
[107] WAG, Sept 2013 at 5.2

Figure 7: Benefits relative to cost for key options



111. A brief summary of the high level conclusions reflected in Figure 7 above is as follows:

a. **HSOTC requirement (status quo) –** At an empirical level, we have not found any appreciable effect, positive or negative, from the HSOTC provisions or the Authority's enforcement actions to date. The legal and economic meaning of "high standard of trading conduct" is amorphous. It relies on safe harbours to reduce uncertainty for suppliers as to whether they comply.

b. **Structural separation** (ownership separation) – In principle, this is a first-best option for substantially reducing market power (recognising that the physical characteristics of almost any electricity market mean that it is uneconomic to remove all constraints). However, given the relatively low value and high uncertainty of potential efficiency gains compared to the higher and more certain implementation and transition costs involved in structural separation, the case for structural separation to address pivotal pricing risks in the New Zealand market is *prima facie* not satisfied.

c. **Virtual separation** (compulsory pre-selling of supply) **–** This option would require pivotal suppliers to pre-sell in long-term contracts a sufficient proportion of their supply so that they were, in effect, no longer pivotal. This would largely remove incentives for pivotal behaviour, except perhaps in the period immediately before the expiry of the contract (where there may be incentives to behave so as to increase the value of future contracts). Anti-avoidance provisions would be required to ensure the provision was not gamed over time. Implementation, monitoring and enforcement costs are likely to be high. There is also a significant risk that the mechanism would undermine incentives for innovation by the supplier. This option would be in the mix if the gains from avoiding inefficient pivotal pricing were assessed to be greater than the costs of virtual separation. Based on analysis to date, this does not appear to be the case.

d. **Structural** (arms-length or operational separation) – This option has a range of variations. In essence, it would require a pivotal supplier to operate its generation as if it were owned separately from its retail business (or as if its multiple generation units were owned independently of each other). It tends to run into problems for a range of reasons, in particular the incentives and practical ability of the pivotal supplier to beat the arms-length rules, even with extensive monitoring. Transactions costs tend to be high. History in the telecommunication sector suggests it has not been especially effective. In the 1990s, arms-length separation was also explored in some detail as an option for separating lines from generation and retail businesses, but it was viewed as highly likely to be ineffective.[108]

e. **Price cap** – "*While such price caps may temporarily ease the pain, they will make the patient sicker by the end of the day*". In short, price caps are best treated as a last resort tool, and should not be considered unless other improvements have been exhausted or ruled out.[109]

f. **Hedge market improvements** – While the Authority's market performance review in relation to the high price event of 2 June 2016 found that the range of available financial products was sufficient for Meridian to manage the risk of price separation[110], the Authority did, however, acknowledge that the flow of rentals in the current FTR market give it "relative poor hedging properties"[111]. The Authority has a review of the FTR market in progress. MDAG is not aware of its likely proposals. There may be benefits in short timeframe FTRs and FTRs at more nodes. This could deepen the hedge markets; however, it is not clear that it would significantly weaken pivotal suppliers' incentives to their market power to manage basis risk. Further, more bespoke FTRs could have relatively high implementation costs. For now, therefore, MDAG is agnostic on this category of measures.

[108] We note that there are arms-length requirements under the Electricity Industry Act 2010 in relation to ownership and operation of lines, generation and retail below certain thresholds

[109] The quote and the rest of the bullet point comes from "Ministerial Review of Electricity Market Performance", Electricity Technical Advisory Group and the Ministry of Economic Development, August 2009, Volume 2, at Appendix 20 (Rejected Options), 421 – 423, which cited *Commerce Act 1986 S27, S30 and S36 electricity investigation report*; quoting Shmuel Oren and Pablo T. Spiller; Commerce Commission, 21 May 2009 at paragraph 659;

[110] EA, Dec 2017 at 7.4 and 7.7. Further, it appears that Meridian conceded in the trading conduct investigation that then currently available financial risk management products are adequate. Note that the Authority's view that the hedge market options were sufficient was a change from the Authority position in its UTS decision, in which the Authority observed that financial and other risk management tools available to Meridian to manage basis risk may **not** have been sufficient for its purposes – see EA, Aug 2016 at 9.6(b) and 10.13.

[111] EA, Dec 2017 at 7.11.

g. **Other measures –** To provide contrast, Figure 7 above includes WAG's options of making the grid owner accountable for increased spot market costs caused by pivotal suppliers during outages, and the option of a declaration when single generators are expected to be net pivotal and apply earlier gate closure for net pivotal generators' offers. The pros and cons of these options are set out in WAG's 2013 consultation paper[112]. MDAG has not undertaken any further analysis of those options. A further option has been mentioned – namely, requiring a pivotal supplier to hold financial risk management cover for its exposure to downstream high prices if its supply is constrained upstream. Given its likely complexity and costs, this has not been considered by MDAG. Since the introduction of Regulatory Control Period 2 (2015 – 2020) under the Commerce Commission's individual price-quality path for Transpower, financial incentives on grid availability have been introduced for the grid owner. This has driven some changes in grid owner behaviour since WAG completed its analysis, for example increased consultation on impacts of planned transmission outages.

[Go to next page]

[112] WAG, May 2013 at 4.6 and 4.8

Part E – Preferred alternative

Approach

112. The HSOTC mechanism was chosen by the Authority and a majority of WAG as a "precautionary" and "light handed" measure assuming costs close to nil.[113] However, the Authority indicated that it would consider more stringent measures if required, and that this was in accord with the WAG's recommendation to "consider other options if these measures don't adequately address concerns about pricing in pivotal supplier situations".[114]

113. MDAG considers that an improvement is required to address the problems outlined in Part C above. Given the uncertainty of potential efficiency gains, and therefore the need for a low cost intervention, MDAG has focused on developing an improved behavioural measure.[115]

114. As set out Part B above, it seems clear that the Authority's intention is that pivotal situations should be evaluated using a relatively orthodox economic efficiency framework where the central question is whether the offers under review would have occurred if the market in the relevant trading periods had been competitive. We would suggest simply saying this clearly in the Code, rather than relying on the current obtuse formulation.

MDAG's proposal

115. MDAG's proposal is to delete existing clauses 13.5A, 13.5B and the definition of "pivotal" in the Code and replace those provisions with the following:

13.5A Conduct in relation to generators' offers and ancillary service agents' reserve offers

(1) Where a **generator** submits or revises an **offer** for a **point of connection** to the **grid**, that **offer** must be consistent with **offers** that the **generator** would have made where no **generator** could exercise significant market power in relation to that **point of connection** to the **grid** for that **trading period**.

(2) Where an **ancillary service agent** submits or revises a **reserve offer** for a **point of connection** to the **grid** (including an **interruptible load group GXP**), that **offer** must be consistent with **reserve offers** that the **ancillary service agent** would have made where no **ancillary service agent** could exercise significant market power in relation to that **point of connection** to the **grid** for that **trading period**.

(3) The purpose of this clause 13.5A is to promote offer behaviour and efficiency outcomes consistent with competitive markets, in particular so that—

[113] WAG, May 2013 at 3.4.4 and 3.4.5 and EA, Feb 2014 at 3.3.3, and 5.4.11. It was also viewed as flexible, readily reversible and having low risk of unintended consequences - see WAG, May 2013 at 3.4.4 and 3.4.5 and WAG, Sept 2013 at 5.1.1
[114] EA, Feb 2014 at 3.3.3
[115] Recognising the inherent limitations outlined above in relation to weak alignment of incentives for conduct rules

(a) the prices of **offers** or **reserve offers** do not exceed, by too much or for too long, the associated economic costs to the **generator** or **ancillary service agent** respectively, assuming a market in which no **generator** or **ancillary service agent** has significant market power;

(b) with the effect that **offers** or **reserve offers** made by **generators** or **ancillary service agents** promote efficient:

(i) consumption decisions by **consumers**; and

(ii) production decisions by suppliers (including **generators** and providers of **electricity** services); and

(iii) innovation and investment by suppliers and **consumers** (including the location of their investments); and

(iv) risk management and risk management markets,

in relation to the **point of connection** to the **grid** (including an **interruptible load group GXP**) at which the **generator** or **ancillary service agent**, as applicable, submits or revises an **offer** or a **reserve offer**, and any **node** in respect of which the **offer** or **reserve offer** may have a material influence on efficiency outcomes of the kind referred to in subparagraphs (i) to (iv);

(c) where, for the purposes of paragraph (a), the term "economic costs":

(i) when assessed in relation to short-run costs, includes scarcity rents and the opportunity cost of generating **electricity** or of providing **instantaneous reserve**, as applicable;

(ii) when assessed in relation to long-run costs, includes recovery of capital costs with a suitable premium for risk.

Drafting note: The use of the long dash (em dash) in the above drafting ("in particular so that—") signifies that paragraphs (a) to (c) which follow are essentially one continuous sentence.

116. The rationale for our proposal is outlined more fully below.

Rationale for our proposal

Counterfactual approach

117. Our proposal is to compare the offer in question to the offer that the supplier would have made in a market where no party could exercise significant market power. Absence of significant market power is a defining element of workable competition.[116] However, as explained below, the advantage of our proposal is that it cuts through some of the uncertainty around "workable competition" and sets out directly the assessment framework to be used.

118. The counterfactual approach in our proposal is drawn from the well-established test in competition law for gauging whether substantial market power has been used.[117] A party's actual conduct is compared to what the party would have done in a hypothetically competitive market in which it is not dominant (or does not have a substantial degree of market power).[118] Our proposal builds in a hypothetical counterfactual test but, for reasons explained below, we are using the expression 'significant' rather than 'substantial' as the threshold

'Significant' market power

119. The expression 'significant' in our proposal is drawn from the High Court decision in *Wellington Airport*[119]. We are not using 'substantial', which is used in the prohibition on taking advantage of market power under section 36 of the Commerce Act. There are two key reasons for this. First, "substantial degree of power in the market" in section 36 is typically used to refer to the existence of market power over much longer periods than the short run occurrences that can cause concern in the electricity spot market. Second, section 36 cases involve showing that a party acted with a clear anti-competitive purpose beyond simply raising prices.[120] Anti-competitive purpose is not a necessary criterion in assessing whether an offer is efficient and so anti-competitive purpose is not required under our proposed standard.

120. The threshold of when market power becomes 'significant' under our proposed standard is obviously a key parameter. It is a central question in competition law in general. What it means in a given fact situation is, inescapably, a matter of judgement for the Courts.

121. A brief summary of the relevant economic theory and law may be helpful. Competition occurs in varying degrees of rivalrous pressure. In principle, competition reduces as market power increases. In its pure definition, market power is the ability "to affect the market price even a little and even for a few minutes"[121], or to set a price in excess of marginal cost[122].

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[117] s.36 of the Commerce Act 1986
[117] s.36 of the Commerce Act 1986
[118] Supreme Court's decision in Commerce Commission v Telecom Corporation of New Zealand Ltd [2010] NZSC 111 at 13 and 31 - 33
[119] [2013] NZHC 3289 at 15
[120] WAG, May 2013 at 4.1.1. This was also noted in Part D above
[121] "Power System Economics," Dr Steven Stoft, at p 318, which adds: "This definition may sound harsh, but it is not. It is simply a definition without punitive implications" – cited in ComCom, May 2009 at 242.
[122] At law, market power is the ability to raise prices above marginal costs both sustainably and profitably - *Southern Cross v Commerce Commission* (2001) 10 TCLR 269. Unilateral market power is the ability to reduce output or increase offer prices in order to change the market price – ComCom, May 2009 at paras 208 and 242, which cites Borenstein S, *Understanding Competitive Pricing and Market Power in Wholesale Electricity Markets*, University of California Energy Institute, and NBER Working Paper No. CPC99-08, 1999 - http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1018&context=iber/cpc. .

122. Prof George Yarrow and Dr Chris Decker point out that these definitions imply that market power is almost ubiquitous. What matters is the degree to which prices can be influenced by one party or group of co-ordinating parties, or the degree to which prices can be set above some relevant measure of economic costs. They observe that, for these reasons, the term market power in competition law and public policy generally appears with a qualifying adjective such as 'significant' or 'substantial' so as to focus on the issue of interest, the degree or level of such power.[123]

123. The central question then is when is market power to be considered significant? Yarrow and Decker observe that the threshold is "often fuzzy". In their view, this is when the potential for inefficiency or harm is sufficiently high to warrant the incurring the costs of intervening.[124]

Competitive benchmark

124. Comparing market clearing prices with marginal supply costs is a widely accepted method for measuring the presence of market power.[125] However, this depends crucially on choices relating the composition and measurement of marginal costs and the degree of competition assumed for the benchmark market.

125. While recognising that perfect competition does not exist[126], the hypothetical counterfactual in our proposed standard assumes a strongly competitive market[127] in which and there is sufficient rivalry between sellers to push offer prices close to their associated efficient costs[128].

126. Under our proposal, costs are 'economic costs'. [129] When assessed in relation to short run costs, this includes scarcity rents and the opportunity costs of generating[130]. When assessed in relation to long run costs, it includes recovery of capital costs with a suitable premium for risk[131]. Economic costs in relation to wholesale electricity production are described further in Annex 3.

[123] The source for this paragraph is Yarrow and Decker, Nov 2014, at page 21. Note footnote 14, which cites Dr Steven Stoft's definition of market power – the same reference used by the Commerce Commission in its definition of market power referred to above. Yarrow and Decker further point out that the relationship between a high degree of price influence and inefficiency is not exact because price influence can have beneficial effects as well as harmful effects – indeed modest levels of price influence are generally beneficial, hence their ubiquity – and the balance of advantages and disadvantages is sensitive to the particular details of the relevant context. They observe that price influence is central to the discovery processes that drive economic adaptation and progress. They also add that a market in which individual participants each have only limited price influence would typically be described as "competitive", not as a market characterised by low levels of market power, even though it can be maintained that the latter description is accurate.

[124] Measuring both potential harm/inefficiency and costs of intervention in net present value terms – see Yarrow and Decker, Nov 2014, at page 21, paras 4 and5

[125] Joskow, Kahn, 2000, p. 9 (earlier version of their March 2001 paper)

[126] *Wellington Airport* [2013] NZHC 3289 at [11] and [25], which is set out in Annex 2

[127] It is well established in law and economics that "the outcomes to be pursued are the outcomes produced by the more strongly competitive markets"- see for example, *Wellington Airport* [2013] NZHC 3289 at [24(h)], which is set out in Annex 2

[128] This is adapted from *Wellington Airport* [2013] NZHC 3289 at [15], which is set out in Annex 2

[129] Economic costs in relation to wholesale electricity production are described further in Annex 3, including "short run marginal cost" and "long run marginal cost"

[130] or of providing instantaneous reserve

[131] The orthodox definition of LRMC includes an appropriate risk adjusted return on investment if all inputs were adjusted optimally, including capital investments (which in reality take years to change). See also "A Critique of Wolak's Evaluation of the NZ Electricity Market: Introduction and Overview", Prof Lewis Evans, Seamus Hogan and Peter Jackson, Working Paper No. 08/2011 at page 9.

127. Some parties may perceive that our proposal could allow the use of a general SRMC benchmark that does not adequately allow for recovery of fixed costs, capital charges in particular. In our view, this perception is misplaced. As Prof George Yarrow and Dr Decker point out, short-run efficiency requires clearing prices to reflect economic cost, which includes scarcity rents.[132] Scarcity pricing is not a departure from the basic principle of short run marginal cost pricing.[133] Further, Prof James Bushnell (with two colleagues) observes that, in a competitive market with free entry, the scarcity rents will on average equal the cost of new capacity over time.[134] In short, the net present value of efficient SRMCs should equal LRMC over time. Yarrow and Decker appear to hold the same view.[135] In this sense, there is no conceptual conflict between using SRMC and LRMC as the efficiency benchmark.

128. Our proposal does not prescribe whether SRMC or LRMC should be used as the counterfactual. Which is appropriate will depend on the circumstances. For a short term event, SRMC may be best. If the offers in question have longer term implications, a comparison of trends toward LRMC may be better. It will be for the enforcement decision-maker (Authority, Rulings Panel or Courts) to decide. This is no different to the status quo. The same issue and choice arise in any application of HSOTC to a pivotal situation or indeed any other offer.

129. While perfect competition does not exist and therefore offer prices may never exactly reflect efficient costs, offer prices in our proposed counterfactual of strong competition are not expected to exceed economic costs by too much or for too long[136].

130. Offer prices exceeding associated efficient costs "by too much" or "for too long" should be disciplined by effective rivalry. If this does not happen, it would indicate significant market power that the competitive process is not countering. In turn, this would indicate that the standard in our proposed rule has not been satisfied.

131. What is "too much" or "for too long" is unavoidably a matter of judgement – there is no mathematical algorithm or black and white boundary. A key benefit of our proposal is that the boundary judgements to be made (as to whether our proposed standard has been satisfied[137]) sit within an established and coherent economic framework that gives effect to the Authority's statutory objectives. By contrast, "high standard of trading conduct" invites justifications for offer behaviour that are unrelated to normal efficiency measures associated with competition.

[132] Yarrow, Decker, Nov 2014 at p.4, 2nd to last para

[133] While there may be few hours when capacity constraints are binding, energy prices would likely go to very high levels as demand is price-rationed and yield substantial revenue for all generators which would allow them to recover their capital costs in long run equilibrium - Joskow, Paul L. 2008, "Capacity Payments in Imperfectly Competitive Electricity Markets," Utilities Policy, 16:159-170.

[134] Bushnell, J, Flagg, M, Mansur, E, Electricity capacity markets at a crossroads, DEEP WP 017, UC Davis Energy Economics Program, page 11.

[135] Yarrow, Decker, Nov 2014 at p.22, 1st para: "there is no conceptual difficulty in extending the definition [LRMC test] to encompass assessments of rather shorter term price movements, or periodic but recurring spikes in prices, which lead to a deviation between the NPVs of revenues and costs of equivalent value to that implied by the AEMC test as currently specified. In both cases the NPVs of the returns from above-cost pricing, which is the underlying measure of the potential for harm, would be the same".

[136] This is adapted from *Wellington Airport* [2013] NZHC 3289 at [15], which is set out in Annex 2

[137] That is, proposed clauses 13.5A(1) and (2)

132. We note that the High Court in *Wellington Airport* used a similar formulation – that in a market where no firm has significant market power, "prices are not too much or for too long significantly above costs"[138]. The use of 'economic costs' in our proposal is a key difference, which obviates the rationale for including "significantly" as in *Wellington Airport.* To include it would imply a greater latitude for market power rents than is intended in our proposal.

133. We have set out in Annex 3 a brief distillation of the efficient pricing benchmark and why MDAG's proposal makes sense in relation to assessing whether offer prices represent an exercise of significant market power.

Economic efficiency purpose

134. A critical point of calibration in assessing whether offer prices exceed associated efficient costs "by too much" or "for too long" is whether the assumptions and yardsticks in the counterfactual give rise to the efficiency outcomes referred to in our proposed clause 13.5A(3)(b). It is well established in law and economics that the purpose of strong competition, which puts downward pressure on costs and causes prices to reflect costs, is to drive economic efficiency outcomes. In the context of the wholesale electricity market, this means efficient:

    a. Consumption decisions by consumers;

    b. Production decisions by suppliers;

    c. Innovation and investment by both suppliers and consumers, including locational signals for suppliers (generators and other providers of electricity services) and consumers; and

    d. Risk management and risk management markets.

135. In some cases, trade-offs are required between different types of efficiency[139] which have to be optimised overall.

136. These efficiency outcomes were in concept central to the Authority's analysis in its decision and market performance assessment in relation to the high price event of June 2016.[140]

137. We had considered including a link between these efficiency outcomes and workable competition, however on reflection we think this is both unnecessary and a source of potential confusion in that it is likely to provide a hook to reintroduce the concerns we are seeking to by-pass or mitigate in our standard.

No adverse impact on investment

138. Given the approach to economic costs outlined above, our proposal is not intended or expected to adversely affect incentives to provide capacity. On the contrary, our proposal recognises that in an energy-only market, spot prices need to be able to reach high levels at times properly reflecting efficient economic costs.

[138] *Wellington Airport* [2013] NZHC 3289 at [15], which is set out in Annex 2
[139] For example, Yarrow and Decker, at the bottom of page 6; and ComCom Jun 2009 at 4.12
[140] EA May 2017; EA Dec 2017

139. For example, our proposal is intended to allow a thermal generator to signal, through a high offer price, that its opportunity cost of generating in the relevant period were high when referenced to a preferred future period, based on start-up costs and the opportunity cost of the fuel. In other words, the thermal generator expects to get higher value from burning its fuel in the future when scarcity is greater, even if its plant runs less frequently, and this opportunity cost of generating supports a high offer price in the current trading period. Similarly, our proposal is intended to allow a hydro-generator to offer at a high price when it expects its water to have that high value in a future period.

140. If the spot market were to clear at the high price in the above examples, it should be due to a tightening of supply relative to demand – that is, an increase in market price (moving up the supply curve) in order to bring supply and demand into balance. In economic terms, this may reveal a scarcity rent, which is that part of the price increase necessary to curtail some demand when the alternative would have been a shortfall in supply relative to demand[141]. As noted above, in a competitive market with free entry, the scarcity rents will on average equal the cost of new capacity over time.[142]

141. In each example above, the generator would be able to show that the offers in question satisfied our proposed standard[143].

Why not "workable competition"

142. If we were to compare the offer in question with the offer that the supplier would have made in a market with "workable competition" –

    (a) A supplier would be able to argue that its offer under this counterfactual would be the same (or close to) the offer actually made because workable competition accommodates passing periods of weak or very limited competition and the supplier would cite other apparently plausible reasons for its high offer.

    (b) It would also be argued that price efficiency under workable competition is gauged by reference to the tendency of spot prices over the longer term relative to LRMC, not by short term prices in isolation, which would therefore support the supplier arguing that the trend of its offers over the longer term is consistent with LRMC despite its apparent transient exercise of market power. For the avoidance of doubt, our proposal is not intended to allow the transient exercise of market power.[144]

    (c) Further and more generally, as Bell Gully has observed, there remains real uncertainty about the meaning of "workable competition".[145] Our aim is to bypass and where possible narrow much of this uncertainty by expressing our proposed standard in more direct terms.

[141] Bushnell, J, Flagg, M, Mansur, E, Electricity capacity markets at a crossroads, DEEP WP 017, UC Davis Energy Economics Program, page 11.
[142] Bushnell, J, Flagg, M, Mansur, E, Electricity capacity markets at a crossroads, DEEP WP 017, UC Davis Energy Economics Program, page 11.
[143] That is, clause 13.5A(1)
[144] See Annex 2, paras 215 to 216
[145] www.adls.org.nz/for-the-profession/news-and-opinion/2014/2/28/working-with-workable-competition/

143. For these reasons, we have not used the expression "workable competition" as our benchmark. Our formulation is intended to cut through some of the uncertainty around "workable competition" and set out directly the assessment framework to be used – namely, a comparison of the actual offer to the offer that would be made in a counterfactual that assumes no significant market power in the trading periods under review.

144. Our understanding of the law and economics in relation to workable competition is set out in Annex 2.

Purpose statement

145. The framework and rationale outlined in paragraphs 117 to 143 above are fundamental to how our proposed standard is intended to work, so we have distilled this into a statement of purpose, as set out in proposed clause 13.5A(3). Consistent with the Acts Interpretation Act 1999, the meaning of our standard in proposed clauses 13.5A(1) and (2) would have to be ascertained from its text and in the light of statement of purpose in proposed clause 13.5A(3).[146]

No safe harbours but possible further guidance

146. Unlike the HSOTC mechanism, our proposal does not include codified safe harbours. The existing safe harbours are there, in essence, to compensate for the uncertainty of what HSOTC means and how to comply with it. As the Authority put it: "The safe harbour principles provide a high degree of certainty for suppliers, and therefore reduce the risk of unintended adverse consequences that could arise if there was no codification of what constitutes acceptable market conduct".[147]

147. As outlined in Part C above, the safe harbours have a range of significant problems. We think the solution is to fix the underlying issue that gave rise to the perceived need to provide safe harbours – namely, frame the test in a clearer and more targeted manner, which is the essence of our proposal.

148. We would suggest exploring further the idea of issuing formal non-binding guidance, which would further set out the Authority's interpretation of the economics and law relevant to the proposed standard that would be applied in any compliance and enforcement, which market participants could then reflect in their internal wholesale trading protocols and strategies. We suggest these guidelines would draw heavily on Annex 3: Efficient pricing benchmark.

[146] See section 5 of the Acts Interpretation Act 1999. For completeness, we note that an "enactment" in that provision includes rules made under an Act

[147] EA, Feb 2014 at 4.3.2(a). The idea of guidance principles, which could be expressed as safe harbours, was developed by WAG in response to concerns raised by market participants in the WAG consultation process in relation to a possible conduct provision – see WAG, Sept 2013 at 6.1.4. In proposing the safe harbours, the Authority was particular to point out "an important distinction between the "safe harbours" as used by the Commerce Commission and as used by the Authority in this proposal is that within the Commerce Commission safe harbours, an acquisition could still be challenged. In contrast, the safe harbours under the Code will provide complete assurance if the conduct requirements are met" – see footnote 2 in EA Feb 2014

149. We have considered whether to create express requirements to offer all available capacity, and to make any changes to offers as soon as possible (which are currently in the safe-harbour provisions[148]). We consider that withholding capacity and making late changes to an offer would be inconsistent with offering where no generator (or ancillary service agent) could exercise significant market power and therefore do not need to be included as express requirements in the proposed standard. However, it may be helpful to cover these points in guidelines.

150. We would stress that it is not possible (or advisable) for the rules in this field to prescribe definitive boundaries that apply in all situations. However, the underlying economic principles can be reflected by market participants in their policies and procedures for trading to ensure they meet the proposed requirements. Each market participant will have its own approach reflecting its risk appetite and capability.

Scope of new provision – all offers and at all times

151. Like the current HSOTC mechanism, our proposal would apply to all offers into the electricity spot market (including reserve offers) at all times.[149]

152. WAG's recommendation in relation to the HSTOC provision was that it should apply to suppliers only when they are gross pivotal. However, given the Authority's view that the safe harbour principles would appropriately reduce the risk of unintended adverse consequences, the Authority decided that the HSOTC requirement should also apply at all times.[150] The Authority considered that the evidence of possible adverse outcomes was not sufficient, and that limiting the provision to pivotal supplier situations would (i) fail to capture the full efficiency benefits of the proposal and (ii) require participants to know when they are going to be pivotal when often this is not the case.[151] We think this reasoning applies to our proposal, and therefore we do not propose to limit its application to pivotal or net pivotal supply.

153. As outlined above, framing the standard in a clearer and more targeted manner, combined with formal interpretation guidance from the Authority, obviates the need for safe harbours to reduce the risk of unintended consequences.

[148] Existing clauses 13.5B(1)(a) and (b)

[149] A question has been raised as to whether, in principle, the proposed new provisions should also apply to the hedge (for example financial transmission rights) and retail markets. MDAG has not considered this issue as it is outside the scope of the Authority's brief.

[150] EA, Feb 2014 at 4.6.3

[151] The reasons given by the Authority for widening its application to cover all trading periods were twofold: first, the evidence of possible adverse outcomes was not sufficient; and second, limiting the provision to pivotal supplier situations would (i) fail to capture the full efficiency benefits of the proposal and (ii) require participants to know when they are going to be pivotal when often this is not the case – see EA, June 2014 at 29.

154. Some may argue that our proposed standard should be restricted to just pivotal, or even just net pivotal, situations. A wider question needs to be considered in this regard: why should an orthodox efficiency and competition standard, which underpins the market's purpose, apply only to those more limited supply situations? Why should it not apply to the spot market as a whole? The safe-harbour in our proposal is available by simply offering on the basis that no party has significant market power. This also recognises that offers should reflect both scarcity rent and the supplier's opportunity cost of generating[152], which of course the supplier is best placed to quantify and explain in any review process.

155. Further, on a practical level, it can be difficult for a supplier to determine in real-time whether it is pivotal and, if so, whether it is net pivotal. In addition, the threshold for proving a breach is relatively high and this is likely to limit enforcement to serious cases.

156. However, while we consider that our proposed standard should apply to all offers, we seek feedback on adopting this approach relative to limiting its application to pivotal or net pivotal supply.

Full replacement of HSOTC

157. Our proposal is to replace the HSOTC provisions as a whole. (Clauses 13.5A, 13.5B and the definition of "pivotal" in clause 1.1 of the Code would be deleted).

158. We consider that the proposal better addresses the predominant purpose of the HSOTC provisions, which (in the Authority's words) is "to improve the efficiency of prices in pivotal supplier situations"[153] or (as the Authority also put it) "to improve confidence in the efficiency of prices when competitive pressures in the wholesale market are weak".[154]

159. To the extent that the Authority would like the Code to cover other categories of behaviour that it may have hoped or perceived were covered by the HSOTC, we would recommend that specific provisions covering those behaviours are put into the Code for that purpose.

160. As noted in Part C above, the idea that an amorphous, single sentence HSOTC requirement may be effective in capturing unwanted behaviours beyond pivotal abuses is likely to be somewhat illusory. More targeted prohibitions, similar to those used in analogous markets, are likely to be necessary to effectively capture categories of behaviour such as insider trading or market manipulation.

161. Market manipulation and insider trading are both complex and relatively sophisticated categories of unwanted behaviour. Analogous markets have detailed sets of provisions in their codes with extensive definitions and requirements that identify and proscribe the behaviour in question, rather than purporting to rely on a nebulous "good conduct" requirement. Those more detailed rules require a reasonably sophisticated understanding of how the behaviour might occur and the boundaries of when it becomes unwanted, which in turn shape careful legal definitions and linkages to relevant case law.

[152] or of providing instantaneous reserve

[153] Letter of 8 May 2017 from the Authority to Mark Binns of Meridian Energy and EA, May 2017, page 2. As the Authority notes, "improving efficiency would provide confidence to consumers about the efficiency of pricing in pivotal supplier situations and so not incur a retreat in trading activity in the wider market" – see EA, Feb 2014 at 5.3.1 and 5.5.2 -- see also 1.1.1, 4.2.2, 4.9.3, 5.1.1

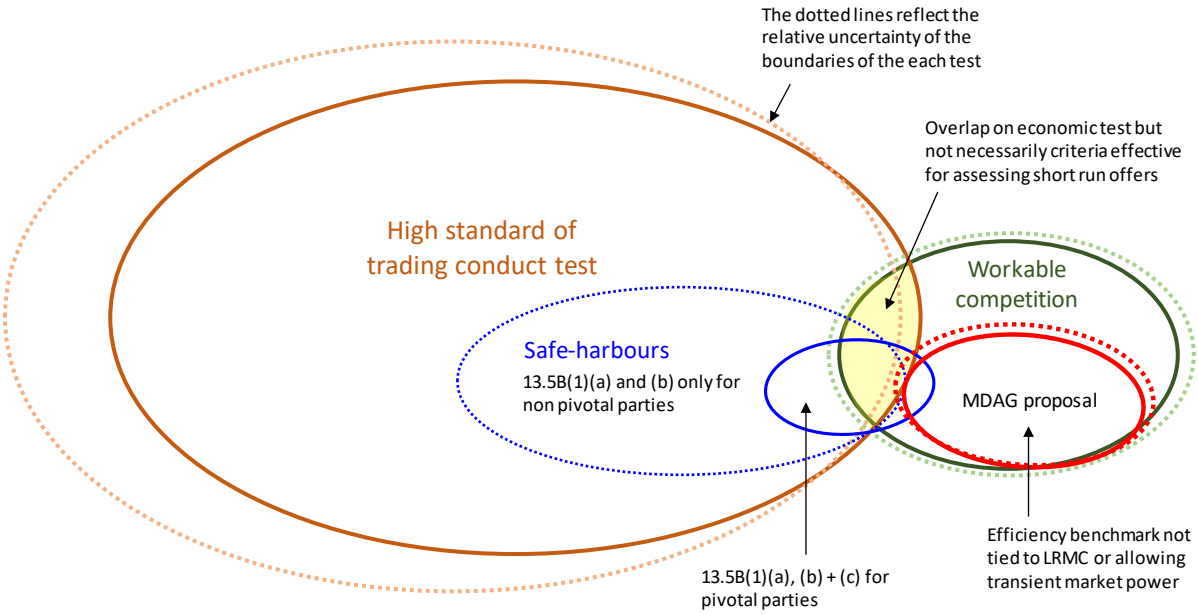
[154] Letter from Authority to WAG Chair, 22 June 2012, WAG work plan

162. By way of an outdoor (or wildlife) metaphor, single all-purpose traps are usually quite ineffective at capturing pests. Tailor-designed traps are required for specific types of pests.

Overview – a conceptual comparison of MDAG proposal and HSTOC provisions

163. Figure 8 below seeks to show in a diagram how the proposal compares to the existing HSOTC provision at a conceptual level in terms of focus.

Figure 8: MDAG's proposal compared to HSOTC at a conceptual level in terms of focus



Evaluation of proposal

164. As noted above, our proposal sits within the category of conduct rules in the spectrum of options for addressing market power. It therefore comes with inherent limitations outlined in Part D above in relation to weak alignment of incentives. This approach reflects that the potential efficiency gains are uncertain and therefore cost of the intervention needs to be low.

Requirements for amendments of the Code

165. As we noted in Part A, but subject to our earlier comments in that regard, the Authority Board has indicated it is open to moving directly to amending the Code after receiving MDAG's recommendations on the matters addressed in this discussion paper, which we will prepare following this consultation. We note that before amending the Code, the Authority must publicise a draft of the proposed amendment (as required by s.39(1)(a) of the Act) and, if not relying on an exemption in s.39(3) of the Act, prepare and publicise a regulatory statement (s.39(1)(b) of the Act). As stated in s.39(2) of the Act, a regulatory statement must include:

a. a statement of the objectives of the proposed amendment

b. an evaluation of the costs and benefits of the proposed amendment

c. an evaluation of alternative means of achieving the objectives of the proposed amendment.

166. We describe our assessment of the proposal in relation to these matters below.

Objectives of proposal

167. The objectives of the proposal are to promote efficient prices in the spot market for electricity in New Zealand by deterring abuse of market power by generators and ancillary service agents.

Cost-benefit analysis

168. Table 1 compares the degree to which our proposal and the status quo address the scope of risk arising from potential situations outlined in Part B above.

Table 1: Summary of evaluation of MDAG's proposal and the status quo

	MDAG's proposal	**Status quo (HSOTC provisions)**
Effectiveness in promoting efficient prices (deter inefficient)	Medium	Low
Risk of adverse efficiency effects (including unintended consequences)	Low	Low - medium (due to safe harbours)
Compliance and transaction costs for participants	Low (medium for transition)	Low (due to vagueness of HSOTC + safe harbours)
Implementation (time / effectiveness)	Low (relative to other options)	NA
Enforceability (includes legal certainty)	Medium	Low
Overall conclusion: balance of benefits and costs	Net positive	Neutral (no evidence it is net positive)

169. Detailed cost-benefit analysis of the proposal is set out in Annex 4. The cost-benefit analysis involves a qualitative assessment of the benefits of the proposal relative to the status quo (the existing HSOTC requirements in the Code). This is because assessing the likely outcomes from both the existing Code and the proposed Code is influenced by subjective judgements about participant behaviour, so it is difficult to meaningfully quantify estimates of the benefits.

170. In addition, we have considered an example of the potential benefits of removing possible inefficiencies in an illustrative pivotal supplier situation. This gives an indication of what impact the proposal would need to have on participant behaviour for the benefits of the proposal to be greater than the expected costs.

171. The cost-benefit analysis assesses that the proposal will lead to efficiency improvements in the electricity industry because it:

    a. more tightly targets the objective of improving efficiency of prices in pivotal supplier situations than the status quo

    b. significantly reduces the legal and economic definitional problems that exist under the status quo by setting out directly the assessment framework to be used when looking at a supplier's offer.

172. The cost-benefit analysis assesses these efficiency improvements will be driven by a reduction in the occurrence of inefficiently high spot prices (that is, high spot prices absent scarcity) in pivotal supplier situations. In particular, it is expected to have the following impacts:

    a. productive efficiency – in particular, purchasers not diverting resources into managing risks of inefficiently high prices

    b. allocative efficiency – in particular, a reduction in price distortions associated with pivotal supplier situations and so a reduction in 'dead weight losses'; and

    c. dynamic efficiency – in particular, innovation and efficient investment over time from greater confidence in competition and lessening the perception of wholesale market price risk.

173. Efficiency gains are expected in relation to both 'local' pivotal supplier situations (events affecting an area smaller than the North or South Island) and 'widespread' pivotal supplier situations (North or South Island or national events).

174. The illustrative example considers a hypothetical local pivotal supplier situation where:

    a. 50 MW of load is affected (which is smaller than five of the six local pivotal supplier situations noted in paragraph 31 and Table 6 of the CBA)

    b. the pivotal supplier increases prices when it is pivotal such that there is a $6/MWh uplift in mean spot prices in that region (which is lower than the $8/MWh price separation observed in the Hawkes Bay in the first half of 2019).

175. The illustrative example estimates upper-bound productive and allocative efficiency gains from the proposal totalling $7.64m in present value terms. In addition, there would be dynamic efficiency benefits but these are not quantified.

176. The illustrative example is just for a single local pivotal supplier situation, so total benefits from the proposal are likely to be much greater as the proposal addresses both local and wider pivotal supplier situations.

177. This illustrative example provides an indication of the level of costs that would need to arise from the proposal for it not to have net benefits. However, the cost-benefit analysis assesses that the costs of the proposal relative to the status quo are expected to be negligible because direct costs are near-zero and substantial indirect costs are not expected.

178. With respect to indirect costs, we have assessed the risk that the proposal both:

    a. fails to deter inefficient behaviour that the existing provisions deter; and

    b. unintentionally deters efficient behaviour permitted by the existing provisions.

179. Because the proposal is linked to the relevant economic principles, relative to the status quo we do not expect any increase in costs from these effects. In addition, we do not expect additional costs from opportunistic litigation, as this risk is mitigated by the greater ability to develop case law under the proposal compared with the status quo. This is because the proposal provides a better connection to a more relevant and established body of jurisprudence compared to the status quo.

180. The cost-benefit analysis does not assess our recommendation for additional monitoring and enforcement. This is because we would also make this recommendation if the status quo were retained.

181. Overall, then, the proposal is expected to have significant net benefits.

Essence of difference between status quo and our proposal

182. The choice between the status quo and MDAG's proposal can be distilled to its essence as follows:

    a. WAG correctly observed that the effectiveness of a conduct obligation would depend on how tightly it targets the underlying economic principles.[155] However, HSOTC is opaque. It does not necessarily translate at law into the framework assumed by the Authority to date. The safe harbours give rise to another layer of issues.

    b. By contrast, our proposal creates a much clearer and tighter alignment with the underlying economic principles. Our proposal has also been fashioned in a manner that seeks to carefully navigate key issues within that body of economic and legal literature.

    c. Our proposal still leaves it to the enforcement bodies to exercise key judgements (for example, when market power should be viewed as 'significant'). No well formed conduct rule can escape those boundary judgements – they are inherent in the fabric of competition law. However, our proposal greatly reduces the definitional problems and risk that create something of a 'fog' around HSOTC. That 'fog' gives rise to material uncertainty as to whether it will be effective in its purpose.

[155] WAG, May 2013 at 4.5.40 and 4.5.41

d. However, another side of the status quo's opaqueness is that it can be perceived as creating room for an enforcement body to be 'flexible' in its approach. This may be viewed by some as useful, and suboptimal by others. In reality, the degree of flexibility it offers may be somewhat less than proponents may assume.

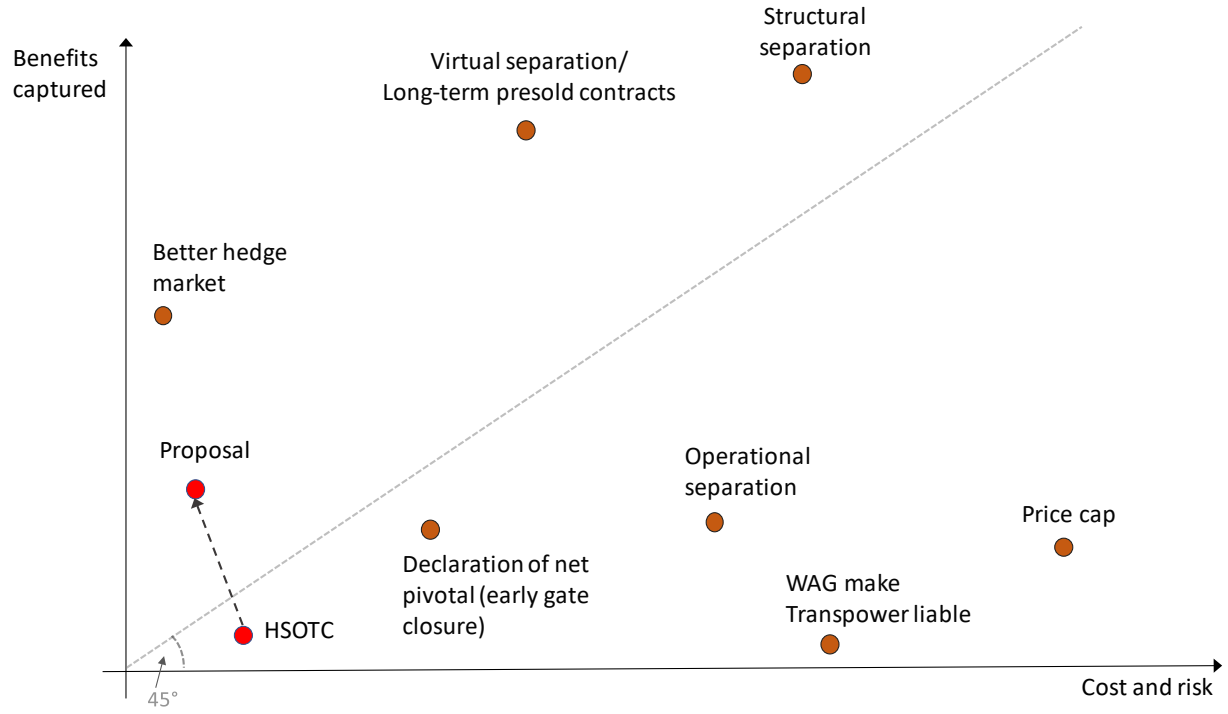
e. To the extent that HSOTC is intended to cover conduct other than the exercise of market power, we consider that rules should be put in the Code to address those other issues. As noted above, the idea that an amorphous, single sentence HSOTC requirement may be effective in capturing unwanted behaviours beyond pivotal abuses is likely to be somewhat illusory.

Our proposal compared to high level options

183. In addition to assessing our proposal against the status quo, we have also considered other options for achieving the objective, which we have described and evaluation in Part D.

184. MDAG's proposal compared to the options considered in Part D above is shown in Figure 9 below.

Figure 9: MDAG's proposal compared to HSOTC at a conceptual level in terms of focus



Assessment against Authority's statutory objective

185. MDAG considers that the proposal would advance the statutory objective of the Authority under section 15 of the Act, which is to promote competition in, and reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers. In particular, consumers would benefit because it would better reduce the incidence of inefficient prices which, in turn, would lead to productive, allocative and dynamic efficiencies which, as the Authority has outlined in its interpretation of its statutory objectives, are central to delivering long term benefits to consumers.[156] In particular, the proposed Code change would help to support competition in hedge and retail electricity markets, support innovation and reduce the risk of inefficient investment. MDAG also considers that the proposal is consistent with section 32 of the Act, which governs the content of the Code.

186. Section 32(1) of the Act says that the Code may contain any provisions that are consistent with the Authority's objective and is necessary or desirable to promote one or all of the following:

Table 2: How proposal complies with section 32(1) of the Act

Section 32(1) of the Act	How proposal complies
(a) competition in the electricity industry;	A reduction in the abuse of market power would promote confidence in the electricity market, which would support entry, innovation and investment, which in turn would promote competition. The proposal would also promote competition because reducing the incidence of inefficient prices arising from abuse of market power would improve the ability of providers of risk management tools without market power to compete in the risk management market. A more competitive risk management market would, in turn, support generation and retail competition, because competitors without market power would have access to more cost-effective risk management tools, better enabling them to compete on a more level playing field.
(b) the reliable supply of electricity to consumers;	The proposal would promote reliable supply to consumers by: • promoting generation competition, which would facilitate a more reliable electricity supply

[156] Electricity Authority, Interpretation of the Authority's statutory objective, 14 February 2011

Section 32(1) of the Act	How proposal complies
	• limiting the ability of suppliers with the market power to withdraw their supply in order to raise prices, which in turn would ensure more supply was available to meet consumer demand • provide more confidence for suppliers to make high priced offers during scarcity, which in turn would promote entry of more supply to meet demand during scarcity.
(c) the efficient operation of the electricity industry;	The proposal would promote the efficient operation of the electricity industry by promoting more efficient offers and therefore prices in the spot market. More efficient prices would mean electricity suppliers face more efficient signals for their operation and investment, which would support productive, allocative and dynamic efficiency in the electricity industry.
(d) the performance by the Authority of its functions;	The proposed amendment would not materially affect the performance of the Authority's functions. The proposal would replace the existing HSOTC provisions with provisions that better promote more efficient offers. The Authority's role of monitoring and enforcing these provisions would continue. However, MDAG intends to recommend that the Authority increases resourcing of both monitoring and compliance.
(e) any other matter specifically referred to in this Act as a matter for inclusion in the Code.	The proposed amendment would not materially affect any other matter specifically referred to in the Act for inclusion in the Code.

Assessment against the Code amendment principles

187. When considering amendments to the Code, the Authority's Consultation Charter[157] requires the Authority to have regard to the following Code amendment principles, to the extent the Authority considers they are applicable. Table 3 describes assessment of the proposal against the Code amendment principles.

[157] The consultation charter is one of the Authority's foundation document and is available at:: http://www.ea.govt.nz/about-us/documents-publications/foundation-documents/

Table 3: Assessment against Code amendment principles

Principle	Comment
1. Lawful	The proposal is lawful, and is consistent with the statutory objective (see paragraphs 167-168) and with the empowering provisions of the Act.
2. Provides clearly identified efficiency gains or addresses market or regulatory failure	The proposal addresses a market failure – the exercise of market power in periods of weak competition. The proposal would promote more efficient offers, and therefore wholesale prices, which would provide material efficiency gains, as set out in the evaluation of costs and benefits in Appendix D.
3. Net benefits are quantified	To the extent to which MDAG has been able to estimate the benefits and costs of the proposal, this is set out in the evaluation of the costs and benefits in Appendix D.
4. Preference for small-scale 'trial and error' options	Principles 4 to 9 apply only if it is unclear which option is best (refer clause 2.5 of the Consultation Charter). As reflected in this paper, MDAG considers its proposal is superior to other options. However, the proposal involves a more effective mechanism to address the problems targeted by the HSOTC provision but does not preclude the introduction of other mechanisms in the future, if necessary.
5. Preference for greater competition	Principles 4 to 9 apply only if it is unclear which option is best (refer clause 2.5 of the Consultation Charter). However, consistent with principle 5, the proposal promotes competition – see Table 2, point (a).
6. Preference for market solutions	Principles 4 to 9 apply only if it is unclear which option is best (refer clause 2.5 of the Consultation Charter).
7. Preference for flexibility to allow innovation	Principles 4 to 9 apply only if it is unclear which option is best (refer clause 2.5 of the Consultation Charter). However, the option allows a range of approaches to comply with its requirements, so provides flexibility to allow innovation.
8. Preference for non-prescriptive options	Principles 4 to 9 apply only if it is unclear which option is best (refer clause 2.5 of the Consultation Charter). However, the proposal is not prescriptive but would allow a range of approaches to comply with its requirements.
9. Risk reporting	Principles 4 to 9 apply only if it is unclear which option is best (refer clause 2.5 of the Consultation Charter). The proposal would promote better monitoring of behaviour in the market, promoting more efficient offering behaviour.

Annex 1: Instances of inter-island price separation since October 2013

Purpose

188. This Annex links to Part B of our paper under the heading "Impact of Authority's findings".

189. Instances of inter-island price separation have not changed substantially since the Authority's decision against Meridian on 14 May 2017. The table below shows all periods with high NI prices and HVDC flow since 2013.

Table 4: Instances of high North Island prices

	Date	Trading period	Price in NI	Price in SI	Price separation	High in both
Prior to 2nd June 2016	3/10/2013	19	$ 1,916.88	$ 94.47	1	0
	18/11/2013	18	$ 1,449.78	$ 0.02	1	0
	3/12/2013	23	$ 1,062.59	$ 975.00	0	1
	5/12/2013	23	$ 1,063.15	$ 977.97	0	1
	29/01/2014	28	$ 1,643.57	$ 1,511.88	0	1
	27/05/2014	16	$ 1,033.96	$ 976.10	0	1
	19/08/2014	35	$ 4,673.74	$ 4,288.50	0	1
	19/08/2014	36	$ 2,181.19	$ 2,006.43	0	1
	19/08/2014	37	$ 8,714.53	$ 8,016.33	0	1
Contemporaneous	2/06/2016	36	$ 4,604.90	$ 4,235.96	0	1
	2/06/2016	38	$ 3,047.96	$ 2,791.79	0	1
	26/07/2016	16	$ 4,756.90	$ 80.25	1	0
	26/07/2016	17	$ 4,702.39	$ 63.33	1	0
	26/07/2016	18	$ 3,999.46	$ 63.33	1	0
Post 2nd June 2016	23/04/2018	37	$ 2,398.92	$ 66.56	1	0
	23/04/2018	38	$ 2,302.42	$ 52.66	1	0
	12/06/2018	36	$ 1,344.13	$ 902.89	0	1
	12/06/2018	37	$ 1,099.61	$ 72.57	1	0
	24/07/2018	17	$ 1,071.68	$ 977.59	0	1
	25/07/2018	16	$ 1,120.46	$ 990.02	0	1
	25/07/2018	17	$ 1,059.92	$ 975.00	0	1
	18/08/2019	42	$ 1,008.01	$ 951.57	0	1

Annex 2: Use of workable competition as the benchmark

Context

190. Workable competition is clearly the benchmark for competition in New Zealand competition law. It is the Authority's underlying benchmark for competition in the electricity market. MDAG has considered carefully how to frame our proposal within this body of law and economics. To this end, we set out below our understanding of the how workable competition has been interpreted by the Courts and the Authority, and issues we have sought to navigate in framing our proposal.

Judicial interpretation

191. The meaning of "workable competition" has been considered by the New Zealand courts in a range of decisions, mostly recently by the High Court in *Wellington International Airport Ltd and others v Commerce Commission*[158]. How to determine efficient prices in markets where there is little or no competition was at the heart of that case.[159] The Court gives a relatively fulsome exposition on its interpretation of the underlying economic principles. This is set out in full in the Annex 2 to this paper.

192. The first thing to observe is that, as Bell Gully points out, even 28 years after the current Commerce Act was passed, there remains real uncertainty about the meaning of "workable competition".[160] The High Court cites the OCED's overview that "[n]o consensus has arisen over what might constitute workable competition but all bodies which administer competition policy in effect employ some version of it"[161].

193. In distilling its analysis, the High Court in *Wellington International Airport* refers to the definition by Donald and Heydon in *Trade Practices Law* approved in two previous High Court decisions:

> "…workable competition means a market framework in which the presence of other participants (or the existence of potential new entrants) is sufficient to ensure that each participant is constrained to act efficiently…Workable competition exists when there is an opportunity for sufficient influences to exist in any market, which must be taken into account by each participant and which constrain its behaviour."[162]

194. A central question is, what degree of competition amounts to "workable competition"? Not surprisingly, there is no clear answer. The Court reserves a typically guarded position: "whether workably competitive conditions exist is a judgement to be made in the light of all the information available, rather than something that can be ascertained by testing whether certain precise conditions are satisfied".[163]

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[158] [2013] NZHC 3289
[159] [2013] NZHC 3289 at the end of 29 – for the supply of goods and services under Part 4 of the Commerce Act 1986
[160] www.adls.org.nz/for-the-profession/news-and-opinion/2014/2/28/working-with-workable-competition/
[161] OECD "Glossary of Industrial Organisation Economics and Competition Law" (16 July 1993)
[162] Donald and Heydon *Trade Practices Law* (Law Book Co, Australia, 1978) approved in *Auckland Regional Authority v Mutual Rental Cars (Auckland Airport) Ltd* [1987] 2 NZLR 647 (HC) at 671; *Fisher and Paykel Ltd v Commerce Commission* [1990] 2 NZLR 731 (HC) at 759.
[163] *Wellington Airport* [2013] NZHC 3289 at [16]

195. However, the Court's exposition of the economic principles can be distilled to four key points of guidance:[164]

196. First, workable competition is best thought of in terms of market outcomes. These outcomes are "reasonably close" to those found in "strongly competitive markets". They are summarised by the term "economic efficiency" comprising technical (or productive) efficiency, allocative efficiency and dynamic efficiency.

197. Second, "the degree of rivalry is critical". In a workably competitive market, "no firm has significant market power". The Court also expressed its view on this aspect as follows: "Workable competition implies that no player has excessive market power".[165] This implies a relatively low tolerance of market power.

198. Third, closely associated with the idea of efficiency is the condition that prices reflect efficient costs (including the cost of capital, and thus a reasonable level of profit). Prices in workably competitive markets may never exactly reflect efficient costs. However, "the practical context is the existence of sufficient rivalry between firms (sellers) to push prices close to efficient costs". "[P]rices are not too much or for too long significantly above costs".

199. Fourth, this tendencies of workable competition towards prices based on efficient costs and reasonable rates of return provides incentives for efficient investment and innovation, and will also lead to improved efficiency, provision of services reflecting consumer demands, sharing of the benefits of efficiency gains with consumers, and limited ability to extract excessive profits.

200. The Court acknowledges that there is a degree of circularity in this notion of workable competition. In the Court's view, "'workably competitive markets' means markets in which these tendencies are seen. The more those tendencies are seen in a market, the more the market can be regarded as workably competitive. And of course, the more competitive the market, the more those tendencies will be seen".[166]

Authority's interpretation of statutory objective

201. In its *Interpretation of the Authority's Statutory Objective*, the Authority's adopts[167] the Commerce Commission's interpretation of workable competition set out in the Commission's *Input Methodologies Discussion Paper* of June 2009.

202. While not as nuanced, the Commission's interpretation draws on many of the same root concepts as the High Court used in its *Wellington Airport* decision. Indeed, the High Court and the Commission both refer to the definition of workable competition by Donald and Heydon, which is set out above.[168]

[164] See the highlighted parts of Endnote (ii)
[165] The High Court cites *Re Queensland Co-operative Milling Association Ltd* (1976) 8 ALR 481 (Trade Practices Tribunal) and the High Court's discussion in *Auckland Regional Authority v Mutual Rental Cars (Auckland Airport) Ltd* [1987] 2 NZLR 647 (HC) at 671.
[166] [2013] NZHC 3289 at 24
[167] Electricity Authority, Interpretation of the Authority's statutory objective, 14 February 2011 at A.15
[168] ComCom, June 2009 at 231

203. The Commission's summary is that "workable competition provides incentives for market participants to act in ways that are efficient, for a given level of service quality, while ensuring that efficiency gains are shared with consumers over time. In addition, firms are limited in their ability to earn excessive profits, but superior performances will be rewarded with profits above normal levels over the short to medium term".[169] Normal levels of profits ought to cover efficiently incurred costs and prudent investment.[170]

Authority's elaboration in its market performance review

204. The Authority expands on its view of workable competition in its market performance review of the high price event of 2 June 2016. In the Authority's view:

> "A market is dynamically efficient in a workable competition sense if it tends towards an efficient equilibrium over time."[171]
>
> "Workable competition is a dynamic view of markets that encompasses prices deviating from long term equilibrium levels as long as barriers to entry are low so that, in the long term, prices move towards competitive levels. Under these conditions potential entry constrains prices either: (a) to levels that discourage entry; or (b) at higher levels for the amount of time it takes for entry to occur." [172]

205. In essence, the Authority is saying that under workable competition:

206. The correct measure of whether prices are efficient in the electricity spot market is whether average spot prices over time reflect long run marginal cost (LRMC).[173]

207. Prices can deviate from long term equilibrium levels as long as barriers to entry are low so that, in the long term, prices move towards competitive levels.

208. Superior performance may lead to prices above the efficient long-run average cost of production including cost of capital. However, those higher profits will be competed away over time and the benefits of that superior performance will be shared with consumers.

209. Prices elevated above cost for a sustained period will induce innovation or entry. For new generation, the lead time is several years. However, demand response and unit commitment decisions (such as Contact's use of TCC) can be made in shorter timeframes in a way that would mitigate transient price spikes.[174]

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[169] ComCom, June 2009 at 236
[170] ComCom, June 2009 at 232
[171] EA, Dec 2017 at 9.1
[172] EA, Dec 2017 at 9.4
[173] This is consistent with the approach of the 2018/19 Electricity Price Review (see "First Report for Discussion", New Zealand Government, 30 August 2018 at p.32) and the 2009 Ministerial Review of Electricity Market Performance (see Electricity Technical Advisory Group and the Ministry of Economic Development, August 2009, Volume 2, at 239) – the latter cited with approval by "The Economics of Electricity", Dr Brent Layton, 4 June 2013 at para 17. See also "Cost Shifting: the single buyer model with price discrimination", Lewis Evans, New Zealand Institute for the Study of Competition and Regulation No. 3: 18 April 2013 at p.4. Critics of the LRMC model argue that it is inconsistent with the economic literature, which calculates market power rents by looking to see if prices are above the SRMC competitive benchmark – see Annex 3 for further discussion.
[174] EA, Dec 2017 at 9.8 and 9.9

210. It seems to be implicit in the Authority's reasoning that it is not acceptable for prices to deviate from the competitive long term equilibrium if barriers to entry are high, or if a party has significant market power with no sufficiently proximate prospect of a countervailing demand or supply response.[175]

Concerns relating to workable competition as the benchmark in pivotal situations

211. There is a concern that, if workable competition necessarily means that the test of price efficiency is whether spots prices are tending over the long term toward LRMC, workable competition would be a difficult benchmark to pin-point and sanction inefficient short term prices. In other words, a long term test of price efficiency is not well suited to determining short term price efficiency, which tends to be the focus of pivotal situations.[176]

212. There is a countervailing concern that using short run marginal cost (SRMC) as the efficiency benchmark may undermine new investment confidence if it were perceived that SRMC did not provide for an appropriate return on capital and risk. (This issue is discussed further below in Annex 3).

213. It is also argued by some economists that workable competition recognises that episodes of temporary market power can and do occur in workably competitive markets.[177] For example, in Australia, the exercise of "transient pricing power" is generally seen as consistent with workable competition. This is where a generator with temporary market power spikes spot prices for a short period to recover its fixed costs. The Australian Energy Market Commission's threshold for when this becomes inefficient is if it occurs regularly enough to cause an average spot price above LRMC.[178] They have, however, qualified this by noting that individual instances could in some circumstances be harmful.[179]

214. We have not found any judicial consideration in New Zealand of whether workable competition accommodates the exercise of "transient pricing power". As noted above, the *Wellington Airport* decision implies a relatively low tolerance of market power.[180] While prices in workably competitive markets "may never exactly reflect efficient costs", "prices are not too much or for too long significantly above costs."[181] The boundaries of "too much" or "too long" are not clear.

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[175] In passing, we note that the Authority asserts that "workable competition is a **dynamic efficiency** concept, not a static concept" (see EA, Dec 2017 at 9.1). In our view, it is more correct to say (to quote the Commerce Commission) that "workable competition tends to reflect a view that competitive behaviour is a **dynamic process** – one that emerges from the rivalry of market participants" (see ComCm, June 2009 at 231). As the High Court put it: "A workably competitive market is one that provides outcomes that are reasonably close to those found in strongly competitive markets. Such outcomes are summarised in economic terminology by the term 'economic efficiency' with its familiar components: technical efficiency, allocative efficiency and dynamic efficiency" (see *Wellington Airport* decision at [2013] NZHC 3289 at 14). In short, dynamic efficiency is one of the three component elements of economic efficiency that workable competition gives rise to.

[176] Although as noted in Part B above, the frequency of gross pivotal is not confined to short term situations

[177] Sapere, Feb 2018 at section 2.2.1, p.4

[178] www.energycouncil.com.au/analysis/power-supply-in-the-nem-generates-debate/. See also Yarrow and Decker, Nov 2014 at p.22

[179] Yarrow and Decker, Nov 2014 at footnote 16

[180] The High Court cites *Re Queensland Co-operative Milling Association Ltd* (1976) 8 ALR 481 (Trade Practices Tribunal) and the High Court's discussion in *Auckland Regional Authority v Mutual Rental Cars (Auckland Airport) Ltd* [1987] 2 NZLR 647 (HC) at 671.

[181] *Wellington Airport* [2013] NZHC 3289 at [15]

215. There may be a definitional or semantic issue in play here. To the extent that "transient pricing power" is a scarcity rent, it should be viewed as efficient. Scarcity rent is the component of the price necessary to reduce demand to the point where it be met by available capacity.[182] However, to the extent that it is simply the exercise of market power, it should be viewed as inefficient and not consistent with workable competition.

Workable competition benchmark found 2 June 2016 price spikes to be inefficient

216. We note in passing that, while the Authority did not expressly consider what price would have a occurred in a competitive counterfactual for the 2 June 2016 event, the Authority applied its interpretation of workable competition as the benchmark and found that the short term price spikes in question were inefficient. In particular, the Authority found that:

    a. Meridian had resorted to "moving prices away from workably competitive levels".[183]

    b. Meridian's offer prices were inconsistent with workable competition because they did not provide a useful price signal to potential entrants, and were not the result of innovation or superior performance.[184]

    c. Linking the prices in both islands caused South Island prices to increase to levels that reflected North Island scarcity, which was at odds with the South Island supply/demand situation and therefore gave an inefficient signal for demand and capacity.[185]

217. It could be argued, therefore, that workable competition is a satisfactory benchmark for addressing pivotal price spikes. This an issue on which we are seeking views in the formal consultation process.

218. We also note in passing that, in its market performance review on the 2 June 2016 event, the Authority refers to short-run marginal cost (SRMC) as a relevant benchmark: "As last resort plant becomes more hedged, they would be net pivotal less often, and would have less incentive to raise offer prices above SRMC, resulting in fewer and less extreme price spikes"[186].

Endnote: *Wellington Airport* case – meaning of "workable competition"–

219. Key extracts are set out below from the 2013 High Court in *Wellington International Airport Ltd and others v Commerce Commission,* which outline the court's interpretation of the underlying economic history and principles relating to "workable competition"[187]. Note that how to determine efficient prices in markets where there is little or no competition was at the heart of the case.[188] [Emphasis has been added to the extracts below]

[182] Bushnell, J, Flagg, M, Mansur, E, Electricity capacity markets at a crossroads, DEEP WP 017, UC Davis Energy Economics Program, page 11.
[183] EA, Dec 2017 at 8.14
[184] EA, Dec 2017 at 9.1.
[185] EA, Dec 2017 at 5.2 and 8.3-8.6
[186] EA, Dec 2017 at 8.24
[187] [2013] NZHC 3289
[188] [2013] NZHC 3289 at the end of 29 – for the supply of goods and services under Part 4 of the Commerce Act 1986

[11] “Workable” and “competition” are plain English words, but dictionary definitions are not sufficient to give flesh to the term as it is used in economic regulation. The concept of workable competition was first introduced by JM Clark in 1940 and developed over a considerable period. Clark wrote, in the context of theories of imperfect and monopolistic competition, of the refinement of the definition of perfect competition and “the realization that ‘perfect competition’ does not and cannot exist”.[189] His concern was that once there is a departure from any single condition of perfect competition, the existence of other conditions of perfect competition may lead to greater rather than lesser imperfection.[190]

[12] Clark gave no definition of workable competition but defined competition as “rivalry in selling goods”.[191] Given the inevitability of imperfections, he sought to specify the conditions that in real markets would nevertheless lead to reasonably competitive outcomes. This gave rise to considerable investigation of the structural characteristics of markets that would ensure workable competition.

[13] The OECD has, however, said that “No consensus has arisen over what might constitute workable competition but all bodies which administer competition policy in effect employ some version of it.”[192] It might also be said that no set of conditions sufficient to ensure workable competition has been rigorously defined. Rather, the legacy of Clark’s notion is that workable competition is a practical description of the state of an industry where government intervention to make the market work better is not justified because the socially desirable outcomes generated by competition already exist to a satisfactory degree.

[14] A workably competitive market is one that provides outcomes that are reasonably close to those found in strongly competitive markets. Such outcomes are summarised in economic terminology by the term “economic efficiency” with its familiar components: technical efficiency, allocative efficiency and dynamic efficiency. Closely associated with the idea of efficiency is the condition that prices reflect efficient costs (including the cost of capital, and thus a reasonable level of profit).

[15] There is a large body of theoretical literature about the relationship between prices, incentives, efficiency and market outcomes. But the practical context is the existence of sufficient rivalry between firms (sellers) to push prices close to efficient costs. The degree of rivalry is critical. In a workably competitive market no firm has significant market power and consequently prices are not too much or for too long significantly above costs.

[16] These terms are admittedly not precise. No two markets are the same and no single market stays the same. Whether workably competitive conditions exist is a judgement to be made in the light of all the information available, rather than something that can be ascertained by testing whether certain precise conditions are satisfied.

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[189] JM Clark “Toward a Concept of Workable Competition” (1940) 30 AER 241 at 241, 60/612/030991.
[190] At 241, 60/612/030991.
[191] At 243, 60/612/030993.
[192] OECD “Glossary of Industrial Organisation Economics and Competition Law” (16 July 1993) <www.oecd.org> at 86.

[17] Much of the discussion of workable competition in competition law involves, naturally enough, market power. Workable competition implies that no player has excessive market power.[193]

[18] In our view, what matters is that workably competitive markets have a tendency towards generating certain outcomes. These outcomes include the earning by firms of normal rates of return, and the existence of prices that reflect such normal rates of return, after covering the firms' efficient costs.

[19] Of course, firms may earn higher than normal rates of return for extended periods. On the other hand, firms may earn rates of return less than they expected and less than commensurate with the risks faced by their owners when they made their investments. They may even make losses for extended periods. Prices in workably competitive markets may never exactly reflect efficient costs, including a normal rate of return.

[20] But the tendencies in workably competitive markets are towards such returns and prices. By themselves, these tendencies will also lead towards incentives for efficient investment (investment that is reasonably expected to earn at least a normal rate of return) and innovation. That is to say, the prices that tend to be generated in workably competitive markets will provide incentives for efficient investment and for innovation.

[21] The same tendencies towards prices based on efficient costs and reasonable rates of return will lead also to improved efficiency, provision of services reflecting consumer demands, sharing of the benefits of efficiency gains with consumers, and limited ability to extract excessive profits.

[22] In short, the tendencies in workably competitive markets will be towards the outcomes produced in strongly competitive markets. The process of rivalry is what creates incentives for efficient investment, for innovation, and for improved efficiency. The process of rivalry prevents the keeping of all the gains of improved efficiency from consumers, and similarly limits the ability to extract excessive profits.

[23] Indeed, the term "workably competitive markets" means markets in which these tendencies are seen. The more those tendencies are seen in a market, the more the market can be regarded as workably competitive. And of course, the more competitive the market, the more those tendencies will be seen.

[24] A degree of circularity may be discerned in the preceding paragraphs. This is because workable competition is best thought of in terms of market outcomes and specifically the market outcomes produced by (strong) competition. The circle can perhaps be expressed as follows:

> (a) Vigorous competition is known from experience to generate market outcomes that are socially desirable, such as productive efficiency (doing as much as possible with a given set of resources), allocative efficiency (producing goods and services that customers want in accordance with their willingness to pay for them), and dynamic (responding quickly to opportunities or changes in circumstances).

[193] The High Court cites *Re Queensland Co-operative Milling Association Ltd* (1976) 8 ALR 481 (Trade Practices Tribunal) and the High Court's discussion in *Auckland Regional Authority v Mutual Rental Cars (Auckland Airport) Ltd* [1987] 2 NZLR 647 (HC) at 671.

(b) These outcomes of competition are also well explained by a highly developed theory.

(c) Actual markets demonstrate varying levels of competition. To a large extent these varying levels are caused by structural characteristics of the market, such as its barriers to entry, the level of sunk costs, economies of scale and scope (with natural monopoly at an extreme).

(d) As a consequence, actual markets will produce outcomes that are nearer or further from the socially desirable ones seen where competition is strong.

(e) The outcomes of strongly competitive markets are better (for society) than those from less competitive markets.

(f) As a corollary, the outcomes from workably competitive markets are better than from markets that do not rise to that level of competition.

(g) Further, within workably competitive markets, the outcomes produced in the more competitive markets are better than those produced by the less competitive.

(h) Since it is outcomes that matter to society, when thinking about workably competitive markets, the outcomes to be pursued are the outcomes produced by the more strongly competitive markets. This is not because such outcomes can be routinely expected, but because they are desirable. Why would regulation aim lower than what is desirable?

[25] As mentioned, the s 52A purpose involves promoting outcomes that are consistent with outcomes produced in competitive markets. It might be asked: why not simply seek to achieve the outcomes produced by competitive markets, as opposed to workably competitive markets? In our view, the use of the term "workable competition" is no more than a recognition that perfectly competitive markets do not exist. Perfectly competitive markets require conditions – axioms for the mathematical proof of the outcomes – that can never be met, including perfect information completely shared among market participants.

[26] Reflecting that analysis this Court has on two occasions approved the following formulation of workable competition:[194]

> ...workable competition means a market framework in which the presence of other participants (or the existence of potential new entrants) is sufficient to ensure that each participant is constrained to act efficiently and in its planning to take account of those other participants or likely entrants as unknown quantities…Workable competition exists when there is an opportunity for sufficient influences to exist in any market, which must be taken into account by each participant and which constrain its behaviour.

[194] Donald and Heydon *Trade Practices Law* (Law Book Co, Australia, 1978) approved in *Auckland Regional Authority v Mutual Rental Cars (Auckland Airport) Ltd* [1987] 2 NZLR 647 (HC) at 671; *Fisher and Paykel Ltd v Commerce Commission* [1990] 2 NZLR 731 (HC) at 759.

Annex 3: Efficient pricing benchmark

220. This Annex links to Part E of our paper under the heading "Competitive price benchmark".

Purpose

221. Some parties may perceive that our proposal could allow the use of a general SRMC benchmark that does not adequately allow for recovery of fixed costs, capital charges in particular. In our view, this perception is misplaced. To the extent that this issue is real, it applies equally to the HSOTC provision as it does to our proposal. In other words, the same choices sit inside the HSOTC mechanism as it relates to offers in general and pivotal situations in particular.

222. This Annex distils the issue and why MDAG's proposal makes sense in relation to assessing whether offers represent an exercise of significant market power.

Fundamentals of efficient pricing

223. It is useful first to briefly recap some of the fundamentals of efficiency in electricity prices.

Concept of efficiency

224. As Prof William Hogan observes, efficient pricing is a central feature of a competitive electricity market. It is essential if the benefits of a competitive market are to flow through to customers and other market participants.[195]

225. In general economic terms, prices are efficient when products and services are produced at the lowest sustainable cost, and no one can be made better off without someone else being made worse off. Inefficient prices tend to deliver inefficient outcomes.[196]

226. In the context of a wholesale electricity market, clearing prices tend to be efficient if (in broad terms):

    a. they reflect the cost of meeting the next unit of demand from the lowest cost source, whether generation or demand reduction (that is, system marginal cost – the standard determinant of competitive market pricing197); and

    b. prices and costs are subject to strong and sustained downward pressure, which is ordinarily best delivered by competition.

227. Prices systematically above marginal cost are viewed as indicating market power.[198]

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[195] Hogan, 2001.
[196] Electricity Price Review, "First Report for Discussion", 30 August 2018, footnote 16
[197] This is the simple definition of the market-clearing price where supply equals demand. In concept, this production level just balances the marginal benefit of additional consumption with the marginal cost of production - see Hogan, 2001 at page 17
[198] Littlechild, 2001 – see footnote 14 of that article, which cites as an example Joskow and Kahn, 15 January 2001, p. 9 (earlier version of their March 2001 paper): "The more the observed price exceeds the competitive benchmark price, the more one can presume that either market power was being exercised or some other source of market imperfection has interfered with the competitive interplay of supply and demand. The competitive benchmark that we utilize is the short run marginal cost of supplying electricity from the last unit that clears the market in

228. Within this framework, the benchmark for efficient electricity pricing turns on four component elements:

    a. market design;

    b. what costs are included in marginal cost;

    c. when the additional unit of electricity is to be produced (in the short or long run); and

    d. the degree of competition assumed.

Market design and economic costs

229. Four design features of the New Zealand electricity spot market have particular salience: it is energy-only (there is no separate payment for the cost of capacity); spots prices are not capped; the grid is long and 'stringy'; and the market is hydro dominated and most hydro power stations are 'run of river' rather than reservoir-fed, and there is limited storage capacity with limited water storage.[199]

230. Among other things, this means that fixed costs – that is, costs that do not vary with changes in output, in particular the cost of capital invested in the assets required for generation – have to be recovered from within the energy price over time. It also means that, given grid constraints and the dominance of hydro with its variability in water inflows and limited water storage, *opportunity costs of hydro fuel (water)* and *scarcity rents* are relatively significant and highly variable components of marginal costs.

Opportunity costs of water

231. The opportunity cost of using water to generate electricity today is the value of using it at some time in the future to generate electricity, or its value in some other use.[200] Using water to generate electricity now extinguishes the opportunity of using that same water later, or for an alternative (non-hydro) use. The value of that lost opportunity at any given time will depend upon several things, including, current storage levels, forecast hydrological conditions and whether river inflows will be high or low, and expected future electricity prices, which will, of course, depend upon the same conditions throughout the rest of the country's hydro schemes.[201]

each hour. Comparing realized prices with marginal supply costs in this way is a widely accepted method for measuring the presence of market power."

[199] For completeness, other key design features of the New Zealand wholesale electricity spot market are summarised in the Endnote to the Annex 3

[200] "The Economics of Electricity", Dr Brent Leyton, 4 June 2013 at para 17

[201] This paragraph comes from "Market power in New Zealand's wholesale electricity market: a critique of critiques", Hayden Green, 13 May 2019. See also "Cost Shifting: the single buyer model with price discrimination", Lewis Evans, New Zealand Institute for the Study of Competition and Regulation No. 3: 18 April 2013: "The electricity spot market gives a value to water that reflects alternative uses, the state of storage and scarcity or plenty of river flow"

232. If the storage lake is full, and more water is flowing in, there is no value in storing any water for the future, i.e. the opportunity cost of using water is zero. On the other hand, if there are low inflows to the lakes, and a spike in demand is forecast, the opportunity cost of using that water now is the price the hydro generator could have received had it held the water until the demand spike.[202]

Scarcity rents

233. In situations of scarcity, such as low lake levels because of drought, prices may need to rise in order to limit demand to available capacity. The extent to which prices must rise over and above the variable cost of the most expensive generating unit in order to limit demand to available capacity is called scarcity rent.[203]

234. Scarcity rent is the component of the price necessary to reduce demand to the point where it be met by available capacity.[204] As Prof Paul Joskow points out, scarcity pricing is not a departure from the basic principle of short run marginal cost pricing. Rather, changes in price (moving along the demand curve) when capacity constraints are binding reflect represent consumers' short run marginal opportunity cost of having more or less generating capacity.[205]

235. In the case of a hydro generator that is marginal when there is scarcity, the scarcity rent is the amount that the price must rise over and above the generator's water value (which, as noted above, is determined by the opportunity cost of the water) plus other operating costs at the time of dispatch in order to limit demand to available generation capacity.

Marginal cost

236. Marginal cost is the total cost of producing an extra unit of electricity from the least cost source (which includes demand-side options). Marginal cost is typically measured over two different frames of reference:

    a. The total cost of producing one more unit of output when total installed capacity is fixed is the *short run marginal cost* (SRMC). It includes opportunity cost of water and scarcity rents as defined above.[206]

    b. The total cost of producing one more unit of output over the longer term (that is, the period required to change capacity in the system) is the *long run marginal cost* (LRMC). It includes an appropriate risk adjusted return on investment if all inputs were adjusted optimally, including capital investments (which in reality take years to change).[207]

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[202] This paragraph comes from Poletti, 2018

[203] Bushnell, J, Flagg, M and Mansur, E (2017), *Electricity capacity markets at a crossroads,* UC Davis Energy Economics Program, DEEP WP 017, page 11.

[204] Bushnell, J, Flagg, M, Mansur, E, Electricity capacity markets at a crossroads, DEEP WP 017, UC Davis Energy Economics Program, page 11.

[205] Joskow, Paul L. 2008, "Capacity Payments in Imperfectly Competitive Electricity Markets," Utilities Policy, 16:159-170. While there may be few hours when capacity constraints are binding, energy prices would likely go to very high levels as demand is price-rationed and yield substantial revenue for all generators which would allow them to recover their capital costs in long run equilibrium -

[206] Yarrow, Decker, Nov 2014 at page 4

[207] Risk-averse investors require recovery of capital costs with a suitable premium for risk, as well as the fixed and variable operating costs they incur in operations -- "A Critique of Wolak's Evaluation of the NZ Electricity Market: Introduction and Overview", Prof Lewis Evans, Seamus Hogan and Peter Jackson, Working Paper No. 08/2011 at page 9

Price discovery process

237. Efficient economic costs of producing an additional unit of electricity are revealed in a process of competitive price discovery, which is an iterative process characterised by a continual updating of forecast information, with market participants adjusting their offers in response to the new information. In effect, a generator's offer is a short-term contingent forecast of its own costs at the relevant dispatch times. In highly competitive markets, competitive pressures may be sufficient to cause generators to bid close to their forecast economic costs. [208]

238. The information required for this includes the level and price sensitivity of demand, the level and availability of supply (including expected future values of water), which is influenced by the costs and expectations of rivals, and system conditions under which the demand is to be supplied. Offers also factor in relative degrees of contract cover, and availability and cost of alternative risk management options, recognising that contract positions can change quickly if the related hedge market is relatively liquid.

239. Only when all supply-side and demand-side information is combined will the level of any opportunity costs (or scarcity rents) be determined. In technical economic terms, *economic costs* and prices are jointly and simultaneously discovered via the competitive process. They are not something that can accurately be determined *ex ante* for the simple reason that the information required will not be fully available ahead of the price determination process itself. [209]

240. It is argued that efficient price discovery is more to do with the discovery of efficient levels of economic rents than with achieving efficient dispatch in the very short term. [210]

Efficiency benchmark

Difference of views

241. There is a strong difference of opinion among some economists in relation to whether the frame of reference for efficient prices is SRMC or LRMC. The Authority in New Zealand and the AEMC in Australia consider that the correct measure of whether prices are efficient in the electricity spot market is whether average spot prices over time reflect long run marginal cost (LRMC). [211] This is viewed as consistent with a normal competition law approach. [212]

[208] Yarrow, Decker, Nov 2014, page 21
[209] Yarrow, Decker, Nov 2014, page 21. In a submission for Meridian, Sapere similarly observes that the efficient price is the opportunity cost and this depends upon the expectations of the generator and marginal demand – see "A clearer High Standard of Trading Conduct Rule", Sapere (Kieran Murray, Toby Stevenson), 14 February 2018 at section 4.5
[210] Yarrow, Decker, Nov 2014 at bottom of p.7 and top of p.8
[211] For a description of the Authority's view, see EA, Dec 2017 at 9.4. For a description of the AEMC's view, see Yarrow, Decker, Nov 2014 at top of p.22 and "Market behaviour rules in New Zealand and internationally", Sapere (Kieran Murray, Toby Stevenson, Sally Wyatt & Eva Hendriks), 29 November 2012 at p.6. This LRMC approach was used by the 2018/19 Electricity Price Review (see "First Report for Discussion", New Zealand Government, 30 August 2018 at p.32) and the 2009 Ministerial Review of Electricity Market Performance (see Electricity Technical Advisory Group and the Ministry of Economic Development, August 2009, Volume 2, at 239 – cited with approval by "The Economics of Electricity", Dr Brent Layton, 4 June 2013 at para 17). See also "Cost Shifting: the single buyer model with price discrimination", Lewis Evans, New Zealand Institute for the Study of Competition and Regulation No. 3: 18 April 2013 at p.4
[212] Yarrow, Decker, Nov 2014 at top of p.22

242. Critics of the LRMC approach argue that it is inconsistent with the economic literature, which calculates market power rents by looking to see if prices are above the SRMC competitive benchmark.[213] Their view is that market power is being exercised whenever prices are consistently above [short run] marginal cost (treating investment costs as sunk), which may well be below the LRMC for many years.[214]

243. It has been pointed out that, in New Zealand's energy-only, hydro dominated system, such a narrow SRMC approach would not recover the risk adjusted capital costs of producing electricity from installed generation[215], and this would likely have a material adverse impact on incentives for new investment and security of supply.

244. We would also observe that seeking to model efficient prices benchmarks over long periods at a system-wide quantitative level in the New Zealand, where water values and scarcity rents are such significant and hard-to-model factors, is inherently difficult. Relatively small variations in inputs can have a substantial effect on modelling results.

No conceptual conflict between SRMC and LRMC

245. Prof George Yarrow and Dr Decker point out that short-run efficiency requires clearing prices to reflect economic cost, which includes scarcity rents.[216] As noted above, scarcity pricing is not viewed as a departure from the basic principle of short run marginal cost pricing.[217] Further, Prof James Bushnell (with two colleagues) observes that, in a competitive market with free entry, the scarcity rents will on average equal the cost of new capacity over time.[218] In short, the net present value of efficient SRMCs should equal LRMC over time. Yarrow and Decker appear to hold the same view.[219]

246. In this sense, there is no conceptual conflict between using SRMC and LRMC as the efficiency benchmark.

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[213] For example, Poletti, 2018. Note that Hayden Green argues that Dr Poletti's SRMC-based benchmark provides for sufficient compensation to cover their fixed costs should already be factored into the scarcity values enshrined in Dr Poletti's competitive benchmarks, and that generators do not need even higher prices in order to earn a normal rate of return – prices at those levels are likely to deliver excess returns – see "Market power in New Zealand's wholesale electricity market: a critique of critiques", Hayden Green, 13 May 2019. Paul L Joskow and Edward Kahn state the orthodoxy for assessing price efficiency as follows: "The more the observed price exceeds the competitive benchmark price, the more one can presume that either market power was being exercised or some other source of market imperfection has interfered with the competitive interplay of supply and demand. The competitive benchmark that we utilize is the short run marginal cost of supplying electricity from the last unit that clears the market in each hour. Comparing realised prices with marginal supply costs in this way is a widely accepted method for measuring the presence of market power"- Joskow, Kahn, 2000, p. 9 (earlier version of their March 2001 paper)

[214] Poletti, S., (2018). *Market power in the New Zealand wholesale market 2010-2016,* University of Auckland at page 9, para 2

[215] Where the value of installed generation is related to LRMC over time

[216] Yarrow, Decker, Nov 2014 at p.4, 2nd to last para

[217] While there may be few hours when capacity constraints are binding, energy prices would likely go to very high levels as demand is price-rationed and yield substantial revenue for all generators which would allow them to recover their capital costs in long run equilibrium - Joskow, Paul L. 2008, "Capacity Payments in Imperfectly Competitive Electricity Markets," Utilities Policy, 16:159-170.

[218] Bushnell, J, Flagg, M, Mansur, E, Electricity capacity markets at a crossroads, DEEP WP 017, UC Davis Energy Economics Program, page 11.

[219] Yarrow, Decker, Nov 2014 at p.22, 1st para: "there is no conceptual difficulty in extending the definition [LRMC test] to encompass assessments of rather shorter term price movements, or periodic but recurring spikes in prices, which lead to a deviation between the NPVs of revenues and costs of equivalent value to that implied by the AEMC test as currently specified. In both cases the NPVs of the returns from above-cost pricing, which is the underlying measure of the potential for harm, would be the same".

247. In relation to assessing questionable high prices in short term pivotal situation, SRMC (with proper water values and scarcity rents) in a market with no significant market power would seem to be an appropriate efficiency benchmark.

248. We note in passing that, in its market performance review on the 2 June 2016 event, the Authority refers to short-run marginal cost (SRMC) as a relevant benchmark: "As last resort plant becomes more hedged, they would be net pivotal less often, and would have less incentive to raise offer prices above SRMC, resulting in fewer and less extreme price spikes"[220].

249. The Authority also cited SRMC as the appropriate counterfactual for pivotal situations in its feedback to WAG on a draft of their discussion paper. The Board noted that "ideally prices in a pivotal supplier situation would be notified well in advance to allow those affected to consider alternative arrangements, which would cause the price to settle at a level just below the *short run marginal cost* of the next best alternative"[221] (italics added).

250. Our proposal does not prescribe whether SRMC or LRMC should be used as the counterfactual. Which is appropriate will depend on the circumstances. For a short term pivotal event, SRMC may be best. If the offers in question have longer term implications, a comparison of trends toward LRMC may be better. It will be for the enforcement decision-maker (Authority, Rulings Panel or Courts) to decide.

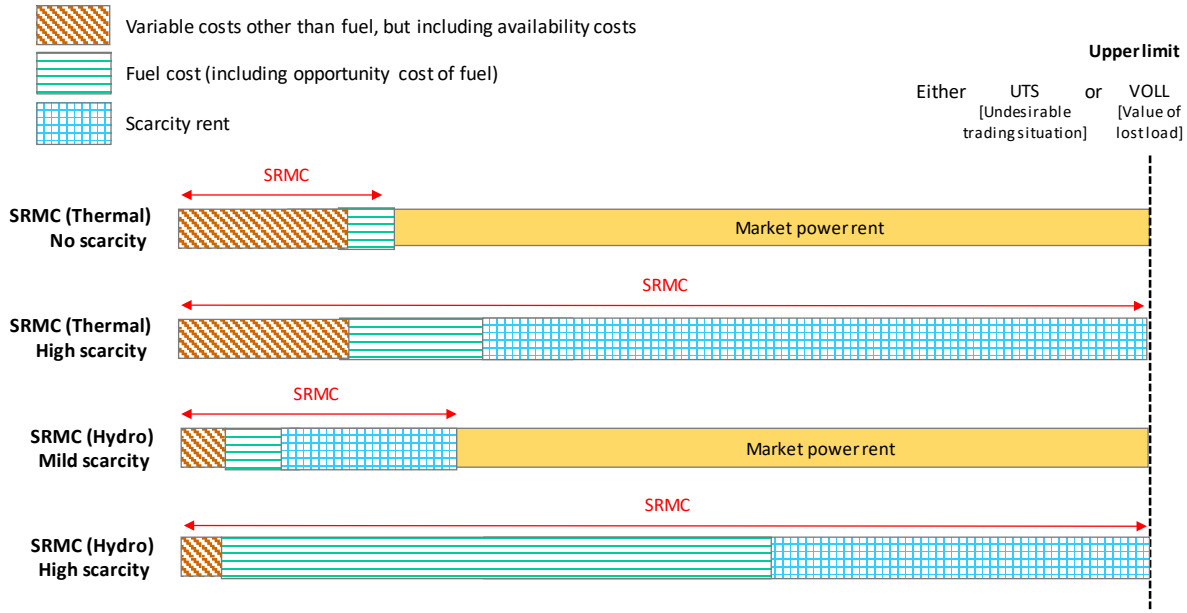
251. This is no different to the status quo. The same issue and choice arise in any application of HSOTC to a pivotal situation, or indeed any other offer.

Illustration of SRMC efficiency benchmarks

252. Figure 10 below shows how the level of the SRMC efficiency benchmark can vary across a wide price range, depending on supply and demand conditions. Among other things, the diagram also seeks to show that the opportunity cost of water tends to have a wider range of variation than for thermal fuel; and scarcity rents for thermal and hydro generation can vary across a similar range.

[220] EA, Dec 2017 at 8.24
[221] WAG, Sept 2013 at 3.1.5

Figure 10: Illustration of SRMC efficiency benchmarks



In conclusion

253. The real-world boundary between efficient SRMC and market power rent can be blurred. As Professor Bill Hogan has observed, the most difficult problem is distinguishing good high prices from bad high prices. In the presence of shortages, high prices can be efficient, a symptom of market failure, or the result of bad market design.[222] Similarly, Professor Paul Joskow suggests: "even the best-designed mitigation measures will inevitably 'clip' some high prices that truly reflect competitive supply scarcity and consumer valuations for energy and reliability as they endeavor to constrain high prices".[223]

254. As noted above, the test proposed by Yarrow and Decker for when there is 'significant' market power, is when the potential for inefficiency or harm is sufficiently high to warrant the incurring the costs of intervening.[224]

[222] "Market power and Electricity Competition", William W Hogan, 25 April 2002 at slides 9 and 10
[223] Paul L. Joskow, "Comments on FERC's Standard Market Design Proposals", Center for Energy and Environmental Research, January 2003
[224] Measuring both potential harm/inefficiency and costs of intervention in net present value terms – see Yarrow and Decker, Nov 2014, at page 21, paras 4 and 5. For completeness, we note that, more broadly, there is a school of thought that, in the real world, competitive markets generally are not characterised by price equal to marginal cost – that it is the wrong benchmark for judging possibly anti-competitive behaviour, and that things are complex and more risky than the marginal cost criterion recognises. The proposition from this perspective is that, given the difficulties of satisfactorily defining and proving anti-competitive conduct, it is better to focus on structure and incentives in designing remedies (new entry, enforced divestment, contracts markets and the like), rather than on conduct - see Littlechild, 2001. We address this view in Part D of this paper.

Annex 4: Cost-benefit analysis

255. This Annex links to the section "Cost-benefit analysis" in Part E of our paper.

Introduction

256. A full quantitative analysis of the costs and benefits of the proposal is not practical in this case. This is because assessing the likely outcomes from both the existing Code and the proposed Code is influenced by subjective judgements about participant behaviour. In such circumstances it is difficult to meaningfully quantify estimates of the benefits.

257. We have therefore assessed the benefits of the proposal relative to the status quo (the existing HSOTC requirements in the Code) on a qualitative basis. We have then considered an example of the potential benefits of removing possible inefficiencies in an illustrative pivotal supplier situation. This gives an indication of what impact the proposal would need to have on participant behaviour for the benefits of the proposal to be greater than the expected costs.

258. The costs of the proposal relative to the status quo are expected to be negligible because direct costs are near-zero and we consider that indirect costs are unlikely.

The approach taken in this cost-benefit differs to the approach taken by the WAG and Authority

259. The cost-benefit analysis undertaken by the WAG in its 2013 discussion paper[225] and subsequently by the Authority in its 2014 consultation paper[226] assessed the benefits of the proposal on a quantitative basis. The WAG and Authority considered the potential for efficiency losses to arise in the future and then made subjective judgements on the plausible bounds for pivotal supplier action and the possible counter responses this could elicit from purchasers and end-users.[227]

260. We considered the approach taken by the WAG and Authority to their quantitative cost-benefit analysis, but decided it required making several assumptions and judgements to estimate the benefits of the proposal that are very difficult to substantiate. We believe this led to a high degree of uncertainty around the results of the WAG and Authority's cost-benefit analysis. For this reason, we have assessed the benefits of the proposal on a qualitative basis.

The status quo and proposal considered in this cost-benefit analysis

261. The cost-benefit analysis assesses the costs and benefits of the proposed Code change (as set out in paragraph 114 of the discussion paper) (the **proposal**) relative to the current Code provisions (as set out in paragraphs 11 and 12 of the discussion paper) (the **status quo**).

[225] WAG, May 2013.
[226] EA, Feb 2014.
[227] WAG, May 2013 at B.1.12.

262. The cost-benefit analysis does not consider the costs and benefits associated with the MDAG's intention to recommend that the Authority increase resourcing of its compliance and monitoring functions. If the Authority were to implement this recommendation it would increase the Authority's compliance and monitoring costs but would also be expected to increase the effectiveness of the proposed Code amendment (and therefore the benefits). The recommended increase in resourcing does not require a Code amendment, so the Authority would not be required to undertake a cost-benefit analysis of this recommendation in order to implement it.

The proposal is expected to improve productive, allocative, and dynamic efficiency

263. The proposal more tightly targets the objective of improving efficiency of prices when competitive pressures in the wholesale market are weak than the status quo. The proposed Code requires that offers "must be consistent with offers that the generator would have made where no generator could exercise significant market power" (and likewise for ancillary service agents' reserve offers) and that offers promote efficient "consumption decisions by consumers", "production decisions by suppliers", "innovation and investment by suppliers and consumers", and "risk management and risk management markets".

264. While the proposal still leaves it to the enforcement bodies to exercise key judgements (for example, when market power should be viewed as 'significant'), the proposal significantly reduces the legal and economic definitional problems that exist under the status quo. The proposal sets out directly the assessment framework to be used when looking at a supplier's offer, namely a comparison of the supplier's actual offer to the offer that would have been made if they had no significant market power. In addition, the proposal requires that suppliers' offers promote efficient decisions by other parties. These requirements reflect the purpose of efficient pricing to promote economically efficient outcomes.

265. For these reasons, we expect the proposal will lead to efficiency improvements in the electricity industry. These efficiency improvements will be driven by a reduction in the occurrence of inefficiently high spot prices (that is, high spot prices absent high opportunity costs and/or scarcity rents) when competitive pressures in the wholesale market are weak. We break these efficiency improvements down into three parts:

Efficiency type	**Definition**[228]	**Improvement in efficiency in this case is caused by:**
Productive efficiency	Doing as much as possible with a given set of resources (including supplying existing outputs at a lower cost)	Purchasers not diverting resources into managing risks of inefficiently high prices

[228] These definitions reflect those set out in *Wellington International Airport Ltd and others v Commerce Commission*, [2013] NZHC 3289 at 24(a).

Allocative efficiency	Producing goods and services that customers want in accordance with their willingness to pay for them[229]	A reduction in price distortions associated with weak competition situations and so a reduction in 'dead-weight losses'
Dynamic efficiency	Timely response to opportunities or changes in circumstances, and so delivering greater productive and allocative efficiencies over time	Innovation and efficient investment over time from greater confidence in competition and lessening the perception of wholesale market price risk

266. Each of these expected efficiency gains is discussed further in the following subsections. Efficiency gains are expected in relation to both 'local' pivotal supplier situations (events affecting an area smaller than the North or South Island) and 'widespread' pivotal supplier situations (North or South Island or national events).

Productive efficiency

267. If pivotal suppliers caused (or were expected to cause) an increase in spot price levels or volatility absent underlying physical scarcity, purchasers would be likely to act to mitigate the impact of these increased prices or volatility. Options for managing this include purchasing hedge contracts, modifying retail positions, arranging short term demand response, and/or constructing additional back-up capacity.

268. In local pivotal supplier situations, it is likely that with ongoing instances of inefficiently high prices retailers will consider withdrawing from the region while other retailers will be less likely to consider entering the region—this means that retail competition would be expected to be thinner in regions subject to pivotal supply risk. Some thinning of retail competition could also be expected in response to widespread pivotal supplier situations, but limiting retail coverage is likely to be less viable when considering price risk that affects very large areas. However, over the long run retailers could decide to exit the retail market completely if ongoing instances of inefficiently high spot prices squeeze retail margins substantially. A reduction in retail competition would be expected to weaken the pressure for retailers that remain to minimise operating costs – this is a productive efficiency cost.

269. In both local and wider pivotal supplier situations, there may be productive efficiency losses due to inefficient investment in and operation of back-up capacity. Construction of additional back-up capacity is likely to be inefficient if the high prices are not associated with genuine scarcity.

[229] This definition differs slightly from some definitions which emphasise that allocative efficiency is where resources flow to their highest value use.

270. Purchasers could mitigate high prices during wider pivotal supplier situations to some extent using FTRs. However, FTRs can provide poor hedging properties in some cases.[230] In particular, a purchaser's exposure to pivotal supplier risk is unlikely to be able to be fully eliminated by purchasing FTRs[231] because:

    a. parties need to acquire FTRs via auctions and therefore face some uncertainty about cover

    b. the cost for FTRs may simply rise to reflect the risk of market power during pivotal supplier situations

    c. FTRs may not always provide full cover in situations where there is an extended transmission outage (because transmission flows and hence rental income to fund FTRs will be reduced).

271. The proposal is expected to lead to productive efficiency gains because there is expected to be a reduction in the occurrence of inefficiently high prices during pivotal supplier situations, reducing the need for purchasers to find ways to manage such events. In paragraphs 276 to 281 we use an example to shed light on the potential scale of this benefit.

Allocative efficiency

272. High spot prices during pivotal supplier situations (absent real shortages) can lead to an increase in mean spot prices where a supplier is frequently pivotal (either locally or more widely), although the increase is likely to be constrained by the threat of new entry (particularly in the case of wider pivotal supplier situations)[232]. This may, in turn, result in an increase in the price paid by end consumers (both retail customers and major users) in the affected region and lead to some inefficient demand response – this is an allocative efficiency cost.

273. Any change in mean spot prices will be very sensitive to the frequency and duration of pivotal supplier situations, and the level of spot prices during those pivotal supplier situations. However, even relatively infrequent pivotal supplier situations can lead to a meaningful change in mean spot prices (depending on the magnitude of the increase in spot prices during pivotal supplier situations). For example, if prices rose to $5,000/MWh for ten hours per year in a region[233], this would lead to a $6/MWh uplift in the mean spot price (over the year) in that region.

[230] The Authority is currently undertaking a review of the FTR market.
[231] We emphasise that this discussion is in relation to use of FTRs to manage *purchasers'* exposure to pivotal supplier risk. This does not contradict the discussion in paragraphs 50-52 of the discussion paper, which discusses the use of financial instruments, including FTRs to manage generators' exposure to price risk.
[232] Mean spot prices may increase more in local pivotal supplier situations than in wider pivotal supplier situations because the cost of the next best alternative for purchasers can be quite high (for example, it could entail building alternative generation to supply all (or most) of the affected load). For wider pivotal supplier events the increment of supply sufficient to offset the supply capacity that is pivotal could be a relatively small increment (although this is not always the case). In addition, if the pivotal supplier is a *gross but not net* pivotal supplier, it will have little incentive to increase prices in the short term, although in the medium to longer term it may have some incentive to increase prices (or create greater volatility) to increase hedge and/or retail returns over the long term.
[233] From a base price of $80/MWh.

274. Given the large impact that even relatively infrequent pivotal supplier situations can have on mean spot prices, market participants may take actions that have efficiency consequences in advance of any high prices actually being observed. The consequences of waiting to see the level of spot prices in pivotal supplier situations may be financially untenable.[234]

275. The proposal is expected to lead to allocative efficiency gains because there is expected to be a reduction in the occurrence of inefficiently high prices during pivotal supplier situations, reducing inefficient demand response. However, the allocative efficiency gains are not expected to be as large as the productive or dynamic efficiency gains. This is because any reductions in mean spot prices are likely to be small and as electricity demand is relatively inelastic[235] (particularly in the short run) the demand response to these lower spot prices will also be small. In paragraphs 282 to 287 we use an example to shed light on the potential scale of this benefit.

Dynamic efficiency

276. Dynamic efficiency refers to the process of innovation and investment. One of the most important drivers for dynamic efficiency is the degree of competition and the impact this has on market dynamics. Pivotal supplier situations have the potential to affect market dynamics.

277. In the New Zealand electricity market there is a significant degree of vertical integration. Parties that are buyers at one time or location can be pivotal suppliers at other times or locations. Parties with such dual interests may be in a better negotiating position with other pivotal suppliers (eg, when purchasing hedge products) because of the potential for mutually beneficial trades.

278. Conversely, smaller or non-integrated parties without any potential to be pivotal may have greater difficulty in managing spot price risk and in buying hedge cover on acceptable terms. These effects could inhibit entry or expansion by such participants and weaken competition. Given that these parties can be expected to have less interest in preserving existing industry structures and processes (as compared to established players), they can represent an important source of new ideas and competitive pressure.

279. In addition, as noted in the discussion of productive and allocative efficiency above, high prices in pivotal supplier situations can have a material impact on investment decisions (eg, decisions by purchasers on whether to invest in back-up capacity). Inefficiently high prices in pivotal supplier situations can lead to both over- and under-investment. In the case of over-investment this could lead to premature adoption of some new technologies (eg, battery technologies). These impacts on investment decisions and adoption times for new technologies can both undermine dynamic efficiency.

280. Measuring dynamic efficiency losses is typically harder than measuring productive or allocative losses because they are less directly observable. However, dynamic efficiency is almost universally regarded as being the most important form of efficiency.

[234] For example, the uplift in mean price might render the operation of an electricity retailer (earning a margin of, eg, $5-10/MWh on sales) unprofitable.

[235] Demand is inelastic when a change in price causes a smaller percentage change in demand. For example, a price elasticity of -0.1 (the price elasticity assumed in the illustrative example at the end of this cost-benefit analysis) means a 10 percent increase in price would result in a 1 percent decrease in consumption.

Quantitative assessment of efficiency improvements not attempted

281. It is difficult to meaningfully quantify estimates of the benefits of the proposal (relative to the status quo) because it would require making subjective judgements about how participants would behave in future pivotal supplier situations under both the proposal and the status quo.[236] For example, it would require assessing at what point a retailer would consider leaving (or scaling back their exposure to) a region prone to pivotal supplier situations.

282. Therefore, to assess whether the proposal is likely to be net present value positive we have considered:

    a. what the costs of the proposal are

    b. by way of an illustrative example, what the potential benefits of the proposal are for just one pivotal supplier situation

    c. given (a) and (b), whether it's likely that the benefits of the proposal will outweigh the costs.

283. The next section considers the direct and indirect costs of the proposal, while the last section of this annex considers the potential benefits of the proposal for an illustrative example and the likelihood that the benefits of the proposal will outweigh the costs.

The costs of the proposal are expected to be negligible

Direct costs

284. Table 5 shows the areas where costs might directly arise from the proposed Code amendment. As set out in the table, we don't expect any material increase in costs in these areas relative to the status quo. The costs from the proposal to increase monitoring and enforcement are not included as this is also recommended under continuation of the status quo.

Table 5: Potential additional direct costs from the proposed Code amendment compared to the status quo

Cost	Expected additional cost ($m)	Reasoning
System costs	Nil	The amendment should not require market participants, the Authority, or its service providers to change their software systems materially.
Staffing costs for Authority	Nil	The Authority already monitors participant behaviour and the proposal is not expected to materially affect the resources it needs to do so.[237]

[236] Quantifying the benefits would also require predicting the likely frequency and duration of these future pivotal supplier situations (as well as the quantity of load affected). While these predictions can be based on what has happened in the past and what we know about the future, these predictions would also add to the uncertainty around the benefit estimation.

[237] However, the MDAG is also intending to recommend that the Authority increase resourcing of both its monitoring and compliance functions. This increased resourcing would have a cost associated with it which has not been captured here. The MDAG expects that increased resourcing

Staffing costs for participants	Minimal	Participants are already subject to trading conduct provisions. Participants may incur some initial costs to get up to speed with the new Code, but we expect these would be modest. Based on current information, we do not expect any material change in costs for participants in this area.
Costs incurred by Authority and participants in pursuing and responding to alleged breaches	Nil	Relative to the status quo no increase in costs is expected. However, there is potential for costs to be lower than the status quo given that there is more established case law on the exercise of market power than there is on a high standard of trading conduct.

Indirect costs

285. We also considered whether the proposed Code amendment might create unintended efficiency costs due to:

    a. inefficient behaviour deterred by the current Code not being deterred under the proposed Code (ie, less deterrence of 'bad' behaviour)

    b. efficient behaviour permitted by the current Code being unintentionally deterred by the proposed Code (ie, more deterrence of 'good' behaviour). This could include suppliers pricing over-cautiously to ensure they can't be found to be breaching the Code amendment.

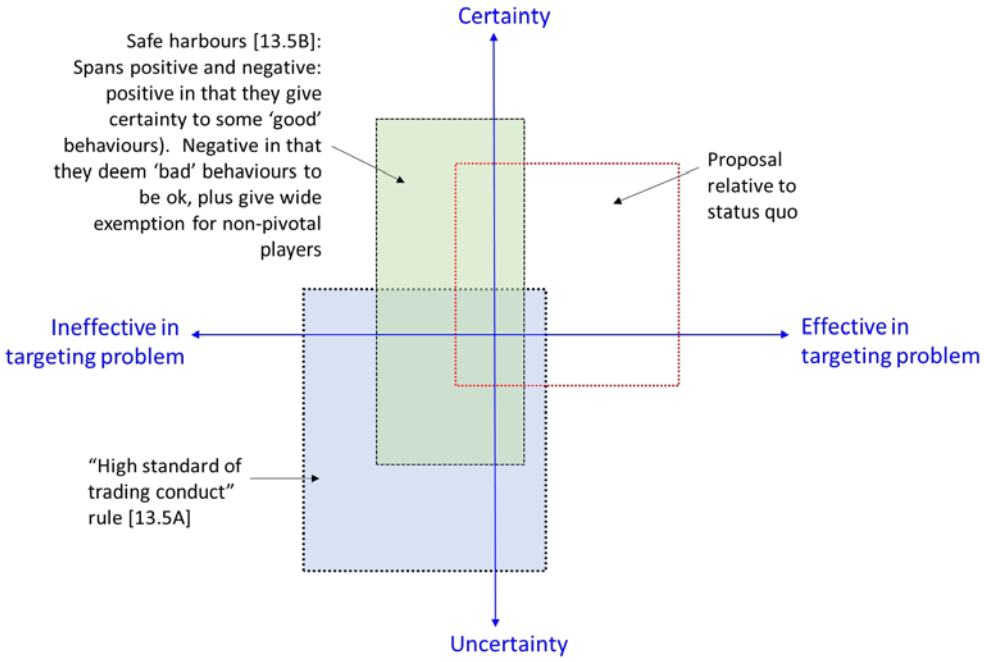
286. Relative to the status quo, we don't expect any increase in costs to arise from either of these effects. This is because the proposed Code uses a standard that is more tightly linked to the relevant economic principles than the existing Code, and for this reason we expect more deterrence of 'bad' behaviour and less deterrence of 'good' behaviour.

287. This conclusion about unintended efficiency costs takes into account that, in some situations, the proposed Code may provide less certainty than is provided by the 'safe harbours' portion of the current Code. The safe harbours clause (clause 13.5B) gives certainty to some 'good' behaviours that may not be provided under the proposed Code. Conversely, the safe harbours clause can provide protection for some 'bad' behaviours.

288. Figure 11 plots our assessment of how effective the proposal and the two parts of the status quo (the 'high standard of trading conduct' rule and 'safe harbours') are at targeting inefficiency of prices in pivotal supplier situations against the level of certainty each of these clauses (the proposed Code, the high standard of trading conduct, and safe harbours) provides.

Figure 11: Effectiveness and certainty of 'high standard of trading conduct', 'safe harbours', and proposal

of the Authority's monitoring and compliance functions would further improve efficiency over and above the efficiency improvements expected under the proposed Code amendment.



289. Our conclusion about unintended efficiency costs also takes into account the potential that having Code that is more tightly targeted and clearer may invite opportunistic litigation by some parties challenging behaviour that is in fact consistent with the Code. We note that this type of cost may also arise under the existing Code. From a cost-benefit perspective, a key question is whether the total costs associated with opportunistic litigation will be higher or lower under the proposed Code. We expect that over time the development of case law will reduce this cost relative to the status quo, especially as the proposed Code is framed around conventional economic principles.

The benefits of the proposal are expected to outweigh the costs

290. We've considered whether it's likely that the benefits of the proposal will exceed the costs by considering an example of the potential efficiency improvements for an illustrative pivotal supplier situation and then considering what this means for the likely overall benefits of the proposal.

Example: local pivotal supplier situation where 50MW of load is affected

291. As noted in paragraph 31 of the discussion paper we identified six current local pivotal supplier situations. These are provided as examples only, and no judgement is made about the standard or acceptability of the associated behaviour. These are set out below in Table 6.

Table 6: Local pivotal supplier situations

Pivotal generator	Load in region	How does the situation arise?	How frequently is generator pivotal?	Historical prices when generator was pivotal[238]
Arapuni 1	~88 MW	Region can be import constrained from LFD to TRK with high load.	Generator appears to be pivotal on numerous occasions, but prices rarely separate.	There were only 4 periods since 2012 with prices of over $200/MWh and significant price separation.
Mangahao	~149 MW	Combination of outages can leave region import constrained.	Rarely. About 1 hour a year.	Price of $3,000/MWh in 2017.
Waikaremoana	~156 MW	Outage of a transformer at Redclyffe leaves region import constrained.	This is often an issue. Even without an outage, there is a group constraint that limits the double circuit to the capacity of a single transformer.	Price separation with prices over $200/MWh has occurred for about 15 hours a year. Highest price seen was $1,500/MWh in 2019.
Waikaremoana	~52 MW at Fernhill and ~50 MW at Tuai	Spring washer effects can result in very high prices at Tuai and Fernhill.	Flows around the FHL, TUI, RDF loop can cause high prices – this is complicated and not necessarily related to an outage.	High prices at Tuai and low at Redclyffe occur about 5 hours a year. However, they were more common in 2019, with prices reaching $4,995/MWh at Tuai on multiple occasions. In the first half of 2019 prices at TUI1101 were around $8/MWh higher than prices at WRK2201 on average across all trading periods.
Tekapo A	~4 MW	An outage of either of two lines supplying the region.	About 200 hours per year. As this is a single circuit, during any outage local supply becomes pivotal.	During 2012 prices reached $3,000/MWh. Prices reached $995/MWh in 2018 and were over $500/MWh on 6 other occasions.
Waipori	~81 MW	Various outages can leave region import constrained.	Infrequently (<10 hours a year) but experienced sustained pivotal supplier events (more than 70 hours) in 2012 and 2018.	Prices rarely exceed $400/MWh. Prices during prolonged 2018 event were consistently around $150/MWh.

[238] Note that there may be valid reasons for (at least some) price separation during these local pivotal supplier situations (such as scarcity concerns). MDAG has not undertaken any assessment of whether there are reasonable efficiency grounds for the observed price outcomes. The time period for this analysis is 01/01/2012 – 30/09/2019.

292. There is the potential for these local pivotal supplier situations to repeat in the future and for new local pivotal supplier situations to arise.

293. We have considered the potential productive and allocative efficiency gains under the proposal (relative to the status quo) of a hypothetical local pivotal supplier situation where:

    a. 50 MW of load is affected (which is smaller than five of the six local pivotal supplier situations noted in Table 6 above)

    b. the pivotal supplier increases prices when it is pivotal such that there is a $6/MWh uplift in mean spot prices in that region[239] (which is lower than the $8/MWh price separation observed in the Hawkes Bay in the first half of 2019[240] (see Table 6 above)).

Potential productive efficiency gain

294. As discussed above, in paragraphs 249 to 253, productive efficiency losses can occur in pivotal supplier situations through a lessening of retail competition and through over-investment in back-up capacity (among other things). However, if parties respond to increased price risk in pivotal supplier situations by investing in additional back-up capacity, there is less likely to be a retail competition effect, and vice versa. For this reason, the productive efficiency loss estimates for capacity and retail sector effects are unlikely to be additive. For this example we have considered potential productive efficiency gains from over-investment in back-up capacity only.

295. The cost of investment in back-up capacity is likely to represent an upper limit in terms of direct productive efficiency losses from a pivotal supplier using its market power to raise local spot prices. This is because, in principle, the pivotal supplier could increase local spot prices to reflect a level that just avoids stimulating investment that would remove its pivotal status in the future.

296. The estimated fixed cost of a large-scale battery installation is $82/kW/year.[241] However, the effective incremental cost to the investor for installing a large-scale battery for use during local pivotal supplier situations will be lower than this as a battery installation would also provide other benefits (eg, during island-level supply shortages). We have assumed that only half of the fixed cost ($41/kW/year) needs to be recovered during local pivotal supplier situations.

297. We have assumed that a battery would be installed that supplies half of the load in the affected area during pivotal supply periods—a pivotal supplier can be pivotal for the entirety of the load in a region,[242] but in most cases less than 100 percent cover is required to deny the local supplier pivotal status.

298. If investment in back-up capacity were undertaken to cover 50 percent of the 50 MW load at a cost of $41/kW/year then this represents a productive efficiency cost of about $1m per year, or $7.6m in present value terms[243].

[239] Where the mean spot price is for all trading periods (not just when the generator is pivotal).
[240] However, a small portion of this price difference is likely due to voltage differences, with prices typically slightly lower on the 220kV network.
[241] EA, July 2019 at Table 18.
[242] For example, Tekapo A during a transmission outage.
[243] Using a discount rate of 6% and a ten year horizon.

299. The proposal is expected to reduce productive efficiency costs from local pivotal supplier situations, but it may not completely eliminate these productive efficiency costs. Therefore, the estimated $7.6m productive efficiency cost (in present value terms) is an upper bound of the potential productive efficiency gains for this example. It is intended to indicate the magnitude of productive efficiency benefits of the proposal if such a pivotal supplier situation occurred in the future. If there are many local pivotal supplier situations in the future and the proposal prevents (or limits) inefficient price increases by these pivotal suppliers, the productive efficiency gains for local pivotal supplier situations could be higher.

Potential allocative efficiency gain

300. It is possible that changes in offer behaviour will result in an increase in mean spot prices in regions where a supplier is frequently pivotal. For example, as noted in Table 6, prices were on average around $8/MWh higher (over all trading periods) at the TUI1101 node than the WRK2201 node for the first half of 2019. This may, in turn, result in an increase in the price paid by end consumers (both retailer customers and major users) in the affected regions.

301. Table 7 sets out the implied change in mean spot prices, for a range of assumptions about the frequency of pivotal supplier situations and the level to which the spot price may be set during these situations.

Table 7: Expected uplift in mean spot price (over all trading periods) in $/MWh

Spot price during pivotal situations ($/MWh)	**Frequency (hours per year)**			
	10	**20**	**50**	**100**
1,000	+1	+2	+5	+11
3,000	+3	+7	+17	+33
5,000	+6	+11	+28	+56
10,000	+11	+23	+57	+113
20,000	+23	+45	+114	N/A[244]
50,000	+57	+114	N/A	N/A

302. An increase in the variable cost paid by end consumers is expected to cause some inefficient demand response resulting in deadweight loss. We assume a price elasticity of -0.1 for this cost-benefit analysis (i.e. a 10 percent increase in mean price is expected to result in a 1 percent decrease in consumption).[245]

303. In this example we have assumed the 50 MW load experiences a $6/MWh increase in mean price. This assumption is based on the $5,000/MWh for 10 hours a year value in Table 7 above and is lower than the $8/MWh price separation seen in the Hawkes Bay over the first half of 2019.

[244] The expected uplift in the mean spot price (over all trading periods) has not been included where it is deemed highly unlikely that this situation would arise (that is, very high spot prices during pivotal supplier situations for many hours per year).
[245] This is within the range of elasticity estimates used in the TPM 2019 CBA technical paper (EA, July 2019).

304. This is expected to result in a deadweight loss (allocative efficiency loss) of $5,000 per year, or $40,000 in present value terms[246].

305. The proposal is expected to reduce allocative efficiency costs from local pivotal supplier situations, but it may not completely eliminate these allocative efficiency costs. Therefore, the estimated $0.04m allocative efficiency cost (in present value terms) is an upper bound of the potential allocative efficiency gains for this example. It is intended to indicate the magnitude of allocative efficiency benefits of the proposal if such a pivotal supplier situation occurred in the future. If there are many local pivotal supplier situations in the future and the proposal prevents (or limits) inefficient price increases by these pivotal suppliers, the allocative efficiency gains for local pivotal supplier situations could be higher. As noted above in paragraph 257, the allocative efficiency gains of the proposal are expected to be significantly lower than the productive and dynamic efficiency gains.

Overall potential efficiency gain

306. The potential productive and allocative efficiency gains determined in the previous two subsections (and reported in Table 8 below) are intended to indicate the magnitude of productive and allocative efficiency gains that might be expected if such a local pivotal supplier situation occurred in the future. If there are many local pivotal supplier situations in the future and the proposal prevents (or limits) inefficient price increases by these pivotal suppliers, the productive and allocative efficiency gains for local pivotal supplier situations could be higher.

307. In principle, dynamic efficiency effects may also arise in such a local pivotal supplier situation. However, the load directly exposed to local pivotal suppliers is a relatively small proportion of total demand so dynamic efficiency effects are not expected to be material in their own right. For this reason, and given the difficulties estimating dynamic efficiency effects, we have not estimated the potential dynamic efficiency gain for this illustrative example.

Table 8: Potential efficiency gain for illustrative local pivotal supply situation example

Type of benefit	Potential benefit PV
Productive efficiency	$7.6m
Allocative efficiency	$0.04m

The efficiency gains for wider pivotal supplier situations are expected to be higher than for local pivotal supplier situations

308. The illustrative example of a pivotal supplier situation considered the potential efficiency gains for a local pivotal supplier situation. However, we expect the efficiency gains for wider pivotal supplier situations to be higher than the gains for local pivotal supplier situations.

[246] [246] Using a discount rate of 6% and a ten year horizon.

309. The efficiency gains for wider pivotal supplier situations are expected to be higher because they affect a much larger load. However, offsetting this to some degree, pivotal suppliers in wider pivotal supplier situations may be more constrained in how much they can raise prices due to the greater threat of new entry.[247] Despite this, the potential productive and allocative efficiency gains for wider pivotal supplier situations are still expected to be higher than for local pivotal supplier situations because of substantial difference in load affected. In addition, dynamic efficiency effects are expected to come into play for wider pivotal supplier situations.[248] As noted in paragraph 262, dynamic efficiency is almost universally regarded as being the most important form of efficiency and could be substantially larger than the productive and allocative efficiency gains.[249]

The benefits of the proposal are expected to outweigh the costs

310. Our analysis of an illustrative local pivotal supplier example and consideration of the likely wider pivotal supplier situation benefits indicate the potential for benefits from this proposal in the millions of dollars. However, as noted already, it's difficult to quantify these benefits more accurately due (largely) to uncertainty about how participants will behave under the proposal. We have also established that the costs of the proposal will be negligible. Therefore, we expect the benefits of the proposal to outweigh the costs.

[247] See discussion above in paragraph 253 and footnote 199.

[248] Dynamic efficiency effects are expected to be much larger for wider pivotal supply situations than for local pivotal supply situations because much more load is affected, but also because parties' decisions on whether to innovate are likely to be made in the context of the wider situation rather than localised situations.

[249] One method for estimating dynamic efficiency effects to multiply total revenue by a factor estimated from qualitative information. Using such a method we determined that the potential dynamic efficiency effect could be between $30 million and $60 million (however, this is highly subjective) based on the following assumptions:

- using wholesale market revenue as the baseline (arguably this is conservative because wholesale market effects will ultimately ripple through the value chain and affect the retail market as well)
- an efficiency factor of between 0.25% and 0.50% (this is the efficiency factor used by WAG in 2013 and was estimated by reference to the factors used in other analyses of market efficiency effects by the Commerce Commission (see paragraphs B.4.26 to B.4.28 of the WAG's 2013 discussion paper at https://ea.govt.nz/dmsdocument/15049-discussion-paper-pricing-in-pivotal-supplier-situations)
- that the incremental benefit of the proposed Code amendment captures 50% of the potential benefits.

Endnote – Key design features of the New Zealand wholesale electricity spot market

311. This endnote links to a reference under the heading "Market design" in Annex 3 above.

312. For completeness, we note that the New Zealand electricity spot market has the following design features:

    a. energy only (no separate payment for the cost of capacity)

    b. security-constrained

    c. a continuous half-hourly offer-bid auction

    d. price clears at the lowest offer price for the last increment of supply required to meet demand[250]

    e. no explicit price caps

    f. market balances supply and demand in the short-run

    g. economic dispatch for real-time decisions

    h. nodal pricing

    i. a substantial proportion of supply is hydro.[251]

313. Briefly elaborating on some of those features:[252]

    a. offers and bids summarise the preferences of the market participants and ensure that the final dispatch choices respect those preferences

    b. the security constraints preserve the conditions needed to ensure reliable operation

    c. the principles of economic dispatch reflect both the traditional engineering practice and the results of a competitive equilibrium

    d. the economic dispatch accounts for system congestion and transmission losses, and thus inherently produces prices that can vary at each location by the combined effect of generation, losses and congestion. These locational prices provide signals for the quantity and location of new investment.

314. It was observed by Prof Bill Hogan in the relatively early stages of the market's formation that "the New Zealand model for real-time operations is aligned with the best international practice for a competitive electricity market."[253]

[250] The process of establishing the wholesale electricity price is usefully set out in a High Court decision relating to an "undesirable trading situation" in 2011 for which Genesis Energy was held to have been mainly responsible. The court decision is reported in [2012] NZHC 238 – the relevant extracts are at paras 17 to 22.
[251] Which has relatively low variable costs, high fixed costs and considerable variability in the opportunity cost of its fuel (water)
[252] Hogan, 2001 at p.16 - https://sites.hks.harvard.edu/fs/whogan/nz031301r.pdf
[253] Hogan, 2001 at p.16

Bibliography

Biggar, 2011	"Theory and Practice of the Exercise of Market Power in the Australian Market", Daryl Biggar, 26 April 2011 - www.aemc.gov.au/sites/default/files/content/1b0947b4-930f-449a-be21-4cf009b2fe7a/AER-Attachment-1.PDF
Borenstein, 2019	"Pricing for the Short Run", Borenstein, Severin, Energy Institute Blog, UC Berkeley, August 19, 2019 - https://energyathaas.wordpress.com/2019/08/19/pricing-for-the-short-run/
Borenstein, Bushnell, 2019	"Do Two Electricity Pricing Wrongs Make a Right? Cost Recovery, Externalities, and Efficiency", Severin Borenstein and James B. Bushnell Current Draft July 22, 2019
ComCom, June 2009	"Input Methodologies Discussion Paper", Commerce Commission, 19 June 2009
ComCom, May 2009	"Investigation Report: Commerce Act – Electricity Investigation", Commerce Commission 21 May 2009
Concept, 2019	Concept Consulting, "Review of impact of trading conduct enforcement action on spot prices", August 2019
Dupuy, 2006	"Electricity Generation: Competition, Market Power and Investment", Max Dupuy, July 2006, Treasury
EA, Aug 2016	Electricity Authority, Final Decision on Electric Kiwi's Claim of an Undesirable Trading Situation in Relation to Trading Periods 35-40 on 2 June 2016, 16 August 2016
EA, Dec 2017	Electricity Authority, "High Prices on 2 June 2016: Market performance review", 18 December 2017
EA, Feb 2014	"Improving the efficiency of prices in pivotal supplier situations: Consultation Paper", Electricity Authority, 18 February 2014
EA, Jul 2019	"CBA approach, methods and assumptions: TPM issues paper 2019", Electricity Authority, 23 July 2019.
EA, Jun 2014	"Improving the efficiency of prices in pivotal supplier situations: Decision paper", Electricity Authority, 4 June 2014

EA, May 2017	Electricity Authority, Notification of the Authority's decision under regulation 29 of the Electricity Industry (Enforcement) Regulations 2010, 4 May 2017
EPR, 2018	Electricity Price Review, "First Report for Discussion", 30 August 2018
ETG, 2009	"Ministerial Review of Electricity Market Performance", Electricity Technical Advisory Group and the Ministry of Economic Development, August 2009, Volume 2, at 239
Evans 2011	"An Examination of Frank Wolak's Model of Market Power and its Application to the New Zealand Electricity Market", Lewis Evans, New Zealand Institute for the Study of Competition and Regulation and School of Economics and Finance, Victoria University of Wellington, January 23, 2011
Evans, 2013	"Cost Shifting: the single buyer model with price discrimination", Lewis Evans, New Zealand Institute for the Study of Competition and Regulation No. 3: 18 April 2013
Glenie (Bell Gully), 2014	"Working with workable competition", Andy Glenie, Bell Gully, 28 February 2014
Green, 2019	"Market power in New Zealand's wholesale electricity market: a critique of critiques", Hayden Green, 13 May 2019
High Court, 2013	Wellington International Airport Ltd v Commerce Commission [2013] NZHC 3289
Hogan, 2001	"Designing market institutions for electric network systems: Reforming the reforms in New Zealand and the US", Prof William W Hogan, 13 March 2001
Hogan, 2002	"Market power and Electricity Competition", Prof William W Hogan, 25 April 2002
Joskow, 2002	"Resource Adequacy Obligations", Paul L. Joskow, December 6, 2002
Joskow, 2003	Comments by Prof Paul L Joskow before the Federal Energy Regulatory Commission, 10 January 2003
Joskow, 2003	Paul L. Joskow, "Comments on FERC's Standard Market Design Proposals", Center for Energy and Environmental Research, January 2003

Joskow, 2008	Joskow, Paul L. 2008, "Capacity Payments in Imperfectly Competitive Electricity Markets," Utilities Policy, 16:159-170.
Joskow, 2011	"Dynamic Pricing of Electricity", Paul L. Joskow, December 2011 - https://economics.mit.edu/files/7428
Joskow, Kahn, 2001	Paul L Joskow and Edward Kahn, "A Quantitative Analysis of Pricing Behaviour in California's Wholesale Electricity Market During Summer 2000", NBER Working Paper 8157, March 2001
Leyton, 2013	"The Economics of Electricity", Dr Brent Layton, 4 June 2013
Littlechild, 2001	"Electricity: Regulatory Developments Around the World", Stephen Littlechild, The Beesley Lectures, Revised version 12 November 2001
Poletti, 2018	Poletti, S., (2018). Market power in the New Zealand wholesale market 2010-2016, University of Auckland
Sapere, 2012	**"**Market behaviour rules in New Zealand and internationally", Sapere (Kieran Murray, Toby Stevenson, Sally Wyatt & Eva Hendriks), 29 November 2012
Sapere, 2018	"A clearer High Standard of Trading Conduct Rule", Sapere **(**Kieran Murray, Toby Stevenson**)**, 14 February 2018
Supreme Court, 2010	Commerce Commission v Telecom Corporation of New Zealand Ltd [2010] NZSC 111
WAG, 2012	"Pivotal pricing project: Problem definition", WAG, 11 October 2012
WAG, May 2013	"Pricing in Pivotal Supplier Situations: Discussion Paper", WAG, May 2013
WAG, Sept 2013	"Pricing in Pivotal Supplier Situations: Recommendations Paper", WAG, September 2013
Yarrow, 2014	"Bidding in energy-only wholesale electricity markets", Professor George Yarrow, assisted by Dr Chris Decker, November 2014
Yarrow, 2017	"Some awkward problems raised by the Electricity Authority's Review of the Transmission Pricing Methodology", George Yarrow, Chair, Regulatory Policy Institute, Oxford, UK, February 2017