# Report on the
# Transpower New Zealand Ltd NIGUP Alliance Contract Arrangements

## Report to

## The Commerce Commission

Strata Energy Consulting Limited

30 July 2014

*This report has been prepared to assist the New Zealand Commerce Commission (the Commission) with its determination of aspects of the Alliance Contract arrangements established and managed by Transpower New Zealand Limited (Transpower) for its North Island Grid Upgrade Project.*

*This report relies on information provided to Strata by the Commission and Transpower. Strata disclaims liability for any errors or omissions arising from information provided to Strata by other parties, for the validity of information provided to Strata by other parties, for the use of any information in this report by any party other than the Commission and for the use of this report for any purpose other than the intended purpose.*

*In particular, this report is not intended to be used to support business cases or business investment decisions nor is this report intended to be read as an interpretation of the application of the Commerce Act or other legal instruments.*

*The report contains Strata's comments, views and opinions based on its understanding of the Alliance and how it was implemented. Our views and opinions have been formed from our interpretation of information provided, discussions with Transpower and on the related experience of our consultants.*

Strata Energy Consulting Limited

PO Box 12332,

Thorndon,

Wellington 6011

New Zealand

Phone: +64 4 471 0312

Email: bill.heaps@strataenergy.co.nz

Web: **http://www.strataenergy.co.nz**

### *About Strata*

*Strata Energy Consulting Limited specialises in providing services relating to the energy industry and energy utilisation. The Company, which was established in 2003, provides advice to clients through its own resources and through a network of Associate organisations. Strata Energy Consulting has completed work on a wide range of topics for clients in the energy sector both in New Zealand and overseas.*

### *Authorship*

| | |
|---|---|
| Prepared by: | David Swanson<br>Stephen Lewis |
| Approved by: | Bill Heaps |
| Date: | 30/07/2014 1:39 am |
| Version: | V3.0 |

# Contents



## Tables

# 1 Introduction

## 1.1 Purpose of this report

10 The purpose of this report is to provide advice to the Commerce Commission (Commission) on specific aspects of Transpower's application to the Commission for an amendment to the major capex allowance (MCA)[1] for the North Island Grid Upgrade Project (NIGUP).

## 1.2 Context

11 Transpower submitted an application to the Commission for an amendment to the MCA for the NIGUP. The Commission is evaluating the application utilising the evaluation framework it has developed for the NIGUP and will, at its discretion, decide an appropriate amended MCA that meets the requirements of the Capex IM and gives effect to the purpose of Part 4 of the Commerce Act.

12 An Alliance Contract model was chosen by Transpower to manage over $300million of overhead transmission line construction for the NIGUP. The Commission has identified the Alliance Contract as a specific area of the NIGUP with the highest risk of avoidable costs in their evaluation of Transpower's amendment application.

13 The Commission has asked Strata for assistance on two specific areas of the Alliance Contract approach and management, specifically:

(a) how the Alliance Contract compares with industry practice in other jurisdictions (e.g. National Grid UK); and

(b) assessment of Transpower's process for managing changes and variations.

14 In undertaking the examination of the above two areas, Strata has:

(a) sought to identify issues that may have put costs at risk;

(b) assessed whether the issues were reasonably foreseeable or not;

(c) assessed whether the issue was controllable by Transpower;

(d) assessed whether the outcome was managed prudently; and

[1] The maximum value of costs for an approved major capex project

[2] Tomo is a New Zealand expression for a depression or hole in the ground caused generally due to the collapse

(e) examined the project governance and management as applicable to the line construction and alliance, the alliance governance and management and the impact of the 'need date' as an input to the Commission's wider consideration of these aspects for the NIGUP as a whole.

15 Although we have not conducted a forensic examination of issues and their impact on costs we have sought to provide recommendations indicating where issues are considered to have had a material impact on costs and an amendment to the application is justified.

## 1.3 Structure of this report

16 Firstly, we provide a Headline section that sets out our key findings and recommendations.

17 We then provide a brief overview of the NIGUP and the Alliance Contract arrangements.

18 In the body of the report we provide information to support our findings and reasons for our conclusions.

19 Initially, we provide our understanding of the Alliance Contract and a description of what we consider to be the key components relative to this review. We then describe our detailed findings in respect of the two specific tasks the Commission has asked us to undertake.

20 The contents, views and opinions in this report have been developed based on our professional opinion and from information provided by the Commission and Transpower throughout the course of this review. The review team has drawn on their working experience of similar Alliance Contract arrangements used overseas particularly in the United Kingdom and of broader governance arrangements for major transmission projects. Our views and opinions expressed in this report have relied on the information and responses to questions provided by Transpower.

# 2 Headline summary of Findings and Recommendations

## 2.1 Key Findings

22 Following a detailed study of the two specific focus areas of the NIGUP overhead line sub-project delivered by the Northern Grid Alliance on behalf of Transpower New Zealand limited, we can summarise our findings as follows.

(a) The motivation to implement the project under an Alliance framework may have been to follow an international trend as well as well as seeking to apply the best methodology available based upon robust analysis of the risks involved.

(b) It is questionable whether the key risks and uncertainties were examined as robustly as they should have been and appropriately managed within a relationship contract model. For example, whether the impact of delays in securing regulatory (BOI) consent, whilst maintaining a fixed completion date, could realistically be achieved.

(c) The decision to restrict the final tender shortlist to two parties and then pay the proponents to prepare their final tender submissions may have had the unintended consequence of driving up tender costs and stifling potential innovation. The magnitude of the project, coupled with the level of interest originally shown by the market, should have led to attractive proposals being received without requiring reward for participation.

(d) The Project Alliancing Agreement work programme and cost model was excessively over optimistic and did not adequately reflect the significant uncertainties that prevailed at the time of award. These uncertainties included the key challenges of landowner access and tower foundation design. In particular, considering the lack of geotechnical survey data and land access agreements, the specific 'remeasurable' provisions for foundations and the general risk contingency are considered to have been inadequate. Our view is that resource levels above those provided, although not to the extent of the levels ultimately required, could have been reasonably been foreseen by both parties. As responsible contracting parties, both Transpower and BBUGL should have reconsidered entering into the PAA until this shortcoming was addressed to the satisfaction of both parties and/or a better defined scope change provision existed within the PAA to cover such significant project uncertainty.

(e) The Australian alliancing model was adopted (as described in the Project Alliancing Practitioners Guide 2006) but the fundamental requirement to establish a sustainable alliance culture appears to have failed resulting in parties reverting to bipartisan positions when challenging issues were being faced.

(f) The contractual pain/gain model applied under which BBUGL's Profit & Overhead Recovery (POH) was put at risk in the event of Target Cost Estimate overrun undoubtedly impacted on its attitude to both Transpower and the Alliance once it became evident that scope change requests related to land access issues for cost overrun were not going to be approved even though the root cause of the increased cost was not of its making. It is noted that Transpower has subsequently acknowledged responsibility for some aspects of cost overrun but this was too late to recover trust between the parties.

(g) Although Transpower had a well-structured governance framework for all capital projects at the time, the framework was not applied in the way it was described when the parties entered into the Alliance contract. With both the GM Grid Projects and the NIGUP Project Director as members of the Alliance Leadership Team (ALT), the benefit of the multi-layer governance model and line management delegation was, at least in part, negated. The non-owner participants of the ALT (BBUGL) would, by default, look to the most senior member of the Transpower representation for decisions, knowing that individual was the appointed Project Owner with full delegated authority for the project from the CEO. This effectively would have reduced the impact of the Project Director in the overall governance structure. All three IQANZ independent audits flagged issues with Project Governance and, in our opinion, these were never adequately addressed and resolved.

(h) Although not considered to have directly impacted on the Alliance or project delivery, the Transpower governance framework was changed after the award of contract, splitting the Project Owner role into EPO and IPO roles. It is not clear to us that the true IPO role was ever effectively implemented as had been intended. What may have had an impact on the project was the CEO's decision during the project to personally effectively take on the IPO role to ensure that there was a clear 'line of sight accountability' for the project. This change may have been ambiguous or unclear to many involved in the Alliance as evidenced by IQANZ who identified in its audits that the GM Grid Development was in this role. This change may have had the undesirable consequence of compromising the governance framework for the project and, as a result, not delivering the originally perceived benefits of the governance framework design above those provided solely through line management reporting, What is evident is that shortly after the change was made, the collaborative approach at ALT level (which is a fundamental of alliance partnership mechanism),

appears to have broken down and the project's commercial relationship shifted much more towards traditional client-contractor behaviours.

(i) The delegation of authority to approve scope change to the ALT introduces a number of significant issues to the Alliance processes. This is likely to have contributed to the ultimate breakdown of the change management process including:

  (i) the need for decisions to be unanimous when the interests of the meeting membership are clearly different and would potentially be at odds when the project became difficult; and

  (ii) the allocation of risk between the parties must be absolutely clear through a common understanding of the definition of scope change and the establishment of a true alliance working culture where it is accepted that project success means success for both parties.

(j) The commercial framework of the PAA failed to adequately reflect the significance of two of the key risks identified from the outset of the project – namely the risks of regulatory decision delay and property access. As these were the two key root causes of programme delay, we are of the opinion that the ALT should have been provided with clear direction regarding how these issues should be treated under the PAA.

(k) We understand that failure of the parties to acknowledge respective responsibilities in the alliance environment led to a loss of trust. The consequence of this was the breakdown of the ALT change control process, with $63.5M of unresolved variation. This situation would have been exacerbated by the commencement of POH withholding by the Cost Auditor at the same time.

(l) The Alliance management processes were generally good and in accordance with good practice but there were shortcomings in both the risk management and reporting processes. IQANZ flagged issues with risk management in its audits. This was further exacerbated by the fact that upward risk reporting did not adequately capture the significant risks and uncertainties managed by the Alliance Management Team (AMT). On the other hand, most other aspects of ALT reporting, running to between 50 and 80 pages, are considered to be excessively detailed which led to the risk of key messages being lost to the eyes of those charged with directing the Alliance.

(m) In reviewing the form and sample content of internal Transpower Divisional Reporting from the GM Grid Projects to the CEO, which we understand was incorporated for onward reporting to the Board, we consider that, although broad in nature, the volume of information presented is likely to have resulted in the key

messages being lost to the recipients. In the documentation we have reviewed, we have found little to highlight the significant risks facing NIGUP despite the criticality of the project to the New Zealand electricity infrastructure and the unfamiliar contracting model used to deliver the project. Although a Red/Amber/Green (RAG) approach was adopted, the relevant significance and required detail is often lost due to the high number of Red flags contained in the tabular data.

(n) The construction programme was significantly impacted by the delayed outcome to the BOI and the very protracted delay in Transpower securing land access necessary for the Alliance to undertake construction works. Transpower has acknowledged that it could have planned the land access better and accepted a $17.7M reduction in its application for an adjustment to the NIGUP capital allowance.

(o) Whilst Transpower, supported by the independent expert, did not consider the construction programme fragmentation arising from late and piecemeal provision of landowner access to be within the definition of Scope Change in the PAA, BBUGL was left severely disadvantaged under the pain sharing mechanism. It is our opinion that, under the general principles of alliancing, the parties should be seeking a win/win or lose/lose outcome that is fair and transparent. We understand that the Alliance worked tirelessly to mitigate the problems associated with late access, revising the construction programme weekly. The responsibility for and risk associated with providing landowner access to support the construction programme is clearly allocated in the PAA to Transpower, given this the interpretation taken during the contract settlement process could be considered to be more favourable to Transpower than might otherwise have been anticipated in different circumstances. This outcome is likely to be attributable to both the initial contract failing to clearly recognise and define how this foreseeable risk would be managed, and failure within the ALT to determine early within the project how this would be treated. As a result, the pain share allocated to BBUGL could have been excessive in relation to the programme prolongation and as a result inconsistent with the principles of alliance working. Although the end result was favourable to Transpower we consider that the lack of clarity within the PAA placed Transpower at financial risk. Indeed up until the findings of the expert, we were led to understand that Transpower had prepared for the potential of a less favourable outcome.

(p) We understand that Transpower broadly acknowledged that the original cost assumptions for foundations were inadequate and accepted the Target Cost Estimate increases related to this in the final commercial settlement.

## 2.2 Recommendations

### 2.2.1 Comparison of the Alliance contract with international practice

23 We consider that the Alliance arrangement in both framework and the agreement was generally aligned with international practices.

24 Whilst we have identified a number of issues with the content, governance and management arrangements for the Alliance contract arrangement, we consider that the arrangement ultimately delivered an overall lower cost outcome for Transpower than could have reasonably been expected. This result is due to the outcome of the negotiated settlement.

25 Accordingly we recommend that the Commission, on this basis, does not make any adjustment to the application with regard to the structure, and operation of the Alliance Contract.

26 Not withstanding the above, it is important that when assessing the broader aspects of the NIGUP, the Commission takes into account our findings on the shortcomings and inadequacy of Transpower's analysis of identifiable and foreseeable risks. In particular, account should be taken of our findings regarding the:

(a) the timing and appropriateness of entering into an alliance contract;

(b) management of availability of adequate resource contingencies; and

(c) inadequacy of the wording of the agreement to mitigate financial risk.

### 2.2.2 Transpower's process for managing changes and variations.

27 We consider that there were deficiencies in the change management and governance arrangements that are likely to have led to challenges and difficulties in maintaining relationships between Transpower and the Alliance partners.

28 In our opinion the failure to make adequate financial provisions for the clearly identifiable and foreseeable uncertainties and risks during the establishment stages of the project are major contributing factors to the issues that emerged later.

29 For any future alliance contracting arrangements that Transpower may enter, we recommend that the contract should ensure that a realistic review and assessment of the identifiable and foreseeable risks and uncertainties is undertaken and reasonable financial resources are adequately provided to cover these.

30 We consider that there was a failure to provide adequate contingency for additional foundation costs due to identifiable and foreseeable ground conditions. However, it is likely that the additional foundation costs incurred due to unexpectedly severe ground conditions such as the cost of addressing tomo[2] would have been prudently incurred under all circumstances. As such, we consider it reasonable that these costs are allowed for.

31 We consider that the majority of the additional costs incurred in work scheduling inefficiencies and the cost of access arrangements were due to the inability to deliver land access to the Alliance in accordance with the planned programme of work.

32 Some of these costs may have been avoided if the Alliance contract had been structured and established to better support the management of land access if more pessimistic assumptions had been made at the time the PAA was agreed. This could have been achieved by delaying entering into the agreement due to the identifiable and foreseen risks associated with land access (although we recognise that the contract award was already deferred due to delays in securing regulatory consent and this already put the system need date at risk) and including an explicit provision to 'stand down' the contractors and delay work until reasonable land access was available (although we acknowledge that this could have a significant cost implication and was considered during the review of stringing options).

33 During the review we were informed by Transpower that the work could not be delayed as (following the BOI decision) the Needs Case was as strong as it had originally had been, and therefore did not allow for deferment. Additionally we were informed that although 'standing down' of the contractors was a consideration at later stages of construction, this consideration and the savings it may have presented was always overridden by the costs of Interest During Construction.

34 Transpower has acknowledged that it could have planned the land access better and accepted a $17.7M reduction in its application for an adjustment to the NIGUP capital allowance.

35 We consider the extent to which any further adjustment to the application can be justified for land access factors will need to take into account the findings of the Land and Access work being undertaken by the Commission. In doing this consideration will need to be given to the ongoing strength of the Needs Case following the BOI decision and during the period of construction. As such, within the scope of this review, we are unable to provide a recommendation in addition to the adjustment proposed by Transpower.

[2] Tomo is a New Zealand expression for a depression or hole in the ground caused generally due to the collapse of the subsurface. Tomo are prevalent in geothermal regions.

# 3 Overview of the NIGUP Alliance Contract

## 3.1 Project Background and Delivery Strategy

### 3.1.1 Project Definition

36 In September 2005, Transpower New Zealand Ltd (Transpower) submitted proposals for the North Island Grid Upgrade Project (NIGUP) to the Electricity Commission as part of the 2005 Grid Upgrade Plan. The project was considered in accordance with the Electricity Governance Rules (2003), public consultation was undertaken and was formally approved by the Electricity Commission on 5th July 2007 for final commissioning in 2011 at a cost of $824M in 2011 dollars[3]. NIGUP comprised a programme of sub-projects including substation works, cable works and transmission line works. The most significant of these sub-projects was the construction of a new 400kV double circuit overhead line between Whakamaru North Substation and Brownhill Cable Transition Station, a total length of 186 route km, at an estimated cost of $235M (excluding Contingency, Exchange Rate Risk and Interest During Construction). The overhead line was scheduled for commissioning in 2011.

37 In preparation for their NIGUP submission, Transpower developed an implementation strategy for the project, with assistance from Beca, Carter, Hollings and Ferner Limited (Beca) in association with EPS International and PB Power. The Beca report, which was published in July 2005, considered a range of project delivery models within the context of project risk, uncertainty and capability and recommended a preferred delivery model for each of the key elements of NIGUP. Of particular relevance to this study is the recommendation to adopt a Design Build Maintain (DBM) approach for the overhead line works[4] with the contractor responsible for procurement of materials and a commercial framework comprising lump sum with provisional sum and schedule of rates to deal with aspects that cannot be fully specified. The report also introduces the concept of Relationship contracts (otherwise known as Alliancing) as a possible delivery framework but does not go so far as to make a firm recommendation in this area.

38 Transpower subsequently commissioned a further study by Evans & Peck (E&P) to review the Beca report and their own interpretation of the implementation strategy (Transpower memo of 6th July 2005). E&P published their own report in August 2005, supporting a shift to a Design

[3] Electricity Commission - Final Decision on Transpower's North Island Grid Upgrade Proposal, 7 July 2007
[4] Beca Report – Implementation Strategy for North Island 400kV Grid Upgrade, July 2005

Build (DB) approach and presenting a much clearer position on the benefits of a Relationship contract for the overhead line *".....due to the need to have the contractor working cooperatively with Transpower to ensure the target completion date is achieved, rather than the contractor working to obtain contractual relief.*[5]"

39 NIGUP was finally completed in October 2013, some 23 months later than originally planned and at an aggregated cost of $894M, some $70M over budget. The overhead lines sub-project Alliance works were commissioned in October 2012 and outturned at $313M, some $78M over budget.

### 3.1.2 Risks and Uncertainties

40 From the earliest days of developing the implementation strategy, the new 400kV overhead line sub-project carried a number of significant risks and identified uncertainties, the majority of which could not be resolved prior to the award of a construction contract. These are briefly summarised below:

(a) outcome of regulatory processes causing the project to be delayed or design changes mandated,

(b) property issues, i.e. delays in obtaining site access,

(c) geotechnical/topographical information not available at time of entering contract for tower foundations, access tracks for tower construction and areas for materials storage; and

(d) constructing through winter periods causing construction delays and impacting on costs.

41 In reality, these four key risks and uncertainties each had a significant impact on the sub-project causing the project programme to be extended from an original overhead line commissioning of November 2011 to an actual date of October 2012 and a cost escalation for the works from an original Target Cost Estimate (TCE) of $205M to an Alliance Outturn Cost (AOC) of $340M excluding Transpower costs prior to pain share adjustment and final settlement negotiation ($313M Actual Cost to Transpower at settlement).

### 3.1.3 Commercial Framework

42 The selection of a Design and Build contract model and the decision to adopt a Relationship commercial framework came out of the original recommendations made by experienced industry consultants (Beca and E&P) in 2005.

[5] Evans & Peck – Project Implementation Strategy Review, August 2005

(a) The rationale for recommending the Design and Build (DB) contract model given by Beca was "*Design Build approach is suited to projects where the technology is proven, the scope and the owners requirements are clearly defined and risks can be clearly identified.*" The Beca report recommended inclusion of a 10 year Maintain element in the contract (DBM) but this was not adopted by Transpower or supported by the E&P review. On this basis, we consider the selection of the DB contract model to be appropriate for the NIGUP overhead lines sub-project.

(b) The application of a Relationship commercial framework was identified as an option by Beca and supported for application to the NIGUP overhead lines sub-project by E&P. In considering the rationale, Beca and E&P cite that this type of contract is "*increasingly popular*" and "*now the preferred type of contract for many of the major contractors*". Undoubtedly this was the case at the time, as alliancing was seen as the panacea to managing scope and programme uncertainty for both clients and contractors. Transpower has demonstrated that it carried out a number of challenges and reviews regarding contract strategy and adequately justified its choice of the alliance relationship contract to the Board. E&P also cite "*Such a form of contract also allows for easy resolution of cost issues resulting from the lack of geotechnical information; (through an open book approach to costs incurred) although in this contract it is not considered that geotechnical issues are significant enough on their own to drive the commercial framework.*" As Transpower recognised during the project development stage, the lack of geotechnical data did become a significant issue two years later, as reflected by the decision to make the tower foundations a remeasurable element in the Project Alliance Agreement (PAA). Furthermore, two other significant risks identified in 3.1.2 above relating to regulatory decision delay and property access, do not seem to have been factors fully taken into account when considering the commercial framework even though both were acknowledged throughout as being Transpower risks.

(c) Our view is that whilst alliance contracts are suitable for managing project uncertainty; in the form adopted by Transpower, the PAA did not have appropriate provisions for managing the fundamental change in construction scheduling arising from regulatory consent delays and disjointed provision of land access. As risk owners for regulatory consents and land access, post-contract cost risk associated with these risks would normally expect to lie fully with Transpower.

43 The E&P report recognised the importance of establishing a relationship based commercial framework rather than attempting to overlay relationship principles to an existing construction contract. Beca also highlighted the benefits of relationship frameworks citing "*This style of contract can work well where two or more parties with similar cultures and corporate*

*governance arrangements establish a sound commercial relationship based on achieving a specified outcome within a specific timeframe. This is also appropriate where many risks are non-quantifiable or where design is complex and likely to necessitate a number of changes*." Given hindsight, the decision to adopt a relationship commercial framework may have been made without fully considering:

(a) whether indeed the parties truly had similar cultures and corporate governance arrangements. Experience has since shown that alliances formed between utility companies and construction contractors are not always successful due to differences in the fundamentals driving the partners with utilities seeking to deliver security of supply at the most economic cost and contractors seeking to deliver projects at the best achievable margin; and

(b) whether the risks and uncertainties identified was indeed manageable within a relationship contract. For example, whether the impact of delays in securing regulatory (BOI) consent whilst maintaining a fixed completion date, was realistically something that the contractor partner(s) would accept simply because of the fact that the parties had joint ownership of the risks and solutions in an alliance framework.

## 3.2 The Principles of an Alliance (Relationship) Contract

### 3.2.1 Key Principles

44 The Project Alliancing Practitioners Guide published by the Victoria Treasury Department defines an alliance relationship as

(a) A commercial/legal framework between an "owner participant" and one or more "non-owner participants" (NOPs) for delivering one or more capital works projects, characterised by:

(i) collective sharing of (nearly) all project risks

(ii) no fault, no blame and no dispute between the alliance participants (except for wilful default)

(iii) payment of NOPs for their services under a "3-limb" compensation model

(iv) unanimous principle-based decision-making issues

(v) an integrated project team selected on the basis of best person for each position.

(b) The same guide sets out a number of key features of such a framework

(i) collective responsibility

(ii) no blame (corporate)

(iii) "3-limb" open-book compensation model

(iv) unanimous principled-based decision-making

(v) fully integrated alliance team.

45 Project Alliancing is a fundamental shift in approach to the delivery of major infrastructure projects compared to more traditional contracting models like Engineer Procure and Construct (EPC). Ownership of and responsibility for project outcomes are very much the responsibility of both the client and the contractor, as opposed to the establishment of clearly demarcated responsibilities for project outcomes and risk allocation in more traditional contracts. This shift leads to significantly different language being used in the contract documents (table extracted from seminar [6]slide pack):

| Traditional | Pure alliance |
|---|---|
| The Contractor shall execute and complete the work under the Contract in accordance with the requirements of the Contract. | We will work together in an innovative, cooperative and open manner so as to produce outstanding results….. |
| The Contractor acknowledges and agrees….. that the Contractor will bear and continue to bear full responsibility in accordance with the Contract for the execution and completion of the work under the Contract…. | We will share all risks and opportunities associated with the delivery of the Program except those which we have specifically agreed will be retained solely by the Owner…..<br><br>We will collectively do all things necessary to deliver the Work under the alliance in accordance with our commitments…. |

47 The achievement of a successful outcome is not simply down to getting the right words in the contract. Success is also dependent on the parties establishing a true partnership relationship and then embedding an alliance culture across the joint team established to deliver the project. This is frequently not so easy as it may sound due to the embedded prejudices and historic ways of working that both companies and individuals bring to the table. Typically, significant work needs to be done at the start up of the alliance and regular maintenance of the relationship is required throughout the life of the partnership, particularly when the project faces major cost, programme or technical challenges.

[6] PCI-Aus Seminar -Project Alliancing Learning from the Australian experience, 10 December 2009

48 Successful alliancing also requires the right incentives on both Owner and Non-Owner participants. These are typically commercial in nature and provide both reward and penalty driven by jointly agreed performance measures. A standard "3 limb" model is generally adopted covering:

(a) Direct Costs incurred – the cost of the plant, equipment, materials and resources required to deliver the project outcomes

(b) Indirect Costs recovery (Profit and Overheads) – the cost of the organisation and management to deliver the Directly Costed works (typically a percentage of the Direct Costs incurred)

(c) Pain/Gain Share – a reward or penalty levied, frequently against the Profit and Overheads, with the level determined by the Direct Cost performance of the project against agreed benchmark levels. This can be further varied by performance against other non-financial measures as agreed by the parties.

Successful alliance working requires the client to provide every support for the contractor to outperform against Direct Cost targets and secure access to Gain share. Again, this is a fundamental shift in client-side thinking compared to traditional contracting where the client is generally looking to minimise the cost of the project by controlling cost variations.

49 Alliance working also requires a fundamentally different approach to project governance and the establishment of clear accountabilities. Typically, this is achieved by setting up a joint Alliance Leadership Team (ALT) with clearly defined accountabilities and delegations of authority, the former being set out in the Project Alliancing Agreement (PAA), the latter being derived from the client financial delegations framework. It is the responsibility of the ALT to create and foster the right culture and relationships within the alliance and to provide guidance and direction to those charged with delivering the project.

### 3.2.2 The NIGUP Alliance

50 The NIGUP approach to alliancing generally demonstrated good industry practice in establishing the Northern Grid Alliance. In reviewing the PAA, a clear set of Alliance Principles were in place and were supported by defined Alliance Objectives [7]aligned to achieving the project goals.

51 The PAA provided for the level of co-operation and collaboration necessary to establish the culture and ownership for the project.

52 The Commercial Framework established was based upon the "3 limb" model and contained a pain/gain provision to incentivise achievement of the project against the agreed Target Cost Estimate including Profit and Overheads. The establishment of the baseline Target Cost Estimate failed

[7] Project Alliance Agreement – North Island Grid Upgrade Project, September 2008

to adequately reflect the level of uncertainty regarding land access and the lack of definition of ground conditions for the project – this is discussed further in section 3.4 of this report.

53 The composition and accountabilities of the ALT were well defined in the PAA and were well executed in the earlier stages of the project. The ALT became more fragmented as the project progressed and project issues led to significant cost challenges to the parties. This is further discussed in section 3.6 of this report.

## 3.3 Establishing the Alliance Delivery Model

### 3.3.1 Establishing a Commercial Framework

54 With Board approval, in 2005 Transpower initiated a competitive process for the construction of the new 400kV overhead line and associated dismantling of the Arapuni – Pakuranga (ARI-PAK) 110kV line which was rendered redundant by the new line. The contract model adopted was a Design & Build based around an Alliancing commercial framework. In September 2007, following Registration of Interest (ROI) and Request for Proposal (RFP) processes, Transpower engaged two proponents, Balfour Beatty United Group Ltd (BBUGL) and Downer Engineering Power Pty (Downer), into an Interim Alliance agreement to bid for the overhead line works. Both proponents were paid $1M to participate. Transpower has stated that this approach provided the following benefits:

(a) Transpower owned the intellectual property in both bids and was able to utilise the best from both offers;

(b) sustainable amounts of design work (especially on towers) and refinement of technical requirements of the SWTC was undertaken during this Interim Alliance phase, representing significant value gains for the project (reducing further subsequent work and risk of claims);

(c) Transpower was able to work with the tenderers before a contract was signed, helping us make a fully informed decision about its Alliance partner;

(d) the tenderers could work from Wellington for the whole period, resulting in a more focused team with regular interactions with Transpower;

(e) the build-ups of the estimates were open and transparent;

(f) the competitive approach applied commercial pressure not present in a negotiated TCE; and

(g) the successful tenderer was familiar with the project and could begin work immediately.

55 We understand the rationale for paying proponents to work up bid submissions in a restricted market to ensure that a competitive environment is maintained for the project whilst protecting the required completion date. Notwithstanding these cited benefits, in our opinion, these costs could have been avoidable due to our expectation of inherent contractor interest in a project of this magnitude. We also consider that, by reducing the competition to two proponents, tendered costs are likely to have been higher and innovation opportunity may also have been lost.

56 In May 2008, the Transpower Board approved BBUGL as the successful party to enter into a Project Alliance Agreement (PAA) and four months later, following a series of risk workshops and negotiation, a contract was awarded to BBUGL to the value of $235M including Profit and Overhead Recovery and Risk Contingency (the Target Cost Estimate (TCE)) for construction of the 400kV overhead line and dismantling of the ARI-PAK 110kV line.

57 We understand that Transpower broadly followed the framework for Project Alliancing as set out in the Victoria Government publication Project Alliancing Practitioners' Guide.[8] The PAA has been reviewed by us and the key points identified are summarised below:

(a) the Agreement is considered to be generally standard in content for Alliance-based contracts with a strong focus on collaborative working and clearly stated principles and objectives; and

(b) the organisational structure defined is typical with an Alliance Leadership Team (ALT) having supervisory responsibilities and an Alliance Management Team (AMT) having day to day operational responsibilities. Membership of both teams is drawn from both parties and we are advised that these appointments were made on a 'best for the project' basis.

(i) We note that, subject to unanimous agreement, the ALT was given delegated authority to approve project scope changes within the value of the contract. We view this to be an unusual accountability to be given to an ALT and consider that fundamental matters such as scope change should be purely a client side responsibility. This is also not an approach advocated in the Project Alliancing Practitioners' Guide 2006. In our view, Transpower's interests would have been better served by reserving the right to approve scope change; leaving the ALT to act more as a governance and supervisory oversight body for the Alliance with specific responsibilities relating to establishing culture, setting direction and resolving operating disputes arising between the parties.

[8] Project Alliancing Practitioners' Guide – April 2006 published by Victoria Government Treasury Department

(ii) The allocation of AMT roles between Transpower and BBUGL is typical of the approach taken in Alliances at the time. The Alliance Manager, however, was also a BBUGL manager, which could have made it more difficult for the Transpower managers to secure its interests at times of disagreement.

(c) We believe the inclusion of an independent Owner's Engineer role in the process to be good practice as this provides a technical assurance function in the management of design acceptance and scope change. We understand that, subsequently, the individual fulfilling this function was directly employed by Transpower and the benefit of the independent assurance function role was lost to the organisation.

(d) The PAA puts an obligation on Transpower to provide Site Access to enable the Alliance to execute the works by the Date for Completion. The only condition to this obligation was covered by the requirement that Transpower and the Alliance parties must comply with any regulatory works approvals. This could be deemed to include delays in the provision of Site Access which may also result in the Date for Completion no longer being achievable. This omission could be interpreted as an open ended commitment on Transpower to accept 50% of any (reasonable) contractor's costs necessary to accelerate the works to meet the Date of Completion from the time Site Access is provided, the other 50% being taken by the contractor as a withholding of POH entitlement. However, it is apparent BBUGL did not take this interpretation with regard to its contribution, which accounts for a significant amount of scope change submissions related to these factors.

(e) Whilst we understand that in reality, until the POH withholding commenced, the parties did work collaboratively on matters related to these two factors, the documents reviewed indicate that the tone of the relationship changed at that time when BBUGL recognised that it was not going to achieve the expected contract margins. This related to risks that are likely not have been considered to be jointly owned or within its control. It is likely that this was a major factor that led the contract into dispute and eventually left the outcome in the hands of an independent expert. It is reasonable to assume that the appointment of a different expert may have resulted in a less favourable outcome for Transpower. This could have resulted in the financial risk (due to the wording in the PAA) materialising. Indeed our discussions with Transpower indicated that management engaged with this aspect did not feel secure in its position and had prepared for a less favourable outcome.

(f) The PAA includes typical standard terms and conditions in regard to many aspects of project delivery including health & safety, environmental management, quality management, completion,

subcontracting, training, payments and ownership. The more generic aspects of the PAA including insurance, indemnities, termination, default, remedies, care of information and documentation have not been reviewed by us in any detail during the study.

(g) The PAA includes a clear position that there will be no arbitration or litigation on any disagreement although the assistance of any person may be engaged to achieve resolution. Although this is the standard approach as described in the Project Alliancing Practitioners' Guide 2006, we consider that the lack of a clear path to arbitration, as is a standard feature of the internationally accepted NEC and FIDIC forms of contract, could be a factor in the apparent breakdown of relationships during the later stages of project implementation.

58 A key element of any Alliance Agreement is the performance incentives included which are designed to drive the behaviours of the Alliance parties. Well-designed incentives, when aligned to the right key result areas and effectively monitored and reported, can heavily influence project outcomes and aid successful project implementation. The PAA incentives framework would appear to be based upon the 3 limb model as described in the Project Alliancing Practitioners' Guide 2006, incorporating reimbursable, profit/corporate overheads (fee), and a pain/gain share mechanism.

59 We have reviewed the PAA incentives framework and have observed that:

(a) The reimbursable element (limb 1) was valued at $202.2M actual cost plus $2.7M risk allowance. This risk allowance of 1.3% of actual costs is considered to be very low for a project of this nature, notwithstanding the fact that $21.5M of remeasurable elements reflecting higher risk aspects were included in the actual cost. BBUGL is eligible for recovery of 100% of all direct costs in the event of cost overrun, irrespective of responsibility. Although this is one of the underpinning principles of Alliance working as defined in the Practitioners' Guide 2006, our opinion is that this should only apply for efficiently incurred costs in a Value for Money framework with the Cost Auditor being accountable to determine 'efficiently incurred'.

(b) The level of profit and overhead (POH) (limb 2) was set at 15% of the Actual Costs. We consider this a reasonable level and consistent with international practice. It is unclear whether Transpower undertook an Establishment Audit to determine the POH or whether it was based upon the tendered submission and negotiation. POH at the agreed rate can be earned on all approved scope changes that increase the Target Outturn Cost (TOC). The POH percentage is not applied to limb 1 risk contingency but this was a relatively low sum in the PAA.

(c) The pain/gain share element (limb 3) appropriately puts 100% of POH at risk due to poor performance and provides a mechanism

to reward cost outperformance. As was the case, the pain share was equivalent to a 50% reduction in POH value associated with Actual Costs exceeding the TOC including all approved scope changes.

(d) The Overall Performance Mechanism (OPM) provided access to an additional $1M pool subject to performance against Key Result Areas (KRAs). At 0.5% of the Actual Cost, we consider the pool was too small to strongly incentivise outperformance and is unlikely to have influenced the AMT decision making when determining prioritises for the project.

### 3.3.2 Roles & Responsibilities

60 Transpower Governance Framework

(a) The governance framework for NIGUP was defined by the Transpower Project Governance Design Document and the NIGUP Programme Management Plan. For NIGUP the governance framework was further modified to separate the role of Programme Owner into an Executive Programme Owner (EPO) and an Investment Programme Owner (IPO) to reflect the need to focus on both the investment drivers and the project delivery. It is understood this approach has now been adopted across all Transpower projects.

(b) The EPO and the IPO are charged with providing direction to the Project Director, reporting on activity to the CEO and receiving regular reports from the Project Director. They are advised by the Project Advisory Team (PAT). Whilst the EPO has accountability for the delivery of the programme, the IPO is solely accountable for the approval of programme changes which require further release of funds or require further regulatory approval. We note that the IQANZ Audit of NIGUP published in September 2009[9] identified that the PAT had not been established at that time increasing the pressure on the Project Director to carry out one-to-one stakeholder engagement. This was noted to have been resolved in the March 2012 Audit report[10].

(c) Following responses received to information request DS-21-0606 and discussion with the CEO of the time, we have concluded it to be likely that NIGUP was not being delivered in accordance with the stated governance framework. During the early stages of the project, the Grid Manager Development was appointed in the IPO role but we understand that this was changed at some point when

[9] NIGUP - Independent Quality Assurance Report Health Check Review - September 2009
[10] NIGUP - Independent Quality Assurance Report Follow Up Health Check Review – March 2012

the CEO took on this role and effectively line managed the project through the GM Grid Projects who was also the EPO. In doing so, the EPO effectively could bring scope changes directly from the ALT to the highest delegated authority for the project without a need to engage with the PAT. Furthermore, with both the GM Grid Projects and the NIGUP Project Director as members of the Alliance Leadership Team (ALT), we consider the benefit of the multi-layer governance model and line management tiers of delegation was, at least in part, negated. The non-owner participants of the ALT (BBUGL) would, by default, look to the most senior member of the Transpower representation for decisions, knowing that individual was the appointed Project Owner and had full delegated authority for the project from the CEO. We are of the view that this effectively would have reduced the impact of the Project Director in the overall governance structure and line management by removing at least one layer of decision making. We note that the whole question of project governance was raised in each of the IQANZ Reports and, in our view, was never satisfactorily resolved during the life of the project.

(d) Our view on governance is further supported by the fact that the Board Papers dated 13 June 2011 and 14 May 2012 seeking approval for increases to the NIGUP approved budget were both submitted by the GM Grid Projects who was the EPO with countersigned approval of the CEO. Whilst not necessarily implying that the EPO was acting as the IPO for the project, with the lack of a senior manager acting in the IPO role below the CEO, the EPO was able to make representations to the CEO for decisions without the independent IPO assessment, leading to potential conflict of interest situations. We consider that the Transpower governance framework with separate IPO and EPO within the business functions below CEO level would have provided governance more aligned to the design intention. We are also of the opinion that the breadth of responsibilities placed upon the GM Grid Projects as NIGUP Project Owner, Programme Owner (EPO), Project Sponsor, chair of the PAT, senior member of the ALT, along with day to day line management of Grid Projects, was likely to have resulted in dilution of senior management focus on the project as a whole and the potential for loss of rigorous control of the activity being delivered in the Alliance. We are aware that Transpower disagrees with our opinion regarding the governance of the project but we stand by our view that delayering of the governance model and the requirement for key senior players to wear multiple hats has inherent risks with significant potential to adversely affect the outcome of such a complex project.

61 Alliance Governance Framework

(a) The Alliance operated as a separate commercial entity under the terms of the PAA with the ALT and AMT discharging the functions

set out in Schedule 9, working in accordance with the Alliance Principles and Objectives set out in Schedules 3 and 4 respectively. Whilst the principles and objectives are typical and in accord with the Project Alliancing Practitioners' Guide 2006, they are generally difficult to objectively measure.

(b) The PAA defined the Target Outturn Cost (TOC) for the project, which was seen as the limit of the ALT delegated authority. A Change Control mechanism which allowed adjustment of the Target Cost Estimate (TCE) was set out in the PAA and was applied diligently for much of the project; however, in the later stages, change management seems to have reverted to a more traditional claims management approach with a backlog of changes being wrapped into a negotiated settlement. It is Transpower's view that there was a fundamental difference of opinion on what Change Requests constituted scope change and how the risks being managed by the project should be allocated between the parties.[11]

(c) Subcontractor engagement, materials procurement and supplier payments were governed by BBUGL processes and were subject to periodic audit. Sample reports have been reviewed by us and are considered to be of an acceptable standard.

## 3.4 Operating the Alliance Model

### 3.4.1 Programme Management

62 The overhead line sub-project programme was subject to extensive change and almost continuous revision due to the following factors:

(a) delay in securing BOI regulatory approvals (14 months),

(b) delay in securing property acquisitions (ongoing during 2010); and

(c) delay in securing land owner agreement for accesses (final easements secured July 2011).

[11] Response to Commerce Commission Question Q012

63 These issues resulted in significant delays to the programme compared to the Baseline programme at the time of awarding the Alliance contract (September 2008):

***Table 1: Programme delays vs Award Programme***

| | Delay compared to Award Programme (Days) | | |
|---|---|---|---|
| | NIGUP Baseline (~July 2009) | NIGUP Stringing (~June 2011) | NIGUP Final (~Jan 2013) |
| PAA Sign-off | 78 | 412 | 412 |
| Site Set Up Start | 183 | 213 | 213 |
| Foundations Site Start | 113 | 235 | 235 |
| Foundations Site Finish | 147 | 482 | 647 |
| Tower Erection Start | 116 | 198 | 198 |
| Tower Erection Finish | 337 | 392 | 510 |
| Stringing Start | 313 | 495 | 500 |
| Stringing Finish | 375 | 553 | 563 |
| OHL Commissioning Date | 364 | 512 | 546 |
| | | | |
| ARI-PAK Dismantling Start | 231 | 553 | 553 |
| ARI-PAK Dismantling Finish | 209 | 334 | 369 |

64 The issues also significantly impacted on the activity durations as illustrated in the following table. The primary reasons for activity duration change are given below.

***Table 2: Impact of delays on activity duration***

| | Key Activity Durations (Days) | | | |
|---|---|---|---|---|
| | NIGUP Award (Sept 2009) | NIGUP Baseline (~July 2009) | NIGUP Stringing (~June 2011) | NIGUP Final (~Jan 2013) |
| Foundation Works | 533 | 567 | 780 | 945 |
| Tower Erection | 570 | 791 | 764 | 882 |
| Stringing | 297 | 359 | 355 | 360 |
| | | | | |
| ARI-PAK Dismantling | 719 | 697 | 500 | 535 |

(a) Foundation activity durations were primarily impacted by:

(i) insufficient programme durations in the PAA due to lack of geotechnical survey data which contributed to failure to establish potential for tomos encountered during construction;

(ii) inefficiency arising from landowner access issues resulting in out of sequence working along the line; and

(iii) the requirement to undertake the works through three winters rather than the Award programme two winters working assumption.

(b) Tower erection activity was similarly impacted by:

(i) insufficient programme durations in the PAA;

(ii) inefficiency arising from foundations not being available resulting in out of sequence working; and

(iii) the requirement to undertake the works through three winters rather than the Award programme single winter working assumption.

(c) Stringing, being dependent on the completion of foundations and tower erection was similarly impacted. The ALT was presented with a number of stringing strategy options in an attempt to recover the programme and an increased resources Supergang approach was adopted which, although not actually recovering the programme, undoubtedly mitigated further slippage.

65 We believe that although the BOI and property acquisition/landowner access delays were significant causes for delay to the programme, the PAA Award baseline programme assumptions originally agreed between the proponents were overly optimistic given the lack of geotechnical information. This would have impacted on establishing the PAA TOC and the risk provisions included therein for foundation works. As the Award programme was jointly agreed, responsibility for any errors lies with both Transpower and BBUGL and the cost of the programme overrun was jointly shared through the commercial pain mechanism. It would be expected that BBUGL, as a competent contractor, would have given careful consideration to a deliverable programme at the time of tendering for the work.

### 3.4.2 Change Management

66 The PAA established a robust change control process for the project with evidence provided that this was complied with during the early stages of the Alliance. Changes were prepared within the Alliance, subjected to challenge and review at AMT level against the PAA provisions, reviewed by Transpower to establish entitlement, cost audited against agreed schedules of rates and submitted to the ALT for consideration. Changes were recorded in a Summary Log[12] and the decision of the ALT noted.

67 Transpower has advised that the Change Request process was maintained throughout the project but as of Q2 2013, with $98.3M of Change Requests tabled and only $34.8M agreed for adjustment of the TCE, there was a difference of opinion between Transpower and BBUGL regarding the interpretation of what constituted scope change in the PAA and, as a result, $63.5M of unresolved changes were not determined by the ALT. The reasons for this difference of opinion cannot be readily established without direct engagement with BBUGL but are likely to include:

(a) loose definition of scope change in the PAA,

(b) failure to fully establish the allocation of risk in the contract,

(c) belief by the Alliance, certainly at least one party to the Alliance, that the key driver was the project end date and changes in working methods to achieve this could be considered scope change;

(d) inadequate financial provisioning to undertake the scope of works due to difficult negotiation at the time of contract award;

(e) recognition by BBUGL that its expected contract margins were not going to be achieved; and

(f) a view from the BBUGL perspective that the collaborative partnership working as espoused in the Alliance Principles had come to an end.

68 Under the terms of the PAA, BBUGL would always receive the direct costs of undertaking the works. Payment, however, of the POH component of BBUGL costs was stopped when the Actual Costs exceeded 90% of the adjusted TCE and would only restart once 100% of the POH ($30.3M) had been withheld. This was noted in the quarterly cost audit report prepared in January 2012[13]. A total of $17.5M of POH was not approved under the pain share mechanism between January 2012 and January 2013. We believe it is not unreasonable to link the commencement of the apparent breakdown in relationships with the implementation of POH withholding under the PAA.

[12] Alliance Transmission Line Scope Change Register provided in response to Request DS-06-0306
[13] Rider Levett Bucknall Cost Audit Report No 37 dated 20 January 2012

69 The ALT held delegated powers to approve scope changes up to the value of the adjusted TCE. We note that January 2012 was also the time when the Actual Costs exceeded the adjusted TCE so therefore had no further delegated power under the agreement. BBUGL would have seen this as further reinforcing its view that it was not going to make the margins originally expected from the project and was potentially going to make a loss.

70 With the breakdown in the PAA Change Management Process and the project nearing completion, the parties determined to seek a negotiated settlement in relation to the $63.5M of unresolved changes requests. After an initial offer by Transpower of $30.6M was rejected by BBUGL and a counter position was rejected by Transpower, in accord with the PAA, an independent expert was engaged. The expert determined in favour of the Transpower position and BBUGL agreed to settle at this figure resulting in a total TOC adjustment of $65.4M against a $98.3M value sought through submitted change requests.

71 We support the approach taken by Transpower as provided in the robust description[14] of the process that was applied in considering the unresolved changes including making provision for the cost of defending a legal challenge and the potential commercial risk of change requests decisions taken being overturned.

72 We are further of the opinion that the breakdown in the Alliance relationship may have had its roots in the original failure to fully establish a collaborative culture. The reasons for this are potentially many but amongst them we understand that the initial start-up workshops were not particularly productive; a culture of ‘us and them’ emerged quite early, and cultural development and communications plans were established but do not seem to have been followed through. In addition, the relationship may well have been strained from the outset by Transpower’s efforts to secure the lowest cost project solution through failure to fully value the risks and uncertainties of the project, as evidenced by the very low risk contingency applied, which in our opinion would not have emerged from a robust P90 risk register assessment.

### 3.4.3 Project Cost Management

73 Transpower applied a project management standard approach to cost management, establishing a challenging baseline position for the project, reflecting the tender submission provided by BBUGL. As discussed previously, the valuation of the significant risks, particularly relating to foundations and landowner related programme delays identified prior to the establishment of the Alliance was understated, meaning that BBUGL,

[14] Transpower Response to Strata Request DS-30-1606 SQ

having won a competitive process to secure its place in the Alliance, was unlikely to have sufficient funding to complete the project.

74 Whilst the full magnitude of programme delays could not necessarily have been foreseen by Transpower at the contract award stage, we consider that the risk contingency agreed at the time was unrealistic given the number of outstanding land agreements still to be secured. In addition, our view is that level of cost provision for remeasureable elements can only be considered to be optimistic given the lack of geotechnical survey data.

75 Furthermore, we note that at least one of the cross submissions made reference to the significantly increased element of the work due to the incidence of tomo on tower foundations. One cross submission contained the following comment '*Given the well-known volcanic ash composition of the southern Waikato, tomo formation should have been anticipated and a mitigation strategy designed and costed in the approved budget.*'. If this was the case, it would provide further support for the view that the valuation of the significant risk relating to foundations prior to the establishment of the Alliance was understated. In fact it begs the question that initially, some base expectation of the requirement should have been built into the scope with a risk margin set above that element.

76 In taking the above points into account, we consider that, if Transpower had a reasonable expectation that the BBUGL offer, post negotiation, was insufficient to undertake the works, in the spirit of alliancing, Transpower should have refused to enter into the PAA. As evidenced further down the project, when the costs became challenging, the parties reverted to more traditional client-contractor roles. We are advised that the unsuccessful alliance tender was of a similar value. If this is the case, this information reinforces our view that the basic assumptions provided for the costing of the project were flawed.

77 A budget for non-Alliance costs was also established as set out in the NIGUP Project Management Plan.

78 The Australian industry standard 3 limb approach for alliance cost modelling was applied in accordance with the Project Alliancing Practitioners' Guidelines 2006, resulting in a significant element of the POH being withheld due to Actual Cost overrun.

79 Transpower confirmed that project cost curves were prepared as part of the monthly reporting pack – examples at key stages of the project were provided. As expected, this reporting included comparison of budget (TCE and adjusted TCE), Actual Costs to date, Anticipated Outturn Forecast and Variance to Budget. The level of detail on the tabled cost curve samples illustrates evolving maturity of cost reporting during the course of the project.

80 Issues were flagged in the IQANZ Report regarding forecasting capability during the earlier stages of NIGUP including issues with the Alliance forecasting, particularly in regard to forecasting against risk provisioning. Transpower and the Alliance addressed these concerns by changing a

number of senior personnel and by the introduction of Earned Value reporting which captures the value of risk in its approach.

81 Transpower non-Alliance costs were captured monthly and added to the Alliance reporting data to provide a view of the total cost of the project for submission to the CEO and Board in accordance with the NIGUP reporting process described in Transpower's response to Commerce Commission Question #003.

82 Monthly cost audit reports were provided to Transpower by the independent Cost Auditor, Rider Levett Bucknall. (Sample quarterly reports were provided to us for review[15]). These reports primarily covered an assessment of invoices, timesheets and expenses to confirm conformance with the PAA, along with a recommendation on interim payments to be made to BBUGL. The reports also highlighted areas of ongoing concern and provided warnings when project budget elements had been exceed by the Alliance. As early as June 2009, the design labour costs had exceeded budget – whilst the design labour costs alone are not a direct indicator that significant cost issues are to be expected, other cost elements also reported budget overruns in the months afterwards, all of which could have suggested that potentially, the project was already heading into difficulty within a year of signing the PAA.

83 There is no specific evidence that the Cost Auditor played any role in challenging the level of the costs being incurred by the Alliance, accepting at face value that the hours booked and costs incurred were necessary costs so long as they were charged at the appropriate rate. There would seem to be a belief that the risk to POH arising from the pain share formula in the event of cost overrun was sufficient incentive on BBUGL to avoid over allocation of resources to the project.

84 We consider it to be likely that BBUGL believed that cost overrun arising from work programme fragmentation should have been recovered through the Change Request process given the magnitude of the programme delay and the collaborative approach within the AMT and the ALT in the early days of the Alliance. In our opinion, in the spirit of Alliancing, this position should have been made clearer from the outset providing BBUGL with a fully understood basis to make project delivery decisions.

85 We are also consider it to be likely that there was a hardening of positions around the ALT and AMT tables following changes in personnel and the reduction in delegated discretion available to the ALT due to Actual Costs exceeding Adjusted TCE. It is likely this would have been looked on seriously by senior executives in the contractor parties and we note that the Balfour Beatty Managing Director took the opportunity around this time to visit the project.

[15] Response from Transpower to information request DS-12-03

### 3.4.4 Risk Management

86 The decision to utilise a relationship based alliance contract for delivery of the overhead line works was founded upon the premise that this was the optimum strategy given the high degree of complexity, risk and uncertainty associated with such a project.

87 The PAA was negotiated on the basis of the allocation of risks to the party best positioned to manage the risks. To ensure the risks were fully identifiable and understood, a comprehensive risk register was drawn up and evaluated using industry standard techniques by the parties during the set-up phase for the contract. This formed a key part of the negotiation of the PAA.

88 Three elements of uncertainty were costed as reimbursable items in the TOC:

(a) selection of foundation types (although a schedule of standard designs had been adopted to underpin the PAA costing),

(b) land access works at 31 sites where surveys were incomplete; and

(c) HV crossings of Distribution Network overhead lines where there had been a failure to secure engagement (although a schedule of rates had been adopted to underpin the PAA costings).

Whilst treating these as reimbursable due to limited knowledge at the time the PAA was prepared, there was no additional risk provision provided for these higher risk activities beyond the basic risk contingency in the TOC.

89 An Alliance Risk Management Plan was prepared setting out the roles and responsibilities of the Alliance Manager and Risk Owners. Regular Risk Review workshops were used to ensure adequate understanding and ownership of contingent and emerging risks.

90 Industry standard risk management tools were utilised and a reporting framework existed to ensure major risks were escalated through the ALT to the Transpower Project Owner, the CEO and the Board. Risk registers prepared within the Alliance are very detailed but there is a risk that high priority risks cannot be easily identified and tracked from the registers. We believe the extraction of project Top 5 or Top 10 open risks for management attention would provide better visibility of critical issues.

91 We have reviewed the risk reporting contained within typical monthly ALT packs[16] and are of the opinion that the nature of the risks presented and the commentary provided would be insufficient to draw the necessary ALT response to the challenges being managed. It has been unclear whether the ALT report or an extract of this report was used for upward reporting in Transpower. If this was the case, then it is likely that the Project Owner

[16] Northern Grid Alliance Monthly progress Reports – December 2010 and September 2012

(EPO) would not have had sufficient detail to adequately brief the CEO and Board on key risks and issues other than information captured during the ALT discussion.

92 At a NIGUP level, the IQANZ Report of March 2012 presented a Green status to Risk & Issues Management whilst identifying that the Risk Register provided was dated July 2011, some 8 months earlier, which did not accurately reflect the risk and issues seen in their fieldwork. This was potentially an indicator that the risk management process was not providing sufficient visibility to Transpower of the risks being managed in the Alliance. Given the issues that the overhead line project was facing during 2011 and 2012, we believe that this issue should have been flagged as Amber or Red as there were signs that the Risk Management Process may have broken down at that time. Interestingly, the IQANZ Report of September 2013 did retrospectively flag a number of deficiencies in the risk management process.

### 3.4.5 Reporting

93 Reporting requirements for NIGUP were well defined in the Project Management Plan including the cascade of reporting through the Project Director, the Project Owner and on to the CEO and Transpower Board. We have reviewed the Standard Report Form template contained in the Project Management Plan but consider it may have been beneficial to establish a standard format for structure and content of reporting at different hierarchy levels in the project to ensure common understanding and consistency of reporting.

94 Having reviewed two sample monthly ALT reports, at 55 and 77 pages in length respectively, it is evident that the Alliance Manager provided comprehensive reporting upwards to the ALT covering all aspects of the Alliance activity, we are of the opinion that whilst these reports do contain a one page Executive Summary, there is a risk that the volume of material provided to the ALT precluded focus on the most significant risks and issues.

95 In reviewing the form and sample content of internal Transpower Divisional Reporting from the GM Grid Projects to the CEO and which we understand was incorporated for onward reporting to the Board: we are of the view that, although broad in nature, the volume of information presented is likely to have resulted in the key messages being lost to the recipients. There is little to highlight the significant risks facing NIGUP despite the criticality of the project to the New Zealand electricity infrastructure and the unfamiliar contracting model used to deliver the project. Although a Red/Amber/Green (RAG) approach is included, the relevant significance and required detail is often lost due to the high number of Red flags contained in the tabular data.

96 Based on the two ALT reports reviewed and other material provided, we would make the following commentary on reporting of the overhead line project:

(a) scope change – robustly captured in a Summary Log which was included in reporting packs (noting that the Change Request decision making process appears to have broken down during late 2012/early 2013);

(b) programme – comprehensive programme progress reporting was included but there is an absence of programme milestone tracking and/or progress against Gantt charts. Due to the significant delays and fluidity of the programme, it is understood to have been re-baselined a number of times. These events could have provided the basis for establishing baseline milestones against which overall progress could be reported;

(c) operations – very detailed and comprehensive reporting was included. The level of detail provided is considered more appropriate for AMT reporting rather than ALT and as such could have become a distraction in ALT discussions as engineers tend to be attracted to solving operational problems when these are presented to them;

(d) costs – comprehensive financial/commercial commentary was included, supported by graphical and tabular information;

(e) risks – as discussed in 3.4.4 above, although a section was included in the report on risks and issues, the content is considered to be lacking in breadth and analysis;

(f) H&S – comprehensive H&S reporting was included with both graphical and tabular data supported by a commentary;

(g) environment - comprehensive environmental reporting was included with both graphical and tabular data supported by a commentary; and

(h) quality - comprehensive quality reporting was included which highlighted audits and inspections completed and provided commentary on issues for resolution.

## 3.5 Project Outcomes

97 As indicated previously, the overhead line sub-project was completed 11 months late and at an Alliance construction cost of $331.6M, some 40.8% above the original Target Cost Estimate.

98 The project delay was due to a number of reasons but the most significant issues were:

(a) delay in securing an outcome to the BOI regulatory process (14 months), leading to cost escalation for major materials purchases compared to the baseline Alliance assumptions;

(b) delay in securing land accesses from property owners (final easements were signed 34 months after award of the Alliance contract), leading to extensive out of sequence construction works, continuous programme changes and increased winter working to accommodate late changes in access provisions; and

(c) underestimate of tower foundation ground conditions at the time of contract award due to lack of geotechnical surveys arising from failure to secure land access (typically illustrated by foundations being, on average, 40% deeper than planned and requiring 155% more materials to construct.

99 The actual costs incurred by the Alliance, as invoiced and audited by the Cost Auditor, totalled in excess of $343.8M; however, at completion, only $34.8M of change requests had been approved by the ALT, adjusting the approved TCE to $275.2M, with a total of $63.5M of submitted scope change requests unresolved. Due to the pain share element of the contract, Transpower had already withheld $17.5M of POH to offset against the Alliance actual costs.

100 The breakdown in the Alliance processes and the failure to agree treatment of the unresolved change requests led the parties into a more traditional contract negotiation position which, following involvement of an independent expert, led to the parties agreeing a settlement value of $331.8M including $18.8M of POH contribution after write-back of $19.2M of POH previously paid.

101 BBUGL took a significant hit in the negotiation, conceding $32.9M of scope change requests, effectively reducing its margin derived from POH from a planned 15% to 6%. In our experience this level of margin for a project of this magnitude is sustainable for the contracting industry and may make major contractors cautious in future interactions with Transpower.

102 In the Transpower application to the Commerce Commission seeking an increase in the Major Capital Allowance (MCA) for NIGUP[17] and clarified in response to Commerce Commission Question #014 dated 13 December 2013, Transpower has acknowledged deficiencies in the planning of NIGUP which contributed to the late provision of land accesses and consequential increased costs incurred by the Alliance resulting in the overhead line costs being $17.7M higher than they would have been otherwise. Whilst the assessment of these increased costs is somewhat subjective, it is certain that Transpower's actions did have an impact on the project outturn cost.

[17] NIGUP Application for Increase of Major Capital Allowance – September 2013

## 3.6 Governance

### 3.6.1 The Transpower Governance Framework

103 The programme governance for NIGUP was based upon the Transpower Project Governance – 17 August 2009 document. This was modified for NIGUP to separate the Executive Programme Owner (EPO) role from the Investment Programme Owner (IPO) role and to reinforce the concept of the Project Advisory Team (PAT) of which both the EPO and IPO are key participants. The IQANZ Report of September 2009 identified that the PAT had not been established for the project and recommended action to address this non-compliance. This action was closed in the March 2012 follow up report.

104 Financial authority to commit the project was approved by the Transpower Board in October 2006 up to a P90 based Maximum Approved Cost (MAC) of $824M. Additional Board approvals were secured in June 2011 and May 2012 to increase the MAC to $894M due primarily to cost and time overruns in the acquisition of property and construction of the overhead line works. The delegated authority for authorisation of NIGUP expenditure was given to the CEO.

105 Under the same Board approvals, the PAA TCE was increased from $235M to $345M (MAC increase from $340M to $402M) to reflect scope changes previously approved by the ALT plus a best view of the Actual Costs to Completion of the overhead line project. The TCE provides the cap on the authority level of the ALT to determine scope change.

106 Transpower established Financial Delegations of Authority for the Grid Projects Team and these were published in the NIGUP Project Management Plan. We have not carried out any review of the application of financial delegations within the project.

107 Transpower established an annual audit programme which is Board approved and which can be supplemented by additional audits at the Board's request. The three IQANZ Audits of NIGUP were established under this process, the third being an additional audit requested to review the close out of the project. Given the magnitude and importance of NIGUP to Transpower, coupled with the issues that the project team were dealing with, particularly on the overhead line sub-project, we are surprised that these audits were only carried out in September 2009, March 2012 and September 2013 and we are of the opinion that there should have been at least annual audits carried out to provide assurance that the management processes were operating effectively. Interestingly, IQANZ were of the same opinion in their 2013 report,

108 We have reviewed the Transpower governance framework as applied to NIGUP and make the following observations and commentary:

(a) the governance framework is well documented with clear roles and responsibilities for participants;

(b) the adoption of the split Programme Owner role and the implementation of the PAT was delayed and could have provided increased clarity of responsibilities during the initial stages of the project;

(c) Whilst the EPO role was always identifiable and directly involved in the project decision making, the IPO role does not seem to have been well adopted or as clearly identifiable as to who was undertaking the role during the project. As discussed in 3.3.2 above, we understand the IPO responsibility was moved from the GM Grid Development to the CEO during the project to achieve clear accountability for the management of scope change, however, this change may have had the undesirable consequences of compromising the governance framework for the project and, as a result, not delivering the perceived benefits of the governance framework design above those provided solely by line management reporting.

(d) The breadth of the GM Grid Projects' responsibilities during the project may have been excessive, being simultaneously Programme Owner for NIGUP (EPO), member of the PAT, member of the ALT (including Chair for a period), General Manager for his department, and line manager of a number of senior staff including the NIGUP Project Director. This could have led to his attention being divided with potential loss of focus on the critical Programme Owner role.

(e) The inclusion of the GM Grid Projects on the ALT effectively eliminated a layer of issue escalation for the Alliance. Once an issue had been raised at the ALT, the obvious route for escalation would have been the Project Director, but as the GM Grid Projects was also his reporting manager, the Project Director was, in our view, effectively excluded. The only channel for resolution was direct to the CEO in the event that there was a breakdown between Transpower and BBUGL at ALT level.

### 3.6.2 The Alliance Governance Framework

109 The Alliance was governed by an Alliance Leadership Team (ALT) comprising up to three senior representatives from each of BBUGL and Transpower. The ALT was the key management mechanism, receiving monthly reports and approving commitments, within delegations set by Transpower and BBUGL themselves. Transpower ALT members received no delegations greater than those contained in the Transpower delegated

authority, and converted key decisions into the applicable Transpower technical and financial process[18].

110 The ALT worked within the governance frameworks of both Transpower and BBUGL. Procurement activity was governed by BBUGL but commitments were reviewed by both companies. Financial payments were made by Transpower to provide separation of roles.

111 We understand that ALT was an effective body during the set-up and early delivery stages of the project but by reviewing the attendance at ALT meetings later in the project, there was an evident reduction in attendance and the use of deputies which can reduce the effectiveness of decision making. As recorded in the IQANZ March 2012 Report, the situation may have been further affected by an apparent split of the ALT along bi-partisan lines when it became evident that the project was in trouble and the BBUGL margins were going to be impacted by withholding of POH due to cost overrun.

112 The ALT placed day-to-day responsibility for project delivery on the Alliance Manager and also appointed an AMT on a 'best for project' basis.

113 Financial Delegations of Authority were established within the AMT and all commitments that exceeded the DoA of the AMT were escalated to the ALT and/or to the Project Director for Transpower approval.

114 The Alliance established an audit programme which covered both financial and non-financial aspects. A key element of this audit programme was the monthly Cost Audit report which was undertaken against defined the audit plan[19] originally published in February 2009.

[18] Transpower Response to Commerce Commission Q#005 Governance Structure and Delegations
[19] Rider Levett Bucknell – North Island Overhead Transmission Line Project – Alliance Contract Audit Plan – July 2009

# 4 Comparison with international practice (National Grid)

## 4.1 Context of drivers to adopt Alliancing

115 The drivers for adopting the Alliancing approach to delivery of major infrastructure projects are numerous and varied but a number of key reasons are commonly cited:

(a) project complexity and/or lack of scope definition,

(b) significant risks and uncertainties that cannot be quantified at the time of contracting,

(c) the cost of risk transfer is excessive; and

(d) the asset owner has particular knowledge and skills that will aid in implementation of the project.

116 In drawing comparison with the UK National Grid experience, the decision to move from traditional contracting to an alliance approach for the construction of substation, overhead lines and cables works was taken in 2006 against a background of an increasing capital works programme and increasing client side demand for infrastructure works in a relatively steady and constrained supply market. After alliance successes in the gas distribution contracting sector, National Grid chose to establish four substation alliances and two overhead lines and cables alliances. It was intended that, by adopting an alliance way of working for a fixed term to deliver a portfolio of 'to be determined' projects, market capacity would be secured and National Grid would enjoy increased transparency and flexibility in the implementation of the forward programme.

117 In contrast, we understand that Transpower adopted the Alliancing methodology specifically as a means of dealing with the significant risks and uncertainties associated with the construction of a single project, the first and currently only 400kV overhead line in the country, against a background of known opposition and a challenging need date. Transpower sought expert advice in making this decision and adopted the already tested Australian model as defied in the Project Alliancing Practitioners' Guide 2006.

## 4.2 Alliance Contract Establishment

118 Our experience is that there is a fundamental difference between establishing a programme delivery alliance and a single project alliance. In the NG case, after discussion with the contracting community, an indicative programme of works was offered to the market with a view of securing up

to six alliance frameworks. The basis of the offer was to deliver the majority of the electricity transmission capital programme within an allocated geographic area based upon a schedule of agreed rates for personnel. Discounts were requested to secure efficiency for volumes. In contrast to the Transpower arrangement, these Alliances were subject to the internationally recognised New Engineering Contract (NEC)20 terms and conditions, using the Option C model which supported a Target Costing, collaborative working methodology. This approach provided a standard contract framework that was fully understood by all parties.

119 NG did not guarantee an allocation of work but would pick up an element of overhead costs irrespective of volumes. Note that in recognition of a subsequent belief that alliancing wasn't delivering the most economic project outcomes, NG was able to use this principal to introduce two additional overhead line alliances and move part of the work book back into a competitive environment, either through inter-alliance competition or open market EPC tendering. In the longer term, it is expected that NG will not extend the alliancing arrangements and will revert fully to competitive Design and Build EPC.

120 Alliance project cost and overhead submissions were subject to benchmarking both between alliances and, where possible, externally.

121 Indicative work is allocated to Alliances on an annual basis. Until recently, the Alliances undertook project development work so these costs formed the basis of the annual workbook but this was changed when NG established its own development capability and the Alliances no longer determined the scope and cost estimates for the workbook. Alliance performance is assessed through annual reconciliation with any errors or incorrect estimates from prior years generating adjustments in the current year. In contrast, the Transpower PAA operated more as a 'pay as you go' arrangement with a POH element added at the agreed rate until the project reached 90% of TCE. Thereafter, a withholding was made to recover overpayment due to adverse cost performance. We believe that this approach may have contributed to the deterioration in the Alliance relationships as BBUGL would have felt that it was effectively working for a negative margin right at the time when all parties should have been striving for successful completion.

122 Similar to the Transpower contract, Target Costing is carried out on a project specific basis with the contractor's costing subjected to rigorous cost assurance challenge, but in the NG case, this challenge considered not only the application of rates but also challenged aspects of the proposed project solution, the programme and working assumptions.

123 Again, similar to Transpower, incentivisation was achieved through a Pain/Gain share mechanism on a per project basis, but in the NG case, this

[20] The NEC contract framework was created by the UK Institute of Civil Engineers to provide a suite of standard contract terms and conditions.

was reported monthly and valued annually through the reconciliation process. In contrast to the Transpower contract, pain/gain was taken as a 50% share of total cost overrun or underspend against the approved Change Request adjusted Target Cost, further adjusted for non-financial performance against a suite of weighted Key Performance Indicators (KPIs), some having a financial penalty/reward, some not. This is markedly different from the Transpower contract where pain share for increased actual costs is recovered through reduction in the POH margin. In the NG case, the contractor's pain share is not artificially capped by 100% of the POH value.

124 In addition, every year, the NG Alliances are given a cost based Efficiency Challenge which requires year-on year improvement in unit costs for similar activity. Again, a sharing mechanism is established to share the benefits of cost savings. A similar mechanism was not applied in the Transpower contract, relying upon the single pain share mechanism to drive contractor efficiency.

125 A Core Team plus Fee cost model has been applied in the NG contract as an alternative to the Transpower POH methodology. This is likely more to do with the programme based alliance framework where volumes are not guaranteed so there would be a contractor risk of under-recovery of overhead. Under the contract, NG agrees to pay a core team cost irrespective of the volume of work allocated/delivered. This core team cost is adjusted annually to reflect the indicative workbook and is rigorously value and efficiency challenged. This approach guarantees an amount of overhead resource and facilities will be available to deliver the allocated work. The core team does not include project engineering and delivery resource as this is project target-costed. Typical core team cost percentages are 3 to 6% of workbook value. In the Transpower case, for the single project, the volumes were more predictable and all overheads were allocated to the one project.

126 A percentage Fee uplift is applied to all actual project and core team costs to provide margin and profit. This is typically 8 to 12% depending on contractor and contract negotiations. Variable fee percentages were also applied to adjust the fee level for high volumes. Again, this approach was not required in the Transpower contract due to the single project scope and the ability to wrap the fee into the POH.

## 4.3 Alliance Establishment

127 Each NG Alliance was required to implement a standard structural governance framework with:

(a) an Alliance Supervisory Board (equivalent to the Transpower ALT) comprising senior executives from both NG and the contractor party(ies). In contrast to the Transpower approach, this was typically always chaired by a senior NG representative. The Supervisory Board was charged to ensure the effective operation of the Alliance and the application of the Alliance Principles and

Objective but, unlike the case in New Zealand, had no delegated authority to approve Scope Change;

(b) as was the case for Transpower, the Alliance Manager had overall responsibility for the successful delivery of the allocated projects and for ensuring that the ongoing principles of Alliancing were upheld across the wider team. In the early days of NG Alliancing, the Alliance Manager could be either a NG or a contractor senior manager, based upon ensuring the 'best person for the job' was appointed. As a check and balance, the Commercial Manager would always be appointed from the other party. After the first three years of experience, in contrast with the New Zealand approach, NG decided that the client interests would be better served if the Alliance Manager was always a NG employee;

(c) similar to the Transpower contract, an AMT was appointed with personnel selected from either NG or the contractor with appointments made on a 'best person for the job' basis. All appointments required Supervisory Board (ALT) approval. The AMT had responsibility for day to day management of the Alliance including programme management, design, operations, health safety & environment, commercial and financial performance. AMT organisational structures were broadly similar; and

(d) all AMT level roles & responsibilities were agreed and signed off by the Supervisory Board.

128 We note that, with full approval of the ALT on a 'best for project' basis, the Northern Grid Alliance AMT organisational structure was changed significantly during the course of the project, shifting from separate Programme and Construction functions to a single Operations function directed by a Transpower manager. We are advised that this change was made for a number of reasons including achieving optimal deployment of skills and experienced personnel. In our opinion, this change may also have been detrimental to the project for the following reasons:

(a) given the fluidity of the programme, clear programme management accountability should have been maintained; and

(b) the absence of a dedicated contractor manager with construction accountability could have resulted in a loss of leadership and direction for the BBUGL project management and construction teams at a time when very clear direction was required.

## 4.4 Programme Management

129 The role of Programme Management in a fixed term portfolio Alliance is somewhat different to that for a single project Alliance. The Programme team was required to track the full portfolio of allocated projects which may have been at any stage from identification through pricing and implementation to commissioning and closure. There was also a requirement to manage the critical network outage interface with the client,

recognising that there was a high degree of interaction between the various delivery vehicle (alliance) programmes and that of the client in its role as system operator.

130 Similar to the initial Northern Grid Alliance structure, the NG Programme Manager was responsible for the client interface and acting as senior client manager where the Alliance Manager was a contractor appointment. In the NG case, project managers reported to the Programme Manager with day to day responsibility for project delivery. They also had strong interfaces with the Construction Delivery Managers (Site Managers) who would inevitably be contractor personnel.

## 4.5 Scope Management/Change Control

131 Similar to the Transpower approach, the NG initial scope of works for each project was worked up by the asset owner function and signed off by the appropriate delegated authority along with the proposed delivery strategy (in-house, Alliance, EPC). This scope was then Target Costed by the Alliance and an initial programme prepared, challenged and finally base lined. This was the equivalent of establishing the Transpower PAA scope and baseline programme.

132 As NG had adopted the NEC Option C contract framework, the change control process was fundamentally different. In the UK, any scope variation and/or significant programme changes were subject to the NEC Early Warning Notice (EWN) and Change Request (CR) process. If the EWN was accepted, the Alliance was required to cost the change and identify any resulting programme impact and submit this as a Change Request to NG. EWNs and CRs were initially reviewed by an internal Alliance sub-committee (known as ACREW or Alliance Change Request & Early Warning) which was always chaired by a NG manager where they were either accepted in principle or rejected. We believe that the two stage approach, operating under an internationally accepted contract framework, provides more opportunity to establish clarity about what constitutes scope and programme change and reduces the potential for friction between the parties.

133 Similar to the North Island Grid Alliance, CRs were then reviewed by the AMT, although in the case of NG, these were then submitted to rigorous client side cost assurance (Cost Audit equivalent) before being passed to the asset owner (IPO equivalent).

134 Unlike in the Transpower contract, the NG Alliance Supervisory Board played no part in deciding upon any Change Request but was provided with summary level reporting and could be asked to undertake a 2$^{nd}$ stage dispute resolution role before any differences went to higher decision or formal arbitration.

## 4.6 Risk Management

135 Similar to Transpower, NG required that all Alliances undertook Risk Management in accordance with a standard procedure using industry standard tools. In the UK, three levels of risk register were in place:

(a) Alliance strategic business risks – these were the non-project specific risks that could impact upon the successful operation of the Alliance including factors such as safety, environment, resources, training, procedural change, culture, etc. These were managed at AMT level on a monthly basis, reported to both NG and contractor head offices with significant risks escalated to the Supervisory Board for information/decision;

(b) Programme risks – these were cross-project risks that could impact upon the wider programme of works, e.g. adverse weather, system outages, change in NG policy. These were managed at AMT level on a quarterly basis (plus ad hoc where required), reported to both NG and contractor head offices with significant risks escalated to the Supervisory Board for information/decision; and

(c) Project risks – these were project specific risks relating to the delivery of individual projects. They were managed by individual Project Managers and were reviewed at least monthly, prioritised, and a project top 5 risks identified for the monthly project reporting pack and review by the AMT.

136 This contrasts with the Transpower approach in which the project risk register was the main risk repository, there being no need for the equivalent to a programme risk register. It is unclear whether the Northern Grid Alliance undertook a strategic business risk review. We believe that if this had been included in the risk management process, some of the relationship risks between Transpower and BBUGL could have been captured, valued, and potential mitigating actions established, reducing the likelihood of relationship breakdown.

## 4.7 Reporting

137 We believe that reporting needs to be tailored to the requirements of the project and the contract. In the NG case, the structure and format of project reports evolved during the life of the Alliances but a number of principles were maintained by NG:

(a) reporting was a bottom-up process driven by the base information prepared by the project teams,

(b) Alliance Project reports were subject to challenge and review by individual (ideally NG) project managers; and

(c) standard content included scope, programme milestones, earned value assessment, SPI and CPI indices, health safety &

environment, cost curves, change request information, project top 5 risks, recent audits, current issues and an outlook for the next period.

138 The Northern Grid Alliance reports we have reviewed during the study indicate a broadly similar approach was taken in New Zealand.

139 In the NG case, project reports in a 'Project on a Page' format were reviewed at the AMT meeting and selected projects identified for 'deep dive' inclusion in the Supervisory Board meeting. This reporting format was much more concise than the sample reports reviewed during the study. We are of the opinion that concise reporting would have provided increased opportunity to highlight key issues and ensure that they were recognised in the upward reporting chain.

140 Additional reporting requirements were placed on the NG Alliances including:

(a) Consolidated Project Status Report – provided a monthly rolled up summary level view of all projects in development and delivery (probably unnecessary in the NZ situation given the single project nature of the Alliance);

(b) Project Cost & Value Report – provided a monthly detail view on of project costs (target vs actual), approved and unapproved variations (change requests), allocation of project and programme risk, pain/gain position (a similar report format was included in the Northern Grid Alliance ALT monthly reporting pack); and

(c) Risk Report –provided a monthly view of current strategic, programme and project risks and a Monte-Carlo derived P50 assessment of the impact of the project risks; (again, a similar report was prepared in the Northern Grid Alliance but we believe was condensed excessively before being presented to the ALT).

141 A PowerPoint based report was compiled by respective Alliance functions and consolidated into an AMT reporting pack for review at the monthly AMT meeting. The Northern Grid Alliance ALT report was not dissimilar in content and coverage to the NG AMT pack but did not seem to be in PowerPoint form with a risk that the headline messages were lost in the content.

142 In the NG case, the AMT pack was distilled to provide a highlights report to the Supervisory Board which could also request deep-dives into any specific areas of concern.

143 The Alliance Finance Manager (a NG employee) was required to provide a consolidated Capital Performance Report which provided a project by project view of the finances (Actuals, Forecasts, Accruals) of each project compared to sanctioned sums. This report also captured all non-Alliance costs to ensure the full cost of projects was visible. Given the single project

nature of the Transpower situation, this report was unnecessary and the ALT finance report provided similar content.

## 4.8 Project Governance Arrangements

144 Just like Transpower, NG undertakes construction projects under a formal governance structure covering all investment decision making. Key elements of the NG framework include:

(a) establishment of a robust Need Case including 6 monthly review of Need Case for all open schemes;

(i) we understand that Transpower carry out an annual review of Need Case for every project;

(b) use of a structured optioneering process to establish the optimum solution;

(i) consistent with Transpower process;

(c) approval of schemes in accordance with Delegations of Authority;

(i) consistent with Transpower process;

(d) schemes sanctioned against scope, cost and time parameters;

(e) it is unclear whether Transpower Board approval included a time parameter although the current completion date was always included;

(f) financial approval on a P50 basis within an upper/lower range;

(i) we understand that Transpower Board approval is given up to the level of TCE for the alliance works and this approval was revised twice as the project progressed;

(g) requirement to seek further approval as soon as project scope change is identified and/or when forecast cost to complete or time to complete are outside of sanctioned parameters;

(i) it is unclear whether the timing of additional Transpower Board approval was driven by increases in the Forecast Cost To Completion or whether it related more to the timing of actual costs rising towards the sanctioned contract value.

145 Projects were included in an annual Works Order process (a summarised schedule by project plus core team, fee and efficiency challenge). This represented the planned work for an Alliance but it was understood that the specific projects are indicative until such time that they are formally committed for construction:

(a) due to the single project nature of the Transpower contract, this process was unnecessary; however, we are of the opinion that an

annual client led budgeting process would have increased focus on the progress to date and the plan for the following year.

146 Similar to the Transpower contract, NG Alliances were invited to submit Target Costs and Programmes for specific projects – these may have been directly allocated to a single Alliance or offered to more than one Alliance on a competitive basis. Cost and Programme submissions received are subject to rigorous Cost Assurance challenge and review before forming the basis of a contractual arrangement.

147 Works are committed to an Alliance by way of a formal NG Project Manager's Instruction (PMI) which is signed-off under prescribed Delegations of Authority.

148 As discussed in 4.5 above, in the NG contract, where project scope changes arose, these were subject to the requirements of the NEC Option C formal Change Control process requiring the parties to seek and implement mitigation actions where possible, flag issues through the submission of Early Warning Notices (EWN), and, where a change was confirmed as necessary, a time and cost estimate was requested with the Alliance response subjected to rigorous Cost Assurance challenge and Review. When accepted by NG, a further PMI was issued to the Alliance. As previously described, this approach was fundamentally different from the approach applied in New Zealand where the Australian Project Alliancing Practitioners' Guide model had been adopted.

149 The NG Alliance performance was subject to a Cost Assurance led annual reconciliation process which reviewed actual costs incurred against Target Costs. It also assessed the application of pain/gain against specific projects to determine entitlement for the year, reviewed core team costs and fee levied by the Alliance, and determined whether efficiencies claimed were in accord with the efficiency challenge set out in the Work's Order:

(a) as previously discussed, the Transpower approach was fundamentally different due to the nature of the contracted deliverables. That said, we are of the opinion that an annual cost reconciliation process led by the Cost Auditor would have provided opportunity to establish the Alliance performance and reset objectives where necessary.

150 As is the case for Transpower, NG published an annual programme of audits to be carried out on the Alliances and these could be supplemented by ad hoc audits where necessary.

151 Similar to the Transpower contract, the NG Alliance governance framework was defined in the Alliancing Agreement. The parties agreed to work within the NG processes which were supplemented by the contractor governance processes in specific activity areas, for example procurement carried out by the Alliance, recruitment and training, health and safety, and environment.

152 To protect the parent companies, the NG Alliances generally established a 'No PMI, no work' approach to ensure that there was always clarity of entitlement to payment for work undertaken. Such an approach, if taken in the Transpower contract, might not have been truly in the spirit of alliancing but would have ensured that BBUGL never found itself doing work without financial coverage and could have helped avoid the breakdown in relationships in the latter stages of the contract.

153 Monthly invoices to NG were signed off by the senior NG AMT representative on the AMT (generally the Alliance Manager once this role was prescribed as a NG appointment). Invoices were subject to limited cost audit before submission but were included in the annual reconciliation when detail review was carried out:

(a) this contrasts with the Transpower approach in which full value Actual Costs were invoiced and these were Cost Auditor reviewed for compliance and, where necessary, costs removed from the payment recommendation.

154 Similar to the Northern Grid Alliance, Members of a NG Alliance AMT worked under published Alliance Financial Delegations of Authority but could also hold parent company delegations. The latter were restricted in regard to NG approvals of project scope change and scheme sanction.

# APPENDIX A: Glossary of Acronyms and Abbreviations

| Acronym | Definition |
|---|---|
| 3 limb | A 3 element commercial framework used in Project Alliance Agreements |
| Actual Costs | Actual expenditure incurred to date within a contract |
| ALT | Alliance Leadership Team |
| AMT | Alliance Management Team |
| AOC | Actual Outturn Cost |
| BBUGL | Balfour Beatty United Group Limited (NOP in the Northern Grid Alliance) |
| Beca | Beca Carter Hollings & Ferner Consultants |
| BOI | Board of Inquiry |
| CPI | Cost Performance Indicator |
| CR | Change Request (a change management element of the NEC contract framework) |
| DB | Design & Build (contract) |
| E&P | Evans & Peck Consulting |
| EPC | Engineer Procure Construct (contract) |
| EPO | Executive Project Owner (a role in the Transpower governance framework) |
| EWN | Early Warning Notice (a change management element of the NEC contract framework) |
| FIDIC | Federation Internationale des Ingenieurs-Conseils (International Federation of Consulting Engineers) |
| H&S | Health & Safety |

| Acronym | Definition |
|---|---|
| IPO | Investment Project Owner (a role in the Transpower governance framework) |
| IQANZ | Independent Quality Assurance New Zealand |
| JV | Joint Venture |
| KPI | Key Performance Indicator |
| KRA | Key Result Area |
| MCA | Major Capex Allowance |
| NEC | New Engineering Contract (UK contract model) |
| NG | National Grid Electricity Transmission Limited (UK) |
| NIGUP | North Island Grid Upgrade Project (Transpower project subject to MCA adjustment submission) |
| NOP | Non-Owner Participant |
| Northern Grid Alliance | Alliance between Transpower New Zealand Limited and BBUGL to construct a new overhead line within the NIGUP |
| OPM | Overall Performance Mechanism |
| PAA | Project Alliance Agreement |
| P50/P90 | 50%/90% Probabilistic assessment regarding the expected outturn cost of a project |
| PAT | Project Advisory Team (an element of the Transpower governance framework) |
| PMI | Project managers Instruction (a change management element of the NEC contract framework) |
| POH | Profit and Overhead Recovery (an element of the Alliance commercial framework) |
| RFP | Request For Proposals |
| ROI | Registration of Interest |
| SPI | Schedule Performance Indicator |
| Strata | Strata Energy Consulting (New Zealand) |

| Acronym | Definition |
|---|---|
| TCE | Target Cost Estimate (refers to an entire estimate) |
| TOC | Target Outturn Cost (refers to a single number – the bottom line of TCE) |
| Transpower | Transpower New Zealand Limited |

# APPENDIX B: The reviewers

## Bill Heaps

**Bill Heaps** is Managing Director of Wellington based Strata Energy Consulting. Bill is an electrical engineer, business executive and company director with broad experience in major infrastructure and energy supply businesses. Bill has held senior executive positions in the generation, transmission, distribution and retail businesses.

### Career summary

- Over 35 years' experience in electricity utilisation and supply in director, executive and senior management positions
- Experienced in electricity utilisation, energy efficiency, demand-side management and technology transfer
- General Manager Commercial Services at Transpower, New Zealand's electricity transmission and system operating company
- Manager of New Zealand's Wairakei and Ohaaki geothermal power stations
- General Manager of Energy Brokers a first mover in the competitive electricity retail markets
- Chairmanship of key energy market and operation advisory groups in electricity and gas (e.g. retail, wholesale market, transmission and investment advisory groups in New Zealand)

### Expertise

- Wholesale electricity market – design, regulation and operations
- Electricity Generation – plant management and investment planning
- Electricity transmission and distribution networks, investment, pricing and revenue, asset management systems and performance
- Retail electricity markets –market design, operation and regulation
- Electricity Utilisation – energy utilisation and purchasing for major industrial manufacturing plants and commercial buildings

### Representative experience

- **Market development**: undertaken key roles in the development of New Zealand's competitive electricity and gas markets. Advised government,

regulators and major industries on market price risk management and supply security.

- **Network performance** and management practices: Extensive advice in Australia, New Zealand and Singapore on energy network management and performance. Undertaken several major reviews of electricity transmission and distribution businesses.

## Stephen Lewis

**Stephen Lewis** is an associate consultant with Strata Energy Consulting. He is an electrical engineer who has over 30 years of electricity supply industry experience. His previous career with National Grid plc spanned the UK, the USA, Australia and South America.

Stephen is currently a Director of MainPower New Zealand Ltd., and a Trustee and Chair of Community Energy Action.

Up until August 2006, Stephen was the Commercial Director for National Grid Australia during the final stages of the Basslink HVDC interconnector project between Tasmania and Victoria. Prior to this, Stephen was a Vice President of National Grid USA and headed the transmission business covering the New England and New York states.

Stephen gained additional international exposure and experience in the capacity of Integration Manager for an acquisition activity in Chile. While in the UK, Stephen held numerous senior management roles for National Grid plc in the fields of: maintenance delivery, maintenance and construction planning, network outage management, rights of way management, logistics, network safety management and marketing, sales and customer relations for unlicensed activities. These varied positions and experiences have provided Stephen an extensive knowledge of many aspects of a complex asset intensive industry.

### Expertise

- **Electricity transmission** – Experienced in transmission governance, business management systems and operations, mergers and acquisitions, asset management and integration of processes and systems
- **Electricity distribution** – Experienced in distribution company governance, strategy and policy development and distribution business processes

# David Swanson

David Swanson is an internationally experienced energy sector senior manager and Chartered Engineer with strong leadership capabilities to undertake both strategic and operational roles in both electricity and gas sectors. Currently UK focused but with extensive experience in the Asia-Pacific region in business and project development fields.

David's specialties include energy sector engineering, project management and delivery, strategy, business development and business process design.

## Qualifications

C. Eng, MIET, BSc Hons

## Expertise

**National Grid Electricity Transmission, UK**

**Senior Project Manager**

As Senior National Grid manager working in an alliance partnership with Balfour Beatty Group, David worked on overhead line and cable construction projects to the value of £170m p.a. The role included overall accountability for delivery, and responsibility for leadership of a joint NG and BB management team and in excess of 100 project management professionals.

Key role responsibilities included:

- Leadership of Alliance Management Team (AMT), reporting to Head of Electricity Construction (Overhead Lines, Cables and Substations)
- Line management of typically 25 National Grid project managers, project officers and trainees.
- Delivery of projects to time, cost and quality whilst ensuring client requirements in relation to safety and environmental requirements were achieved by the contractor.
- First line technical and cost assurance to ensure standards were achieved at the right cost to the client – including direct challenge and review of cost, time and scope deviation reported by contractor.
- Named contract Project Manager under the NEC with responsibility for management of contract change process.
- Cost & Progress reporting to client.

Additional roles included:

- Programme co-ordination responsibility for GBP350m project to uprate Anglo-Scottish transmission capacity including 200 circuit km of overhead line uprating, extension of three operational 400kV substations and construction of fast acting Series Compensators and Mechanically Switched Capacitors.
- Project development and delivery strategy responsibility for largest single development project within National Grid at present (connection of 3200MW of new nuclear generation and 1200MW of new gas fired generation) requiring construction of 92 circuit km of new 400kV

overhead line, 18 circuit km of new 400kV cable, construction of two new 400kV substations and extension/reconfiguration of five existing substations. Total project value approximately £800m.

**Cable Delivery Manager**

Responsible for the formation of a team of client-side project engineering professionals with accountability to develop and deliver high voltage cable projects using Engineer Procure and Construct (EPC) contract strategies. Value of projects in delivery was £200m

**Process Design Manager (project role)**

An off-line project role with responsibility to design, develop and secure business wide acceptance of a revised capital delivery process model. The role required working in a collaborative cross-functional environment, application of 6-sigma techniques and extensive business consultation. The role was an integrated element of a wider review of the Company's capital investment environment.

**Programme Manager**

Reporting to the Overhead Lines and Cables Alliance Manager and a leading member of the Alliance Management Team (AMT), responsible for project managing a portfolio of overhead line and cables schemes through to delivery valued typically at £150m pa.

Various roles in Gas Transmission operations, Liquefied Natural Gas asset management and operations, HVDC Interconnector asset management and operations

**Regional Business Development Director, Asia Pacific January 1997 – February 2003 (6 years 2 months)**

Based in Manila, Philippines, responsible for the identification and development of investment opportunities in the Asia Pacific region. Role was predominantly government, regulatory and external client facing with key contacts at Legislative, Cabinet, Ministerial, Regulator and CEO/Director/Head of Department levels, to promote UK experience of electricity and telecommunications sector reform, restructuring and privatisation, and to facilitate the positioning of National Grid as a partner of choice. Responsibilities also included identification and negotiation of project financing options, assessment of investment returns, and organisation structural change requirements

.