Review of Vector Capacity Arrangements

A Research Paper

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CreativeEnergy

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1. Introduction

1.1. Objectives and Structure

Gas Industry Company (GIC) has engaged Creative Energy Consulting to develop a research paper which can be used as a resource by Vector Transmission (VT) and/or its shippers to inform their discussion on how Vector's arrangements for selling capacity on its transmission pipelines might be improved. The research paper is to:

- describe the current arrangements;
- describe the policy issues and practical difficulties which arise; and
- consider possible options to address the issues.

1.2. Scope

GIC has requested that the paper considers the capacity offerings[1] on VT pipelines, particularly the opportunities for shippers to purchase "short-term" (ie less than one year) capacity. The paper is to consider the issues and concerns that were described in GIC's 2006 Issues Paper[2], including:

- the possible need for short-term (ST) capacity to facilitate short-term gas trading;
- the lack of secondary trading in capacity;
- the "arbitrary" price of overrun which may needlessly ration capacity and affect competition in wholesale and retail markets; and
- the concern that the current arrangements may provide a competitive advantage to VT affiliates in the retail gas market.

The scope does not include consideration of the Maui Development Limited (MDL) pipeline, except to the extent that this has direct relevance for VT arrangements.

This paper addresses GIC's requirements as follows:

- section 2 considers GIC's statutory objectives and uses these to develop some specific objectives for capacity arrangements;
- section 3 discusses some generic issues and concepts relating to gas pipeline transport arrangements;
- section 4 describes the current capacity arrangements on Vector pipelines;
- section 5 considers policy issues arising in the current arrangements;
- section 6 presents and evaluates some options for enhancing the current arrangements; and
- section 7 presents conclusions and recommendations.

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[1] These might more clearly be described as "gas transportation services", but "capacity" is the common shorthand used in the industry and so is employed in this paper.
[2] Gas Transmission Access Issues Review, June 2006

1.3. Next Steps

This research paper is for information only and is not intended to be a formal consultation paper. Comments are nevertheless welcome.

It is anticipated that capacity arrangements and issues will be progressed, in the first instance, in the next version of the Vector Transmission Code (VTC), which VT is expected to commence consultation on later this year.

1.4. Acronyms

The acronyms used in this paper are explained in table 1.

Acronym	Meaning
AQ	Authorised Quantity
CRF	Capacity Reservation Fee
DP	Delivery Point
GIC	Gas Industry Company
GPS	Government Policy Statement
MCE	Marginal Cost of Expansion
MDL	Maui Development Ltd
RP	Receipt Point
SO	Statutory Objective
ST	Short-term
STGM	Short-term Gas Market
TPF	Throughput Fee
TSA	Transmission Services Agreement
TSO	Transmission System Operator
VT	Vector Transmission
VTC	Vector Transmission Code

Table 1: Acronyms used in this Paper

2. Capacity Objectives

2.1. Statutory Objectives

Before considering issues around the current VT capacity arrangements and options for addressing them, we need to establish a set of economic objectives against which these issues and options can be evaluated. A useful starting point is the statutory objectives set out in the Gas Act and the Government Policy Statement (GPS), to which GIC must have regard in making regulations.

The principle objective of GIC in recommending gas governance regulations and rules under section 43F is to:

1. "…ensure that gas is delivered to existing customers in a safe, efficient, and reliable manner."

The other objectives are:

2. "the facilitation and promotion of the ongoing supply of gas to meet New Zealand's energy needs, by providing access to essential infrastructure and competitive market arrangements;
3. barriers to competition in the gas industry are minimised;
4. incentives for investment in gas processing facilities, transmission, and distribution are maintained or enhanced;
5. delivered gas costs and prices are subject to sustained downward pressure;
6. risks relating to security of supply, including transport arrangements, are properly and efficiently managed by all parties;
7. consistency with the Government's gas safety regime is maintained; and
8. GPS objectives and outcomes."

The GPS (paragraph 12) adds five new general policy objectives for Gas Industry Co to apply to its recommendations as follows:

9. "energy and other resources used to deliver gas to consumers are used efficiently;
10. competition is facilitated in upstream and downstream gas markets by minimising barriers to access to essential infrastructure to the long-term benefit of end users;
11. the full costs of producing and transporting gas are signalled to consumers;
12. the quality of gas services where those services include a trade-off between quality and price, as far as possible, reflects customers' preferences; and
13. the gas sector contributes to achieving the Government's climate change objectives as set out in the New Zealand Energy Strategy, or any other document the Minister of Energy may specify from time to time, by minimising gas losses and promoting demand-side management and energy efficiency."

For ease of analysis, these objectives have been distilled into just 6 objectives which are considered to be most relevant to this discussion on capacity arrangements. The objectives are:

1. ensure *efficient pricing* of capacity;
2. promote *efficient investment* in capacity;
3. *facilitate competition* in related markets;
4. favour *simple* and transparent design and operation;
5. allow *tariff stability*; and
6. provide the level of service *firmness* that users[3] require and are willing to pay for.

The relationship between these capacity objectives and the statutory objectives is presented in table 2, below. The objectives are discussed in turn in the following section.

[3] This paper employs the terms "user" for a person who uses capacity services. This term is synonymous with the term "shipper" used by VT. A consumer of gas is referred to as an "end-user"

Statutory Objective	Capacity Objective					
	Efficient Pricing	Efficient Investmnt	Facilitate comp'n	Simplicity	Tariff Stability	Firmness
1. gas delivered safely…	✓	✓	✓			✓
2. access and competition			✓		✓	
3. minimise barriers			✓	✓		
4. investment incentives		✓				
5. falling delivered gas costs				✓		
6. manage supply risks						✓
7. safety						
8. promote GPS objectives	✓		✓	✓	✓	✓
9. efficient resource use	✓					
10. access and competition			✓			
11. full costs signalled to consumers	✓			✓	✓	
12. quality that customers wants						✓
13. promote energy efficiency	✓				✓	

Table 2: statutory and capacity objectives

2.2. Capacity Objectives

Efficient Pricing

Efficient use of a resource (ie "allocative efficiency"), as referred to in the ninth statutory objective listed above ("SO9") is promoted by ensuring that the resource is priced efficiently: ie that to the extent possible the price of the resource reflects the marginal cost of its supply.

Does this imply that the "full costs" of capacity will be signalled to consumers (SO11)? Not by itself. However, pricing efficiency also requires that resource costs are fully recovered; otherwise, the pipeline business becomes untenable. The issue of reconciling marginal cost pricing and full cost recovery is discussed in section 3.5.

Efficient pricing of capacity contributes to the efficient delivery of gas (SO1).

Efficient Investment in Capacity

This simply restates SO4, in relation to pipeline capacity. It is assumed that the pipeline company will be the investor. Efficient investment requires that demand for new capacity is appropriately signalled and that these signals are acted upon. There is some overlap between the *efficient pricing* and *efficient investment* objectives. In particular, if prices are inefficient, demand for new capacity may be distorted, which in turn will affect investment. For this reason, when evaluating against the *efficient investment* objective, the impact of inefficient prices on investment will be discounted.

Facilitate Competition

Objectives SO2, SO3 and SO10 all relate to facilitating competition through provision of access to essential infrastructure. Capacity arrangements are a major element of access to pipelines (the other element being interconnection arrangements). To facilitate competition, there must be access to all-comers on equal or equivalent terms. There must also be recognition that competitive processes in upstream markets (eg gas trading) and downstream markets (eg customer churn) will create variable and uncertain capacity requirements. Capacity arrangements should ideally have the flexibility to accommodate this uncertainty.

Simplicity

Simple and transparent arrangements help to minimise transactions costs and so promote SO5. They also promote new entry (SO3), by simplifying the task for new entrants. Finally, simplicity ensures that price signals to consumers are clear and coherent (SO11).

Tariff Stability

Tariff stability is necessary to provide effective access and promote competition (SO2) and to send coherent signals to consumers (SO11). New entrants may incur multi-year sunk costs and will only do this if they have some certainty around long-term viability. Tariff stability is a prerequisite for this. Capital expenditure on energy efficiency (SO13) similarly requires such stability.

Firmness

The most important: “quality” of a capacity service[4] (SO12) is firmness: ie reliability and continuity of service provision. Some users will require, and be prepared to pay for, a very “firm” (ie reliable and continuous) service; others will be content with a cheaper, non-firm (ie interruptible) service Firmness applies to the long-term as well as the short-term. Users with a requirement for long-term (ie multi-year) service continuity should be able to obtain this: through long-term contracts or renewal rights.

2.3. Summary

The six capacity objectives defined above are relevant to capacity arrangements and encapsulate the broader statutory objectives established for GIC activities. Therefore, issues and options discussed in this paper will be evaluated using these objectives.

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[4] indeed, it is difficult to think of other qualities which relate to capacity arrangements. Other important service qualities - such as pressure and gas composition - relate to interconnection services rather than capacity services

3. Capacity Concepts

3.1. Overview

Before considering the specifics of the VT arrangements, it may be helpful to present some concepts which have generic relevance to any and all gas pipeline capacity offerings[5]. These concepts are discussed below.

3.2. Contract Carriage and Common Carriage

Contract carriage and common carriage are the two alternative models[6] for providing access to gas pipelines and other supply infrastructure. Contract carriage has conventionally been used for gas pipelines, whilst common carriage is typically used for electricity transmission - although there are exceptions to these rules. This dichotomy has particular significance for New Zealand, because VT and MDL have adopted the contract carriage and common carriage models, respectively, for access to their pipelines.

These two models can be compared and contrasted by considering the different responsibilities they place on the transmission system operator (TSO[7]) and users and the different pricing structures for capacity services. These are summarised in table 3 below.

Role/Pricing	**Contract Carriage**	**Common Carriage**
Demand Forecasting	user	TSO
Capacity procurement	user	TSO
Peak Charges	capacity reservation fee (CRF) and overrun fee	tariff applied to actual peak demand
Charges on anytime demand	throughput fee (TPF)	TPF

Table 3: comparison of Contract Carriage and Common Carriage

Under contract carriage, the user reserves, or “books”, capacity ahead of time, based on *its* forecast of its peak demand requirement. The TSO is responsible for ensuring that the capacity is “firm” by limiting the amount of booked capacity to the physical pipeline capacity. A user whose demand exceeds its booking is charged an overrun fee, typically a multiple of the capacity tariff, as an incentive to book adequate capacity. This is discussed further in the next section.

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[5] and also to transportation services in similar “displacement” transport networks, such as electricity transmission.

[6] although this dichotomy is somewhat simplistic: many existing arrangements incorporate elements of both models

[7] this section refers to a TSO who is responsible for making operational decisions and a pipeline owner who makes, and funds, investment decisions

Under common carriage, on the other hand, responsibility for ensuring capacity is sufficient to cover peak demand is placed on the TSO. Externally imposed reliability standards define how often peak demand is allowed to exceed pipeline capacity.

3.3. Optimising Overrun Charges

The overrun charge may perform two important roles in a contract carriage model. Firstly, it helps to address an externality associated with capacity: that one user's failure to book sufficient capacity may lead to another user (who has booked adequately) being interrupted. Alternatively, this externality may be addressed explicitly, by requiring that the overrunning user pays some form of liquidated damages to compensate the interrupted user. Secondly, the overrun charge encourages a user to book an adequate level of capacity. It is this role that is considered in this section.

A rational user will book capacity so as to minimise its total (booking plus overrun) charges[8]. It does this by booking so that it will overrun on only 365/K days[9] over the year, where "K" is the ratio of the overrun charge to the booking charge[10]. To see this, suppose the user overruns on "N" days, and that N is less than 365/K. Then booking one less GJ of capacity will save the user- 365*CRF in capacity booking fees but increase its overrun charges by N * K * CRF. Since N*K < 365, the reduced booking will save money overall. So, the user has booked too much capacity to optimise its overrun charges, and should reduce its booking until it overruns on more days (see figure 1).

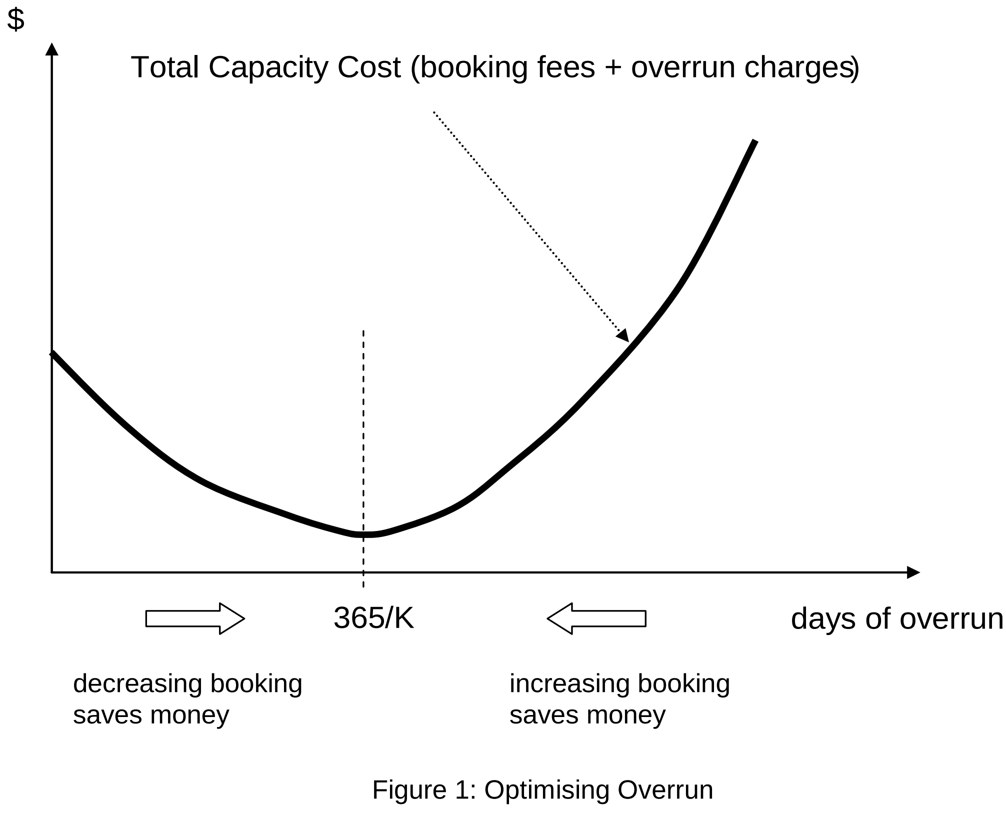

Figure 1: Optimising Overrun

[8] assuming there is no additional exposure to liquidated damages
[9] or the whole number nearest to 365/K
[10] expressed as daily equivalents. For example, if the annual CRF for capacity is $365/GJ, the daily equivalent CRF is $1/GJ. A $10/GJ overrun charge would then imply a "K" factor of 10

Conversely, suppose that N > 365/K. If the user books an extra 1GJ of capacity, this will cost it an extra 365*CRF but save it N*K*CRF in overrun. Since N*K > 365, there is a saving overall. So, the user should book extra capacity so that it overruns on less days. (see figure 1).

It can be shown mathematically[11] that the total charged to the user when it optimises its overrun is the same as it would be if there were no overrun charge and the user booked an amount of capacity equal to its *average demand over these highest 365/K* days of demand. The mathematics is presented in the box below.

Optimal Cost of Booked Capacity Plus Overrun Charges

The total cost is the cost of booked capacity (C_B) plus the cost of overrun charges (C_O)

$$C = C_B + C_O$$

Now:

$$C_B = CRF * 365 * Q_B$$

$$C_O = K * CRF * \sum_{d=1}^{365/K} \left(D_d - Q_B\right)$$

$$= K * CRF * (\overline{D} - Q_B) * 365 / K$$

$$= CRF * 365 * (\overline{D} - Q_B)$$

where

Q_B is the level of booked capacity,

D_d is the demand level on the d[th] highest demand day; and

$\overline{D}$ is the average demand level over the 365/K days of highest demand.

Therefore:

$$C = CRF * 365 * Q_B + CRF * 365 * (\overline{D} - Q_B)$$

$$= CRF * 365 * (Q_B + \overline{D} - Q_B)$$

$$= CRF * 365 * \overline{D}$$

This result is shown graphically in Figure 2

[11] In fact, the maths presented here only “works” if 365/K is a whole number. Similar results could be obtained where 365/K is not a whole number using somewhat more complicated maths.

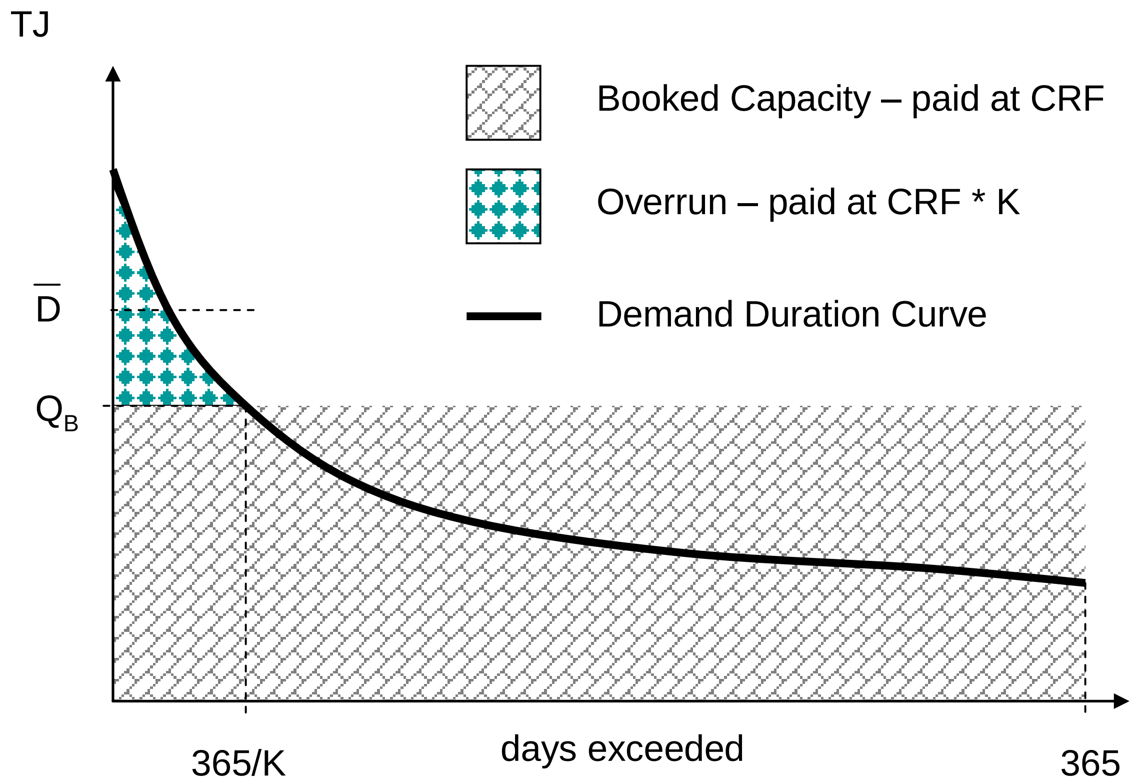

Figure 2: Cost of Booked Capacity and Overrun

It will be seen, then, that for a fixed CRF, capacity revenue (CRF plus overrun) will increase as the overrun multiplier increases, but by no means proportionately. In particular, for large values of K, revenue will approach CRF * peak demand[12].

3.4. Marginal Cost of Expansion

The marginal cost of expansion (MCE) on a pipeline is the present value of the cost of investing in additional pipeline capacity to meet a unit increment (eg 1TJ) in demand. Or, since pipeline investment will be needed anyway to meet expected demand growth, MCE may be better defined as the *change* in the present value of future investment to meet a unit increment in demand over and above the expected, baseline growth rate.

[12] This analysis simplistically assumes that the user can forecast their demand year-ahead with perfect accuracy. In practice, given demand uncertainty, users will book higher amounts than the result shown, because the cost of under-booking outweighs the cost of over-booking. For larger K, this asymmetry increases and optimal booking amounts will increase somewhat (over and above the result presented earlier) to offset this.

There are some important factors to consider in estimating the MCE. Firstly, investment is only likely and appropriate where there is a *sustained* increase in demand, so it makes sense to consider a sustained unit increase in demand – ie a step change – rather than a one off.

Secondly, discrete investments – eg looping or compression - will occur to add capacity at bottlenecks and each investment will add substantial new capacity, so investment is "lumpy" by nature.

Finally, an increment of demand will not change investment plans, except to bring investments forward incrementally[13].

Investment lumpiness makes the actual calculation of MCE complex. A demand increment will, hypothetically, bring forward not just the *next* investment in capacity, but all of the subsequent investments (see Figure 3). The change to the present-value cost of these subsequent investments may or may not be material, depending on the discount rate etc.

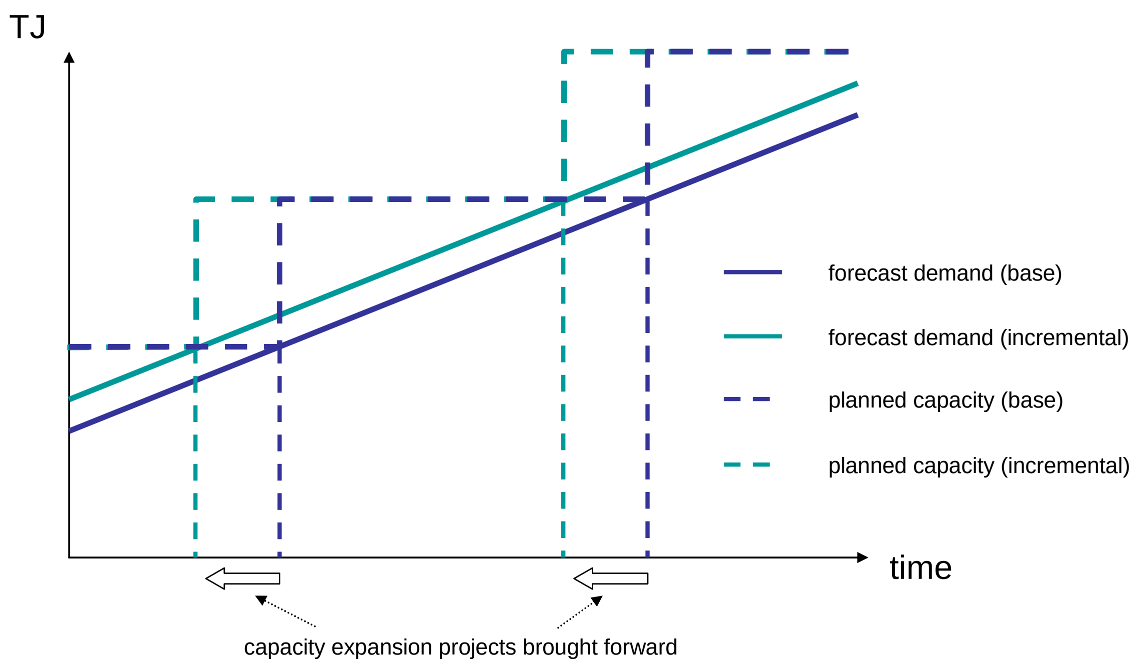

Figure 3: Incremental Demand brings forward Planned Projects

If we "assume away" lumpiness, the modelling of MCE becomes much simpler. Suppose that capacity can be continuously added at a cost of $X/GJ. Now consider the effect of a 1GJ step-change increase in demand. If capacity expansion is planned for next year anyway, this expansion will have to be increased by an additional 1GJ, at an extra cost of $X. In future years, capacity expansion then proceeds as it would have without the demand increment.

[13] In practice, demand seasonality means that investments will be brought forward by one year, if at all.

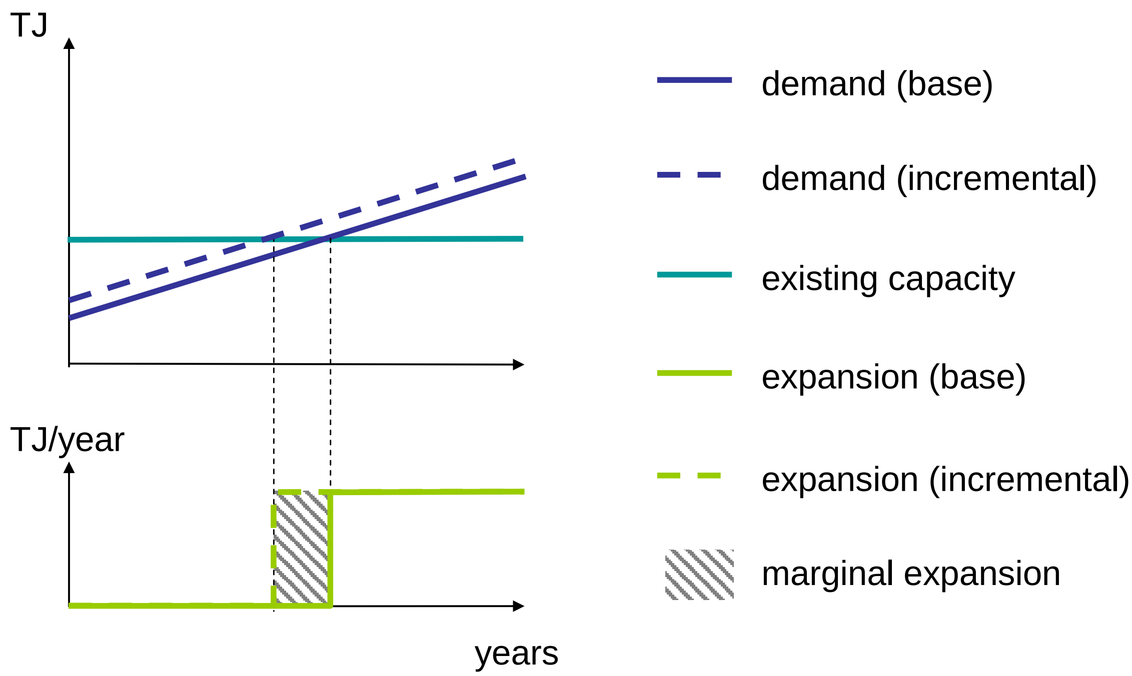

Figure 4: adding “non-lumpy” Capacity

However, if no capacity expansion is required next year, the extra 1GJ of demand is unlikely to trigger an expansion. If an expansion is not required until N years out then, with the extra demand, this expansion will now need to be 1GJ larger (see figure 4). The incremental cost is still $X, but in present value terms, the cost will be discounted by applying the relevant discount rate (r) for N years: ie

$$MCE = \frac{X}{(1+r)^N}$$

In the light of this[14], it will be seen that MCE will be low if:

- incremental capacity expansions are cheap (in $/GJ terms);
- current spare capacity is high;
- demand growth is low; or
- some combination of these.

In the limit, if demand is stagnant and spare capacity is high, MCE may, to all intents and purpose, be zero.

[14] and assuming our “no lumpiness” assumption does not totally change the characteristics of MCE

Even in higher growth pipelines, MCE may be low compared to the average cost of capacity provision: ie the amortised capital cost of the existing pipeline divided by the existing physical capacity. This is because:

- capacity can be added relatively cheaply with compression – up to the technical pressure limits of the pipeline; and
- looping capacity is required only at bottlenecks, not along the entire pipeline.

3.5. Pricing Efficiency

Capacity prices will promote *allocative efficiency* – ie efficient use of existing capacity resources and of the resources needed to build new capacity – if they reflect the marginal cost of capacity provision. The marginal cost has two components:

- the MCE in relation to providing additional capacity; and
- the variable cost of employing existing capacity: such as the costs of compressor fuel and odorisation.

The need for additional capacity is driven by the level of peak demand on a pipeline, while variable cost is driven by demand at any time. So efficient prices should be structured by applying:

- the MCE at times of peak pipeline demand; and
- the variable cost at all times.

Such a pricing structure would be applied for contract carriage and common carriage as shown in the table 4 below.

Price Component	Contract Carriage	Common Carriage
MCE-based price	CRF and overrun price	peak demand[15] tariff
variable-cost-based price	throughput fee	throughput fee

Table 4: efficient pricing under contract carriage and common carriage

As discussed in section 3.4, the MCE may be quite low and will commonly be less than average cost. This means that a TSO levying peak charges based on MCE will not recover the sunk capital costs of the existing pipeline. In this respect, the "efficient" price structure shown in table 4 is unrealistic and infeasible and higher prices are needed.

To minimise any loss of efficiency, the additional revenue required should be recovered using the "Ramsey Pricing" principle. This principle states that the mark-up of prices compared to marginal cost should inversely correlate with the price elasticity of demand: mark-ups (in percentage terms) should be higher where elasticity is low and lower where elasticity is high.

[15] This should be the *coincident* peak demand, as discussed in the next section.

For the end-user, the relevant price is the delivered gas price – combining the gas "commodity price" with the transmission (and distribution) price. Transmission prices will represent a proportionately larger component of the delivered gas price at peak times (when transmission prices are much higher but gas prices may only be slightly higher) than at other times. So, a given percentage increase in the transmission price at peak will have a bigger impact on the delivered gas price (see the example in table 5) – and so a likely bigger impact on demand – than away from peak. Therefore, it seems reasonable to assume, irrespective of the end-user, that elasticity of demand to transmission price will be highest at demand peak and lower at other times.

	Off-peak Period	**Peak Period**
Transmission Price	1	15
Gas Price	4	5
Delivered Gas price	5	20
Impact of doubling transmission price	1	15
impact of doubling transmission price as percentage of delivered gas price	20%	75%

Table 5: Impact of Gas Prices on Transmission Price Elasticity of Demand

Applying the Ramsey Pricing principles, this suggests that the mark-up on marginal cost should be *lowest* at peak and higher at other times.

In summary:

- where MCE is similar to average (sunk) capital cost, efficiency is promoted by recovering capital costs on peak demand or booked capacity and recovering variable costs from throughput charges; and
- where MCE is lower than average cost, peak demand prices and anytime demand prices should be at a mark-up to MCE and variable cost, respectively. The mark-up at peak, in percentage terms, should probably be *lower* than the mark-up off-peak.

3.6. Peak Demand Diversity

The previous section, considers peak *pipeline* demand (the peak gas flows on a pipeline), since it is this demand that drives the need for investment in new capacity. However, contract carriage requires a user to book capacity to cover its own peak demand[16].

The aggregate of peak user demands will always equal or exceed the peak pipeline demand. The ratio of these two quantities (which will therefore be one or less) is referred to as a "diversity factor". A lower diversity factor implies *greater* diversity between users, in that they have their peak demands at different times. Diversity factors can similarly be defined for delivery points (the ratio between aggregate peak DP demands and the pipeline peak) or end-users (based on aggregate peak end-user

[16] assuming no secondary trading - see discussion in section 3.8 below

demand). Similarly, a pipeline diversity factor can be defined by comparing the aggregate of pipeline peak demands with peak network demand.

The demand of a user at the time of the pipeline peak demand[17] is known as the *coincident* peak demand. For clarity, the (anytime) peak demand of the user may also be referred to as the *non-coincident* peak demand.

By definition, the aggregate of coincident peak demands of all users on a pipeline equals the pipeline peak demand. The ratio of a user's (or end user's) coincident peak demand and non-coincident peak demand is referred to as that user's (or end-user's) diversity factor. Since demand generally – and coincident peak demand in particular – can never exceed non-coincident peak demand, the diversity factor is, again, less than or equal to one. A numerical example is shown in table 6.

	Coincident Peak	**Non-coincident peak**	**Diversity Factor**
User A	80	100	80%
User B	250	250	100%
User C	30	50	60%
Pipeline	**360**	**400**	**90%**

Table 6: user and pipeline diversity factors

Common carriage pricing may be structured around coincident or non-coincident peak demands. An objective of reflecting marginal cost would mean that the MCE-component should be based on *coincident* peak. However, as noted above, contract carriage by definition structures pricing around non-coincident peaks and may therefore be somewhat inefficient, depending upon the level of user diversity.

3.7. Receipt and Delivery Point Flexibility

When booking capacity under contract carriage, the user may have to specify the relevant receipt point (RP) and delivery point (DP). The booked capacity is then only valid for transport of gas between the specified RP and DP (the "RP-DP pair").

It is common, however, for RPs or DPs to be grouped into a "receipt zone" or "delivery zone", respectively. In this case, the booked capacity applies for transport between any RP and DP in the specified zones. A TSO will typically define zones in terms of a pipeline or sub-pipeline, so that transport between points in the zones uses common pipeline assets, as shown in figure 5. The TSO can then have confidence that there will be sufficient physical capacity, irrespective of which particular RP and DP within the specified zones the gas is transported between.

[17] or at the time of another peak demand, depending upon the context

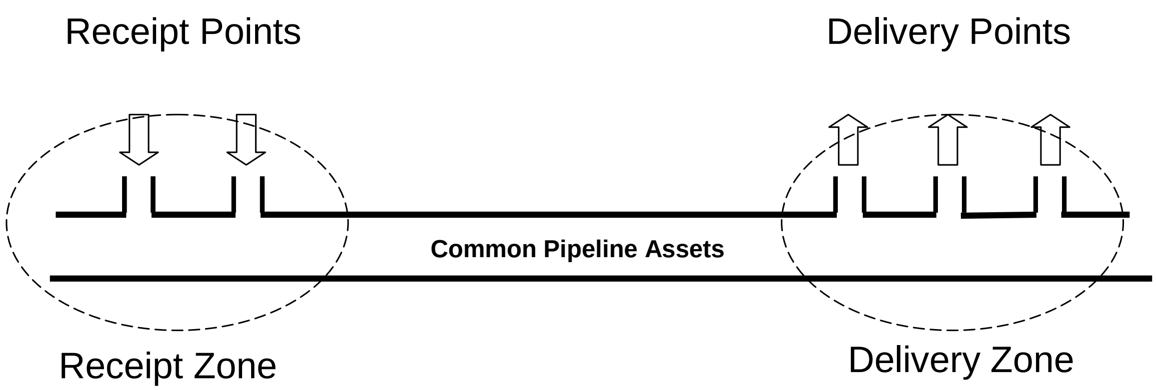

Figure 5: Receipt and Delivery Zones

This flexibility allows a user to book capacity based on its (non-coincident) demand peak for the zone as a whole, rather than for the demand peak at each DP or RP individually.

3.8. Secondary Trading

Where secondary trading of capacity is permitted, a user need not book capacity to cover its entire non-coincident demand. Indeed, if the secondary market is liquid and *efficient*[18], a user should only need to book its coincident demand. This can be illustrated using the example from table 6, above.

If User A and User C book only their coincident demands of 80 and 30 respectively (user B will still book 250, because its coincident demand and non-coincident demand are equal), they must buy from the secondary market whenever these levels are exceeded. When User A's demand is at its peak (100), the demand of B and C cannot exceed 260 in aggregate, since the coincident peak pipeline demand is 360. But these two users have between them booked 280, so they must have at least 20 available to sell to A[19]. Similarly, at User C's peak of 50, A and B cannot exceed 310, so they must have at least 20 of their 330 of booked capacity available to sell to C. There is, in principle, sufficient booked capacity for all users' demand to be covered at all times.

[18] In this context, *efficiency* means that each user is able and willing to sell, at a nominal price, its unused capacity to any other user who requires it.
[19] They may choose not to sell, but in this case the secondary market is not efficient, since B and C are holding surplus capacity that has no value to them but that would have value to A. This is discussed further in section 6.5.

4. Current Arrangements

4.1. Overview

This section describes VT's capacity arrangements as defined in the VTC, which contains standard terms and conditions for transmission services agreements (TSAs).

Some existing and prospective TSAs may differ from these standard terms in certain areas. These differences are noted, where relevant.

4.2. Capacity Reservation and Overrun

The VTC requires that users must book, in advance, capacity for an entire gas year[20]. Once booked, capacity must be paid for at the relevant tariffed CRF and can only be cancelled under certain conditions[21]. Similarly, capacity cannot be booked mid-gas-year or for shorter periods, except under certain conditions[22] or for interruptible service[23].

Where a user's demand exceeds its booking, an "*unauthorised"* overrun charge[24] is incurred, at a rate of 10 times the CRF. An overrunning user is also liable to compensate VT should other users have their service interrupted and their capacity payments reduced as a result of the overrun.

Annually booked capacity is firm, meaning that VT is obliged to provide service to a user up to the level of its booked capacity except in unusual circumstances such as emergencies or scheduled maintenance. Firmness is maintained by VT limiting the amount of booked capacity to the physical capacity of the relevant pipeline.

Renewal rights come with booked capacity, under which an existing user has priority over new users to book capacity in the following year, up to the level of its current booking. Where user demand for capacity exceeds physical capacity, capacity is rationed by allocating capacity to each user proportionate to its request for *increased* booked capacity.

Capacity must be booked for a specified RP-DP pair. A tariff for each RP-DP pair is calculated using VT's pricing methodology and published (see section 4.4).

VT acknowledges that users will optimise the total cost of capacity booking and overrun by deliberately booking less than their forecast demand, as discussed in section 3.3. Therefore, if VT were to change its overrun charge, the aggregate revenue to VTC will change as discussed in section 3.3.

As part of its capacity disclosure information, VT publishes daily demand information for transport to delivery points, except where this would reveal confidential customer

[20] October to September
[21] described in section 4.5, below
[22] described in section 4.5, below
[23] see section 4.3, below
[24] a*uthorised* overrun is a form of booked short-term capacity and is discussed in section 4.3

information[25]. Figure 6 provides flow duration curves for each pipeline system based on the most recent disclosure (2006 data). Figure 7, uses the formula derived in section 3.3 to show how VT revenue would change[26] if the overrun fee were changed but CRFs were left unchanged.

The revenue is expressed as a percent of the revenue that would be obtained if the bookings fully covered peak demand. The current overrun multiplier of 10 recovers around 90% of this revenue. Reducing the multiplier to 3 (say) would reduce revenue to around 80% of maximum. Put another way, if the overrun multiplier were reduced to 3, CRFs would have to rise by around 10% in order for VT to maintain its current revenue level.

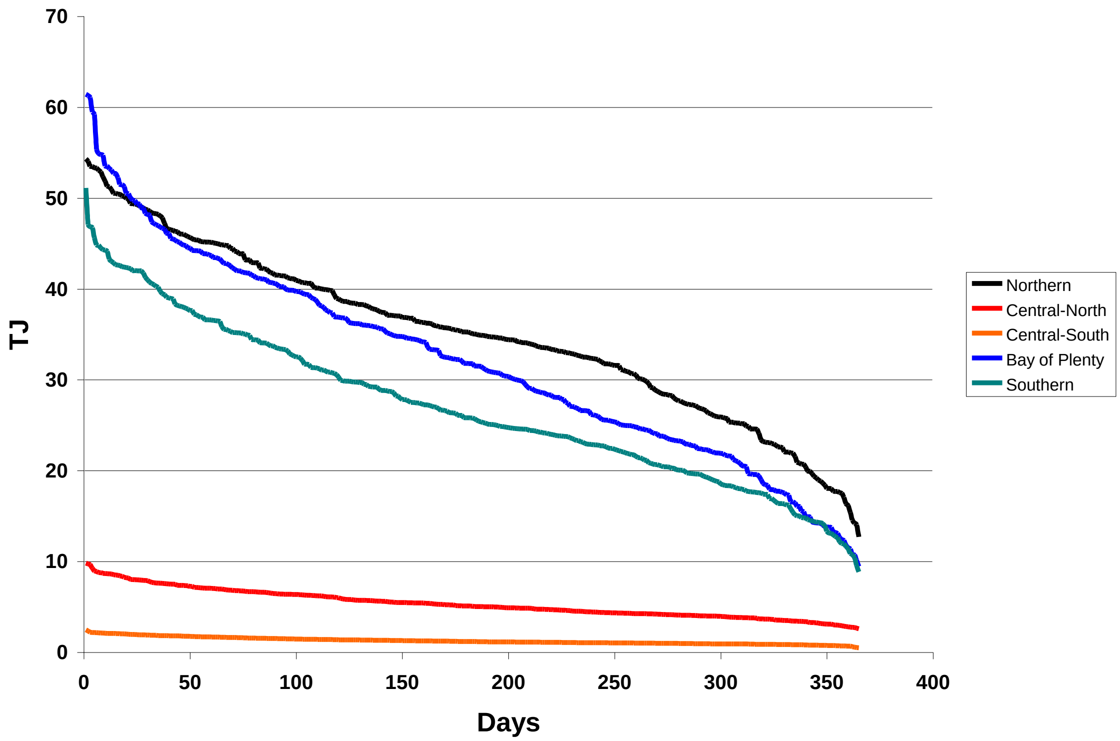

Figure 6: Pipeline Demand Duration Curves

[25] eg where there is a single customer at that point
[26] assuming, for simplicity, a common CRF for all delivery points and efficient capacity transfer/trading so that only coincident peak demand is booked

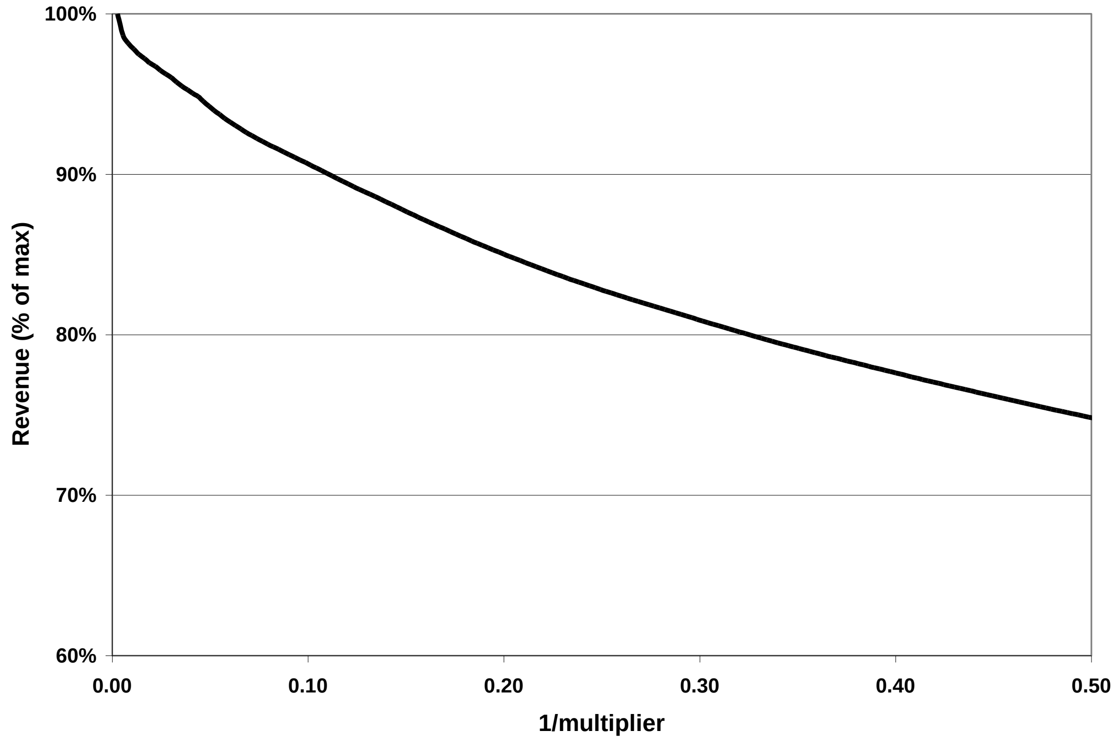

Figure 7: Pipeline Revenue versus Overrun Multiplier

4.3. Authorised Overrun and Interruptible Service

VT offers a short-term capacity service on all pipelines: its “authorised overrun” service. A user may request authorised overrun for any future day and VT will, subject to RPO obligations, agree to each request. This provision implies that VT will agree to provide authorised overrun capacity so long as there is expected to be some *unutilised* capacity, even if a pipeline is fully booked, although this is not entirely clear.

The booking fee for each day of authorised overrun is equal to the CRF/365. In addition, there is an authorised overrun usage fee of 8*CRF/365. So, authorised overrun is only marginally cheaper than unauthorised overrun, but it offers the benefit of removing the contingent liability associated with unauthorised overrun.

Since authorised overrun is cheaper than unauthorised overrun and does not attract contingent liability, a user should always book authorised overrun (if permitted) in preference to unauthorised overrunning, if it can forecast its demand accurately. In this case, and assuming that it is confident all authorised overrun requests will be approved by VT, a user will optimise its annual capacity booking based on a K factor of 9 rather than 10.

Authorised overrun is a *firm* short-term capacity service: it has a firmness equivalent to annually-booked capacity[27]. VT also offers interruptible services. These services are

[27] see VTC clause 10.1(e)

provided under confidential, "supplementary" agreements, rather than under the VTC, and so information on these agreements is not in the public domain[28]. However, it is understood that:

- interruptible services are offered without limitation on certain pipelines[29];
- interruptible services are also offered on other pipelines which are fully booked; and
- interruptible charges are based, or primarily based, on usage rather than booking and may be booked at short-notice for daily durations.

Interruptible services must be interrupted in preference to firm services (whether annual booking or authorised overrun)[30]. It is not clear how a decision to interrupt is made or how interruptions are enforced.

4.4. Pricing Methodology

VT has established a pricing methodology to calculate tariffs for the CRF and TPF. A description of the methodology is not included in the VTC, but was provided in earlier information memoranda[31]. It is assumed that it has not changed materially since then.

The CRF is designed to recover the capital costs[32] of the network. The CRF varies according to the RP-DP pair, based on sharing the cost of each pipeline asset between all users who book capacity that makes use of that asset: ie whose specified RP and DP are upstream and downstream of that asset, respectively.

The TPF fee is a single, flat tariff that applies to all gas flows, irrespective of their location and is designed to recover all other costs: ie the remaining capital costs (eg of offices), together with operating costs and overheads.

4.5. Conditions for Issuing or Cancelling Capacity Mid-Year

Subject to certain conditions, VT is obliged to agree to a request from a user who is a retailer to cancel a surplus capacity booking: ie booked capacity that is expected by the user no longer to be required. These conditions are[33] that:

- the surplus capacity arises as a result of loss of a customer to another retailer;
- the surplus capacity is net of any capacity requirement arising from customers gained by the retailer;
- the surplus capacity has been unsuccessfully offered for sale on the secondary market[34]; and

[28] the VTC simply states that terms for interruptible service may provide "for transmission services to be interruptible at Vector's sole discretion for any reason at any time" (clause 2.7(e)(viii))
[29] the Rotowaro-Kapuni and Frankley Rd pipelines
[30] VTC clause 10.1(e)
[31] Transmission System Information Memorandum, October 2004
[32] return on pipeline asset base plus depreciation
[33] VTC clause 4.15

- another user has requested, and VT has agreed, to purchase a corresponding amount of within-year capacity on that pipeline.

Where approved by VT, the capacity is cancelled from the date of the customer loss to the end of the gas year.

Similarly, again subject to certain conditions, VT is obliged to agree to a request from a retailer to book part-year capacity. These conditions are[35]:

- there is sufficient spare capacity available; and *either*
- the retailer gains a customer at the relevant DP mid-year; *or*
- an existing customer of the retailer proposes to increase its gas consumption, either by installing new plant or appliances or by increasing its utilisation of existing plant.

Where approved, part-year booked capacity is provided from the date of the increased customer requirements to the end of the gas year.

Users cancelling or booking capacity mid-year in accordance with the above conditions are required to pay only the part-year, *pro rata* booking fee. Users must provide to VT the customer information that VT needs to confirm the circumstances of the request. Users that do not seek or obtain VT approval may still book mid-year capacity, but are charged the full-year fee.

4.6. Capacity Transfer and Trading

VT allows users to transfer, mid-year and for daily durations, capacity from a booked RP-DP pair (the "booked pair") to another RP-DP pair (the "novated pair") anywhere on VT's pipeline network. Transfers are subject to spare capacity being available for the novated pair. The capacity is scaled according to the ratio of the CRFs for the booked and novated pairs, so that the booked and novated capacity have equal value. For example, if 10TJ of capacity is transferred and the novated pair has twice the CRF of the original pair, only 5TJ of additional capacity is novated.

The VTC also allows capacity to be transferred to another user[36]. Such a transfer may or may not involve a new RP-DP pair. Although the VTC refers to all such capacity changes as "transfers", this paper will distinguish between:

- *capacity "transfers*": being a transfer of capacity to a new location but under the same user; and
- *capacity "trades" (or "secondary trades"):* being a transfer of capacity to a different user but for the same location;

A "capacity transfer" as defined in the VTC may then, in this paper's terminology, be a trade, a transfer, or a trade plus a transfer.

[34] the secondary market is described in section 4.6, below.
[35] VTC clause 4.7
[36] but not to a non-user

Trades and transfers are subject to the receiving user having the necessary allocation arrangements etc at the novated points.

VT's consent is required to all trades and transfers and may be withheld only where:

- there is insufficient spare capacity at the novated points (transfer only); or
- the recipient does not have the required allocation agreement or gas transfer agreement at the novated points; or
- a transfer or trade is prohibited under the terms of the transferor's or transferee's TSA[37]; or
- the recipient's TSA is not valid at the novated points; or
- VT is given less than one business day's notice of the transfer/trade.

Capacity transfer rights under the VTC mean that, subject to the limitations above, capacity booked at a location is, in effect (and subject to the scaling), good for any novated location. So, in terms of delivery/receipt point flexibility (see section 3.7), it is as though there is a single receipt zone and delivery zone covering the entire network. This, in turn, means that users need only book to cover their non-coincident peak demand across the network as a whole[38], rather than for each delivery point or pipeline separately.

There is no information on historical trades and transfer in the public domain. However, it is understood that, whilst transfers are frequent, trades are rare.

4.7. Spare and Developable Capacity

VT is not obliged to invest in new capacity. However, VT has previously indicated[39] that:

- it will always endeavour to offer a capacity service, even if it involves the development of new capacity; and
- the costs and benefits of new investments will be rolled into fees to the extent that existing customers are not disadvantaged.

VT provides a substantial amount of information on spare and developable capacity in its capacity disclosure documentation, providing *inter alia*:

- existing spare capacity at each delivery point; and
- a description and cost of indicative expansion projects to deliver incremental capacity to each delivery point.

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[37] such a restriction may be specified in a supplementary agreement for a non-standard TSA

[38] As discussed in section 3.6, but subject to scaling, so that the user "demand" for which a peak is calculated is actually the sum of the demands at each delivery point, weighted by the relevant scaling factors (ie the inverse of the CRFs)

[39] Information Memorandum, October 2004, section 6.12

Table 7 uses the expansion information to calculate an indicative estimate of MCE for various delivery points.

Pipeline	Delivery Point	Description of Expansion	Cost ($m)	Inc TJ	MCE[1]	CRF
					($/GJ/yr)	
North	Westfield	Pap East to Smales Rd loop	26.7	116	23	60
	Whangarei	Pap East to Smales Rd loop	26.7	16	167	600
Central North	Morrinsville	Horotiu compression	11.9	42	28	326
Bay of Plenty	Kinleith	upgrade Pokuru compressor	16.1	24	68	99
	Gisborne	upgrade Pokuru compressor	16.1	21	77	600
South	Tawa	upgrade Kaitoke, loop to Hima	39.8	105	38	356
South	Hastings	upgrade Kaitoke, loop to Hima	39.8	68	58.5	600

Note 1: Assumes a real WACC of 10% to convert capital cost to annualised amount

Table 7: assessment of MCE on VT network

The MCE calculation assumes:

- that capacity can be added continuously (and so may underestimate MCE somewhat); and
- that existing spare capacity is limited and so expansion is required next year: in practice, most pipelines have substantial spare capacity (so this will overestimate MCE somewhat).

It is notable that the calculated MCE is generally much lower than the posted CRF tariff for the delivery points presented. In this context, rolling the investment cost into the CRF will generally cause the CRF to fall[40].

4.8. Demand Diversity

User diversity was defined in section 2.6. VT does not publish demand information by user, and so it is not possible to estimate this diversity.

Two additional measures of diversity are:

- *delivery point diversity:* the ratio of the aggregate of the pipeline peak demands to the aggregate of the delivery point peak demands; and
- *pipeline* diversity: the ratio of the network peak demand to the aggregate of the pipeline peak demands.

[40] Put another way, since marginal cost is lower than average cost, expansion will reduce the average cost.

These measures can be estimated from published demand information and are presented in table 8 below.

	Delivery Point Diversity	**Pipeline Diversity**
Peak Demand Day	94%	91%
40-day Average Peak	95%	96%

Table 8: diversity on VT pipelines

Diversity is calculated for both the peak day and the 40-day average peak: the latter is the level that users will book to in order to optimise their overrun charges (see section 3.3).

What do these diversity estimates tell us about the impact of capacity transfer on capacity booking? If we assume that there is a single user or, equivalently, that secondary trading is efficient, then, without capacity transfer, booked capacity must cover peak demand at each delivery point. If capacity transfer were allowed within a pipeline ("intra-pipeline" transfer) capacity booking need now cover just the pipeline peak demand and so, based on the estimates of delivery point diversity in table 8, booking could be reduced by around 5%. Allowing *inter*-pipeline transfer would suggest that, based on the pipeline diversity estimates, bookings might be reduced by a further 4%.

In this context, the impact of capacity transfer is fairly modest. However, without secondary trading, the impact of capacity transfer may be much greater, depending upon how user diversity and DP/pipeline diversity interact.

4.9. Regulation

It is understood that VT capacity prices will be formally regulated from 1 July 2010, through provisions of the Commerce Amendment Act 2008. The regulatory methodology is still to be determined by the Commerce Commission but the Act makes mention of CPI-X.

In the meantime, Vector is, in effect, restricted to increasing its weighted-average capacity price to approximately CPI. Otherwise, the Commission has a discretionary power to require a supplier to lower its prices (post-2010) in order to compensate consumers for some or all of any over-recovery of revenues that occurred between 1 January 2008 and 1 July 2010 [41].

It is not clear, at this stage, how the weighted-average price will be calculated.

[41] Commerce Amendment Act 2008 section 55F(2)

4.10. MDL arrangements

Although the MDL pipeline is outside of the scope of this report, it may be helpful to briefly describe the MDL capacity arrangements, for two reasons. Firstly, they provide a possible alternative to VT's capacity arrangements. Secondly, any problems of incompatible arrangements at the VT-MDL interface may highlight the benefits of better aligning the VT and MDL arrangements.

The main MDL capacity service is common carriage, with charges based on distance-related tariffs applied to anytime demand. However, unlike typical common carriage arrangements, there are no separate charges on peak demand and there is no obligations on MDL to add new pipeline capacity as needed in order to maintain a specified reliability standard[42].

However, MDL also offers an "Authorised Quantity" (AQ) service, in which users can book capacity on a contract carriage basis. The tariff is the same as for the common carriage service (although it may be discounted by MDL), but is paid on the booked amount rather than the actual throughput. The AQ service has priority over the common carriage service in the event of congestion and service interruption.

MDL has a nominations regime and operational balancing arrangements, meaning that gas allocation and capacity charges are both based on nominations.

4.11. Short-term Gas Market

GIC is currently facilitating the development of a short-term gas market (STGM) trading platform. The current design provides for trading to take place at a notional welded point at a physical location on the MDL pipeline. Users trading at this point must pay the relevant capacity fees to transport gas to the trading point to sell or to transport purchased gas from the trading point.

Trading will take place prior to nominations, so nominations will include any agreed gas trades. Nominations to/from the trading point must match the sold/purchased gas. The design of arrangements for reconciling differences between traded amounts and nominations has yet to be finalised.

Although located on the MDL pipeline, the STGM may have implications for VT capacity arrangements, to the extent that gas purchased in the STGM is transported on VT pipelines. This is considered further in section 5.1.

[42] although the current level of spare capacity makes this point moot.

5. Policy Issues Arising

5.1. Impediment to Short-term Gas Trading

Might the price and availability of short-term capacity on VT pipelines impede or inhibit trading in the STGM?

Location of Gas Trading

The trading point for the STGM is located on the MDL pipeline. VT capacity is therefore generally not required to transport gas to the market[43]. Gas purchased from the STGM will only require VT capacity where it is destined for a VT DP and will create a new capacity requirement only to the extent that the purchase represents additional gas (and so additional delivery) rather than just replacing gas that would otherwise be sourced from elsewhere.

To assess whether the STGM will increase VT gas deliveries, we need to consider who are likely to be the buyers of short-term (ST) gas.

Buyers of ST Gas

There are a number of possible buyers of gas on the STGM, as presented in table 9 below

Buyer	**Discussion**	**Conclusion**
Gas Wholesaler	Wholesalers typically sell-on to retailers at VT RPs	Do not require VT capacity
Power Station	VT-connected power stations are likely to have booked LT capacity to cover their peak load requirements	Do not require additional ST VT capacity
Retailer covering peak demand	Will have already booked VT capacity to cover peak demand and optimise overrun costs	The ST gas purchase does not create a need for any *additional* ST VT capacity
Retailer covering unexpected new customers	Need additional capacity, irrespective of whether gas purchased from STGM	The ST gas purchase does not create a need for any *additional* ST VT capacity
Retailer covering unexpected customer consumption	As above, except where the customer is opportunistically consuming gas purchased on the STGM	Lack of ST capacity may impede ability of retailer to meet unexpected customer consumption with ST Gas

Table 9: Possible Buyers of Short-term Gas

[43] the exception is where traders wish to sell VT-connected production into the STGM. These would need to make use of the VT Frankley Rd pipeline and inject from there into the MDL pipeline. However, VT offers ST interruptible on the Frankley Rd pipeline, so issues around availability and price of short-term VT capacity do not arise.

Based on this analysis, it appears that availability of ST capacity may only affect STGM trading where a retailer seeks to sell opportunistically some *extra* gas purchased from the STGM. This would probably be to large customers, since for small customers the transaction costs associated with selling the extra gas would be prohibitive.

For example, suppose a large customer is on a gas retail tariff of $10/GJ and there is an opportunity to buy some extra gas on the STGM at $2/GJ or, say, $3/GJ including delivery to the relevant VT RP. If the retailer has sufficient booked VT capacity, it might be able to offer the extra gas to the customer at $5/GJ, including a retail margin of $2/GJ. On the other hand, with insufficient capacity, overrun charges would make the cost of delivering the extra gas prohibitive[44]. If alternative ST VT capacity were available at, say $1/GJ, the trade might still be economic.

Evaluation

There appears to be only one situation where the price and availability of ST capacity would potentially affect trading on the STGM: the example above of ST opportunistic gas sales to a large customer. This situation is plausible but seems likely to be infrequent and would probably represent no more than a small and immaterial minority of STGM trades.

Therefore, in summary, VT capacity arrangements appear unlikely to significantly affect STGM trading. However, it is plausible that it could slightly affect competition (in the STGM) and capacity usage/pricing efficiency.

5.2. Impediment to Customer Churn

Do the VT capacity arrangements impede the transfer of customers between retailers during the gas year?

Sources of part-year capacity

A retailer that gains a new VT-connected customer mid-year requires part-year VT capacity (ie from the acquisition date to the end of the gas year) to supply the customer. This capacity may be sourced:

- from the secondary market;
- from existing surplus capacity (eg due to lost customers), perhaps including capacity transfer;
- from VT under the terms of the VTC; or
- through authorised or unauthorised overrun.

Similarly, a retailer that loses a customer mid-year will seek to rescind or sell part-year capacity from the loss date to the end of the gas year. This capacity may be:

- sold in the secondary market;
- held to cover future customer gains, perhaps including capacity transfer; or

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[44] VTC provisions would not require VT to offer part-year capacity in these circumstances. Only a sustained increase in customer gas consumption qualifies: see VTC 4.7(c)(d)

- cancelled under the terms of the VTC.

These sourcing and disposal options are discussed below.

VTC Process

The VTC allows part-year capacity to be purchased or rescinded – at the CRF – if this relates to customer churn (see section 4.5). However, there may be some concerns with this process.

- the transaction costs associated with applying to VT, providing the requisite information and so on;
- the risk of VT denying the request where there is insufficient spare capacity; or
- confidentiality concerns associated with providing detailed customer information to VT.

The process is costly because the user must potentially provide information to VT on an individual customer basis and must ensure that customer gains and losses are netted out. On the other hand, risks of requests being denied will be lower where there is known to be substantial spare capacity.

It is understood that user requests for part-year capacity are infrequent.

Secondary Trading

The lack of trading in the secondary market suggests that this option is impractical.

Surplus Capacity

Gains and losses can be covered through a holding of surplus capacity so long as the volume of gains and losses are roughly equal. This may be difficult to manage in practice, particularly for retailers serving larger customers.

Evaluation

The issue is likely to impact primarily on two capacity objectives: competition and simplicity.

Retail competition will be impeded by the potential difficulty that retailers will have in obtaining part-year capacity to cover gained customers. This creates a competitive advantage for the incumbent retailer, meaning that customer churn is reduced and entry barrier increased.

This concern is mitigated by the VTC provisions. However, these may be complex and costly to administer and so act against the simplicity objective.

5.3. Impediment to Efficient Capacity Usage

Do the capacity arrangements mean that existing physical capacity is used inefficiently?

Pricing Inefficiency

Efficient resource usage (ie allocative efficiency) follows from pricing efficiency. So, another way of framing the above question is: do the capacity arrangements provide efficient capacity prices – prices that reflect the marginal cost of provision?

From the earlier discussion (see section 4.7) we have seen that the answer to this question is "no". Furthermore, given that marginal costs are well below average costs, it is impractical and infeasible to set prices equal to marginal cost. Prices necessarily exceed marginal cost.

Therefore, we need to ask a more meaningful question: does the mark-up of price above marginal cost follow the Ramsey Pricing principle? Are prices as efficient as they can be, given the funding constraint that prices overall must reflect average cost?

Peak and Off-peak Pricing

Section 3.5 considered the application of Ramsey Pricing principles to gas transmission pricing and concluded that, where MCE is substantially below average capital costs (as is the case for VT), the mark-up of anytime prices (ie the TPF) on variable cost should be greater than the mark-up of peak demand prices (ie CRFs) on MCE.

In fact, VT only charges a mark-up on peak demand; throughput charges are based on actual variable costs[45]. This pricing might be efficient, but only if elasticity of anytime demand (to the delivered gas price) is substantially higher than elasticity of peak demand. This seems unlikely.

Therefore, it seems likely to be the case that CRFs presently are rather high compared to the TPF and this may lead to inefficient under-utilisation of peak capacity relative to off-peak capacity.

Overrun Fee

Section 3.3 describes how a high overrun fee is required to ensure that users book capacity to cover their peak demand. Specifically, if the overrun fee is K times the CRF then the user will book so as to overrun on just 365/K days in a year and will pay an amount (including overrun charges) equivalent to its average demand level over these days.

As described above, the CRF should reflect a certain mark-up against the MCE. Capacity expansion is driven by peak demands, so this implies there is no basis for charging the CRF on demand levels away from peak. With the current overrun fee of eight times CRF, the CRF is in effect levied on the average of the 45 highest demand days, which would reasonably cover a peak "season" (eg 45 days is around 2 months'

[45] although, arguably some of these costs – eg relating to corporate fixed assets – could be regarded as fixed

worth of business days). A lower overrun multiplier would begin to spread peak charges onto demand which is well away from the peak, thus diminishing pricing efficiency.

In summary, the overrun multiplier seems broadly to promote pricing efficiency in the context of the contract carriage model.

Customer Diversity

There is little or no secondary trading in VT capacity. Section 3.8 explained how this means that capacity prices are levied on user non-coincident peak demand rather than coincident peak demand, as efficiency considerations would dictate. This will lead to inefficient capacity pricing and usage, with the degree of inefficiency depending upon user diversity: the greater the diversity, the greater the inefficiency.

For example, suppose that a user has a very low diversity factor, because it supplies a single customer, whose peak demand is in January, well away from the pipeline peak demand in July. The user will need to book capacity to cover that customer's January peak and is likely to charge him accordingly. The customer will therefore be discouraged from using gas (and pipeline capacity) in January, even though there will always be plentiful spare capacity at these times[46]. Conversely, the customer may be encouraged to use more gas in July, even though capacity is scarce at this time.

A user supplying a single customer is perhaps unrealistic. The pricing regime will encourage users to develop a diverse customer base so as to minimise their average capacity costs. In a sense, a "secondary market in customers" may take the place of a secondary market in capacity.

Capacity Transfer

The efficiency impact of capacity transfer will vary depending upon whether it is intra-pipeline or inter-pipeline transfer (see section 4.8). Intra-pipeline transfers provide the user, in effect, with delivery point flexibility as described in section 3.7, so that the user need book only to cover its peak (non-coincident) demand across the pipeline as a whole rather than at each delivery point separately. Capacity expansion is typically driven by pipeline demand rather than individual delivery point demand, so these transfers will typically promote efficiency.

On the other hand, *inter*-pipeline transfers have the broader effect of allowing a user to book to cover its peak demand (its "network peak demand") across the network as a whole. So long as its peak demands on two pipelines do not coincide, it can book less than its peak demand on one pipeline, knowing that it is able to transfer capacity from another pipeline.

But since pipeline peak demand is the driver for capacity expansion, allowing a user to avoid booking to cover pipeline peak demand is likely to degrade pricing efficiency.
A user with a network peak demand that occurs away from the peak on any individual pipeline will be penalised unnecessarily for increasing its network peak demand and have no incentive to manage its demand at times of pipeline peak.

[46] even if the January demand increases, the July demand is likely to increase as well and drive capacity expansion before the January capacity surplus is substantially eroded

Again, the degree of efficiency will depend upon the level of diversity, although in this case the relevant diversity measure is of user demands across different pipelines.

Evaluation

Current capacity pricing arrangements may be inefficient in two respects. Firstly, because CRFs represent a mark-up on marginal cost but TPF does not, the pricing does not follow Ramsey Pricing principles and so may recover sunk costs inefficiently.

Secondly, inter-pipeline capacity transfer means that capacity booking is driven by network peak demand, whereas expansion costs are driven by *pipeline* peak demand. Where there is significant pipeline demand diversity, this may reduce pricing and usage efficiency.

In summary, the current capacity arrangements may not promote the efficient pricing objective

5.4. Benefits to VT user-affiliates

Statement of Issue

A concern has been expressed that a high overrun fee creates a competitive advantage for users that are affiliated with VT. The argument is that, whilst for independent users the overrun risk transfers directly to "bottom-line" profit risk[47], there is no corresponding bottom-line impact on the Vector "parent company" that owns both VT and the affiliated user: the overrun payment is just an accounting transfer between two divisions of the parent company.

Destination of Overrun Payments

Underlying this issue is an assumption that VT "retains" all overrun payments, rather than returning them to users in the form of lower tariffs – perhaps in future years. It is not clear whether this is currently the case. If the assumption is wrong, the issue does not arise.

Revenue and Risk

If the underlying assumption is true, what competitive advantage does this give the affiliate-user?

Firstly, does it mean that the affiliate-user need not incorporate the expected cost of overrun into the prices that it offers to customers? If this occurred, the affiliate user would run at a loss, or at least a reduced profit. VT's profitability is unchanged. So, profit to the parent company is reduced. This strategy is not rational.

Secondly, does it mean that the affiliate-user need book less capacity, because the exposure to overrun charges is just an accounting item? If it failed to optimise overrun charges in this way, the affiliate-user would reduce its profitability, but this would be made up for by higher profitability to VT. So, the affiliate-user might do this[48]. However, such a strategy does not affect its retail pricing (as discussed in the previous point),

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[47] unless the overrun cost is passed through to customers in some way

[48] Equally, the user-affiliate could deliberately overbook capacity, since this would similarly have no net impact on VT profitability.

would be invisible to customers and does not affect the overall profitability of the parent company. Therefore, it does not create any competitive advantage.

Thirdly, does the reduced risk (to the parent company) associated with overrun mean that the user-affiliate has lower funding costs and so, other things being equal, greater profitability? This may well be the case. The risk of overrun charges may be most significant in relation to customers whose peak demand is most uncertain and the user-affiliate may be able to profitably acquire these customers by pricing below its competitors. Overrun risk may also occur from unexpected customer churn, although this risk may be mitigated by the VTC provisions to acquire or rescind part-year capacity.

Evaluation

It is possible that high overrun charges are anti-competitive, for the reasons discussed above. In this case, there might be an argument for reducing the overrun multiplier somewhat, on the basis that the gains from improved competition outweigh the losses from lower pricing efficiency. However, the validity of this argument would depend upon the relative magnitude of these gains and losses.

In summary, it is possible that the competitive benefits provided to VT-affiliate users may impede achievement of the competition objective.

5.5. Issues Summary

The potential impact of the issues on the capacity objectives are summarised in table 10, below

Current Policy Issue	**Impediment to Promoting Capacity Objectives?**					
	Efficient Pricing	**Efficient Investmnt**	**Facilitate comp'n**	**Simple**	**Stability**	**Firmness**
Impede ST Gas Trading	**?**		**?**			
Impede Customer Churn			✓	✓		
Impede Efficient Usage	✓					
Favour VT affiliates			**?**			

Table 10: Impact of Policy Issues on Capacity Objectives

6. Possible Solutions

6.1. Common Carriage

Overview

A radical option to address issues around short-term capacity is simply to abolish "capacity": ie to introduce common carriage arrangements. The MDL arrangements suggest that this can be done; the question is at what cost.

Why we don't have it now

There are a number of possible reasons why VT uses a contract carriage rather than a common carriage model:

- *tradition*: contract carriage is the conventional approach for gas pipelines and has been used by VT for a long time; change would be costly;
- *firm capacity*: common carriage may not provide the same reliability and continuity of service as contract carriage;
- *information*: capacity reservations may provide useful planning information for VT that is not available under common carriage;
- *investment efficiency*: contract carriage may promote efficient investment better than common carriage; and
- *efficient pricing*: common carriage may not allow efficient pricing – particularly on peak demand.

These motivations are discussed below.

Tradition

Contract carriage was first introduced, in the US, in the context of limited short-term gas trading (on a pipeline) and no retail contestability, so many of the issues around short-term capacity were not relevant. Whilst, despite the emergence of trading and retail contestability, contract carriage remains the norm for gas pipelines, some markets (notably Victoria and MDL) have introduced common carriage-type arrangements successfully.

Because OATIS already has common carriage functionality, and common carriage is in many ways a simpler arrangement than contract carriage (no capacity booking, overrun etc), the cost of change may not be prohibitive.

Firm Capacity

Service reliability is maintained under contract carriage by the TSO limiting service availability to the physical capacity of the pipeline. Such a mechanism does not exist under common carriage.

However, there are a number of ways for managing service firmness under common carriage:

- offer optional contract carriage type services (in addition to standard common carriage service) for users who require additional firmness: MDL and Victoria both offer such optional services;
- establish regulated reliability standards and require that the pipeline owner invest as needed to maintain these standards – the typical approach for common carriage electricity transmission[49]; or
- introduce congestion management arrangements so that curtailment in the event of congestion is price-based and those who require continuous service will receive it – although they will pay a price for it.

As discussed below, the most attractive option for a VT common carriage arrangement would be to adopt the MDL optional-firm-service ("AQ") approach, since this could be done at low cost and would improve alignment with MDL arrangements.

Information

TSOs need information on future demand for capacity to help in operational planning (for example, deciding when maintenance should be undertaken) and investment planning: planning (for capacity expansion). Booking amounts provided under contract carriage provide some information on future demand.

However, booking amounts only relate to expected peak demand and so are not useful for operational planning, which needs to know the off-peak demand levels and timings (eg for scheduling maintenance). Booking amounts are driven by non-coincident user peak demands whilst investment planning is based on coincident peaks. Therefore, additional information on future user diversity is needed and may not be available.

Investment planning requires medium-term forecasts of peak demand, whilst firm booking is only for one year ahead. Furthermore, capacity transfer means that booking may not necessarily take place on the pipeline where the peak demand is expected[50].

Finally, in the presence of retail competition, capacity bookings by individual retailers may incorporate unreliable assumptions about customer churn (eg two retailers both forecast serving the same customer), which may make aggregate booking levels inaccurate forecasts of aggregate peak demand.

For these reasons, booking information may not provide useful or accurate information to support planning. In any case, common carriage arrangements typically include user or distributor obligations to provide demand forecasts.

[49] this means that everybody must pay for this reliability standard, even if it is higher than required. In some cases, however, the TSO may procure interruptible services from customers requiring a lower reliability standard, as an alternative to capital investment

[50] although booking to cover peak demand is likely to occur for fully-booked pipelines, since transferring capacity to such pipelines may not be permitted

Efficient Investment

The contract carriage model provides a mechanism for users to make long-term commitments to use, pay for and hence underwrite (at least partially) new capacity. This is considered important in a capital-intensive industry with long asset lives. Under common carriage, on the other hand, users only pay for capacity as they use it and are not required to enter into any future commitments. Thus, there may be some concern that moving to a common carriage approach could undermine efficient investment, due to the uncertainty over whether current capacity requirements are likely to be sustained.

Notwithstanding its commitment to provide new capacity where required (see section 3.6), VT is only likely to invest (like any for-profit business), where the return on investment exceeds its risk-adjusted cost of capital. As a regulated monopoly, VT's return on investment will primarily be determined by the regulatory framework.

Consider the risk of demand not being sustained. This could lead to the new assets being stranded which, under some regulatory models, may mean that VT is not allowed to recover their investment costs. Suppose that the new capacity has been contracted by users under long-term contracts. This revenue stream would only be protected under asset stranding if it were outside of the revenue regulation: if not, revenue through the contracts would simply mean VT would be obliged to reduce tariffs elsewhere.

In summary, it is not clear at present what effect the capacity model would have on investment, since the main driver is likely to be the new regulatory framework, which is yet to be fleshed out.

Efficient Pricing

As discussed in section 3.5, efficient prices should levy separate tariffs on anytime demand and coincident pipeline peak demand. Although the MDL arrangements do not levy a separate tariff on peak demand, this is atypical: common carriage arrangements usually have peak *and* anytime charging.

The move from non-coincident to coincident peak charging would eliminate concerns about how retailer diversity is reflected (see section 5.3). However, there might be user resistance to coincident peak charging because it is difficult to predict in advance when these may occur: they might be driven entirely by the consumption decisions of a single, large consumer. To mitigate this concern, peak charges could be spread over a longer, more predictable period: eg every weekday in the peak month[51]

[51] Just as charges under contract carriage are also, in effect, spread over several peak days.

Approach

As noted above, if common carriage were to be introduced, it would likely be on the MDL model so as to minimise implementation costs and maximise alignment with MDL. Thus:

- there would no longer be a need to book capacity and so issues around short-term capacity would no longer exist;
- an optional "AQ" contract carriage service would be offered for users who place a high value on service continuity;
- tariffs would be levied on anytime and coincident peak demand: VT's existing CRF pricing methodology could largely be preserved;
- MDL's nominations regime would *not* necessarily need to be introduced to VT pipelines: tariffs could be levied on actual (metered/allocated) demand rather than nominations; and
- pre-existing contract rights and renewal rights would be preserved: eg through converting them to AQ rights.

Impact

Benefits

Common carriage would address concerns around short-term capacity, as booked capacity would no longer exist. In particular:

- there could be no impediments to short-term gas trading;
- there could be no impediments to customer churn;
- some issues around efficient pricing/usage would remain, but the concern around diversity would be addressed; and
- concerns around user-affiliates and overrun charges would instead be in reference to peak demand charges.

There may also be benefits from greater alignment with MDL arrangements. This might simplify approaches to gas balancing or title tracking, although this would be a matter for the relevant workstreams to consider.

A competitive advantage to diverse retailers under contract carriage[52] would be removed, which may help to promote competition.

Finally, there would be removal of transaction and operating costs associated with capacity booking, capacity transfer, churn-related mid-year capacity issuance, and overrun booking and payment. This may lead to significant savings in recurrent costs.

[52] This is explained in section 6.5

Costs

As discussed above, concerns around common carriage relate to service firmness, planning information, investment efficiency and pricing efficiency. These concerns are largely addressed under the MDL model, modified by the addition of a peak demand tariff.

The remaining concern is cost of change. Notwithstanding the benefits of using existing OATIS functionality, the cost of change is likely to be substantial, although these will be offset to some extent by lower recurrent costs.

Estimation of these costs is beyond the scope of this report. However, incurring substantial costs simply to address the issues discussed in section 5 would seem to be disproportionate.

Evaluation

The potential impact of introducing common carriage on the capacity objectives is summarised in table 11, below.

Objective	**Description of Impact**	**Summary**
Efficient Pricing	Peak prices levied on coincident peak rather than non-coincident	promotes
Efficient Investment	Unclear, as primarily driven by regulatory framework	unclear
Facilitate Competition	Removes the competitive advantage for large, diverse retailers	promotes
Simple	May be complex to introduce but likely to simplify operation	net effect unclear
Stability		no impact
Firmness	An “AQ” service should continue to provide firmness to those who require it	no impact

Table 11: Impact of adopting Common Carriage

6.2. Cheaper Short-term Capacity

Overview

A second possible approach to concerns about expensive short-term capacity is simply to make it cheaper. This could be done by reducing CRFs or the overrun multiplier, or by offering capacity on alternative, sub-year (eg monthly) terms.

Why we don’t have it now

VT’s prime service offering is annual booked capacity, at the CRF. A premium overrun price is needed to ensure that users purchase this service. As discussed in section 3.3, with an overrun multiplier of K, users will book annual capacity to cover their 365/Kth highest demand day. Reducing K will simply lead to users booking against a lower demand level.

Offering "cheap" monthly capacity – even if at a higher tariff than the CRF – will similarly lead users to book against their monthly peak demands rather than their annual peak, so total booked capacity will approximate to the average monthly peak.

Approach

There are three possible approaches to making short-term capacity cheaper:

- reduce CRFs and leave the overrun multiplier unchanged, with the revenue shortfall recovered through a higher TPF;
- reduce the overrun multiplier; or
- offer sub-annual capacity (eg monthly) at a premium to annual capacity, but at a lower price than overrun.

Impact

Reduced CRF

The discussion in section 5.3 suggests that CRFs may be too high compared to the TPF in the context of the Ramsey Pricing principle. Therefore, a reduced CRF and increased TPF may improve pricing/usage efficiency. However, short-term capacity will remain priced at a substantial premium to medium-term capacity and so this option will not address the other issues around short-term capacity. It will also not address the inefficiency concerns around diversity.

Reduced Overrun Multiplier

As discussed above, this will lead to a lower amount of annual capacity being booked. VT could recover the revenue shortfall by increasing CRFs or the TPF. The price of short-term capacity would come down, but it would remain at a substantial premium to annual capacity. However, moving away from peak demand charging may adversely affect pricing/usage efficiency, particularly if CRFs have already been adjusted in accordance with the approach above.

Sub-annual Capacity

The effect of this would depend upon the premium of monthly (say) capacity compared to annual. If the premium were 100% (say), then users would book annual capacity to cover their lowest 6 monthly-peak demands and then book monthly capacity to cover the remainder. Again, moving away from annual peak demand charging in this way may adversely affect pricing/usage efficiency. Furthermore, it would not necessarily address concerns around short-term gas trading and customer churn, since these may not align with calendar months.

Summary

To summarise, there may be some benefit in reducing CRFs and increasing TPF to better reflect Ramsey Pricing principles. However, this will not substantially affect the price of short-term capacity. The options to directly reduce short-term capacity prices, on the other hand, would likely adversely affect pricing/usage efficiency, without necessarily addressing the other issues.

Evaluation

The evaluation in table 12 below is for a reduction in CRF (and corresponding increase in TPF). The other options do not seem to be worth pursuing.

Objective	Description of Impact	Summary
Efficient Pricing	Reduced CRF may better reflect the Ramsey Pricing principle	Benefit
Efficient Investment	No impact, so long as CRF remains higher than MCE	no impact
Facilitate Competition	ST capacity price not significantly affected, so no impact on customer churn risks	no impact
Simple	no change	no impact
Stability	no change	no impact
Firmness	no change	no impact

Table 12: Impact of reducing CRF

6.3. More Interruptible Capacity

Overview

A third approach to reducing short-term capacity prices is to offer a new service of short-term *interruptible* capacity, whilst maintaining the existing regime for firm capacity.

Why we don't have it now

Interruptible capacity services are only interrupted when pipeline congestion occurs and this is only likely on heavily used/booked pipelines - on which VT already offers interruptible service. An interruptible service on an underutilised pipeline will have *de facto* firmness and so would introduce the same problems as offering *cheaper* firm short-term capacity, as discussed in section 6.2, above.

Approach

One way to avoid this *de facto* firmness is to interrupt the service even when there is no pipeline congestion. The service terms would allow interruption whenever pipeline flows exceeded the annual booked firm capacity, rather than the physical pipeline capacity. If users responded to the offering by booking less firm capacity, the interruptible service would become commensurately less firm and so less attractive to most users.

What level of firm capacity would be booked under this approach? If each user booked to cover its coincident peak demand, then the aggregate booking would equal the pipeline coincident peak demand. This, by definition, is never exceeded, so the interruptible service would never be interrupted. However, each user (not knowing the booking levels of other users) would then be taking a risk of being interrupted when its demand exceeded its coincident peak. Prudent users would likely adopt more conservative booking strategies, at least until behaviour of other users was well established. Capacity transfer introduces additional uncertainty, as this means that booked capacity on a pipeline does not necessarily directly relate to user demand on that pipeline.

Impact

If users were to book to their coincident demand, as suggested above, this would seem to improve pricing efficiency/usage by taking diversity into account. However, it is uncertain whether this would occur.

Without a nominations regime, pipeline flows are not known in advance, so it is not clear how interruption would be notified[53]. Interrupting on the new "commercial" terms, as well as for the current operational reasons, creates additional complexity for VT and for users.

The interruptible offering would allow users to buy short-term gas even when their demand was already high, so long as overall pipeline demand was relatively low. It would probably not address customer churn issues, since a retailer may not wish to take on a new customer unless it has firm capacity to serve that customer.

Evaluation

The potential impact on the capacity objectives of introducing more interruptible capacity is summarised in table 13, below.

Objective	Description of Impact	Summary
Efficient Pricing	Users may book coincident demand rather than non-coincident demand	benefit
Efficient Investment	No impact as *new* interruptible service only introduced on underutilised pipelines	no impact
Facilitate Competition	New service not firm enough to support gained customers, so may not facilitate customer churn	limited benefit
Simple	New process required to call interruption	extra complexity
Stability	User strategies will depend upon others' behaviour, so the level of booking may be unstable	possible instability
Firmness	Firm bookings remain firm, but greater opportunity to use a cheaper interruptible service where preferred	benefit

Table 13: Impact of introducing more Interruptible Capacity

[53]although this issue exists anyway in relation to existing interruptible services

6.4. Non-gas-year Capacity

Overview

The existing VTC provisions target sub-year capacity requirements arising from unexpected mid-gas-year customer losses and gains. However, to the extent that customers are on annual (or multi-year) contracts, the need is not so much for sub-year capacity as for annual, non-gas-year capacity: starting and ending on the date of the customer's contract renewal rather than the new gas year. This option considers the provision of such capacity.

Why we don't have it now

It is not clear why this is not currently offered. Indeed, existing non-standard TSAs may not align with gas years, although it is understood that current VT policy is for *new* contracts to align.

Approach

The non-gas-year capacity would be sold at the CRF[54] and would have the same rights and obligations (eg capacity transfer, renewal rights etc) as normal gas-year capacity. There would be no obligation on a user to demonstrate "need": ie because of customer churn.

Gas-year capacity booking would have priority over non-gas-year capacity booking. This would be done by only issuing non-gas-year capacity where there is sufficient physical capacity for existing levels of gas-year capacity to be renewed. Once booked, gas-year and non-gas-year capacity would have the same level of firmness.

Impact

Because capacity booking remains annual, the overall level of booked capacity should not change substantially[55]. It would not be possible for users to "game" by switching between different capacity start months, since any such move would lead to double-booking or under-booking (unless accompanied by part-year capacity, which would remain subject to existing VTC conditions).

This approach would address much of the uncertainty around customer churn, but only for customers on annual (or multi-year) fixed-term contracts. Where customers are able to terminate their service at anytime, churn risks would remain.

Because there is no requirement to demonstrate need, the cost and complexity will be low compared to the existing VTC mid-year capacity processes and so overall costs will fall to the extent that this new capacity displaces the existing process. There will be some extra cost to VT of issuing capacity throughout the year but this should not be substantial.

Assuming that price regulation is applied on a gas-year basis (see section 4.9), non-gas-year capacity may, at best, create some additional compliance complexity or, at worst,

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[54] or perhaps at a weighted-average of the current-year and following-year CRFs, to reflect its straddling of the gas year

[55] there may be some change, to the extent that retailers currently over-book somewhat to address churning uncertainty

be prohibited by the regulator, depending upon the detailed design of the regulatory framework.

Evaluation

This approach seems able to substantially reduce the costs and risks associated with customer churn, without adversely affecting other aspects of the capacity arrangements.

By facilitating customer churn, this option would seem to promote the "facilitate competition" objective. It may also, to the extent it displaces the existing VTC process, promote simplicity.

The potential impact on the capacity objectives of introducing non-gas-year capacity is summarised in table 14, below.

Objective	Description of Impact	Summary
Efficient Pricing	there may be slightly lower booking levels, on reduced holdings to cover uncertain customer churn	minor benefit
Efficient Investment	no impact	no impact
Facilitate Competition	allows users to better manage capacity against uncertain customer churn	benefit
Simple	introduction of new issuance processes, but allows users to avoid VTC churn-related processes. Possible complexity in regulatory compliance.	net benefit
Stability	users will still book capacity to cover annual peak demand	limited impact
Firmness	Restrictions on non-gas-year capacity ensure firmness of gas-year capacity is unaffected	no impact

Table 14: Impact of introducing non-gas-year Capacity

6.5. Improved Secondary Trading

Overview

Another potential source of short-term capacity is the secondary market. However, this market is inactive currently, despite being permitted and supported.

Why we don't have it now

Secondary trading is currently permitted and supported by VT, but little if any trading takes place. There are several possible reasons for this.

Firstly, it may not be in the commercial interests of large, diverse retailers to participate in secondary trading. To understand why this might be, recall[56] that a lack of secondary trading means that each user must book capacity to cover its (non-coincident) peak demand. Furthermore inter-pipeline capacity transfer means that the user must only

[56] see section 3.8

cover its peak demand across the VT network as a whole, rather than separately cover its peak demand on each pipeline[57].

The more diverse a retailer's customer base (that is the lower the ratio between a retailer's peak demand and the aggregate of the peak demands of its customers) the lower is its relative cost of capacity. A retailer with no diversity must book 1TJ of capacity of each 1TJ of its customer peak demand. So a customer with a peak demand of 1TJ will be charged the cost of 1TJ of capacity. A retailer with 50% customer diversity factor, would need only charge that same customer for the cost of 0.5TJ.

This means that a diverse retailer has a lower cost-to-serve and so a competitive advantage over a non-diverse retailer. Obtaining diversity will typically mean having a retailing presence in several different geographical markets[58] and/or customer segments. Established, major retailers may be able to do this better than new entrants, who with limited resources will typically need to focus on a particular target market. So, there would seem to be some competitive advantage that flows to major retailers.

With efficient secondary trading, each retailer need book capacity only to cover its *coincident* peak demand[59]. It will then need to recover from each customer the cost of that customer's contribution to the network coincident peak. This is the same for every retailer, irrespective of their diversity. So, secondary trading would eliminate the diversity-related competitive advantage for major retailers.

Given this, one can see why a diverse retailer may be reluctant to promote secondary trading. Although it will gain somewhat from having to buy less capacity, non-diverse retailers will gain more. A large retailer (whose potential impact on the secondary market is greatest) may therefore choose to "hoard" its surplus capacity rather than sell it onto the secondary market. Non-diverse retailers may seek to trade, but may by themselves be too small to provide the critical mass that a market needs to become established.

A second possible reason for lack of trading is that, as with all markets, liquidity is self-reinforcing: traders will join markets where there are many buyers and sellers, thus adding more buyers and sellers. Indeed, in a capacity secondary market, liquidity concerns are more acute: where users are not confident about buying secondary capacity, they will book sufficient capacity to cover their peak demand, meaning that they then have no *need* for secondary capacity. So, their concerns become self-fulfilling.

A third possible reason for lack of trading is simply that the transaction costs associated with finding a counterparty and agreeing a price outweigh the benefits of lower capacity costs.

A final reason for lack of trading is that some users, with non-standard TSAs, may be prohibited from secondary trading by the terms of their TSA.

[57] as discussed in section 4.6
[58] to gain the most benefit from inter-pipeline capacity transfer
[59] with inter-pipeline capacity transfer, this means their demand at the time of the peak demand across the VT network as a whole

Approach

There are four possible approaches to encouraging secondary trading:

- reduce transaction costs by introducing a "generic capacity" product;
- reduce part of the motivation for capacity hoarding by removing the right to transfer capacity between pipelines;
- force a user to make its unused capacity available to other users: a "use-it-or-lose-it" approach; and
- ensure that all user TSAs permit secondary trading.

These approaches are described below.

Generic Capacity

The point-to-point nature of capacity means that there are myriad different capacity "products" which may be traded: every RP-DP pair represents a different product.

To address this, a "generic capacity service" could be introduced which would have a monetary rather than a locational basis. It could be traded in units of $1000 say. The capacity transfer service would be expanded to allow conversion of generic capacity into the usual "located capacity". For example, a $1000 of generic capacity could be converted into 10GJ of a located service with a CRF of $100/GJ or alternatively converted into 50GJ of a located service with a CRF of $20/GJ. The generic capacity service would cover the same term as the located capacity service

Users wishing to sell secondary capacity would first convert it to generic capacity and then offer it on the OATIS secondary trading platform. A user wishing to buy the secondary capacity would purchase this offering (if the price were acceptable) and then request that VT convert it into located capacity where the buyers required additional capacity.

Like with capacity transfer, located capacity requests would only be approved where there was sufficient spare capacity. This would mean that generic capacity would not be able to be converted to located capacity on fully utilised pipelines. For this reason, located capacity would still be tradeable on the secondary market. However, users would generally prefer to buy and sell generic capacity.

End Inter-pipeline Capacity Transfer

Under this option, the right to transfer capacity between pipelines would be removed. However, capacity would still be transferable to different points on the same pipeline[60].

Use it or Lose it

"Use it or lose it" is a generic term to denote arrangements to prevent hoarding of capacity. In this case, the objective is to prevent users with surplus capacity hoarding it from the secondary market for strategic reasons, as discussed earlier in this section.

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[60] "pipelines" would need to be appropriately specified

Under this option, users would bid for ST capacity in a similar way to the secondary market now. VT would provide this ST capacity, if it believed that demand would be sufficiently below the booked capacity level for this period: ie if there was some unused booked capacity.

The price would be set based on the level of unused capacity: the lower the amount of unused capacity, the higher the price. VT would allocate revenue from the sale to the holders of the unused capacity. This would need to be done *ex post*, once actual utilisation was known.

In effect, VT arranges for the bidder to acquire secondary capacity from holders of unutilised capacity, at a tariffed price. The price that the involuntary "sellers" receive will be lower than the price that they would have willingly sold at, given the strategic benefits of hoarding.

No TSA Prohibitions on Secondary Trading

The VTC would be changed to prohibit non-standard TSAs of this type. This prohibition would *not* apply retrospectively to pre-existing contracts.

Impact

The success of the various options depends upon the underlying reason for the current lack of trading, as presented in table 15, below.

Trading Impediment	Preferred Option	How it works
High transaction costs	Generic Capacity	Reduces transaction costs by having only one capacity product traded
Hoarding by major users with diversity across pipelines	End Capacity Transfer	Users must now book capacity to cover their pipeline peak demand, so the strategic benefit of hoarding is reduced
Hoarding by major users with diversity within or across pipelines	Use It or Lose It	Capacity that is hoarded for strategic reasons may be "lost". Users may prefer to sell it voluntarily
TSAs prohibit trading	Outlaw such TSAs	Users who are currently willing but unable to trade would be able to do so
Self-reinforcing illiquidity	All	Each option may have the effect of "kick-starting" the market, by encouraging trading

Table 15: Addressing Impediments to Secondary Trading

Benefits

As discussed in section 3.8, an efficient secondary market means that users will in effect be charged based on their coincident peak demand rather than non-coincident peak demand. Since this better reflects the incidence of MCE costs, this will improve pricing and usage efficiency.

A liquid secondary market will also provide a mechanism for users to buy or sell capacity to manage customer churn or to deliver short-term gas purchases. It may also promote competition by removing some competitive advantages to diverse retailers.

Even if "end capacity transfer" is unsuccessful in promoting capacity trading, there are some efficiency benefits associated with moving the incidence of capacity pricing from network peak to pipeline peak (albeit non-coincident peaks in each case). Again, since this better reflects the incidence of MCE costs, this will improve pricing and usage efficiency.

Costs

Each option comes with some costs. The major cost with the Generic Capacity option is the changes required to OATIS to implement it. This cost could be minimised if generic capacity were defined to be the same as an existing, heavily-utilised, capacity product: eg Rotowaro to Auckland. The "Use It or Lose It" option would similarly require the development of new OATIS functionality to support it.

There is no direct cost associated with end capacity transfer. However, the indirect cost is that an existing source of short-term capacity is removed. This could potentially worsen the issues around short-term gas trading and customer churn, if capacity trading does not provide an adequate replacement.

It is understood that trading prohibition terms exist primarily in long-term TSAs relating to large end-users such as power stations. Renegotiation of these contracts to allow secondary trading may not be feasible. Furthermore, preventing VT from negotiating such non-standard terms may also limit their ability to offer discounted prices for long-term TSAs.

Evaluation

The potential impact on the capacity objectives of establishing efficient secondary trading is summarised in table 16, below.

Objective	Description of Impact	Summary
Efficient Pricing	Efficient trading will ensure that users book their coincident demand and removal of capacity transfer means pipeline diversity does not spuriously affect booking levels	benefit
Efficient Investment	No impact	no impact
Facilitate Competition	Availability of ST secondary capacity will support customer churn. Diverse retailers lose their competitive advantage	promote competition
Simple	Generic capacity simpler, but "use-it-or-lose-it" adds new complexity	some new complexity
Stability	Uncertain dynamics in secondary market may affect booking levels	possible instability
Firmness	Firm capacity still available and only "lost" when not required	no impact

Table 16: Impact of establishing efficient Secondary Trading

As discussed above, a package of measures might be employed to promote trading and the overall impact (especially the costs) will depend on the components of this package

6.6. Return of Overrun Revenue to Users

Overview

None of the options above directly addresses the issue of competitive advantage to a user-affiliate of VT[61]. A direct way to address this issue is to ensure that overrun charges are not retained by VT but are returned to users in some way. This option considers how this might be done.

Approach

VT would be permitted to recover total revenue from capacity and overrun charges equal to its capital costs. Revenue above this (whether from higher overrun or higher capacity booking) would be returned to users the following year; revenue below this would be recovered from users in the following year. This could be done by adjusting CRFs and/or the TPF.

Impact

Under this option, VT becomes financially indifferent to the level of overrun charges and so the holding company directly bears the risk of overrun charges to the user-affiliate. Any competitive advantage arising from lower overrun risks is negated.

The pass-through mechanism may add some volatility to tariffs as they are adjusted in the light of varying overruns. The materiality of this – and the impact on users and end-customers – would need to be assessed.

Evaluation

The potential impact on the capacity objectives of returning overrun revenue to users is summarised in table 17, below.

Objective	Description of Impact	Summary
Efficient Pricing	Does not affect price levels	no impact
Efficient Investment	No impact	no impact
Facilitate Competition	Removes possible competitive advantage for VT affiliates	may promote competition
Simple	Limited complexity in calculating and passing-through overrun charges	limited new complexity
Stability	Volatile overrun charges may feed into unstable tariffs in future years	may create instability
Firmness	Does not affect firmness	no impact

Table 17: Impact of returning Overrun Revenue

[61] although to the extent that they reduce overrun risks, they will address this issue indirectly

7. Overall Evaluation

Table 18 below summarises the evaluation of the current arrangements and the options. The symbols used in this table are explained in table 19.

Option	Capacity Objective					
	Efficient Pricing	**Efficient Invstmnt**	**facilitate comp'n**	**Simple**	**Stability**	**Firmness**
Current Arrangements	✗	✓	✗	✗	✓	✓
Options (compared to status quo						
Common Carriage	✓	?	✓	?	-	-
Reduced CRF	✓	-	-	-	-	-
More Interruptible	✓	-	✓?	✗	✗?	✓
Non-gas-year capacity	✓?	-	✓	✓	✗?	-
Secondary Trading	✓	-	✓	✓?	✗?	-
Return overrun charges to users	-	-	✓?	✗?	✗?	-

Table 18: evaluation of Current Arrangements and Options for Change

Symbol	Meaning
✓	Likely to promote objective
✓?	May promote objective
?	Effect on objective unclear
-	No effect on objective
✗?	May impede objective
✗	Likely to impede objective

Table 19: Explanation of Symbols

This evaluation suggests that there may be some concerns around the current arrangements, relating to inefficient pricing/usage, impediments to competition, and complexity.

Of the various options considered, a number look promising: in particular, introducing common carriage, promoting secondary trading, and offering non-gas-year or interruptible capacity. Each of these options seems potentially able to better promote the capacity objectives, whilst also addressing concerns about availability of short-term capacity.

The analysis in this paper has been high-level and largely qualitative and so these results should be treated with caution. A more thorough analysis of the options and their costs and benefits would be needed before any changes to the current arrangements could be seriously considered.