Options for Vector Transmission Capacity

Date issued: May 2010
Submissions close: Thursday 8 July 2010

GAS INDUSTRY COMPANY LIMITED

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About Gas Industry Co.

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

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 and Resources on the performance and present state of the New Zealand gas industry, and the achievement of the Government's policy objectives for the gas sector.

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27 May 2010

Executive summary

Purpose

The Associate Minister of Energy and Resources (the Associate Minister) wrote to Gas Industry Co in December 2009 requesting we release an options paper on transmission capacity issues by June 2010.

This paper considers Vector Gas Limited's (Vector) options for changing its commercial arrangements for transporting gas on its transmission pipelines. These arrangements are known as its 'transport service' or 'capacity regime'.

Background

Open access transport

Open access transport on gas transmission pipelines is defined by the physical capabilities of the pipelines, access arrangements (that is, the commercial terms for users), and regulatory arrangements. The pipeline owner can package the capability of the pipeline in different ways, offering a transport service described in terms of:

- the degrees of security of the service (often described as 'firm', 'semi-firm', and 'interruptible');
- the term of the service (investors in a major project, such as a power station, typically wish to purchase firm capacity for the economic life of the project); and
- the arrangements for scheduling gas flows ('no-notice' service, or various 'nomination' regimes).

As gas pipelines carry a hazardous product, they are subject to technical and safety regulations. In addition, some pipelines are of such scale and economic significance they are considered to be 'essential facilities' and subject to economic and access regulation. Of particular relevance to this paper are regulations relating to the price and quality of service and investment currently being developed by the Commerce Commission (the Commission).

Current capacity issues: timeline of events

Gas Industry Co first identified issues related to access to short-term capacity on the Vector pipeline in its 2006 *Gas Transmission Access Issues Review* paper[1]. The review noted shippers need a range of capacity 'products'; from very long-term to very short-term, and from firm to interruptible. We questioned whether Vector arrangements met those needs. To assist discussions between Vector and its shippers, Gas Industry Co engaged Creative Energy Consulting to develop a research paper on

[1] Available from Gas Industry Co's website www.gasindustry.co.nz.

Vector's capacity arrangements entitled *Review of Vector Capacity Arrangements: A Research Paper*, January 2009 (the Research Paper). However, issues raised in the paper remained unresolved.

In mid-2009 Vector advised its shippers it would be unlikely to be able to accept increased capacity reservations on its North Pipeline. Vector held an industry forum in September 2009 to discuss the issues. It announced the measures it would take to manage the capacity issue, including possibly disallowing increased capacity reservations, disallowing capacity transfers, and queuing capacity requests. Vector also noted it would be considering further changes to its regime.

At the end of March 2010, Vector held another forum to update the industry on its deliberations on the access arrangements. It set out short-term measures for the coming winter demand peak to 'achieve better end-user outcomes'. Possible changes included greater use of interruptible contracts. Vector noted no further significant improvements to physical capacity of the North Pipeline were likely until after the 2012 winter. In regard to the regulatory context, Vector noted:

- the imposition of price/revenue regulation would be a fundamental change for its transmission business;
- taking investment decisions would be challenging until the regulatory treatment of assets was known; and
- Vector was preparing an options paper for transmission/regulatory regimes.

Vector outlined the investment possibilities for overcoming the current capacity issue. However, an overriding concern was 'there is no clear regulatory mechanism in place to support major pipeline investment'.

Review process

The Associate Minister has asked Gas Industry Co to issue a capacity options paper by mid 2010 followed by a Statement of Proposal by December 2010. In this options paper we consider alternative ways in which Vector may develop its access arrangements. We evaluate the current arrangements and these options against criteria for an effective capacity regime. We pay particular attention to the difficulties currently being experienced on the North Pipeline. The paper describes the significant links between the capacity regime and the price-quality and investment aspects of the regulations currently being developed by the Commission. We will be holding an industry workshop to discuss this paper on Wednesday 9 June 2010. The workshop discussions and the submissions on this options paper will be incorporated into further development on the preferred option and a Statement of Proposal.

Vector is also working towards issuing an options paper. Vector has informed industry it is progressing three workstreams. One of these is a longer-term workstream to identify and resolve any underlying problems with the access arrangements. This workstream overlaps with Gas Industry Co's review.

At this stage we do not know what Vector will propose for the longer term or what arrangements shippers would prefer. We hope this paper facilitates industry discussion on capacity issues and influences possible outcomes for resolving those issues. At the end of the paper we propose next steps for this workstream.

Vector's current arrangements

Vector's pipelines have three types of capacity.

- *Physical capacity* is the capability of Vector's pipelines to transport gas. A shortage of physical capacity leads to congestion. Vector must manage congestion by reducing gas demand through interruption (reducing the demand of 'interruptible' users) or curtailment (reducing delivery to 'firm' users, that is, users with reserved capacity);
- *Commercial capacity* is the maximum reserved capacity Vector is prepared to issue. We have coined this term for this paper. Vector can prudently issue more reserved capacity than physical capacity because it is unlikely all users will simultaneously have gas demand equal to their reserved capacity; and
- *Reserved capacity* is a product Vector sells to users, giving them a right to a firm transport service. It has a defined meaning in the VTC and takes the same meaning in this paper. Reserved capacity is *issued* by Vector and *held* by users. The amount of reserved capacity is limited by the amount of commercial capacity.

The Research Paper described in detail the current Vector arrangements for structuring, issuing, and pricing reserved capacity. However, that paper was written in the context of no shortage of physical or commercial capacity. In the current context of capacity shortages, however, processes for managing or relieving capacity shortages become critical.

Capacity planning and investment

Capacity planning

In the medium term, capacity shortages can be relieved by investment in new pipeline assets. Investment directly increases physical capacity and so, indirectly, increases commercial capacity. 'Capacity planning' refers to the process for deciding when, where, and how to invest.

Capacity planning involves forecasting demand for capacity and then investing in new pipeline assets when a 'capacity shortage' is anticipated. Either physical capacity or commercial capacity can drive capacity planning, giving rise to two possible planning approaches.

- Managing spare physical capacity: this is a 'common carriage' approach in which the level of congestion/reliability is managed; and

- Managing spare commercial capacity: this is a 'contract carriage' approach in which the level of queued capacity is managed, irrespective of the level of congestion.

The effect of new regulations

Suppliers of gas pipeline services are subject to the Commerce Act 1986. The Commerce Amendment Act 2008 declares gas pipeline services to be subject to information disclosure and to price-quality regulation. The exact form of that regulation is yet to be determined by the Commission and its implication for capacity planning is currently unclear. Until this uncertainty is resolved, Vector's capacity planning is effectively on hold[2].

The regulatory framework will establish investment incentives since it will determine – implicitly or explicitly - the allowed incremental revenue that will attend any investment. It is possible to align these investment incentives with the capacity planning policy by only allowing a regulated return on 'prudent investments' that are consistent with that policy.

Options

This paper presents five alternatives to the current arrangements. The key aspects of these options are summarised in the table below.

Option	Key aspects
Contract carriage	Under the contract carriage model, pipeline capacity is contracted to users under long-term contracts.
Common carriage	Under common carriage, express capacity entitlements do not exist, but capacity is available for all users to share.
Hybrid	Under the hybrid option, users can elect to contract for long-term capacity but will otherwise share available pipeline capacity.
MDL carriage	Under the MDL carriage option, users share pipeline capacity, but can elect to buy 'Authorised Quantity' rights if they wish to have priority use of capacity.
Incremental change	Incremental changes involve progressively introducing such elements as a capacity planning policy, transparency of capacity requests, and capacity assigned to large customers, rather than retailers.

Evaluation of options

The criteria for evaluating capacity options are based on the 'capacity objectives' developed in the Research Paper, amended to account for the current capacity issues. The objectives are to:

- ensure efficient pricing of capacity;
- ensure efficient allocation of capacity;

[2] Vector has indicated it will not undertake any substantial investment, although it is nevertheless investigating investment options.

- promote efficient investment in capacity;
- facilitate competition in related markets;
- favour simple and transparent design and operation;
- allow price stability;
- provide the level of service firmness that users require and are willing to pay for; and
- minimise costs of transition from current arrangements.

Conclusions and recommendations

Results of qualitative evaluations of each of the current arrangements and the alternative options are summarised in the table below.

Objective	**Current Arrangements**	**Contract Carriage**	**Common Carriage**	**Hybrid**	**MDL Carriage**	**Incremental Change**
Efficient pricing	✓	✓	✓✓	✓✓	✓	✓
Efficient allocation	×	××	✓✓	✓✓	✓	✓
Efficient investment	✓	××	✓✓	✓✓	✓✓	✓✓
Facilitate competition	×	××	✓✓	✓✓	✓✓	✓
Simple and transparent	×	✓✓	✓	✓	×	×
Price stability	✓	✓✓	✓	✓✓	✓✓	✓
Firmness	✓	✓	✓	✓✓	✓	✓✓
Transition costs	✓✓	×	××	✓	✓	✓
	✓✓ good	✓ moderate		× poor	×× very poor	

The poor ratings for the common carriage and contract carriage options rule them out of further consideration. The MDL carriage option rates fairly well, but is inferior or equal to the hybrid option for all objectives. It therefore does not merit further consideration.

Overall, the hybrid option rates well generally and is equal or superior to all of the options on all objectives except that:

- current arrangements rate better on transition (as they always will, whatever the alternative); and
- contract carriage rates better on simplicity.

On this basis, the hybrid option merits further examination. The incremental change option also rates inferior or equal to the hybrid option for all objectives. However, there may be individual elements of this option worth implementing, particularly if the transition costs associated with the hybrid option are found to be prohibitive. Therefore, this option should remain in consideration.

Subject to feedback from stakeholder submissions, Gas Industry Co recommends further consideration of the hybrid and incremental change options.

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1 Introduction

1.1 Purpose

The Associate Minister of Energy and Resources (the Associate Minister) wrote to Gas Industry Co in December 2009 requesting we release an options paper on transmission capacity issues by June 2010.

This paper considers Vector Gas Limited's (Vector) options for changing its commercial arrangements for transporting gas on its transmission pipelines. These arrangements are referred to as its 'transport service' or its 'capacity regime'.

1.2 Context

Open access transport

Open access transport is defined by a combination of physical arrangements, access arrangements, and regulatory arrangements.

- Physical arrangements determine the capabilities of the pipelines to transport gas.
- Access arrangements are the commercial terms on which gas transport services are provided.
- Regulatory arrangements are the statutory requirements relating to transport services and pipeline operation.

The physical capability of a gas pipeline to transport gas is determined by factors such as its design pressure, the size and configuration of compressors on the pipeline, and gas supply and demand conditions. The pipeline owner can package the capability of the pipeline in different ways; typically this package is referred to as the pipeline's 'access arrangement'. For example, a pipeline owner may provide a transport service described in terms of:

- the degrees of security of the service (often described as 'firm', 'semi-firm', and 'interruptible');
- the term of the service (investors in a major project, such as a power station, typically wish to purchase firm capacity for the economic life of the project); and
- the arrangements for scheduling gas flows ('no-notice' service, or various 'nomination' regimes).

Because gas pipelines carry a hazardous product, they are subject to technical and safety regulations. In addition, some pipelines are of such scale and economic significance they are considered to be 'essential facilities' and subject to economic and access regulation.

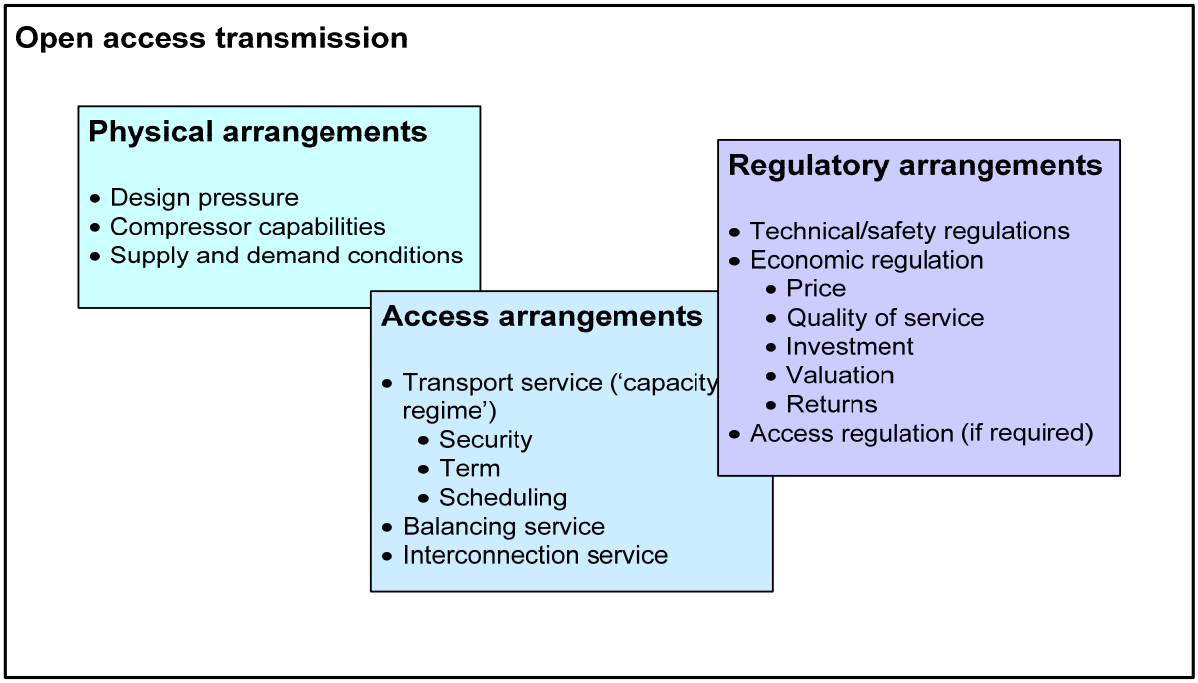


Figure 1: Components of open access transmission

Regulatory arrangements under development by the Commerce Commission

This paper considers Vector's access arrangements, describing how they connect with physical and regulatory arrangements. Of particular relevance are the regulatory arrangements for price, quality of service, and investment. The Commerce Commission (the Commission) is currently developing these arrangements.

Suppliers of gas pipeline services are subject to price-quality regulation under subpart 10 of Part 4 of the Commerce Act 1986. The price-quality regulation allows for a default set of regulatory price-quality provisions. Regulated suppliers have the option of proposing to the Commission a customised price-quality path. The price-quality paths comprise starting prices, the allowed annual rate of change in prices, and the quality standards that apply.

The Commission considers[3] quality of supply measures will relate to the following factors.

- Reliability, including System Average Interruption Duration Index (SAIDI), System Average Interruption Frequency Index (SAIFI) and Customer Average Interruption Duration Index (CAIDI).

[3] See the Commission's paper *Initial Default Price-Quality Path for Gas Pipeline Businesses Issues Paper*, 12 April 2010.

- System integrity, including Publicly Reported Escapes (PRE), third party damage events, leaks, poor pressure events, and Unaccounted For Gas (UFG).
- Quality of gas, including gas pressure and contaminant measures.
- Customer service, including connection times, emergency response times and number of customer complaints.

The Commission's timetable for this work is shown in Table 1 below.

Table 1: The Commission's proposed process for setting the initial default price path

Key step	Indicative date
- Submissions due on *Form of Price Control* section of [Issues - Paper: Initial [Default Price Path] for Gas Pipeline Businesses]	30 April 2010
- Submissions due on remainder of [Issues Paper: Initial DPP for Gas Pipeline Businesses]	14 May 2010
- Cross-submissions due on all submissions	31 May 2010
General Issues Discussion Paper (including discussion on starting price adjustments)	July 2010[5]
- [Gas Pipeline Businesses] related submissions due	September 2012
Emerging Views Paper	March 2011
-Submissions due	April 2011
Draft Decisions Paper and Draft Determination	June 2011
-Submissions due	August 2011
-Cross-submissions due	August 2011
Updated Decisions Paper and Updated Draft Determination	November 2011
-Submissions due	December 2011
Final Determination	29 February 2012[6]
Summary of Final Determination in *Gazette*	
Final Decisions Paper	

Source: The Commission. Initial Default Price-Quality Path for Gas Pipeline Businesses: Issues Paper, 12 April 2010, Table 2, p.4.

[5] The timing of this paper is based on the indicative date published in the Commission's paper, '*Further Work for the Reset Default Price-quality Path for Electricity Distribution Businesses, Updated Process Paper,* May 2010.
[6] The Commission recognises that in accordance with s53M(7), the Commission must provide four months between publishing a summary of the determination in the *Gazette* and the determination's commencement.

Electricity sector

Investment is an issue currently under review in the New Zealand electricity sector. The Minister of Energy and Resources appointed the Electricity Technical Advisory Group in April 2009 to work with the Ministry of Economic Development (MED) in reviewing the electricity market and its governance arrangements and to make recommendations on improvements. The advisory group released its preliminary recommendations on 12 August 2009. One of its recommendations was to amend the current test for approving new investment in the transmission grid to make it 'clearer, simpler and less prescriptive, and to take account of wider competition benefits'. The report also recommends that the role of approving major grid upgrades be moved from the Electricity Commission to the Commission.

1.3 Review process

Previous reviews of Vector capacity arrangements

From the complex mix of physical, contractual, and regulatory arrangements illustrated in Figure 1, problems occasionally emerge. In Gas Industry Co's 2006 *Gas Transmission Access Issues Review* paper[7] we identified access to short-term capacity on the Vector transmission system as an issue. The review noted shippers need a range of capacity 'products'; from very long-term to very short-term, and from firm to interruptible. We questioned whether Vector's arrangements met those needs. In particular, we were concerned Vector did not offer a satisfactory short-term capacity service to support short-term trading of wholesale gas. We also suggested Vector should clarify how it decides to make interruptible services available and on what terms.

Vector capacity was on the agenda of a series of meetings between Vector and its shippers, leading to a revision of the Vector Transmission Code (VTC). To assist these discussions, Gas Industry Co engaged Creative Energy Consulting to develop a research paper on Vector's capacity arrangements. The paper:

- described Vector's capacity arrangements;
- described the policy issues and practical difficulties arising from those arrangements; and
- considered possible options to resolve the issues.

Due to higher priorities and time constraints, capacity was never fully discussed at the meetings between Vector and its shippers. Issues raised in the Research Paper remained unresolved.

This paper, entitled *Review of Vector Capacity Arrangements: A Research Paper*, January 2009 (the Research Paper), is available from the Publications section of Gas Industry Co's website.

[7] Available from Gas Industry Co's website www.gasindustry.co.nz.

Current review

The Associate Minister wrote to Gas Industry Co in December 2009 requesting that by June 2010 we complete a paper exploring transmission capacity options.

In February and March 2010, Gas Industry Co interviewed industry participants to identify issues with capacity services offered on New Zealand's open access transmission pipeline system (comprising transmission pipelines owned by Maui Development Limited (MDL) and Vector). Participants' concerns were dominated by Vector's decision to restrict reservations of new capacity for the current 'gas year' (1 October 2009 to 30 September 2010) on its North Pipeline because of capacity constraints.

Industry participants raised various issues related to Vector's physical, regulatory, and access arrangements. Gas Industry Co has focused on the access issues, but recognises any solutions encompasses all the issues raised.

The capacity options considered in this paper are alternative ways in which Vector may develop its access arrangements. We evaluate the current arrangements and these options against criteria for an effective capacity regime. We pay particular attention to the difficulties currently being experienced on the North Pipeline.

The paper describes the significant links between the capacity regime and the price-quality and investment aspects of the regulations currently being developed by the Commission. However, the paper does not propose any additional regulation. The changes proposed can be achieved through the development of Vector's contractual arrangements.

Vector review

Vector is also working towards issuing an options paper. Vector has informed industry it is progressing three workstreams:

- a short-term workstream to deal with problems of commercial capacity shortages for winter 2010;
- a medium-term workstream to consider options to expand physical capacity; and
- a longer-term workstream to resolve underlying problems with the access arrangements.

The longer term workstream overlaps with the Gas Industry Co review. This options paper relates to developing a viable long-term solution to support open access arrangements.

Next steps

At this stage we do not know what Vector will propose for the longer term or what arrangements shippers would prefer. We hope this paper facilitates industry discussion on capacity issues and

influences possible outcomes for resolving those issues. At the end of the paper we propose next steps for this workstream.

1.4 Invitation for submissions

Gas Industry Co invites submissions on this options paper. We are particularly seeking responses to the questions highlighted at various points in the paper. Submissions on the questions should be provided in the format shown in Appendix A.

Submissions are due by **Thursday 8 July 2010 at 5pm.** Please note that submissions received after this date may not be able to be considered.

We prefer receiving submissions in electronic form (Microsoft Word format and PDF). Submissions may be uploaded on our website at www.gasindustry.co.nz. You will need to log in as a user and upload the submission on the consultation page by clicking on the submissions button.

Gas Industry Co will acknowledge receipt of all submissions electronically. If you do not receive electronic acknowledgement of your submission within two business days, please contact Jay Jefferies on 04 472 1800.

Gas Industry Co values openness and transparency and therefore submissions will generally be made available to the public on our website. If you intend to provide confidential information in your submission, please discuss this first with Ian Wilson at Gas Industry Co (04 472 1800).

Gas Industry Co will release a paper containing a summary of submissions together with an analysis and next steps.

2 Current arrangements for managing capacity

2.1 Overview

This section describes how capacity is currently managed on Vector's pipelines. In particular, it considers how the current level of capacity is determined and how it is allocated if demand for capacity exceeds supply.

Vector's pipelines have three types of capacity and it is important to distinguish between them.

- *Physical capacity* is the capability of Vector's pipelines to transport gas. The term is not used in the VTC, but is commonly used by Vector[8].
- *Commercial capacity* is the maximum reserved capacity Vector is prepared to issue. We have coined the term for this paper. To our knowledge, the concept has not been named or explicitly discussed elsewhere.
- *Reserved capacity* is a product Vector sells to users, giving them a right to a firm transport service. It has a defined meaning in the VTC and takes the same meaning in this paper. Reserved capacity is *issued* by Vector and *held* by users.

The amount of reserved capacity is limited by the amount of commercial capacity. Physical deliveries are limited by the physical capacity.

Although it seems commercial capacity should equal physical capacity, this is not the case. (The reasons are discussed below.) It is therefore vital when discussing 'capacity', and 'capacity shortages', to be clear which type of capacity is being referred to. Figure 2 shows that contractual capacity can be greater than the physical capacity in the pipeline.

[8] For example, in the Vector presentation *North Pipeline: Winter 2010 and Beyond*, by Stephen J Kirkman, March 2010, slides 4-5. https://www.oatis.co.nz/Ngc.Oatis.UI.Web.Internet/Common/Publications.aspx

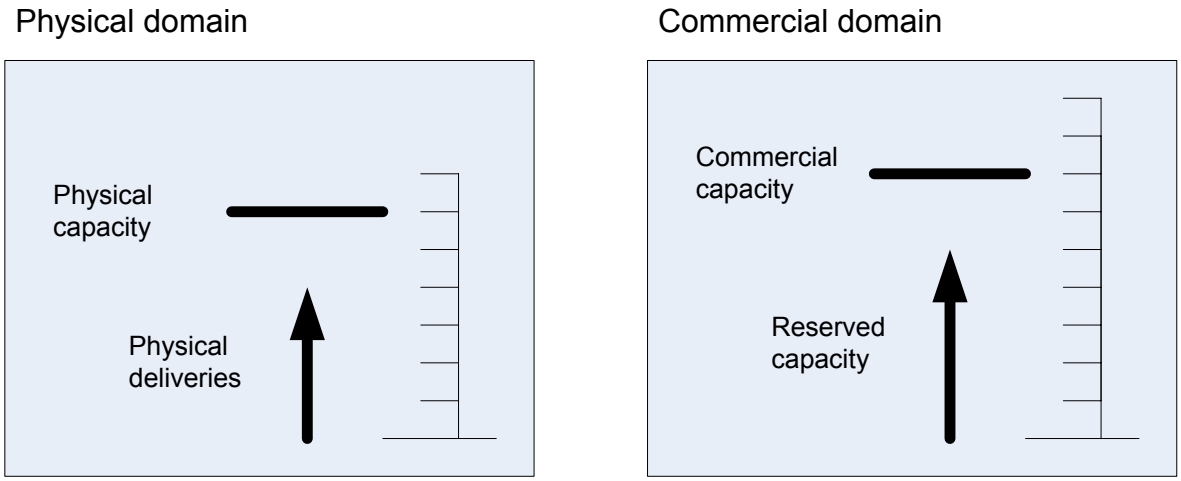


Figure 2: 'Capacity' in the physical and commercial domains

2.2 Physical capacity

Definition

Physical capacity relates to the maximum amount of gas that can be transported through a pipeline system, without operating constraints being breached. Physical capacity at each delivery point along a pipeline will be different, depending on the set of pipeline operating conditions applying at the time. Physical capacity therefore falls within an 'envelope', which delineates sets of delivery point quantities that can be delivered from those that cannot. Physical capacity is not a single number for each delivery point.

Determination

Physical capacity depends on the rating and topology of pipeline assets. It also depends on operating constraints, which define how those assets may be operated. Therefore, physical capacity can be increased by investment in new assets or, in principle, by relaxing operating constraints. For example, physical capacity can be increased by installing new compressors. Physical capacity may reduce during planned or unplanned outages of pipeline assets, for example, because of a compressor 'trip'. Vector has provided information on the operating and physical constraints determining physical capacity on the North Pipeline[9].

In principle, pipeline modelling can determine physical capacity. Note that physical capacity does not depend on the pipeline access arrangements.

[9] Vector North Pipeline presentation, slide 4.

Managing scarcity (congestion management)

A shortage of physical capacity leads to congestion. Vector must manage congestion by reducing gas demand using interruption or curtailment.

- *Interruption* refers to operator actions to reduce the demand of 'interruptible users'.
- *Curtailment* refers to operator actions to reduce delivery to users with reserved capacity ('firm' users). Curtailment is a last resort.

In effect, congestion management is a process for allocating scarce physical capacity between users, with preference given to firm users over interruptible ones.

During periods of curtailment, Vector does not know which users, if any, are in overrun. Therefore, overrun by one user might cause the curtailment of another user. In this situation, the VTC requires the overrunning user to compensate the curtailed user. Thus, the cost of overrunning during curtailment periods is likely to be higher than during non-curtailment periods[10].

2.3 Commercial capacity

Definition

Commercial capacity is the maximum amount of reserved capacity Vector is prepared to issue. Like physical capacity, it is not a single number for each delivery point. Rather it is an 'envelope', which delineates sets of reserved capacity combinations that can be issued from those that cannot.

Vector's obligations under section 2.2 of the VTC is to transport gas up to the levels of reserved capacity determine the level of commercial capacity. Section 2.2 obliges Vector to deliver gas to users up to their reserved capacity in all circumstances except those listed in section 10.1 of the VTC. The exceptions are:

- *extreme conditions*: emergencies and Force Majeure;
- *maintenance conditions*: where one or more pipeline assets are out of service for planned maintenance;
- *imbalance conditions*: where imbalance or line pack is outside agreed levels; or
- *overrun conditions*: where one or more users' gas demands exceed their reserved capacity.

In this paper, 'abnormal conditions' refers to the first three conditions above; 'normal conditions' refers to the absence of the three conditions. Thus section 2.2 of the VTC can be paraphrased as: 'Vector shall ensure curtailment occurs only in abnormal or overrun conditions'.

[10] Overrun charges—at a multiple of the capacity price— apply in both circumstances.

Determination

Under the VTC, Vector may reject, or scale back, a user's request for additional reserved capacity. Vector may do this if it considers issuing the additional reserve capacity might cause it to breach its section 2.2 obligation. Thus, the 'capacity request process' (in which Vector considers these requests) implicitly determines the level of commercial capacity. For example, suppose Vector has issued 90TJ of reserved capacity. It receives a request for another 10TJ, and decides to reduce the request to 4TJ. Vector has implicitly determined that commercial capacity equals 94TJ[11].

Vector could adopt a policy that deems commercial capacity equal to normal-condition physical capacity. Such a policy would ensure Vector meets its section 2.2 obligations, because curtailment under normal conditions would occur only when gas demand exceeded commercial capacity. This situation would imply some overrunning.

Adopting this type of policy would be a simple, but conservative, approach. Outside of overrun conditions, total gas demand equals total reserved capacity only when all users *simultaneously* have gas demand equal to their reserved capacity. In practice, this is unlikely to happen. Therefore, Vector can prudently issue somewhat more reserved capacity than there is physical capacity (because of the gap between non-overrun gas demand and reserved capacity). The question then becomes how much more reserved capacity than physical capacity can be issued? Two user-related factors need to be taken into account: user diversity and capacity coverage.

User diversity

Users typically have peak gas demands at different times, termed 'non-coincident' user peak demand. Without a liquid secondary market for capacity, users reserve capacity to cover their peaks. The 'diversity factor' is the ratio of the pipeline peak demand to the sum of these 'non-coincident' user peak demands. The lower the factor[12], the higher the diversity.

[11] For simplicity, capacity values are expressed as a single number rather than as envelopes.
[12] User diversity is discussed in detail in the Research Paper.

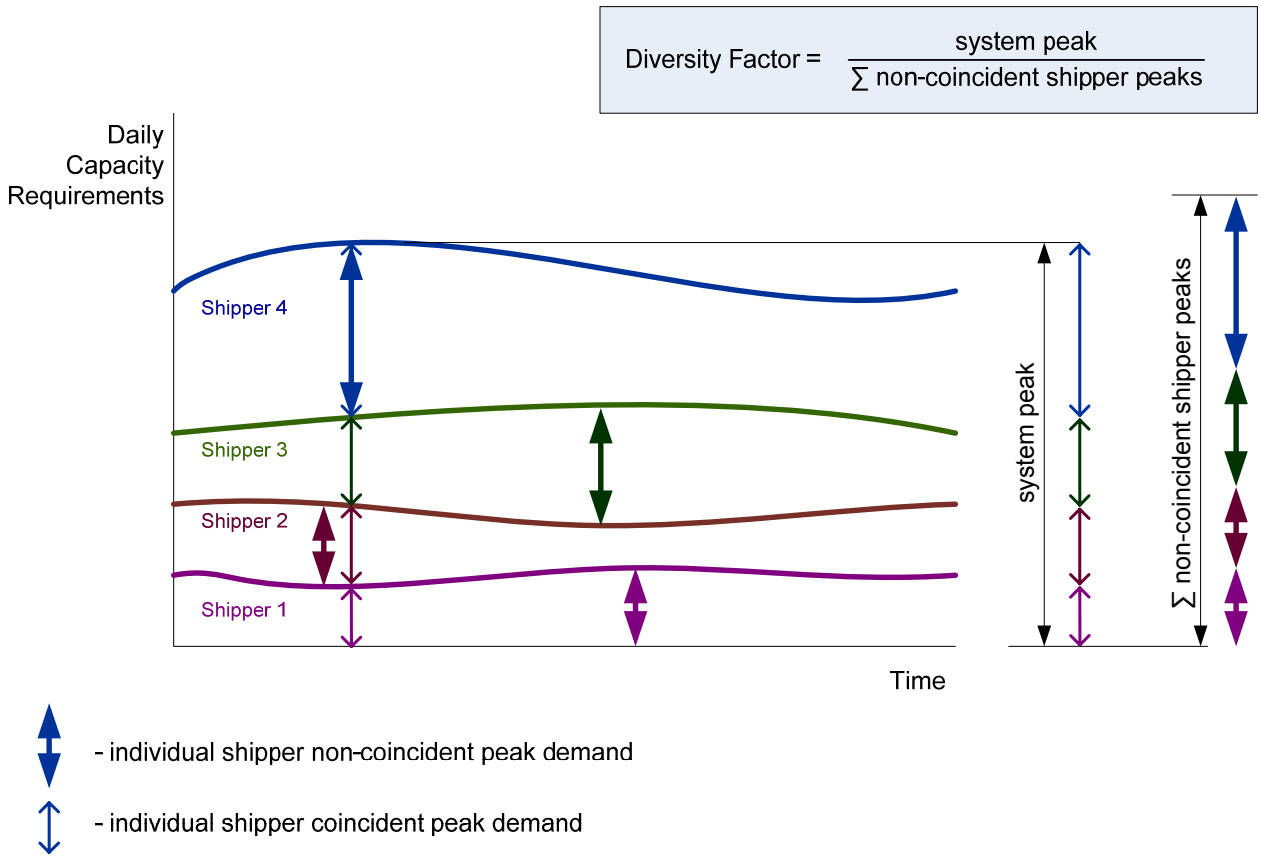


Figure 3: Illustration of user diversity

Suppose Vector knows the diversity factor is 80%[13] and physical capacity in normal conditions is 80TJ/day. It can confidently issue up to 100TJ/day of capacity because user diversity means it is unlikely gas demand will exceed 80TJ outside of overrun conditions.

Capacity coverage

For each user, we define the 'capacity coverage factor' to be the ratio between the amount of capacity that a user reserves and its (non-coincident) peak demand. Each user has a capacity management policy, which determines a target capacity coverage factor. Capacity management is discussed further in section 2.4 on page 13. For the purposes of this section, we assume that, in some circumstances, the coverage factor could be higher than 100%. Figure 4 shows an illustration of a Shipper's capacity coverage.

[13] Or, more generally, Vector is confident the diversity factor is no higher than 80%.

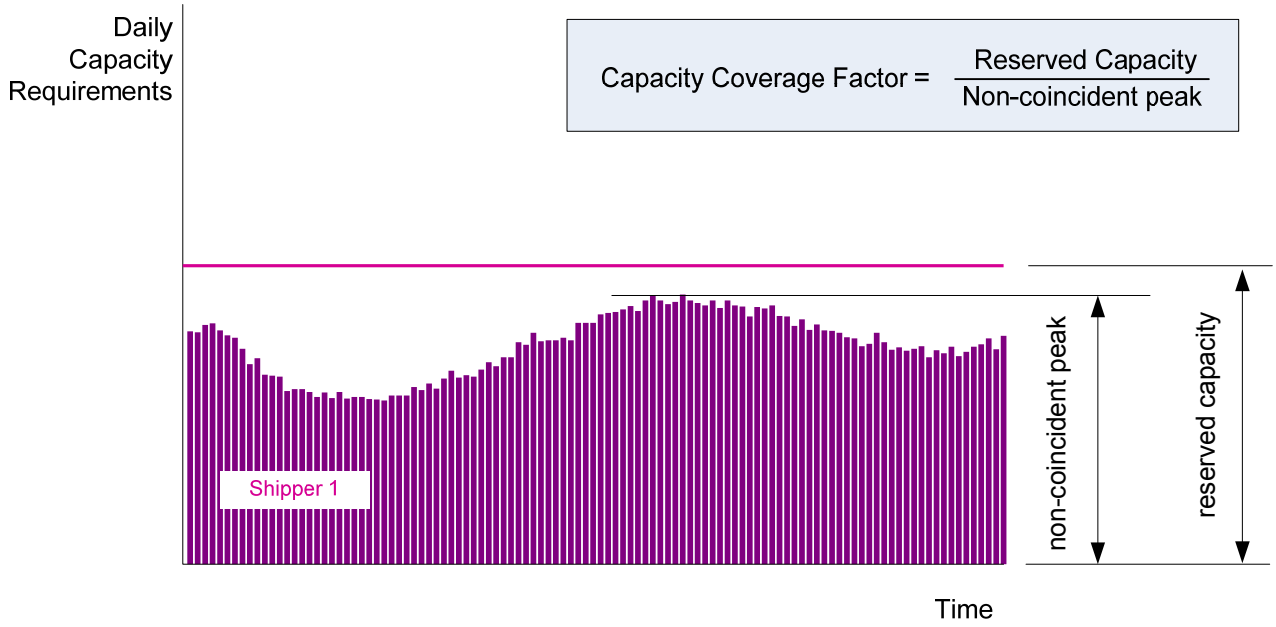


Figure 4: Illustration of capacity coverage

In the example above, suppose Vector knows capacity coverage factors are 110%. In this case, it can issue 110TJ/day of capacity, because it knows this equates to only 100TJ/day of aggregate user non-coincident peak demand. In turn, 100TJ/day of aggregate user non-coincident peak demand equates to 80TJ/day system peak demand, which equals the physical capacity. Commercial capacity is therefore 37.5% higher than physical capacity (110TJ/80TJ).

The reverse does not apply. If the capacity coverage factor were only 90%, this would not restrict commercial capacity to 90TJ (90% of 100TJ). This is because Vector is not required to deliver overrun demand.

Vector does not publish its capacity request process. However, we understand Vector does take some account of user diversity and capacity coverage factors, which allows it to set commercial capacity higher than physical capacity.

Managing scarcity (grandfathering)

The VTC provides existing users with 'grandfathering' rights entitling them to maintain their levels of reserved capacity from gas year to gas year. The users have this right irrespective of the capacity request process. If there is a shortage of commercial capacity, then grandfathered users' requests are approved first, with remaining requests scaled back or rejected.

'Grandfathering' might cause problems in the capacity request process if user diversity factors were to increase or capacity coverage factors were to reduce over time. In these situations, the level of

commercial capacity would fall. However, Vector might be unable to 'claw back' the issued reserve capacity because of grandfathering.

To illustrate the effect of grandfathering, consider the capacity coverage factor is fixed at 100% but over time, the user diversity factor increases. In the previous example physical capacity is 80TJ and the user diversity factor is 80%. Vector can issue 100TJ of reserved capacity, because the diversity factor implies a system peak demand of 80TJ. But, suppose over several years the user diversity factor steadily increases to 100% and, at the same time, system peak demand grows to 100TJ. If users hold on to their 100TJ of reserved capacity using grandfathering, Vector will be obliged to deliver 100TJ of system peak demand, even though physical capacity is only 80TJ.

Alternatively, suppose user diversity factor is fixed at 100%, but the capacity coverage factor falls over time from 110% to 100%. Vector can initially issue 88TJ of reserved capacity, but again has to deliver 88TJ of system peak demand once capacity coverage factors falls to 100%.

2.4 Reserved capacity

Definition

Reserved capacity is the amount of capacity reserved and held by users under the VTC. Reserved capacity sets the limit on the amount of gas a user can have transported without incurring overrun charges.

Determination

Outside of scarcity conditions, each user's 'target capacity holding' (the amount it chooses to hold) determines its level of reserved capacity. Each user has its own policy for deciding target capacity holding. We refer to this policy as the 'capacity management strategy'.

The target capacity holding depends on several factors, including the user's:

- existing customer base and associated demand;
- expected level of future customer churn;
- willingness to incur overrun charges;
- anticipated ability to procure or rescind capacity mid-year following customer gains or losses;
- amount and price of capacity it can buy or sell on the secondary market; and
- amount of capacity it can transfer between pipelines or delivery points.

Where there is a shortage, or anticipated shortage, of commercial and/or physical capacity, retailers are likely to increase their target capacity holdings because the factors above are affected by:

- an increased likelihood of curtailment, under which overrun charges may include a 'damages' component;
- mid- gas year capacity becoming unavailable;
- prices for capacity in the secondary market increasing; and
- capacity transfer becoming restricted.

Therefore, anticipated scarcity of capacity creates higher demand for capacity resulting in actual scarcity[14].

Where capacity is not scarce, capacity coverage factors are typically less than 100%. This is because it is cheaper to pay for infrequent overruns than to pay for reserved capacity to avoid them.[15] However, when capacity is scarce, target capacity coverage factors can plausibly exceed 100%.

Managing scarcity (retail strategies)

Each retailer has its own retailing strategy, describing its marketing objectives, pricing policy and so on. Our interest here is how that strategy guides responses to a capacity shortage.

A shortage of commercial capacity implies one or more users have had a capacity request rejected or scaled back. Those users then face a shortage of reserved capacity, because they are unable to obtain their target capacity holding. Other users may be unaffected, in particular where their grandfathering rights ensure their reserved capacity.

A retailer short of capacity faces higher overrun charges. It can manage this risk in two ways: by increasing its retail prices or by reducing its customer base. Generally, retail prices can be raised only at the end of a retail contract, so these two strategies amount to the same thing. By increasing retail prices to new or out-of-contract customers, the retailer gains fewer customers and loses more existing customers to its competitors.

Retailers apply these strategies differently to large and small customers. For large customers, retailers typically make offers conditional on obtaining the necessary reserved capacity to cover the customer's demand[16]. This might be done, for example, by passing overrun costs through to the customer if that capacity is not obtained. Retailers who already hold sufficient reserved capacity, in particular the incumbent retailer, would be able to make unconditional offers.

[14] If Vector allowed for the increase in capacity coverage factors, commercial capacity would increase correspondingly and there would be no worsening of the capacity shortage. However, we are not aware that Vector has done this. Vector's difficulty is knowing whether the increased demand for reserved capacity is because of higher capacity coverage factors or higher underlying gas demand.
[15] The Research Paper discusses this trade-off in more detail.
[16] The exact level of capacity needed depends on the retailer's capacity management strategy.

For large customers, even a small risk of high overrun prices may be prohibitive. A customer may therefore choose to remain with its current retailer, even if that retailer's delivered gas price is higher than its competitors. New customers and those with substantial new demand may not be able to obtain unconditional offers at all. This may be a significant impediment to new investment in the region, particularly for energy-intensive industry.

For small customers, retailers typically factor expected overrun costs into the offer price. For retailers short of reserved capacity—and unable to obtain additional capacity—the level of overrun may cause the offer price to be uncompetitive. In this case the retailer may need to stop acquiring new customers until it either loses old ones, or is able to acquire additional reserved capacity. Therefore, retailers gaining market share become progressively less competitive as the commercial capacity shortage bites; and those losing market share become progressively more competitive. The outcome is to stabilise existing market shares and to impede the growth of new or small retailers.

Small customers, therefore, are likely to see less choice of retailer and higher retail prices, as the disruptive impact of new, or acquisitive, retailers is diluted.

3 Capacity planning and investment

3.1 Overview

In the medium term, capacity shortages can be relieved by investment in new pipeline assets. Investment directly increases physical capacity and so, indirectly, increases commercial capacity. 'Capacity planning' refers to the process for deciding when, where, and how to invest.

This section describes processes and issues around capacity planning on the Vector's transmission system. In particular it considers:

- which types of capacity should be managed (commercial capacity or physical capacity);
- how demand for capacity is forecast; and
- how investment returns are affected by the regulatory framework for Vector's transmission charges.

3.2 Which types of capacity to manage

Capacity planning involves forecasting demand for capacity and then investing in new pipeline assets when a 'capacity shortage' is anticipated; that is, spare capacity at one or more delivery points falls to, or below[17], zero. Either physical capacity or commercial capacity can drive capacity planning, giving rise to two possible planning approaches.

- Managing spare physical capacity: this is a 'common carriage'[18] approach in which the level of congestion/reliability is managed.
- Managing spare commercial capacity: this is a 'contract carriage' approach in which the level of queued capacity is managed, irrespective of the level of congestion.

Because Vector runs a contract carriage-type access regime, one might expect it to choose the latter approach[19]. However, now that Vector is becoming regulated, it does not necessarily have a choice, as discussed in section 3.4.

[17] Negative spare commercial capacity or physical capacity would lead to queued requests or congestion, respectively.
[18] The approach is common carriage only in relation to capacity planning. It could potentially co-exist with a contract carriage access regime.
[19] This was the case, under the Information Memorandum, which preceded the VTC.

3.3 Demand forecasting uncertainty

The starting point for capacity planning is demand forecasting. Future demand on the North Pipeline has been uncertain for some years. One or more major power station projects might be built along the pipeline; however, to date, none has been committed.

A new power station would require major investment to provide extra capacity. The additional capacity would probably also cover growth in existing demand, averting the need for minor investment specifically to meet that growth. An investment strategy needs to take account of the probability of a major project proceeding. If a new project is likely, it makes sense to wait for that project to proceed before investing in capacity. If the project is unlikely, minor investment must proceed in the meantime.

The longer the wait for the new project, the more pressing the minor investment becomes. In these circumstances, there might be capacity shortages until the decision on the major project is made. This issue may be exacerbated where the minor investment would not be made if the larger investment went ahead.

In forecasting demand, Vector relies on information from users. Relying on this information might be appropriate when the user is also the end-user. But if the user is a retailer, its forecast may simply reflect projections of its market share not underlying gas demand. These projections of market share growth are unreliable and may be inconsistent between retailers.

3.4 Regulatory framework

The Commerce Amendment Act 2008 declares gas pipeline services to be subject to information disclosure and to price-quality regulation. The exact form of that regulation is yet to be determined by the Commission and its implication for capacity planning is currently unclear. Until this uncertainty is resolved, Vector's capacity planning is effectively on hold[20].

The Commission has not yet considered how gas transmission capacity should be regulated, and so the discussion below is necessarily speculative. A common approach overseas is to allow a regulated return only on 'prudent investments': that is, investments demonstrated to be consistent with a specified capacity planning policy. If this approach were adopted here then, as noted above, there would then be a choice of either a contract carriage or a common carriage approach.

A common carriage policy would involve the Commission or other body specifying or adopting a reliability standard[21]. It would approve as prudent any investment required to efficiently maintain that reliability standard. Depending on Vector's capacity request process, this approach could lead to a

[20] Vector has indicated it will not undertake any substantial investment, although it is nevertheless investigating investment options.
[21] Reliability standards can be deterministic, probabilistic, or economic. A deterministic standard might be that 'curtailment never occurs under normal conditions'. A probabilistic standard might be that 'curtailed demand is no higher than 0.1% of total demand' or that 'curtailment occurs only one year in 10'. An economic standard would be that 'curtailed demand is valued at $1000/GJ' and this value is included in the cost-benefit analysis for capacity investments.

shortage of commercial capacity some time before a shortage of physical capacity triggered investment. For example, it might be the case that the *current* level of reliability meets the new reliability standard. If so, investment would not be supported, even though there is obviously a shortage of commercial capacity.

Under a contract carriage policy, investment is triggered by a shortage of commercial capacity. However, investment might not be immediate. Investment is typically lumpy[22] and a substantial amount of queued capacity may be needed before an investment is economically or commercially justified. So, commercial capacity shortage will occur in cycles under such a policy.

In summary, under these forms of regulatory framework, a shortage of commercial capacity could continue to be a problem, even when the current regulatory uncertainty is resolved. It is possible, of course, that the Commission establishes a different framework under which the capacity shortage issue is better addressed.

[22] That is, a single investment may deliver a substantial increase in capacity.

4 North Pipeline situation

4.1 Overview

The previous two sections describe in general Vector's arrangements for managing capacity and issues that might hypothetically arise when capacity is scarce. This section describes the current situation of capacity shortages on the North Pipeline.

4.2 Vector communications to the industry

7 September 2009 industry forum

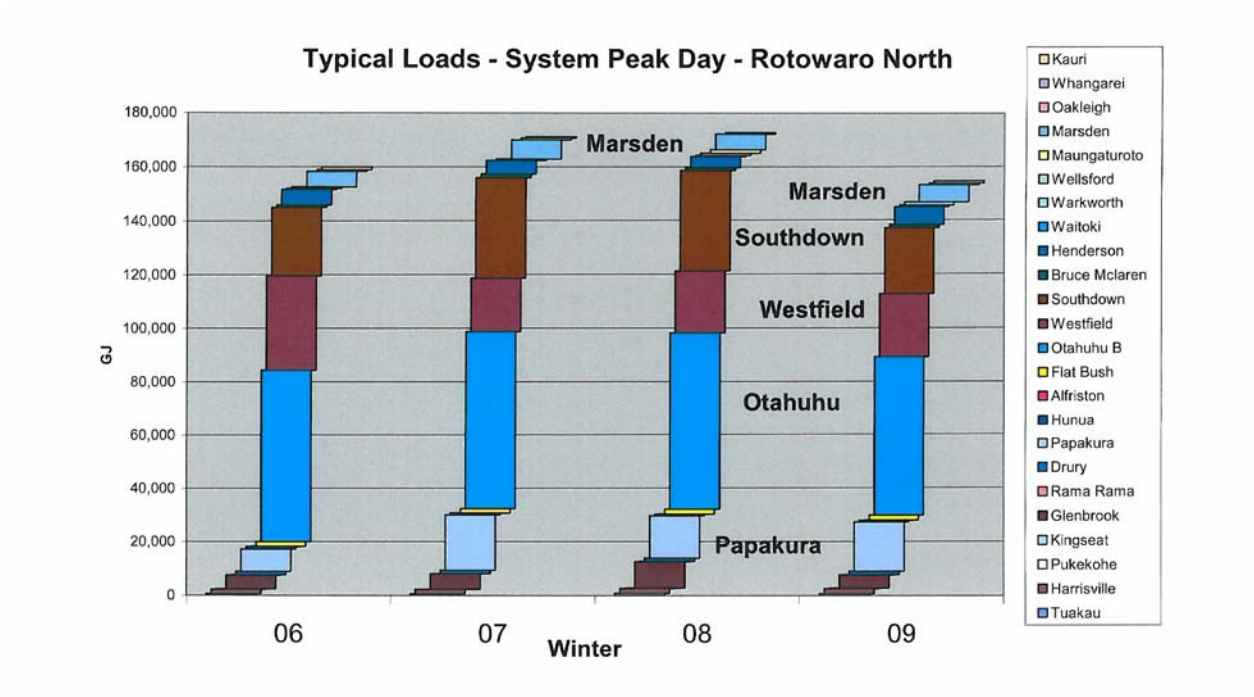
In mid-2009, Vector advised its shippers it would be unlikely to be able to accept increased capacity reservations on its North Pipeline[23]

Because of the widespread concern, Vector held a seminar to discuss the North Pipeline capacity constraint in Wellington on 7 September 2009. The seminar was attended by approximately 40 industry participants, including representatives of major users (NZ Refining Company, NZ Steel, Fonterra, and ACI Glass), shippers and retailers. The presentation described the physical situation and the contractual position.

In regard to the physical situation, Vector explained that demand on the North Pipeline had been less than in the previous two years. But demand was tending to move northwards along the pipeline, resulting in reduced deliverability. Vector talked in terms of reduced 'survival time'. For the North Pipeline, survival time is the time from loss of supply at the start of the pipeline at Rotowaro to minimum pressures being reached (for example, for pressures at delivery points in Northland to fall to 20 bar).

A slide from the presentation is shown in Figure 5. It illustrates the typical loads on peak days over the 2006-2009 winter months.

[23] The North Pipeline extends from the end of the Maui pipeline at Rotowaro (near Huntly) to Auckland and Whangarei. It is understood that Vector first alerted its customers to the capacity reservation restrictions in June 2009. Reservations apply for a full 'gas year' beginning on 1 October 2009.



Source: Vector 7 September 2010 presentation to the industry[24].

Figure 5: Deliverability on the North Pipeline

Vector noted it had been in 'project-based discussions' with several parties (that is, parties with a major project that would require substantial system reinforcement). However, none of these big projects has reached the point of commitment. Also, Vector has exhausted all of the 'quick fix' capacity enhancements. It provisionally estimates that $20m of pipeline reinforcement is required to allow for continued 'organic growth' of the Auckland gas market over the next decade[25]. Vector noted a business case for this investment had not yet been made.

Among the many questions on the physical situation, some attendees queried why Vector had not given more warning of these circumstances. Although Vector's 2009 Pipeline Capacity Disclosure, developed and published in accordance with the Gas (Information Disclosure) Regulations 1997, did not explicitly highlight the issue[26] Vector believes that a conscientious reader would have been alerted to the capacity situation.

In relation to the contractual position, Vector noted it has a few 'interruptible' contracts[27] on the North Pipeline. Users on these contracts had been interrupted during winter peaks.

Provisional capacity reservations for the gas year beginning 1 October 2009 were over 30% higher than reservations for the previous year. Because the market has not grown, the increase in

[24] Available on the OATIS publications page: https://www.oatis.co.nz/Ngc.Oatis.UI.Web.Internet/Common/Publications.aspx
[25] This would loop the section from Papakura East to Smailes Road.
[26] Vector's capacity disclosures reports are available: http://www.vector.co.nz/corporate/disclosures/gas/gas-pipeline-capacity
[27] Under these agreements, Vector's transmission services can be interrupted at Vector's sole discretion at any time.

reservations appears to be shippers making sure they are not 'caught short' in response to Vector advising they may need to ration capacity. However, confirmed capacity reservations were significantly lower.

Vector announced the measures it would take to manage the capacity issue.

- Capacity reservations higher than those in the previous two gas years might not be allowed.
- Capacity transfers into the North Pipeline will not be allowed.
- Requests for additional capacity during the gas year will be queued (first come, first served).

Vector also noted further changes were being considered, including:

- bringing an end to 'grandfathering' of capacity (that is, shippers would no longer be entitled to reserve the same amount of capacity they booked in the previous year); and
- changing the capacity reservation regime, at least for the North Pipeline.

31 March 2010 industry forum

Vector held another industry forum on 31 March 2010 to provide an update on its deliberations on the access arrangements. It set out short-term measures for the coming winter demand peak to 'achieve better end-user outcomes'. Possible changes included greater use of interruptible contracts.

Vector noted no further significant improvements to physical capacity of the North Pipeline were likely until after the 2012 winter. Its modelling predicts the pipeline will be operating at capacity (from a survival time perspective) if:

- reticulated market demand reaches the levels of the 2006 winter;
- anticipated new gas-fuelled projects in Auckland eventuate; and
- the Southdown and Otahuhu B power stations run to their capacity.

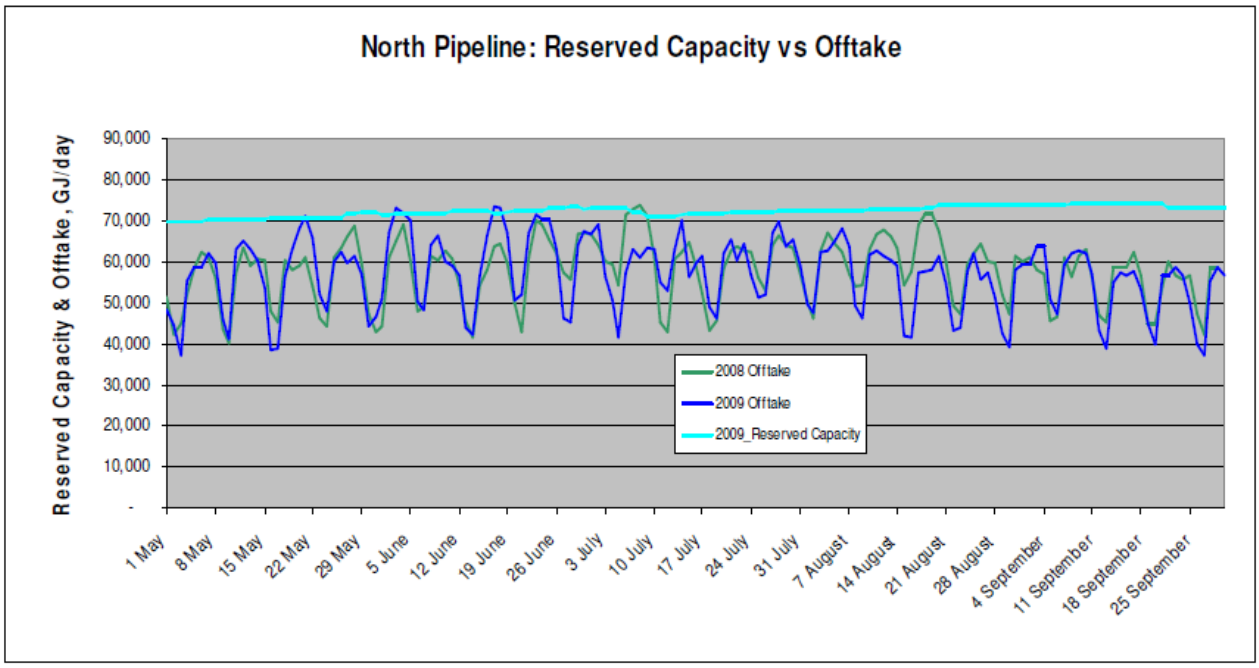
Vector confirmed it would therefore not sell new reserved capacity.

In regard to the regulatory context, Vector noted:

- the imposition of price/revenue regulation would be a fundamental change for its transmission business;
- taking investment decisions would be challenging until the regulatory treatment of assets was known; and
- Vector was preparing an options paper for transmission/regulatory regimes.

Vector outlined the investment possibilities for overcoming the current capacity issue. However, an overriding concern was 'there is no clear regulatory mechanism in place to support major pipeline investment'.

To illustrate the situation Vector presented the graph of reserved capacity for 2009 compared to 2008 and 2009 offtake, shown in Figure 6.



Source: Vector 31 March 2010 presentation to the industry[28].

Figure 6: North pipeline use

4.3 Gas Industry Co analysis

As discussed above, Vector began rejecting requests for additional reserved capacity (that is, above the grandfathered level) on the North Pipeline in mid-2009. With some exceptions, this situation continues. Therefore, spare commercial capacity is effectively zero (or perhaps negative to the extent capacity requests are queued). This suggests there is no shortage of physical capacity at least for firm users. Curtailment has not occurred under normal conditions, although Vector has indicated capacity will be very tight for the 2010 winter[29].

[28] Available on the OATIS publications page: https://www.oatis.co.nz/Ngc.Oatis.UI.Web.Internet/Common/Publications.aspx.
[29] Slide 6, Stephan J Kirkman's presentation to Vector Shippers, March 2010, notes that, 'Modelling (with zero Marsden Pt load) predicts that if (a) reticulated load again reached levels of winter 2006, (b) new loads projected for Auckland eventuate, and (c) Southdown and Otahuhu B run to capacity then the pipeline will be running at capacity from a survival time perspective'.

It is not clear why a commercial capacity shortage should have pre-empted a physical capacity shortage[30], but there are some plausible explanations.

- The existence of grandfathering rights causes Vector to be conservative in determining commercial capacity, as discussed in section 2.3.
- An anticipated shortage of commercial capacity has led to an increase in capacity coverage factors and so an actual shortage, as discussed in section 2.4.
- Vector is concerned about its commercial exposure to curtailment during overrun conditions (although it does not have liabilities under the VTC) and so it is issuing less reserved capacity in order to dampen demand growth and avoid curtailment.

It is as yet unclear what effect the shortage will have on users' overrun charges. The effect might not be revealed until peak gas demand conditions this winter. However, the shortage has clearly affected retail competition and therefore end-users, particularly large ones.

Although Vector has said it will not invest under the current regulatory uncertainty, it is not clear investment would have taken place otherwise. The lack of curtailment to date suggests that common-carriage investment might not be justified. However, it is plausible the shortage of commercial capacity has dampened growth of gas demand. Relieving the shortage would prompt new gas demand and retrospectively justify the investment.

Without information on the level of queued capacity, it is impossible to know whether contract-carriage investment would be justified. However, because of the effect of anticipated shortages, much existing capacity demand could quickly disappear if the capacity shortage were relieved. In that context, Vector might be hesitant to invest.

[30] One might easily expect it to be the other way around, because overrun might trigger curtailment even when there is no shortage of commercial capacity.

5 Evaluation criteria

In the remaining sections of this paper we evaluate the current arrangements for managing capacity, and the proposed alternatives against a set of criteria. The evaluation considers the extent to which each option achieves the objectives set out below.

5.1 Capacity objectives

The criteria for evaluating capacity options are based on the 'capacity objectives' developed in the Research Paper. The objectives were to:

- ensure efficient pricing of capacity;
- promote efficient investment in capacity;
- facilitate competition in related markets;
- favour simple and transparent design and operation;
- allow tariff stability; and
- provide the level of service firmness that users require and are willing to pay for.

We have re-examined these criteria to assess whether they are appropriate for the current review. Several new aspects to the current capacity issues need to be considered.

- Capacity is now scarce and may be unavailable to users at the posted price.
- Most capacity on Vector's North Pipeline is contracted at negotiated terms and conditions, not the standard terms and conditions of Vector's transport service. Therefore contract prices are as relevant as posted prices.
- Transition costs also need to be taken into account, because this paper considers some significant changes to the current arrangements. Transition costs are implicit in the objective of simple and transparent design, but it is helpful to consider them separately.

To reflect these new aspects to capacity issues, the objectives have been amended as follows (changes are in bold):

- ensure efficient pricing of capacity;
- **ensure efficient allocation of capacity**;
- promote efficient investment in capacity;
- facilitate competition in related markets;
- favour simple and transparent design and operation;
- allow **price** stability;
- provide the level of service firmness that users require and are willing to pay for; and
- **minimise costs of transition from current arrangements**.

The two new objectives are described below. The other objectives were discussed in the Research Paper.

5.2 Ensuring efficient allocation

The objective of efficient allocation becomes relevant where there is a capacity shortage, requiring capacity to be allocated between competing users. At other times, all users are able to obtain the capacity they require and no (imposed) allocation is required.

The allocation of capacity is efficient if it is distributed to the users who value it most highly. An inefficient allocation means users who value capacity are allocated less capacity than users who value it less highly. Where there is an effective secondary market for capacity, these two users should trade with each other, eliminating the inefficiency.

5.3 Minimising transition costs

The costs of transition from the current arrangements cover the direct costs of designing and implementing new arrangements. Costs may be high even for simple designs, particularly where long-term contracts 'lock in' the existing arrangements and are not easily terminated or renegotiated.

Q1:	Do you agree the objectives identified in section 5 are appropriate criteria for evaluating transmission capacity options?

6 Evaluation of current arrangements

This section evaluates the current arrangements by considering the extent to which they achieve the objectives listed in section 5. The resulting 'ratings' of 'good', 'moderate', 'poor' or 'very poor' are qualitative. They are most relevant when compared with the corresponding ratings for alternative regime options, discussed in sections 8 to 12.

6.1 Efficient pricing

Issues relating to the long-run efficiency of capacity pricing—that is, prices for reserved capacity—were discussed in detail in the Research Paper. The most relevant issue for this paper is that, without capacity trading, each user needs to reserve capacity to cover its non-coincident peak gas demand[31]. This requirement is irrespective of the user's coincident peak demand, although the latter drives capacity expansion and so should be the basis for efficient pricing. Thus, pricing may be inefficient for users with high diversity.

In the short-run, capacity prices should rise to reflect the scarcity of capacity. This effect is closely related to efficient allocation of capacity and so is discussed under that objective, below.

Rating: moderate

6.2 Efficient allocation

Overview

Allocation of commercial capacity and physical capacity can be considered separately. Three areas where commercial capacity allocation might be inefficient are as follows:

- in the capacity request process, Vector conservatively sets commercial capacity; that is, Vector effectively withholds reserved capacity;

[31] Other issues relate to the pricing methodology: such as how this reflects the cost of capacity expansion and whether it causes sunk costs to be recovered efficiently. These issues are common to all the regime options explored in this paper and so are not factored into their ratings.

- grandfathering of capacity, where shippers are entitled to reserve the same capacity as the previous year;
- the trading of capacity between users; and
- physical capacity is allocated as part of the congestion management process.

Conservatively setting commercial capacity

There are several reasons why Vector might be conservative in issuing capacity. First, the risks of over-selling or under-selling are asymmetric. Depending on the regulatory framework, over-selling might or might not increase revenue. However, the benefit of higher revenue is likely to be more than outweighed by the risk of not meeting VTC section 2.2 obligations.

Second, the factors that determine commercial capacity (user diversity and capacity coverage) have considerable uncertainty. The combination of uncertainty and asymmetric return means it is rational for Vector to be conservative.

Third, capacity coverage factors might have increased recently because of the capacity shortage. Vector might not have taken this into account.

Fourth, grandfathering means capacity issued now might create contingent liabilities for many years to come. Again, this would suggest conservatism.

Grandfathering of commercial capacity

Aside from its role in capacity determination, grandfathering appears inefficient. Grandfathering allocates capacity to those who held it in previous years rather than those who most value it. Users might not take up their entire grandfathered amount, unless they value it more than the posted prices[32]. Because capacity reservation fees on much of the North Pipeline (for example, the greater Auckland area) are quite low, surplus capacity has generally not been rescinded.

Trading of commercial capacity

Users unable to obtain capacity might value it higher than the posted price. One might expect this misallocation to lead to secondary trading of capacity between those with a (grandfathered) surplus and those with a shortage. We understand there has been no such trading, although some offers have been made. Some reasons for the lack of secondary trading were discussed in the Research Paper.

[32] Reserved capacity may have value even if it is not used for immediate demand. It can be used to back offers to potential new customers, sold on the secondary market or even deliberately hoarded to damage competitors.

Managing congestion

Allocation of physical capacity occurs in the congestion management process through interruption and then curtailment. Interruptible users generally value capacity less than firm users and so are interrupted first. Apart from this, however, the congestion management process does not (necessarily) efficiently allocate capacity.

The problem is users have no mechanism to express their short-run valuation of capacity and so there is no information for Vector to act on during congestion.

Summary

Allocation of capacity is likely to be poor under the current arrangements, because of:

- limitations in the capacity request process;
- the distorting effect of grandfathering rights;
- the lack of secondary trading to correct this distortion; and
- the lack of mechanisms for efficiently allocating physical capacity during congestion.

Rating: poor

6.3 Efficient investment

The three impediments to efficient investment are:

- regulatory uncertainty;
- lack of a clear investment policy; and
- demand uncertainty.

Regulatory uncertainty

Vector has stated it will not make any significant investments given the current regulatory uncertainty. 'Do nothing' might or might not be the currently efficient option.

Lack of investment policy

Related to the regulatory uncertainty, Vector does not publish a capacity planning policy. This means that it is not clear what, of any, investment would be made by Vector even if the Commission agreed to treat all investments as 'prudent' for the time being.

Demand uncertainty

Investment must be based on future demand for either physical capacity or commercial capacity, depending on which is being managed under the investment policy. Vector does not currently have the information or tools needed to effectively forecast either physical or commercial capacity. To forecast physical capacity, Vectors obtains information from users on their forecast gas demand. However, users are often not well placed to provide this information, because they have no reliable way of forecasting customer churn. Distributors or end-users would be a better source of information.

To forecast commercial capacity, Vector uses information from users' capacity requests, because these implicitly provide forecasts of demand. However, capacity requests are only for the next gas year and only for users on posted prices. Vector receives no information on demand for future gas years, except in relation to long-term contracts.

Summary

Investment is likely to be inefficient under the current arrangements because of a range of factors, including:

- regulatory uncertainty;
- Vector does not publish a capacity planning policy; and
- Vector does not have good information on demand;

The first two factors can be excluded from the evaluation because they affect all of the options. The third factor will have some moderate effect on investment efficiency.

Rating: moderate

6.4 Facilitate competition

As discussed above, the shortage of commercial capacity is adversely affecting retail competition. Currently, two factors contribute to the commercial capacity shortage:

- the lack of investment because of regulatory and demand uncertainty; and
- conservative setting of commercial capacity in the capacity request process.

These issues have been discussed above. Even if the regulatory uncertainty were resolved and a prudent capacity planning process implemented, there are likely to be periods when the physical capacity margin is low and so commercial capacity shortages may occur for reasons discussed in section 2.4.

The current problems in the retail market are likely to recur whenever capacity becomes tight. Without a liquid secondary market, a contract carriage regime can aid retail competition only when spare commercial capacity provides 'headroom' for retail churn.

Rating: poor

6.5 Simplicity and transparency

Simplicity and transparency are lacking in two key areas:

- determination of commercial capacity; and
- determination of physical capacity.

Determination of commercial capacity

Vector publishes no information on its capacity request process (that is, its method of calculating commercial capacity) or on the current level of spare commercial capacity.

We acknowledge the capacity request process necessarily involves some discretion and so it is not possible or sensible to publish a standard process. However, this should not prevent Vector from providing a broad description of the process and an indication of where and how discretion is applied.

Vector has also been unclear about whether there is zero capacity on the entire North Pipeline or just on parts of it affected by particular physical constraints[33]. Before the current capacity shortage, Vector gave limited information about the impending scarcity. As a result, many users were surprised by the shortage.

When requests for commercial capacity are queued, spare capacity is effectively negative. The VTC provides for rejected requests to be queued. However, Vector provides no information on the amount and type of queued capacity, or where users are in the queue.

In summary, transparency for determining commercial capacity is poor. Even with better transparency, capacity determination would remain complex, for the reasons discussed earlier.

Determination of physical capacity

Similarly, Vector provides limited information on the level of spare physical capacity and the implied likelihood of congestion. Because users may either overrun or under utilise commercial capacity, the level of spare commercial capacity is not necessarily a strong indicator of spare physical capacity.

[33] The clauses of the VTC describing capacity requests refer to 'Pipelines' and may imply that a commercial capacity shortage somewhere on the Pipeline means capacity requests rejected everywhere on the Pipeline. If this is a problem, it could easily be corrected by amending the VTC or re-defining Pipelines.

Vector's annual capacity disclosure provides some information on spare physical capacity. However, it is not clear how to convert calculations made on a planning timescale into levels of operational spare capacity.

Information on spare physical capacity may be important to users. Interruptible users are most affected by low levels of spare capacity, because the frequency of interruption increases. Firm users are affected by the risk of curtailment.

Rating: poor

6.6 Price stability

Capacity reservation fees are stable from gas year to gas year, as are interruptible prices. However, overrun prices are high and users who are unable to obtain sufficient commercial capacity may incur higher overrun charges. Thus, during capacity shortages, the overall price paid by users is not stable and can increase significantly.

Rating: moderate

6.7 Firmness

Vector is able to maintain firm service, even where physical capacity is scarce, by issuing less reserved capacity. Users who nevertheless experience curtailment because other users overrun are compensated by those other users. Therefore, the current arrangements provide a firm service.

An interruptible service is available for those users who do not value firmness highly.

However, these two services occupy the two ends of a spectrum. There are no intermediate services for those users who value firmness, but are prepared to be interrupted if adequately compensated. Because interruptible customers are not compensated, they risk additional costs if interruptions become more frequent. The risk of high costs discourages more use of the interruptible service at the time this would be of most value to Vector and firm users.

In summary, the current arrangements are moderate in the context of the firmness objective.

Rating: moderate

6.8 Transition costs

There are no transition costs.

Rating: good

6.9 Summary

The ratings for the current arrangements are summarised in Table 2. The major concerns are:

- inefficient allocation of capacity;
- effects of commercial capacity shortage on retail competition; and
- complexity and lack of transparency, particularly of capacity request process.

Table 2: Ratings for current arrangements

Objective	Score
Efficient pricing	✓
Efficient allocation	×
Efficient investment	✓
Facilitate competition	×
Simple and transparent	×
Price stability	✓
Firmness	✓
Transition costs	✓✓
✓✓ good ✓ moderate × poor ×× very poor	

Q2: Do you agree with the evaluation of the current capacity arrangements?

7 Overview of options

Two models for access regimes for gas pipelines and other monopoly infrastructure are well established in overseas markets: contract carriage and common carriage. Although the current arrangements bear some hallmarks of contract carriage, for example, capacity reservations, they differ in some key aspects, for example, in capacity planning policy.

Contract carriage is the traditional regime for gas transmission. However, in New Zealand, common carriage is more commonly used by energy utilities such as in gas and electricity distribution, electricity transmission and, in gas transmission, on the Maui Pipeline.

Contract carriage and common carriage regimes are considered two alternative options to the current arrangements. A third option is a hybrid of contract and common carriage. We also consider two further options:

- the MDL access regime (MDL carriage); and
- incremental change.

These options are described and evaluated in the following sections.

8 Contract carriage option

8.1 How it would work

This option is based on the following principles:

- commercial capacity is defined as equal to physical capacity; and
- capacity planning is aimed at managing commercial capacity (rather than physical capacity[34]).

We assume the regulatory framework would be aligned with this capacity planning policy.

Terms and conditions for firm service are similar to the current arrangements, but with some important differences.

- Contract terms are long (10 years or more) rather than annual.
- Contract prices are fixed for each contract, rather than being set annually.
- Capacity transfers are restricted to adjacent points on a pipeline.

In these respects, firm service would be marketed like existing long-term capacity contracts with power stations, rather than as annual, posted price capacity.

Interruptible service is the same as current arrangements.

Although liquid secondary capacity markets are commonly a feature of contract carriage overseas, we assume the secondary market remains illiquid.

8.2 Evaluation

Efficient pricing

The pricing structure is similar to the current arrangements, with a price for reserved capacity and other prices for throughput and overrun. However, contract-specific prices replace posted prices.

[34] Note that, because commercial capacity and physical capacity are identical, any investment to expand physical capacity expands commercial capacity by the same amount. However, a shortage of physical capacity may occur before or after a shortage of commercial capacity.

Contract prices reflect the level of spare capacity or the marginal cost of expansion at the time the contract begins. This approach allows prices to reflect marginal cost more closely than the current arrangements do.

However, the main shortcoming of the existing arrangements—that prices do not reflect user diversity—remains in this option, because users must reserve capacity to cover their non-coincident peak gas demand[35].

Rating: moderate

Efficient allocation

Because commercial capacity is set equal to physical capacity, Vector's ability to issue capacity is restricted compared with the existing arrangements. Capacity would not take account of user diversity or capacity coverage factors. In the current context, this would substantially worsen the capacity shortage.

The current annual and mid-year processes allow users to vary capacity. Under contract carriage, users are locked into an amount of reserved capacity for the long term, with no opportunity to vary capacity levels should circumstances change. A secondary market is needed, but there is no reason to suppose this will develop.

This option is likely to have substantial spare physical capacity[36], so allocation is not an issue.

Rating: very poor

Efficient investment

The restricted level of commercial capacity means that increased investment would be needed to provide the capacity required by users. Such investment might be 'efficient' in the context of a capacity planning policy that manages commercial capacity. However, this investment is inefficient in the sense it would be largely unnecessary under the current arrangements and would create a large amount of spare physical capacity.

Rating: very poor

Facilitate competition

Under this option, barriers to entry to the retail market are high. A new retailer needs a long-term contract for capacity, but has no guarantee of acquiring the level of retail demand necessary to use and pay for that capacity. Without a secondary market, the costs of that capacity are effectively sunk.

[35] This is because we assume the secondary market remains illiquid.
[36] Once the investment driven by the shortage of commercial capacity has been made.

Existing retailers have the capacity to serve their existing market share, but would similarly find it difficult to expand market share. The effect would be to freeze market shares at current levels.

Until new investment occurs, the worsened capacity shortage would exacerbate the existing problems in retail competition.

Rating: very poor

Simple and transparent

This option simplifies the capacity request process because commercial capacity is equal to physical capacity. There is no need to estimate user diversity and capacity coverage factors.

Capacity allocation is also simplified, because capacity is allocated occasionally for the long term, rather than the current annual, mid-year, and capacity transfer processes.

Rating: good

Price stability

Prices are stable for the term of each contract. However, there would be some 'price shock' upon contract renewal, particularly if retailers need to invest in expensive new capacity to support the new contract. Users can mitigate such price shock by entering into longer-term contracts.

Rating: good

Firmness

This option provides one firm and one interruptible service, similar to the current arrangements. Therefore, it rates the same as the current arrangements.

Rating: moderate

Transition costs

Long-term contracts exist and are accommodated in the current arrangements and so no new Vector processes are required to manage long-term contracts for all users.

Negotiating and agreeing new long-term contracts with users currently on annual capacity would be complex and would have major commercial effects for those users.

Rating: poor

Summary

The evaluation of this option is summarised in Table 3. As a basic contract carriage model, the option rates well on simplicity. However, its poor ratings on allocation, investment, and competition reflect the fact that contract carriage cannot work efficiently without an effective secondary market. Therefore, simplifying the model makes these areas worse.

Table 3: Evaluation of contract carriage option

Objective	Score
Efficient pricing	✓
Efficient allocation	××
Efficient investment	××
Facilitate competition	××
Simple and transparent	✓✓
Price stability	✓✓
Firmness	✓
Transition costs	×
✓✓ good ✓ moderate × poor ×× very poor	

There are two fundamental problems with this option. First, the contract carriage concept was developed in the absence of retail competition and does not easily support it. Contract carriage regimes have commonly required adaptation to facilitate retail competition. Annual capacity and capacity transfers under current arrangements are partly a response to the needs of retailers. So, removing them causes problems.

Second, contract carriage requires a secondary market to allocate capacity efficiently, otherwise users are locked into decisions made many years previously.

Q3: Do you agree with the evaluation of the contract carriage option?

9 Common carriage option

9.1 How it would work

Under common carriage, all users have equal access to physical capacity and do not need to reserve capacity. Therefore, common carriage differs from the current arrangements in the following areas:

- capacity planning;
- capacity reservation;
- capacity prices;
- allocation of congestion costs; and
- investment.

A capacity planning policy manages physical capacity by establishing a reliability standard and maintaining sufficient physical capacity to meet that standard. The standard might be established by Vector (in consultation with users) by the Commission or even by Gas Industry Co. We assume the regulatory framework treats any investment reasonably required to maintain reliability as 'prudent'.

To assist Vector with investment planning, gas distributors and transmission-connected end-users are required to provide forecasts of gas demand.

Commercial capacity no longer exists as a concept. Related processes are eliminated, including capacity requests, capacity transfer, capacity trading, and overrun charging.

Capacity prices are replaced with transmission prices, which are charged on coincident peak user gas demand[37]. There is some adjustment to prices (for example, by scaling) to ensure Vector recovers the same amount of aggregate transmission revenue as it does now.

Interruptible users pay the same transmission prices as firm users, but are paid by Vector for the right to interrupt them during periods of congestion. The payment structure may include a fixed charge or

[37] Note that the 'common carriage' arrangement on the MDL pipeline does not have a peak demand price. This is an unusual implementation of common carriage and reflects the high level of spare capacity on the MDL pipeline anticipated at the time it was implemented.

discount to the transmission price and/or a payment per interruption or per GJ interrupted. As is the case now, interruption occurs before curtailment.

The order in which Vector curtails users is based on economic and practical considerations, as now. The model might or might not provide compensation for curtailed users[38].

Costs of congestion management through interruption or curtailment are recovered from all users through the transmission price.

9.2 Evaluation

Efficient pricing

Under common carriage, charges are levied on coincident peak user gas demand, rather than on non-coincident peak demand as in the current arrangements. Therefore, prices are lower to users with higher diversity, as they should be. Apart from that, pricing is similar to the current arrangements.

Rating: good

Efficient allocation

Commercial capacity does not exist under this option, so inefficient allocation is impossible. Physical capacity is allocated through congestion management. As now, interruptible users are interrupted before firm users. However, each interruptible user is compensated at a rate reflecting its value of capacity. Vector interrupts users with the lowest rate first. These are the users who value capacity least; therefore, allocation of physical capacity is more efficient than currently.

Rating: good

Efficient investment

Common carriage establishes a clear capacity planning policy based on a specified, published reliability standard. Demand forecasting is improved through information provided by distributors and end-users.

Rating: good

[38] Generally, common carriage models do not provide such compensation, but the existing VTC arrangements for providing compensation could be retained in this model.

Facilitate competition

With commercial capacity eliminated, impediments to retail competition are also eliminated. Retailers no longer need to be concerned about capacity (unless they are serving interruptible end-users) and can concentrate on competing on retail margin and wholesale gas price.

Rating: good

Simple and transparent

The elimination of commercial capacity processes removes the associated complexity and opacity. However, the new structure for interruptible contracts creates some complexity, for example, in congestion management. In particular, if payment is based on GJ interrupted, a mechanism must be designed to determine the amount by which a user has reduced gas demand in response to an interruption request.

Rating: moderate

Price stability

Under common carriage, price stability is similar to the current arrangements. The removal of overrun charges increases the stability of overall charges to users, particularly during capacity shortages.

However, the recovery of interruption and curtailment costs through prices introduces some instability, because these costs are volatile. Unlike overrun charges, they cannot be managed by users[39]. In principle, interruption and curtailment costs should be spread across many years, as capital costs are. However, this is unlikely to be feasible within the regulatory framework.

Rating: moderate

Firmness

The level of service reliability for firm users implicit in section 2.2 of the VTC is replaced by the reliability standard. Furthermore, to maintain this standard, Vector must invest in new physical capacity and/or enter into interruptible contracts. It cannot simply restrict capacity as it does now. If the regulated rate of return is too low, Vector might not invest to a level that would maintain the reliability standard.

The reliability standard might be too low for some firm users. These users are unable to get reliability at a level higher than the one set in the standard. However, setting a high reliability standard may be inappropriate and uneconomic for most users.

[39] Users can reduce overrun charges by reserving additional capacity.

Users that require a lower reliability level could, in principle, enter into interruptible agreements. The restructured interruptible agreements in effect allow interruptible users to choose their level of firmness, rather than just being 'interruptible' or 'firm' (to the reliability standard).

In summary, this option improves some aspects of firmness but worsens others overall. Therefore, it is given the same rating as the current arrangements.

Rating: moderate

Transition costs

The elimination of commercial capacity implies the termination of all existing long-term capacity contracts. Eliminating these contracts requires substantial compensation to affected users. Therefore, the transition cost is high.

Rating: very poor

Summary

The ratings of this option are summarised in Table 4.

Table 4: Evaluation of common carriage

Objective	Score
Efficient pricing	✓✓
Efficient allocation	✓✓
Efficient investment	✓✓
Facilitate competition	✓✓
Simple and transparent	✓
Price stability	✓
Firmness	✓
Transition costs	××

✓✓ good	✓ moderate	× poor	×× very poor

Common carriage eliminates the problems associated with contract carriage without secondary markets and so rates well against the associated objectives (the first four in Table 4). The moderate ratings for price stability and service firmness reflect well-known concerns with the common carriage model and would cause concerns for users that value these characteristics highly. Currently, such users are typically on long-term contracts, and moving them to common carriage is the major issue with this option.

Q4:	Do you agree with the evaluation of the common carriage option?

10 Hybrid option

10.1 How it would work

Under this option, the contract carriage and common carriage options operate alongside one another. Each user chooses which regime to be served by. In general, those users who have most concern over certainty of price and firmness—and less concern about the complexities and risks of capacity management—would choose contract carriage. Therefore, users currently on long-term contracts are likely to choose contract carriage, as would some large industrial end-users. Users that do not require the same level of certainty, such as retailers to medium and small end-users, are likely to opt for common carriage.

Users could also opt for part of their gas demand to be served under contract carriage with the remainder under common carriage.

The details of these arrangements are presented below.

User choice

Each user can opt to become:

- a *contract user* served by a contract carriage service; or
- a *common user* served by a common carriage service.

Contract users are required to enter into long-term contracts, as in the contract carriage option. The contract specifies:

- the contract term and any renewal rights;
- the Maximum Daily Quantity (MDQ);
- the end-user site or sites to be served[40]; and
- a fixed price with escalation formula.

[40] This information is required for metering and forecasting contract gas demand.

Contract users with diverse demand could negotiate[41] a variable MDQ, for example, specified monthly. Summer peaking customers, for example, could expect a lower price for a variable MDQ than for a flat MDQ.

Reserved capacity would, in principle, be tradeable, and transferable between adjacent delivery points. However, because contracts are site-specific, the transferring user(s) need to specify the existing and new sites. For this reason, trading/transfer is impractical and rarely undertaken.

Contract users are not subject to overrun charges. Instead, any usage above reserved capacity is subject to common carriage conditions and charges.

Common users are not required to enter into contracts and are subject to the same transmission charges as in the common carriage option. Users not entering into contracts before the start of the new arrangements would automatically become common users.

Capacity planning

As in the common carriage option, the hybrid option requires a reliability standard to be established. Vector is required to invest as needed to maintain that standard. Vector's future demand is the sum of:

- the current and notified contract MDQ; and
- the forecast 'common demand' (the demand of common users).

One way to view this calculation of future demand is to consider part of the physical capacity as being dedicated to covering contract MDQ[42] and the rest being managed to cover the common demand. Managing the common demand uses a common carriage approach of defining and maintaining a reliability standard. As under the common carriage option, we assume the regulatory framework treats any investment reasonably required to maintain the reliability standard as prudent.

To aid forecasting, contract users are required to give advance notice of the requirements of new and renewed contracts[43]. Existing common users wishing to switch to contract terms are not required to give notice, because the switch leaves total demand unchanged[44].

Gas distributors and transmission-connected common end-users are required to forecast common demand; that is, total gas demand net of gas demand from contract users. To assist forecasting,

[41] Note that contract prices are *always* negotiated. There is no pre-determined contract price. If a user is unhappy with an offered contract price, it always has the option of using the posted price service instead.
[42] Although this capacity is available to service common users (at a price) if the contract users agree to be interruptible.
[43] Or, alternatively, be made to wait for a contract until the necessary investment could be undertaken.
[44] So long as the requested MDQ did not exceed the user's current coincident peak demand.

Vector provides distributors with a list of contracted sites connected to their distribution networks. This information allows contract gas demand to be removed from aggregate metered demand[45].

Transmission charges

Contract users pay fixed charges as set out in their contracts.

Common users, and any contract user with demand above reserved MDQ, pay transmission charges based on transmission prices, as in the common carriage option.

A question arises as to the relativities of prices under the common and contract services. However, this issue exists already. It is, in any case, primarily a matter for the Commission.

Congestion management

As in the common carriage option, Vector contracts with users (common or contract) to be interruptible. The costs are passed through to common users[46].

Under 'normal operating conditions' (which would be specified in the common and contract carriage terms[47]) congestion is managed first by interruption and next by curtailment of common users. Contract users would never be curtailed under normal conditions[48].

Under abnormal operating conditions, both contract and common users could be curtailed, based on practical and economic considerations, as now. If contract users are curtailed, those taking gas above their reserved capacity are liable to pay damages to curtailed users, as in the current arrangements.

10.2 Evaluation

The hybrid option combines the contract carriage and common carriage options; thus, we have in many cases combined the ratings. For some criteria, we have rated the hybrid option at the higher of the ratings for the contract carriage and common carriage options. We have done this where the hybrid option allows a user to choose between the two types of service.

Efficient pricing

The hybrid option might resolve the issue of inefficient pricing for diverse users that arises under the contract carriage option. Under the hybrid option diverse users can contract for variable MDQ, common service, or they can agree interruption terms.

[45] This sounds potentially complex, but in practice there are likely to be relatively few contracted sites.
[46] Contract prices are fixed, so there is no way to pass uncertain costs through to contract users. However, negotiated contract prices implicitly reflect the benefit of avoiding these common charges.
[47] As they are currently in the VTC, see the discussion in section 2.3.
[48] In practice many would probably agree to be interruptible, with interruption payments paying their internal costs of interruption.

Rating: good

Efficient allocation

Contract users who enter into an interruptible contract can effectively release capacity to common users who value it more highly. For example, a power station contract user could agree to be interruptible if compensated at the electricity spot price and so release capacity when the electricity price is low. This ability deals with the problem of long-term contracts locking up physical capacity.

Varying MDQ also ensures capacity allocation better reflects user diversity. In any case, diverse users are likely to opt for common service for much or all of their demand.

Rating: good

Efficient investment

Contract users must provide advance notice of their requirements for new or renewed contracts. They must also enter into long-term contracts. These two requirements allow Vector to better forecast contract demand.

Distributors are provided with sufficient information about contract users to allow them to remove contract demand and separately forecast common demand.

Therefore, both common and contract demand forecasts should be reliable and support efficient investment.

The problem (under the contract carriage option) of contract demand not reflecting user diversity is largely avoided by allowing diverse users to opt for a common service or request variable MDQ.

Rating: good

Facilitate competition

Retailers will generally opt for the common service, which does not impede retail competition. Contract users will typically be those users serving large end-users who do not require competing retailers but are simply seeking competitive wholesale prices. Thus, the poor rating the contract carriage option has for this objective is irrelevant to this hybrid option.

Rating: good

Simple and transparent

The hybrid option combines the contract carriage and common carriage options. This creates some complexity where the two regimes interact, for example, in capacity requests, capacity planning and congestion management. Complexity is therefore higher than either of the constituent options and perhaps similar to the current arrangements.

Nevertheless existing transparency problems are either resolved or eliminated. Transparency overall should be similar to the constituent options.

Rating: moderate

Price stability

Some price instability is a feature of the common service. Users concerned about price instability will generally choose the contract service. Therefore, this option scores the same as contract carriage.

Rating: good

Firmness

Users have the choice of a contract service that is very firm or a common service whose firmness is determined by the reliability standard. Under either service, users can choose a lower level of firmness by being interruptible. Therefore, this option gives users a wider choice and scope of firmness options than either of the contract carriage or common carriage options.

Rating: good

Transition costs

Existing users on long-term contracts will move onto contract service and so the existing contracts can remain in place. Some re-negotiation is needed because the contract terms are slightly different. Other users can avoid long-term capacity commitments by opting for common service. Therefore, the hybrid option avoids the major contract-related costs associated with the constituent options.

However, the introduction of two new regimes duplicates the design and implementation costs of each constituent option.

Rating: moderate

Summary

Table 5 summarises the evaluation of the hybrid option.

Table 5: Evaluation of hybrid option

Objective	Score
Efficient pricing	✓✓
Efficient allocation	✓✓
Efficient investment	✓✓
Facilitate competition	✓✓
Simple and transparent	✓
Price stability	✓✓
Firmness	✓✓
Transition costs	✓
✓✓ good **✓ moderate** **× poor** **×× very poor**	

The hybrid option scores well under the first four objectives, similar to the common carriage option. It avoids that option's problems under firmness and transition by allowing existing long-term contract users to remain on contract service. Therefore, it achieves the 'best of both worlds' except in relation to simplicity, where it is more complex than either the contract carriage or common carriage options.

Q5: Do you agree with the evaluation of the current hybrid option?

11 MDL carriage option

11.1 How it would work

Under the MDL carriage option, the access regime is similar[49] to the MDL regime on the Maui pipeline. Specifically:

- users are required to nominate receipt and delivery quantities;
- reserved capacity does not exist and all users receive a common carriage service;
- users could purchase an optional Authorised Quantity (AQ) service, which gives them priority during periods of congestion;
- users' priority is effected by first curtailing nominations of non-AQ users (users who continued to take delivery of gas after being curtailed are subject to imbalance charges); and
- AQ is sold as a 'take-or-pay' service, and total AQ sales are limited to a specified proportion (for example, two-thirds) of physical capacity, to ensure AQ is firm under all credible scenarios.

The MDL regime has no peak demand price. But in this option there is such a price, which is similar to that described in the common carriage option.

The MDL regime has no clear capacity planning policy. Under this option, we assume a common carriage planning model is used, meaning a reliability standard needs to be established.

11.2 Evaluation

The MDL carriage option has many similarities to the hybrid option, in that users can effectively choose a contract or common service. The main differences are:

- AQ is specified by zone, rather than being specific to an end-user site;
- AQ provision is limited to a portion of physical capacity;

[49] In relation to transport. It is not proposed to introduce other elements of the Maui regime, for example in balancing.

- congestion is managed through curtailing nominations, and then charging for any resulting imbalance, rather than curtailing end-users; and
- all non-AQ service is interruptible, with no compensation for interruption.

Rating differences between the hybrid and MDL options reflect these differences.

Efficient pricing

Zoned pricing of AQ may be inefficient to the extent that cost drivers in the Vector system are not naturally zoned.

Rating: moderate

Efficient allocation

The fixed limit on the level of AQ that may be issued might prevent users from getting the quantity of gas they require, unless MDL invests in new physical capacity.

Rating: moderate

Efficient investment

Rating: good (same as hybrid option)

Facilitate competition

Rating: good (same as hybrid option)

Simple and transparent

The need for a nominations regime creates additional complexity. Furthermore, the combination of a zoned AQ capacity with delivery-point-based physical capacity might create some complexity.

Rating: poor

Price stability

Rating: good (same as hybrid option)

Firmness

As with the current arrangements, service is either fully firm (AQ) or fully interruptible (non-AQ). Unlike the hybrid option, the MDL carriage model has no compensation for interruption.

Rating: moderate

Transition costs

The MDL carriage option introduces a nominations regime. However, the functionality for this already exists in OATIS.

Existing long-term contracts need to be converted into AQ. The result is a similar service, but long-term users might nevertheless require compensation to renegotiate these contracts.

Rating: moderate

Summary

Scores for the MDL carriage option are summarised in Table 6 below.

Table 6: Evaluation of MDL carriage option

Objective	Score
Efficient pricing	✓
Efficient allocation	✓
Efficient investment	✓✓
Facilitate competition	✓✓
Simple and transparent	✖
Price stability	✓✓
Firmness	✓
Transition costs	✓
✓✓ good **✓ moderate**	**✖ poor** **✖✖ very poor**

The MDL carriage option is similar to the hybrid option, in that it allows users to choose between a contract or common service. However, some of the detailed aspects of the MDL arrangements (for example, zoned pricing, nominations, limits on AQ amount) are designed specifically for the Maui pipeline and are unsuitable for the Vector pipeline system.

Thus, the MDL carriage option is an improvement on the current arrangements, but inferior to the hybrid option. The MDL option might be considered if it were part of an overall strategy to align the MDL and Vector arrangements across all access services.

Q6: Do you agree with the evaluation of the MDL carriage option?

12 Incremental change option

12.1 How it would work

Incremental changes to the current regime, rather than a radical overhaul, may give many of the benefits of the hybrid option. The elements that appear most beneficial are:

- common carriage capacity planning policy;
- transparency on capacity requests;
- capacity assigned to large customers[50];
- restructuring of interruptibility payments; and
- pipeline definitions.

These elements are described below. Apart from these changes, this option is identical to the current arrangements.

Capacity planning policy

If a reliability standard were established, an investment policy could also be established. The reliability standard would be predicated on total demand, including overrun, not just demand covered by contract MDQ.

Capacity request transparency

Under this option, Vector is required to better explain its capacity request process, but is not otherwise required to change it.

Capacity assigned to customer

Large customers include new provisions in their gas supply contracts with retailers. These provisions state that, should they wish to change supplier, the old retailer must rescind a specified amount of

[50] Vector has also proposed a mechanism by which capacity can also be effectively assigned to small customers, but this has not been considered here.

capacity and make it available to the new retailer. Vector's capacity request processes need to recognise this contract provision and ensure the rescinded capacity is made available to the new retailer. Thus, customers would, to all intents and purposes, control their capacity, without needing to become users in their own right.

Interruptibility payments

The terms of the interruptible service are amended to provide for a specified amount of compensation for interruption as in the hybrid and common carriage options.

12.2 Evaluation

Because this option is based on the current arrangements, ratings are the same, unless affected by one more of the incremental changes.

Efficient pricing

Rating: moderate (same as current arrangements)

Efficient allocation

With capacity assigned to large customers, some of the problems associated with grandfathered capacity would be resolved under this option.

Rating: moderate (versus 'poor' currently)

Efficient investment

Rating: good (same as common carriage)

Facilitate competition

Assigning capacity to large customers would solve competition issues for large customers but current problems remain for small customers.

Rating: moderate (versus 'poor' currently)

Simple and transparent

This option improves capacity request transparency. However, complexity is added in assigning capacity to customers and in restructured interruptible contracts.

Rating: poor (same as current arrangements)

Price stability

Compensation payments for interruption are recovered through the price, as in the common carriage option. Recovering payments in this way creates some price volatility. In addition, overrun charges continue and create further price instability. Therefore, price stability is slightly worse than either the current arrangements or the common carriage option.

Rating: moderate

Firmness

As with common carriage, compensation for interruption under this option provides varying levels of firmness. Therefore, this option improves on the current arrangements, and is rated good.

Rating: good (versus 'moderate' currently)

Transition costs

Incremental changes create some transition costs. The main difficulty is to change existing gas supply contracts to allow capacity to be assigned[51].

Rating: moderate

Summary

Ratings for the incremental change option are summarised in Table 7 below.

Table 7: Evaluation of incremental change option

Objective	Score
Efficient pricing	✓
Efficient allocation	✓
Efficient investment	✓✓
Facilitate competition	✓
Simple and transparent	✖
Price stability	✓
Firmness	✓✓
Transition costs	✓
✓✓ good **✓ moderate** **✖ poor** **✖✖ very poor**	

[51] Alternatively, this could be effected through changes to the VTC, as Vector have proposed. This would also have its difficulties.

The option of incremental change gives some modest improvements to the current arrangements. However, it does not tackle the fundamental problem that retail competition is complex under a contract carriage regime and may be impeded by a shortage of commercial capacity.

Q7:	Do you agree with the evaluation of the incremental change option?

13 Conclusions

Ratings for all of the options are summarised in Table 8 below.

Table 8: Evaluation of all options

Objective	Current Arrangements	Contract Carriage	Common Carriage	Hybrid	MDL carriage	Incremental Change
Efficient pricing	✓	✓	✓✓	✓✓	✓	✓
Efficient allocation	×	××	✓✓	✓✓	✓	✓
Efficient investment	✓	××	✓✓	✓✓	✓✓	✓✓
Facilitate competition	×	××	✓✓	✓✓	✓✓	✓
Simple and transparent	×	✓✓	✓	✓	×	×
Price stability	✓	✓✓	✓	✓✓	✓✓	✓
Firmness	✓	✓	✓	✓✓	✓	✓✓
Transition costs	✓✓	×	××	✓	✓	✓
	✓✓ good		✓ moderate	× poor		×× very poor

The table does not provide an 'overall' rating, because this depends on the weighting given to the different objectives. However, the hybrid option rates well generally and is equal or superior to all of the options on all objectives except that:

- current arrangements rate better on transition (as they always will, whatever the alternative); and
- contract carriage rates better on simplicity.

On this basis, the hybrid option merits further examination.

The common carriage and contract carriage options rate well in some areas but poorly in others. These poor ratings are probably sufficient to rule these two options out of further consideration. Although it may be possible to introduce 'legacy' arrangements to deal with any transitional problems with common carriage, these arrangements would comprise a variation of the hybrid option and could be considered under that option.

The MDL carriage option rates fairly well, but is inferior or equal to the hybrid option for all objectives. It therefore does not merit further consideration.

The incremental change option also rates inferior or equal to the hybrid option for all objectives. However, there may be individual elements of this option worth implementing, particularly if the transition costs associated with the hybrid option are found to be prohibitive. Therefore, this option should remain in consideration.

Subject to feedback from stakeholder submissions, Gas Industry Co recommends further consideration of the hybrid and incremental change options.

Q8:	Are there other options you think should be considered and evaluated?
Q9:	Do you agree that only the hybrid and incremental change options should be considered further?

14 Next steps

14.1 Next steps

Subject to the views of submitters to this paper, Gas Industry Co recommends a process to further consider the hybrid and incremental change options. We believe we can add value to the process by working with Vector and its pipeline users to:

- flesh out the hybrid and incremental change options to ensure they are properly defined and understood;
- alert the Commission to the capacity planning issues to ensure they are fully covered in the regulatory development process and the access regime and regulatory framework are aligned;
- consider whether the options can be implemented through changes to the VTC alone;
- consider what changes to OATIS and to other Vector and user systems would be required; and
- refining the preferred option in the light of the above and develop an implementation strategy and timetable.

Gas Industry Co appreciates Vector has its own commercial objectives, but hopes there is sufficient common ground among all stakeholders to allow for a constructive development process.

Q10: Do you agree with the proposed next steps?

14.2 Timeline

The Associate Minister has requested Gas Industry Co issue a Statement of Proposal by December 2010. To meet this requirement, we have determined a timeline as set out in Table 9.

Table 9: Timeline for transmission pipeline capacity arrangements

Table heading	Date
Capacity Options Paper Workshop	Wednesday 9 June 2010
Closing date for submissions on Options Paper	Thursday 8 July 2010
Issue Options Paper Analysis of Submissions and Statement of Proposal	By December 2010

Appendix A Format for submission

To assist the Gas Industry Co in consider stakeholders' responses, below is a suggested format for submissions. The questions are the same as those contained in the body of this document. A word version of this template can be downloaded from our website: http://www.gasindustry.co.nz/work-programme/transmission-pipeline-capacity?tab=1661

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

QUESTION	COMMENT
Q1 Do you agree the objectives identified in section 5 are appropriate criteria for evaluating transmission capacity options?	
Q2 Do you agree with the evaluation of the current capacity arrangements?	
Q3 Do you agree with the evaluation of the contract carriage option?	
Q4 Do you agree with the evaluation of the common carriage option?	
Q5 Do you agree with the evaluation of the current hybrid option?	
Q6 Do you agree with the evaluation of the MDL carriage option?	

QUESTION	COMMENT
Q7 Do you agree with the evaluation of the incremental change option?	
Q8 Are there other options you think should be considered and evaluated?	
Q9 Do you agree that only the hybrid and incremental change options should be considered further?	
Q10 Do you agree with the proposed next steps?	

Glossary

Abnormal conditions	Conditions other than normal conditions. A contract carriage pipeliner is entitled to curtail firm service under these conditions.
AQ	Authorised Quantity. A term of the Maui Pipeline Operating Code for a priority right to use pipeline capacity.
Capacity management	User processes for managing their level of commercial capacity relative to their gas demand.
Capacity planning	The process in which the pipeliner manages the level of spare capacity through investment in new pipeline assets.
Capacity request process	The process in which a pipeliner decides whether to approve or reject a capacity request, by determining whether there is sufficient spare commercial capacity.
Coincident user peak demand	The gas demand of a user at the time of maximum total gas demand on the pipeline.
Commercial capacity	The maximum amount of reserved capacity that a pipeliner is prepared to issue. Like physical capacity, this will be an envelope rather than a simple number. It will be related to—but not necessarily the same as—physical capacity.
Congestion	Where gas demand exceeds physical capacity.
Congestion management	Management of congestion through interruption and curtailment to reduce gas demand.
Curtailment	Administrative actions to reduce gas demand from firm users to relieve congestion.
End-user	A gas consumer.
Gas demand	This is the amount of gas that is consumed—or would be consumed in the absence of interruption or curtailment - by end-users. Given the locations of the end-users and the sources of gas, this determines

	the demand for transportation.
Firm service	A transport service that is permitted to be curtailed only under specified, rare circumstances.
Interruption	Administrative actions to reduce demand from interruptible users to relieve congestion.
MDQ	Maximum Daily Quantity. The amount of reserved capacity a user holds.
Non-coincident user peak	The highest daily gas demand of a user in a gas year.
Normal conditions	The pipeline conditions under which a contract carriage pipeliner has agreed to *always* provide firm service, up to the amount of reserved capacity. Currently specified in the VTC.
OATIS	'Open Access Transmission Information System'. The information system and internet site used to manage the day to day operations of open access on the Maui and Vector pipelines.
Overrun conditions	Where the gas demand of one or more users exceeds its reserved capacity. A contract carriage pipeliner is entitled to curtail firm service—to any user—under these conditions.
Physical capacity	The maximum amount of gas that can be transported. Generally, this is an envelope of combinations of delivery point quantities, rather than a simple number at each delivery point. For example, for two adjacent delivery points, the physical capacity may be the sum of the two delivery amounts.
Reliability	Reliability of firm service provision. Inversely related to the frequency and severity of curtailment.
Reliability standard	A statutory or contractual minimum reliability level.
Reserved capacity	The amount of firm service for which a user has contracted.
Retailer	A user who on-sells delivered gas to end-users.
Spare commercial	The difference between commercial capacity and total reserved

capacity	capacity.
Spare physical capacity	The difference (on a day) between physical capacity and gas demand.
User	A Vector shipper.
User diversity factor	The ratio of the sum of coincident peak user demands to the sum of non-coincident peak user demand.