Interim arrangements for inter-island reserve sharing

Decisions and reasons

18 November 2014

Contents

1. The Authority's decisions

1.1 Introduction

1.1.1 The Electricity Authority (Authority) is an independent Crown entity charged with promoting competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.

1.1.2 In December 2013, Transpower New Zealand Limited (Transpower) completed a major upgrade of the high voltage direct current (HVDC) link and control systems. The upgrade introduced new control functions that allow for greater sharing of instantaneous reserve between the North and South Islands. The system operator identified an opportunity to put in place a set of interim arrangements that allow for increased reserve sharing across the HVDC link, prior to development of a full national market for instantaneous reserve.

1.1.3 The system operator can implement the interim arrangements without changes to the Electricity Industry Participation Code 2010 (Code). In June 2014, the Authority released an information paper that detailed the interim arrangements, and provided an opportunity for stakeholders to submit feedback.

1.1.4 The information paper and further detail on the project is available on the Authority's website.[1]

1.1.5 This paper sets out:

(a) the Authority's decisions regarding the implementation of the interim arrangements

(b) the Authority's comments on issues raised in the feedback it received

(c) the Authority's reasons for its decisions.

1.1.6 The feedback received in response to the information paper is available on the Authority's website.[2]

1.2 The Authority has decided to implement changes to increase reserve sharing across the HVDC link

1.2.1 The Authority has decided to implement interim arrangements to take greater account of the reserve sharing available from the HVDC link.

1.2.2 The interim arrangements will deliver a net increase in the fast instantaneous reserve (FIR) transfer capability over the HVDC link. This transfer capability will increase from around 25 MW in summer and 50 MW in winter currently, to 60

[1] http://www.ea.govt.nz/development/work-programme/wholesale/national-instantaneous-reserves-market/

[2] http://www.ea.govt.nz/development/work-programme/wholesale/national-instantaneous-reserves-market/development/information-paper-on-interim-arrangements-for-inter-island-reserve-sharing/

MW at all times, or as otherwise limited by South Island sustained instantaneous reserve (SIR) procurement arrangements.

1.2.3 Other arrangements will remain unchanged. Instantaneous reserve will continue to procured in each island from the reserve offers available in each island.

1.2.4 The system operator plans to implement the necessary changes to its reserve management tool on 17 December 2014.

1.2.5 The Authority is intending to replace the interim arrangements with the implementation of a national market for instantaneous reserve in mid-2017.

2. Background

2.1 Interim arrangements a step toward a national market

2.1.1 Instantaneous reserve is an ancillary service that ensures that electricity demand can continue to be met in the event of unplanned generation or transmission interruptions.

2.1.2 Participants provide instantaneous reserve in the New Zealand electricity market separately in each island. Until recently, the HVDC has only been credited for transferring 25 MW of FIR between the islands in summer and 50MW in winter. The transfer capability is limited by the HVDC's minimum transfer limit of 30 MW, and the system operator's ability to accurately model the likelihood of transfers entering this range.

2.1.3 In December 2013, Transpower completed a major upgrade of the HVDC link, which made it possible to introduce the following new control modes:

(a) frequency keeping control (FKC): the HVDC will respond more readily to frequency disturbances in either island, increasing the quantity of reserve transferred between islands to counter frequency deviations

(b) round power: the quantity of reserve transferred across the HVDC is less constrained as the HVDC loading approaches 0 MW.

2.1.4 The HVDC and control system upgrades remove the physical barriers to a national market for instantaneous reserve. A full national market would capture the most value from these upgrades and deliver substantial benefits. However, implementing it is expected to require extensive changes to market system tools and take a little over two years to implement.

2.1.5 The proposed interim arrangements take some account of the physical sharing between the islands without implementing the more extensive changes to the market tools to create a national market.

2.2 Authority's process

2.2.1 Transpower identified a national instantaneous reserve market as a potential benefit of its HVDC upgrade project. As the HVDC upgrade project approached completion, the Authority began investigating the concept of a national market, and decided to add the investigation to its work programme.

2.2.2 The Authority investigated the feasibility and practicality of implementing a national market by engaging:

(a) the Wholesale Advisory Group, who identified substantial net economic benefits from a national market, and recommended (inter alia) that the Authority progress the project as a matter of priority

(b) the system operator, who identified detailed options for implementing a national instantaneous reserve market, including interim arrangements

that would take some account of the new FKC and round power control functions for the HVDC link.

2.2.3 No Code amendments are required to implement the interim arrangements. The Authority published an information paper *"Interim arrangements for enhanced inter-island instantaneous reserve sharing"* in June 2014 to inform stakeholders of the Authority's intentions. The information paper outlined:

(a) existing arrangements for reserve sharing between the islands

(b) why the Authority is pursuing interim arrangements

(c) options that were identified to implement a national instantaneous reserve market, including the preferred option that provides for interim reserve sharing arrangements

(d) a detailed description of the intended changes that comprise the interim arrangements

(e) the costs and benefits of the interim arrangements.

2.2.4 The information paper also invited stakeholders to provide feedback on the project and the information paper.

2.2.5 The Authority received feedback from four stakeholders. The list of submitters is provided in Table 1.

Table 1: Stakeholders that submitted feedback

Generator-retailers	Demand-side participants
Contact Energy Limited (Contact) Genesis Energy Limited (Genesis) Meridian Energy Limited (Meridian)	EnerNOC New Zealand Limited (EnerNOC)

2.2.6 The Authority has published the submissions on its website at http://www.ea.govt.nz/development/work-programme/wholesale/national-instantaneous-reserves-market/.

3. The Authority's reasons for its decisions

3.1 Submissions prompted the Authority to confirm the proposal

3.1.1 Four submitters provided feedback in response to the Authority's information paper. All four submitters were generally supportive of the proposal, and of the eventual move toward a full national market.

3.1.2 While there were some qualifications, the Authority does not consider there were any issues raised that necessitate a change in approach.

3.1.3 Two submitters sought clarification on some aspects of the interim arrangements. Specifically:

(a) Contact prefaced its support on the understanding that energy transfer across the HVDC link has precedence when the HVDC becomes the binding risk (it would).

(b) Meridian questioned whether the interim arrangements would limit HVDC capacity available for energy transfer (it would not).

(c) Meridian also questioned whether the implementation time would depend on its own implementation of multiple frequency keeping (it would not).

3.1.4 Contact suggested that it would also support an additional increase in the HVDC transfer limit, which the Authority posed as an alternative option in the information paper. The Authority would support further discussion on this option, and will engage with Contact (in the first instance) toward this end. However, in any case, it does not preclude progress being made on the interim arrangements, as proposed.

3.1.5 Some submitters identified initiatives they considered should be progressed alongside the interim arrangements:

(a) Genesis considered that the Authority should either introduce a cap payment or have a daily monitoring plan in place before moving toward a South Island multiple frequency keeping market (a pre-requisite of the interim reserve sharing arrangements). South Island multiple frequency keeping has now been implemented. The Authority referred this suggestion to the project team in charge of the multiple frequency keeping project.

(b) EnerNOC suggested the Authority consider introducing an interim change in the allocation of under-frequency event charges alongside the interim reserve sharing arrangements, so as to avoid compounding the effects of lower reserve prices on interruptible load providers.

3.1.6 EnerNOC and Meridian both suggested that the Authority look to progress related projects (including introduction of a "very fast reserve" product and a

review of the reserve cost allocation methodology) alongside the national market project, rather than stagger their implementation.

3.1.7 The Authority does not consider that these suggestions preclude implementation of the interim instantaneous reserve sharing arrangements at this stage. While the Authority agrees that progressing related ancillary services projects in tandem would be the ideal approach, both the system operator and Authority are resource constrained. Implementation is staggered because there are insufficient resources to carry them out simultaneously.

3.1.8 The Authority has not yet made decisions regarding the governance and implementation of the national instantaneous reserve market, and will consider relevant suggestions from submitters when it does so.

3.2 The proposal supports the Authority's statutory objective

3.2.1 The proposed interim arrangements would:

(a) improve competition in the wholesale market

(b) have little, if any, effect on existing levels of reliability

(c) improve operational efficiency.

3.2.2 Implementing the proposal would improve competition in the wholesale market because less FIR, on average, would be procured in each island to cover contingent events. While this might cause some instantaneous reserve providers to be unprofitable and exit the market, the excess capacity remaining would increase competition in the wholesale market for both energy and instantaneous reserve.

3.2.3 Implementing the proposal would not promote more reliable supply as it would have no impact on the ability of the system operator to dispatch generation to meet demand. It would reduce the instantaneous reserve procured in excess of what is required to meet the reliability standard provided for in the Code, which is deemed to be efficient.

3.2.4 Implementing the proposal would improve the operational efficiency of the power system, as the dispatch and resulting prices would more accurately take account of the contribution the HVDC link provides to supporting frequency following a contingent event.

3.3 Costs are expected to be outweighed by the benefits

3.3.1 During tests of the new HVDC control system settings, the system operator found there was a greater variation between the electricity dispatched from one island to the other across the HVDC link and the level of electricity actually transferred. This means, at times, the loss of a single HVDC pole could be a greater risk than expected.

3.3.2 Consequently, the system operator has increased the quantity of instantaneous reserve required to cover the loss of a single HVDC pole by 40MW.

3.3.3 This action prompted the Authority to reconsider the costs and benefits of the interim arrangements. This reconsideration has determined that:

(a) the increase in FIR transferred across the HVDC link could reduce wholesale market costs by $2 million in PV terms, assuming a period of 15 years and a discount rate of 8% pa

(b) modelling the effect of the increased modulation risk as part of the interim arrangements could increase wholesale market costs by around $15 million PV, under the same assumptions

(c) the interim arrangements have additional benefits in terms of reduced frequency keeping costs, which more than offset the net cost to the instantaneous reserve market

(d) overall, the interim arrangements are expected to have a net benefit in the order of $115 million PV.

3.3.4 More details on the costs and benefit calculations are contained in Appendix A.

4. The Authority has made no changes to the proposal following consideration of submissions

4.1 Summary of changes

4.1.1 No issues were raised in submissions that impact the Authority's proposal to implement the interim instantaneous reserve sharing arrangements. Furthermore, the revised cost-benefit analysis supports the proposal.

Glossary of abbreviations and terms

Act	Electricity Industry Act 2010
Authority	Electricity Authority
Code	Electricity Industry Participation Code 2010
FIR	Fast instantaneous reserves
FKC	Frequency Keeping Controller
HVDC	High Voltage Direct Current link that connects the electricity network in the North Island to the electricity network in the South Island
NPV	Net present value
PV	Present value
SIR	Sustained instantaneous reserves

Appendix A Estimating the costs and benefits of the interim arrangements for inter-island reserve sharing

18 November 2014