Performance of the System Operator

The Electricity Authority's assessment of the system operator's performance for 2011-12

Final report

30 January 2013

Operations Development

747231-16

Executive summary

The Authority has produced this review in accordance with Part 7 of the Electricity Industry Participation Code 2010 (Code). It assesses the system operator's performance for the period 1 September 2011 to 31 August 2012.

The key inputs into this review were the system operator's self-review for the same period, and the feedback from Authority staff who have dealt with the system operator during the review period.

Overall, the conclusion of this review is positive; the performance of the system operator has been good. The principal performance obligations have been met or exceeded and compliance with the Code has been good.

Two main areas of concern are discussed in this review:

- that establishment of the system operator's new security of supply role has been slower than anticipated
- that project management of Code and system developments has been unsatisfactory.

The system operator has made many improvements to its systems and procedures during the review period, including to the above areas of concern.

The relationship between the system operator and the Authority remains communicative and productive.

The Authority has made a number of recommendations in this review. These recommendations propose that the system operator should:

- have procedures that result in future post-event analyses being resourced to produce rigorous, timely and suitably detailed reports
- assess its performance against its Code obligations relating to rolling outage plans for inclusion within future self-reviews, regardless of whether any related work was planned or performed
- provide more detailed ten year capital expenditure forecasts
- continue to invest in improving its programme and project management capabilities
- make changes to ensure that collaboration on projects with other service providers is cooperative and productive
- review its business processes relating to the establishment of projects
- ensure alignment of priorities between itself and its internal service providers.

Contents

1 Introduction

1.1 The system operator is a market operation service provider who performs a crucial role for the electricity industry in New Zealand. The system operator must manage the processes required to coordinate generation at least cost to meet demand without overloading grid assets, while employing resources to mitigate specific threats of power supply interruptions.

1.2 To emphasise the importance of this service provider role and the relationship between the Electricity Authority (Authority) and the system operator, the Electricity Industry Participation Code 2010 (Code) requires both parties to regularly review how well the system operator is performing its role.

1.3 The system operator submitted a review and assessment of its own performance to the Authority on 30 September 2012 for the review period from 1 September 2011 to 31 August 2012[1].

1.4 This report provides the Authority's assessment of the system operator's performance in the same review period.

2 Regulatory requirements of system operator performance review

Reviews are required under the Code

2.1 Under clause 7.11 of the Code, the system operator is required to provide to the Authority by 30 September each year, a review and assessment of its own performance for the previous 12 month period ending 31 August.

2.2 Clauses 7.8 and 7.9 outline the requirement for the Authority to also review the system operator's performance, and the matters that the Authority must consider in its review. Clause 7.8 requires the Authority to concentrate on the system operator's compliance with:

(a) its obligations under the Code and the Electricity Industry Act 2010 (Act)

(b) the operation of the Code and the Act

(c) any performance standards agreed between the system operator and the Authority[2]

(d) the provisions of the system operator's service provider agreement (SOSPA) with the Authority.

2.3 Clause 7.9 requires the Authority to take into account the following matters when conducting the review:

(a) the terms of the SOSPA

(b) the reports from the system operator to the Authority

(c) the performance of the system operator over time in relation to parts 7 and 8 of the Code

(d) the extent to which acts or omissions of other parties have impacted on the system operator's performance and the nature of the task being monitored

(e) reports or complaints from any person

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1 The self-review is available from http://www.ea.govt.nz/industry/pso-cq/system-operations/system-operator-reports/system-operator-annual-self-review-assessment/

2 No performance standards have been agreed. The Authority and system operator plan to conduct an alignment review that would establish performance standards.

(f) the fact that the real time coordination of the power system involves a number of complex judgments and inter-related incidents

(g) any disparity of information between the Authority and the system operator

(h) any other matter the Authority considers relevant.

2.4 Clause 7.11(4) requires the Authority to publish its review and assessment of the system operator within 10 business days after the meeting at which the Authority completes its review and assessment.

Review process

2.5 The review process aims to cover all aspects, both positive and negative, of the system operator's performance and provide constructive feedback, wherever possible, for the purpose of continuous improvement in performance.

2.6 In conducting this review, Authority staff preparing this report have:

(a) considered the system operator's self-review of its performance

(b) considered the 14 November 2012 letter from the Chair of the SRC to the Chair of the Authority in which five system operator performance issues are outlined[3]

(c) sought feedback from the different Authority groups that regularly work with the system operator

(d) sought feedback from the system operator on a draft version of this review.

3 System operator meeting its regulatory obligations

3.1 As a key service provider to the electricity industry, the system operator has many obligations placed on it under the Code and Act.

3.2 The Authority is generally satisfied with the system operator's compliance with its regulatory obligations.

3.3 The system operator continues to exhibit a focus on continuous improvement and mitigating the market impact of non-compliance with the Code. The Authority receives open and timely communication from the system operator on compliance matters. Further, the Authority considers that the increase in reports from the system operator of breaches by other parties is, at least in part, due to the system operator taking a firmer line with other participants in relation to their compliance with the Code.

3.4 The system operator self-reported 26 breaches during the review period. This is an increase of 11 over the previous period, but as 26 is the median result over the last seven review periods, this is not statistically unusual.

3.5 However, the November 2012 meeting of the Authority's Compliance Committee resulted in six warning letters and one strong warning letter being issued to the system operator, for breaches occurring in the latter half of the review period.

Principal performance obligations met

3.6 Clause 7.2 of the Code contains a set of obligations called the principal performance obligations (PPOs) that require the system operator to:

[3] This letter is available from http://www.ea.govt.nz/our-work/advisory-working-groups/src/8nov12/

(a) act as a "reasonable and prudent system operator"[4] in dispatching assets made available to avoid cascade failure of generation

(b) ensure frequency remains within prescribed upper and lower limits and that the number and duration of frequency fluctuations (outside the normal band) stay within specified limits.

3.7 In this regard, the Authority acknowledges that the system operator has met all of its PPOs, with frequency excursions well within target limits, and no instances of time error during the review period.

3.8 Last year's performance review and assessment noted that the standard of security being delivered appears to be higher than that embodied in the Code requirements, and that this higher standard is being achieved through higher ancillary service costs. In this respect, the system operator has made progress on the initiatives in the under-frequency management project, discussed further in paragraphs 5.3 to 5.5.

System operator performed well against its dispatch objective

3.9 Clause 13.57 of the Code requires the system operator to fulfil the dispatch objective, which is to take the offers from generators and maximise, for each half hour, the gross economic benefits to all purchasers of electricity at the grid exit points, less the cost of supplying the electricity at the grid injection points and the costs of ancillary services purchased by the system operator.

3.10 The system operator must record instances where it departs from the dispatch schedule in order to meet the dispatch objective. The system operator recorded a total of 627 such instances during the review period, down from 789 in the previous year, partly due to improved management of potline reductions at Tiwai.

3.11 The system operator has introduced timely reporting of instances where it has exercised its discretion to dispatch out-of-merit order generation.

Good work on Policy Statement and Procurement Plan reviews

3.12 Part 8 of the Code requires an annual review by the system operator of:

(a) the Policy Statement, which outlines the policies and means that the system operator would follow in complying with its PPOs and meeting the dispatch objective

(b) the Procurement Plan, which outlines, for each ancillary service, the principles and processes the system operator would use in purchasing ancillary services.

3.13 The Authority considers that the system operator consistently handles these annual reviews well, and the reviews done during this review period were no exception.

3.14 Further, the Authority found that the system operator provided particularly constructive input into the Authority's recent project to amend the arrangements to improve the flexibility and efficiency of the review process.

System operator handled difficult system security situations well

3.15 The system operator faced a number of system security challenges during the review period. The Authority considers that the system operator generally handled these situations well.

[4] Defined in clause 1.1 of the Code as: "...exercising that degree of skill, diligence, prudence, foresight and economic management, as determined by good international practice and that would reasonably and ordinarily be expected from a skilled and experienced system operator engaged in the co-ordination of an integrated transmission network under the same or similar circumstances as applied in New Zealand at the time."

(a) The 2012 year saw a period of record low South Island hydro inflows. There was widespread industry concern about how this might affect power system management and security of supply going into the winter. The system operator successfully performed its role in this situation by hosting regular forums for affected participants to facilitate information sharing and maximise the electricity flows from the North Island to the South Island. The process itself was handled well and showed good planning by the system operator. The industry indicated its appreciation of the system operator's performance at the last of these forums.

(b) Automatic under-frequency load shedding (AUFLS) relays were triggered on 13 December 2011 for the first time since 1996. AUFLS was able to stabilise system frequency and allow for full system restoration in a timely manner even though the AUFLS system did not operate as intended. This event also helped to highlight a number of issues about the design and operation of the AUFLS system. Some of these issues are being addressed under the AUFLS project, discussed further in paragraphs 5.6 and 5.7. However, the post-event analysis provided by the system operator:

(i) was not comprehensive in its scope (for example, failure to address the implications of incorrect protection settings) or detail (17 pages)

(ii) took too long to produce (six months).

Recommendation

The Authority considers that the system operator should have procedures that result in future post-event analyses being resourced to produce rigorous, timely and suitably detailed reports.

(c) A rupture of the Maui gas pipeline in October 2011 led to a major gas contingency situation. The Authority considers that the system operator handled the situation well by keeping the electricity industry informed, and no power system security issues arose. A further, shorter contingency occurred in March 2012, and a potential contingency was declared in July. These events underscored the need for the system operator to complete its review of its emergency management policy for gas supply disruptions. The Authority has received this from the system operator, outside of the review period.

(d) The Rugby World Cup took place in September-October 2011, and the power system operated successfully throughout, ensuring uninterrupted service to venues associated with the competition. The Authority acknowledges the detailed planning done by the system operator over many months to prepare for the event.

(e) The system operator displayed good planning and business-as-usual operation in dealing with a number of other events including the snow storm in June 2012, the decommissioning of HVDC Pole 1 and the eruption of Mount Tongariro.

Constructive contribution toward Authority's review of the system security forecast

3.16 The Authority considers that the system operator contributed constructively to the review of the need for, and content of, the system security forecast, and has already implemented some of the Authority's recommendations. The Authority looks forward to the system operator implementing the remaining recommendations in 2012-13.

System operator generally performing new security of supply role well, but progress slower than anticipated

3.17 The system operator acquired security of supply and emergency management functions under the Electricity Industry Act 2010.

3.18 The system operator has taken on the new role and has met its new obligations in the Code.

Security of supply forecasting and information policy yet to be submitted

3.19 Under clause 7.3(1)(a) of the Code, the system operator is required to publish a security of supply forecasting and information policy (SOSFIP), which includes an obligation to publish an annual security of supply assessment, information for monitoring the utilisation of generation in managing dry periods, and the modelling data used in each.

3.20 The Authority wrote to the system operator in December 2011 recommending that various improvements be made to the hydro risk curve framework. The system operator replied that it was planning to address these issues as part of a review of the SOSFIP, an updated version of which it planned to submit by the end of June 2012.

3.21 The system operator forwarded a draft SOSFIP to the Authority in May 2012 for discussion, in anticipation of formal consultation thereafter. It was unsatisfactory in some respects: the key deficiency was the omission of the impact on the hydro risk curves of the resource consent changes for several hydro lakes. The Authority considers this demonstrates that the system operator needs to continue to improve its industry awareness. The system operator did not submit an updated SOSFIP to the Authority during the review period. The Authority understands that this was largely due to the system operator's focus being on managing a period of low inflows and consulting on changes to the emergency management policy (EMP).

3.22 The Authority also had concerns regarding the transparency of information available on the input assumptions of the hydro risk curves. The system operator has now addressed these concerns.

3.23 The system operator has satisfactorily completed its first Annual Security Assessment, required by the SOSFIP.

Emergency management policy completed

3.24 Under clause 7.3(3)(a) of the Code the system operator is required to publish an EMP:

(a) that sets out the steps that it will take, and encourage participants to take, during an extended emergency such as an extended dry sequence or an extended period of capacity inadequacy

(b) that, by 1 November 2012, includes discussion of steps to take to deal with a gas transmission failure or gas supply failure to electricity generators.

3.25 The system operator submitted an EMP, which was approved by the Authority in December 2011. The system operator has, outside of the period of this review, submitted a revised EMP for approval by the Authority. The revised EMP includes discussion of contingencies in the event of gas supply disruption.

No change to rolling outage plans

3.26 Under subpart 1 of Part 9 of the Code the system operator is required to prepare and publish a rolling outage plan, which is incorporated by reference in the Code. The rolling outage plan is available from the system operator's website, with no changes made in the period under review. .

Recommendation

The Authority considers that the system operator should assess its performance against its Code obligations relating to rolling outage plans for inclusion within future self-reviews, regardless of whether any related work was planned or performed.

4 System operator engaging well with stakeholders

Constructive engagement with Authority

4.1 Overall, the Authority considers that the relationship between the Authority and the system operator is positive and constructive.

4.2 As required under clause 7.7 of the Code, the Authority and system operator have agreed on a ten-year joint development programme. The programme coordinates and prioritises the items on the Authority's industry development work plan on which it intends to liaise with the system operator, and the items on the system operator's capital expenditure programme that are provided to the Authority under the SOSPA.

4.3 The Authority considered that the process for agreeing this programme was good, and looks forward to working together on the projects incorporated within the programme.

4.4 In one area, however, the Authority believes there is room for improvement: the ten year capital expenditure forecasts need to be more detailed.

Recommendation

The Authority considers that the system operator should provide more detailed ten year capital expenditure forecasts.

4.5 The Authority has also found that ad-hoc requests have generally been responded to quickly, and the system operator has been good at providing data that has been requested (including asset capability statements, system modelling data and pre-dispatch data) to Authority staff in a timely manner.

Constructive engagement with wider industry

4.6 The system operator demonstrated its willingness to provide the industry with improved information. Examples of this improved information are:

(a) in the course of the review of the system security forecast, the system operator undertook to provide participants with information on the levels of north-to-south transfer that will be possible once HVDC Pole 3 is installed

(b) the security constraints that will be in place following the implementation of simultaneous feasibility test software

(c) reports on the transmission capacity that will be unlocked by the North Island grid upgrade and the Wairakei ring project.

4.7 The Authority considers that the system operator has achieved a high level of proactive and constructive engagement with stakeholders, which is supported by improvements in ratings for a number of service factors in the customer satisfaction survey. However, the Authority notes there was a decline in some important service factors in the survey, namely the "understanding your needs" measure.

5 Good performance on investigations

5.1 The system operator has provided assistance to the Authority on a number of investigations during the review period.

5.2 This assistance was provided under the Technical Advisory Services Contract (TASC). The TASC is a consultancy arrangement for the provision of advice that relates directly to the system operator's role and expertise.

Under frequency management

5.3 The objective of this project was to investigate and propose strategies that offer the most reliable and cost-effective under-frequency management regime that allows the system operator to maintain compliance with its PPOs.

5.4 As well as helping identify inefficient over-procurement of instantaneous reserves, this project has also highlighted that such over-procurement can also give rise to detrimental security outcomes through increasing the risk of over-frequency collapse following the triggering of reserves and AUFLS in an under-frequency event.

5.5 The under-frequency management project has been progressed well using a collaborative approach between the system operator and the Authority. The Authority considers that having individuals from both organisations working on issues which have both technical and market design implications has helped identify options that seek to optimise technical and economic considerations. However, there is still scope to improve and entrench this collaborative approach.

AUFLS

5.6 The purpose of the AUFLS investigations is to determine the Code requirements that will provide the most reliable, secure, and efficient AUFLS system for New Zealand. There is a large amount of work underway with various AUFLS work streams progressing simultaneously.

5.7 The system operator has demonstrated a communicative and collaborative approach which is helping to maintain quality and momentum. Progress to date is slightly delayed, but the Authority has every reason to believe that the system operator will deliver what is expected of it.

AUFLS exemptions

5.8 The purpose of this investigation is to determine how to improve the current equivalence and dispensation arrangements with respect to AUFLS.

5.9 Overall, the Authority has observed satisfactory performance to date. Effective communication and explanation of a delay to the scoping phase has given the Authority comfort that the delay is necessary to ensure the desired outcomes (including those of other investigations and projects) are achieved.

5.10 Nonetheless, the Authority considers that there is scope for improved collaboration by the system operator with the Authority.

Multiple frequency keepers (stage two)

5.11 The system operator made satisfactory progress on stage two of the multiple frequency keepers investigation. This work involves investigating systems for exchanges of frequency keeping services between islands and a more sophisticated market arrangement than the current pay-as-offered market. There were no reviewable outputs for the investigation as the work started late in the assessment period in August 2012.

Frequency keeper selection

5.12 The Authority urgently requested that the system operator investigate changes to the frequency keeper selection tool to address a limitation in the selection methodology. The system operator responded promptly to this request and implemented the Authority's solution in a tight timeframe, which minimised the adverse market impacts of the limitations in the selection methodology.

Allocation of commissioning-related instantaneous reserve costs

5.13 The system operator investigated the cost and timetable to implement the Authority's proposed changes to the way that instantaneous reserve costs associated with commissioning are allocated. The system operator completed this work proficiently and was able to identify a number of implementation issues that need to be resolved before the changes are implemented.

6 Mixed performance on development work

6.1 The system operator has provided assistance to the Authority on the development of several projects (Code amendments and development initiatives) over the review period. This assistance was provided under the SOSPA.

6.2 The Authority considers that, in general, the quality of project management by the system operator has been unsatisfactory. During the year under review, the Authority observed that:

(a) detailed project plans were rarely evident. For example, project plans often had:

(i) no staged decision points

(ii) no resource planning

(iii) no plan to manage risks (especially internal risks such as managing resource constraints across projects)

(b) communication from the system operator on some projects was reactive

(c) there was no standardisation of project plans across the programme of projects

(d) there was no reporting on the programme of projects.

6.3 During the review period, resolution has been achieved, or improvements have been made, to all of the above areas of concern. In particular, the system operator has established the 'system operator project management framework' as the platform for enhancing its medium and long-term project capability.

Recommendation

The Authority considers that the system operator should continue to invest in improving its programme and project management capabilities.

6.4 There are unresolved issues with the capital expenditure arrangements between the Authority and the system operator that have been discussed in a recent information paper published by the Authority as part of the appropriation consultation.[5]

6.5 This review now goes on to consider the following projects in greater detail.

[5] This information paper is available from http://www.ea.govt.nz/our-work/consultations/corporate/appropriations-2013-14/

Dispatchable demand

6.6 The Authority found it difficult to successfully engage with the system operator during the conceptual design and Code development stages of the dispatchable demand project, and considers this contributed to issues that were exposed during the Code implementation phase.

6.7 The system operator repeatedly expressed concerns about the timeframe for implementation that was set by the Authority, though these concerns were not expanded upon by the system operator.

6.8 In preparation for Code implementation, the system operator provided the Authority with an initial business case with costs and timeframes. The Authority considers this design document:

(a) failed to provide an adequate breakdown of all costs, particularly contingency

(b) highlighted that the system operator's original estimate of costs was too low ($2.5 million compared with $4.8 million).

6.9 The system operator worked cooperatively in joint workshops to identify innovative solutions to the problem of costs being higher than expected. This was vital to refining this project and keeping it on track.

Scarcity pricing

6.10 The Authority found the system operator to be helpful and fully engaged in the Code development stage of the scarcity pricing project.

6.11 The pricing manager provided a scope of work to the system operator in July 2012 for two options for scarcity pricing implementation.

6.12 The system operator prepared costs estimates and implementation timeframes for both options. In doing so the system operator missed two deadlines totalling seven weeks delay and did not provide communication to predict or acknowledge its failure to meet the deadlines.

6.13 The system operator's communication with the pricing manager was also poor, and the Authority would have liked to have seen better collaboration by the system operator with the pricing manager.

6.14 Despite these weaknesses, the project is now on target for implementation.

Demand-side bidding and forecasting

6.15 Demand-side bidding and forecasting (DSBF) was gazetted in October 2011 and came into effect on 28 June 2012.

6.16 DSBF was unusual for being an implementation project carried out jointly by the Authority, the system operator and the wholesale information and trading system (WITS) service provider. The areas in which the Authority considers the system operator could have improved the project were:

(a) more detail and transparency on project management, costs and reporting. For projects the size of DSBF, the Authority expects that there would be a full project plan with more than one timesheet code established

(b) greater openness around project issues

(c) more cooperation and independent coordination between the system operator and the WITS service provider.

Recommendation

The Authority considers that the system operator should make changes to ensure that collaboration on projects with other service providers is cooperative and productive.

6.17 Overall, the project was well run, on time and within budget. Key factors in the success of the project were:

(a) excellent cooperation between the system operator and the Authority, especially when developing the conceptual design of the Code

(b) adequate resourcing that was able to cope with a number of system operator personnel changes during the project.

Financial transmission rights

6.18 The service provider role of FTR manager was won by Energy Market Services: a division of Transpower that is part of the system operator. The Authority considers this a distinctly separate service provider role, and outside the scope of this review.

6.19 The system operator delivered the Authority its business case for its FTR implementation in June 2012 and requested Authority approval of both the chosen option and the capital expenditure for the rest of the project. The Authority considers the business case, and the process leading up to the delivery of the business case, was not satisfactory.

6.20 However in August 2012 the system operator's role in the FTRs implementation came to an end because the grid owner was identified as a more suitable party to provide the required information.

Multiple frequency keepers (stage one)

6.21 The system operator is assisting the Authority in a project to provide the technology and market arrangements that will allow multiple frequency keepers to be dispatched in the same trading period and coordinated by a centralised frequency control system.

6.22 The project is now making good progress but has suffered from:

(a) awkward business processes, particularly the system operator's internal sign-off for establishing projects

(b) a misalignment of priorities between the system operator and its internal Transpower service providers, particularly the Information Services Technology group.

Recommendations

The Authority considers that the system operator should review its business processes relating to the establishment of projects.

The Authority considers that the system operator should ensure alignment of priorities between itself and its internal service providers.

6.23 In the latter part of the review period, the system operator has improved the resourcing and budgeting of the project, and planning of commissioning is now well advanced. Given the expected market benefits, the Authority is keen to maintain progress on this project.

Glossary of abbreviations and terms

Act	Electricity Industry Act 2010
AUFLS	Automatic under frequency load shedding
Authority	Electricity Authority
Code	Electricity Industry Participation Code 2010
EMP	Emergency management policy
FTRs	Financial transmission rights
HVDC	The high voltage, direct current link between the North and South Islands
MFK	Multiple frequency keepers
PPOs	Principal performance obligations
SOSFIP	Security of supply forecasting and information policy
SOSPA	System operator's service provider agreement
SRC	Security and Reliability Council
TASC	Technical advisory services contract