



ELECTRICITY COMMISSION

Initial Statement of Opportunities

Commentary on Submissions

October 2005

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1. Introduction

Background

- 1.1 Under Part F of the Electricity Governance Rules 2003 (the “EGRs” or “the Rules”) the Commission has been given a number of responsibilities in relation to transmission. These include the obligation to prepare and publish Statements of Opportunities (SOO).
- 1.2 In terms of Part F, the Statement of Opportunities (SOO) is, first, an information document, its purpose being to enable identification of potential opportunities for efficient management of the grid, including investment in upgrades and transmission alternatives. Secondly, the SOO is also relevant to the Grid Investment Test (GIT) and the Grid Reliability Standards (GRS) under Part F, each of which reference the possible future scenarios set out in the SOO (but with power to the Commission to depart from them as provided for in the GIT and GRS).
- 1.3 The Commission is required to publish Statements of Opportunities at least every two years. Section III of Part F sets out provisions relating to its preparation and publication. In particular, the Board is required to publish the SOO in draft and provide an opportunity for stakeholders to make submissions on that draft. The Board is required to consider submissions and then publish the final Initial SOO within 20 business days of submissions closing.
- 1.4 The Commission published the draft Initial SOO for industry consultation on 10 May 2005. Submissions were received from 25 parties by the closing date of 10 June 2005. After considering the submissions received the Commission prepared the final version of the Initial SOO and published this on 8 July 2005, in compliance with the maximum 20 day period after submissions closing.

Purpose of this paper

- 1.5 The purpose of this paper is to comment on the submissions made and the approach the Commission took in addressing those submissions when deciding the final form of the Initial SOO.
- 1.6 Please note that this commentary does not set out to cover each submission and every point made. Instead, the approach of this commentary is to refer to key issues coming out of those submissions, grouped under various headings.
- 1.7 The submissions included a wide array of suggestions on how the SOO might be improved. The time frame necessary to finalise the Initial SOO did not permit development or adoption of many of those and the Commission decided it would be inappropriate to do so having in mind the desirability of further consultation. However, many of the suggestions have merit for future SOOs, and the Commission will be considering them in that context as well.

- 1.8 The Commission is now in the early stages of its work programme for preparation of the next SOO, targeting publication of the draft for consultation by June 2006.

Important Note

- 1.9 This commentary is for general information only. As with the Initial SOO, nothing in this paper is to be seen as the Commission commenting on, endorsing, or criticising any particular proposal under Part F, or any view or proposal on any other matter, whether of Transpower or any other person. This document does not bind, or prejudice any view of, the Commission in relation to any decision to be made by the Commission, whether under Part F or otherwise. Readers' attention is also drawn to the "Important Note" at the beginning of the Initial SOO.

2. Overview of the Initial SOO and its preparation

Introduction

- 2.1 The approach to the preparation of the Initial SOO is set out in detail in the Initial SOO itself. It is briefly summarised here for reference, as background to the explanatory material addressed in this paper.

Preparation of the Initial SOO

- 2.2 The Commission developed its approach to preparing the Initial SOO against the background of the requirements in the Electricity Act 1992 (“the Act”), the objectives and outcomes in the Government Policy Statement on Electricity Governance (October 2004, “the GPS”), and the provisions in Part F of the EGRs. In doing so, the Commission was mindful that this was the first such SOO to be prepared under the new transmission arrangements, and that there is a close inter-relationship between the SOO and other key elements of Part F such as the Grid Upgrade Plan (GUP), Grid Investment Test (GIT), and Grid Reliability Standards (GRS).
- 2.3 It is the Commission’s interpretation of Part F that SOOs should be produced regularly, each one dependent on previously approved GUPs and containing a wide range of transmission augmentation possibilities. These possibilities would be subjected to industry scrutiny and later detailed analysis by Transpower.
- 2.4 For this Initial SOO there was no preceding GUP for the Commission to draw upon in undertaking the power systems analysis, and the timeframe was compressed because of the need to consider the first GUP by September 2005¹. For these reasons the process for establishing the Initial SOO involved:
- adopting an Interim GRS, essentially comprising the current practice for the main transmission system to be designed to withstand a range of single credible contingencies without shedding demand (“the N-1 criterion”)
 - adopting a set of economic criteria for the analysis consistent with those set out in the GIT
 - drawing on a range of existing Transpower planning documents and transmission investment possibilities
 - making certain forecasts of national and regional electricity demand
 - selecting five plausible generation scenarios which are intended to provide a reasonable sensitivity test on the location of new generation investments that the transmission system may need to cope with;
 - undertaking a limited analysis of the ability of the transmission system to comply with the Interim GRS under the range of generating scenarios as electricity demand grows through the next 20 years

¹ The Commission acknowledges that on 13 April 2005, it received a letter from the Minister re-setting the September 2005 date to mid-2006.

- identifying when critical elements of the transmission system may fail to comply with the Interim GRS without some augmentation of the transmission grid
- exploring some of the options that may be available for augmenting the transmission grid; and
- inviting and considering submissions made on the Initial SOO in draft.

2.5 This compressed approach dictates that the Initial SOO is more limited in its detail and coverage than future SOOs are likely to be, and the document should be seen as being of an interim nature pending the issue of a further SOO. Its contents and conclusions (including its forecasts and scenarios) are subject to various assumptions and limitations, are prepared only for the purpose of this Initial SOO, and should be treated with caution.

Consultation on the draft Initial SOO

2.6 The Commission published the draft Initial SOO for industry consultation on 10 May 2005. Submissions were received from 25 parties by the closing date of 10 June 2005. The list of submitters is set out in Table 1, and their submissions are available in full from the Commission's website².

Table 1: Submissions received

Consumer	Distributor /Grid Owner	Generator /Retailer	Other
<ul style="list-style-type: none"> • Comalco • MEUG • Solid Energy NZ • The NZ Refining Co 	<ul style="list-style-type: none"> • Orion • Transpower • Vector 	<ul style="list-style-type: none"> • Contact Energy • Genesis • Meridian • Mighty River Power 	<ul style="list-style-type: none"> • 3M NZ Ltd • EECA • Employers & Manufacturers Assoc • Energy Centre – University of Auckland • Environment Waikato • Molly Melhuish • New Era Energy • NZCID • NZ Photovoltaic Assoc • Odyssey • Saha International • Sustainable Energy Forum • University of Waikato • Strategic Energy

² <http://www.electricitycommission.govt.nz/submissions/transsubs>

Publication of the final Initial SOO

- 2.7 After considering the submissions received the Commission prepared the final version of the Initial SOO and published this on 8 July 2005, in compliance with the maximum 20 day period after the closing date for submissions. The final version of the Initial SOO is available electronically from the Commission's website, <http://www.electricitycommission.govt.nz/publications/sooprinted/publication.pdf/> or in printed form on request from the Commission.
- 2.8 The submissions included a wide array of suggestions about how the SOO might be improved. The timeframe necessary to finalise the Initial SOO did not allow the Commission to develop or adopt many of these suggestions, and the Commission decided it would be inappropriate to do so having in mind the desirability of further consultation. However, many of the suggestions have merit for future SOOs, and the Commission intends considering them in that context as well.
- 2.9 The key changes made to the final version of the Initial SOO tended to relate to addressing matters of error, or redrafting for clarification. They can be summarised as follows:
- additional explanatory information, for instance, regarding;
 - assumptions in relation to aspects of demand forecasting, including energy efficiency, demand-responsiveness, embedded generation and local losses
 - approach to scenario development
 - approach to the power systems analysis
 - approach to NPV analysis
 - correction of figures in the generation tables (existing and modelled)
 - additional options included in the “Constraints and Supply Augmentation Options” tables
 - corrections to, and additional options included in, the “Augmentations for Modelled Analysis” and “Network Changes – Loads Shifted” tables.
- 2.10 A number of minor text and layout amendments were also made to reflect the move from a draft for consultation to a final post consultation. For instance, references to the submission questions and process were removed or amended.

Approach to this commentary on submissions

- 2.11 The Commission has prepared this commentary on submissions as supplementary material to the final version of the Initial SOO. The purpose of this commentary is to discuss the submissions received and the Commission's response to the key issues raised. The issues have been grouped under the following key themes:
- context for the SOO
 - content of the SOO/meeting Part F requirements

- the role of the Commission and of Transpower
- demand forecasting
- approach to scenario modelling
- generation projects in the scenarios
- approach to power systems analysis
- transmission alternatives and Auckland transmission issues (400kV project)
- approach to electricity market modelling.

2.12 This commentary has been structured around these themes.

3. Context for the SOO

Overview

- 3.1 Several submitters raised issues relating to the context within which the SOO sits and the overall approach the Commission is adopting in relation to matters relating to the SOO. These included issues such as:
- concerns with central planning
 - need for a strategic approach
 - incomplete nature of Part F
 - the link between the SOO, the GIT and the GUP
 - relationship between Part F and other aspects of the Commission's roles
- 3.2 The issues relating to the context for the SOO are addressed here.

Concerns with central planning

- 3.3 Submitters expressed a variety of views and concerns broadly around the theme of central planning. In particular, several expressed concern that the Commission's approach to the SOO demonstrates that a centralist planning supply-driven approach is emerging.
- 3.4 The Commission believes such a view of its approach and role is incorrect. The Act and the EGRs provide a regime under which the Commission, Transpower, participants and other interested persons each have particular roles and responsibilities.
- 3.5 That is the case under Part F in relation to transmission as well. In respect of transmission, Part F also sets out procedures, some of which involve the Commission having an approval role, others of which require the Commission to publish material to enable other participants and interested parties to make their decisions or form their own views.
- 3.6 In the SOO, the Commission is required to set out the GRS, the grid planning assumptions (GPA), and an analysis of the performance of the power system against the GPA and applicable GRS. It is also important to recognise that the SOO itself has a limited role in that it is, first, under section III of Part F an information only document and, secondly, that even in respect of the GIT and the GRS the possible future scenarios set out in the SOO can be departed from. The SOO is, therefore, not a central plan, nor, in publishing it, is the Commission engaging in a central planning role.
- 3.7 The Commission considers the SOO and the SOO process as one of the means by which the industry, as well as the Commission itself, can obtain a source of information relating to transmission and transmission alternatives (including certain options).

Need for a strategic approach

- 3.8 Several submitters set out views relating to the need for a strategic approach. These included such comments as:
- A more strategic approach is required, recognising that generation investment options are valuable, future locations and fuel sources are not certain, new technology is likely to emerge over the life of transmission assets, new generation can be constructed more quickly than transmission, transmission options need to be secured in advance of generation decisions, and that the Resource Management Act 1991 (RMA) is a fundamental driver
 - There is no overarching vision for efficient operation of the industry, and efficient investment in particular
 - Concern that there is a looming energy supply gap with no effective strategy to deal with the generation shortfall
 - The Commission should consider on-going development of the market and incentives for timely investment in generation in the absence of early, clear and unambiguous signals regarding the transmission system.
- 3.9 The previous sub-section outlined that the Commission has regulatory obligations under the Act and the EGRs that it is required to meet, including publication of its view of credible generation scenarios and approval of transmission investments. The Commission also has obligations under the Act and GPS in relation to longer-term security of supply, and associated requirements to publish supply and demand projections. The Commission considers that, collectively, fulfilment of these obligations addresses the concerns expressed. However, the SOO on its own is but one aspect of the framework. Through the ongoing development of scenarios through a consultative process the Commission intends to capture the essential elements of an overarching strategy for the efficient development of the transmission system.
- 3.10 The Commission also notes that the SOO and GIT are intended to provide for such matters as on-going development of the market and incentives for generation investment. The GIT allows for the Commission to take a strategic approach regarding transmission investment decisions if it can be demonstrated that there are likely economic benefits.
- 3.11 It is important to recognise that it is not the Commission's role to itself develop an energy strategy or seek itself to determine a centrally-planned outcome to the nation's energy supply needs. Instead, the Commission has various roles and obligations under the Act and the EGRs, including in respect of transmission under Part F. These include, under the SOO provisions, making certain forecasts, outlining certain scenarios, and providing certain other information, for the purpose of the SOO. The Commission's role under Part F also includes considering and deciding whether or not to approve particular transmission investments proposed by Transpower where Transpower wishes to recover applicable costs of those investments from designated transmission customers. The SOO is but one part of the Part F matrix.

Incomplete nature of Part F

- 3.12 Some submitters expressed concern with the fact that the analysis is being performed when major building blocks of the decision-making framework (eg transmission pricing, transmission contract counterparties) are not in place.
- 3.13 The Commission acknowledges that Part F is still in its infancy and that by necessity, various work streams have had to be progressed in parallel. The Commission is actively addressing interface issues between the various elements as part of the development and implementation process.

Link between the SOO, the GIT and the GUP

- 3.14 Many submitters raised queries or concerns with the link between the SOO, the GIT and the GUP. These included comments such as:
- the SOO ought not to be used to define the planning basis used for preparation of the GUP through the construct of the GIT; this link has fundamentally altered the operation of Part F, and the SOO is not an “information-only” document
 - if the linkage between the SOO and GIT is to continue, a wide range of additional detailed modelling data needs to be included in the SOO
 - the Commission should advise of the approach it intends following with regard to the scenarios in the GIT in its consideration of the GUP, in particular whether it intends to develop new scenarios, undertake more rigorous power systems analysis or make general changes to the GPA
 - further consultation is sought on the mechanics of how to undertake the GIT, including modelling techniques and the way in which benefits of options should be captured, possibly through a special advisory group, to bring industry expertise to bear
 - explanation of how the SOO is to be practically used in the GIT process would be helpful
 - it is unclear how the high/medium/low demand forecasts will be used in conjunction with the GIT
 - in view of the simplistic approach for the Initial SOO, concerns are expressed regarding what reliance Transpower can place on the Initial SOO in preparing its first GUP
 - it is unclear how the GIT and transmission pricing arrangements deal with generation projects that require new transmission
 - a revised GIT process is required to reverse some of the existing biases against transmission alternatives.
- 3.15 In response, the Commission makes the following comments:
- the linkage between the SOO and the GIT is a result of the operation of Part F itself
 - the Commission does not propose at this point to review the rules in Part F relating to the GIT and the SOO, nor the GIT itself

- the Commission will review specific suggestions for additional information to be included in the SOO by virtue of the linkage to the GIT, and, on the basis of the review, then seek to address the requirements in an appropriate manner
- the Commission is in the process of determining the approach it intends to adopt with regard to consideration of the first GUP and application of the GIT. The analysis of the GUP will be consulted upon when a draft decision is provided. The Commission considers that it is impractical to do otherwise
- the Commission notes the request for information on the issues raised, and intends to consider how it might address these matters
- the Commission considers that the TAG provides a suitable forum for provision of advice on these matters. The Commission will also use other expert advisors as required
- the GIT will establish whether there is a net market benefit to providing new transmission.

Relationship between the SOO and the SSF

- 3.16 Some submitters sought clarification on the relationship between the SOO and the System Security Forecast (SSF), in terms of respective roles and how to interpret potential differences in assumptions.
- 3.17 The SOO and the SSF are each produced for specific purposes defined in the EGRs. Each document explains the purpose for which it was developed. In key respects, the two documents are likely to have similar assumptions. For example, in respect of committed projects and demand forecasts the Commission expects that the assumptions should ordinarily be similar.
- 3.18 As part of its on-going development and implementation of Part F, the Commission will address issues of interface between the Commission's SOO, the System Operator's SSF, and the Grid Owner's Grid Reliability Report, with a view to ensuring clarity of the role for each, consistency (where appropriate), and minimum duplication.

Supporting information and models

- 3.19 A number of submitters acknowledged the additional background information provided by the Commission as part of the SOO publication, including the provision of some of the models employed.
- 3.20 However, some considered that the benefit of enabling other parties to use the models is worthless unless support is available. It was suggested that workshops could be offered in which interested parties could request model runs to be carried out to a variety of specifications.
- 3.21 The Commission acknowledges the issue raised, but notes that it is not resourced or funded to provide services of this type. It also notes that similar services are available in the marketplace.

Future SOOs

- 3.22 It was suggested in submissions that the SOO should be updated at least annually or (ideally) every six months. The Commission notes that updating the SOO every six months would involve significant resources on the part of the Commission, participants, and other interested parties, and could increase rather than reduce uncertainty. The Commission does not believe that an annual or six monthly update is justified. The Commission's preferred approach is to produce a SOO at least every two years, or more frequently in the event of a major change in key inputs or assumptions.
- 3.23 In recognition of the compressed approach for the Initial SOO, the Commission has undertaken to produce the next SOO in the 2006 calendar year.
- 3.24 It was suggested in submissions that a list of proposed enhancements for future SOOs would be helpful. The Commission agrees that the maintenance and publication of a list of possible enhancements for future SOOs is a good idea, and this will be adopted.

4. Content of the SOO and meeting Part F requirements

Overview

- 4.1 A large proportion of submitters' responses related to the content of the SOO, the Part F requirements, and the Commission's interpretation as to how best to meet those requirements. These included issues such as:
- interpretation of, and approach to meeting, the Part F requirements
 - addressing the relationship between transmission and generation
 - suggestions for additional information to be included in the SOO and questions as to the appropriateness of some content in the Initial SOO.

Interpretation and approach to meeting Part F requirements

- 4.2 A number of submitters set out views or concerns relating to aspects of the Commission's interpretation of the Part F requirements for the SOO. These included whether the Initial SOO enabled identification of opportunities for investment in transmission or transmission alternatives, concerns with the approach adopted, and suggested alternative approaches. The comments included the following:
- the SOO does not adequately identify opportunities, or enable their identification
 - the SOO does enable identification of opportunities for investment, but further information would be useful
 - sufficient analysis should be undertaken to identify emerging energy and capacity constraints, but leave participants to identify potential solutions to these opportunities
 - the SOO should identify key constraints likely within the next 15-20 years, generically identify various options for relieving constraints (eg. local generation, demand-side, capacitors, transmission), evaluate options in terms of reliability and security, and provide stress sensitivity analysis
 - a better approach would involve modelling predetermined elements (demand, committed projects, energy policy, available technologies), determining regional and national supply adequacy through gap analysis, then considering transmission solutions to address inadequacies
 - some of the expert reports accompanying the SOO go well beyond identifying opportunities, which is inappropriate
 - the high degree of uncertainty surrounding the scenarios, the fact that the options ultimately remain subject to relative economics, and the implicit assumption that generation investment should drive transmission investment decisions means that the scenarios and modelling results are of questionable value

- the SOO fails to reveal opportunities to the demand-side or small supply-side providers to compete effectively with transmission investment
- not addressing opportunities for efficient management of the grid, instead focusing on investment, is regrettable as such options could be lower cost; this should be included in future SOO's
- the approach does not appear to meet the requirement regarding the rigour in developing GPA being commensurate with the economic significance of the decisions to be made
- the SOO appears to be grid security and not investment security focused.

4.3 The Commission has considered the issues and queries raised against the backdrop of its obligations and related work streams. It has been mindful of the fact that this was the first SOO and that, by necessity, a compressed approach was adopted in its preparation. The Commission makes the following comments in response to the key issues raised in submissions:

- it notes a wide and disparate set of views from submitters. Some indicate that the Initial SOO goes too far, while some indicate that it does not go far enough
- the Commission also notes that some submitters expressed the view that the SOO met their requirements in terms of enabling identification of opportunities, whereas others have expressed concerns as to the extent to which this has been achieved
- the Commission considers that the approach it has adopted is appropriate in view of the requirements of Part F and does address many of the points raised, but acknowledges that future SOOs could take a more developed approach
- while some submitters have questioned the value of the analysis in view of the compressed approach adopted for the Initial SOO, others have commended the Commission on the material provided.
- scenario development in the future will incorporate experience gained with the Initial SOO and feedback from submitters where practicable
- information presented in future SOOs will be more comprehensive and, where practicable, targeted at addressing the gaps identified by submitters
- the Commission acknowledges the concerns about the SOO failing to fully reveal opportunities to the demand-side or small supply-side providers to compete effectively with transmission investment. It is not the role of the SOO to itself identify all opportunities; indeed, it may not be practicable for it to do so. Instead, the SOO is a document, a primary purpose of which is to enable identification of potential opportunities for efficient management of the grid (including investment in upgrades and investment in transmission alternatives). However, to the extent appropriate within the SOO parameters, the Commission will continue to consider these concerns in future SOOs
- the Commission considers that the overall approach, rigour, and content of this Initial SOO is appropriate, given that also this is the Initial SOO.

Relationship between transmission and generation

- 4.4 A number of submissions touched on the relationship between generation and transmission, and the manner in which this was, or was not, addressed in the Initial SOO. Comments included the following:
- the approach does not recognise the degree of substitution and interdependence between transmission and generation
 - the SOO should include a fuller investigation of the dynamic relationship between transmission augmentations, generation options, and demand-side responses
 - the SOO fails to signal clearly the emerging future supply/demand balance. Rather, it assumes generation investment occurs to balance demand, thereby obscuring, rather than highlighting, some future investment opportunities
 - the SOO should discuss the need for reserve generation capacity, consideration of implications of major generation contingencies (eg if they occur in a dry year), the “energy gap” after taking into account committed new projects, and who should have accountability to invest to fulfil security of supply criteria should the market fail to deliver.
- 4.5 The Commission has considered the issues and queries raised against the backdrop of its wider obligations and related work streams. In particular, the Commission notes that, while the comments were made as submissions on the SOO, some of the issues are perhaps more relevant to its (longer term) security of supply obligations and GPS expectations. It is not the role of the SOO to address all these issues.
- 4.6 The Commission makes the following comments in response to the key issues raised in submissions:
- the Commission considers that it is appropriate for the scenarios to be developed on the basis of generation investment occurring to balance demand, as this is a reasonable representation of the market response to investment signals and is consistent with the role of the Commission under the Act and the GPA requirements in Part F
 - the Commission does not have a central-planning role in relation to generation
 - the SOO is a document, a primary purpose of which is to enable identification of potential opportunities for efficient management of the grid (including investment in upgrades and investment in transmission alternatives). It also has the function relating to the GIT and the GRS referred to earlier in this document. The generation scenarios in the SOO are developed for that purpose
 - the Commission also has obligations under the Act and GPS in relation to longer-term security of supply, associated requirements to publish supply and demand projections, and to monitor the security of supply situation. The Commission is progressing these matters as part of its wider work programme.

SOO content

- 4.7 A number of submitters set out additional material they would like to see included in future SOOs. These included the following:
- more detail on the material included, for instance, on the linkages between possible augmentations and the impacts on each scenario, the underlying assumptions, triggers for possible augmentations (voltage/thermal), information on spill, and network losses under each scenario
 - the SOO should be developed and assessed against GPS outcomes other than just the transmission related outcomes, and have a national context, with macro-economic considerations
 - the SOO should contain, for each year of each scenario, the capital expenditure, expected fuel expenditure, expected O&M expenditure, expected spill, dispersion of nodal AC location factors, expected loss and constraint rentals, average transmission losses, and expected non-supply
 - the treatment of investment options does not present information for evaluation of generation and transmission alternatives at a national policy, regional, or financial markets level
 - the HVDC upgrade/replacement issue should not be regarded as outside the scope of the SOO
 - it is not clear whether, in addition to economic costs, the environmental, social and cultural costs have been included in the analysis
 - the SOO should include consideration of implications for security of supply and retail competition
 - the SOO should identify relative economic costs of reliability and security of supply, and benchmark these against risk/volatility and investment options
 - the SOO should establish performance measures (eg power factor, customer load factor, losses)
 - the focus appears to be on identifying reliability issues only – is there an intent to address economic opportunities in future SOOs?
 - while acknowledging that the Commission is required to work within the GPS, this should not inhibit it from highlighting opportunity costs imposed by current policy settings and considering options such as removal of carbon taxes or removing Kyoto constraints.
- 4.8 The Commission notes these suggestions about possible additional SOO content and will investigate these. A number of the points raised have been addressed, or will be addressed, in other Part F components or related Commission work streams.
- 4.9 A number of submitters also commented on material in the draft Initial SOO (or in the background documents) that they considered should not form part of the SOO. These included the following:
- the NPV analysis should be removed; comments included that it is invalid, it is of little value, it is more appropriate for the GIT, and it ignores many potential benefits of transmission investment

- price forecast information should not be included; comments included it is inappropriate, unhelpful, invalid, unrealistic, inconsistent with new entry prices, not the role of the Commission, potentially misleading, and has the potential to distort the market; and
 - that NPV and price forecast information should be retained but improved.
- 4.10 The Commission notes the concerns expressed regarding the NPV analysis and price forecast, and acknowledges that there are limitations with the approach adopted for the Initial SOO. The Initial SOO stressed that the NPV analysis was provided simply as an illustration of the base case costs of each scenario and that it should not be considered as providing any comment on the desirability of or otherwise of specific scenarios.
- 4.11 The Commission also notes that some submitters supported the inclusion of this material, particularly if the analysis and modelling were enhanced.
- 4.12 The Commission formed the view that the NPV information should be retained in the final version of the Initial SOO. Its preference is to retain similar information for future SOOs but enhance the manner in which the analysis is undertaken and the information is presented. However, the Commission intends to review the appropriateness or otherwise of including similar material in future SOOs when the next SOO is in preparation and will be inviting submissions on that document in draft.

5. Roles of the Commission and of Transpower

- 5.1 Many submitters raised issues about the respective roles of the Commission and Transpower. These included issues such as:
- concerns about the Commission potentially acting in a role of central planner; and
 - concerns with the Commission undertaking transmission planning rather than relying on Transpower.
- 5.2 A summary of the views expressed about the role of the Commission and/or that of Transpower is set out here:
- the Commission should not be undertaking transmission planning, as this is the role of Transpower, which is the appropriate body with the appropriate expertise, experience, and regulatory incentives
 - the SOO appears to cross the boundary between provision of information to industry participants and the central planning of transmission investment
 - the role of the Commission relative to that of Transpower is at serious risk of becoming blurred, with accountability for transmission planning passing to the Commission
 - the role of transmission planner should remain with the grid owner, and the regulator's role should be confined to assessing proposals from the grid owner as opposed to independently developing an alternative plan
 - there is a need to carefully assess where the balance is between the Commission acting as purely an information broker and being a future path setter
 - the SOO is primarily an exercise in transmission planning, whereby the Commission forms its own view of future transmission requirements based on a set of assumed generation investments
 - there is a clear intent for future SOOs to contain more detailed transmission planning content
 - until the role for transmission planning is settled between the Commission and Transpower, there will be uncertainty of accountability in terms of network performance and outcomes, duplication of scarce resources and uncertainty for investors
 - the Commission's role should be to facilitate a competitive wholesale market supported by a robust national grid
 - the Commission's role should be to ensure that a transmission solution put forward for approval meets the requirements of the GIT
 - there a risk of undermining the competitive generation market and security of supply.

- 5.3 In response, the Commission makes the following comments setting out its views as to its role and that of Transpower, with reference to the submissions made:
- the Commission's role in the transmission area is governed by Part F of the EGRs, and the Commission is required to meet these obligations in preparing the SOO; the Commission considers that the Initial SOO clearly sets out the role of the SOO and the Commission's approach to its preparation
 - the Commission agrees that Transpower has the primary role as transmission planner and that this is not the role of the Commission. However, the Commission must develop or acquire sufficient understanding of the transmission network, options for development, and alternatives to transmission, to enable it to carry out its functions and obligations under Part F. In particular, the Commission must ensure that it is capable of being an informed recipient of the GUP and is able to make robust and informed decisions regarding transmission investment proposals presented to it by Transpower. In relation to the SOO itself, an important role of that document is, of course, to provide information to the market which the market and interested parties can take into account, together with other information and material, in forming their own views and assessments. For the reasons stated earlier in this commentary, the SOO is not a "central plan" or a "transmission plan".
 - a number of comments made appear to reflect a desire to re-open debate as to the design of Part F and of the elements within it
 - while some parties have expressed concern as to the scope and extent of the Commission's work in the SOO, many parties have indicated the need for significant additional work
 - the transmission elements included in the SOO and the base case investments are those provided by Transpower in its transmission planning role. Transpower has various obligations under Part F relevant to that role. The Commission has further reinforced Transpower's role as transmission planner by requiring that Transpower prepare Grid Reliability Reports on a regular basis
 - the power systems analysis set out in the Initial SOO is only a static and high-level analysis. The Commission would like to stress that this work is not sufficient to form a transmission plan, nor is it intended to second-guess Transpower's planning role. However, it is intended by modelling augmentation to provide sufficient analysis to reveal when the transmission grid is likely to become constrained and to reveal potential opportunities for investment in transmission and alternatives
 - the Initial SOO clearly sets out that in the SOO the Commission is not commenting on, endorsing, or criticising any present Transpower proposal, or any proposal or view of any other person. It also reiterates that nothing in the SOO binds or prejudices any view of the Commission in considering or deciding any matter under Part F or otherwise.

6. Demand forecasting

Overview

- 6.1 Many submitters raised issues about the demand forecasting approach adopted by the Commission, and the forecasts themselves. These included issues such as:
- suggestions for modelling enhancements or alternative approaches
 - proposed alternative inputs and assumptions
 - concerns with some aspects of the forecasts produced
 - requests for clarification on some points; and
 - minor errors.
- 6.2 Matters relating to clarification and error correction were addressed in the process to finalise the Initial SOO, and amendments made. However, many of the submissions related to modelling approach and these have been collated into natural groupings and addressed in this commentary to the extent practicable.
- 6.3 It is important that readers of the SOO recognise that the forecasts are qualified and based on certain assumptions as set out in that document, and should be treated with caution. They are included for the purpose of the SOO only.

Forecast Uncertainty

- 6.4 A number of comments were made in relation to drivers that may impact on future electricity demand growth rates. Several submissions referred to the potential for reductions in demand as a result of energy efficiency improvements, and potential increases in the uptake of embedded generation. Other submissions referred to possible increases resulting from demand currently 'frustrated' by perceptions of transmission constraints and from increased electricity use in the heavy industrial sector.
- 6.5 The Commission acknowledges that there is considerable uncertainty inherent in forecasting electricity demand. The demand modelling approach used by the Commission has been focused at producing a range of forecasts based on uncertainty in future demographics and productivity. While there is potential for significant reductions arising from improvements in energy efficiency and an increase in embedded generation, there is also potential demand growth from sources such as increased use of air conditioning, home heating, and technology changes (such as plug-in hybrid electric vehicles). Further analysis is required before explicit adjustments associated with any one particular driver can be made to the demand forecasts. The Commission is currently in the process of developing the capability to undertake this work.

Comparison with other agencies' forecasts

- 6.6 It has been suggested that the Commission should compare and comment on electricity demand forecast published by other agencies. The Commission is not privy to the underlying models and assumptions used by the other agencies and is therefore not in a position to provide an informed critique of the alternative forecasts.

Peak vs total demand

- 6.7 A number of submissions commented on the relationship between peak demand and total demand.
- 6.8 There are several factors that can affect peak demand relative to total demand, including the underlying diversity of the loads behind each individual grid exit point, and the responsiveness of the loads to particular circumstances (the impact of a cold snap was highlighted in one submission). As a result, individual grid exit points will be subject to varying levels of uncertainty.
- 6.9 The Commission is conscious that the approach applied in the Initial SOO of assuming that peak demand grows at the same rate as total demand is relatively simplistic. There is a significant amount of work required before a final approach to forecasting peak loads can be settled on. However, as suggested in some submissions, the Commission's intention is to develop load probability curves for future demand at individual grid exit points. The first phase of this work has been the compilation of comprehensive historical half-hourly demand data at a grid exit point level for the Centralised Dataset.
- 6.10 At a more detailed level, comment was also directed at the choice of base year used to project peak demand. The Commission agrees with the suggestion of estimating an appropriate base using trended values based on several years data rather than selecting a representative individual year.

Regional Forecasts

- 6.11 The Commission used an interim approach to allocate the national demand forecasts in the Initial SOO. Several suggestions were made by submitters outlining possible alternative approaches to developing regional forecasts.
- 6.12 Using lines company forecasts to improve the regional forecasts was suggested in a number of submissions. The Commission is in the process of reviewing the regional demand modelling work carried out earlier this year, with a view to seeking additional information from participants to enable more robust models to be developed. In the short term, the Commission intends to use lines company forecasts as a check against the results obtained using alternative allocation approaches. Experience has shown that the development of long term national forecasts by simply collating lines company forecasts (as was suggested in one submission) has proved to be significantly more inaccurate than econometrically-based methods in the past. However, in the longer term the Commission intends to explore incorporating the line company forecasts into the regional forecast allocation process in some manner.

7. Approach to scenario modelling

Overview

- 7.1 Many submitters raised issues about the scenario modelling approach adopted by the Commission. These included issues such as:
- the generation-focussed approach to developing the scenarios
 - whether the scenario modelling approach enabled identification of opportunities for investment in transmission or transmission alternatives
 - concerns with the rigour of the scenario development process
 - the time horizon
 - suggested alternative/additional scenarios
 - alternative/additional factors to be considered in developing scenarios; and
 - requests for clarification on some points.
- 7.2 Matters for clarification were addressed through amendments to the final version of the Initial SOO. However, many of the submissions related to modelling approach, and these have been collated into natural groupings and addressed in this commentary to the extent practicable. Some submitters also proposed corrections to specific generation projects included in scenarios, and these are discussed in Section 8 of this document.
- 7.3 It is important that readers of the SOO recognise that the scenarios are qualified and are based on certain assumptions as set out in that document, and should be treated with caution. They are included for the purposes of the SOO only.

Range of scenarios

- 7.4 Several submissions suggested that the range of scenarios presented by the Commission was inadequate. Various alternative scenarios were suggested including a status quo scenario, an environmentally constrained scenario, a most likely scenario, an LNG scenario, and a nuclear scenario.
- 7.5 As is outlined in the SOO, the intent of the scenarios is to provide a range of plausible outcomes. The choice of specific fuels is not the focus of the scenarios. The intent is to obtain a range of outcomes with differently sized and located generation appropriate for the assessment of transmission proposals. The Commission suggests that, from a transmission analysis focus, most of the alternative scenarios suggested in submissions fit within the range covered in the SOO.
- 7.6 For the purposes of the Initial SOO the Commission decided not to make any substantive comments as to the likelihood between scenarios or to include a 'most likely' scenario. In section 8.1 of the Initial SOO, the Commission explained that in the process of developing scenarios there is always a

tendency to make each scenario more plausible by reflecting current views and opinions. The effect of this is to contract the region of uncertainty encompassed by the scenarios, and part of the value of the scenario planning process would be lost. Further, as noted earlier in this document, it is not the Commission's role to, itself, develop an energy strategy or, itself, seek to determine a centrally-planned outcome to the nation's energy supply needs. The Commission will, however, consider revisiting this approach in future SOOs and does intend to develop a set of potential generation schemes for use in preparing alternative generation scenarios.

Depth of analysis

- 7.7 Many of the comments relating to the development of generation scenarios were directed at the depth of analysis that had been carried out on the individual schemes. This ranged across concerns such as inadequate modelling and optimisation of generation development, suboptimal location of generation, and the impact of transmission on individual schemes.
- 7.8 The Commission intends to improve its capability in the area of generation modelling. This includes obtaining additional information about potential generation options, and improving feedback between transmission and generation outcomes. The intention is to produce a portfolio of generation options along with various characteristics that can be used as a base for improved modelling and scenario development.

Demand side responses and embedded generation

- 7.9 A number of submitters commented that there was insufficient consideration of demand side response options and the impact of smaller scale embedded generation.
- 7.10 The impact of energy efficiency impacts and embedded generation on total demand will be considered as part of the demand forecasting process. Where adjustments to the forecasts are appropriate they will be incorporated into the forecast figures.
- 7.11 The development of load probability curves will facilitate the identification of opportunities for peak shifting. By providing an analysis of the shape of the peaks at individual grid exit points, the appropriateness of demand side measures can be assessed relative to other capacity based solutions.
- 7.12 The Commission intends to assess the impact of demand forecast scenarios on the timing of transmission or transmission alternatives as part of future SOO development work.

8. Generation projects

Generation project information

- 8.1 Several corrections to generating plant parameters were noted in submissions. The tables provided in the Initial SOO were amended as appropriate. Readers are referred to the final version of the Initial SOO for the amended project information tables.
- 8.2 The Commission is currently in the process of confirming Asset Capability Statement information with generators as part of the work associated with the publication of the Centralised Dataset and intends to maintain a comprehensive set of generation plant information.
- 8.3 The Commission will work with generators and other appropriate groups to ensure that the range of generation alternatives included in futures SOOs is robust and represents a realistic range of potential options.

9. Approach to Power Systems Analysis

Overview

- 9.1 Many submitters raised issues about the approach adopted by the Commission for the power systems analysis. These were often closely related to concerns about the content of the SOO and the role of the Commission, discussed earlier in this commentary. The submissions included issues such as:
- concern that the approach amounted to transmission planning
 - whether the analysis enabled identification of opportunities for investment in transmission or transmission alternatives
 - suggestions for additional or alternative analyses to be undertaken
 - suggested additional or alternative inputs, assumptions and sensitivities; and
 - requests for clarification on some points.
- 9.2 Matters relating to clarification were addressed in the process to finalise the Initial SOO, and amendments were made. However, many of the submissions related to the analytical approach, and these have been collated into natural groupings. A general response to the issues raised is set in the following:
- as a general comment, the Commission suggests that the overall approach and rigour is appropriate for the Initial SOO
 - the Commission suggests that future SOOs will benefit from the experience gained with this initial SOO and from the feedback provided by submitters
 - the Commission's approach is not intended to be one of central planning. However, it does have obligations under the Act and the EGRs which it is required to meet, including the publication of its view of credible generation scenarios and the approval of transmission investments
 - the transmission elements included in the SOO and the base case investments are those provided by Transpower in its transmission planning role. The Commission has further reinforced Transpower's role as transmission planner by requiring that Transpower prepare Grid Reliability Reports on a regular basis
 - the Commission suggests that it will be better informed on a number of these issues when it has had the opportunity to fully consider the first GUP and application of the GRS and GIT
 - the Commission notes the suggestions regarding additional and/or alternative power systems analyses and input assumptions
 - the Commission considers that it is not the role of the SOO to address some of the issues raised. In particular, the GUP and the GIT are the more appropriate vehicles for undertaking some of the analyses sought by submitters.

- 9.3 It is important that readers of the SOO recognise that the power systems analysis is qualified and is based on certain assumptions as set out in that document, and should be treated with caution. It is included for the purposes of the SOO only.

Transmission augmentations used in the SOO

- 9.4 A number of submitters expressed views or concerns about the transmission augmentations used in the SOO. These included:
- the analysis is an assessment of the transmission options proposed by Transpower rather than a presentation of the issues and associated opportunities
 - the analysis should be at a higher level, highlighting existing issues and identifying potential opportunities rather than proposing specific solutions
 - there has been no attempt to develop optimal transmission development plans for each of the five scenarios
 - there is concern that “non-controversial” augmentations such as capacitors and line up-rates were included with what appeared to be less rigour than “controversial” options; and
 - there is concern regarding the assumption that all tactical upgrades would be made, when they have not yet been approved by the Commission.
- 9.5 It is clear from this summary that submitters have widely differing views about the appropriate role for the SOO and whether transmission augmentations should be included in the SOO at all.
- 9.6 The objective of the SOO is primarily to highlight opportunities for efficient management of the grid including investment in transmission and in alternatives to transmission. In order to achieve this objective, the Commission considers that it is necessary to indicate both when investments might be necessary and what some of the investment options could be.
- 9.7 The power systems analysis, therefore, included transmission augmentations to the main transmission system in order to reduce N-1 contingency constraints when they occurred. The transmission options considered by Transpower in its transmission planning role were used for this purpose since these are the ones most likely to be proposed by Transpower to address the constraints. In particular, likely cost effective augmentations such as capacitors and thermal line up-rates were included in the analysis in order to provide participants with an indication of solutions that will likely be considered.
- 9.8 The “non-controversial” augmentations such as capacitors and line up-rates were intentionally included without assessing whether they were optimal investments. This is because the cost of the “non-controversial” augmentations was considerably less than the “controversial” augmentations, and it seemed appropriate to inform participants about likely low-cost options.
- 9.9 Inclusion of transmission augmentations in the SOO does not mean that they are approved by the Commission, or even considered likely to be approved. Indeed, the Initial SOO specifically states that the Commission is not

commenting on, endorsing, or criticising any present Transpower proposal, or any proposal or view of any other person.

- 9.10 The analysis identifies constraints in the power system. While a transmission augmentation may be used to remove a constraint, there is no reason why demand-side management or regional generation could not be substituted. These are opportunities for cost effective alternatives.

GRS (N-1) criterion

- 9.11 Some submitters expressed the view that satisfying the (Interim) GRS should not be the only criterion for transmission investment. In response, the Commission makes the following comments:
- the (Interim) GRS are not the only criteria for transmission investment, and it is clear from the final form of the GRS and the GIT that economic criteria are intended to be the primary focus. The N-1 reliability standard inherent to the Interim GRS has been applied to the Initial SOO because of the compressed timeframe available for the power system analysis;
 - however, the Commission considers that application of the N-1 reliability standard is adequate for identifying the likely timing for investment opportunities.

Scope of power system analysis

- 9.12 A number of submitters expressed views or concerns in relation to the scope of the power systems analysis undertaken for the Initial SOO. These included:
- the analysis should include dynamic stability and voltage stability
 - the analysis should consider summer peaks, summer troughs, winter troughs and dry years
 - fault level studies should be completed
 - the analysis should include sensitivities on generation availability (e.g. de-rating for intermittent nature, de-rating for transmission or fuel limits, major/multiple generation contingencies, timing/implications of maintenance outages)
 - the analysis should consider differing reliability levels of generation compared to transmission options
 - the analysis should be repeated for a “low” demand forecast; and
 - energy efficiency and demand-side management options should be included in the analysis; information is needed on how these will be modelled, valued and analysed.
- 9.13 In response, the Commission makes the following comments:
- the inclusion of dynamic and voltage stability analysis, consideration of peaks, troughs and dry years, and fault level analysis would provide a more comprehensive study. The Commission will consider these suggestions for future SOOs

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- the inclusion of sensitivities on generation availability and reliability would provide a probabilistic approach to the power system analysis. The Commission is not persuaded at this time that it is the role of the SOO to provide this level of detail in the analysis, and considers at this point that such assessment would be more appropriately undertaken as part of the GUP analysis, and application of the GIT
 - it is the role of the SOO to reveal opportunities for investment in transmission and alternatives, not to consider and opine on what the optimum outcomes would be. Accordingly, energy efficiency and demand-side options should emerge from participant proposals and be considered by Transpower when it is making an investment proposal.
- 9.14 Concern was also expressed regarding the validity of expecting Otahuhu A to be able to continue to provide 5 units for compensation duty. The Commission suggests that the assumption that Otahuhu A is capable of providing 5 units is reasonable, because the equivalent dynamic reactive support could be available through investment within the Auckland region if Otahuhu A is not available.
- 9.15 It was suggested in submissions that the analysis should include more specific assumptions regarding transmission overload capabilities rather than a generic 110% assumption. The Commission considers that, for modelling purposes, it may be better to dispatch all generators to maximum output, use 100% for transmission line overloads, and the stated four hour overload capability for transformers (where re-dispatch is not available).
- 9.16 It was suggested in submissions that the analysis should consider ancillary service requirements, particularly frequency keeping and instantaneous reserves, which could become constrained under some scenarios. The Commission suggests that reserves are best provided for by ensuring that there is sufficient HVDC headroom to handle a single pole trip or largest single generator trip. Interruptible load is ignored and provides an extra margin.
- 9.17 It was suggested in submissions that options such as capacitors and other forms of voltage support are only “band aids” that buy a little time and should be reserved for managing the situation while transmission is being built, rather than provided as a means of deferring transmission investment. The Commission for the purposes of the SOO disagrees with this approach and considers that voltage support investments in some situations can provide an effective alternative to investment in additional transmission lines.

10. Transmission Alternatives and Auckland transmission issues

- 10.1 Several submitters proposed both general and specific transmission alternatives. These suggestions were collated and are held as part of the information base for consideration of GUPs submitted by Transpower. Those alternatives that specifically relate to the proposed Auckland 400kV project have been referred to that work stream also.
- 10.2 A few submitters commented on issues which the Commission considered were more specifically related to the Auckland transmission situation and Transpower's proposed 400kV grid investment. The Commission has taken these issues into account to the extent they are relevant to the Initial SOO. These suggestions have also been collated and considered as part of the specific work stream being progressed by the Commission relating to the Auckland transmission issues.

11. Approach to electricity market modelling

Overview

- 11.1 Some submitters raised issues relating to the approach to electricity market modelling adopted by the Commission. These were often closely related to concerns regarding the content of the SOO and the role of the Commission, discussed above. The submissions included issues such as:
- concerns with the analytical rigour
 - issues relating to the offer strategy assumptions underlying the modelling
 - accuracy of simulation results
 - suggestions for additional/alternative analyses to be undertaken
 - suggested additional/alternative inputs, assumptions and sensitivities
 - concerns with accuracy and/or relevance of NPV analysis and price forecasts; and
 - errors in some inputs.
- 11.2 Matters relating to clarification and error were addressed in the process to finalise the Initial SOO, and amendments made. However, many of the submissions related to the modelling approach. These are listed here in summary form, together with the points the Commission wishes to make in response.
- 11.3 It is important that readers of the SOO recognise that the electricity market modelling is qualified and is based on certain assumptions as set out in that document, and should be treated with caution. It is included for the purposes of the SOO only.

Comments relating to methodology

- 11.4 A number of submitters expressed views or concerns in relation to the methodology adopted for the energy market modelling undertaken for the Initial SOO. These included:
- analytical rigour and proper process appear to have been impaired by the need to meet unrealistic statutory deadlines;
 - the approach appears to rely on assumptions about generator offer strategies that appear inconsistent with observed behaviour; a variety of offer assumptions should be used
 - there are dangers in using variable cost as a proxy for SRMC, and simulating market dispatch based on the assumption that generators offer at this cost; it is unlikely to produce robust assessment of the value of alternative generating scenarios or grid investments

- the simulation does not adequately capture risks associated with generation location, which is a key driver of scenario prices
 - the simulation results are relevant and necessary, but materially inaccurate, and misleading to a potential investor, primarily attributable to internally inconsistent generation scenarios
 - the approach should compare risks of each scenario as well as costs (eg climate change, peak oil, failure to find big gas fields)
 - the analysis should consider environmental and health costs
 - there are concerns about the assumptions lying behind the NPV analysis and the appropriate discount rate
 - there are concerns about fuel price and carbon tax assumptions; and
 - there are concerns about the validity of the input assumptions and the outputs of the price forecasts emerging from the analysis.
- 11.5 The Commission agrees that the electricity market modelling, price forecasts, and NPV analysis can be further developed and improved on in future SOOs by addressing the issues raised in submissions. For future SOOs it intends to further consider the value provided by such forecasts, how best to undertake the analysis, and what assumptions to use.
- 11.6 In relation to the Initial SOO the Commission believes the approach it has taken is appropriate in this context on the basis of the qualifications, assumptions and cautions set out, and given the purpose and basis on which the Initial SOO is published.

12. Next steps

- 12.1 The Commission would like to take this opportunity to thank all those who made submissions on the draft Initial SOO, and has noted the issues and suggestions raised in submissions.
- 12.2 It considers that future SOOs will benefit from the experience gained with the Initial SOO and the feedback provided by submitters. The Commission also considers it will be better informed on a number of the issues raised once it has had the opportunity to fully consider the first GUP and application of the GIT and GRS.
- 12.3 The Commission has initiated a number of work streams aimed at enhancing its modelling and analytical capabilities, not just for the SOO, but for a number of its accountability areas. It is also enhancing its information data sets.
- 12.4 The GPS requirement is that the SOO be produced at least every two years. In recognition of these matters, and that a compressed approach was required for the Initial SOO, the Commission has undertaken to produce the next SOO next year rather than waiting until 2007. The Commission is now in the preliminary stages of developing its work programme for preparation of the next SOO, and is targeting release of the draft SOO for consultation in June 2006.
- 12.5 In parallel, the Commission is progressing a number of related transmission issues, such as development of the Benchmark Agreements, arrangements for transmission alternatives, and consideration of transmission investment proposals.
- 12.6 The Commission encourages all stakeholders to participate in progressing the important transmission issues that lie ahead.

Appendix 1. Commonly Used Terms

Act	The Electricity Act 1992 (as amended in 2001 and 2004)
Commission	The Electricity Commission
EGRs	The Electricity Governance Rules 2003
GIP	Grid Injection Point
GIT	Grid Investment Test
GPA	Grid Planning Assumptions
GPS	Government Policy Statement on Electricity Governance (as published in October 2004)
GRS	Grid Reliability Standards
GUP	Grid Upgrade Plan
GXP	Grid exit point
HVDC	High Voltage Direct Current
LNG	Liquefied Natural Gas
LRMC	Long run marginal cost
MED	Ministry of Economic Development
Minister	The Minister of Energy
NPV	Net present value
PSA	Power Systems Analysis
SOO	Statement of Opportunities
SRMC	Short run marginal cost
SSF	System Security Forecast
SVC	Static VAr Compensator
WACC	Weighted Average Cost of Capital