GAS INDUSTRY COMPANY LIMITED

Consultation Paper

Cost Benefit Analysis of Options for Switching Arrangements in the New Zealand Gas Industry

16 March 2006

Table of Contents

Page

1 Introduction & Purpose 1

2 Background 2

3 Submission Requirements..... 5

Appendix A: Format for Submissions 6

Annex A: "Cost Benefit Analysis of Options for Switching Arrangements in the New Zealand Gas Industry" Final Report of CRA International; 28 February 2006

1 Introduction & Purpose

1.1 The purpose of this consultation paper is to present the findings of an independent cost benefit analysis that has been commissioned by the Gas Industry Co regarding options for switching arrangements for the New Zealand gas industry. The Gas Industry Co is inviting submissions from stakeholders as to whether they agree with the assessment of this paper or whether there are additional factors that need to be taken into account prior to a formal recommendation on this subject being made.

1.2 It should be noted that this consultation paper relates specifically to the contents of the cost benefit analysis. Therefore, it is requested that all submissions in response to this consultation paper focus specifically upon this aspect of forming a recommendation on developing a central registry option. In relation to any future recommendation by the Gas Industry Co to the Minister on this issue, industry participants shall be consulted on any additional requirements such as design, implementation and governance of a central registry option.

1.3 Stakeholders are invited to study the report from CRA International and to provide submissions to Gas Industry Co on the questions set out in Appendix. A.

2 Background

2.1 The Government Policy Statement on Gas Governance (GPS) states, inter alia, that the Government invites the Gas Industry Co to recommend arrangements, including regulations and rules where appropriate, in the following area:

> *"The standardisation and upgrading of protocols relating to customer switching, so that barriers to customer switching are minimised".*

2.2 The Gas Industry Co has been working with the Switching and Registry Working Group (SRWG)[1] and all industry participants on this issue. The SRWG reviewed previous work undertaken on switching arrangements and provided recommendations to the Gas Industry Co on the options to address switching issues and a preferred switching solution. The SRWG represent a broad but specific level of expertise across of the industry who can advise on current issues arising from switching arrangements.

2.3 The Gas Industry Co identified a number of process issues with the current switching arrangements. These include:

- Inefficient information exchange processes;
- Incomplete access by retailers to key ICP[2] data;
- Lack of rules for updating ICP data;
- Discrepancies in information;
- Lack of compatibility between systems;
- Lack of a governance structure to support and enforce compliance and a complaints resolution procedure; and
- No linkage with allocation and reconciliation processes.

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1 Further information on the Switching and Registry Working Group, including a list of members and their affiliations, can be found on the Gas Industry Co website http://www.gasindustry.co.nz.

2 The term "ICP" or "Installation Control Point" refers to the point at which a premise is deemed to have gas supplied from a gas network.

2.4 These process issues have resulted in outcomes which can be summarised as follows:

- Customer dissatisfaction with switching service performance;
- High participant transaction costs; and
- Barriers to competition due to inefficient and incomplete processes.

2.5 The Gas Industry Co prepared a consultation paper with the assistance of the SRWG on the options for switching arrangements for the gas industry. This consultation document was issued to industry in October 2005[3]. This consultation document sets out the Gas Industry Co's legislative objectives and identified the issues with the current switching arrangements. The paper also discussed the reasonably practicable options for addressing these objectives and outlined the proposed functionality of the Gas Industry Co's preferred switching option, which is the development of a central registry.

2.6 The four options considered in the consultation document were:

- **Option 1. Status Quo.**

This option assumed the current arrangements for switching would continue. The voluntary Reconciliation Code would be the sole arrangement governing gas retail customer switching.

- **Option 2. Reconciliation Code Enhancements.**

This option entails the amendment of the Reconciliation Code to specify information exchange processes, standard file formats and dispute resolution processes. The provisions of the Reconciliation Code would become regulation and be mandatory for all industry participants.

- **Option 3. Central Registry.**

The central registry option entails the development of a database of record for information necessary to initiate a switch, which also has the ability to co-ordinate all switch processes. A central registry could be achieved by either a single central registry (one physical database of information) or a virtual central registry (a network of co-operative databases coordinated through a central system).

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[3] The consultation paper "Options for Switching Arrangements for the New Zealand Gas Industry" October 2005 and all responses can be viewed on the Gas Industry Co's website http://www.gasindustry.co.nz.

- **Option 4. Central Registry integrated with Allocation Mechanism.**

  This option is an extension of the central registry option. The registry would be developed as described under option 3, but would include allocation and reconciliation processes, which establishes daily gas gate quantities by retailer, as part of the registry.

2.7 Option 3. Central Registry was clearly indicated as the Gas Industry Co's preferred option.

2.8 Responses to consultation generally agreed that the Gas Industry Co had identified the key issues in relation to current switching arrangements. There was also general support for the development of a central registry. However, a common theme across many responses was the need for a more robust cost benefit analysis to be undertaken that would provide greater clarity as to whether the options under consideration would provide a positive net present value (NPV) for the industry. Accordingly, we commissioned the attached report from CRA International in February 2006 to address concerns raised by industry participants.

3 Submission Requirements

3.1 The Gas Industry Co invites submissions on this consultation document, preferably including answers to the specific questions in Appendix. A, by **5:00 pm on Friday, 31 March 2006**. Please note that submissions received after this date may not be able to be considered.

3.2 The Gas Industry Co's preference is to receive submissions in electronic form (Microsoft Word format and pdf) and to receive one hard copy of the electronic version. The electronic version should be emailed with the phrase "Submission on Cost Benefit Analysis" in the subject header to info@gasindustry.co.nz and one hard copy of the submission should be posted to the address below:

Gas Industry Company Limited
Level 9, State Insurance Tower
1 Willis Street
PO Box 10 646
Wellington
New Zealand
Attention: Paul Mitchell, Senior Adviser – Retail & Distribution

Tel: +64 4 494 2466
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3.3 The Gas Industry Co will acknowledge receipt of all submissions electronically. Please contact Paul Mitchell if you do not receive electronic acknowledgement of your submission within two business days.

3.4 The Gas Industry Co values openness and transparency and, therefore, submissions will generally be made available to the public on the Gas Industry Co's website. Where respondents intend to provide confidential information as part of their submissions, we ask that you discuss this with Gas Industry Co prior to lodging your formal submission.

Appendix A: Format for Submissions

To assist the Gas Industry Co in the orderly and efficient consideration of stakeholders' responses, a suggested format for submissions has been prepared. This is drawn from the questions posed throughout the body of this consultation document.

Respondents are also free to include other material in their responses.

Recommended Format for Submissions

QUESTION	COMMENT
Q.01 Do you agree with the methodology applied by CRA International in determining the relevant costs and benefits of the options previously consulted on?	
Q.02 Do you agree with the identification and quantification of costs and benefits of switching arrangements contained within CRA International's report?	
Q.03 Are there are any other factors you are aware of that should be taken into account in assessing the costs and benefits of the preferred option.	

Annex A:

"Cost Benefit Analysis of Options for Switching Arrangements in the New Zealand Gas Industry"

Report by CRA International

28 February 2006

INTERNATIONAL

FINAL REPORT

Prepared For:

Gas Industry Company

Level 9, State Insurance Tower

1 Willis St

Wellington

Cost Benefit Analysis of Options for Switching Arrangements in the New Zealand Gas Industry

Prepared By:

CRA International

Level 11, Mobil on the Park, 157 Lambton Quay

Wellington, New Zealand

Date: 28 February 2006

CRA Project No. D08982-00

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TABLE OF CONTENTS

1. INTRODUCTION AND EXECUTIVE SUMMARY 1

1.1. INTRODUCTION 1
1.2. EXECUTIVE SUMMARY 2

2. BACKGROUND TO SWITCHING ARRANGEMENTS 3

2.1. INTRODUCTION 3
2.2. THE CURRENT SWITCHING ARRANGEMENTS 3
2.3. OPTIONS FOR SWITCHING ARRANGEMENTS 5

3. METHODOLOGY FOR THE COST BENEFIT ANALYSIS 8

4. IDENTIFICATION AND QUANTIFICATION OF COSTS AND BENEFITS OF SWITCHING ARRANGEMENTS 10

4.1. INTRODUCTION 10
4.2. IDENTIFICATION OF COSTS AND BENEFITS 10
4.3. QUANTIFICATION OF COSTS AND BENEFITS 11
4.4. COMPARATIVE ANALYSIS 13
4.5. NET PRESENT VALUE RESULTS 16

5. SENSITIVITY TESTING 17

6. CONCLUSIONS 19

APPENDIX A : DETAILED PRESENT VALUE CALCULATIONS 21

1. INTRODUCTION AND EXECUTIVE SUMMARY

1.1. INTRODUCTION

In October 2005, the Gas Industry Company (Gas Industry Co) issued a consultation paper seeking input from gas industry stakeholders on options for switching arrangements for the New Zealand Gas Industry.[1] The need to address switching arrangements arose from the Minister of Energy's Government Policy Statement on Gas Governance (GPS), which invited Gas Industry Co to recommend arrangements for the standardisation and upgrading of protocols relating to consumer switching. In response to the GPS, Gas Industry Co formed the Switching and Registry Working Group (SRWG), an industry group that identified options for switching arrangements and recommended a preferred switching option, on which the Gas Industry Co consultation paper is based.

The paper identified eight process issues with the current arrangements by which consumers can switch between gas retailers, and argued that these issues could have resulted in consumer dissatisfaction, high transaction costs and barriers to competition in the retail gas market. As a means of addressing these issues, Gas Industry Co identified four options (including the status quo) for reforming and improving the efficiency of consumer switching arrangements in the gas industry.

As part of the next phase in this consultation process, Gas Industry Co has commissioned CRA International to undertake a cost benefit analysis of the four options for consumer switching arrangements. This analysis is based on information from two sources, provided to us via Gas Industry Co Requests for Information:

- Estimates of costs and benefits of the various switching options provided by the industry participants (retailers, network owners, and metering equipment owners); and

- Cost estimates for IT systems required for the various switching options provided by four software development companies.

We have analysed these costs and benefits, based on our industry knowledge and relative to similar costs that were quantified in the New Zealand electricity industry. In accord with our terms of reference, no other sources of cost-benefit information have been sought.

1 See Gas Industry Company Limited, "Options for Switching Arrangements for the New Zealand Gas Industry", Consultation Paper, October 2005.

1.2. EXECUTIVE SUMMARY

Gas Industry Co, through its consultation process, has identified eight process issues with the current arrangements governing consumer switching in the New Zealand retail gas market, and indicated that these issues could have resulted in barriers to competition in the market. As a means of resolving these issues, Gas Industry Co has identified four options for switching arrangements: the status quo; enhancements to the current Reconciliation Code protocols; the establishment of a central registry; and the establishment of a central registry with an additional mechanism governing the allocation and reconciliation process.

In this report, we have analysed the costs and benefits of the central registry option and the central registry with allocation mechanism option relative to the status quo, from information provided to us (via Gas Industry Co Requests for Information) by industry participants and software development companies. We have not analysed the costs and benefits of the Reconciliation Code enhancements option, as we did not have sufficient information provided to us to undertake such an analysis. Nonetheless, we note that this option does at least partially resolve some of the issues with the status quo (although the central registry options resolve them to a greater extent), and work is already progressing on enhancing the Reconciliation Code.

The key results from the cost benefit analysis are:

- The present value of the net benefits for a central registry (on its own) range from a minimum of -$146,766 to a maximum of $930,438 with an average of $391,836; and
- The present value of the net benefits for a central registry with allocation mechanism range from a minimum of -$1,680,533 to a maximum of $769,078 with an average of -$455,727.

For these results, we calculated the present value of the net benefits over a five-year time period (the time period as advised by Gas Industry Co) using a discount rate of 7.9 percent (based on the cost of capital for gas pipeline businesses, which will not necessarily equal the cost of capital for the industry as a whole, but we test the sensitivity of the present value results to changes in this discount rate).

These results should be compared relative to the status quo with the present value of the net benefits equal to zero. In comparison with similar costs for the electricity industry, the costs for development and operation of the central registry software could lie towards the lower end of the range, and, in this case, the present value of the net benefits would lie towards the maximum of the range.

Our results are also subject to the caveat that we are constrained by the data and information that has been provided to us. This data and information may not provide a fully accurate or complete dataset of all the likely costs and benefits and some of the data is inconsistent across different companies.

2. BACKGROUND TO SWITCHING ARRANGEMENTS

2.1. INTRODUCTION

In this section, we set out the background to consumer switching arrangements in the New Zealand gas industry that established the context for the Gas Industry Co consultation paper. We provide information on the current switching arrangements in New Zealand, and highlight the eight issues identified by Gas Industry Co with these arrangements. We then briefly outline the four options identified by Gas Industry Co as a means of addressing the issues with current switching processes.

2.2. THE CURRENT SWITCHING ARRANGEMENTS

Consumer switching in the retail gas market is currently governed by the Reconciliation Code, a voluntary industry code established in July 2000 and given legal status through Transmission Service Agreements and Distribution Service Agreements between owners and users of the gas network. The aim of the Reconciliation Code is to develop a competitive gas market by:

> *providing a uniform process for customer transfers between competing retailers, and allocation and reconciliation of gas quantities between users at Receipt Points into a transmission system or distribution network at which possession, control or ownership of gas passes from one person to another.*

The consumer switching aspect of the Reconciliation Code (Part B) establishes a process of information exchange between the relevant parties affected by a switch. The parties involved in the switch are the consumer, the consumer's existing retailer, the new retailer the consumer is switching to, the network owner and metering equipment owner currently associated with the consumer, and the allocation agent[2]. From our interpretation of the Reconciliation Code, the process essentially involves the following steps:

1. The new retailer obtains authority from the consumer that they wish to switch from their existing retailer, and also obtains authority from the existing retailer regarding the release of consumer data;

2. The new retailer provides a customer transfer notice to the affected parties of the transfer (the existing retailer, the network owner, the meter owner and the allocation agent) with information including the consumer's name and address, Installation Control Point (ICP) number[3], and nominated date of transfer;

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2 The allocation agent is appointed by parties that share a receipt point (a point in the network where gas passes from one party to another, for example, from the transmission system to the distribution system) to manage their allocation and reconciliation responsibilities at that point.

3 An ICP number is a unique number corresponding to the point at which a premise is deemed to have gas supplied from the network.

3. In reply to this notice, the existing retailer, network owner and meter owner each provide a customer transfer response to the new retailer with information such as recent consumption data, credit status, current network charge, meter pressure and location details for the consumer requiring the transfer; and

4. After receipt of the customer transfer responses, the new retailer notifies the allocation agent with the confirmed transfer details, and the transfer can then proceed on the appropriate transfer date.

The Reconciliation Code also provides timelines to be met by the affected parties providing the information. A new retailer must provide a customer transfer notice to the existing retailer, network owner and meter owner within five business days of the nominated transfer date, and these affected parties must respond with the customer transfer response within five business days after receiving the notice.

Despite the protocols set out in the Code governing the consumer transfer process, there are problems with the process that could be impeding consumers switching between retailers and thus limiting the efficient operation of a competitive market. Gas Industry Co, in its consultation paper on options for switching arrangements, has identified the following eight key issues with the current switching process:

- Information exchange processes are inefficient: file formats exchanged between affected parties are not standard; the additional time for processing contributes to required timelines for information exchange often not being met;

- Retailers have incomplete access to ICP data: this makes it difficult to identify the existing retailer and meter owner affected by a switch;

- There are no rules for updating ICP data: ICP data is not always updated, and thus does not necessarily reflect the correct retailer or meter owner;

- Information discrepancies: discrepancies often exist between the information in the databases of the retailers and network owners, causing problems and delays in the transfer process, and issues for billing and reconciliation;

- Lack of compatibility between systems: there is no mechanism in the switching arrangements for ensuring that the databases of retailers and network owners are compatible;

- No governance structure to support and enforce compliance: there is no mechanism in the switching arrangements to ensure compliance by affected parties;

- Does not support effective complaints resolutions: the current arrangements do not allow for key switching information to be obtained in a timely manner for consumer complaint resolution; and

- No linkage with the allocation and reconciliation processes: there is no link between the current switching arrangements and the arrangements for allocation and reconciliation of monthly energy purchases by retailers.

It is generally accepted among industry participants (via responses to Gas Industry Co's consultation paper) that these perceived problems with the current switching arrangements are indeed evident in the industry and are currently generating inefficiencies. Thus, Gas Industry Co has proposed four options for switching arrangements, some of which attempt to resolve these inefficiencies and meet the objectives of the GPS. The options were identified by the SRWG, covering a broad representation of industry participants. We briefly discuss these four options in the next section. A more complete explanation of the options can be found in Gas Industry Co's consultation paper.[4]

2.3. OPTIONS FOR SWITCHING ARRANGEMENTS

Gas Industry Co's first proposed option (option 1) is to retain the status quo, whereby the Reconciliation Code in its current form remains the only arrangement governing consumer switching in retail gas markets. Clearly this option does not remedy any of the problems set out above.

Option 2 is to enhance the Reconciliation Code to include, amongst other things, improved information exchange processes and an improved governance and compliance process. While this option does specifically address some of the problems with the status quo, others still remain. In particular, each retailer, network owner and meter owner still maintains its own database of ICP data. Thus, problems related to the compatibility of databases and discrepancies between the information contained in these databases are unlikely to be resolved under this approach. However, work has already commenced on this option, and one of the key requirements identified as an outcome of this work is for a central registry to be created.

Gas Industry Co's third and preferred option is to develop a central registry that holds all the necessary ICP data in one location, coupled with a process to coordinate consumer switches through the registry. Transfer of information relating to consumer switching will be managed through the registry by what would, in large part, be an automated process. ICP data would also be maintained in the central registry itself by retailers, network owners or meter owners depending on the relevant party's specific access rights to the ICP. Specific compliance arrangements will also be part of the registry to ensure the parties perform their required roles (such as creation or maintenance of specific ICP data).

4 See Gas Industry Company Limited, "Options for Switching Arrangements for the New Zealand Gas Industry", Consultation Paper, October 2005.

Gas Industry Co expects that the central registry option will resolve some of the problems identified with the current switching arrangements. Both the SRWG and Gas Industry Co identify benefits from this option, including:

- Improved consistency and security of information flows;
- Improved timeliness and accuracy of the switching process;
- Mitigation of information discrepancy issues between different databases; and
- Simplification and automation of the processes involved in a switch.

Option 4, the final option presented by Gas Industry Co, is to integrate the central registry option with an allocation mechanism. An allocation mechanism is needed where retailers share a receipt point – essentially, where gas is transferred from the transmission system to the distribution system. The allocation procedure establishes the day- and month-end gas quantities allocated to each retailer. Currently, the allocation process involves an allocation agent contracting directly with retailers to determine these quantities. Incorporating this process into the central registry would, according to the Gas Industry Co consultation paper, reduce the transaction costs associated with each process by creating one integrated mechanism.

In Table 1 we summarise the extent to which the four options for switching arrangements resolve the eight issues noted above. Clearly options 3 and 4 have the most significant effect on the problems with the status quo, with the central registry resolving all but one of the problems, and that problem can be remedied by incorporating an improved allocation methodology.

Option 2, as specified in Gas Industry Co's consultation document, only resolves two of the problems completely. However, there are a number of problems that could be partially resolved through Reconciliation Code enhancements that are not outlined in the consultation document. Protocols could be established to ensure consistency and compatibility across databases, to require industry participants to update ICP data, and to enforce compliance (although, given that industry participants still maintain their own databases, it may be difficult to enforce these protocols). A central registry does not appear to be a necessary mechanism to ensuring these problems are resolved, although the lack of a central registry might mean that the problems would remain, to an extent.

Table 1: Extent to Which Switching Arrangements Resolve Current Problems[5]

Issues with the Current Switching Arrangements	Option 1: Status Quo	Option 2: Reconciliation Code Enhancements[6]	Option 3: Central Registry	Option 4: Central Registry with Allocation Mechanism
Information exchange processes are inefficient	Not resolved	Resolved	Resolved	Resolved
Retailers have incomplete access to key ICP data	Not resolved	Partially resolved	Resolved	Resolved
No rules for updating ICP data	Not resolved	Partially resolved	Resolved	Resolved
Information discrepancies	Not resolved	Partially resolved	Resolved	Resolved
Lack of compatibility between systems	Not resolved	Partially resolved	Resolved	Resolved
No governance structure to support and enforce compliance	Not resolved	Resolved	Resolved	Resolved
Does not support effective complaints resolution	Not resolved	Partially resolved	Resolved	Resolved
No linkage with the allocation and reconciliation processes	Not resolved	Partially resolved	Not resolved	Resolved

5 We note that Gas Industry Co does not necessarily agree with the classification of each option in this table, and the extent to which they resolve each issue.

6 It is possible that the Reconciliation Code could be enhanced to at least partially resolve some of these issues. On the other hand, given that the Code only establishes protocols, rather than strict rules, any requirements of industry participants relating to their own databases could be difficult to enforce.

3. METHODOLOGY FOR THE COST BENEFIT ANALYSIS

Our cost benefit analysis is based on determining the present value of the net benefits (benefits less costs) for each of the switching options over a five-year period (the time period for analysis as advised by Gas Industry Co). The analysis is calculated on an incremental basis relative to the status quo (option 1), which essentially assumes that the present value of the net benefits for option 1 is zero. That is, we determine the incremental benefits and incremental costs for each of the options over and above the benefits and costs of the status quo. The reason for undertaking this analysis on an incremental basis is that it is difficult to establish absolute benefits and costs, particularly for the status quo. However, it is easier to determine cost savings relative to the status quo, and implementation and operation costs for each option that would otherwise not occur for the status quo, particularly given the nature of the data that has been provided to us.

We have been provided with data on the current costs associated with switching processes, and the costs and benefits of the central registry option and the central registry with allocation mechanism option (options 3 and 4). Thus, we have not been able to analyse the costs and benefits for the reconciliation code enhancements option (option 2). We also understand that the gas industry is already facilitating work on enhancing the allocation and reconciliation arrangements, through the Gas Allocation and Reconciliation Team (GART), and an issues paper has already been prepared. We make some comments in the concluding section of this report on the relative merits of option 2 based on the extent to which it resolves a number of the issues with the status quo.

The costs and benefits for the central registry options (both with and without an allocation mechanism) can be classified into the following categories:

- ***Development costs***: initial capital costs associated with designing, building and implementing the registry. This includes costs to the industry as a whole for developing the registry, and to the costs incurred by each retailer and network provider for required activities such as data cleansing and migration;

- ***Ongoing operational costs***: ongoing costs associated with maintaining and operating the registry; and

- ***Cost savings***: benefits that retailers and other industry participants can reasonably expect to achieve. While there are likely to be other benefits resulting from the registry options (for example, potentially improving retail competition), these will be difficult to quantify, and, in any case, the only data on benefits that has been provided by industry participants is through cost savings (through expected efficiency gains).

More detail on the likely costs and benefits for each of the options can be found in the next section of this report.

We have been provided with information on the expected one-off development costs, and the ongoing operational costs and costs savings per annum. As the timeframe of our analysis is a five-year period, we determine the present value of the net benefits by discounting using an appropriate cost of capital.

As an estimate of the cost of capital, we have taken the weighted average cost of capital (WACC) estimated by the Commerce Commission in the Gas Control Inquiry.[7] While this estimate is specific to gas pipeline businesses (that is, network owners) and not the industry as a whole, it at least provides us with an indication of the likely cost of capital.[8] The Commission estimates WACC from 2004 onwards for most gas pipelines businesses to be 7.9%. The Commission also estimates the range of WACC values as 6.8% to 9.2%.

Submissions into this Inquiry argued that the WACC for gas pipelines businesses would be higher, with LECG suggesting a range of 8.3% to 11.2%,[9] and a CRA report noting that NGC's publicly disclosed hurdle rate is 8.5% to 10%.[10] It may be the case, therefore, that the discount rate to use is considerably higher than the WACC suggested by the Commission. Nonetheless, as our base case, we assume a discount rate of 7.9%, and we test the sensitivity of the results to changes in this discount rate (both higher and lower discount rates).

We also test the sensitivity of changes in the time period for analysis (both longer and shorter time periods). Sensitivity testing allows us to determine the extent to which our assumptions about the discount rate and time period influence the results.

7 See Commerce Commission, "Gas Control Inquiry Final Report", 29 November 2004.

8 The WACC for the industry as a whole will be the weighted average of the WACC's for the component parts of the industry (retail, network owners and meter owners). The network owner (gas pipeline) component of the industry has a high proportion of fixed charges, and thus a stable income stream (relative to the retail component of the industry). While we have not made an explicit assessment of any WACC differences, it is therefore possible that the WACC for the industry as a whole is higher than that just for gas pipelines.

9 LECG, "Response to the Commerce Commission's Gas Control Inquiry Draft Report: Estimation of the Weighted Average Cost of Capital", Prepared on behalf of NGC, Vector and Powerco, 2 July 2004.

10 Charles River Associates, "Review of the Commerce Commission's Gas Control Inquiry Draft Report", Prepared for NGC, 2 July 2004.

4. IDENTIFICATION AND QUANTIFICATION OF COSTS AND BENEFITS OF SWITCHING ARRANGEMENTS

4.1. INTRODUCTION

In this section, we undertake our core analysis for the report. We first identify the costs and benefits for each of the two central registry options for switching arrangements identified by Gas Industry Co through its consultation process, and then quantify these costs and benefits using the information provided by industry participants and software development companies. We note that caution should be exercised in interpreting this information, as the inputs from industry participants and software development companies may be unreliable. As a check on the validity of the costs associated with the central registry on its own (that is, without an allocation mechanism), we compare results with similar values for the New Zealand electricity industry, noting that caution should be exercised in making these comparisons due to the significant differences between the industries. Nonetheless, given the absence of any previous centralised database for the New Zealand gas industry, the electricity industry offers an approximate benchmark in this regard. We conclude this section with the results of our present value analysis and our interpretation of these results.

4.2. IDENTIFICATION OF COSTS AND BENEFITS

Our identification of the costs and benefits is constrained by the information we have been provided by industry participants and potential service providers (software development companies). That is, while there would be other costs and benefits that we have not incorporated in our analysis, these are difficult to quantify in the absence of information provided by industry participants, and it was outside our scope of work to obtain information from other sources.

For those costs and benefits that we have quantified, we have used information obtained from responses to Gas Industry Co's Requests for Information:

- Responses from gas industry participants (retailers, network owners and metering equipment owners), providing information on their direct costs and benefits; and
- Responses from software development companies, providing information on the costs of establishing and running a central registry database (with and without an associated allocation mechanism).

As noted above, we consider only the incremental costs and benefits relative to the status quo. That is, we quantify the additional cost and benefit of the particular option (for options 3 and 4) that would otherwise not have been incurred under the status quo. In Table 2 we set out the incremental costs and benefits we have identified for each of these three options.

Table 2: Incremental Costs and Benefits for Central Registry Switching Options Relative to the Status Quo

Switching Arrangement	Incremental Costs	Incremental Benefits
Option 3: Central Registry	Data cleansing and migration Registry software development Registry software ongoing costs	Switching cost savings (through greater efficiencies and standardisation of protocols)
Option 4: Central Registry with Allocation Mechanism	Data cleansing and migration Registry and allocation mechanism software development Registry and allocation mechanism software ongoing costs	Switching cost savings (through greater efficiencies and standardisation of protocols)

For both options, the only incremental benefits that we have been able to quantify are the savings achieved by lowering switching costs. While there may be other benefits resulting from implementation of each of the options, the information we have been provided with by industry participants does not enable us to quantify these, and it is similarly difficult to benchmark against the electricity industry due to the lack of any readily available information on quantified benefits.

For both options, there will be one-off data cleansing and migration costs in establishing the switching arrangement. There would also be additional costs of software (relative to the status quo). These would include a one-off development cost, as well as ongoing operational costs. We have been provided with estimates from four software development companies of the likely costs for each of these.

4.3. Quantification of Costs and Benefits

Using the information provided by industry participants and the estimates from software development companies, we have quantified the costs and benefits identified above. We have aggregated the responses to obtain an overall measure of the costs and benefits to the industry as a whole, with the results presented in Table 3. The data that have been provided to us typically give a range for the cost or benefit, for example $5,000-$10,000. Thus, we aggregate across the industry at the lower bound and upper bound of the range given. To determine the minimum overall industry net benefits we match the lower bound of the benefits with the upper bound of the costs, and subtract costs from benefits. Similarly to determine the maximum industry net benefits that could be achieved, we subtract the lower bound of the costs from the upper bound of the benefits. Our net present value analysis is then done using the maximum and minimum net benefits such that we have a range of net benefits to the industry. We also determine the average net present value using the average costs and benefits within the range of values each takes.

Much of the information that has been provided to us is incomplete or inconsistent (although it is the only information that has been made available to us), and thus our quantification is based on the following assumptions:

- We were only provided with information on the switching costs savings resulting from the central registry (option 3). We have assumed for the central registry with allocation mechanism (option 4) that the switching cost savings will be equivalent to a central registry on its own;

- Similarly for data cleansing and migration costs, we were only provided with costs for the central registry (option 3). We have therefore made the same assumptions as for the switching costs savings: that the data cleansing and migration costs will be equivalent for a central registry with allocation mechanism as they will be for a central registry on its own;

- One software company suggested registry development costs could be as high as $1.5 million. However, this was a significant outlier relative to the maximum costs quoted by other software companies (and even relative to the electricity comparison, as we show later in the report). Thus, for the maximum development cost we have used the next highest quote of $375,000, which is more in line with the quotes provided;

- Similarly, one software company estimated the maximum registry ongoing costs as $600,000 per annum, which was a significant outlier relative to the other companies. We have thus used the next highest quote of $200,000 per annum; and

- Only two software companies provided us with estimates of the development and ongoing costs for a central registry with an allocation mechanism (with those not providing quotes noting that the central registry would be the initial step, and that an allocation mechanism could always be added at a later date). These quotes came from two of the higher-priced companies in the quotes for the central registry mechanism only (call these companies “A” and “B”). To use the quotes provided would have caused a considerable deviation from the quotes for a central registry on its own, and one that we did not believe was warranted. Thus, to determine the minimum and maximum software costs for the central registry with allocation mechanism we determined the average factor by which companies A and B had increased costs from a central registry only to a central registry with allocation mechanism. We then applied these factors to the minimum and maximum costs determined for the central registry to determine the appropriate costs for the registry with allocation mechanism. In this way, the costs for the latter remain approximately consistent with the costs for the former.

Table 3 below summarises the costs and benefits of the two options based on the assumptions discussed above.

Table 3: Quantification of Incremental Costs and Benefits for Switching Options Relative to the Status Quo

Switching Arrangement	Switching Cost Savings ($ per annum)	Data Cleansing and Migration Costs ($)	Software Development Costs ($)	Software Ongoing Costs ($ per annum)
Option 3: Central Registry	$272,000 - $282,000	$22,000 - $60,000	$29,000 - $375,000	$36,840 - $200,000
Option 4: Central Registry with Allocation Mechanism	$272,000 - $282,000	$22,000 - $60,000	$79,750 - $1,375,000	$64,470 - $333,333

4.4. COMPARATIVE ANALYSIS

As a check on the costs for the central registry outlined in Table 3, we have compared the costs of the gas switching options with the costs of establishing a central registry in the New Zealand electricity industry.

There are two important caveats to note regarding this comparison. First, we have only been able to compare against the costs of developing a central registry for the electricity industry. That is, we do not have any information with which to compare the costs of the central registry with allocation mechanism, or the benefits of either of the options. Nonetheless, the comparison between the costs of the gas and electricity central registries provides some indication as to the quality of the estimates given above.

Second, the electricity industry in New Zealand is considerably larger than the gas industry. The electricity industry has approximately 1.7 million consumers and 13,000 switches per month, compared with approximately 230,000 consumers in the gas industry and an estimated 1,000 monthly switches. The costs for developing and operating a switching mechanism could therefore be considerably different between the electricity and gas industries.

Information on the costs of developing the central electricity registry in New Zealand is as follows:

- Final software development costs of the registry, implemented in October 2002, were $507,000.[11]
- Ongoing software costs from the registry vary. Registry costs in the years to March 2002, 2003 and 2004 respectively were $127,000,[12] $92,000,[13] and $80,000.[14]

11 See Easton, P. (2002), "MARIA Registry Project", Project Closure Report; and MARIA Annual Review 2003.

- Data cleansing and migration costs vary across industry participants, ranging from $20,000 for one participant to $1.2 million (cost of systems development) and $300,000 (cost of data cleansing) for another.[15]

These costs can be compared with the costs for a central gas registry on a dollar-value basis, a cost per consumer basis, and a cost per number of annual consumer switches. We set out this comparison in Table 4.

Table 4: Comparison of Electricity Registry Costs with Gas Registry Costs

	Costs		Costs per consumer		Costs per annual consumer switches	
Costs	**Electricity**	**Gas**	**Electricity**	**Gas**	**Electricity**	**Gas**
Average Registry Development Costs	$507,000	$202,000[16]	$0.30	$0.88	$3.25	$16.83
Average Registry Ongoing Costs	$99,667	$118,420[17]	$0.06	$0.51	$0.64	$9.87
Data Cleansing (lowest individual)	$20,000	$2,000[18]	$0.01	$0.01	$0.13	$0.17
Data Cleansing (highest individual)	$300,000	$25,000[19]	$0.18	$0.11	$1.92	$2.08

12 MARIA Annual Review 2002.

13 MARIA Annual Review 2003.

14 MARIA Annual Review 2004.

15 Easton, P. (2002), "MARIA Registry Project", Project Closure Report.

16 This is calculated as an average of the lower and upper bounds of the range of registry development costs presented in Table 3.

17 This is calculated as an average of the lower and upper bounds of the range of registry ongoing costs presented in Table 3.

18 This represents the data cleansing costs of the lowest individual participant, and differs from the minimum data cleansing costs aggregated across all individual participants that were noted earlier.

19 This represents the data cleansing costs of the highest individual participant, and differs from the maximum data cleansing costs aggregated across all individual participants that were noted earlier.

	Costs		Costs per consumer		Costs per annual consumer switches	
Costs	**Electricity**	**Gas**	**Electricity**	**Gas**	**Electricity**	**Gas**
Systems development	$1,200,000	N/A	$0.71	N/A	$7.69	N/A

On a dollar-value basis, the one-off development cost of the electricity registry is greater than the average development cost for the gas registry. Nonetheless, in terms of costs per consumer and costs per consumer switch, the gas registry costs are higher. The ongoing costs for the gas registry are higher than those for the electricity registry across all three cost comparisons calculated in Table 4. The electricity industry is considerably larger than the gas industry, and we would expect on an absolute basis that the costs related to registry development and ongoing operation would be higher. We would, however, expect the costs per consumer and per consumer switch to be broadly similar.[20] The difference in costs may be a result of taking the average development and ongoing cost for the gas registry, which would be high relative to the costs for the electricity registry, and it is therefore possible that software costs for the gas registry would lie more towards the minimum of the range given in Table 3.

The data cleansing and migration costs indicated for individual participants (as opposed to the costs aggregated across the entire industry) in the electricity industry are significantly greater than those we have established for the gas industry in absolute terms. However, when compared on a cost per consumer and cost per annual consumer switch the numbers are broadly similar. From this we infer that data cleansing and migration costs for the gas industry as a whole (maximum, minimum and average) will be similar to the costs for the electricity industry.

Our overall view is that the data cleansing and migration cost data for the gas industry is broadly consistent with similar data for the electricity industry. Comparison with the electricity industry suggests that the costs for a gas central registry (software development and ongoing costs) are likely to lie towards the lower end of the range presented in Table 3.

20 While some software development and ongoing costs will be fixed, indications from the software development companies in the quotes provided suggests the other costs relating to time and materials will vary with the number of consumers and consumer switches in the market. Based on this, the cost per consumer and consumer switch across the gas and electricity industries should be approximately similar.

4.5. NET PRESENT VALUE RESULTS

Using the cost and benefit estimates set out above we determine the present value of the net benefits for each of the two registry options over a five-year time period. We assume a discount rate of 7.9 percent for the reasons set out earlier and discount the annual cash flows over the five-year period. The minimum, maximum and average present values for the two central registry options are shown in Table 5. Full details of the present value calculations for each of these options are provided in Appendix A.

Table 5: Present Value of Net Benefits for Switching Arrangements

Switching Arrangement	Minimum Net Present Value	Maximum Net Present Value	Average Net Present Value
Option 3: Central Registry	-$146,766	$930,438	$391,836
Option 4: Central Registry with Allocation Mechanism	-$1,680,533	$769,078	-$455,727

The net benefits are calculated on an incremental basis, relative to the status quo. This is equivalent to a net present value for the status quo of $0, and the relative present value for each other option is given above.

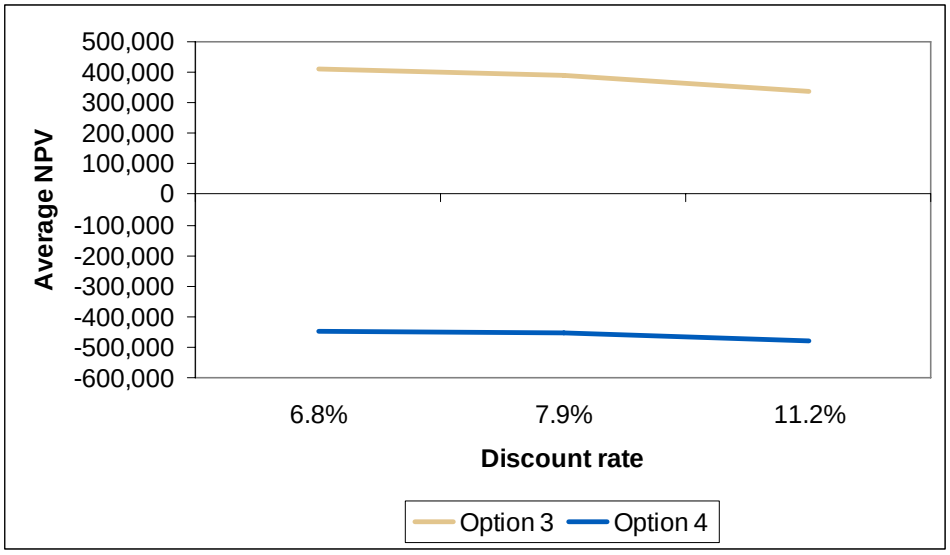
Based on this analysis, the maximum present value of the net benefits is largest for the central registry option (option 3). The average present value of option 3 is also positive and greater than the average present value of the costs for the central registry with allocation mechanism (option 4). Moreover, option 4 has a negative average net present value, suggesting that the present value of the net benefits from this arrangement are lower than they would otherwise be for the status quo.

We note also that, from our comparison with the electricity industry above, the software development and ongoing costs for the central registry are likely to be towards the low end of the range we have given. This suggests that the maximum value (that is, upper bound of the benefits and lower bound of the costs) may be a more appropriate present value on which to focus. In this case, both options 3 and 4 have positive net present value relative to the status quo.

5. SENSITIVITY TESTING

In this section we test the sensitivity of our results to changes in the discount rate and the time period for analysis. We first calculate the net present value results over three discount rates: 6.8% (low point in the Commerce Commission's cost of capital range as noted above), 7.9% (as used in our base case analysis above) and 11.2% (high point in LECG's range as noted above). We do this analysis for the average net present value. The results of this analysis are shown in Figure 1.

Figure 1: Sensitivity of Average NPV to Changes in Discount Rate



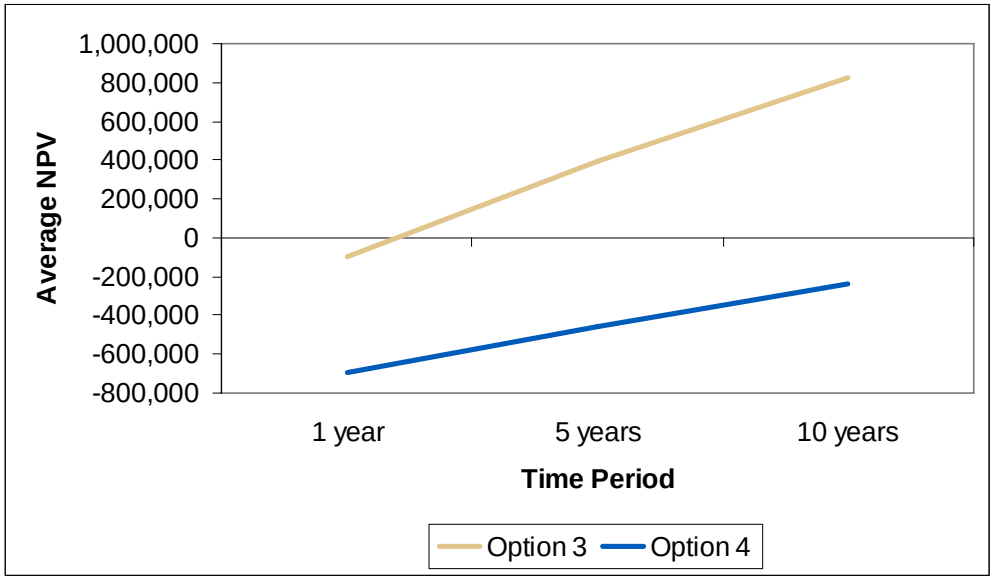
We infer two observations from Figure 1:

- The average NPV of the net benefits for options 3 and 4 is negatively related to the discount rate. For each option, the cash flows that are discounted are positive (net benefits received in the future, while initial development and data cleansing costs are incurred in period zero and are therefore not discounted), and an increase in the discount rate reduces the present value of positive cash flows. Thus, the overall present value is reduced following an increase in the discount rate; and

- Neither option is sensitive to changes in the discount rate. Indeed, over the entire range of discount rates, the change in the average NPV for option 3 is only $71,000 while the average NPV for option 4 changes by $35,000.

We also tested the sensitivity of our results to changes in the time period for analysis, calculating the present value of the average net benefits arising from options 3 and 4 for 1 year, 5 years (as in our base case) and 10 years. The results of this analysis are shown in Figure 2.

Figure 2: Sensitivity of Average NPV to Changes in Time Period for Analysis



The following three observations can be made regarding Figure 2:

- The average NPV of the net benefits for options 3 and 4 is positively related to the discount rate. Indeed, as the number of years increases we would expect the net benefits to accrue, thus resulting in an increase in the present value of these net benefits;

- For a one-year time period, the present value of the average net benefits for option 3 is negative, suggesting this option is less favourable than the status quo (on a cost-benefit basis) and requires a longer period of analysis for the present value of the net benefits to offset the initial costs.[21] In addition, 10 years is not a sufficient time period for option 4 such that the present value of the net benefits offset the initial costs, and this option continues to show a negative NPV; and

- The results are quite sensitive for the time period for analysis, particularly for option 3.

21 For option 3, it takes somewhere between 1 and 2 years for the present value of the net benefits to fully offset the initial costs.

6. CONCLUSIONS

This report presents our cost benefit analysis of the two central registry options (central registry on its own, and central registry with allocation mechanism) for consumer switching arrangements, put forward by Gas Industry Co in its October 2005 consultation paper. Our analysis is based on information provided to us from industry participants and software development companies (via a Gas Industry Co Request for Information) on the likely costs and benefits of the central registry options. We are constrained by the data and information that have been provided to us. This data and information may not provide a fully accurate or complete dataset of all the likely costs and benefits and some of the data is inconsistent across different companies. Our results are therefore subject to noting these caveats.

We have calculated the present value of the net benefits for the two central registry options over a five-year period using a discount rate of 7.9%. This cost benefit analysis is done on an incremental basis relative to the status quo, such that we assume the present value of the benefits for the status quo is equal to zero. We have not attempted to analyse the Reconciliation Code enhancements options put forward by Gas Industry Co in its consultation paper due to a lack of information provided by industry participants on the costs and benefits of this option, and an understanding from our conversations with Gas Industry Co that work is already being facilitated on this option.

The key results from our cost benefit analysis are:

- The present value of the net benefits for a central registry on its own range from a minimum of -$146,766 to a maximum of $930,438 with an average of $391,836; and

- The present value of the net benefits for a central registry with allocation mechanism range from a minimum of -$1,680,533 to a maximum of $769,078 with an average of -$455,727.

As noted above, these results should be compared relative to the status quo with a net present value of zero. We note also that, in comparison with similar costs for the electricity industry, the costs for development and operation of the central registry software could lie towards the lower end of the range, and, in this case, the present value of the net benefits would lie towards the maximum of the range.

While our results suggest that, over a five-year period, the central registry option is the preferred option relative to the status quo and the central registry with allocation mechanism option, there may also be merit in the Reconciliation Code enhancements option. As we noted in Section 2, it is possible for enhancements to the Code to at least partially resolve a number of the current problems with the status quo. While it may not resolve these to the extent a central registry would, it could still provide a number of benefits. Moreover, Reconciliation Code enhancements can be developed as an initial step, with a central registry developed later (although we note that the incremental costs and benefits at that point may be quite different to those presented in this report). It may be, therefore, that this option could be a transitional step before moving to the central registry option, although in order to completely resolve many of the current inefficiencies with the switching process, a central registry is a necessary step.

APPENDIX A: DETAILED PRESENT VALUE CALCULATIONS

Table 6: Minimum Net Present Value of Option 3

	Year					
Cost/Benefit	**0**	**1**	**2**	**3**	**4**	**5**
Switching cost savings	$0	$272,000	$272,000	$272,000	$272,000	$272,000
Data cleansing and migration	-$60,000					
Registry development	-$375,000					
Registry ongoing	$0	-$200,000	-$200,000	-$200,000	-$200,000	-$200,000
Net Benefits	-$435,000	$72,000	$72,000	$72,000	$72,000	$72,000
Present value of net benefits	**-$146,766**					

Table 7: Average Net Present Value of Option 3

	Year					
Cost/Benefit	**0**	**1**	**2**	**3**	**4**	**5**
Switching cost savings	$0	$277,000	$277,000	$277,000	$277,000	$277,000
Data cleansing and migration	-$41,000					
Registry development	-$202,000					
Registry ongoing	$0	-$118,420	-$118,420	-$118,420	-$118,420	-$118,420
Net Benefits	-$243,000	$158,580	$158,580	$158,580	$158,580	$158,580
Present value of net benefits	**$391,836**					

Table 8: Maximum Net Present Value of Option 3

	Year					
Cost/Benefit	**0**	**1**	**2**	**3**	**4**	**5**
Switching cost savings	$0	$282,000	$282,000	$282,000	$282,000	$282,000
Data cleansing and migration	-$22,000					
Registry development	-$29,000					
Registry ongoing	$0	-$36,840	-$36,840	-$36,840	-$36,840	-$36,840
Net Benefits	-$51,000	$245,160	$245,160	$245,160	$245,160	$245,160
Present value of net benefits	**$930,438**					

Table 9: Minimum Net Present Value of Option 4

	Year					
Cost/Benefit	**0**	**1**	**2**	**3**	**4**	**5**
Switching cost savings	$0	$272,000	$272,000	$272,000	$272,000	$272,000
Data cleansing and migration	-$60,000					
Registry and allocation mechanism development	-$1,375,000					
Registry and allocation mechanism ongoing	$0	-$333,333	-$333,333	-$333,333	-$333,333	-$333,333
Net Benefits	-$1,435,000	-$61,333	-$61,333	-$61,333	-$61,333	-$61,333
Present value of net benefits	**-$1,680,533**					

Table 10: Average Net Present Value of Option 4

	Year					
Cost/Benefit	**0**	**1**	**2**	**3**	**4**	**5**
Switching cost savings	$0	$277,000	$277,000	$277,000	$277,000	$277,000
Data cleansing and migration	-$41,000					
Registry and allocation mechanism development	-$727,375					
Registry and allocation mechanism ongoing	$0	-$198,902	-$198,902	-$198,902	-$198,902	-$198,902
Net Benefits	-$768,375	$78,098	$78,098	$78,098	$78,098	$78,098
Present value of net benefits	**-$455,727**					

Table 11: Maximum Net Present Value of Option 4

	Year					
Cost/Benefit	**0**	**1**	**2**	**3**	**4**	**5**
Switching cost savings	$0	$282,000	$282,000	$282,000	$282,000	$282,000
Data cleansing and migration	-$22,000					
Registry and allocation mechanism development	-$79,750					
Registry and allocation mechanism ongoing	$0	-$64,470	-$64,470	-$64,470	-$64,470	-$64,470
Net Benefits	-$101,750	$217,530	$217,530	$217,530	$217,530	$217,530
Present value of net benefits	**$769,078**					