



# Transmission Balancing Options Paper

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## **About Gas Industry Co.**

Gas Industry Co was formed to be the co-regulator under the Gas Act.

As such, its role is to:

recommend arrangements, including rules and regulations where appropriate, which improve:

- the operation of gas markets;
- access to infrastructure; and
- consumer outcomes;
- administer, oversee compliance with, and review such arrangements; and
- report regularly to the Minister of Energy on the performance and present state of the New Zealand gas industry, and the achievement of Government's policy objectives for the gas sector.

## **Authorship**

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**Submissions close:** 27 February 2009

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# Executive summary

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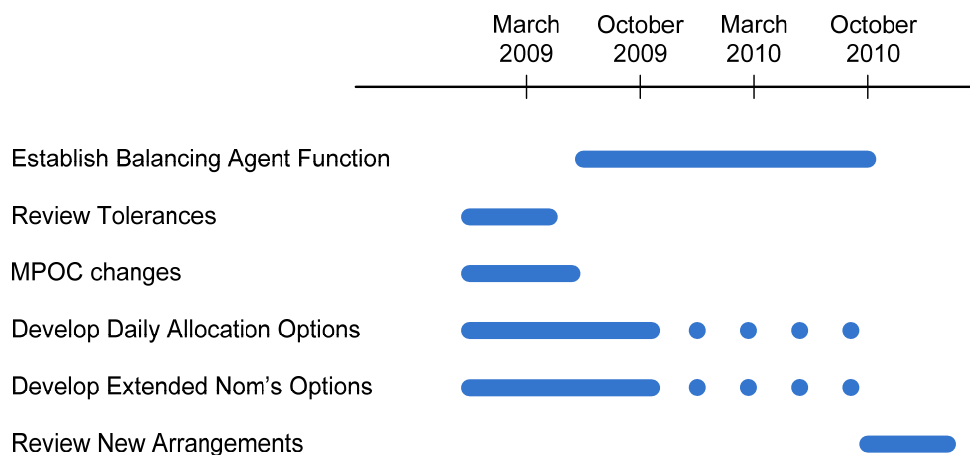
Gas Industry Co has been assessing the current arrangements for balancing gas transmission pipelines in New Zealand. Balancing refers to maintaining the gas inventory in a pipeline (so-called linepack) within limits to ensure the reliable receipt and delivery of gas.

Gas Industry Co has found that current arrangements are not consistent with the objectives in the Gas Act 1992 (Gas Act) and the April 2008 Government Policy Statement on Gas Governance (GPS), and are unlikely to improve sufficiently through industry agreement.

Accordingly, Gas Industry Co proposes to take the lead in improving balancing arrangements, in particular by:

- recommending the appointment of an independent Balancing Agent;
- commissioning an independent expert review of Maui Pipeline Operating Code (MPOC) tolerances;
- suggesting changes for MPOC parties to consider;
- developing daily allocation options to lessen the risks for mass market retailers; and
- developing options for extended nominations.

An indicative timeline for conducting and reviewing this work is set out in the diagram below:



Gas Industry Co's reasoning, in outline, is as follows:

- The key Gas Act and GPS objectives in this setting are to minimise the costs of balancing while protecting wholesale and retail competition.

- Residual gas balancing is currently undertaken by Maui Development Ltd (MDL) and, to a lesser extent, Vector Transmission (Vector). Gas Industry Co would prefer a single independent Balancing Agent because:
  - multiple balancing agents divide an already small market;
  - transmission system operators do not have the right incentives to achieve balancing at a low cost; and
  - MDL and Vector interests in gas production, wholesaling and retail could raise questions about the neutrality of their performing the balancing function.
- The gas Balancing Agent can best minimise the cost of residual balancing by sourcing balancing gas from a pool of flexible gas supplies and demand management options. Initially this would be through a daily tendering process but, in time, through a more automated spot market. The Balancing Agent may also contract for longer term flexible supply arrangements.<sup>1</sup>
- The tendering, and eventually spot market, arrangements will also help mass market retailers manage the risks of balancing costs.
- To lessen risks for mass market retailers, Gas Industry Co will explore the daily allocation of mass market gas gate deliveries.
- As an additional measure to improve the targeting of balancing cost allocations, Gas Industry Co will explore further requirements for transmission system nominations.

This paper describes Gas Industry Co's analysis in developing the plan recommended above. Submissions on this analysis are requested by 27 February 2009.

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<sup>1</sup> Currently referred to as 'secondary balancing gas'.

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# 1

## Introduction and problem definition

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In August 2008, Gas Industry Co published an Issues Paper on Transmission Pipeline Balancing (Issues Paper).<sup>2</sup> The Issues Paper followed from earlier work undertaken by Gas Industry Co in the context of its Transmission Access work stream. The papers published in relation to that work stream can be found on Gas Industry Co's website. In light of the submissions on the Issues Paper,<sup>3</sup> this Options Paper moves the discussion forward and explains how Gas Industry Co proposes to take the lead on improving balancing arrangements, in particular by proposing the appointment of an independent Balancing Agent. This introduction summarises the main reasons for Gas Industry Co's proposed intervention.

### 1.1 What is gas balancing?

Balancing refers to the management of the gas inventory in a pipeline, which is generally known as linepack. Linepack must be managed to keep the gas pressure in the pipeline within safe limits:

- below the safe physical operating limit for the pipeline; and
- above the minimum required to maintain actual supply of gas to consumers.

Without effective balancing, reliable transportation of gas is impossible. Effective balancing of transmission pipelines is therefore a key element of successful open access.

### 1.2 Why is Gas Industry Co intervening in balancing?

As noted above, Gas Industry Co proposes to take the lead in improving and formalising arrangements for balancing. The main reasons for this are that under the current arrangements:

- pipeline users lack sufficient information with which to make the best balancing decisions;

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<sup>2</sup> The Issues Paper provides a detailed review of the physical and ownership context for balancing, pipeline operator arrangements, the contractual framework, and existing balancing arrangements. The Issues Paper and related submissions are available on Gas Industry Co's website.

<sup>3</sup> See Transmission Pipeline Balancing Issues-Analysis of Submissions on Gas Industry Co's website.

- the tools available to pipeline users and operators are such that they are unlikely to achieve balancing at least cost; and
- the situation may become competitively questionable due to competing incentives on the pipeline owners.

As required by the Gas Act,<sup>4</sup> following an extensive review and consultation process, Gas Industry Co has concluded that it is unlikely that improvements which appear clearly worthwhile will be achievable by industry agreement alone. Indeed Gas Industry Co's perception is that the industry is eager for Gas Industry Co to take the lead in this area.

Gas Industry Co's preference is for parties to the Maui Pipeline Operating Code (MPOC) to consider some changes to that code, for daily allocation and nomination options to be further developed by industry working groups, and for regulations to provide for the establishment and governance of an independent Balancing Agent. This paper sets out the rationale for these preferences and explores the options for the Balancing Agent's approach to its task.

### **The 'do nothing' option**

Until recently, pipeline balancing was largely managed through gas supply flexibility from the Maui Gas field, at no explicit cost to pipeline users.<sup>5</sup> Even after the Maui pipeline became an open access pipeline in 2005, the overhang of legacy arrangements prevented the true cost of balancing being passed through to the beneficiaries of balancing services. During this period, both the Maui and Vector pipelines have experienced significant volatility in imbalance, well beyond linepack flexibility. However, in a setting without appropriate pricing for balancing services, where costs have not been passed on effectively to those contributing to imbalances, this is not a surprising outcome.

Recent changes to the MPOC to remove the 'legacy' arrangements<sup>6</sup> allow balancing costs to flow through to parties using the pipeline's residual balancing services. It is too early to assess how this has affected the balancing behaviour of pipeline users, and therefore difficult to assess how large the residual balancing role will be in the future.

However, Gas Industry Co believes that leaving balancing arrangements as they are now is unlikely to be a practicable option. Primarily this is because current arrangements do not consistently sheet home costs to causers, and Transmission System Owners (TSOs) are not incentivised to balance at least cost, or sufficiently incentivised to ensure neutrality in the service.

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<sup>4</sup> Section 43L of the Gas Act requires Gas Industry Co, before making a recommendation for gas governance rules or regulations, to "ensure that the objective of the regulation is unlikely to be satisfactorily achieved by any reasonably practicable means other than the making of the regulation (for example, by education, information, or voluntary compliance)".

<sup>5</sup> In this paper the term 'users' means the parties using the transmission system, such as 'welded parties' and 'shippers'. Welded parties are parties interconnected to the transmission pipeline system and shippers are the parties transporting gas through the transmission pipeline system.

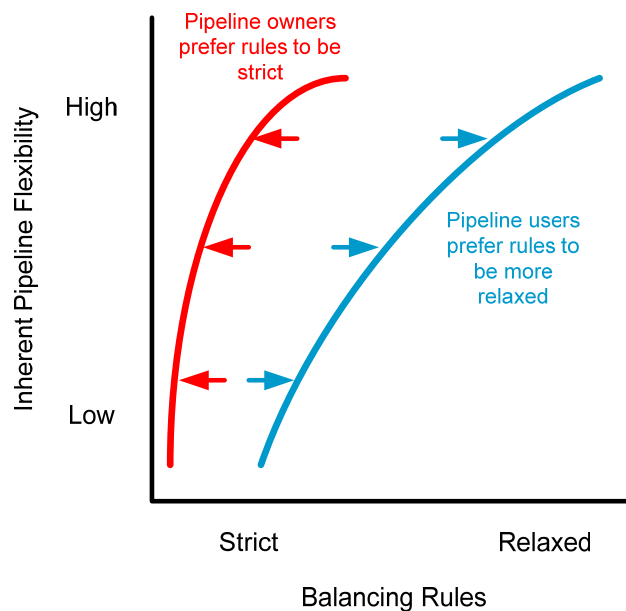
<sup>6</sup> The MPOC has been amended to remove legacy gas provisions and the changes came into effect on 12 December 2008.

## Balancing at least cost

Assuming gas balancing costs will be a pass-through in the TSOs' regulated revenues, the TSOs will have no incentive to minimise balancing costs or to optimise the pricing of balancing. Indeed the TSOs could have an incentive to simplify their involvement in balancing by imposing high penalties for imbalances or by holding excessive levels of flexible capacity.

Although TSOs and pipeline users both wish to avoid the extremes of overpressure and contingency, for any particular level of pipeline flexibility, TSOs will prefer stricter rules, while users wish the rules to be as relaxed as possible. The TSOs are interested in the effectiveness of the balancing market, but not necessarily in its efficiency. It is the community of users – who are both the providers and consumers of flexibility – who are best motivated to achieve an efficient balancing market.

Even where the inherent flexibility of a pipeline is high, pipeline owners will wish to maintain as much operational flexibility as possible, and minimise the possibility of having to take residual balancing action. Pipeline users, on the other hand, will wish to ensure that full use is made of whatever inherent flexibility may be available. This will provide them with some 'free' flexibility before they have to resort to more costly self-balancing actions. This tension, illustrated in Figure 1 below, is difficult to resolve by negotiation because there are no incentives on pipeline owners to compromise.



**Figure 1 - Divergent preferences of pipeline owners and pipeline users**

Gas Industry Co's view is therefore that the TSOs are not well placed to ensure that balancing is achieved at least cost.

### **Neutrality: avoiding potential conflicts of interest**

The TSOs have affiliates that are pipeline users with interests both upstream and downstream in the gas market. To keep the neutrality of the open access regime beyond doubt, it seems best to separate balancing from the provision of transmission services.

### **Conclusion**

In summary, Gas Industry Co's view—and probably the TSOs' view—is that balancing is really the 'business' of the community of pipeline users. Gas Industry Co has therefore concluded that doing nothing and leaving balancing arrangements as they are now is unlikely to be a practicable option. However, TSOs should continue to retain a safety role of ensuring that linepack stays within bounds when commercial balancing arrangements fail.

## **1.3 The consultation process**

Gas Industry Co's proposal for an independent Balancing Agent is a substantial intervention in the sector. This section explains the recent background and the next steps.

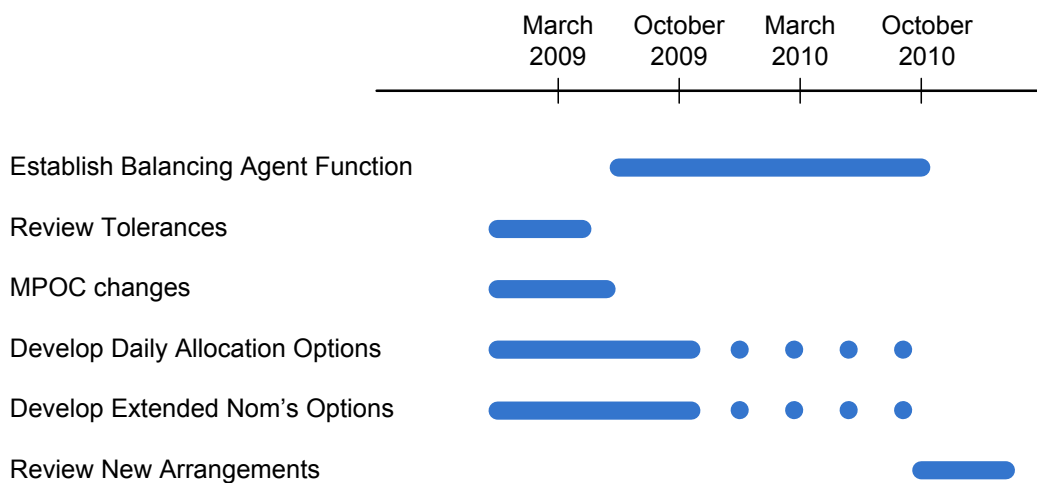
Because balancing mechanisms are complex and contentious, Gas Industry Co has undertaken an extensive consultation process on the subject. Most recently, Gas Industry Co prepared an Issues Paper for consultation. The Issues Paper considered why regulatory intervention may be necessary to address the balancing problems, analysed the causes of the problems, and suggested the design elements that should be considered in this subsequent Options Paper.

### **Next steps**

In this Options Paper, Gas Industry Co will set out the main components of its preferred option to improve balancing arrangements, including:

- recommending regulations to the Minister of Energy for the appointment of an independent Balancing Agent;
- suggesting changes for MPOC parties to consider;
- commissioning an independent expert review of MPOC tolerances;
- developing daily allocation options to lessen the risks for mass market retailers; and
- developing options for further nominations.

A rough timeline for conducting and reviewing this work is set out in Figure 2 below:



**Figure 2 - Rough timeline for balancing work**

This paper focuses on identification and formulation of a preferred solution. To comply with the requirements of the Gas Act, following consultation on this Options Paper, and some progress on the MPOC changes, and developing daily allocation and extended nominations options, Gas Industry Co will prepare a further options paper in which it will undertake additional consultation on the reasonably practicable options that it has identified and the assessment of those options. Gas Industry Co will then prepare a Statement of Proposal (SoP) prior to making a recommendation to the Minister of Energy.

### **Earlier consultation and policy proposals**

Balancing was discussed in Gas Industry Co's June 2006 Transmission Access Issues Review, mostly in relation to the effects of the Maui legacy gas sale contracts. Balancing remained a major feature of the consultation papers which culminated in Gas Industry Co's October 2007 Transmission Access Statement of Proposal. The draft regulations that accompanied that document provided for balancing to be one of three 'standard services' which TSOs would be required to offer (the other two being transportation and interconnection). However, due to legal uncertainty, the approach recommended in the SoP will not be pursued until a change to the Gas Act can be considered.

Over this time, the industry continued to suffer from balancing problems and Gas Industry Co has continued to engage with the industry on balancing related matters. In particular, following the 2006/07 summer over-pressure episode, Gas Industry Co participated in a series of workshops on likely causes and possible remedies, and in July 2007 it published an independent expert report on the treatment of unaccounted for gas.<sup>7</sup> In June 2008 Gas Industry Co received an MPOC change request

<sup>7</sup> See Independent Expert Report on Transmission UFG, Creative Energy Consulting, June 2007, on Gas Industry Co's website.

that led to the removal of the legacy gas provisions from the MPOC in December 2008. However, as Gas Industry Co noted in the Issues Paper:

‘... Gas Industry Co remains concerned that core elements of the balancing regime are flawed, and will not provide efficient pipeline balancing.’

To help in the detailed examination of each design element of the balancing regime, Gas Industry Co formed a Transmission Pipeline Balancing Advisory Group (TPBAG) comprising industry executives with expertise in areas related to pipeline balancing. This group has proved extremely helpful to the analysis of the problems, and identification of possible solutions. Gas Industry Co thanks the companies who contributed executive time to this matter.

In addition to the TPBAG meetings, Gas Industry Co has met with pipeline owners, major end users of gas, shippers on transmission pipelines, and the Ministry of Economic Development (MED) to discuss their views.

## 1.4 Outline of this paper

The remainder of this paper is structured as follows:

**Section 2: Objectives** This section derives relevant objectives for gas balancing from the Gas Act and GPS.

**Section 3: Necessary developments** A number of relatively un-contentious developments are needed to improve the performance of current balancing arrangements, independent of other design options considered. These changes are outlined in this section.

**Section 4: Core design features** This section describes the features common to all options, that the primary obligation for balancing will remain with pipeline users and that there is a residual balancing role believed, by Gas Industry Co, to be best managed by a single, independent Balancing Agent.

**Section 5: Assessment of core design features** This section rates the core design features against a set of criteria derived from the objectives discussed in section 2.

**Section 6: Design features under review** The Balancing Agent will have a variety of possible approaches to securing supply flexibility and demand management. This section discusses the options and outlines the tradeoffs in the ‘market’ that will develop around balancing. It also considers improvements that can be made through daily allocations of mass market deliveries and extended nominations on the transmission pipelines.

**Section 7: Preliminary assessment of design features under review** This section makes a preliminary assessment of the costs and benefits of the design features under review.

**Section 8: Gas Industry Co's proposal** This section explains Gas Industry Co's plan, summarising the rationale and describing the work that is required to refine the separate components, and discusses the next steps.

# 2 Objectives

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In assessing institutional arrangements for balancing options, Gas Industry Co has applied the principles set out in the Gas Act and GPS. The Gas Act requires such an assessment if Gas Industry Co is to recommend regulations at a later stage in the process.

## 2.1 Key principles for balancing arrangements

This section explains why Gas Industry Co has reached the view that the two key principles for present purposes are that:

- balancing arrangements should aim to achieve balancing at least cost, where 'cost' includes transaction costs for users; and
- users should be able to manage risks associated with balancing charges, including having good knowledge of their balance positions and having an ability to hedge price risk.

### **Gas Act and GPS objectives essentially promote service standards and efficiency**

Section 4 of the Issues Paper explained the requirements of the Gas Act in recommending gas governance regulations and rules. The principal objective is that 'gas is delivered in a safe, efficient and reliable manner'. The GPS augments this principal objective by adding the words 'fair' and 'environmentally sustainable'.

For the purposes of assessing options for balancing, Gas Industry Co's view is that the Gas Act and GPS objectives fall into two groups, one relating to promoting service standards, the other relating to promoting efficiency:

- the relevant service standard is that pipeline pressures should be maintained within an appropriate band, both for safety and so that transmission services are not interrupted; and
- the relevant aspect of 'economic efficiency' is that balancing is achieved at least cost.

In the balancing context, Gas Industry Co considers 'safe' to mean that the risk of breaching defined linepack limits is acceptable to the community of pipeline users. However this must be tempered by the interests of the TSO in providing its transmission service, which essentially involves a claim on



'flowing linepack'<sup>8</sup>. Gas Industry Co considers that these service standards are largely independent of the balancing regime design, so they are not discussed further here.

Defining economic efficiency can be contentious. Gas Industry Co's view is that, in the context of balancing, the main focus should be on minimising costs. Here, we note how characterising the approach as simply seeking 'least cost' covers many of the views expressed in submissions on balancing.

Signalling 'costs to causers' will help minimise costs. If users know that their imbalances will incur a charge when a balancing action is undertaken, they will make some balancing arrangements themselves. Users will set the level of their own balancing effort to minimise the total expected cost of their own arrangements plus the occasional balancing charge. If the balancing charge reflects the balancing agent's costs, overall balancing costs should be roughly minimised.

Pooling supply flexibility on the day will similarly help minimise balancing costs. One can think of increments of supply flexibility lying on a rising 'supply curve', with the lowest cost options first and successive flexibility mechanisms at higher and higher cost. If users contract separately to reserve these increments of flexibility for when they need them and some are not used on the day, then those actually implemented will be more costly overall than if all increments could be traded on the day. It is for this reason that Gas Industry Co expects the balancing agent will tender daily for supply flexibility and demand management options.

Some submissions have recommended penalties - charges over and above balancing costs - to encourage users to stay close to balance, but Gas Industry Co regards this approach as unlikely to minimise costs. If penalties exceed the marginal costs of balancing actions, users will over-invest in balancing arrangements, raising the overall cost of keeping linepack within bounds.

### **Preserving competition**

Gas Industry Co expects that there could be a trade off between achieving balancing at least cost through short term gas trading, and ensuring that the complexities or risks of that trading do not overwhelm small retailers and reduce competition. Gas Industry Co has therefore sought a solution that maximises efficiency (least cost balancing) subject to ensuring that retailers can manage the risks associated with balancing costs.

### **Efficiency objectives interpreted as desirable features**

To help find the best tradeoffs when assembling the options, the efficiency objective has been extrapolated into a list of criteria against which the practicable options have been assessed. The criteria for an efficient market is then supplemented with the design principles adopted by the European Regulators Group for Electricity and Gas (ERGEG). Gas Industry Co's view—supported by

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<sup>8</sup> See section 2.2 of the Issues Paper for a discussion on the uses of linepack.

submissions on the Issues Paper—is that the ERGEG principles are helpful in assessing options, so long as they do not cut across the objectives derived from the Gas Act and GPS.

The assessment of options for the core design features is set out in section 5, and essentially relies on identifying the reasonably practicable options and performing a cost benefit analysis. The assessment of options for the design features still under review is set out in section 7, and involves qualitative assessments against the desirable characteristics previously described and, where it is practical to do so, consideration of numerical costs and benefits.

Q1: Do you consider that the objectives identified in Section 2 are appropriate for the analysis of balancing options? If not, what other objectives would you propose?

# 3

## Necessary developments

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There are a few changes to existing arrangements that Gas Industry Co regards as necessary regardless of what other design elements are selected in the preferred solution. These are relatively non-contentious and include:

- the need to review tolerances; and
- changes to the MPOC in order to:
  - enable back-to-back cash-out;
  - allow balancing prices to reflect costs; and
  - provide for damages for over-pressure episodes.

### 3.1 The need to review tolerances

Gas Industry Co proposes to commission an independent expert review of tolerances to avoid what it sees as the potential socialisation of balancing costs.

Tolerances provide a safe harbour for users within which they are immune from balancing costs. Tolerances are discussed in section 7.5 of the Issues Paper.

The provision of tolerances influences the allocation of balancing costs among users. Indeed, if tolerances in aggregate provide more leeway than the inherent flexibility of the pipeline, balancing costs will be socialised across all users. MDL claims there is evidence that the current Maui tolerance levels are well outside the pipeline flexibility limits and that this will cause a significant portion of balancing costs to be routinely socialised.

In regimes where there is a penalty element incorporated in imbalance fees - such as with automatic cash-out or when penalty fees are applied when tolerances are exceeded - a case can be made that tolerances are efficient.<sup>9</sup> However, if the cash-out of imbalance positions is always back-to-back with a balancing gas transaction, the linepack flexibility is effectively fully and efficiently used at all times, so

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<sup>9</sup> For example it could be argued that in the presence of penalty fees, tolerances provide a safe harbour which mimics the 'congestible' resources cost curve: zero until a point is reached when congestion occurs.

the benefit of that inherent flexibility is automatically shared among users. In this situation, the rationale for tolerances is not so clear.

The Maui balancing regime provides a tolerance to welded parties, with a wider tolerance for Vector. The rationale for this is that Vector's welded points feed gas into the mass market which is inherently less able to manage demand than major plants, such as power stations.

The Vector balancing regime does not include any explicit concept of tolerance. However Vector shippers share the benefits of:

- Vector's Maui tolerances, since those tolerances reduce the frequency and amount of balancing costs being charged to Vector by MDL, and recovered from Vector shippers through Vector's Balancing and Peaking Pool; and
- the inherent linepack flexibility in Vector's pipelines, since shippers are only charged when balancing actions are taken.

The ERGEG principle five states that:

*"tolerance levels weaken balancing incentives and ... as markets develop it should be possible to reduce (and minimise) the size of tolerances".*

Gas Industry Co's view is that an independent expert review of tolerances is required to establish:

- what levels of tolerance would be appropriate for users to fully utilise the inherent flexibility of the pipelines;
- what levels of tolerance would be efficient at present; and
- which factors would influence the setting of tolerance levels in the future.

The conclusions of this review can be used by MDL, and later, the independent Balancing Agent, to modify tolerance levels.

**Q2:** Do you agree that it is necessary to review of tolerances as described in Section 3.1?

## **3.2 MPOC changes**

### **Enabling back-to-back cash-out**

Gas Industry Co shares the widespread view that the Imbalance Limit Overrun Notice (ILON) process prescribed in the MPOC needs improving.

Currently, if a welded party's Running Operational Imbalance (ROI) exceeds tolerance levels (currently set at the daily operational imbalance tolerance levels), MDL may notify the welded party to return or take away the excess gas within a defined timeframe by issuing an ILON. The defined timeframe can be between one day and a week, although typically MDL has been requiring timeframes of one day.

At present, the slowness of the ILON process means that balancing costs may not go effectively to causers and incentives on users to self balance are weakened. In particular, ILONs are issued on the day following an excess imbalance and generally allow a further day to correct the position. In the meantime, TSO balancing actions could have been taken as a result of the excess imbalance, but the causer may have also corrected its position. This may even cause the TSO to take a further balancing action, but still be unable to recover the costs from the causer. These costs would then be socialised.

Balancing charges should signal to users the full costs of balancing actions resulting from the users' behaviour in order to promote efficient behaviour and provide incentives for investment in information and business systems.

### **Allowing MPOC balancing gas prices to reflect costs**

Gas Industry Co is concerned that the current MPOC requirement for MDL to post balancing charges with at least a seven day notice period will prevent prices from reflecting costs.

Since it may be some time before an independent Balancing Agent function is introduced, it is important that current arrangements are as dynamic as possible. Gas Industry Co believes that cash-out prices should reflect costs, and that the seven day notice period may be a barrier to MDL developing more dynamic balancing gas procurement arrangements. Balancing prices should be notified when they become known, provided that it is before the balancing action is taken.

### **Adding a provision to the MPOC for damages for 'over-pressure' episodes**

Gas Industry Co considers that a damages regime is required to compensate producers that are unable to inject gas into the pipeline to the amount of their scheduled quantity because of the actions of others.

The new Gas Governance (Critical Contingency Management) Regulations 2008 (CCMRs) will require parties to pay the 'critical contingency price' for taking gas to which they do not have title during low pressure disruptions. Gas Industry Co encourages MDL, or other MPOC parties, to propose MPOC

changes to address the issue of compensation for parties damaged as a result of parties injecting more gas than they are entitled to, or not uplifting gas resulting in 'over-pressure' episodes.

**Q3:** Do agree that it is necessary to consider MPOC changes as described in Section 3.2?

# 4

## Core design features

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The Gas Act requires Gas Industry Co to identify all reasonably practicable options when recommending rules or regulations. This section identifies the aspects of the balancing regime design that will be common to all the reasonably practicable options, and are core design features of Gas Industry Co's preferred solution.

The main common features will be that:

- users will retain the primary responsibility for balancing; and
- some party needs to undertake the residual gas balancing role which is currently undertaken by the TSOs. Gas Industry Co recommends transferring the commercial aspects of that role to a single independent Balancing Agent.

### 4.1 Users retain the primary balancing obligation

Currently users have an obligation to balance their inputs and outputs in order not to consume linepack or 'park' gas in the transmission system beyond allowed tolerances.<sup>10</sup> Submissions on earlier consultation papers have generally supported the principle that users should continue to have the primary obligation to balance, and this appears to be a common approach in Europe. ERGEG Principle 1 states

*"The primary responsibility for network users is to balance their own inputs and off takes over the relevant period according to the rules and incentives of the respective balancing regime".*

This position is consistent with Gas Industry Co's belief that pipeline balancing is primarily a community of users issue, and that the TSOs should only have a residual safety role when commercial arrangements fail.

Section 5.1 provides an assessment of the primary balancing obligation options.

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<sup>10</sup> On the Maui pipeline, shippers "must ensure that" nominations balance (MPOC 8.2) and a Maui welded party "shall use its reasonable endeavours to manage" its accumulated imbalance so that it "tends towards zero over a reasonable period of time". The key Vector obligation is that Vector shippers "shall use all reasonable endeavours to ensure" a daily balanced position, other than to cause their accumulated mismatch to tend towards zero.

## 4.2 The residual balancing role

Gas Industry Co believes that it remains necessary for some party to undertake a residual balancing role. This section explains why.

### Residual balancing is best managed collectively

Balancing is only required within the limits of pipeline pressure and only the aggregate imbalance across all users is relevant. As a result, balancing should be managed (indirectly) by the community of pipeline users.

Although users have the primary obligation to balance, they cannot be compelled to balance on the day<sup>11</sup>, and linepack flexibility is small, relative to gas throughput. As a result, individual or aggregate imbalances may move the pressure towards one or other operating limit. Gas Industry Co's view is that to meet the Gas Act objective of safe, efficient, and reliable delivery of gas, some party must stand ready to inject or remove gas from the pipeline in order to avoid interruptions to transmission services, such as a critical contingency due to low pressure or shutting in producers due to high pressure.

Attempting to eliminate the residual balancing role completely would be inefficient. Ensuring that the aggregate imbalance remains within limits by relying on individual users would require severe penalty prices for individual imbalances. This would result in excessive investment in information systems, supply flexibility and interruptible load.

Doing away with the residual role by heavily penalising users with imbalance positions would also be inefficient because those individual imbalances impose no costs on the system unless the aggregate imbalance approaches one of the pipeline limits. This feature is similar to other so-called 'congestible' resources like highways and sports facilities. Up to some level of use, additional traffic or participation imposes no costs on other users;<sup>12</sup> beyond that critical level, additional users increasingly crowd each other out. A price signal is only efficient as congestion develops.

### Retailers have imperfect information

In the New Zealand gas market, there are good reasons to expect that residual balancing actions will be required despite users attempting to balance individually. Mass market retailers know their supplier nominations on each day but do not know at the time of offtake exactly what gas is due to their customers and what is due to other retailers' customers. They will only know their (allocated) daily offtakes—and hence their balance positions—well into the following month.

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<sup>11</sup> Because they have imperfect knowledge of their imbalance positions on the day, and are reliant on the behaviour of their customers, the end users of gas.

<sup>12</sup> Use is said to be 'non rival' up to this point and charging any price may send the wrong signal.



Consequently retailers have less than perfect information in respect of their daily demand and it is thus unlikely that all users will balance their position all of the time. This is not to say a mass market retailer cannot invest in information systems to improve the accuracy of estimating its position. Improvements will be possible but complete accuracy is unlikely to be cost effective and it would be difficult to set standards for market monitoring.<sup>13</sup>

### **Gas Industry Co favours an independent Balancing Agent**

The residual role is currently with the TSOs. Although this approach appears to be favoured by ERGEG as a long term solution,<sup>14</sup> Gas Industry Co believes that there should be a separation between ensuring physical security and the commercial management of linepack.

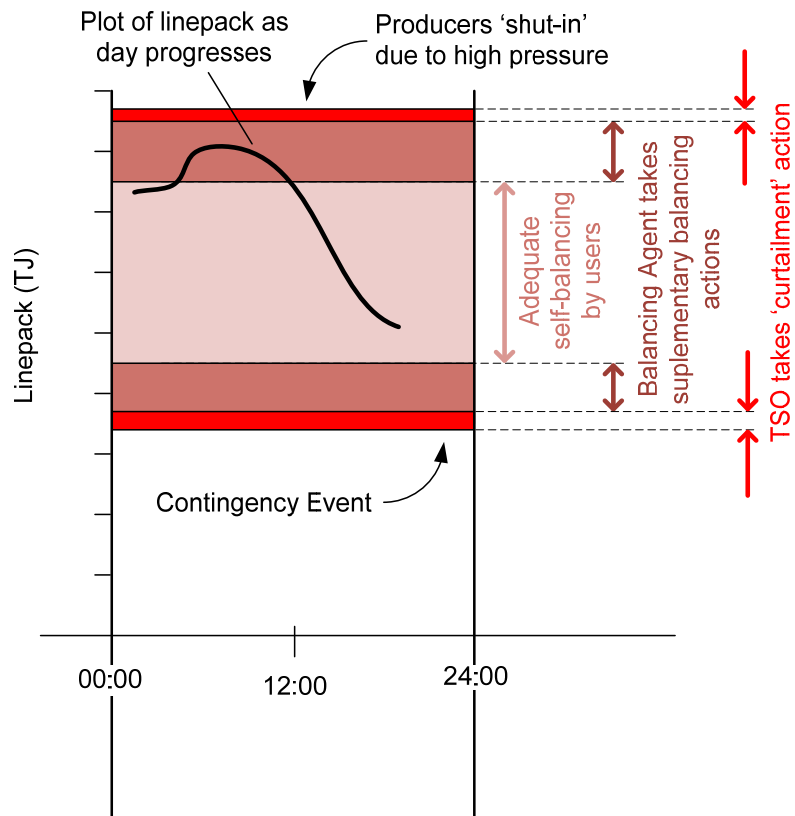
Gas Industry Co's view is that, while the transmission codes should continue to require each TSO to provide any 'curtailment'<sup>15</sup> options, an independent Balancing Agent will be better placed to manage the residual commercial option of buying and selling balancing gas in a non-discriminatory way. The TSO would only intervene if this commercial process fails. This is illustrated in Figure 3 below.

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<sup>13</sup> It is possible that, given the historic lack of price incentive, users have underinvested in information systems and that clearer price signals would enable investment decisions to be made that will reduce imbalance from historic levels. It is however impractical to determine quantitatively what an optimal investment would be as it would vary between retailers and over time with changing market conditions.

<sup>14</sup> ERGEC Principle 1 states that *"The TSO retains the overall responsibility for the economic and efficient operation of its system and therefore should retain a residual role to maintain physical balance to ensure the efficient and safe operation of the system"*

<sup>15</sup> As discussed elsewhere in this paper, even the 'curtailment' option is unlikely to involve physical intervention by the pipeline owner. The action is more likely to involve 'upping the ante' by invoking provisions of the code which cause one or more users to chose self-imposed flow restrictions.



**Figure 3 - Balancing responsibilities**

### **Limit on balancing cost vs. security of supply**

The rules for the residual Balancing Agent will need to set a limit on the cost that the Balancing Agent will incur before ceasing to procure balancing gas. This limit will need to be consistent with the industry standard for security of supply.

Section 5.2 provides an assessment of the Balancing Agent options.

# 5

## Assessment of core design features

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This section sets out the rationale for users retaining the primary balancing obligation, and for the establishment of a single independent Balancing Agent.

### 5.1 Assessment of primary balancing obligation options

The current pipeline balancing arrangements can be considered as a 'repayment in kind' regime, where users have an opportunity to self-balance over time. Moving away from this 'overs and unders' arrangement to one which could accommodate users maintaining deliberately imbalanced trading positions would appear to require access to a market for overall injections and offtakes - a 'gross pool' analogous to the electricity wholesale market.

There is no such gross pool spot market for gas in New Zealand. To introduce one would require not only changing the pipeline balancing arrangements, but also requiring that all gas be traded through the gross pool. This would be a substantial and unjustified intervention in the gas trading market and therefore Gas Industry Co does not regard it as being a practicable option for dealing solely with balancing. In addition, from its discussions with the TPBAG, Gas Industry Co understands that there would be no support for a gross pool from industry participants.

Gas Industry Co concludes that the primary balancing obligation should remain with pipeline users.

**Q4:** Do you agree that the primary balancing obligation should remain with pipeline users?

### 5.2 Assessment of Balancing Agent options

Sections 7.2 and 7.7 of the Issues Paper discussed the issues with the current situation where MDL and Vector each provide their own Balancing Agent. Submissions on the Issues Paper supported Gas Industry Co's preliminary view that two balancing roles were likely to be more inefficient and supported the concept of a single Balancing Agent, providing the function would be contestable.

There are two aspects of this issue to be considered: whether one Balancing Agent is better than two; and, if so, whether that single Balancing Agent should be independent of Vector and MDL.

Addressing the 'one versus two' issue, Gas Industry Co considers that with two Balancing Agents:

- both might take balancing action which are in conflict with each other;
- users will need to choose which Balancing Agent to offer flexibility to, losing the benefit of pooling a scarce resource, and the ability to hedge balancing costs;
- a high priced balancing option may be dispatched before a low cost one, depending on which Balancing Agent acts first; and
- operating costs are likely to be higher than for a single Balancing Agent.

However, Gas Industry Co is also aware that with a single Balancing Agent, the separation of the management of linepack from the provision of transmission services may be technically problematic. In addition, establishing the governance and accountability arrangements between the Balancing Agent and the pipelines will be challenging, particularly where the Balancing Agent function is not independent.<sup>16</sup>

Turning to the question of whether the single Balancing Agent should be independent of Vector and MDL, Gas Industry Co considers that leaving the balancing function with Vector or MDL will perpetuate concerns about:

- lack of independence from other parts of their businesses, particularly gas trading;
- lack of incentives to achieve balancing at least cost and maximise market efficiency;
- principal-agent problems, given that the Balancing Agent (the TSO) will have different incentives to the community of users it is acting on behalf of; and
- Vector, at least, indicating an unwillingness to continue in the role of Balancing Agent.

However, Gas Industry Co is also aware that with an independent Balancing Agent:

- the extent to which the Balancing Agent is involved in the operation of pipeline compressors will become an issue;<sup>17</sup> and
- issues of funding, liability, contract term etc. in the Balancing Agent's contract will need to be addressed.

The independent Balancing Agent could be set up as a joint venture of the TSOs, a joint venture of the users, or a service provider reporting to Gas Industry Co. Gas Industry Co does not oppose the first

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<sup>16</sup> Unless the single balancing agent is independent, it may be inclined to give priority to balancing its own pipeline, or purchasing flexibility from its own affiliate.

<sup>17</sup> The lowest cost balancing option at times could be shifting (borrowing) linepack from one balancing zone to another rather than buying or selling balancing gas.

two options but, given that the industry has not already moved to initiate those options and the difficulties in achieving industry agreement, considers the most practicable option is that the independent Balancing Agent should be a service provider reporting to Gas Industry Co.

On balance, Gas Industry Co considers that a single independent Balancing Agent is likely to be the best option for the industry, and will provide:

- a means of managing both pipeline systems as a whole (greater harmonisation);
- higher balancing market efficiency; and
- the ability for users to hedge against balancing price risk.

### **Costs and benefits**

Gas Industry Co expects the costs of moving the balancing role to be outweighed by likely cost savings in providing enough supply flexibility and demand side management to deal with balancing.

The costs of residual balancing comprise:

- the cost of balancing gas; and
- the operating costs of the Balancing Agent function.

According to information MDL released to the industry on 10 November 2008, during the four month period from July to October 2008 inclusive, the MDL Balancing Agent took 175 balancing actions: 79 'calls' amounting to 641TJ, and 96 'puts' amounting to 2,625TJ. At posted gas prices of \$6 and \$1, this totalled to a transaction value of \$6.5m. Of course, this was during a time when the costs of balancing were not flowing through to causers.

For a first order approximation of what the value of balancing transactions might be after balancing costs are allowed to flow to causers, it could be assumed that:

- the four month July to October 2008 period is typical;
- the prices for balancing gas will average out around the same value in the future; and
- the total number and value of balancing gas transactions will halve (say) as a result of allowing costs to flow through to causers.

Given these assumptions, the expected value of future balancing transactions is:  $(3*6.5)/2 =$  approximately \$10m/year.

Currently, it is difficult to know what the costs of the two Balancing Agents are. It is therefore difficult to know whether an independent balancing agent will cost more or less. While a cursory analysis would assume that cost savings would result from reducing from two Balancing Agents to a single Balancing Agent, this may be illusory. The current Balancing Agents share overheads with their parent organisations, and may benefit from lower information costs. A more cautious approach is therefore to assume that a single independent Balancing Agent will cost as much as the two existing affiliated Balancing Agents.

In addition, there will be some initial set up costs for the independent Balancing Agent. These could amount to as much as \$2m (depending on the level of sophistication of the balancing tools employed). This would amortise to, say, \$0.5m/year.

To be justified on a cost basis, the independent Balancing Agent function would need to capture at least \$0.5m/year of benefit through lower balancing gas costs (ignoring the intangible benefits arising from independence). However, given that this is only 5% of the estimated \$10m/year procurement costs, it seems readily achievable.

Given that the independence of the Balancing Agent function also brings intangible benefits – particularly by removing conflicts of interest and improved transparency – Gas Industry Co's assessment is that the benefits will exceed the costs.

Another approach to considering the costs and benefits is to look at the cost of investing in supply flexibility. While it is always difficult to determine the true marginal cost of gas production capacity, the cost of recent developments like Kupe and Pohokura were of the order of NZ\$4m - \$14m per TJ/day<sup>18</sup>. However, these were expensive offshore developments. A more realistic source of supply flexibility would be an onshore field or storage facility such as Contact Energy's recently announced gas storage project. Based on the (almost) depleted Ahuroa reservoir near Stratford, it will cost about \$204m and is expected to provide delivery and receipt flexibility of 170 TJ/day<sup>19</sup>. The unit capital cost of this supply flexibility will therefore be about \$1.2m per TJ/day.

The sector might plausibly need 50 TJ/day of residual balancing capacity. Taking an average of \$1.2m per TJ/day as an indicative cost of supply flexibility, the balancing capacity would cost \$60m, say \$10m per year.

As in the previous calculation, the independent Balancing Agent function would only need to bring about improvements in the order of 5% to cover establishment cost of \$2m (again, assuming that the operating cost of the independent agent is no more than the combined cost of the existing two affiliated Balancing Agents). From this point of view, the benefits seem equally achievable.

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<sup>18</sup> Kupe \$NZ1.1b for 70 TJ per day and Pohokura US\$600m for 225 TJ per day.

<sup>19</sup> From Presentation to Contact Energy Investors, Queenstown, April 2008.

**Q5:** Do you agree that there should be a single independent balancing agent?

# 6

## Design features under review

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This section describes the elements of Gas Industry Co's proposal that require further investigation. This includes the contracting and spot market approaches that could be adopted by the Balancing Agent in securing balancing gas, as well as the 'daily allocation' mechanism that would remove the retrospective assessment of imbalances for mass market retailers. Finally, Gas Industry Co wishes to further explore the comprehensive proposal that Vector submitted in response to the Issues Paper (extended nominations proposal), to unify the balancing role and treat producers and large users on the Maui and Vector pipelines more consistently.<sup>20</sup>

Gas Industry Co has concluded that having the Balancing Agent rely on contracting in advance for balancing gas is likely to be relatively inefficient. Pooling all available flexibility in a daily tendering process or spot market is likely to achieve lower cost balancing. Section 6.1 describes the balancing gas procurement options, and section 7.1 provides a preliminary assessment of these options.

Daily allocation of mass market deliveries could be a useful way of avoiding the threat to mass market retail competition that is posed by cash-out risks. Even though more work is required to establish if daily allocation is feasible, for present purposes Gas Industry Co has assumed it may be a practicable option and included the mechanism in the proposed work programme. Appendix B considers what information is currently available to pipeline users. Section 6.2 considers what options are available for improving daily balance information, and section 7.2 provides a preliminary assessment of the daily allocation options.

Gas Industry Co also considers that certain features of the extended nominations proposal require further investigation. However, valuable progress can be made in improving balancing in the meantime, without cutting across the longer term prospects for the extended nominations proposal. Appendix C provides an overview of the Vector proposal. Section 6.3 considers whether the extended nominations proposal has features that might improve balancing, and Section 7.3 provides a preliminary assessment of these options.

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<sup>20</sup> A core design feature of Gas Industry Co's proposal is a single independent Balancing Agent with a residual safety role for the TSO, which is common to the Vector proposal.



## **6.1 Balancing gas procurement options**

### **The 'market' for balancing**

Self balancing by users and any residual balancing will invariably involve adding or removing 'balancing gas' from the pipeline. Sourcing or disposing of balancing gas inevitably creates a balancing 'market', whether participants secure a suite of flexible contracts in advance or participate in a spot market. This section distinguishes this market from the New Zealand Gas Exchange (NZGE) and then discusses the tensions in the balancing market. The crucial consideration is how to make best use of the possibly limited - but numerous - sources of flexibility in supply and demand.

### **The balancing market will be different to the NZGE**

The balancing market is likely to be a different market to the NZGE being developed by Gas Industry Co. While some balancing gas could be sourced from the NZGE, which is currently designed as a day-ahead market, the flexibility sought in the balancing market is likely to be short term flexibility that is deliverable immediately (intra-day) and potentially outside of the constraints of the nomination cycle. Therefore the balancing market is discussed here as a separate market even if it can potentially operate on the same platform as the NZGE or be a different product range on the NZGE.

### **There is a tension between reserved flexibility and short term trades in balancing**

Mechanisms that pool all available flexibility on the day will allow balancing - by users and by the Balancing Agent - to be achieved at lower cost than if parties seek to reserve flexibility long term. On the other hand, all parties will want to be sure that flexibility is available on the day at a reasonable price. Gas Industry Co expects that users will secure contracts for flexibility but proposes that the Balancing Agent should provide a short term market to maximise the chances that spare capacity is pooled. This does not prevent the Balancing Agent from securing term contracts if required.

It will be in the interests of consumers for the rules governing the operations of the Balancing Agent to promote:

- the balancing market being open to all credible providers of flexibility;
- dispatch of the lowest cost flexibility option first;
- market prices reflecting the value of additional flexibility, thus providing the right price signal for investment in flexible capacity; and
- users being able to hedge the risk associated with uncertain charges for residual balancing by participating in the balancing market themselves.

## Balancing using a portfolio of contracts

One option for the Balancing Agent is to enter into a portfolio of flexible contracts with 'put' and 'call' option characteristics. Contracts are attractive in that they can stabilise balancing charges and thus potentially impose lower risks on mass market retailers. The process for establishing the portfolio can be summarised as follows:

- establish a process for determining the security of supply standard with the TSOs, users and Government;
- remove relevant MPOC and VTC processes;
- create controls around the Balancing Agent's procurement of balancing gas;
- have the Balancing Agent enter into a portfolio of balancing contracts to the given standard;
- set the cash-out price as an estimate of the long-term balancing cost (including fixed costs) with the difference washed up over time or levied on the market;
- have users manage price risk by knowing the approximate balancing charge a little in advance;
- institute a process for recovery of costs of the service; and
- develop a governance regime to manage the Balancing Agent with a change control process to allow evolution over time.

As discussed in the next section, Gas Industry Co's view is that this option does not seem particularly attractive by itself. Gas Industry Co's reservations are as follows:

- While a suite of contracts entered into ahead of the time can be open and transparent, the approach has the downside of locking in capacity that is consequently not available to users for self balancing, even if the Balancing Agent does not need it on the day.
- Similarly, there would be no mechanism for spare capacity in flexibility secured by users to be made available to the Balancing Agent on the day. Both effects will cause over investment in capacity, raise the costs of balancing, and raise gas prices.
- Contract prices are unlikely to fully reflect the actual opportunity cost of balancing gas at the time of the net imbalance. The Balancing Agent may need to set balancing charges to reflect estimated opportunity costs to avoid users preferring these charges to self-balancing. Over-use of the Balancing Agent's resources could compromise security of supply.

- Contract prices are likely to entail fixed costs. The net cash flow from balancing charges and fixed contract costs may be highly volatile, raising the administrative costs of recovery (or distribution) downstream and potentially diluting the price signal.

### **Balancing using a spot market**

Gas Industry Co sees numerous benefits in requiring the Balancing Agent to use a balancing spot market to secure balancing gas. This section outlines a possible approach.

#### **Pooling flexibility on the day**

A balancing spot market would need to operate on-the-day as the timeframe for action is likely to be after the main market and nominations have closed. The idea is that each user should first balance its own position (as far as it can be assessed) and then offer any spare flexibility into the balancing pool, thereby lowering the overall costs of balancing.

#### **Risk management**

A key concern raised by users is the exposure to an uncertain balancing cost imposed by the Balancing Agent since these costs would be set by the market, and hence be unmanageable. Indeed, a balancing spot market would appear to create an unknown and uncapped risk. However, a balancing spot market also provides an opportunity to give users a mechanism to hedge the risk associated with balancing charges.<sup>21</sup>

Enhancing the market in this way is consistent with ERGEG principle 4c:

‘if flexibility tools and/or information are not sufficient to allow market participants to manage their positions effectively then other mechanisms should be introduced’.

Enabling users to hedge their exposure to balancing charges will not require the Balancing Agent to source balancing gas exclusively from the spot market. The Balancing Agent may have other options such as the NZGE or a standing flexibility contract. Hedging will be possible so long as the Balancing Agent first seeks gas on the balancing spot market to ensure there are no cheaper options available. If the Balancing Agent first checks the balancing spot market in this way, users will be protected because the imbalance price will then be the same or better than the offers in the balancing spot market.

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<sup>21</sup> See section 7.5 and Appendix C of the Issues Paper for more detail on how hedging would work, together with a numerical example.

## Market rules

The following table lists some potential rules for the balancing spot market:

Feature	Corresponding rules
Open, ie pool and use all available capacity	All credible providers can take part. Offers can be accepted at locations other than the zone being balanced, and the Balancing Agent can use its balancing TSA to move late gas (ie gas available outside nomination cycles). TSOs to provide the Balancing Agent with TSAs that operate outside nomination cycles.
Transparent	Terms will be consulted on, common to all, and published.
Efficient use of flexibility	Long term contracts which lock-up capacity will only be entered if required by lack of market liquidity. Even then, it would be a requirement to always test the spot market first to ensure the lowest cost source is utilised.
Ability to match quantities with need	Allow partial acceptance of offers.
Marginal priced to dispatch the resource on merit and price the resource at the marginal cost of consumption of the resource	Offers to be in the form of minimum sell or maximum buy price, with those offering able to limit other users from accepting the offer (ie to make an offer Balancing Agent specific). The clearing price would be the highest/lowest accepted price.
Imbalance price can be hedged by users	Cash-out price is the same or better than the clearing price (other than adjustments for location). Other balancing gas sources would only be used after establishing there are no better balancing spot market offers.
Service levels clear	The market would be managed to established standards.

## Establishment of a spot market

The process for establishing a spot market can be summarised as follows:

- establish a process for determining the security of supply standard with the TSOs, users and government;
- determine arrangements for participation in the market and for the recovery of the costs of providing the service (if this is not already addressed in the Balancing Agent arrangements);
- if not already done, remove relevant MPOC and VTC gas procurement processes;
- review the size of MPOC tolerances in light of the additional risk management offered by the market, and the need for an MPOC incentives pool;

- provide a balancing spot market platform;
- create controls around the Balancing Agent's procurement of balancing gas<sup>22</sup>; and
- develop a governance regime to manage the spot market and Balancing Agent with a change control process to evolve over time.

Section 7.1 provides a preliminary assessment of the gas procurement options.

## 6.2 Daily allocation options

As noted earlier in section 3.2, delayed metering in the mass market and the allocation process mean that some users do not know their allocated daily balance position until after the end of the month. This makes it difficult to manage possible imbalances on the day and creates a significant cost risk on cash-out. Some submissions on the Issues Paper have proposed allocating imbalances each day instead.

Gas Industry Co's view is that daily allocation could be a good way of protecting retailers from risks associated with retrospective cash-outs but the feasibility of the process has yet to be established. This section sets out the options and Gas Industry Co's preliminary preferred solution.

### Options for improvement

From the analysis in Appendix B, it is clear that the information problem - of estimating mismatch positions - is challenging for retailers supplying gas to mass market consumers. Not only is there the problem of estimating actual sales, but also of estimating the outcome of initial allocations (on which the allocation of balancing costs are based).

Possible options for addressing the issue include:

- leave industry-wide arrangements as they are and allow individual users to choose how much to invest in improving their information systems, and how much to rely on residual balancing (status quo option);
- provide some improvements to the industry-wide arrangements, but otherwise leave individual users to manage their affairs (modified status quo option); or
- rather than using the (quite inaccurate) initial allocations for allocating balancing costs apply, an alternative algorithm which can be applied daily, rather than monthly (daily allocation option).

These possible options are discussed in the sections below.

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<sup>22</sup> For example, this could require the Balancing Agent to always test spot prices, and minimize the use of fixed price flexibility contracts.

### **Status quo daily information option**

The status quo option is to leave the industry-wide arrangements as they are and leave it to individual retailers to determine how much to invest in their individual information systems. Subject to other gas governance arrangements already in place, they would determine their optimal settings for investment in telemetry, TOU meters, frequency of meter reading, sampling of mass market users, and forecasting and internal business processes, based on the incentives provided by the balancing costs allocated to them.

While this may at first sight seem unattractive, it may prove quite efficient. The choice facing the retailer is whether to invest in systems that will improve its knowledge of its balance position thereby allowing it to better manage that position, or accept an allocation of balancing costs because it did not adequately manage its position. This choice will be quite different for each retailer. For example, a retailer supplying small industrial customers may choose to invest in ToU metering, but this is not a realistic choice for a retailer supplying residential customers. Similarly, retailers which have good access to flexibility arrangements may prefer to actively manage their balance positions, whereas others may prefer to leave the fine-tuning to the Balancing Agent.

### **Modified status quo option**

It is possible that current industry information systems could be modified to improve the information available to users. For example, this could include requiring Vector pipeline deliveries to be validated and posted on OATIS every day, rather than every business day, or presenting information in a more user-friendly format. However, Gas Industry Co believes that these improvements are best described and promoted by users as MPOC or VTC change requests.

In submissions on the Issues Paper, it was proposed that daily allocations could be performed one day in arrears, rather than in the subsequent month. Broadly, there are three possible approaches to doing this:

- replicate the current month end processes, but in a compressed timeframe and on a daily basis;
- centralise data gathering (through increased use of TOU devices and profiling), but otherwise try to deliver allocation results that are as close as possible to those that the month end allocation process will deliver; or
- centralise the calculation of a daily allocation of gas gate quantities but do so based on a simple algorithm, possibly based on historical information.

### **Preferred daily allocation option**

At this stage, Gas Industry Co's preferred option is to determine each user's daily allocation of gas gate deliveries for balancing purposes (the 'balancing allocation') entirely from earlier market shares (historical profiles). This balancing allocation would be established quickly enough to allow the user to self-balance and avoid being cashed-out. It should be possible to provide the information by 4pm on

the day after gas flow. The balancing allocation would only be calculated for the purpose of determining balance positions, and allocating balancing costs. The calculation would be independent of the allocations that are performed under the Gas (Downstream Reconciliation) Rules 2008 during the month after gas flow (too late for self-balancing). The balancing transactions would not be reopened.

While a user's balancing allocation may not match the end-of-month allocation, the attraction is that the approach enables the user to manage to a known position. In addition, the algorithm could be refined over time to improve its accuracy. Overall, the approach is regarded as likely to promote balancing by retailers and reduce the need for intervention by the Balancing Agent.

Section 7.2 provides a preliminary assessment of the daily allocation options.

### **6.3 Extended nomination options**

Appendix A gives a description of the extended nominations proposal.

On balance, Gas Industry Co believes that while the extended nominations proposal has many features that would improve balancing, it may go further than necessary. For example, the imposition of daily penalties charged to Large Station shippers for imbalances outside the station's 'Daily Limit', regardless of the overall balance position of the pipeline, seems unnecessary.

Gas Industry Co's major concern with the extended nominations proposal is the possible cost of implementation. Further detailed analysis is therefore required. However, Gas Industry Co's initial views are that:

- Some aspects of the proposal are already part of Gas Industry Co's preferred option. These are:
  - the single independent Balancing Agent role, contracted to Gas Industry Co; and
  - the TSOs retaining a residual safety role;
- Some aspects have not been explicitly addressed in this paper, but Gas Industry Co believes they are implicit in its preferred option. These are:
  - the balancing agent allocating balancing costs to users; and
  - the ILON, Operational Balancing Agreement and Balancing and Peaking Pool processes being removed from the existing codes and replaced by new arrangements managed by the Balancing Agent.
- Other aspects have not been explicitly addressed in this paper, but Gas Industry Co believes they should be given further consideration. These are:

- the six balancing zones;
  - the Large Station / Small Station distinction (including the pooling of Small Stations);
  - the cost allocation (first to shippers supplying Large Stations, and then, if there are any costs remaining, to the shippers supplying Small Stations);
  - shippers nominating on both the Maui and Vector systems;
  - replacing 'Imbalance' and 'Mismatch' with 'Imbalance Positions';
  - grouping Small Stations into pools;
  - all injecting parties being responsible for their Imbalance Positions; and
  - balancing costs being allocated by the Balancing Agent without tolerances, first pro-rated to contributing Large Station shippers and then if any costs remain, to Small Station shippers.
- Other aspects, which Gas Industry Co does not support are:
    - daily penalties being charged to Large Station shippers for both positive and negative imbalances outside the Station's 'Daily Limit'; and
    - provisions being regulated into gas sale agreements to enable shippers to pass on their balancing costs to end users.

Section 7.3 provides a preliminary assessment of these extended nominations options.



# 7

## Preliminary assessment of design features under review

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This section assesses:

- the procurement options that will be available to the Balancing Agent - the spot procurement mechanism appears attractive, either through on-the-day gas tendering or through a spot market;
- the daily information options – a simple daily algorithm might be all that is required, if it turns out to be feasible; and
- the extended nomination options – further analysis is required.

### 7.1 Assessment of balancing gas procurement options

In section 2, the relevant key objectives identified were that:

- balancing arrangements should aim to achieve balancing at least cost, where ‘cost’ includes transactions costs for users; and
- users should be able to manage (hedge) risks associated with balancing costs.

In assessing whether Gas Industry Co’s prescription for the Balancing Agent’s approach is appropriate, the second objective is treated as a requirement and the first objective is extrapolated into a list of criteria for efficient markets that have been developed here and in the Issues Paper.

Criteria	Portfolio of contracts	Score (1 to 5)	Spot market	Score (1 to 5)
Responsibilities clear	Yes	5	Yes	5
Balancing services open to all credible providers	Less Some users will be unable to make term commitments (but may have flexibility available on an ad-hoc basis)	4	More Terms will be less difficult to meet (all available on-the-day capacity can be considered)	5

Criteria	Portfolio of contracts	Score (1 to 5)	Spot market	Score (1 to 5)
Transparent balancing process	Less Multiple sets of bilaterally negotiated terms	4	More One set of posted terms	5
Efficient use of flexibility, ie does not tie up flexibility and reduce the ability to self-balance, and pools available flexibility on the day	Low Flexibility removed from the users over an extended period	3	High Flexibility remains with users prior to a need then pooled	5
Prices reflect the market value of flexibility	Partial Contracts would be tendered but the price is set ahead and not on-the-day	2	Yes The price changes with the market conditions on the day	5
Users can manage the imbalance price risk	Partially Only if the user can practically participate in the tender	3	Yes Users can hedge by participation	4
Effective price signals to those contributing to balancing costs	Partial Contracts may entail fixed costs and marginal costs less than opportunity costs	2	Yes	5
Minimises additional regime cost	Yes Little change cost	5	No New spot market operations	2
Timely implementation	Yes	5	Medium if regulated (MDL could implement quickly if unregulated)	3
		33		39

The spot market mechanism clearly has a number of attractions, but the closeness of the overall score (33 v 39) suggests some caution is necessary.

In summary, Gas Industry Co considers that the advantages of an on-the-day balancing spot market include:

- maximising the flexible capacity available by enabling spare capacity not used in setting nominations to be subsequently offered into the balancing market, hence increasing liquidity and lowering overall balancing costs;

- lowering barriers to users participating in the balancing market (ie lower than necessary to enter a fixed contract for flexibility);
- balancing charges reflecting the opportunity cost of flexibility at the relevant time, hence providing more efficient signals for investment in flexibility and preventing arbitrage<sup>23</sup>; and
- the ability for users to hedge their cash-out price risk by participating in the spot market.

Disadvantages include the risk that the smallest pipeline users will find participation too costly and may need to buy secondary hedging products, perhaps from competitors.

Gas Industry Co expects that there would be a strong incentive for users to participate in the spot market due to the attraction of being able to hedge cash-out risk. While liquidity on the day would not be assured, it seems likely to be better than with contracting options. However, if a party did prefer to offer available flexibility on a term contract, then the Balancing Agent could enter such a contract and still use the spot market to test the value of that gas on the day.

Some proponents of the daily allocation method take the view that, if other improvements provide mass market retailers with better information on their balance positions, residual balancing will seldom be required and the existing TSO arrangements may suffice. Gas Industry Co's view is that the consideration of daily allocation and the establishing of the independent Balancing Agent role should be undertaken in parallel. The feasibility of daily allocation is far from certain. However, Gas Industry Co acknowledges that in the unlikely combination of events in which daily allocation fell into place easily and residual balancing turned out to be almost unneeded, then the work on developing the independent Balancing Agent function may not be required.

## Daily processes

The key to minimising balancing costs is to pool sources of flexibility on the day.

From the previous section, it is clear that if the balancing price signals are set ahead of time, say to recover the costs of a standing contract, and do not follow market values on the day, there will be times when the imbalance prices will make the balancing process attractive to users as a source of additional gas and security of supply could be compromised. It is also clear that physical flexibility is very expensive relative to the costs of running a balancing market.

Therefore a balancing market that maximises the use of available flexibility, minimises investment in new flexibility and sends accurate market price signals is desirable. Initially, the Balancing Agent is likely to use daily tender processes to access flexible supply and demand response. In time, a spot market platform may be developed to maximise the pooling of flexibility, dispatch the cheapest

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<sup>23</sup> For example, setting the balancing price ahead in a term contract for flexibility will invariably result in times when the value of spot gas exceeds the imbalance price. The Balancing Agent would then be the cheapest source of supply, and flexibility could be used up in providing base gas supply requirements rather than providing a back-stop.

resources and provide an on-the-day price. These daily processes will produce lower costs than long term contracts that lock up capacity in advance and therefore cannot dispatch the cheapest source on the day.

### **Value of improved procurement arrangements**

The market is likely to value flexibility highly and therefore to put a high value on any cost reductions resulting from an independent Balancing Agent's balancing gas procurement arrangements. For example:

- from section 5.2, a 10% improvement in balancing procurement arrangements could reduce costs by about \$1m/year; and
- the cost of non-supply is high:
  - If a large industrial consumer's gas cost is 10% of its operational expenditure, and operational expenditure is 50% of revenue, the economic cost of non-supply could be of the order of 20 times the gas price. Therefore if the delivered retail gas price is \$10/GJ, the short-run cost of non-supply could be of the order of \$200/GJ; and
  - If a power station has a conversion rate from gas to electricity of 7,500MJ/MWh and the electricity spot price is \$500/MWh when supply is tight, then the marginal value of gas in generation could be \$67/GJ.

Gas Industry Co concludes that more efficient utilisation of the market's flexible capacity is significantly more valuable than the cost of operating a new balancing regime.

**Q6:** Do you agree with the section 7.1 preliminary assessment of balancing procurement options?

## **7.2 Assessment of daily allocation options**

The daily allocation mechanism and a balancing spot market will both contribute to retailers' ability to hedge the risks associated with balancing.

The Gas Act and GPS (and ERGEG principle 3) require that shippers should not be exposed to risks they cannot manage or costs that could create barriers to entry. An advantage of a balancing spot market is that mass market retailers will be able to hedge their exposure to balancing costs. The daily allocation mechanism could also reduce the risks faced by mass market retailers by giving them a clearer balancing target on the day.

The first approach (replicating the current month end processes each day) is very likely to be the most costly. The arrangements would involve retailers and the allocation agent working during every day of the year and throughout each night, in order to achieve the 'day in arrears' results. Retailers would

have to substantially improve their data collection and validation systems in order to deliver data that is currently due on four business days after month end in about half a day.

The service provider cost of allocation for the current end of month regime is approximately \$1m in capital and \$1m/year in ongoing operating costs. While performing the same operation every day will not increase the service provider cost by a factor of 30, it could easily increase it by a factor of 5, with a similar order of investment required by retailers. If that ongoing cost of \$10m/year was recovered across the mass market demand of, say, 20PJ, it would increase delivered gas prices by \$0.50/GJ.

The second approach (additional centralised data gathering supporting a daily allocation) would involve:

- agreeing the algorithm and proving the concept;
- agreeing a TOU and telemetry standard and policing of that standard;
- developing arrangements for the ownership, operation, maintenance and cost recovery of this equipment;
- defining the allocation service, governance and cost recovery arrangements;
- developing rules or regulations to implement the regime;
- tendering for and appointing a service provider; and
- each day:
  - polling all TOU devices and downloading data;
  - validating the TOU metering data, or correcting or estimating it where it is invalid;
  - performing the allocations; and
  - notifying retailers and the Balancing Agent of their allocations.

The centralisation of data collection would avoid some of the duplication of effort inherent in replicating the monthly process. There would also be less opportunity for gaming through the mis-reporting of data to the allocation agent. However, this solution is unlikely to be substantially cheaper than the first option.

In addition, the implementation of this option would require a process to design and agree the algorithm and test it (proof of concept), and establish that the output is worth the effort and that daily data validation is viable, prior to committing to developing rules or regulations, appointing a service provider, investing in the telemetry systems and establishing IT systems. There may, therefore, be a significant delay before this option could bring improvements.

The third approach (to run a historically based algorithm each day) would allocate daily gas gate deliveries amongst retailers based only on historical information. While the algorithm could be refined over time to, for example, adjust for climatic effects, or by including an adjustment for changes in ICP numbers, it would not involve using any current metering data other than the gas gate deliveries being allocated. This arrangement would be well suited to an automated routine that could be run every day by the existing allocation agent.

As well as being substantially cheaper than the alternatives, it is quite possible that the results from this option would not be materially inferior. Some simulation work will be required to establish if this is so.

Gas Industry Co currently considers that the third approach is likely to be the best daily allocation option, but accepts that further analysis is required.

**Q7:** Do you agree with the section 7.2 preliminary assessment of daily allocation options?

### **7.3 Assessment of extended nomination options**

Gas Industry Co believes many features of the extended nominations proposal, outlined in Appendix C, further the objectives of the Gas Act and GPS. For example, efficiency is likely to be improved by the proposal in that:

- there is a single independent Balancing Agent;
- Vector producers are treated the same as Maui producers;
- Vector shippers are treated the same as Maui shippers;
- allocation at Large Stations would occur each day, providing information to improve shippers' ability to self-balance and making end users more directly accountable for their balance positions; and
- there is a more visible on-the-day link between supply and demand as shippers are forced to make their intentions explicit from end-to-end (eliminating some gaming opportunities).

Some concerns Gas Industry Co has with the proposal are that it:

- requires (possibly material) changes to OATIS with corresponding costs and delays;

- is quite extensive and may introduce unforeseen issues;
- does not address the information problem for shippers to mass market customers (although it does reduce the consequences to the mass market shippers of having an unbalanced position);
- may raise problems with real time validation of nominations at Maui/Vector interface points (because of the gas trading arrangements occurring there);
- may cause equity and efficiency issues through the different treatment of imbalance exposure between Large Station shippers and Small Station shippers; and
- seems unnecessary to regulate provisions into gas sale agreements to enable shippers to pass on their balancing costs to end users.

Gas Industry Co believes that further analysis of the proposal is required. Gas Industry Co will approach Vector and MDL to request their help in doing this.

**Q8:** Do you agree with the section 7.3 preliminary assessment of the extended nominations options?

# 8

## Gas Industry Co's proposal

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This section outlines Gas Industry Co's proposal for improving gas balancing arrangements and the further work that is required to refine the proposal.

### 8.1 Essential components of Gas Industry Co's proposal

Gas Industry Co's recommendation is a hybrid including:

- establishing an independent Balancing Agent function involving a daily tendering approach for sourcing balancing gas, possibly developing into a spot market platform;
- an independent expert review of pipeline tolerances;
- MPOC changes to introduce effective daily balancing, allow for real time balancing costs, and establish a damages regime for 'over-pressure' situations;
- investigating the feasibility of daily allocation options; and
- investigating the feasibility of extended nomination options.

Gas Industry Co's recommendation addresses the problems in the balancing regime identified in section 6 of the Issues Paper and further discussed in this paper, by providing a process that will result in:

- a single independent Balancing Agent role representing the collective interests of the community of pipeline users, with defined accountability and service levels, thereby avoiding duplication and conflicts of interest in the provision of balancing services;
- the development of balancing gas procurement arrangements which users can participate in to manage price risk and to access all available on-the-day flexibility;
- daily price discovery of the true value of flexibility (rather than the MPOC pricing lag), and recovered from causers (rather than being socialised as a result of the lengthy ILON process);
- compensation for damages following over-pressure episodes;



- the further consideration of an information option to improve information for shippers to the mass market on their daily balance positions; and
- the further consideration of extended nomination options to improve compatibility between transmission systems and the equal treatment of like users.

**Q9:** Do you agree with the hybrid approach proposed?

## **8.2 Further work on the proposal**

Gas Industry Co considers that there are a number of components to its preferred solution which can, to a large extent, be pursued independently.

### **MPOC changes**

There are a number of changes to the MPOC that will improve balancing performance, but at an increased cost to some users. The MPOC change process provides an opportunity for all users to make submissions on proposed changes and for Gas Industry Co to assess the costs and benefits of those changes. Gas Industry Co considers that the MPOC change process is therefore the best vehicle to progress those parts of its preferred solution that only involve arrangements between MPOC parties. It also considers that MDL is probably best placed to develop and propose the changes in the first instance, although any Maui pipeline user could do so if it wished.

As Gas Industry Co is not able to propose an MPOC change itself, Gas Industry Co will invite MDL to work with it to develop a set of possible MPOC changes to:

- enable back-to-back cash-out to reduce the socialisation of balancing costs;
- allow for balancing gas prices to reflect the cost of efficiently procured short term flexibility, and
- allow users to claim damages where scheduled quantities cannot be flowed as a result of other users being in positive imbalance (the 'over-pressure' situation).

These changes would be progressed through the MPOC change request process.

### **Expert review of tolerances**

Regardless of other matters, the tolerances applicable under the MPOC should be reviewed. Although the industry has recognised this need since the inception of Maui open access, the review has never been done. Gas Industry Co will now progress the matter by commissioning its own independent expert review.

Gas Industry Co will consult with the TSOs on suitable terms of reference for an independent review of tolerances. At this stage, Gas Industry Co considers that the review would need to establish:

- what levels of tolerance would be appropriate if they are to fully utilise the inherent flexibility of the pipelines;
- what levels of tolerance would be efficient at present; and
- what factors would influence the setting of tolerance levels in the future.

Once the terms of reference are decided, Gas Industry Co will commission an independent expert to perform the review.

### **Development of daily allocation options**

Any improvements that provide more timely mismatch information to shippers are likely to improve balancing performance. However there are a number of possible approaches to achieving this. These alternatives need to be described and costed to assess which will be most beneficial for the industry.

Gas Industry Co will continue its evaluation of daily allocation options with the continued assistance of the TPBAG. It is expected that the work will involve an investigation of the options discussed in section 6.2, including proving the concept designs, completing cost estimation and establishing the effectiveness of data collection, and testing algorithms.

### **Development of extended nomination options**

In its submission on the Issues Paper, Vector suggested a solution which involves, among other things, extending the nominations regime into its pipeline system and making major users directly accountable for their balance positions. Gas Industry Co sees merit in further investigation of this proposal.

Gas Industry Co will continue its evaluation of the extended nominations options with the continued assistance of the TPBAG.

### **Establishment of Balancing Agent function**

A major component of Gas Industry Co's preferred solution is the establishment of a single independent Balancing Agent function. This is very likely to require new regulations to provide for the establishment of the Balancing Agent function and set out the functional description of the role, its governance arrangements, and the participation of the pipeline owners in the hand over and ongoing performance of the function.

Gas Industry Co is required to do further work to:

- develop suitable balancing procurement tools such as:
  - standard procurement contracts; and
  - a spot market to enable users to hedge balancing costs (ie marginal pricing that clears at the cash-out price);
- fully describe the components of the Balancing Agent role, including:
  - the management of linepack by taking balancing actions to given service levels;
  - arranging for the procurement of balancing gas within given constraints;
  - working with the TSOs to operate compressors efficiently between balancing zones; and
  - managing OFOs;
- establish operational standards with the TSOs covering:
  - acceptable pressure limits within each defined balancing zone;
  - cooperation on operation of compressors to move gas between pipelines (and replacing it);
  - handling of safety issues;
  - the interaction with the MPOC and VTC;
  - use of OFOs; and
  - procedures for returning control of gas flow to the TSOs when commercial balancing arrangements fail;
- create controls around the Balancing Agent gas trading and cash-out pricing to create transparency; and
- define governance arrangements to provide accountability and allow for the ongoing evolution of the Balancing Agent function.

## Review

Once implemented, the changes instigated through the above processes will be reviewed. It may be that further changes will be required. For example, the relevance of the MPOC Incentives Pool may be reviewed.

Depending on Gas Industry Co and wider industry resources, possible timing of these processes is illustrated in Figure 4 below.

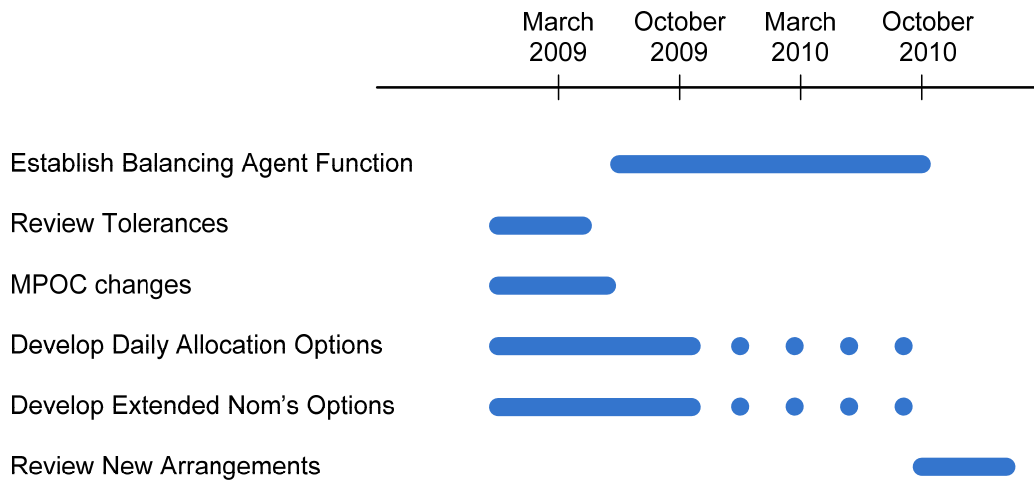


Figure 4 - Possible timeline for implementation

**Q10:** Do you agree with the proposed work programme?

## Appendix A Format for Submissions

To assist the Gas Industry Co in the orderly 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.

QUESTION	COMMENT
<b>Q1</b> Do you consider that the objectives identified in Section 2 are appropriate for the analysis of balancing options? If not, what other objectives would you propose?	
<b>Q2</b> Do you agree that it is necessary to review tolerances as described in Section 3.1?	
<b>Q3</b> Do agree that it is necessary to consider MPOC changes as described in Section 3.2?	
<b>Q4</b> Do you agree that the primary balancing obligation should remain with pipeline users?	
<b>Q5</b> Do you agree that there should be a single independent Balancing Agent?	
<b>Q6</b> Do you agree with the section 7.1 preliminary assessment of balancing procurement options?	

QUESTION	COMMENT
<b>Q7</b> Do you agree with the section 7.2 preliminary assessment of daily allocation options?	
<b>Q8</b> Do you agree with the section 7.3 preliminary assessment of the extended nominations options?	
<b>Q9</b> Do you agree with the hybrid approach proposed?	
<b>Q10</b> Do you agree with the proposed work programme?	

# Appendix B Information on users' daily balance positions

Pipeline users can only actively manage their balance positions when they have timely and accurate information about what those positions are. In the absence of such information, they will rely on the residual balancing arrangements provided by the Balancing Agent. This Appendix considers what information is currently available to pipeline users.

## **Current information status of Maui pipeline users**

On the Maui pipeline, shippers are required to make balanced receipt and delivery nominations. Each shipper's entitlement to gas is determined by that shipper's approved nominations, which are known on the day and can be viewed by it on OATIS at any time.

The sum of approved nominations at each point where gas is injected into or withdrawn from the Maui pipeline (that is, each 'welded point') forms the scheduled quantity at that point. The pipeline operator expects the welded party to flow a quantity of gas equal to the scheduled quantity for the day.<sup>24</sup> Each welded party can access its welded point information on OATIS including the scheduled quantity and imbalance, at any time, updated on an hourly basis (other than for small welded points without telemetry). 'Validated' metered quantities are available on OATIS by 1200 hours on the next day.

Because Maui shippers are required to make balanced nominations, it is the welded parties on the Maui pipeline who are responsible for actively managing their balance positions, and hence the overall balance of the pipeline.

Maui pipeline welded parties have timely and accurate knowledge of their on-the-day balance positions, and can assess their validated receipts/deliveries and balance positions on the day after gas flow.

## **Current information status of Vector pipeline users**

On the Vector pipeline, shippers are required to reserve capacity between receipt and delivery points but only major plants, such as power stations, are required to make daily nominations. However, Vector shippers are required to maintain balanced positions over time. To do so, they need information on their actual receipts and deliveries. Their mismatch at any time is the difference between these receipts and deliveries, and shippers may be allocated balancing costs through Vector's Balancing and Peaking Pool (BPP) in proportion to their mismatch positions.

Vector shippers are aware of their receipts through their gas purchasing arrangements. For example, where a Vector shipper is receiving gas into the Vector pipeline from a Maui welded point, its gas

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<sup>24</sup> Welded parties may also transfer accumulated imbalance which represents the debt or credit of not matching prior entitlements.

transfer (trading) arrangements will determine how the quantity it receives from Maui shippers will be determined. Normally the Gas Transfer Agent will calculate it based on gas purchase nominations notified to it in advance by the Vector shipper, so the shipper will be aware of its trading arrangements and will know how much gas it will receive from Maui shippers on any day.<sup>25</sup>

Vector shippers supplying large users directly connected to Vector's transmission pipeline will also have good knowledge of their delivery positions. Such large users will have time of use (TOU) metering, so will know their gas consumption on the day, and 'validated' delivery quantities will be posted on OATIS by 1400 hours on the next day. A shipper supplying such a user should have access to all this information.

**Vector shippers supplying direct connect end users** have timely and accurate knowledge of their on-the-day balance positions and can assess their validated deliveries on the day after gas flow.

As with large user delivery points, major network gas gate delivery quantities are posted on OATIS by 1400 hours on the day following gas flow. Shippers that use a gate can access this information on OATIS (with rules around confidentiality). However, there are frequently a number of shippers delivering gas to each network gas gate. The allocation of the aggregate gas gate deliveries amongst these shippers is performed by an allocation agent during the month after gas flow in accordance with the Gas (Downstream Reconciliation) Rules 2008 (the Rules). It is that 'initial allocation' which is used to calculate each shipper's mismatch position for entry into the BPP and subsequent allocation of balancing costs. Shippers wishing to assess their individual deliveries before this would need to make their own assessment of what the likely results of that initial allocation will be.

Where a shipper is supplying only large users embedded in distribution networks, it is a relatively straightforward matter for it to assess its likely end-of-month allocation. This is because the algorithm currently specified in the rules simply adds an annual allowance of unaccounted for gas on to the quantities of gas delivered to the user. Such users are likely to have TOU metering and retailers supplying those users should have access to that equipment and be able to make timely and accurate assessments of the quantities of gas delivered.

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<sup>25</sup> While most wholesale gas supply arrangements are based on ex-ante nomination, some (such as the arrangements at Kapuni) are based on ex-post metered quantities. This is only a problem in relation to balancing if those quantities cannot be calculated in a timely manner.



**Vector shippers supplying large users embedded in distribution networks** can, by calculating the daily deliveries made to those users, have timely and accurate knowledge of their on-the-day balance positions.

Small users are generally supplied from distribution networks, and generally do not have TOU meters. Their meters may only be read monthly or every second or third month. Each shipper supplying such customers is responsible for providing the allocation agent with estimates of the aggregate monthly quantities of gas delivered to them by the fourth business day of the following month. The allocation agent then makes an initial allocation of the quantities of gas delivered each day at each gas gate on the fifth business day. The algorithms specified in the rules for making these calculations are more complex than for large users. It would be very difficult for a shipper to make an accurate assessment of what its initial allocated quantities at month end would be since these are a function of (primarily) the:

- gate deliveries (available daily);
- quantities supplied by other shippers to large users on the network (not known);
- quantities supplied by other shippers to other small users on the network (not known); and
- monthly unaccounted for gas (not known).

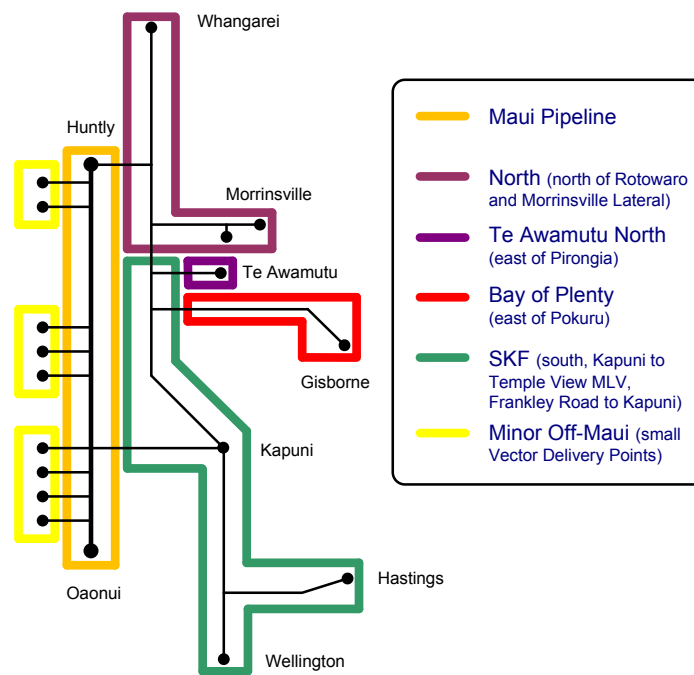
**Vector shippers supplying small users embedded in distribution networks** have poor information on their balance positions, and their daily allocation positions only crystallise (for balancing purposes) when the allocation processes are completed during the following month.



# Appendix C Extended nominations proposal

In its submission on the Issues Paper, Vector proposed a packaged solution to the balancing issues. Its proposal is summarised here.

1. The Maui and Vector transmission systems are divided into six Balancing Zones, each with a defined linepack range.



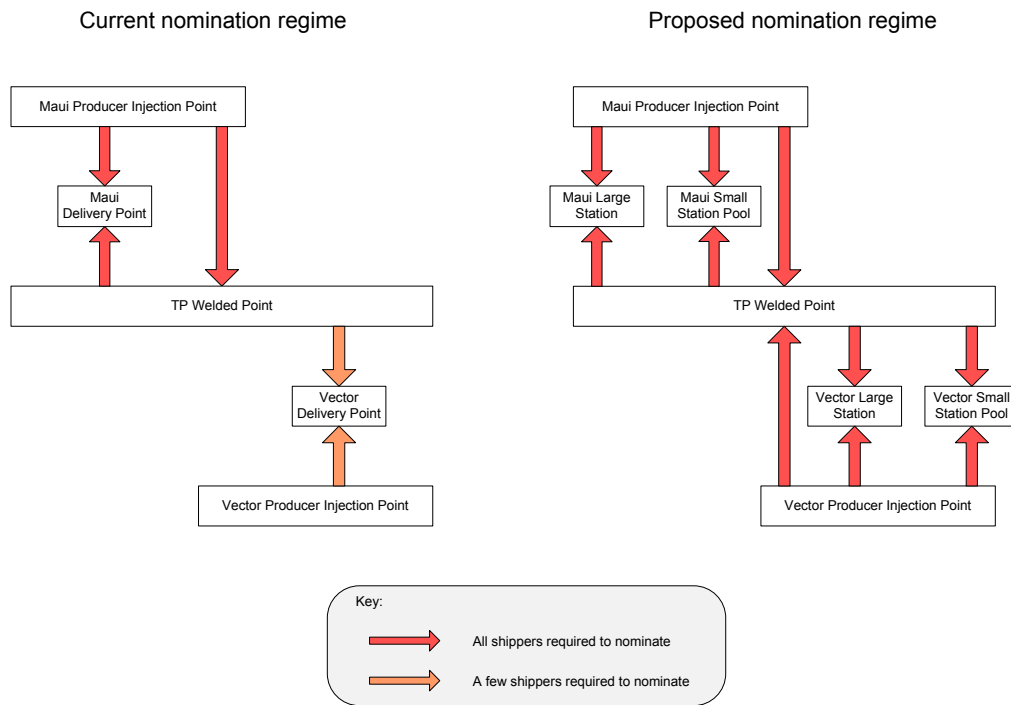
**Figure 5 - Proposed Balancing Zones**

2. Points where gas enters or leaves Maui and Vector transmission pipelines are either 'Large Stations' or 'Small Stations'.
3. Large Stations include all receipt points, interconnection points and direct connect end user delivery points bigger than 5000scm/hr. All other points – essentially the mass market delivery points – are Small Stations.

4. Small Stations<sup>26</sup> are grouped into pools, each pool treated as a single delivery point.
5. All Large Stations must have telemetry for provision of hourly information to the TSOs.
6. A single independent Balancing Agent is contracted by Gas Industry Co to carry out the balancing role.
7. The TSOs have a residual safety role.
8. Costs associated with a balancing action are allocated by the Balancing Agent to the shippers who caused the imbalance, first to shippers supplying Large Stations, and then, if there are any costs remaining, to the shippers supplying Small Stations.
9. In addition, daily penalties are charged to Large Station shippers for both positive and negative imbalances outside the Station's 'Daily Limit'. This will not apply to Small Station shippers because of the poor daily information available to this group.
10. Shippers must nominate on both the Maui and Vector system (nominations would not cross the Maui/Vector interface points). Nominations would be from receipt points (Large Station producer injection points or Maui/Vector interface points) to delivery points (Large Stations including Maui/Vector interface points, and Small Stations). See Figure 6.

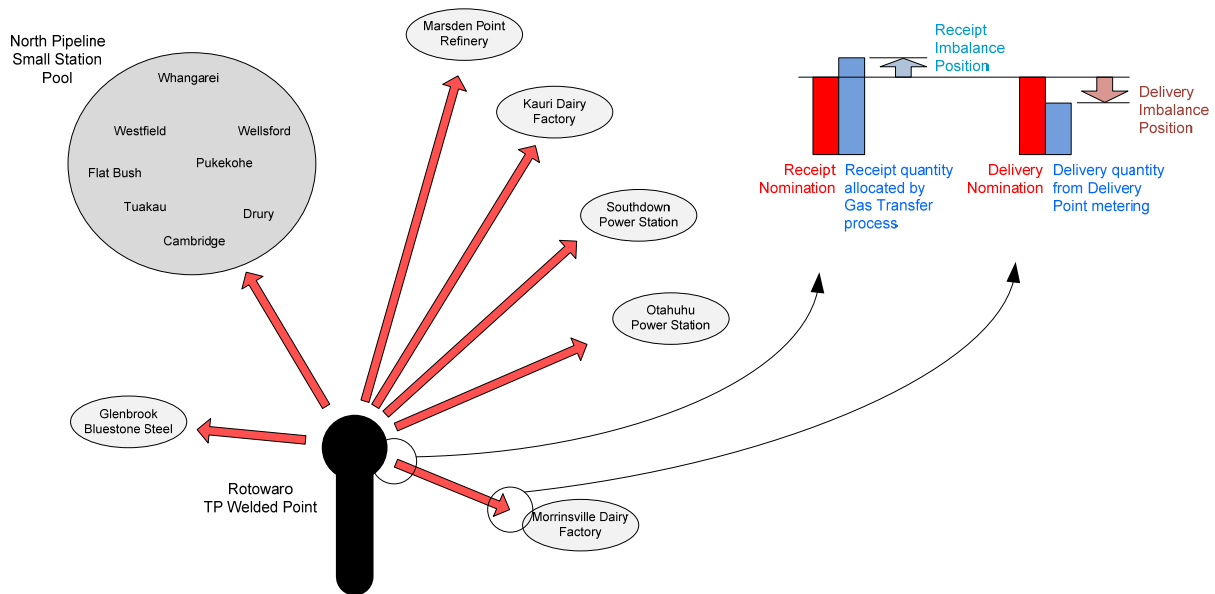
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<sup>26</sup> The term Small Station may be confusing since it would include large city gates like Westfield in Auckland. Perhaps a Small Station is best thought of as a mass market gas gate.



**Figure 6 - Current and Proposed nomination arrangements**

11. The term 'Imbalance Position' replaces the current terminology of 'Imbalance' and 'Mismatch'. Essentially Imbalance Position means the same as imbalance ie the difference between the quantity nominated and the quantity delivered.
12. Each Large Station (including injection points and Maui/Vector interface points) and Small Station pool will have an Imbalance Position. Injecting parties are responsible for the Imbalance Positions at their injection points. Shippers are responsible for the Imbalance Positions at all other points.
13. Injecting parties have an absolute obligation to match injection quantities with nominations. Shippers have an 'all reasonable endeavours' obligation to balance on a day and absolute obligation to return the running balance to zero over a period.
14. Imbalance Positions are calculated from the nominations and initial allocations. There is no wash-up after the initial allocation even if there is alternative information available. Large Station allocations are performed daily, Small Station allocations after the end of the month.



**Figure 7 - Shipper Nominations and Imbalance Positions on North Pipeline Balancing Pool**

15. Balancing costs are allocated by the Balancing Agent without tolerances, first pro-rated to contributing Large Station shippers and then, if any costs remain, to Small Station shippers.
16. In addition, Large Station shippers are charged daily penalties for both positive and negative imbalance outside of a tolerance. This penalty fee would not apply to Small Station shippers.
17. Provisions are regulated into gas sale agreements to enable shippers to pass on their balancing costs to end users.
18. The ILON, Operational Balancing Agreement and Balancing and Peaking Pool processes are removed from the existing codes and replaced by new arrangements managed by the Balancing Agent.

Further details are in the Vector submission, available on Gas Industry Co's website.

## Appendix D Related work streams

While the focus of this paper is on options to improve pipeline balancing, Gas Industry Co is pursuing a number of other work streams that have implications for pipeline balancing. This Appendix outlines the progress and key features of Gas Industry Co's work streams

It should be noted that these work streams could have an influence on the selection, or effectiveness, of preferred balancing options.

### Short-term Gas Trading Platform - NZGE

A short-term gas trading platform called the NZGE is currently under development by Gas Industry Co. The purpose of this platform is to establish a market to facilitate the secondary trading of gas, and to provide price signals that allocate surplus capacity to the highest bidder. This furthers the objectives of the GPS, which specifies that there is need for the development of a secondary market for the trading of excess and shortfall quantities of gas, and protocols and standards applying to wholesale gas trading.

The final market design is still under development; however it will likely feature:

- a matching system using a white list of mutually acceptable trading partners;
- bids and offers made in advance;
- trades settled a day before the actual gas is flowed;
- a market platform using web-based infrastructure; and
- a virtual trading hub, as opposed to trading at a physical location, at which gas title is transferred.

The outcome of this work stream is likely to have significant impact on options for improving pipeline balancing arrangements. The most benefit obtained for balancing will be a clearer knowledge of the price of gas on a day, and the ability to use the short-term gas trading platform as a source for balancing a trader's portfolio or even for the Balancing Agent to manage linepack. However there are issues in that, in its present form, the short-term gas trading platform is a day-ahead market only, and that for linepack management purposes it is known, based on historical evidence, that on-the-day balancing gas will also be required.

Despite this, there is potential for the NZGE to be used as a base on which to source balancing gas, with some amendments, thus reducing the set-up costs of such an option.

Therefore the progress of this work stream is closely linked to the selection of preferred options for improving balancing arrangements, and consideration must be given to any potential efficiency gains of aligning the preferred option with the goals of the NZGE.

## **Critical Contingency Management**

A critical contingency is considered to occur when a shortage of supply, due to a supply outage or failure of a transmission pipeline, is unable to be managed through normal commercial pipeline arrangements. Arrangements for the effective management of critical contingencies are an essential component of an efficient gas market. The Critical Contingency work stream has been developed with the aim of meeting the objectives of the Gas Act and GPS in delivering 'sound arrangements for the management of critical gas contingencies'. This is required as the previous arrangements are largely obsolete and inconsistent with the objectives of the GPS specified above.

The result of this work stream to date has been the coming into effect of the Gas Governance (Critical Contingency Management) Regulations 2008 ('CCMRs'). The CCMRs govern the development of critical contingency plans by TSOs, the appointment of a Critical Contingency Operator, and the process to be followed by parties in the event of a critical contingency.

This has an impact on pipeline balancing, as a critical contingency is effectively the failure of commercial balancing arrangements to cope with a physical supply or transmission pipeline issue. Balancing arrangements need to be developed in light of the CCMRs, and to recognise the need for this function in the event that commercial pipeline arrangements fail.

## **Upstream Reconciliation / Title Tracking**

Title tracking is the name given to the process of transferring legal title, or ownership, of a tranche of gas. Due to open access and the shared use of transmission pipelines in New Zealand, gas can change ownership at a number of locations, and many times, before reaching the end user. Title tracking was identified in the 2006 Transmission Access Issues Review as requiring investigation to ensure the objectives of the Act and GPS were being met.

Currently, title tracking is conducted on two time scales, ex-ante (before the gas day), and ex-post (after the gas day). Ex-ante involves the buyer nominating the required quantity to the supplier, the process repeats itself and the title cascades up the title chain. Buyers are deemed to have received the amount nominated. Ex-post involves the seller of gas determining how much has been sold to its various customers, generally using metered quantities.

In relation to balancing, the primary requirement of the title tracking process is that pipeline users have timely and accurate information on how much gas they own. However, the balancing arrangements can significantly affect the title tracking process, particularly in relation to quantities of balancing gas where the transactions may only occur in the subsequent month. Since balancing



therefore has the potential to alter or influence title tracking arrangements, it is sensible to proceed with this work stream only once balancing arrangements become clear.



# Glossary

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<b>Balancing Agent</b>	The party with the responsibility for the 'residual balancing role'
<b>Balancing gas</b>	Gas added to or removed from the transmission pipelines by the Balancing Agent in order to manage linepack
<b>Balancing market</b>	The market created by the Balancing Agent when sourcing or disposing of balancing gas, whether a contracts market or a spot market. This may be different from other markets due to the timeframes for dispatching gas
<b>Cash-out</b>	A forced trade with the Balancing Agent, used to correct part or all of a user's imbalance position
<b>CCMRs</b>	Gas Governance (Critical Contingency Management) Regulations 2008
<b>Critical contingency</b>	A low pressure event that is sufficiently severe to invoke the CCMRs
<b>ERGEG</b>	European Regulators Group for Electricity and Gas
<b>Extended nominations proposal</b>	A comprehensive solution to balancing problems proposal by Vector in its submission on the Issues Paper
<b>Gas Act</b>	Gas Act 1992
<b>GPS</b>	Government Policy Statement on Gas Governance issued under the Gas Act published 18 April 2008
<b>ILON</b>	Imbalance Limit Overrun Notice as defined and used in the MPOC
<b>Imbalance</b>	In this report the term imbalance refers to the difference between receipts and deliveries on the pipeline and can be Operational Imbalance of the Maui pipeline or Mismatch on either the Maui pipeline or Vector pipelines.
<b>Issues Paper</b>	Transmission Pipeline Balancing Issues, August 2008, Gas Industry

	Co
<b>MDL</b>	Maui Development Limited (an agent company for the Maui Joint Venture that owns the Maui transmission pipeline)
<b>MPOC</b>	Maui Pipeline Operating Code
<b>NZGE</b>	New Zealand Gas Exchange - the day-ahead gas trading platform currently under development by Gas Industry Co
<b>OFO</b>	Operational Flow Order - an instruction to a user to curtail gas flow
<b>Operating Imbalance</b>	The difference between scheduled quantities (gas entitlement) and actual flow at a welded point, which is a form of imbalance
<b>Residual balancing role</b>	The role of managing linepack after the users have endeavoured to balance themselves, to ensure safe and reliable transmission services
<b>TOU</b>	Time of use - generally used in reference to metering that records consumption on an hourly basis
<b>Transmission pipeline</b>	High pressure pipelines used to transport natural gas which does not include distribution networks
<b>TSO</b>	Transmission System Owner
<b>UFG</b>	Unaccounted for Gas - a change in linepack where the source is not identified largely due to metering or estimation errors
<b>User</b>	The users of the transmission services - either a shipper or welded party
<b>Vector</b>	Vector in its role as owner of the Vector transmission pipelines
<b>VTC</b>	Vector Transmission Code
<b>Mismatch</b>	The difference between a shipper's receipts and deliveries which is a form of imbalance

