

Annual review of the system operator's performance

Summarising the Authority's annual review of
system operator performance for the ten-month
period ending 30 June 2016

28 March 2017

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1 The Authority has reviewed the system operator's performance for the ten months to 30 June 2016

- 1.1.1 The Security and Reliability Council (SRC) functions under the Electricity Industry Act 2010 include providing advice to the Electricity Authority (Authority) on the performance of the system operator.
- 1.1.2 The Code requires both the system operator and Authority to perform an annual review of the system operator's performance.¹
- 1.1.3 For 2016, both these reviews cover a shorter, ten-month period. This is because the Authority made changes to the Code, effective 19 May 2016, to align the review period with the Authority's financial year and the performance review process under the system operator service provider agreement. A shorter review period was necessary to transition to the new timing.
- 1.1.4 The system operator's annual self-review for the ten-month period ending 30 June 2016 was considered by the SRC at its 19 October 2016 meeting. The SRC:
- a) suggested the system operator's performance has been positive and its relations with the industry are perhaps the best they've ever been
 - b) recommended that future reporting include a greater focus on risk management and planning to counteract an aging workforce.
- 1.1.5 The Authority has now completed its own review of the system operator's performance ("the review"). Inputs of the review included the system operator's self-review and the SRC's advice. The Authority structured the review around the system operator's five strategic goals. The review was published on 24 January 2017.
- 1.1.6 The purpose of this paper is to summarise the findings of the review, to obtain any feedback from SRC members on the performance of the system operator. This paper is intended to be an extensive summary of the review, reducing the need for SRC members to read the full review. The full review is attached as a reference should there be matters that members wish to delve into in more detail.
- 1.1.7 Continuing the trend of recent years, the Authority's review findings are generally very positive.

1.2 The review recognises the system operator's competent management of system security, and its constructive engagement with stakeholders on such matters

- 1.2.1 The Authority has a high level of confidence in the system operator's commitment to system security, and ability to prudently manage issues that arise. It did not identify any issues in this respect during the review period. The review commends the system operator for:
- a) its approach of publishing market impact and technical reports on system events, as they provide confidence in the system operator's handling of events, and transparency around the cause and remediation.
 - b) conducting a review of its policy of setting the reserves adjustment factor to zero following under-frequency events.

¹ The requirements of both the system operator and the Authority with respect to the annual processes to review the system operator's performance are specified in clause 7.11 of the Code.

- c) its detailed and considered work to maximise the value of the new HVDC controls through improved operation, and refinements to settings.
- d) successfully managing a heavy work load in the security of supply area. This was primarily driven by a series of announcements regarding plant retirements. The Authority found the system operator's work to be of high quality, and very thorough and considered, despite working under tight timeframes. Its communication about its work was open and successful.
- e) working with industry to test the system's ability to respond to, and recover from potential island-wide disruptions to supply.

1.3 The review recognises the system operator has been identifying opportunities to provide further value-for-money

1.3.1 The Authority considers that the system operator maintains a high level of commitment to, and professionalism in, ensuring it complies with its regulatory and contractual requirements.

1.3.2 The review discusses that:

- a) the Authority's and system operator's joint work planning operated well, and seems to have become embedded as a 'business-as-usual' activity
- b) the system operator provides high-quality commercial services. The system operator has highly competent and effective project managers, who communicate well, and have good oversight and control of projects. This was reflected in the smooth operation of many of the system operator's capital projects, and development projects under the Technical Advisory Service Contract
- c) the delays to Transpower's PRISM SCADA upgrade created some challenges during the review period. However, in an endorsement of the commitment to the joint objective, and growing strength of the working relationship, the system operator and Authority engaged constructively on ways to resolve the issues, and learn from them.

1.3.3 The review also notes that the system operator:

- a) responded to the three recommendations that the Authority made in the 2014-15 review of the system operator's performance
- b) met its principal performance obligations. However, the review notes that over-procurement of instantaneous reserve is a concern for some stakeholders, to be addressed through the review of instantaneous reserve project
- c) improved its compliance under the Code, because of a meaningful reduction in manual errors. The number of manual errors was the subject of recommendations made to the system operator in previous performance reviews, so it was positive that the system operator explored opportunities to reduce these
- d) performed all its software auditing obligations
- e) demonstrated continued improvements in its approach to reviewing documents incorporated into the Code by reference
- f) achieved 98% under the 'at-risk' assessment for the year to 30 June 2016 - its highest ever result.

1.4 The review recognises the forethought that the system operator has shown regarding its future role and challenges it might face

- 1.4.1 In the previous review period, the Authority recognised that the system operator had been developing its thinking about its role and how to deliver it. During this review period, the system operator showed continued evolution of thought, and further incisive consideration of these issues. The review discusses the evidence for this, including the system operator's:
- a) attitude and engagement in negotiating and agreeing the new SOSPA
 - b) transition to the new SOSPA
 - c) recognition of the effect of the new SOSPA within its market systems roadmap
 - d) clear strategic direction, as outlined in its strategic plan and interpreted in the short-term via its business plan.
- 1.4.2 The review notes that the system operator showed foresight in investigating and anticipating challenges to system operations, and opportunities that might arise from new technologies and changes in market conditions.
- 1.4.3 The review also outlines the SRC's advice, that the system operator consider including more information in its future self-reviews on the topics of risk management and planning to counteract an aging workforce.

1.5 The review recognises improvements in the system operator's relationship with the Authority and with stakeholders

- 1.5.1 A significant conclusion of the review is that the system operator has been conducting its work with a growing degree of openness and transparency that is highly valued.
- 1.5.2 This improvement is reflected in the system operator's positive working relationships with Authority staff at multiple levels. The review notes the role of the relationship charter in facilitating this. It suggests that both organisations have been coalescing around the joint objective, and actively nurturing the working relationship. The review also recognises the constructive way in which any disagreements are managed.
- 1.5.3 The improvement is also evident to stakeholders, as shown by the results of the system operator's customer satisfaction survey. The review particularly recognises how effective the Reserve and Frequency Management forums have been for engaging and communicating with stakeholders on some technically complex issues.

1.6 The review recognises the benefits of the system operator's investments in its staff

- 1.6.1 The system operator has been nurturing the capabilities of its staff across various disciplines. The review notes that this has been clearly observed by the Authority through:
- a) system operator staff's strong project management disciplines
 - b) the system operator's development of its strategic plan and the transition to the new SOSPA, which have both demonstrated strategic thinking, strong leadership, and effective change management
 - c) continued improvements in the quality of written communication.

1.6.2 The review also recognises the value in the system operator continuing to invest in its human resource. It encourages the system operator to ensure that institutional knowledge can be maintained and utilised.

1.7 The Authority made four recommendations for the system operator

1.7.1 In its review, the Authority made the following four recommendations to the system operator for it to further improve its performance.

- a) Ensure that any recommendations of the post-project review of the PRISM SCADA upgrade are implemented, and that the Authority is informed about the implementation.
- b) Work with the Authority to identify what information and indicators on financial performance should be included in future self-reviews.
- c) Consider whether there would be value in further aligning the annual self-review and system operator service strategic plan, specifically by making an assessment against the intended activities expected to contribute to meeting the strategic plan's overarching goals.
- d) Consider including information in future annual self-reviews that enables readers to assess the system operator's performance with respect to risk management and any planning to counteract an aging workforce

1.7.2 The SRC may wish to consider the following questions.

Q1. What further information, if any, does the SRC wish to have provided to it by the secretariat?

Q2. What advice, if any, does the SRC wish to provide to the Authority?

Annual review of the system operator's performance

For the period from 1 September 2015 to 30 June
2016

24 January 2017

Executive Summary

The Electricity Authority (Authority) has produced this review in accordance with Part 7 of the Electricity Industry Participation Code 2010 (Code). The review assesses the system operator's performance for the 10-month period ending 30 June 2016.

The scope of the review includes the performance of the system operator under both the Code and the system operator service provider agreement (SOSPA).

The key inputs into the review were the system operator's self-review for the same period, comments from Authority staff and feedback on draft versions of this review from the Security and Reliability Council (SRC), the System Operations Committee of the Authority Board (SOC) and the system operator.

Overall, the conclusion of the Authority's review is that, during the review period, the system operator has continued to make meaningful changes that contribute to a clear trend of improving performance.

The system operator has been conducting its work with a growing degree of openness and transparency that is highly valued. The improvement is evident to stakeholders, as shown by the results of the system operator's customer satisfaction survey. It is also reflected in the system operator's positive working relationships with Authority staff at multiple levels.

It is clear to the Authority that the system operator is genuinely focussed on how its actions can better support the objective of long-term benefit of consumers. The new SOSPA has created structural improvements that support both organisations in pursuing this joint objective.

The system operator has set five strategic goals, which are outlined in its strategic plan. These strategic goals provide the system operator with a clear and positive direction, and the Authority is encouraged by its progress towards each of them:

- **Delivering competition with security:** The Authority has a high level of confidence in the system operator's commitment to system security. A number of announcements of thermal generation retirement during the year resulted in a demanding workload on security of supply issues. The system operator's work on these announcements was highly commendable, in spite of tight timeframes. Its communication with the Authority, SRC, SOC and industry stakeholders was very effective.

The system operator's core-grid restoration exercise was a positive development—with recent events in South Australia demonstrating the value of being prepared for worst-case events. The Authority also values the progress that has now been made on reserve adjustment factor settings following under-frequency events.

- **Demonstrating value for money:** The system operator maintains a high level of commitment to, and professionalism in, ensuring it complies with its regulatory and contractual requirements. During the review period it showed improvements in areas the Authority had raised in previous annual reviews as opportunities for enhancing performance. These included the frequency of manual errors and approach to consulting on documents incorporated into the Code by reference.

The system operator has shown a commitment to reviewing the extent to which its policies, procedures, and initiatives support the joint objective. It is also working effectively with the Authority to manage, prioritise and deliver projects.

- **Planning for tomorrow:** The Authority recognises the forethought that the system operator has shown to identify:
 - how the system operator role can evolve over time to best support competition, reliability and efficiency – as apparent from its strategic plan, and the new SOSPA

- various challenges for the power system in future, which will require preparation and diligence – as apparent from its solar PV study, environment scan and market systems roadmap.
- **Strengthening relationships:** The relationship charter between the Authority and system operator has been valuable in strengthening the parties' relationship. The two organisations have formed working relationships and escalation pathways that are resulting in good business and project outcomes. Additionally, the Authority considers that the Reserve and Frequency Management forums have continued to be an effective and well-organised approach to engaging and communicating with stakeholders on the technically complex issues involved.
- **Investing in good people:** The system operator's past investments in its staff have been paying dividends, and the Authority recognises the value of the system operator continuing to nurture the capabilities of its staff across various disciplines. The Authority notes that system operator staff exercise strong project management disciplines, and the quality of written communication has continued to improve.

The Authority notes that the review period was not without some challenges. In particular, these included the delays to the PRISM SCADA upgrade, and the time taken to come to agreement on issues around the reserve adjustment factor. However, in an endorsement of the commitment to the joint objective, and growing strength of the working relationship, the system operator and Authority were able to engage constructively on ways to resolve these issues.

The Authority supports the system operator in continuing to align itself with the joint objective, and in responding to the recommendations included in this review, which are to:

- Recommendation 1: Ensure that any recommendations of the post-project review of the PRISM SCADA upgrade are implemented, and that the Authority is informed about the implementation.***
- Recommendation 2: Work with the Authority to identify what information and indicators on financial performance should be included in future self-reviews.***
- Recommendation 3: Consider whether there would be value in further aligning the annual self-review and system operator service strategic plan, specifically by making an assessment against the intended activities expected to contribute to meeting the strategic plan's overarching goals.***
- Recommendation 4: Consider including information in future annual self-reviews that enables readers to assess the system operator's performance with respect to risk management and any planning to counteract an aging workforce.***

1 Introduction

- 1.1 The system operator is a market operation service provider that performs a crucial role for the electricity industry in New Zealand. The system operator must manage the processes required to coordinate resources (mainly dispatchable generation) in order to meet demand at least cost, without overloading grid assets, while employing resources to mitigate specific threats of power supply interruptions.
- 1.2 The system operator also has a role in working with the Authority to support and facilitate industry development and day-to-day operations that promote competition, ensure reliable supply, and promote efficient operation of the electricity industry, for the long term benefit of consumers.
- 1.3 In recognition of the importance of this service provider role and the relationship between the Authority and the system operator, Part 7 of the Code requires both parties to regularly review how the system operator is performing its role.
- 1.4 This Authority review of the system operator's performance covers the 10-month period ending 30 June 2016. The reason for this timeframe is explained in paragraphs 1.11-1.13.
- 1.5 The key inputs into this review were:
 - (a) the system operator's self-review of its performance for the same period (self-review)
 - (b) comments from Authority staff who have worked with the system operator during the review period
 - (c) feedback on a draft version of this review from:
 - (i) the SRC
 - (ii) the SOC
 - (iii) the system operator.

This annual performance review is required under the Code

- 1.6 Requirements for the Authority's review of the system operator's performance are outlined in Part 7 of the Code. In particular:
 - (a) Clause 7.8 of the Code requires that the Authority undertake a review at least once each financial year, concentrating on the system operator's compliance with:
 - (i) its obligations under the Code and the Electricity Industry Act 2010 (Act)
 - (ii) the operation of the Code and the Act
 - (iii) any performance standards agreed between the system operator and the Authority
 - (iv) the provisions of the SOSPA.
 - (b) Clause 7.9 of the Code requires that the Authority's review takes into account:
 - (i) the terms of the SOSPA
 - (ii) reports from the system operator to the Authority, specifically including the system operator's annual self-review, which it is required to perform each year under clause 7.11 of the Code, and provide to the Authority by 31 August
 - (iii) the performance of the system operator over time in relation to parts 7 and 8 of the Code

- (iv) 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
 - (v) reports or complaints from any person, and any associated responses by the system operator
 - (vi) the fact that the real-time coordination of the power system involves a number of complex judgments and inter-related incidents
 - (vii) any disparity of information between the Authority and the system operator
 - (viii) any other matter the Authority considers relevant to assess the system operator's performance.
- 1.7 As outlined in the Act, the Authority has a statutory objective to "*promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers*".
- 1.8 Achieving this objective requires the system operator's support. In recognition of this, and the fact that the Authority and system operator have many objectives in common, the two organisations agreed a relationship charter in 2014. The relationship charter establishes the Authority's statutory objective as the *joint objective* for the two organisations. It also outlines principles for resolving tension, and pursuing the joint objective.
- 1.9 The relationship charter is the primary 'performance standard' that the Authority has considered under paragraph 1.6(a)(iii).
- 1.10 In conducting its review, the Authority aims to cover all aspects of the system operator's performance—both positive and negative—and to provide constructive feedback, wherever possible, for the purpose of continuous improvement in performance.

The reviews cover a shortened period for 2015-16

- 1.11 Previously, the annual system operator self-review and Authority review both covered the 12-months to 31 August. However, amendments to the Code, effective from 19 May 2016, changed the review process to operate on a 30 June year-end. This aligned the review process with the Authority's financial year, and with the parallel performance assessment processes under the SOSPA, reducing duplication and inefficiency.
- 1.12 To transition to this new timeframe, the system operator's self-review and the Authority's corresponding review for 2015-16 both cover a shorter ten-month period, from 1 September 2015 to 30 June 2016. Future reviews will cover 12 months.
- 1.13 Additionally, in February 2016, the Authority and system operator signed a new SOSPA, which came into effect on 1 July 2016. However, given the backward-looking nature of the review, the system operator's performance has been assessed against the now-superseded SOSPA, which applied during the review period.

2 Delivering competition with security

Power system status, events and challenges

Day-to-day management of the power system was effective

- 2.1 The review period was relatively quiet in terms of power system events. The Authority continues to have a high level of confidence in the system operator's commitment to system security, and ability to prudently manage issues that arise.
- 2.2 Storms in late Autumn 2016 created some outage risks, but these risks were generally well-managed. The Authority also recognises the high number of transmission system outages, and the commissioning of new grid assets, which were undertaken without incident.
- 2.3 The system operator managed the power system in an environment that had high HVDC utilisation for much of the review period, because of high inflows into South Island hydro catchments. The HVDC was generally very reliable, though there was a bi-pole trip in December.¹ The system operator was proactive in publishing market impact and technical reports on the event, with a quick turn-around. These reports provide confidence in the system operator's handling of the event, and transparency around the cause and remediation.
- 2.4 There was one under-frequency event during the review period, compared to three in the previous review period. It appears that new HVDC controls have improved frequency stability, and the system's resilience to outages.
- 2.5 Reduced capacity in the North Island following the retirement of the Otahuhu B and Southdown generation plant may add to the challenge of managing the power system in the future. Warning notices for potential shortages of North Island generation solicited sufficient response on the 2nd and 27th of June to avoid the need to declare a grid emergency. However, it was a very mild winter, and periods of low wind generation may present a particular challenge in future. The system operator has noted that winter evening peaks have become less easy to manage compared to recent years. Its work on system security (discussed in paragraphs 2.13 to 2.17) will be invaluable in informing its own response, as well as the industry's response to these future challenges.

There were improvements in the approach to managing under-frequency events

- 2.6 Authority and system operator staff had disagreed for some time on the system operator's operational processes following under-frequency events—particularly its policy of setting the reserves adjustment factor to zero.
- 2.7 The issue was discussed during the review of the policy statement, as the Authority had some concerns that the specific policy was inconsistent with the statutory objective. The system operator subsequently undertook a detailed review of the policy, engaged in discussions with industry, and decided to initiate some changes.
- 2.8 The Authority notes that the system operator's Transient Stability Assessment Tool (TSAT) project has facilitated a mutually agreeable way to address the concerns the Authority had, while being simple and reasonably easy to implement. The changes being made will create efficiencies, and improve restoration times and power system reliability, with consequential market benefits.

¹ This occurred overnight when transfers were low, and so did not cause an under-frequency event. However, it affected the HVDC's risk status in the following days, with consequent market impacts.

- 2.9 The Authority notes that it has taken some time to resolve the difference in views on this issue. However, the Authority is pleased that an improved outcome has been achieved. It commends the system operator for conducting its review, and working openly and constructively with the Authority during the review period.

The new HVDC capabilities are providing value to the industry

- 2.10 The Authority commends the system operator's detailed and considered work to maximise the value of the new HVDC controls, through improved operation and refinements to settings.
- 2.11 The new controls have facilitated a significant reduction in the amount of frequency-keeping required in each half hour, and also the national instantaneous reserve market which is due to be implemented in late 2016. Furthermore, the security tools project has allowed for greater automation of the new capabilities, allowing them to be utilised more often and more efficiently, resulting in greater operational and market efficiency, and increased frequency-keeping and reserve-sharing benefits.
- 2.12 The Authority commends the system operator for having implemented four of the seven recommendations that came out of its June 2015 Frequency Keeping Control Trial report. The system operator is also working effectively to complete the remaining three recommendations, some of which are being jointly completed with the Authority via the Frequency Keeping Strategy project.

Hydrology, security of supply and emergency management

The system operator successfully managed a demanding security of supply workload

- 2.13 The system operator had a heavy work load in the security of supply area during the review period, involving:
- (a) preparation of analysis and a number of documents relating to security of supply over different time-frames, including:
 - (i) a National Winter Group report providing a detailed assessment of the ability of the power system to meet peak demand over the winter of 2016. This required substantial analysis given the change in system conditions since the winter of 2015, due to the retirement of Otahuhu B and Southdown generation plant
 - (ii) an update to the system security forecast out to 2017, taking into account those retirements
 - (iii) a series of reports looking at the mid- to long-term impacts on the power system of: the retirement of Otahuhu B and Southdown generation plant; announcement and subsequent deferral of the retirement of the remaining two Huntly coal units; and the potential retirement of the aluminium smelter at Tiwai, given the ongoing uncertainty around its future. The reports focussed on both technical and market impacts, and also considered what response would be necessary and appropriate to manage any issues
 - (iv) multiple updates to the 2016 hydro risk curves following each subsequent retirement announcement
 - (b) a number of industry forums and teleconferences to keep the industry informed of the work undertaken on thermal decommissioning
 - (c) presentations to the SOC and SRC on all of this work.

- 2.14 The Authority found the system operator’s work to be of high quality and very thorough and considered. While it was not flawless, much of the work was prepared on tight timeframes, and covered issues that were somewhat of a moving target given the staggered timing of the retirement announcements, and subsequent decision by Genesis Energy to defer retirement of the Huntly units.
- 2.15 In light of those circumstances, the quality of the work was very impressive. The Authority considered that the system operator’s approach of segmenting the thermal decommissioning issue into four reports was effective in demonstrating the development of its thinking over time. The SOC and SRC were also complimentary of the various reports they reviewed.
- 2.16 The Authority also considers that the system operator’s communication about its work—with the Authority, SRC, SOC and industry stakeholders—was open and successful. All parties were well-informed and kept abreast of the analysis as it evolved and various findings came to light.
- 2.17 Furthermore, the system operator was receptive to feedback on its work. For instance, it promptly amended the National Winter Group report in order to account for filter outages, which had not previously been included in the report, but were identified as having a material impact on its 2016 conclusions.

Core-grid restoration exercise a positive development

- 2.18 The system operator was proactive in testing the system’s ability to respond to, and recover from potential island-wide disruptions to supply.
- 2.19 The system operator is required to perform extensive testing, planning and training to review and mitigate impacts of supply disruption. In the previous review period, the system operator was asked to present a paper to the SRC on its objectives and arrangements for black-start.
- 2.20 Following on from that work, it became apparent that:
- (a) there may be a gap between the expectations of stakeholders and the system operator with respect to the time it could take to restore supply following an island-wide black-out
 - (b) an industry-wide simulation exercise would offer benefits by enhancing industry coordination and identifying opportunities for improvement.
- 2.21 The Authority considers that the core-grid restoration exercise that the system operator undertook with industry during the review period was a very positive development. While an island-wide black-out is an extremely unlikely event, recent events in South Australia demonstrate the value in being prepared for worst-case events.
- 2.22 The exercise means that the wider industry is now better prepared for such an event, were it to occur. The Authority looks forward to the system operator implementing its learnings with the industry through continued work in this area.

3 Demonstrating value-for-money

System operator showing a commitment to improvement

- 3.1 The Authority recognises the system operator's response to the three recommendations it made in the 2014-15 review of the system operator's performance. Specifically:
- (a) The Authority is impressed that the system operator was able to complete all but five of the 38 Key Performance Indicators from its 2014-16 business plan, and has demonstrated a strong commitment to aligning itself with the joint objective during the review period. The Authority commends the system operator for its effort in reviewing the extent to which its policies and procedures are consistent with the joint objective.
 - (b) The Authority commends the system operator for its focus on reducing manual errors, and for introducing some new procedures that include peer review processes.
 - (c) The Authority considers that the system operator is conducting itself with a greater level of openness and transparency, and is identifying opportunities to engage constructively with stakeholders. This appears to be recognised and valued by the industry.

Joint work planning has become confident and consistent

- 3.2 Clause 7.7 of the Code requires the system operator and the Authority to agree and publish a Joint Development Programme that coordinates and prioritises:
- (a) the items on the Authority's industry development work plan on which the Authority intends to liaise with the system operator
 - (b) the system operator's capital expenditure plan (capex plan) provided to the Authority under the SOSPA.
- 3.3 Authority staff consider that the Authority's and system operator's joint work planning has been operating well, and seems to have become embedded as a 'business-as-usual' activity. Authority staff generally express confidence in joint work planning processes, reporting that they have become very effective for managing activities, and that engagement and coordination between the two organisations continued to improve over the review period.
- 3.4 Joint Work Planning Team meetings allow for free and frank conversations, are well organised, and are effectively supported by the Joint Work Planning Steering Group. Updating the Joint Development Programme appears to be easier and more seamless each time, with earlier sharing of ideas, and quick agreement on issues.
- 3.5 The system operator made significant improvements to its capex plan in the previous review period, and the updated capex plan for this review period was again comprehensive and well-supported. The Authority also commends the system operator for re-focussing its capex plan to reflect the joint objective and the new SOSPA, through its Aardwolf II project.
- 3.6 The Authority notes that the effectiveness of engagement around joint planning was tested during the year by the delays and cost overruns from Transpower's SCADA PRISM project. The delays had flow-on effects for a number of joint projects. The Authority was pleased with how constructive the discussions were around these challenges. The system operator was upfront about the issues, and there were good discussions about the cause. The system operator agreed to undertake a post-project review of the project, and the Authority looks forward to the system operator applying any lessons it identifies.

Recommendation 1: *Ensure that any recommendations of the post-project review of the PRISM SCADA upgrade are implemented, and that the Authority is informed about the implementation.*

Project delivery

- 3.7 In addition to providing funding to the system operator for performing its key role, the Authority also:
- (a) helps to fund developments to the market and market systems that are agreed under the Joint Development Programme
 - (b) procures the system operator's expert advisory services.
- 3.8 The Authority considers that the system operator provides high-quality commercial services. The system operator has highly competent and effective project managers, who communicate well, and have good oversight and control of projects. Service delivery is generally excellent day-to-day. Project reporting was reliable and effective during the period, and the system operator made some valued improvements to the various periodic reports it provides to the Authority.

Capital project delivery has been successful but with some delays

- 3.9 Capital projects are those that involve the development or maintenance of the market systems. Some of these are developments that support the Authority's market design projects, and some are developments that the system operator initiates and oversees.
- 3.10 The system operator generally has a good track record for delivering the Authority's market design projects, and this review period was no exception. Specifically:
- (a) the system operator has effectively managed its contribution to the extended reserves project during the year
 - (b) there has been a promising start to the gate closure implementation
 - (c) the implementation of the national instantaneous reserve market has been on target to meet timelines, is under budget, and generally appears to be of a high quality. The project ran smoothly for much of the review period. There were some disagreements late in the review period. However, the two organisations agreed on a suitable process to overcome those disagreements, and the issues were managed well to avoid jeopardising timelines.
- 3.11 The system operator's own projects suffered some delays. In particular, as discussed above, Transpower's SCADA PRISM project was delayed, which had broader impacts on other projects. The implementation of that project appears to have otherwise gone very well, causing minimal market impact. The Authority also notes that the new electronic service bus and TSAT application were implemented smoothly.
- 3.12 The Authority recognises the benefits provided by the system operator's successful implementation of various capital projects. In particular, the Authority notes that:
- (a) The security tools project, TSAT online and RMTSAT Study Tool all allow for more secure and efficient operation of the power system.
 - (b) The interim reserve sharing project has had economic benefits through reduced instantaneous reserve procurement, and operated as expected during the 16 May under-frequency event.

- (c) Multiple frequency-keeping—a project delivered in the previous review period—has continued to operate smoothly, providing benefits through greater competition in the provisions of frequency-keeping.

TASC projects are very well managed, but progress is slow

- 3.13 The Authority procured the system operator’s advice on development projects under the Technical Advisory Service Contract (TASC). Activity under the TASC involved significant elements of project management and project delivery, and projects of varying size.
- 3.14 The system operator assisted the Authority on eight pieces of work during the review period. The work contributed toward three groups of projects: spot market refinements; frequency strategy review; instantaneous reserve markets review. The Authority considers that:
 - (a) The spot market refinements project is going well. The team working on the project has shown a strong commitment to considering the options in detail, and working through the issues. The system operator made a constructive contribution to workshops that were held.
 - (b) The frequency strategy review included some substantial and challenging pieces of work. However, the system operator was diligent in completing work packages, collaborated effectively on workshops, and was helpful in sharing its expertise.
 - (c) The nature of the work on the frequency strategy review and the instantaneous reserve markets review has been challenging and exploratory. The system operator has contributed effectively to these projects and has completed its TASC work within time and to scope.
- 3.15 However, the Authority considers that progress in the next review period could be aided by the two organisations seeking to:
 - (a) maximise what can be achieved under individual packages of work (such as requests for technical advisory services), and utilising timeline and/or budget extensions if they would allow for more complete consideration of issues
 - (b) be as conclusive as possible, and embrace options that would promote competition, reliability and efficiency, even where they may represent a significant departure from the status quo
 - (c) give due consideration to all reasonable ideas, and maintain an open dialogue to ensure issues can be identified at an early stage
 - (d) optimise levels of contingency and testing, to attempt to strike the best balance between realistic cost estimates and prudent evaluation of risks.

Compliance

Principal performance obligations have been met

- 3.16 Clause 7.2 of the Code sets out the system operator’s principal performance objectives (PPOs). The Authority is satisfied that, as required by the PPOs, the system operator has acted as a “reasonable and prudent system operator” during the review period, and:
 - (a) has avoided cascade failure of the power system
 - (b) has maintained frequency such that excursions and time error were within the prescribed limits. While it was not outlined in the self-review, the system operator has separately verified that time error was eliminated at least once each day

- (c) did not receive any requests from participants relating to harmonic levels, voltage flicker levels, or negative sequence voltage in the review period.
- 3.17 The PPOs also require that the system operator ensure the scheduling, pricing, and dispatch tool has the information necessary to schedule a *minimum* quantity of instantaneous reserve. The Authority acknowledges that this requirement seeks to promote an ideal standard of reserve procurement and that the risks of under- and over-procurement of instantaneous reserve relative to that standard are asymmetric. The system operator reports that it has met this objective.
- 3.18 However, the Authority notes that through the Review of Instantaneous Reserve Markets project, a number of inefficiencies have been identified that might suggest the amount of instantaneous reserve procured is conservative. These include:
- (a) The amount of sustained instantaneous reserve procured could be further optimised.
 - (b) The fast and sustained instantaneous reserve products are not co-optimised with each other.
 - (c) It may be more consistent with the reserve management objective to procure enough instantaneous reserve to halt frequency decline, and then use re-dispatch to restore the power system to normal security status.
- 3.19 The Authority is also aware that some participants have at times expressed concern about the amount of instantaneous reserve procured and who pays for it. Specifically, the concerns relate to:
- (a) whether the system operator efficiently accounts for the variability of wind generation when determining the secondary reserve-risk it may present
 - (b) how the system operator identifies whether some excluded generators should be required to either comply with asset owner performance obligations or obtain a dispensation.
- 3.20 The Authority is satisfied the system operator is open-mindedly and constructively seeking to identify opportunities to optimise procurement of instantaneous reserves. The Authority looks forward to working with the system operator to progress the instantaneous reserve markets review during the next review period, which will consider these issues.

The system operator has improved its compliance under the Code

- 3.21 The Code imposes a number of compliance obligations on the system operator, including in documents incorporated into the Code by reference.
- 3.22 The Authority appreciates the system operator's attitude toward compliance. It is open and proactive in reporting breaches, and in communicating with the Authority to discuss compliance matters and issues of market behaviour. The system operator also engages well with the industry on compliance matters, and encourages reporting of breaches.
- 3.23 Breach reports are of good quality. The approach of aligning them with the Authority's breach reports is a good one, and the estimates of market impacts appear realistic. While the system operator is proactive in addressing the implications of a breach quickly, the Authority encourages the system operator to ensure it reports breaches straight away, so as to give affected parties the best opportunity to be part of the investigation and any remediation.
- 3.24 In its self-review, the system operator noted that it breached the Code 14 times during the review period, compared with 30 in the previous review period. This was a result of a meaningful reduction in the number of manual errors from 26 to 8. There was also a reduced number of pricing errors caused by the system operator during the review period.

- 3.25 In previous reviews of system operator performance, the Authority made recommendations about manual errors. In relation to these, the Authority notes the following:
- (a) It recommended in its 2014-15 review of the system operator's performance that the system operator investigate greater use of procedural oversight (such as process controls like peer review) in manually-intensive procedures in order to reduce instances of human error. The Authority notes that the reduction in manual errors was contributed to by the implementation of the new system security tools for the HVDC and RMTSAT Study Tool, which have reduced the need for manual processes. However, the system operator notes it explored a number of other approaches to try reduce manual errors during the review period, and did introduce new processes that include peer review. The Authority commends the system operator for investigating these issues, and supports it in its aim to better understand instances of manual errors, and continue to find ways to reduce them.
 - (b) It recommended in its 2013-14 review of the system operator's performance that the system operator consider categorising self-reported breaches in more detail and reporting the results in future self-reviews. The Authority commends the system operator for including this in its self-review for the first time.
- 3.26 The system operator showed initiative in conducting a review of its ancillary services cost allocation process, and making subsequent changes that will support it in consistently meeting its Code obligations.
- 3.27 The Authority notes that the system operator has performed its review and software audit obligations under the Code, and appreciates the transparency provided over the audit findings, and follow-up changes that were made.

Documents incorporated into the Code by reference were reviewed successfully

- 3.28 The Code requires the system operator to prepare and publish a number of documents that are incorporated into the Code by reference, and which must be reviewed or updated at specified intervals.²
- 3.29 During the review period, the system operator:
- (a) completed reviews of the system operator rolling outage plan (SOROP) and emergency management policy (EMP)
 - (b) substantively completed a review of the policy statement
 - (c) initiated a review of the procurement plan.
- 3.30 The Authority's review of the system operator's performance for 2012-13 included three recommendations relating to documents incorporated into the Code by reference. These were that the system operator should:
- (a) work with the Authority to develop better processes around making changes to documents incorporated by reference
 - (b) consider whether it could adopt a more formal approach to consultation
 - (c) assess the revisions to the documents for consistency with the Authority's statutory objective.
- 3.31 The Authority observed improvements against these recommendations in the previous review period, commending the system operator's:

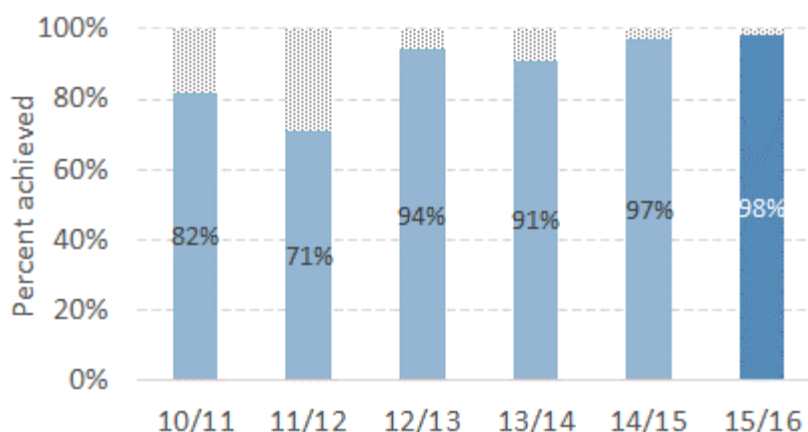
² Clauses 7.5(3), 8.10A, 8.42A, and 9.5(3) of the Code require the system operator to consult on revisions to the security of supply forecasting and information policy, emergency management policy, policy statement, procurement plan, and system operator rolling outage plan (respectively).

- (a) early and proactive engagement on changes to the SOROP and EMP
- (b) high-quality consultation documents that accompanied the draft SOROP, EMP and policy statement
- (c) approach to consultation on the credible event review³
- (d) appropriate assessment of the EMP and SOROP against the Authority's statutory objective. There were some discussions around whether the same was true for the policy statement, as discussed in paragraph 2.7. However, the system operator approached the issues with an open mind, and the two organisations engaged in good conversations to come to an eventual agreement about how to address it.

Positive result against the 'at-risk' assessment under the SOSPA

- 3.32 The now-superseded SOSPA provided for a component of the annual fee payable to the system operator to be dependent on the system operator's performance, as measured against criteria established by the Authority, in consultation with the system operator.
- 3.33 The amount of the system operator's payment that was at risk each year ending 30 June was set at \$250,000 plus an annual adjustment in line with the Consumer Price Index.
- 3.34 The assessment of the system operator's performance under the SOSPA in the year to 30 June 2016 was based on four key areas:
- (a) joint planning requirements under Part 7 of Code, including capital expenditure and business planning
 - (b) service delivery across the contract
 - (c) meeting agreed project deliverables for selected items on the Authority and system operator's Joint Development Programme
 - (d) achievement of critical Key Performance Indicators from the system operator's 2015-16 business plan.
- 3.35 In 2015-16, the system operator achieved 98% against the 'at-risk' assessment - its highest ever result. This is shown in Figure 1.

Figure 1: Determinations of 'at risk' assessments since 2010-11



- 3.36 The 2015-16 year is the last time that the 'at-risk' assessment will be performed, as a new performance assessment process has been established under the new SOSPA. The new

³ The Credible Event Review is not a document incorporated by reference, but is a requirement of the policy statement (which is a document incorporated by reference), and can affect the content of the policy statement.

performance assessment process involves the Authority and system operator agreeing each year on performance metrics, and any related incentives.

New SOSPA structured to ensure system operator is providing value for money

- 3.37 The Authority did not identify any concerns with the system operator's financial performance during the review period under the superseded SOSPA.
- 3.38 The Authority notes that the new SOSPA has been structured in a way to address some previous concerns that both parties had about the old fee arrangements, and incentives for cost efficiency. The new SOSPA provides greater certainty of cash flows for both organisations, whilst also ensuring value for money by subjecting the system operator's operational expenditure to a CPI-X approach, with five-year reviews.
- 3.39 The new SOSPA also provides for greater transparency around costs. The system operator will assess the feasibility of providing cost-of-service reporting to the Authority. This could break its costs down into up to five key categories, and give the Authority greater visibility about how the system operator allocates the SOSPA fees across its business. The more detailed this cost breakdown, the greater value it is to the Authority.
- 3.40 The Authority is currently considering what data and analysis around financial performance under the new SOSPA would be most informative to the public, and could be meaningfully included in future reviews of the system operator's performance. The Authority will work with the system operator during the next review period to this end.

Recommendation 2: Work with the Authority to identify what information and indicators on financial performance should be included in future self-reviews.

4 Planning for tomorrow

4.1 In the previous review period, the Authority recognised that the system operator had been developing its thinking about its role and how to deliver it. This review period showed continued evolution of thought, and further incisive consideration of these issues.

4.2 In particular, this was apparent through the system operator's:

- (a) attitude and engagement in negotiating and agreeing the new SOSPA. The two organisations had been negotiating the new SOSPA since 2014. The system operator was open to change and constructive throughout the negotiations. The negotiations focussed on developing a SOSPA suited to the changing nature of the system operator service, the changing industry context, and the nature of the relationship between the two organisations. The new SOSPA provides the framework to support the two organisations in delivering the joint objective
- (b) transition to the new SOSPA. This transition has been excellent. The system operator earnestly prepared a number of new documents that are intended to provide transparency and confidence that the system operator is providing a value-for-money service. The Authority looks forward to the continued evolution of those documents
- (c) recognition of the effect of the new SOSPA within its market systems roadmap
- (d) clear strategic direction, as outlined in its strategic plan and interpreted in the short-term via its business plan. These strategies appear to be starting to permeate throughout the business. The Authority notes that the strategic plan includes a number of intended outcomes under each of the five strategic goals. The Authority considers that the system operator's approach of aligning its self-review with its strategic plan is effective in showing progress toward each of these goals. The system operator should consider whether it would be worthwhile making an explicit assessment within future self-reviews against the intended activities expected to contribute to meeting the goals.

Recommendation 3: Consider whether there would be value in further aligning the annual self-review and system operator service strategic plan, specifically by making an assessment against the intended activities expected to contribute to meeting the strategic plan's overarching goals.

4.3 The system operator has also shown foresight in investigating and anticipating challenges to system operations, and opportunities that might arise from new technologies and changes in market conditions. This is apparent from its solar PV study, environment scan and market systems roadmap. The system operator appears to be giving appropriate consideration to how it can best prepare, and ensure it continues to provide a value-for-money service.

4.4 The SRC advised the Authority that “The SRC has asked the system operator to consider including more information in future self-reviews on the topics of risk management and planning to counteract an aging workforce.”⁴ The Authority has reflected this in the following recommendation.

Recommendation 4: Consider including information in future annual self-reviews that enables readers to assess the system operator’s performance with respect to risk management and any planning to counteract an aging workforce.

⁴ This is an extract from a letter to the Authority’s Chairperson from the SRC’s Chairperson, dated 6 December 2016.

5 Strengthening relationships

System operator and Authority forming strong working relationships

- 5.1 The relationship charter signed by the Authority and system operator in 2014 has been invaluable in strengthening the relationship between the two organisations. It is apparent that the two organisations have been coalescing around the joint objective, and that staff are actively ensuring their interactions remain positive and productive.
- 5.2 The way the two organisations work together has improved considerably over the years, having formed good working relationships at multiple levels. As should be expected, there are still occasional disagreements though this has included instances where system operator staff appear resistant to accept other ideas or points of view. However, these are rare, and effective escalation pathways have been developed, which allow for open and constructive resolution of any issues that do arise.
- 5.3 The system operator's communication is, on the whole, very effective and highly valued by Authority staff. The system operator is helpful and responsive, and generally good at involving Authority staff in discussions in a proactive and timely manner. Communication and engagement between technical staff within the two organisations is an area for improvement in the next review period. The Authority looks forward to seeing the effects of a process that is being established to support this.

System operator is conducting itself with a high level of transparency and openness

- 5.4 The Authority has been particularly pleased with the level of transparency and openness that the system operator is now applying to itself. It has been reliably and promptly publishing reports and analysis of various system events, the actions it took during those events, and any learnings it took from them. It has also shown a willingness to take on board feedback from, and work collaboratively with, other parties. This shows a high level of self-reflection and commitment to the joint objective.
- 5.5 The system operator has interacted well with:
 - (a) the SRC and SOC. As discussed in paragraph 2.13(a), the system operator prepared a number of documents during the year that were presented to these groups. The documents were well received, and the system operator was receptive to the groups' feedback.
 - (b) other service providers, including the extended reserve manager and clearing manager. However, there are also opportunities to involve these parties in earlier conversations on issues that potentially concern them – such as WITS notifications.
 - (c) the wider industry, through several useful workshops and meetings, in which it has shared its knowledge, and informed stakeholders about various developments and initiatives. Specifically, the Reserve and Frequency Management forums continue to be an effective and well organised approach to engaging with stakeholders on the technically complex issues involved. The Authority values the system operator's enthusiasm for using these forums to engage and inform the industry.
 - (d) forums and working groups – including the Smart Grid Forum and GREEN grid project – which the system operator has used as an effective way to both inform and be informed, and to support its 'planning for tomorrow' strategic goal.

- 5.6 The Authority recognises that close to 40% of respondents to the system operator's customer satisfaction survey rated the system operator's service as "getting better". While communication remains an area of lowest performance, it is positive to see that this was also an area of improvement, along with 'knowing the customer'. These results will hopefully form the basis of an improving trend in these areas.
- 5.7 Overall, responses to the detailed questions in the survey appear to accumulate around the "good" category. However, the Authority looks forward to a more detailed trend assessment against the detailed questions from the survey.

6 Investing in good people

The Authority has observed the positive effects of the system operator's investments in its staff

- 6.1 The specialised nature of the system operator role requires similarly specialised and highly capable staff, across a range of disciplines. The Authority supports the system operator in investing in its staff as the benefits it provides includes the operation and development of systems, and the quality of communication and relationships.
- 6.2 The Authority has observed the positive effects of the system operator's past investment in its staff. Specifically:
- (a) The system operator's project management capability has come a long way in recent years. Project managers demonstrate strong project management disciplines, resulting in well-run projects, strong relationships with their Authority counterparts, and open and effective lines of communication.
 - (b) The system operator's development of its strategic plan and the transition to the new SOSPA have both demonstrated strategic thinking, strong leadership, and effective change management. The system operator's past changes to its structure to include more people in senior positions has improved communication channels and escalation pathways, and achieved a clear focus on the relationship charter and joint objective amongst all system operator staff.
 - (c) The system operator appears to have focussed on improving the clarity of its writing. Authority staff and other audiences, such as the SOC and SRC, have been complimentary of the various system operator reports they reviewed during the year. Some of the system operator's reports necessarily cover very technical material, which will always be challenging to present in an accessible way. However, the Authority has noted improvements in this area, and encourages the system operator to continue to strive to meet this challenge.
- 6.3 The Authority notes the system operator's current programmes to nurture and upskill staff. In particular the Authority supports the system operator investing in its staff in order to ensure:
- (a) processes and communication are maintained through any staff changes – permanent or temporary
 - (b) institutional knowledge is maintained and utilised. The system operator's progression programmes for its engineering and market services staff, and its changes to the system coordinator teams, appear to reflect the high levels of institutional knowledge within the system operator, and the value in building this within newer recruits. Some of the Authority's and system operator's joint projects are very technical in nature, and it is important that the knowledge of experienced technical staff is being efficiently and effectively utilised on those projects
 - (c) it remains abreast of the challenges it might face from a changing technology environment, and how to efficiently tackle such challenges
 - (d) a continued reduction in instances of manual error, in the interests of continuous improvement.

7 Overall the review period demonstrated continued improvement

- 7.1 Overall, the Authority considers that the review period has demonstrated a continued trend of improved performance.
- 7.2 The Authority highly values the system operator's growing degree of openness and transparency in how it conducts its work. The improvement is evident to stakeholders, as shown by the results of the system operator's customer satisfaction survey. It is also reflected in the system operator's positive working relationships with Authority staff at multiple levels.
- 7.3 It is clear to the Authority that the system operator is genuinely focussed on how its actions can better support the long-term benefit of consumers. The new SOSPA has significantly improved the structures in place, so as to support both organisations in pursuing the joint objective.