Auckland Gas Distribution Network
Pricing Methodology Report

01 May 2009

(Public Version)

Glossary

ACS: Annual Compliance Statement. This statement is submitted on 1 May each year for the proceeding pricing year starting 1 October. It demonstrates Vector's compliance with clause 10 of the Authorisation and other requirements such as compliance with the Weighted Average Price Cap.

Allowable Notional Revenue: The notional revenue cap that Vector may recover in the pricing year. This is amended each pricing year by CPI

Authorisation: The Commerce Act (Vector Natural Gas Services) Authorisation 2008

Commission: means the Commerce Commission

Control Period: The period from 25 August 2005 until the earlier of 1 July 2012 or when the Authorisation is revoked.

Connection Type: All customers connect to the gas network via three types of connections: Primary (P), Secondary (S) or Tertiary (T) connections.

Primary Connection types are customers who connect directly to the "A" assets (backbone) by means of their own connection assets. Currently there are no "P" connection types on the Auckland network.

Secondary Connection types are customers who connect directly to the "A" assets (backbone) by means of Vector owned connection assets ("B" assets). The small number of Secondary Connection types are mostly made up of customers with large gas usage.

Tertiary Connection types are customers who connect to the "C" assets (meshed distribution). Most customers are connected via Tertiary Connections.

Controlled Services: "Line function" services provided by means of Vector's distribution system. See the Controlled services schedule in the Commerce (control of Natural Gas Services) Order 2005 for full definition of Controlled Services and see Commerce (control of Natural Gas Services) Order 2005 for full interpretation of Line function services.

COSM: Cost of Supply Model

Excluded Services: disconnections, reconnections, decommissionings, new connections, and non-standard contracts entered into after 30 September 2007.

Transmission gas gate station: The interconnection point between the distribution and transmission gas systems

GIS: Geographic Information System (i.e map based information system)

GMS: Gas Measurement System

Methodological Requirements: pricing methodology requirements that Vector must "have regard to and be consistent with" in developing its pricing methodology. See Schedule 3, Part 2 of the Authorisation

Notional Revenue: the sum of individual prices for Controlled Services multiplied by individual quantities for the reference year ending 31 September 2008

ODV: Optimised Deprival Value is the optimised depreciated value of the network system fixed assets prepared under the Commission's valuation methodology set out in the document - Authorisation for the Supply of Natural Gas Distribution Services by Powerco and Vector, Valuation of the Opening Regulatory Asset Base Valuation Methodology 15 February 2007

PMR: Pricing Methodology Report. The report required by clause 7.3.2(a) of the Authorisation

Pricing Year: 1 October to 30 September

Provisional Authorisation: The Commerce Act (Natural Gas Services) Provisional Authorisation 2005

RAB: the Regulatory Asset Base being the sum of the system and non system fixed assets as prepared under the Commission's valuation methodology set out in the 2007 Gas Distribution Valuation Handbook.

Reference Quantities: the quantities for individual Controlled Services as at 31 September 2008. Used in the calculation of the notional revenue in the weighted average price cap.

Remaining Control Period: Remaining pricing periods in which the Authorisation remains in force i.e. between 1 October 2009 and 1 July 2012

WAPC: Weighted Average Price Cap

2007 Gas Distribution Valuation Handbook: Commerce Commission Authorisation for the Supply of Natural Gas Distribution Services By Powerco and Vector, Valuation of Opening Regulatory Asset Base Valuation Methodology, 15 February 2007

Executive Summary

Introduction and background

Vector's gas Controlled Services in Auckland, including the provision, operation, and maintenance of distribution pipelines, are covered by the Authorisation released on 31 October 2008. In aggregate, the Authorisation requires Vector to set prices consistent with a weighted average price cap. Vector made the first changes required by this price cap on 1 January 2009. These price changes were generally a uniform reduction of existing charges. For the pricing year starting 1 October 2009, Vector is also required to demonstrate that the prices it sets have regard to and are consistent with the pricing principles set out in the Authorisation.

Following implementation of the 1 January 2009 price changes, Vector has undertaken a process of reviewing its existing price structures, assessed commercial issues relevant to current and expected economic conditions, developed an appropriate cost of supply model consistent with the required pricing principles and developed a transition structure to move prices to meet the implied cost allocations.

This report outlines Vector's approach and methodology to calculating prices for Controlled Services from 1 October 2009 until the end of the Control Period.

Summary of Vector's proposal

Historical context

Vector purchased the Auckland gas network in 2002. The current price structure was largely inherited from UnitedNetworks and Vector does not know of any cost of service / cost allocation model developed by UnitedNetworks for the Auckland gas network that underpins existing prices.

Since 2002, Vector has largely been focused on the Gas Inquiry initially (which commenced in 2003) and then the Authorisation process (concluded in October 2008). From 2005 the Provisional Authorisation prevented Vector from making any changes to its pricing structures and it did not make sense to develop a pricing methodology until the outcome of the Authorisation was known. These factors have necessitated a ground-up development of a pricing methodology/cost of supply approach for the purposes of meeting the requirements of the Authorisation.

Vector's existing price structure on the Auckland gas network is as follows:

- Standard prices relating to connection capacity (measured in standard cubic meters per hour), customer type (e.g., CNG, residential) and zones (e.g., distance from gate station); and
- Non-standard prices that are generally reserved for larger customers that have specific needs that do not fit into standard customer types.

This history is relevant in that it provides the context for why Vector has not been able to review an existing model and update it for the Authorisation.

Despite this need to build a model from scratch, Vector is acutely aware that its customers have made investment decisions based on the current pricing structure. While we are proposing some changes to the current structure, this will be managed in a staged process, which mitigates rate shock to customers, particularly through the present tough economic conditions. The need to manage rate shock has unfortunately created the need for a transition structure that is more complex than Vector would have preferred and a multi-stage process has been designed to move from the existing structure to the currently envisaged end-point for the pricing methodology.

Key characteristics of the proposed pricing methodology

The proposed price structure for implementation on 1 October 2009, commences a transition path to a model that:

- Retains the structure of standard price groups and non-standard arrangements for atypical customers.
- Is based on the principles of cost causality. New service classes are defined according to the nature of the network or asset type that the customer is connected to; the back-bone network, or the meshed distribution network. This is based on different costs being incurred for these different types of connection. Within these service classes are a number of price groups based on the capacity of the gas measurement set ("GMS") used by the customer.
- Eventually Vector will remove the zonal approach for standard customers. Vector has determined that the risks of bypass for standard customers are negligible and limited instances of bypass risk can be dealt with through non-standard contracts, where necessary. Vector considers that for all but the largest of customers, locational signals inherent in zonal pricing do not make any difference to customer location decisions, and results in a price structure that is more complex than necessary.
- Retains the existing capacity groups (e.g., less than 10 scm/hr, 10-40 scm/hr, etc) as these provide a mechanism for signalling the economies of scale that are derived and passed on to customers as volume increases. In

addition the capacity groups are familiar and well understood by customers.

- Has not departed materially from the existing balance of fixed and variable charges across capacity groups. Reflective of the discretionary nature of demand for gas, the significant degree of heterogeneity across customers usage, and the overall economics of gas supply (high levels of sunk network assets) Vector has retained the high weighting towards variable charges to promote dynamic efficiency in the use of the existing network.
- Has developed a clearer policy for when customers are eligible for non-standard pricing relating to the combination of through-put and distance from transmission gates. As a result, a number of customers on expired non-standard contracts are no longer eligible for non-standard pricing and are being transitioned to standard prices. This ensures an equitable application of pricing to customers in similar circumstances.

Vector considers that this approach, given the commercial and physical context of the Auckland network, will result in a set of prices that are clear, simple, meet the pricing principles in a practical manner, meet customer expectations, and which should be stable over time. As we will demonstrate in this report, there are a number of practical issues that have impacted on how the cost allocation model has been developed and the prices that sit within that cost allocation framework.

Managing rate shock

As noted above, Vector is acutely conscious that in the present economic climate it may be more difficult than usual for customers to cope with any kind of rate shock. Accordingly, in setting prices to take effect from 1 October 2009, Vector has adopted a policy of generally restricting price changes for standard customers to a maximum of 10% at the distribution level. While this may seem high, the impact on delivered prices is considerably smaller, as the distribution component of the customer's bill is typically within the range of 20% to 35%. Until the economic outlook improves, Vector intends to restrict price changes experienced by customers to such modest levels.

The consequence of this is that on top of the desired end-goal for prices, we have had to develop a transitional arrangement to progress prices and service classes towards the preferred model approach.

The transitional structure progressively consolidates existing pricing zones and splits customers out into the new service classes over time.

Treatment of non-standard arrangements

As noted above, Vector has a number of non-standard contracts with customers. The majority of these contracts were inherited from UnitedNetworks Ltd in 2002.

The records relating to how most of these non-standard prices were developed are not available. Since 2005, Vector has been required to roll these contracts over at the reduced prices required by the Provisional Authorisation. Accordingly, these customers, a number of which were already receiving favourable prices prior to the Provisional Authorisation, have benefited further from the initial price reduction in 2005 and the subsequent real price reductions when prices were not updated to reflect CPI over the period of the Provisional Authorisation. The Provisional Authorisation also required that new non-standard contracts be consistent with similar customers on existing non-standard contracts, so relatively recent non-standard agreements have been predicated on this disproportionately low comparison group.

Given this history, Vector proposes to implement the following process for establishing new non-standard prices:

- As the non-standard contracts expire, if:
  - the customer does not meet the newly established criteria for non-standard pricing (e.g., because the load is very small) it will be transitioned to the applicable standard price;
  - the customer is eligible for non-standard pricing, then the original terms that applied in the contract will be restored (e.g., prices will be adjusted to the level that the customer contracted for when the agreement was first negotiated). This effectively means a reversal of the initial price reduction and escalation at CPI;
  - the customer was on pricing that is anomalous (i.e. unusually low) then Vector will transition prices inline with other non-standard customers.
- Once all existing non-standard contracts have expired and been updated, Vector will implement a more standardised framework for calculating non-standard charges. **[…] CI**

Diagrammatic representation of the proposed price structure

The following two tables illustrate the existing and proposed pricing frameworks:

Table 1 - Standard price structures from 1 January 2009

Load Group	Description
1G10	Residential
1G21	<10 scm/h
XG22	10-40 scm/h, Zone X
YG22	10-40 scm/h, Zone Y
AG22	10-40 scm/h, Zone A
BG22	10-40 scm/h, Zone B
CG22	10-40 scm/h, Zone C
XG23	40-200 scm/h, Zone X
YG23	40-200 scm/h, Zone Y
AG23	40-200 scm/h, Zone A
BG23	40-200 scm/h, Zone B
CG23	40-200 scm/h, Zone C
XG24	>200 scm/h, Zone X
YG24	>200 scm/h, Zone Y
AG24	>200 scm/h, Zone A
BG24	>200 scm/h, Zone B
CG24	>200 scm/h, Zone C
1G27	CNG
1G31	Co-generation

Table 2 - Target price structures for 2012

Load Group	Description
GA0R	Residential
GA01	≤10 scm/h
GAS2	>10 and ≤40 scm/h, Secondary
GAS3	>40 and ≤200 scm/h, Secondary
GAS4	>200 scm/h, Secondary
GAT2	>10 and ≤40 scm/h, Tertiary
GAT3	>40 and ≤200 scm/h, Tertiary
GAT4	>200 scm/h, Tertiary

In the remainder of this document we provide further detail (as required by the Authorisation) of the development of Vector's cost of supply model ("COSM") and related prices, following the template prescribed in Schedule Four of the Authorisation.

Section 1: Overview

1.1. Requirements[1]

The Authorisation requires Vector to provide a:

- "description of the regulatory requirements
- description of the business' price setting policy framework, including the outcomes sought by the business from its pricing policy.
- summary of the overall price strategy for the Control Period (to 1 July 2012)".

1.2. Description of Regulatory Requirements

The Authorisation requires Vector to:

- Set prices each year to comply with a weighted average price cap;
- Report on and comply with quality service targets; and
- Set prices based on a pricing methodology approved by the Commission.

In addition the pricing methodology must:

- Include an audited quantitative cost of supply model; and
- Have regard to and be consistent with pricing principles issued by the Commission in the Authorisation.

Vector must initially submit the pricing methodology to the Commission for approval by 1 May 2009. The Commission then has 25 business days to notify Vector that it either does not approve the pricing methodology or requires additional information; otherwise the pricing methodology is approved. Vector then has 10 business days to respond (or longer if the Commission may allow) before the Commission's final approval decision. The Commission must approve the pricing methodology unless it considers that it does not comply with the pricing methodology requirements outlined in the Authorisation.

Any significant future amendments to the pricing methodology must also be formally approved by the Commission in a similar process to that described above. These must be submitted by 1 May prior to the pricing year starting 1 October of that year. Amendments that require the Commission's approval include the creation of a new standard service and any structural changes to the cost of supply model.

[1] The Commission has prescribed a template in Schedule 4 of the Authorisation. At the commencement of each section, we reproduce the requirements of each section from Schedule 4.

This report follows the template for reporting detailed in Schedule 4 of the Authorisation. There has been some slight re-ordering to improve the flow of the document. Vector has included sufficient detail and supporting information to assist the Commission, retailers, and customers[2] to ascertain how the pricing methodology and resulting prices were developed, the rationale for key decisions and the resulting impact on customer charges.

More specifically, section 2 outlines Vector's pricing methodology and, its development, Vector's compliance with the pricing principles, and information on how the cost of supply model (separately provided to the Commission) was developed. Section 3 provides information on pricing and transition plans to mitigate the impact of pricing changes on customers. Section 4 outlines Vector's pricing strategy for the remaining Control Period and beyond.

1.3. Price setting policy framework

1.3.1. Economic, commercial and practical drivers

In this section we highlight some of the key factors that have influenced the design of Vector's proposed pricing approach. The foundation of the development of the proposed prices is based on an application of economic pricing principles, given practical, physical and commercial constraints. It is useful to have an understanding of these factors up front, as it assists in understanding various decisions Vector has reached in establishing the pricing methodology.

Gas use is discretionary and customers are heterogeneous

The starting point for establishing Controlled Service prices is a consideration of the role of gas as a fuel. Unlike electricity, for most customers the choice to take gas in the first instance and at discrete points in time is discretionary. In the Auckland region, of mains-fronters[3], only 34% elect to connect. **[…] CI** Given the substantial costs of laying the core pipeline network, there is a strong commercial drive on Vector to maintain and improve economies of density (more customers per km of pipeline) and economies of scale (more kWh delivered per km of pipe). Improved economies of scale and density mean that Vector can use its capital more efficiently and customers ultimately benefit from the sharing of common costs across a wider number of customers or kWh delivered. A more diverse customer base is also in Vector's commercial interests as it mitigates asset stranding risks.

[2] The term "customer" refers to "end-consumers" Vector's actual customers are generally the gas retailers.
[3] These are customers with gas mains running past their property.

Customer discretion to connect to gas then creates a need to ensure that pricing is effective in both retaining existing customers and in facilitating uptake. The structure of prices is particularly important in this regard. Although the service provided to customers is fixed, which would tend to indicate that there should be a higher weighting of fixed components in customer charges, the need to compete with other fuels dictates that there is a strong weighting towards variable charges.[4] Higher proportions of variable charges means that it is possible to attract and maintain customers based on the value that they derive from gas. Even within customer groups (e.g., residential) there is wide ranging use. For example, a gas customer that uses only a gas hob would disconnect from gas if they were required to pay a fully fixed price, as they would be better off using electricity or LPG. Vector is unable to dictate consumption choices over the lifetime of the connection. A customer may elect to cease using gas hot water at the time of replacing a hot water cylinder, or convert heating loads to alternative fuels, or use of mixture of heating sources over time depending on fuel availability[5]. It is in all customers' interests that even small loads remain connected to the network, so long as they cover at least their incremental costs and make some contribution to the significant shared network.

The majority of costs to be recovered are shared costs, which cannot be specifically attributed to particular service classes except at high levels of aggregation

Related to the point above, that there is a substantial core network cost to be recovered, it is also important to recognise that customers are not generally geographically segmented in their use of different network assets. For example, there are not purely "industrial zones" or "residential zones" where there is no possibility of intermingling of customers with different requirements. In Appendix 3, we provide a GIS-generated representation of the Auckland network that illustrates this point. A key feature of the network is that customers are highly intermingled; a residential customer consuming only 20 GJ of gas per year can be using the same network mains as a commercial customer consuming 100 TJ (5000 times the residential customer).

The intermingling of customers has had significant implications for the development of network prices. First, it means that there are substantial common costs, so a substantial proportion of the prices paid by customers are a recovery of common costs rather than being directly attributable to the provision of a specific service to that customer. There are inevitably judgements that have

[4] In economic terms, *static efficiency* considerations that might indicate a higher weighting of fixed charges are outweighed by *dynamic efficiency* considerations, which dictate that customers' long term interests are maximised by a price structure that enhances economies of scale and density over time.

[5] For example, many homes have fireplaces which may be used when surplus wood (e.g., from trimming trees) is available.

to be made in determining appropriate allocation approaches. This feature has constrained the scope of the cost of supply model to high levels of aggregation, with more general "cost reflectivity" principles applying to the manner in which prices have been developed consistent with the aggregated cost allocations.

The small size of most possible service classes restricts the ability to design a highly granular cost allocation model which directly calculates required revenues for each service class

Another factor that has impacted on the development of the cost of service/cost allocation model is the small size of many service classes. Of the total customer base of 83,396 customers, the majority of these are residential customers (78,112) with the other customer numbers (based on the existing price structure) as follows:

Table 3 - Number of customers by load group, 1 January 2009

Load Group	Description	Customers
1G10	Residential	78,112
1G21	<10 scm/h	2,104
XG22	10-40 scm/h, Zone X	92
YG22	10-40 scm/h, Zone Y	69
AG22	10-40 scm/h, Zone A	19
BG22	10-40 scm/h, Zone B	352
CG22	10-40 scm/h, Zone C	1,671
XG23	40-200 scm/h, Zone X	42
YG23	40-200 scm/h, Zone Y	23
AG23	40-200 scm/h, Zone A	17
BG23	40-200 scm/h, Zone B	171
CG23	40-200 scm/h, Zone C	477
XG24	>200 scm/h, Zone X	5
YG24	>200 scm/h, Zone Y	1
AG24	>200 scm/h, Zone A	-
BG24	>200 scm/h, Zone B	16
CG24	>200 scm/h, Zone C	29
1G27	CNG	1
1G31	Co-generation	5
	Non-standard	191

Because of the small size of a number of the service classes and the inability to separate out different assets as being used solely by different customers, this has made the development of a highly granular cost allocation model that directly calculates prices or required revenues for each service class impractical. Vector investigated a number of possible allocation models that would directly calculate the required prices/revenues for each class, but determined that such an approach would result in a highly inefficient price structure that would create strong artificial incentives for customers to switch classes to obtain a cheaper

price (only for this to be reversed in the following year when the cost allocation model would reallocate costs in the following year to follow the switched customers so they are no better off).

This feature has led Vector to develop prices that when aggregated conform to the cost of service/cost allocation model outputs and the requirements of the weighted average price cap. The development of these prices has been informed by general considerations relating to economies of scale and cost causality (explained further in section 2.3.3).

There are practical limits on the sophistication of prices to improve efficiency

Vector contracts indirectly with customers through gas retailers. Retailers are free to repackage Vector's prices as they see fit, meaning it is not necessarily the case that price signals inherent in Vector's prices make their way through to the customer. In any event, gas distribution prices make up only 20-35% of the average customer's bill, so any price signal at the distribution level will tend to be overwhelmed by energy and transmission charges[6].

In addition, Vector has to work with the metering technology available to measure customers' use. The majority of customers' meters are simple and record customers' total use over monthly or two-monthly meter-reading cycles. These meters do not record the time of use or maximum demand. Having customer consumption information limited to monthly intervals (at best) limits Vector's pricing structures to simple fixed and variable components. The data limitations have additional flow on effects, for example reducing the available allocators required for cost allocation purposes explained further in the document.

Development of prices necessarily requires a high level of averaging

There are a myriad of factors that contribute to the overall level of network costs, including, but not limited to distance, customer density, variations in ground conditions, customer demand profiles, traffic management conditions, age of the network, incidence of other utilities in the road (can cause additional costs of relocating assets), and territorial authority requirements which differ across the Auckland region. It is impossible to take all these different cost drivers into account in designing network prices, and, therefore, there is necessarily a high degree of averaging in developing prices to recover the overall costs. Reflecting "cost causality" in prices is achieved only in a general sense and price design is necessarily limited to reflecting a few key cost concepts to manage the overall complexity of prices.

The development of Vector's price structure has accordingly focussed on:

- Cost reflectivity in the design of service classes;

[6] Note that gas transmission charges are paid for directly by retailers.

- A price structure that creates incentives for retaining and attracting customers, including appropriate fixed/variable splits and non-standard agreements. Customers will benefit most from increased economies of scale and density over time as more customers share the substantial costs of the core network mains;
- Reflecting economies of scale in pipeline capacity augmentation; and
- A design that once implemented will be stable over time.

Review of pricing zones

From 2002, Vector continued the introduction of pricing zones begun by UnitedNetworks in specific response to network bypass. These zones provided lower prices for customers locating close to gate stations or an existing bypass network.

As part of the development of a new pricing methodology, Vector has reviewed the use of network zones and has concluded that market conditions are sufficiently different in 2009 compared to 2002 that it is no longer necessary to maintain the zonal approach to pricing. In particular, the costs of building networks have increased substantially, so bypass is less of a threat for smaller customers and can be specifically managed through non-standard agreements with customers with large loads that may be attractive to a bypass network. In addition there was insufficient evidence to suggest that the zones had the intended outcome as the customers most likely targets of network bypass have been individually contracted with under non-standard arrangements.

Although a zonal pricing approach is consistent with the concepts of cost reflective pricing, Vector considers that for most customers differences in gas delivery costs are inconsequential for location decisions. For example, a restaurant will not locate close to a gate station in order to receive a lower gas delivery charge, but where there is a suitable premises and customer base. In other words, gas delivery charges are a small proportion of most of these types of customer's cost structures.

There is, of course, a balance to be struck in developing prices, Vector considers that it is more equitable to treat small gas customers the same regardless of location, and individual location decisions for such small customers do not drive network costs. For large customers, Vector will offer a non-standard price which, among other things, will depend on their distance from the transmission gate station and will reflect the costs that an individual large load can impose on the network.

A further consideration affecting Vector's decision to move away from zonal prices is the discontinuities for customers at zonal boundaries. A customer 999m from

the gate station will pay less than a customer 1001m away, but the actual difference in costs between these two customers is trivial.

Retailers' interests

Although Vector has taken a customer centric point of view in developing its cost of supply model, we have also recognised the impact that complex price structures apparently have on retail competition. Vector is conscious that its Auckland gas network (indeed the entire New Zealand gas market) is small and retail competition does appear to be limited to a few companies. Electricity retailers have recently complained that distributor price complexity creates barriers to retail competition. While we have a healthy scepticism for this claim, our decisions on changes to the existing pricing methodology have taken into account possible disruption to the gas retail markets and the administrative and transaction cost benefits for all parties of relatively simple and clear price structures.

Implications for the outcomes sought from pricing policy

As we indicated at the conference on the draft Authorisation, we have no disagreement with the pricing principles as they align with sound commercial interests. From Vector's perspective there are, however, limits to how theoretical pricing principles can be practically applied and the pricing principles in the Authorisation are best considered in a holistic fashion, whereby Vector's prices are reviewed for their overall consistency with the principles.

1.3.2. Outcomes sought from Vector's pricing policy

Accordingly, the outcomes we seek from Vector's pricing policies are:

- Recovery of the revenues Vector is allowed under the weighted average price cap;
- A clear and simple price structure that enhances dynamically efficient use of the existing sunk network by making it attractive to maintain connections and for new customers to connect;
- To ensure that the overall price structure is coherent, so that customers are not artificially incentivised to switch service classes to take advantage of anomalies in the pricing structure;
- To ensure that all customers face prices that are based on cost-reflectivity principles so that charges to all new customers at least cover their incremental costs of connection and charges to recover the cost of the shared network reflect customers' propensity to pay; and

- To provide pricing stability to customers and manage rate shock effectively in the transition to the new price structures.

Finally, price cap regulation is intended to promote improvements in efficiency over time. We consider that this applies equally to the development of pricing methodologies. The reality for Vector is that information on customer response to prices is highly imperfect. Vector intends to review customers' responses to the prices and will continue to enhance price design over time, including over the Control Period.

1.4. Summary of overall pricing strategy for the Control Period (to 1 Jan 2012)

Within the price setting policy framework outlined above, Vector's pricing strategy during the Control Period is to:

- Comply with weighted average price cap;
- Develop a stronger understanding of cost relativities between service classes;
- Refine the established cost allocation methodologies;
- Rationalise historical pricing approaches and align service classes and prices with the cost of supply model;
- Ensure prices for customers meet commercial requirements and facilitate appropriate customer outcomes; and
- Consider appropriate transitional arrangements for customers impacted by any pricing changes.

High weight has been given to the current economic environment, and the desirability of limiting rate shock for customers that may already be struggling from the downturn.

Section 2: Pricing Methodology

2.1. Requirements

This section requires Vector to provide a:

- "Description of pricing methodology for controlled services;
- Description of the development of the pricing methodology for controlled services, including, but not limited to:
  - an explanation of how the cost of supply model operates;
  - definition of the classes of service provided and the parameters by which the quality of service in each class are measured;
  - identification of the relationship between the quality of service provided and the level of current and future cost for each class of service;
  - explanation of the cost allocation methodology used to allocate existing and future network costs to service classes;
  - analysis of the extent to which costs are marginal, and whether the associated price components in the price structure reflect those marginal costs;
  - description of the methodology to estimate the range of subsidy-free prices for each service class; and
  - demonstration of compliance with the pricing principles."

2.2. Description of pricing methodology for controlled services

In this section we provide a high level description of the pricing methodology. Further detail is provided on the methodology in section 2.3, which describes how the methodology has been developed, and section 2.4, which describes the development of the cost of supply model.

Vector's pricing methodology is based on defining service classes based on assets used (which are the primary source of costs to be recovered) and the manner in which customers using those assets connect to the network. A cost of supply model was used to establish the costs to be attributed and allocated to those service classes. Within the service classes, Vector then defined a number of capacity segments, which reflect a desire to signal economies of scale in network augmentation. Prices in each of the capacity segments within the service classes were developed to provide a coherent overall price structure, which reflects this

economies of scale factor (i.e., charges increase, but at a decreasing rate as volumes/capacity requirements increase) and consistent with the overall requirements for the weighted average of prices to fall within the price cap.

Having developed this desired end-point for Vector's price structure, Vector then compared the resultant prices with existing charges and developed a transitional structure and rebalances to ensure that the impact on customers of price reform is managed over time. The resulting transitional arrangements progressively remove current pricing zones and introduce the newly defined service classes over time. In section 3.2 and 4.2 we set out these transition arrangements in detail.

2.3. Description of pricing methodology development

2.3.1. Process

The process for developing prices has been as follows:

- We developed a conceptual framework for examining network cost elements, and the attribution and allocation of costs to different service classes;
- Prices were then calculated according to this model;
- These prices were then compared with existing prices to examine the impact on customers; and
- Transitional pricing structures were developed to manage rate shock for customers.

The outcome of this process is a relatively complex transitional arrangement, including a multi-year period of consolidating existing price structures, before implementing our preferred price structure. This is necessitated by the need to manage rate shock for customers, particularly in the current economic climate.

Furthermore, as customer responses to price changes are also not well-understood, because Vector does not have a direct contractual relationship with the customer, this phased approach also will allow Vector to monitor the impact of changes over time, and for retailers to provide their input for future price changes.

2.3.2. Development of the conceptual framework

Review of network cost structures

As a general proposition, from a "beneficiary pays" perspective, the starting point for determining prices is to directly attribute costs to customers/service-classes as far as possible. Once this direct attribution has been performed, given the shared nature of the majority of network assets, it then becomes necessary to allocate the remaining common costs or develop some alternative cost-reflective approach to developing prices such that the total costs of the network (directly attributable and shared) can be recovered.

In terms of direct attribution of costs, Vector has identified three service classes based on the nature of the connection to the gas network. This process identified three distinct classes of assets that are used to different extents by customers in each service class.

The service classes are defined corresponding to the following three different connection-types:

- Primary connection types are customers who connect directly to the "A" assets (backbone) by means of their own connection assets. Currently there are no "P" connection types on the Auckland network, however, Vector wanted to make provision for this type of connection, as our experience in electricity distribution is that some customers prefer to own their own connection assets.
- Secondary connection types are customers who connect directly to the "A" assets (backbone) by means of Vector owned connection assets ("B" assets). The small number of Secondary connection types is mostly made up of customers with large gas usage.
- Tertiary connection types are customers who connect to the "C" assets (meshed distribution). Most customers are connected via Tertiary connections.

The three asset types are as follows:

- "A" assets are the network that connects gas gate stations and serves as a backbone for to the meshed distribution network ("C" assets). "A" assets include the standard pipe pressure ranges HP, IP and MP7. "A" assets are shared by all connection-types.
- "B" assets are the connection assets (such as end consumer specific pressure-reducing valves and service pipes) used by Secondary Connection types to connect to the "A" backbone assets. "B" assets are exclusively used by Secondary Connection types.

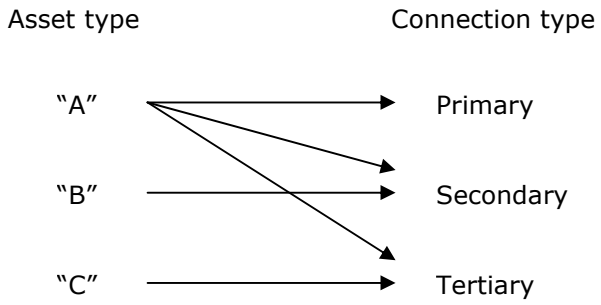
- "C" assets are the meshed distribution network which connects to the "A" backbone assets via pressure reducing stations. "C" assets include the standard pipe pressure ranges MP and LP but excluding MP7. "C" assets are exclusively used by Tertiary Connection types.

Appendix 3 depicts the backbone and meshed networks described above.

Vector selected these asset types on the basis that there are different costs associated with building high pressure and medium pressure networks. Customers also face different costs of connecting to the IP system compared to the MP system. IP connections typically require steel service lines and more expensive pressure reduction equipment to cater for the higher pressures. The costs of this equipment can be around five times more than plastics-based polyethylene pipes and equipment used on MP systems[7]. Whether a customer chooses to supply their own service lines and equipment is therefore also very important in distinguishing assets costs.

The following figure illustrates the relationship between asset types and connection types.

Figure 1 - Relationship between Asset type and connection service class



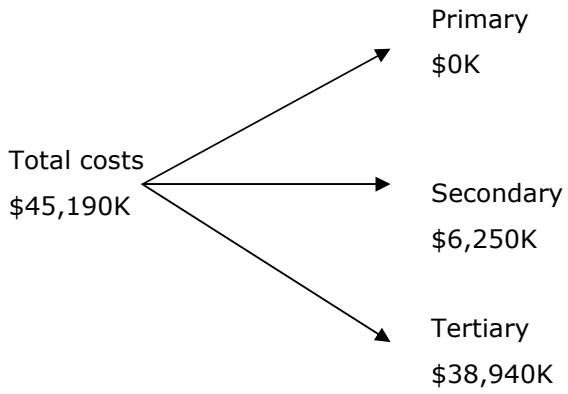
The diagram shows that no single connection type, or service class, uses all three asset types. It also shows that Secondary customers have sole use of "B" assets, and Tertiary customers have sole use of "C" assets.

The "A" assets are allocated to Primary, Secondary, and Tertiary service classes on the basis of the volumes consumed by each connection type. It would be preferable to allocate on the basis of some measure of peak demand, as this would be a better indicator of cost causality, however such information does not exist. Volume is considered a reasonable proxy for peak demand, as on an aggregated basis the demand profiles are similar between Secondary and Tertiary customers.

[7] However, overall such customers use fewer network assets, so their charges will tend to be lower.

The output of this first step in the pricing process is to allocate total costs as follows:

Figure 2 - Cost allocation to connection types



Within each connection type (Primary, Secondary and Tertiary), there are further segmentations made in establishing prices based on the connected capacity of the customer. On the backbone network these include all commercial load groups (≤10scm/h, 10-40scm/h, 40-200scm/h and >200scm/h) whilst the meshed distribution network has all commercial and residential load groups present. The backbone network is categorised by having a significant portion of the higher capacity connections whilst the meshed distribution network has a greater portion of the smaller capacity connections present. This is illustrated in the table below;

Table 4 - Percentage of customers in each capacity group by connection type

Service class and capacity group	Percentage of customers in each capacity group
Secondary	
Residential	0%
≤10 scm/h	2%
>10 and ≤40 scm/h	5%
>40 and ≤200 scm/h	13%
>200 scm/h	17%
Tertiary	
Residential	100%
≤10 scm/h	98%
>10 and ≤40 scm/h	95%
>40 and ≤200 scm/h	87%
>200 scm/h	83%

Vector has elected to continue with capacity groups and these ranges for the purpose of pricing for the following reasons:

- Capacity groups provide a basis for recognising cost causality and economies of scale in the provision of the network (see below for further discussion); and
- The proposed ranges are accepted capacity groups and to move away from them would prove highly disruptive for retailers, meter owners, and customers. There has been no call from retailers or customers, that we are aware of, for a different approach to capacity grouping.

Vector has, however, elected to discontinue the CNG and cogeneration customer groups. Customer demand for these options has significantly diminished and customer profiles within these groups are the same as the customer profiles in the capacity-based groups. The CNG and cogeneration customers will be transferred to capacity-based price options.

Vector does not consider that capacity groups represent different services. The actual service provided to different capacity groups is the same, with the GMS restricting the use of the network service. The role of capacity groups is to recover the costs of the Primary, Secondary and Tertiary services in an efficient manner that reflects cost causality.

At an early stage in the development of the pricing methodology, it was apparent that Vector would need to consolidate pricing zones before moving to introduce the Primary, Secondary and Tertiary service classes. Not doing so would have resulted in an overly complicated price structure with potentially 57 different prices covering only 800 customers.

A method was therefore required to develop consolidated prices for each capacity group. A straight-forward way to achieve this would be to develop a cost allocation model that further splits costs into capacity groups. However, such an approach proved to be impractical due to the nature of the customer base. There are effectively only two currently measured allocators Vector could use to allocate costs between service classes - volumes and number of ICPs. Neither proved to be a satisfactory basis for allocating costs:

- A volume basis would see most costs being allocated to the few large customers on the network. This would be disproportionate to the costs that they cause, because even though a large customer in terms of GJ consumed will cause wider diameter pipes to be used, they do not create the demand for the length of the network caused by the significant proportion of residential customers. In addition, volumes can be relatively unstable over time and because of the small numbers of customers in some categories, single customers switching categories could induce

substantial movements in cost allocations and therefore price changes; and

- An ICP basis would see the majority of costs allocated to residential customers (94% of the customer base). Large customers would face the same cost as a residential customer on this basis, so we would strike the opposite problem of a volume-based allocation and fail to recognise the fact that large customers do create additional capacity requirements on networks.

The reality is that some "middle ground" type of approach was required to achieve proportionate allocations of costs between customers, which reflect the significant costs that residential consumers impose on the network, but also reflect the additional capacity costs that larger customers impose. We were unable to find a mechanistic cost allocation approach that would generate a coherent and stable price structure. The need for a coherent price structure where there is a logical progression in prices as customers change their usage is important because it avoids customers artificially representing their usage patterns in order to obtain lower charges. Under some mechanistic cost allocations Vector tested, a customer could seek to increase connection capacity (but without increasing volumes) and achieve a reduction in charges.

A thorough review of possible differentiation in price-quality arrangements indicated that Vector's network services are homogeneous and the lack of geographic segmentation of customers means that it would be impossible to differentiate service quality to different customers. There has not been any customer demand for different levels of quality and inherently the quality of supply on gas networks is very high with minimal customer interruptions due to safety requirements. The proposed pricing approach reflects this ubiquitous service level by having uniform prices. Section 2.5 sets out the results of our consideration of different quality of supply factors.

2.3.3. Translation of costs into prices

As discussed above, rather than develop a price structure based on a purely mechanistic allocation approach, which would not lead to an effective or efficient set of prices over time, Vector considered alternative cost reflective approaches to setting prices. In this section, we explain how Vector developed these prices.

Prices were developed according to the following considerations and constraints:

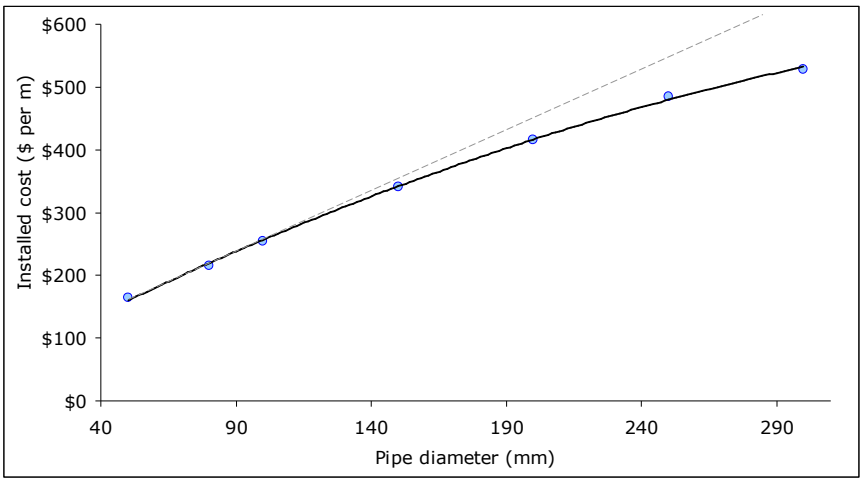
- The aggregate of prices multiplied by quantities must equal the allocated costs;
- Residential customers are the significant (but unfortunately, not only) causers of network length and should contribute a substantial proportion

of network revenues. A comparison of Appendix 3 and 4 illustrates the spatial spread and predominance of residential customers across Vector's network;

- The price structure must be coherent, so that there is no artificial incentive for customers to switch categories (but not change volumes) to obtain a lower level of charges. This is achieved by establishing the cross-over points between capacity groups at approximately the mid-point between average volumes in each capacity group;
- The price differentials between customer categories must recognise that additional capacity usage causes additional costs on the network, but at a declining rate (i.e., there are economies of scale in the provision of network services); and
- The balance between fixed and variable prices should promote gas uptake, recognising that different customers have different usage profiles even within capacity groups and these requirements may change over time, as customers change their appliance mix.

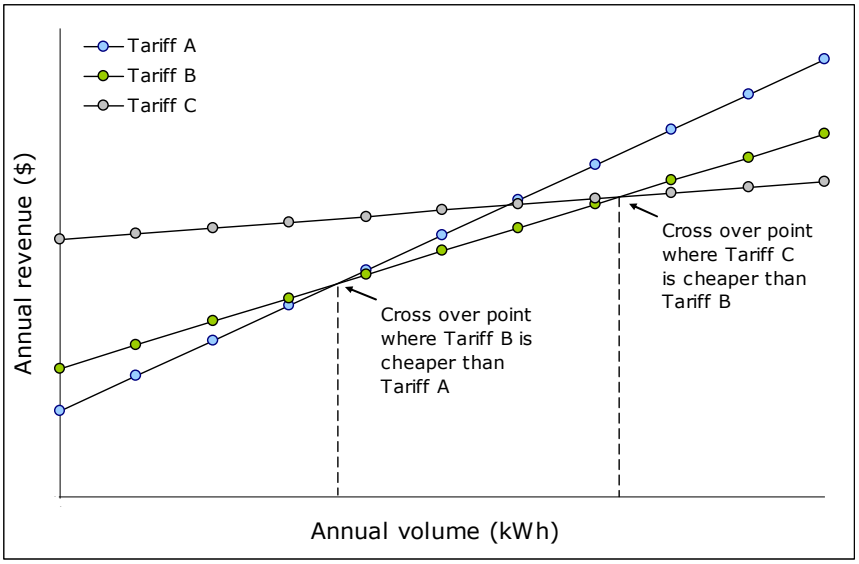
Figure 3, illustrates the concept that as customers use additional network capacity, the costs for a meter of pipeline increase, but at a decreasing rate – i.e., there are economies of scale in network provision. This curve is compared against a constant returns to scale technology depicted by the straight line. This economy of scale factor is a significant driver for the overall profile of Vector's pricing structure. It is not possible to directly infer from the economies of scale, demonstrated in the diagram below, a scale factor to apply to the determination of network prices as total costs reflect the combination of capacity of the network as well as numerous other factors such as distance, age, variations in customer density etc.

Figure 3 - Installed cost of gas distribution pipe compared with pipe capacity (diameter)



The outcomes of applying these concepts are illustrated in the figure below, where the different price types represent different capacity groups.

Figure 4 - Comparison of annual revenue and annual volume for three hypothetical prices



To construct the pricing structure, the price model develops combinations of fixed and variable prices for each capacity group (which determine the slopes of the lines and intersection with the Y axis) and the relativities between capacity groups required to meet the overall constraint that the derived prices do not exceed the allocated costs.

The development of prices under this framework is essentially a manual process of testing combinations of fixed and variable prices to simultaneously meet the constraints listed above. The starting point of developing prices was to take existing prices, particularly the levels and proportions of fixed and variable charges (albeit averaged into the new price structure), and then make adjustments to the price structure to meet the constraints listed in the five bulleted points above. Vector did not want to make material departures from the existing balance of fixed and variable charges given uncertainty about how customers would respond, and the effectiveness that the existing structure has had in attracting customers, which meets the overall dynamic efficiency objective of enhancing utilisation of the existing sunk network.

Vector's modelling indicated that the following prices would meet the constraints listed above for setting prices on 1 October 2009, reflecting a removal of zones. It leads to a progressive increase in charges as customers increase their network utilisation, but at a declining rate, reflecting economies of scale in capacity augmentation.

Table 5 - Initial proposed price structure for 1 October 2009

1 October 2009			
Load group	Description	Variable	Fixed
		($/kWh)	($/day)
GA0R	Residential	0.0247	0.22
GA01	≤10 scm/h	0.0235	0.27
GA02	>10 and ≤40 scm/h	0.0198	1.00
GA03	>40 and ≤200 scm/h	0.0161	4.00
GA04	>200 scm/h	0.0124	20.00

We then compared these proposed prices with the existing prices, which indicated that there would be substantial rate shocks for some customers as a result of removing zones. Vector considers that in the present economic environment it would be inappropriate to implement the prices derived above in a single step.

Accordingly, Vector then turned its attention to developing a transition approach that would mitigate rate shock that would otherwise be caused by the immediate abandonment of pricing zones. These transition arrangements are set out in section 3.2, 3.3 and 4.2.

Development of prices for 1 October 2009

Given the concerns about rate shock arising from the immediate removal of zones on 1 October 2009, Vector developed a transitional price structure that progressively consolidates existing zonal price structures over time. This will allow the Secondary and Tertiary service classes to be introduced over time and prices set to move revenues to those implied by the cost of supply model.

The consolidation of zones and price movements were determined by:

- An examination of future price structures to determine whether zonal price consolidation could be completed over the Control Period.
- Consideration of how many zones could be removed in any one year whilst limiting rate shock to 10% and complying with the weighted average price cap. Analysis demonstrated that no more than 2 of the 5 zones in each capacity group could be removed during 2009.
- Checking the direction of price changes against the direction of planned future price changes.
- Comparison of the cross over point between prices with the average customer usage in each group. Wherever possible prices were adjusted so that crossover points tended towards the midpoint between average customer usage in each group (to mitigate the possibility of customers

artificially switching capacity groups). Future scenarios were checked to ensure anomalies could be rectified over time.

- Overall price structures were checked to ensure that appropriate outcomes were achieved including:
  - discounted zonal prices were not more expensive than non discount prices; and
  - prices reflected scale economies in capacity provision.

Again, given the simultaneous nature of these constraints, the development of prices to deliver a reasonable transition structure to the new cost of supply/pricing model was a manual process of adjusting prices until the constraints were simultaneously met. As with the development of the initial prices, set out in Table 5, Vector took as a starting point the balance and levels of existing prices, particularly the proportions between fixed and variable charges, in order to ensure that the new pricing structure would continue to promote dynamically efficient utilisation of Vector's existing sunk network.

The proposed prices for 1 October 2009 are set out in section 3.4.

2.4. Description of the cost of supply model

2.4.1. How the cost of supply model operates

Overview

Vector's experience in aligning prices with those indicated by a cost of supply model ("COSM") has provided the basis for the development of the gas cost of supply and segmentation approaches. Two of the key drivers that have resulted from this process are:

- Wherever possible ensuring a strong relationship between cost causality and the establishment of service classes so that costs can be attributed rather than allocated; and
- The need to develop a coherent and linear structure of prices.

In this section we describe in detail how the COSM operates.

Operation

For the purposes of creating the COSM, Vector has adopted all the inputs and treatments described in the Commission's decisions paper and used in the Authorisation spreadsheet model as inputs for the COSM. This approach has been adopted given the time constraints Vector has had in preparing the COSM and that it provided a thorough and complete data set and a working example of

the building-blocks model which underpins the COSM. For simplicity Vector has adopted the Commission's approach in total. This does not indicate Vector's acceptance or otherwise of such approaches, merely the approach that time has necessitated. Moreover, the COSM ultimately is used to determine relativities between service classes, so developing new aggregate cost estimates would not provide any different result, given the overall constraint of the WAPC.

As the WAPC calculates the overall allowable notional revenue for the network, the COSM's purpose is to set price relativities between service classes, rather than to determine the allowable notional revenue per class. In other words it calculates the percentage of revenues required from each class and not the actual dollars. This is required as the purpose of price cap regulation is to create incentives for improvements in efficiency and therefore prices may diverge from costs over time. The best way to accommodate this within a cost of supply framework is to determine the relative proportions of the revenue requirement to be recovered from customers. Effectively this approach scales the cost allocations to the WAPC.

The COSM apportions the building blocks required revenues (which equate to total costs and was determined in the Commission's Authorisation) into Primary, Secondary and Tertiary service classes using specified allocators. This in turn determines the revenue percentage for each class. Vector has designed its COSM to provide for a high degree of pricing stability for customers over time. In particular, although the model includes forward-looking input information this will not be updated annually. To do so would lead to unnecessary pricing volatility as year on year variations in inputs (e.g., changing volume due to weather variations) result in similar variations in output prices. Vector intends to review the outputs of the COSM at the end of the Control Period, rather than enter into a process where annual updating of inputs could induce significant model-induced volatility in prices.

Data sources

In addition to the financial information used in the COSM from the decisions process, the COSM uses data from a number of other sources.

Annual customer information, including kWh and customer numbers (ICP's), are extracted from the Vector billing system. Vector notes that it has used the same audited information as was reported in the annual compliance statement.

To allocate costs to service classes the COSM requires some information already split into service class. In particular the ODV of the Auckland gas network has been reported from Vector's RAB valuation database by asset type. Vector notes that in allocating the 2005 valuation adopted by the Commission, it has had to use the asset database from the valuation that was originally prepared under the Commission's 2007 Gas Distribution Valuation Handbook. This was necessary as

the asset data was already categorised into the asset types required by the COSM and identified as P, S and T; a complicated process that occurs during the extraction process from GIS. Vector then scaled the asset values from the more recent database to match the totals adopted by the Commission.

Vector has also introduced replacement cost and depreciated replacement cost categorised into asset types as these were identified as being useful allocators. Vector has followed the same process for these valuations as it did with the ODV valuation to determine overall values and the apportionment into asset types.

Determining revenues to set prices

The COSM uses aggregate cost information allocated to service classes to determine the revenues necessary to recover these costs. Some of the financial costs allocated within the COSM are recorded in the input data, for example direct and indirect costs, whereas some of the financial costs are calculated within the model based on other input data, for example tax and interest. The financial variables used in the COSM and the financial formulae used are set out below in Table 6 and Table 7 below.

Table 6 - Description of financial variables

Variable	Description
L	Leverage
K_e	Return on equity
K_d	Interest rate for debt
t_t	Corporate tax rate
RRR_t	Regulated rate of return
C_t	Capital expenditure
capex	Rate of capital expenditure within year
CC_t	Customer contributions
O_t	Operating expenditure
DT_t	Tax depreciation
ODV_t	Optimised Deprival Value of system fixed assets
G_t	Indexed revaluation gain
RAB_t	Value of the total regulated asset base at the start of year t
ΔCPI_t	Change in the cost of price index (using 8 lagged indices) ending March quarter
X	Adjustment factor in CPI minus X price path
DR_t	Regulatory depreciation

Table 7 - Description of financial formulae

Variable	Description	Formulae
ROI_t	Allowed return on the RAB	RRR_t *(RAB_t+(capex*C_t))
I_t	Interest expense	RAB_t * L * K_d
IS_t	Interest tax shield	I_t * t_t
$BBAR_t$	Building blocks allowable notional revenue	ROI_t * RAB_t + O_t + DR_t + TR_t - CC_t - G_t
LTI_t	Levered taxable income	$BBAR_t$ - O_t - DT_t - I_t
LTP_t	Regulatory (levered) tax payable	LTI_t * t_t
TR_t	Regulatory tax	LTP_t + IS_t

Allocators

As with electricity a significant determinant of network investment for the gas network is expected peak customer demand. However, unlike electricity, usable demand information for customers on the gas network does not exist as a very limited number of gas meters measure demand. This means that Vector has used alternative methods to allocate group information to service classes.

Vector has identified four possible ways to allocate the COSM cost categories

- ODV within each service class;
- Replacement Cost minus Depreciated Replacement Cost (RC-DRC) within each service class;
- Volume (kWh); and
- Number of connections (ICP).

These four allocation methods are shown in a percentage format in table 8, below. These percentages can be applied to the group total to obtain the service class values for each cost category.

Table 8 - Allocation Methods and Weightings by connection-type

Allocation Method	Primary	Secondary	Tertiary
RC-DRC	0.0%	10.1%	89.9%
Volume (kWh)	0.0%	35.5%	64.5%
ODV	0.0%	5.9%	94.1%
Number of Connections (ICP)	0.0%	0.4%	99.6%

The table illustrates that there is a wide range of outcomes depending on the allocation method chosen for each cost category. Vector has followed a process of considering all allocators for each cost category, and then using the allocator most appropriate to each; for example with the strongest relationship to cost causation.

Table 9 outlines each COSM cost category and the allocator Vector has used to split that cost into the Vector service classes, and the rationale for choosing this allocator.

Table 9 - Method of cost allocation

COSM Cost Category	Allocator	Rationale
Asset Accounting Depreciation – System Fixed Assets and Non System Fixed Assets	RC-DRC	This allocator has been chosen to reflect the relative age (and hence depreciation) of the assets used by each service class compared with an ODV allocation. Due to the weak relationship between volume and depreciation, as well as the weak relationship between customer numbers and depreciation, an allocation by these methods is not deemed appropriate.
Direct Costs – excluding Pass-through	RC-DRC	The major component of direct costs is maintenance costs. Vector's experience has indicated there is a direct relationship between maintenance costs and the age and value of network assets. To reflect this relationship Vector has adopted RC-DRC to allocate direct costs
Indirect and Pass-through Costs	Volume	Indirect costs tend to be items such as corporate costs and salaries, legal costs, and marketing costs. Pass through costs are predominantly governmental and regulatory levies. Both these costs are difficult to attribute to individual or groups of customers. Vector has used kWh to allocate these costs. This assessment was adopted as it provided the most

		balanced allocation to segments and is commonly used by agencies to allocate regulatory fees and levies in the first instance to industry participants.
Non System Fixed Assets Allocation	ODV	As the regulatory asset base includes both system fixed assets, which accounts for the vast majority of the RAB, and non-system fixed assets, we have allocated the non-system fixed assets on the basis of the system fixed assets (ODV). Changes in volume, possibly due to the gain or loss of a large customer for example, is unlikely to spur a change in non-system fixed assets, so allocating on the basis of volume or customer numbers would be inappropriate.
Indexed Revaluation	ODV	The revaluation gains arise directly from the indexation of system-fixed assets. ODV has been used to apportion this cost due to the direct relationship with the cost causality and the allocator.
Capital Expenditure	ODV	Capital expenditure is most commonly associated with the extension or replacement of network assets. Extensions of the network are most likely to occur in line with the current proportions of ODV, and therefore allocating on the basis of ODV is the most prudent choice.
Regulatory Tax	ODV	Regulatory tax is directly related to profit which is (through the COSM process) proportional to the RAB. Due to this we have allocated regulatory tax on the basis of ODV.
Customer Contribution	ODV	Vector receives capital contributions from end-customers to meet the costs of connection in circumstances where costs are atypically large (e.g., lengthy

		distance from the mains or through volcanic rock). As customer contributions are payments for extending the network, which increases the system fixed asset pool, ODV is the most sensible allocator. The customer contributions forecast in the Authorisation were not linked to any specific service class.

2.5. Consideration of quality of service

In this section we discuss the requirements:

- "Definition of the classes of service provided and the parameters by which the quality of service in each class are measured; and
- Identification of the relationship between the quality of service provided and the level of current and future cost for each class of service."

To develop a segmentation approach that considered the quality of the service provided, Vector reviewed the way its network is built, configured, and operated with a view to distinguishing different quality output drivers. This review identified three main quality measures that impact a customer's service experience:

- Available pressure at point of connection;
- Interruption restoration times; and
- Security of supply.

Each of these quality measures are discussed further below.

Pressure

Pressure availability is a key quality characteristic of a gas network and is directly influenced by, and affects, network interruptions and security of supply. Unlike electricity networks, which are instantaneously affected by faults and supply interruptions, a gas network has some capability to continue to supply energy, even following a fault or outage, due to energy storage (pressure) in the supply pipelines. A network incident (e.g. third party strike or equipment failure) may cause a pipeline incursion, but so long as the minimum available pressure is delivered to the customer their service will not be affected. Multi-directional flows on the gas pipelines, particularly on the meshed distribution network, where there are multiple points of interconnection, assist in this regard.

Vector has reflected these pressure requirements into quality standards with energy retailers. The service standards require pressures to be delivered to the customer's meter typically within 50%-110% of the nominal operating pressure for each pressure system. For example, the nominal operating pressure for the "medium pressure 4" (MP4) system is 400kPa so the pressure range supplied to meters is 200kpa-440kPa. The retailer often reduces the pressure supplied by Vector to much lower levels to meet customer requirements (e.g. 3kPa at 6SCM/hour).

Vector's pressure standard to retailers is homogenous across all groups in the Secondary and Tertiary service classes. Vector does not offer different pressure standards to customer (except at these service class levels) as this is ultimately determined by the energy retailer through the GMS.

Interruption restoration times

Vector commits to different restoration times in the "General Conditions for Use of Networks" for Urban and Rural customers, respectively. The entire Auckland gas network is in the Urban zone so the same standard restoration time applies to all Auckland gas services. We have not had any requests for different fault restoration times and it would not be possible to differentiate this in different price/quality service arrangements as customers are inter-mingled.

Security of supply

Security of supply is the provision of an alternative network path, or network equipment, that the gas can flow through if one path is interrupted. Additional security of supply will minimise the chance that pressure availability drops below specified ranges. Gas networks typically require much higher levels of security due to safety issues associated with outages (for example pilot lights that require constant gas supplies to prevent leaking gas when services are restored). To meet these high security requirements Vector provides a level of supply redundancy between the meshed and the backbone networks and between the backbone and transmission networks. This allows for supply to be maintained from an alternative source when one particular supply route is compromised. Security is also provided as a result of the inbuilt storage capacity of the gas network as previously described.

The fact that gas is inherently reliable compared to other fuels may explain why no customer has requested additional security of supply/redundancy from Vector.[8] At an aggregate level, Vector can not distinguish customers by security of supply.

[8] Although we would consider meeting any such request from a customer through a non-standard agreement, where technically possible.

Conclusion: quality of supply cannot be differentiated in price categories

Overall, it is impractical/infeasible for Vector to offer different customers different levels of service, because of the inherent requirements for safety of gas pipeline services and the intermingling of customers on the network. Accordingly, Vector's segmentation approach does not seek to link price with quality of service.

In an aggregate sense, Vector's overall cost structure is related to the overall requirements to offer a secure and safe gas distribution service. These issues were considered in the setting of the WAPC, including through the setting of capital expenditure and maintenance allowances.

2.6. Analysis of the extent to which costs are marginal

In this section we report our analysis of the extent to which costs are marginal and whether the associated components of the price structure reflect those marginal costs

Vector's proposed price structure is heavily weighted towards use of variable charges. As discussed in section 2.3.3, Vector considers that this approach promotes dynamically efficient use of the network, as customers are non-homogeneous and gas use is discretionary.

The nature of gas networks is that a fixed cost type service is provided to customers. The consumption of an additional kWh of gas causes no costs to be incurred in delivering that unit. There is no additional "wear and tear" of the network caused by delivering an additional unit of gas. From a static, allocative efficiency point of view, that would tend to suggest that charges should be weighted more heavily towards recovery through fixed charges, so that additional use of the fixed network does not result in additional distribution charges (as marginal costs from distribution of an additional kWh is effectively zero).

However, customers are not homogenous and derive differing levels of value from use of gas. Vector is unable to identify different types of customers (in terms of differences in willingness to pay, even within customer categories or capacity groups) and therefore unable to set fixed charges based on their type. Moreover, customer willingness to pay varies over time according to changes in preferences. At discrete points in time customers will replace their appliances and can and do make different decisions on preferred heating sources, based on a comparison of relative costs of using different fuels.

For example, a gas customer using only a small amount of gas will have their willingness to pay based on the costs of electricity supply. Given that there is a reasonably significant fixed charge for use of electricity set by retailers, and electricity use is essential, a customer that has a small gas usage requirement

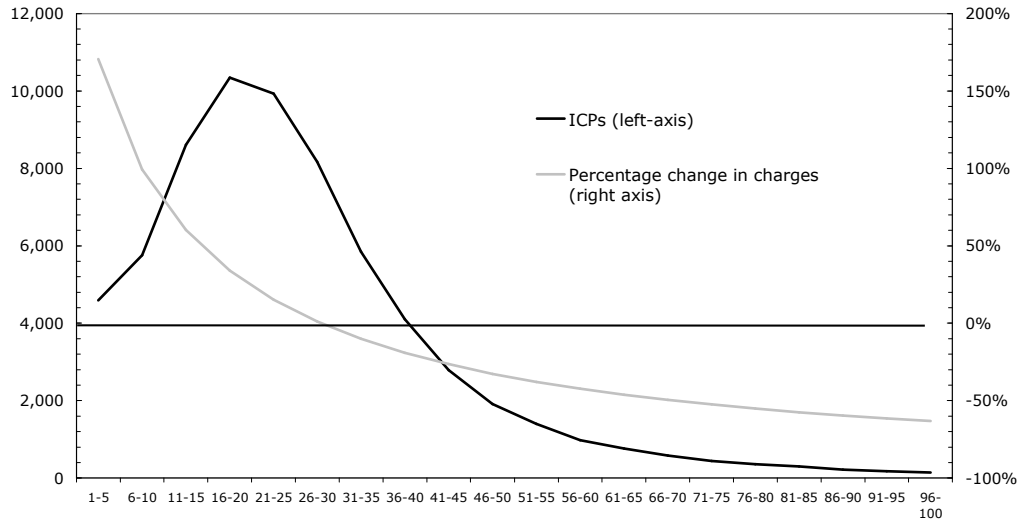
would compare the avoided costs of gas (fixed and variable charges) against the impact on variable electricity charges from a switch (given that they will be incurring fixed electricity charges regardless). Accordingly, to compete effectively with electricity it is necessary to set the structure of gas prices to a relatively high proportion of variable charges, so that customers are not deterred by paying two sets of fixed charges. Connection policies are then required to ensure that each connection is expected to cover the incremental cost of connecting to the network.

If Vector were to set fixed charges based on dividing the annual revenue requirement by the number of ICPs in the very short-term, this would improve allocative efficiency, albeit by an insignificant amount as distribution charges make up only 20-35% of a customer's bill, and short-run elasticities are very small. Over time, however, we would expect to observe a large number of customers disconnect from the network, because fixed charges are less discriminating of variations in customer willingness to pay. Over time, customers would be worse off as there are fewer customers over which to spread the fixed costs of the network and allocative efficiency would decrease in a general sense as charges would have to be higher (and therefore more distant from marginal costs).

In Vector's submission on the Form of Control, we set out the following analysis of a movement to a purely fixed charge:[9]

> "The following chart shows the number of customers in each customer category and the percentage impact on charges from moving from the current fixed/variable split to a fully fixed charge:"

Figure 5- Number of ICPs versus percentage change in charges



[9] Vector (2006) *Response to Form of Control Discussion Paper* 7 August 2006, paragraphs 58 to 60.

> The chart illustrates that the smaller customer groups (1-10 GJ) would experience distribution charge increases of 100% to 170%, from a movement to fully fixed charges. Such an increase would almost certainly result in the majority of these customers disconnecting.
>
> There would also be energy efficiency consequences from shifting from a variable to a fixed charge basis. The Government is concerned that energy should be used in an efficient and environmentally sustainable manner and has encouraged increasing the proportion of cost-recovery from variable charges. A shift to fixed charges would reduce incentives for consumers to improve energy efficiency, would result in additional demand for pipeline capacity, and ultimately result in higher charges for consumers in the long-run. Because of the deterrent effect of fixed charges to use gas, there would also be negative spill-over consequences into the electricity market, where more gas (as the marginal fuel) would be used to satisfy demand, but it is relatively more efficient to use gas directly than indirectly in electricity generation."

Vector considers that this analysis remains relevant to its decision that there should remain a high weighting of variable charges, particularly for smaller customer categories.

2.7. Compliance with pricing principles

This section demonstrates how Vector has shown regard for and consistency with the Pricing Principles, outlined in Schedule 3 of the Authorisation, in developing its pricing methodology.

We have compared the price structure that Vector intends to shift to as the basis for demonstrating compliance with the pricing principles, however, as the transitional structures contain a number of the same features as the likely end-point for price structures, we are also of the view that the transitional prices are also compliant with the pricing principles. In particular, a comparison of revenues earned under the current price structures with the required movements in revenue between the Secondary and Tertiary service classes amounts to only 2% of total revenues, so the requirements for prices to be subsidy-free will also be met through the transition.

2.7.1. Subsidy free range

Vector's methodology for estimating the range of subsidy-free prices for each service class is outlined in this section.

Pricing Principle 1a) in the schedule 3 of the Authorisation states that:

> "Prices are to signal the economic costs of service provision, by… being subsidy free (equal to or greater than incremental costs, and less than or equal to stand alone cost)"

That is, a certain price for a service will be subsidy free if it falls within the following range:

> Incremental Cost ("IC") ≤ Price ≥ Stand Alone Cost ("SAC")

Vector agrees that it is economically and commercially desirable for charges to be subsidy-free. If prices are outside of the subsidy-free range, then this means that some service classes are being cross-subsidised, which is ineffective from a capital deployment point of view, as Vector would make a loss on each new customer connecting into the subsidised category. The reality of being under the constraint of a weighted average price cap, the substantial nature of the shared network that must be recovered, and the small size of incremental costs of connecting customers into the network, means that it would be an extremely perverse price structure for prices to fall outside of the subsidy-free range.

Vector has found that developing quantitative estimates of the subsidy-free range is extremely difficult, particularly for estimating stand-alone costs. To accurately estimate standalone costs it would be necessary to develop a separate ODV for each service class, which is an extensive undertaking. We have been able to undertake this analysis for the Secondary and Tertiary service classes, but not for the capacity groups within these service classes. Vector wrote to the Commission seeking guidance on the approach to apply given this constraint. The Commission responded[10]:

> Pricing Principle 1(a) in Schedule 3 of the Authorisation requires that prices should be subsidy-free. Methodological Requirement 3(g) requires that price development should incorporate, *to the extent practicable*, an analysis of the cost of service provision that includes *estimates* of the range of subsidy-free prices for each service class.
>
> Reflecting the cost of different customers groups in pricing may not be a precise process in this instance. However, the Commission considers it important that Vector demonstrates how pricing decisions have been informed by the information that Vector has available, so as to make pricing as cost-reflective as possible, taking into account consumers' demand responsiveness and the quality of service. However, precise calculations of stand alone and incremental costs for every combination of services might not be necessary in order to demonstrate that the relevant principles and methodological requirements have been applied.

And further:

> The Commission recognises that some break-up or attribution of the value of the regulatory asset base (RAB) may assist in demonstrating that prices are subsidy free. The Commission appreciates the constraints placed on this process by the limited time available and would expect estimates of the stand-alone costs to a reasonable standard, given the time available.

Vector's interpretation of each component of the subsidy free range is as follows.

Incremental Cost:

Incremental cost ("IC") is the additional cost associated with supplying one more unit of service. A "unit" associated with a gas distribution service could conceivably be thought of as supplying an extra unit of capacity to an *existing*

[10] Letter from Commerce Commission to Vector, 12 December 2008 in response to Vector's letter of 7 November 2008.

customer or alternatively providing a connection for a *new* customer. From a dynamic efficiency point of view, prices in conjunction with connection policies should at least cover the incremental costs of connecting to the network. Therefore we have defined incremental cost as the cost of connecting an additional customer[11].

The IC associated with a new connection is the total construction and works cost of connecting a service line pipe from the meter to the existing distribution network. Vector maintains more recent records of these costs for each new customer and has analysed a set of this data to determine the typical cost range by customer type. These estimates are presented in section 3.7.

Stand alone cost approach

Consistent with the definition of Primary, Secondary and Tertiary service classes, Vector has developed what it considers are reasonably accurate estimates of services at this level. Vector has interpreted Stand Alone Cost ("SAC") as the cost of supplying gas distribution services to only one group of customers with no shared physical or commercial ties to any other customer group. For example, the total cost of supplying gas distribution services, including operations and support costs, to just the Secondary connection service on a stand alone basis.

Vector has adopted a top-down approach to calculating SAC by utilising the outputs of the Commission's building-block model, as a starting point from which costs can be scaled to a notional stand-alone business. One of the main benefits of this approach is that it allows modelling and analysis synergies from using the same inputs and calculations as the audited COSM and that the building-block costs are already accepted by the Commission and align with Vector's current Allowable Notional Revenue. Vector's standalone cost estimates are conservative, in that the indexed historic cost base, used to establish the RAB, is a notional financial value only. The RAB is significantly lower than the ODV, which is the measure of the efficient costs of providing the network at a point in time and which theoretically should be used to establish the SAC.[12]

The resulting SAC estimates are then compared to the cost allocations for these two connection types. If SAC is higher than the cost allocations then this part of the Subsidy Free Range test is passed. As noted above, Vector has been able to demonstrate that prices/revenues are less than standalone costs at the Secondary and Tertiary service levels. It has not been possible/practical to estimate ODVs for each capacity group within the Secondary and Tertiary service classes.

[11] However, in theory Vector would be willing to discount its prices to near-zero for an existing customer that would otherwise disconnect from the sunk network. It is unlikely that Vector would ever confront such a situation, however.

[12] The indexed historic cost-type methodology used in the Authorisation was $226 million, where as the ODV value prepared according to the Handbook was estimated at $339 million.

To demonstrate that SAC is higher than annual revenues earned at more granular service levels, we have compared the revenues to be earned from each of the capacity groups and compared these to estimates of SAC based on notional reductions of total costs based on a spatial analysis of customer locations on Vector's network. In addition, we then calculate for each capacity group how much total costs would have to decline before revenues from each group would exceed standalone costs. This latter analysis demonstrates by a wide margin that there would have to be infeasible reductions in costs before revenues collected from each capacity group could exceed SAC. This analysis is detailed in section 3.7 along with the other estimates of the subsidy free range.

Comparison of IC, SAC and prices

As IC, prices, and SAC are not comparable as they are defined (i.e. IC is a one off payment, prices are per unit of consumption plus a fixed charge, and SAC is an annual revenue requirement), they have been expressed as annual revenues.

Two methods have been adopted to show the subsidy free range. It does not make sense to determine the stand-alone cost of serving an individual customer, given the network nature of the service, so we compared the annualised SAC for the Secondary and Tertiary service classes against the annual revenues proposed for each class, and the annualised SAC of serving each capacity group.

ICs are annualised by calculating the payment that would recover the connection-costs over the life of the connection assets. Prices, to compare to IC, are expressed as an average annual revenue per customer by customer type using reference quantities to determine averages. Revenue requirements are already expressed in annual terms.

Estimates, showing Vector's compliance that prices fall in the subsidy free range, are presented in section 3.7.

2.7.2. Level of available service capacity

"1) Prices are to signal the economic costs of service provision by:

… b) Having regard, to the extent possible, to the level of available service capacity;

This requirement is met by segmenting customers into capacity groups within the Secondary and Tertiary service classes. Prices in each group are determined in accordance with the principle that as capacity requirements increase, customers should pay higher charges, but the rate of increases in charges should be declining, reflecting that there are economies of scale in the provision of additional pipeline capacity.

This price structure is reflective of long-run capacity augmentation costs. In the short-term it is impossible to signal capacity constraints or network congestion, as current customer metering technology does not allow this. Unlike electricity, it is not possible to provide a controlled load price as gas appliances cannot be remotely controlled. This would be an alternative way of signalling the benefits of using the network outside of peak demand periods. In any event, the desirability of signalling short-term capacity issues is low on gas networks as inherent pipeline storage provides a low cost means of meeting peak demands.

The method for determining the prices in each service class and the relativities between service classes is discussed in more detail in section 2.3.3.

2.7.3. Signalling the impact of additional usage on future investment costs

"Prices are to signal the economic costs of service provision by:

…c) Signalling, to the extent possible, the impact of additional usage on future investment costs."

The extent of capacity usage is measured by the network peak-demand over the engineered maximum demand for a particular pipe segment. The best pricing structure to signal capacity usage and potential future investment is through a price related to the customer's demand during the peak-demand period on the network (where network demand is the highest). Although this type of pricing is theoretically ideal it is not practical for Vector as the meters on our network do not record demand data for the significant majority of customers. On electricity networks it is feasible to signal the benefits of avoiding consumption during peaks through controlled prices, which allow controllable loads (e.g. water heating) to be controlled by ripple control. However, this is not possible with gas appliances.

Notwithstanding the impracticalities of signalling the impact of additional usage on future investment costs, the segmentation of customers into capacity groups and the differences in charges between groups does provide a low level signal that additional usage does have an impact on the capacity requirements of the network. The use of variable prices ($/kWh) also sends a weak signal that the more demand placed on the network, the higher capacity required.

For larger customers, Vector intends on establishing a more standardised *methodology* for determining non-standard charges. This approach will be much more capable of signalling the additional capacity costs induced by larger loads.

Vector considers that this overall approach is all that is practical given the constraints of metering technology and the nature of the customer base.

2.7.4. Ramsey pricing

> '2) Where prices based on 'efficient' incremental costs would under-recover allowed revenues, the shortfall should be made up by setting prices in a manner that has regard to consumers' demand responsiveness, to the extent practicable'

Vector interprets this Pricing Principle as the economic principle of Ramsey pricing. That is, for a natural monopoly, pricing at marginal costs ("MC") will result in the company making a loss as the MC of sunk distribution network assets is low (zero in Vector's case) and insufficient to cover total costs. Ramsey pricing suggests that companies should recover average cost but the price mark-up on MC for each service class should be proportionally inverse to the price elasticity of demand for that customer. That is, customers with lower price-elasticity of demand (a given price increase will result in a relatively small decrease in usage) should have a proportionally higher price mark-up on their MC.

In practice, Ramsey pricing is only ever used to provide guidance in the development of prices and price structures, as price elasticities for different customers are generally not observable. Indeed, Vector has not conducted a price elasticity analysis on its gas distribution customers and this would be difficult given the compliance timeframes under the Authorisation. Ramsey pricing also requires an ability to segment customers by their characteristics. For example, a movie theatre can distinguish children from adults from students from retired people by time of day/week. Prices can be set to reflect differences in willingness to pay between these groups. It is impossible for a network owner (particularly under interposed arrangements with retailers) to carry out such segmentation, except in differentiating major customer classes such as "residential" or on a case-by-case basis with large customers where the transaction costs of developing non-standard arrangements are small in relation to the value of the network service.

Ramsey pricing principles have also influenced the balance of revenues to be recovered between fixed and variable charges. By weighting charges towards variable charges, particularly for smaller customers, this is an effective means of discriminating between differences in willingness to pay between customers when it is unknown what elasticity each customer-type has. For a discussion on how variable and fixed prices have been set please refer to section 2.3.3.

Offering non-standard pricing is also consistent with Ramsey considerations. Vector's non-standard charges are effectively a variable discount to standard charges. These non-standard charges recover at least the incremental costs imposed by that customer on the network and some level of contribution to the

costs of the shared network, reflecting an assessment of bypass and/or interfuel substitution possibilities, given the customer's particular characteristics. As we have stated elsewhere in this document, given the substantial shared costs of the network and intermingling of customer types, it is in all customers' and Vector's interests to have some contribution to shared costs, by offering a discount to standard charges, than none at all. This approach leads to improved economies of scale and density over time.

2.7.5. Discourage uneconomic bypass

"3) Provided that prices satisfy (1) above, prices should be responsive to the requirements and circumstances of users in order to:

…a) Discourage uneconomic bypass"

This principle requires that prices should not be so high for any customer that it becomes economic for a competitor to supply that customer using an alternative network supply. This principle is based on the economic rationale that it is more efficient for one natural monopoly gas network to serve all customers itself because of economies of scale/density. If another network tried to compete with the gas network side-by-side it would be less efficient as the economies of scale for those customers would be lost.

Vector has historically sought to avoid uneconomic bypass through the use of pricing zones based on distance from the transmission system gate stations. Competing networks need to connect to a transmission system gate station to supply downstream customers so Vector previously priced customers closer to the transmission network at a lower price to discourage bypass.

As part of this review, Vector has since reconsidered the threat of such uneconomic bypass and, on balance, has decided to move away from these pricing zones in our pricing schedule. Vector considers that it is more appropriate to deal with uneconomic bypass issues through non-standard contracts as each situation can be dealt with on a case-by-case basis where all customer specific factors can be taken into account.[13]

[13] As noted elsewhere, the shift away from zonal pricing was also influenced by the need to maintain a relatively simple price structure, given the number of customers that are subject to zonal prices. If Vector maintained zonal prices and implemented the Primary, Secondary and Tertiary service classes, there would be a significant multiplication of price categories to deal with only 800 customers that are subject to zonal pricing.

2.7.6. Allowing negotiation to better reflect the economic value of specific services

"3) Provided that prices satisfy (1) above, prices should be responsive to the requirements and circumstances of users in order to:

…b) Allow negotiation to better reflect the economic value of specific services"

Vector considers that the best way to allow customers to negotiate differing levels of economic value from a service is through non-standard contracts. Large customers are able to negotiate with Vector for different terms and conditions as long as it is commercially viable and possible for Vector to provide the service.

Typical examples of customers negotiating to realise economic value of different specific service include reinforcement of the network to allow for greater capacity and the installation and management of specialist equipment and connections. Contracts have been negotiated on non-standard pricing structures to allow customers to manage their risk, including adjustment in prices to allow for atypical demand loads (e.g. seasonal use patterns) or a preference for pricing that is largely, if not wholly, fixed. Vector is also willing to offer different terms for different length contracts.

Please refer to section 3.2 for Vector's non-standard policy.

2.7.7. Promotion of stability and certainty for customers, and changes to prices should have regard to impact of customers

"4) Development of prices should promote price stability and certainty for customers and changes to prices should have regard to the impact on customers"

Vector has also remained very mindful of the impact of pricing structure changes on our customers throughout the process of developing our pricing methodology. This is particularly important in light of the current economic recession. The impacts resulting from changes to standard pricing structures and from cost allocation modelling has been analysed for each customer-type and connection-type.

The movement away from zonal pricing was seen to produce the most substantial variation in standard customer prices. To limit the impact on customers, Vector decided against removing zonal pricing in 2009 and delayed moving to final connection-type groups until 2011. This was due to the decision to limit any individual customer's price increase to 10% compared to the significant rate shock that several customers would otherwise have experienced, if Vector had immediately removed the current pricing zones on 1 October 2009. In section

3.2 we set out a transition plan to ensure that rate shock (particularly relating to the consolidation of zones) is mitigated.

In addition to standard pricing, many non-standard prices are also being reassessed as contracts expire. Several have been moved to standard prices as they do not meet non-standard eligibility requirements. Some of these will experience an increase in their price, so Vector considered whether it was necessary to implement a transition structure for these customers. Ultimately, Vector determined that for all customers that would move to standard prices it was not necessary to provide a transition. This is because the likely impact on final delivered charges was considered to be modest given that these customers are in the larger capacity groups, where standard charges are still very low on a $/kWh basis, and in Vector's view it is important that there is equity in pricing such that customers in similar circumstances should pay the same prices. In addition, the 25% real reduction in prices these customers have experienced since 2005 was also taken into consideration.

In summary, the development of Vector's prices through the Remaining Control Period has been heavily conditioned by current economic circumstances and the need to manage customers' exposure to rate shock. Vector has promoted price stability and certainty for customers in our pricing decision in the following ways:

- Non-standard contracts are fixed for set terms and price changes are usually based on pre-defined escalators.
- The approach to developing prices for the capacity groups ensures a degree of pricing stability by moving away from mechanical cost allocations (which our experience in electricity shows can generate significant levels of price volatility particularly for service classes with few customers).
- Vector considered that having zonal pricing and connection-type pricing structures would create too many price bands which would ultimately lead to customer confusion over pricing, so we have moved to simplify price structures over time.

Section 3: Impact of Applying the Proposed Pricing Methodology

3.1. Requirements

In this section we are required to provide information on:

- Tariff reform and/or restructuring required, including an explanation for why it is necessary;
- Extent to which rebalancing of prices (if any) between service classes is required, including an explanation for why it is necessary;
- Discussion of the approach to implementing rebalancing over the Control Period and justification for taking this approach;
- Proposed tariffs for 2009-2010 pricing year;
- Comparison of proposed prices per service class for 2009-2010 pricing year with prices per service class in 2008-2009 pricing year;
- Estimates of subsidy-free prices for all service classes; and
- Schedule setting out a reconciliation of how the proposed 2009-2010 pricing year's pricing schedule has been derived from the overall revenue requirement through the application of the methodology.

3.2. Tariff reform and restructuring and price rebalances

In this section we compare the existing price structure with the proposed price structure arising from Vector's development of its pricing methodology. Although the template specifies that "price reform and restructuring" and "price rebalances" be dealt with separately, we have consolidated these sections as the transitional arrangements Vector is proposing involve simultaneous reform and rebalancing over time.

There is to be a multi-stage process of price reform and restructuring that recognises the importance of mitigating rate shock in the transition to the new structure. In Vector's view, it was necessary to move to the new structure of prices and undertake rebalancing over time in order to meet the requirements of the Authorisation. Further, Vector believes that the proposed structure is better reflective of cost causality and will result in a more coherent structure of prices that is proportionate to the size of the customer base.

Existing price structures

Vector's existing price structures are based on customer groups, including commercial, co-generation, CNG and residential segments. The commercial groups are disaggregated into 4 broad capacity groups:

- ≤10scm/h
- 10-40 scm/h
- 40-200 scm/h
- >200scm/h

In addition to capacity, the commercial capacity groups also use multiple zones in each group greater than 10scm/h. Zonal pricing was gradually introduced between 2002 and 2005 to ensure prices were competitive against bypass networks. Vector currently has 5 zones within each capacity group:

- Zone A, within 1 km of a transmission gate station or designated gas network
- Zone B, more than 1 km away and within 5 km of a transmission gate station or designated gas network
- Zone C, not in zone A, B, X or Y
- Zone X, within 1 km of a designated gas network
- Zone Y, more than 1 km away and within 2km of a designated gas network

The zones are illustrated below, in figure 6, and in a larger version in Appendix 1:

The adoption of zone and capacity has meant that Vector has a complicated structure of 5 zones in each of the 3 commercial capacity groups greater than 10scm/h. This leads to a matrix of 15 different price plans. In addition there are a further 4 standard customer type price options as well as non-standard arrangements. Table 10 shows Vector's standard price structure as at 1 January 2009.

Figure 6 –Pricing zones on the Auckland gas network (1 January 2009).

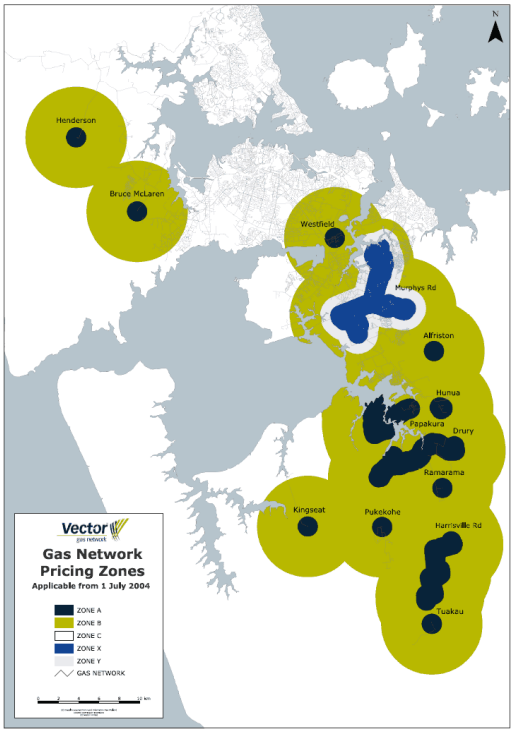


Table 10 - Standard price structure (1 January 2009)

Load Group	Description
1G10	Residential
1G21	<10 scm/h
XG22	10-40 scm/h, Zone X
YG22	10-40 scm/h, Zone Y
AG22	10-40 scm/h, Zone A
BG22	10-40 scm/h, Zone B
CG22	10-40 scm/h, Zone C
XG23	40-200 scm/h, Zone X
YG23	40-200 scm/h, Zone Y
AG23	40-200 scm/h, Zone A
BG23	40-200 scm/h, Zone B
CG23	40-200 scm/h, Zone C
XG24	>200 scm/h, Zone X
YG24	>200 scm/h, Zone Y
AG24	>200 scm/h, Zone A
BG24	>200 scm/h, Zone B
CG24	>200 scm/h, Zone C
1G27	CNG
1G31	Co-generation

Proposed price structures

As previously discussed in section 2.3.2, Vector has defined Primary, Secondary and Tertiary connection types. Costs are recovered within those connection types through a number of price categories relating to the capacity of the customer's GMS. If Vector were to maintain its zonal pricing approach, this would require further disaggregating existing prices into Primary, Secondary and Tertiary connection types, which would result in a 3x19 matrix of 57 unique price groups. In Vector's view this approach would introduce an overly complex price structure that would be both difficult to manage, hard to understand by customers, and disproportionate to the number of customers in the zonal groups (approximately 800). Accordingly, Vector is consolidating its price zones in a staged manner, before it starts to introduce connection types.

Zonal prices are significantly lower in zones closer to bypass areas compared with non bypass zones. Removing bypass zones would result in price increases for these customers. Although Vector would prefer to resolve price structural changes in a single year it is cognisant of the current economic conditions and the impact significant increases have on customers, particularly during difficult financial times. Removing zones would result in increases greater than 10% for approximately 450 of Vector's larger commercial customers. If Vector moved immediately to eliminate pricing zones, the impact on customers would be as shown in the following table:

Table 11 - Rate shock from immediate removal of zones

Zone	Number of customers	Weighted average price change
A	36	22%
B	538	6%
C	2,177	-4%
X	138	75%
Y	94	43%

To limit rate shock, Vector has proposed a phased removal of zones during the remaining Control Period, outlined further in Section 4. This approach has regard to the impact of standard distribution price changes on customers and has voluntarily limited distribution price increases to 10% (the impact at the delivered price level would be much lower, as distribution charges make up around 20% to 35% of the average bill). The intention is to limit significant price increases for customers but to transition as quickly as possible to new structures.

Due to the initial impact of consolidating some zones in the first year of the Control Period and the limitation of distribution price changes to 10%, Vector has

not been able to introduce the Primary, Secondary and Tertiary connection types into price structures from 1 October 2009. However, Vector has been able to implement a significant portion of its price rationalisation consolidating 3 of the 5 zones within each capacity group. The CNG and co-generation customer types have been removed as the customer requirement for these options has significantly diminished[14]. The price structures from 1 October 2009 are shown below:

Table 12 - Price structure for 1 October 2009

Load Group	Description
GA0R	Residential
GA01	≤10 scm/h
GA22 GA12 GA02	>10 and ≤40 scm/h, Zone 2 >10 and ≤40 scm/h, Zone 1 >10 and ≤40 scm/h, Zone 0
GA23 GA13 GA03	>40 and ≤200 scm/h, Zone 2 >40 and ≤200 scm/h, Zone 1 >40 and ≤200 scm/h, Zone 0
GA24 GA14 GA04	>200 scm/h, Zone 2 >200 scm/h, Zone 1 >200 scm/h, Zone 0

The new zones consolidate existing zones as follows:

Zones A, B and C have been consolidated into a single zone "0". Zones X and Y have not changed other than the renaming of these to zone 2 and 1 respectively. The new zones are mapped in appendix 2.

Non-standard customers

For customers under non-standard contractual arrangements, a different approach is required to reviewing prices. The price escalation provisions contained in the standard form non-standard contract govern how prices can be changed during the term of the non-standard agreement. These escalation provisions specify a CPI or PPI price increase calculated using the June quarter CPI/PPI. The timeframes contained in the Authorisation pricing process require that final pricing is established prior to the publishing of this data. The escalation provisions are therefore unenforceable if Vector is to comply with the Authorisation and meet its obligations under the non-standard contracts. Ultimately this disconnect between the Authorisation and Vector's historical customer contracts means that Vector cannot make the agreed changes to prices of non-standard customers, whose contracts do not expire before 30 September 2009 as part of the 2009 price change.

[14] Vector currently has 6 customers across both these options which have been transitioned onto capacity based options

For customers expiring on or before 30 September 2009, Vector has reviewed the arrangements in advance and determined if the customer still qualifies for non-standard pricing. If not they are transferred onto standard pricing arrangements at the end of the current term.[15] Whilst the non-standard criteria are designed to cover most situations, they remain guidelines only and the ultimate decision, with respect to pricing, will be made by Vector. The current non-standard criteria are:

- The Annual Quantity (AQ) is greater than 20 TJ per annum (5.6GWh). In general, non-standard prices would not be offered below this AQ unless there are exceptional circumstances;
- The AQ is in the range 10 to 20 TJ (2.8 to 5.6GWh) and the connection is within 2 km of a gas transmission delivery point or a competing gas distribution network;
- Inter-fuel substitution is practicable or likely; or
- The customer's consumption profile is unusual.

[…] CI

Most customers who were re-contracted to non standard pricing have kept their original prices but have had the price reductions as a result of the Provisional Authorisation reversed. This effectively means that these customers are back on the prices that they originally negotiated. Several non standard customers have had larger increases applied to their expired contracts as Vector has sought to unwind significant historical discounts that can not be validated.

[15] Vector does not benefit from this transfer, as the volumes and prices remain subject to the WAPC.

3.3. Rebalancing over the Control Period

Notwithstanding that the connection types will initially not exist in the price structure from 2009, Vector has been able to place individual customers and their revenues into service classes. This allows Vector to compare revenues by service class before and after the price change on 1 October 2009. Vector has expressed revenues by connection type as a percentage of total revenue instead of providing the actual revenue allowing direct comparison of revenue relativities irrespective of the total revenue (which changes year-on-year as allowed for under the WAPC). Vector has also included the revenue relativities as indicated by the COSM to compare actual revenues with target revenue. These relativities are shown in the table below:

Table 13 - Revenue weighting by connection type

	2008	2009	COSM
	Actual (%)	Actual (%)	Forecast (%)
Primary	0.0	0.0	0.0
Secondary	11.5	11.5	13.7
Tertiary	88.5	88.5	86.3
Total	**100.0**	**100.0**	**100.0**

The table above indicates that although Vector has not incorporated the specific outputs of the COSM into price changes in the 2009 pricing year, the consolidation of historical pricing has maintained existing connection type relativities.

As described in Section 4, Medium Term Pricing Strategy, Vector will introduce connection types into the pricing structure from 1 October 2010. From this point onwards, the outputs of the COSM will become more obvious in the price structure. Vector has carefully analysed the changes that can be made to prices, price structures, and rebalances, in each year of the Control Period, to achieve the outputs of the COSM over time. This analysis has set out the rebalance path over the Control Period in the table below:

Table 14 - Future revenue weightings by connection type

	2010	2011	2012	COSM
	Forecast (%)	Forecast (%)	Forecast (%)	Forecast (%)
Primary	0.0	0.0	0.0	0.0
Secondary	11.5	12.0	13.7	13.7
Tertiary	88.5	88.0	86.3	86.3
Total	**100.0**	**100.0**	**100.0**	**100.0**

As price structures contain connection type to a fuller effect in the latter stages of the Control Period Vector is able to achieve more of the rebalances required.

3.4. Proposed Prices for 2009-2010 pricing year

Based on the consolidation of historical prices, and compliance with the weighted average price cap, Vector has developed the following price structures and prices from 1 October 2009.

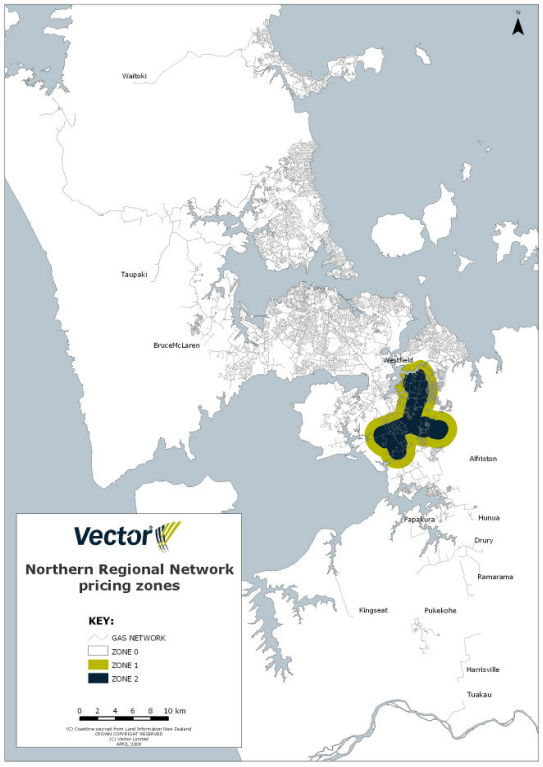
The ultimate prices and associated revenues from each service class under this approach are as follows:

Table 15 - Proposed price structure 1 October 2009

Load Group	Description	Fixed	Variable	Notional revenue
GA0R	Residential	0.24	0.0256	$ 22,276,469
GA01	≤10 scm/h	0.29	0.0263	$ 1,596,771
GA22	>10 and ≤40 scm/h, Zone 2	0.89	0.0118	$ 127,660
GA12	>10 and ≤40 scm/h, Zone 1	1.04	0.0132	$ 121,524
GA02	>10 and ≤40 scm/h, Zone 0	1.12	0.0228	$ 5,101,607
GA23	>40 and ≤200 scm/h, Zone 2	2.96	0.0099	$ 258,749
GA13	>40 and ≤200 scm/h, Zone 1	3.77	0.0113	$ 130,084
GA03	>40 and ≤200 scm/h, Zone 0	4.89	0.0129	$ 5,512,464
GA24	>200 scm/h, Zone 2	8.88	0.0079	$ 179,755
GA14	>200 scm/h, Zone 1	11.30	0.0094	$ 35,714
GA04	>200 scm/h, Zone 0	14.79	0.0108	$ 1,386,424

The revised zones are illustrated below and in a larger version in Appendix 2.

Figure 7 – Proposed pricing zones at 1 October 2009



3.5. Comparison of 2009-10 proposed prices and 2008-09 prices by service class

The following table shows a side-by-side comparison of the current prices effective from 1 January 2009, resulting from the commencement period price compliance and the proposed prices from 1 October 2009. The weighted average price change has been calculated to demonstrate the change in revenue for all customers in each load group. Individual price changes will vary depending on the customer's annual usage compared with the average in the group. Price changes also reflect compliance with the weighted average price cap, the consolidation of zonal prices, and the removal of cogeneration and CNG price options.

Table 16 - Comparison of 2009/10 prices with 2008/09 prices

1 January 2009			1 October 2009			Price change	Customers (#)
Load Group	Variable	Fixed	Load group	Variable	Fixed		
	($/kWh)	($/day)		($/kWh)	($/day)	%	
1G10	0.023311	0.214183	GA0R	0.0256	0.24	10	78,112
1G21	0.025641	0.259724	GA01	0.0263	0.29	4	2,104
AG22	0.020710	1.019888	GA02	0.0228	1.12	10	19
BG22	0.020710	1.019888	GA02	0.0228	1.12	10	352
CG22	0.020710	1.019888	GA02	0.0228	1.12	10	1,671
YG22	0.012551	0.986179	GA12	0.0132	1.04	5	69
XG22	0.010758	0.806874	GA22	0.0118	0.89	10	92
AG23	0.011655	4.482631	GA03	0.0129	4.89	10	17
BG23	0.013000	5.379157	GA03	0.0129	4.89	-3	171
CG23	0.015102	6.218401	GA03	0.0129	4.89	-16	477
YG23	0.010758	3.586105	GA13	0.0113	3.77	5	23
XG23	0.008965	2.689578	GA23	0.0099	2.96	10	42
AG24	0.009862	13.447892	GA04	0.0108	14.79	-	-
BG24	0.012104	16.137471	GA04	0.0108	14.79	-10	16
CG24	0.013896	19.133805	GA04	0.0108	14.79	-22	29
YG24	0.008965	10.758314	GA14	0.0094	11.30	5	1
XG24	0.007172	8.068735	GA24	0.0079	8.88	10	5
1G27	0.009055	2.410670	GA24	0.0079	8.88	5	1
1G31	0.010131	0.000000	GA24	0.0079	8.88	-5	5

3.6. Reconciliation between proposed 2009-2010 prices and revenue requirement

Table 16, above, sets out a reconciliation of Vector's prices and the associated notional revenues that will be derived from each capacity group. The Annual Compliance Statement sets out these calculations in more detail.

3.7. Estimates of subsidy free prices for all service classes

As part of the pricing methodology development Vector is required to illustrate that prices are signalling the economic costs of service by being subsidy-free.

Subsidy-free prices are defined by the Commission as those that 'lie between the incremental cost (IC) and the stand alone cost of supplying the relevant service (and for combinations of services)'[16]. Vector has taken a conservative approach to assessing the subsidy-free range and illustrates in the following sections that

[16] Commerce Commission, Authorisation for the Control of Supply of Natural Gas Distribution Services by Powerco Ltd and Vector Ltd, Decision Paper, 30 October 2008, Page 260

prices effective 1 October 2009 are compliant with the Authorisation and are within the subsidy-free range.

As noted above, in the description of the methodology for calculating the subsidy free range, the Commission indicated that it was effectively looking for a thoughtful and practical demonstration that the subsidy-free requirements are met in the time available.

Vector considers that the approach set out below is a satisfactory demonstration that prices are less than standalone costs and greater than incremental costs.

3.7.1. General approach

Vector has used the COSM as the starting point for determining the SAC of services and considers this the most appropriate methodology for estimating the subsidy-free range under the Commission's assessment guidelines. This approach allows for a consistent and logical progression of the pricing methodology that has been developed and a consistent set of input assumptions.[17]

Given the difficulties encountered in the subsidy-free assessment process, Vector has taken a conservative approach and has detailed major assumptions to aid understanding. As a final test on the subsidy-free analysis, Vector has prepared an alternative assessment criteria to further illustrate that prices fall below the SAC. This alternative assessment is more subjective than our primary assessment but is useful to illustrate the outcomes.

3.7.2. Primary SAC analysis

Stand alone cost calculation

As described in earlier sections Vector's network is categorised into three connection types (Primary, Secondary and Tertiary). For each of these groups Vector has determined what network assets are required to supply each discrete connection-type and then made an assessment as to what cost reductions would be necessary to supply this group.

As a starting point it is necessary to understand that Vector's network is constructed to a set security standard. This involves having sufficient capacity to maintain pressure levels and maintain a degree of redundancy to mitigate the risks of supply point outages. Given that Auckland is supplied from the north and the south, a large part of the network is unavoidable in that it is needed to provide diverse supply points from the transmission network.

[17] As noted in section 2.7.1, the use of the RAB, instead of ODV to measure efficient capital costs, means that estimates of SAC will be under-estimated.

In determining what assets are required to supply each connection-type Vector has utilised its engineering network models. These models are used by Vector's engineers for system optimisation and planning. In identifying the stand alone assets required to supply each connection type, Vector has removed all customer connections and volumes that are not being assessed. This has enabled the system optimisation models to identify the optimised backbone network required to supply the connection type being considered. Consistent with the RAB valuation process a brown fields optimisation approach has been used. Because of the security criteria outlined above regarding network design and security, the sum of the stand alone asset bases is greater than the RAB. This is driven by the need for both stand alone businesses to retain large portions of the core network.

Formulaically the asset valuation determination can be expressed as:

Total asset value = $V_A+V_B+V_C$

Total asset depreciation = $D_A+D_B+D_C$

Secondary stand-alone asset value = $(V_A \times O_s) + V_B$

Secondary stand-alone asset depreciation = $(D_A \times O_s) + D_B$

Tertiary stand-alone asset value = $(V_A \times O_t) + V_C$

Tertiary stand-alone asset depreciation = $(D_A \times O_t) + D_C$

Where:

V_A = Value of A assets

V_B = Value of B assets

V_C = Value of C assets

D_A = Depreciation of A assets (represented by RC-DRC)

D_B = Depreciation of B assets (represented by RC-DRC)

D_C = Depreciation of C assets (represented by RC-DRC)

O_s = optimisation required (%) to adjust V_A for avoiding Tertiary customer load. This has been calculated as 80%

O_t = optimisation required (%) to adjust V_A for avoiding Secondary customer load. This has been calculated as 98%

Vector has calculated the non-asset costs for each connection type on a stand alone basis by using the COSM. Costs have been allocated to the stand-alone

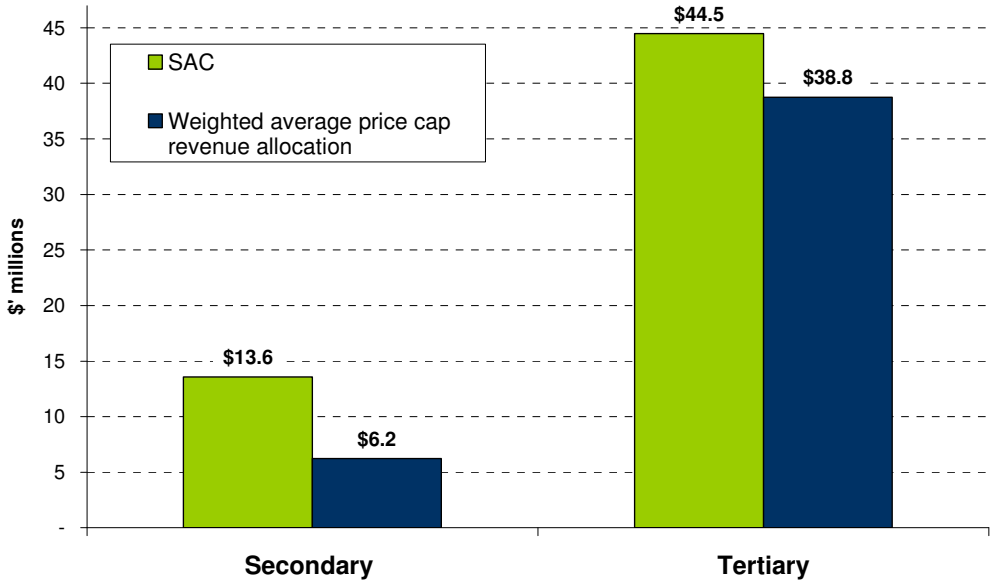
businesses using the COSM allocators for all categories except indirect costs, which has had its allocator changed from kWh to an estimated value.

Indirect costs are mainly made up of staffing and corporate costs. As Vector operates an outsourced business model for field services, indirect costs represent the shared corporate and engineering services that are not directly scalable with customer numbers. For the purposes of estimating SAC, Vector has assumed that for Tertiary customers there would be no reduction in the level of indirect costs given the size of this group. For Secondary connections we have made an optimistic assumption that 20% cost savings could be made.

Comparison of Standalone costs with Allocated Allowable Revenue

The following chart illustrates the outcomes of the stand-alone analysis and compares these to the allowable revenues for 2009 allocated to the Secondary and Tertiary customers via the COSM. From the chart, it is apparent that for both the Secondary and Tertiary connection types that the revenues required under a stand alone business model would be in excess of those proposed for 2009[18]. Vector's prices are therefore compliant in that they do not exceed the stand alone costs.

Figure 8 - SAC vs Weighted average price cap revenue-allocation Secondary and Tertiary service classes for 2009



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[18] As there are no primary connection customers both SAC and the revenue allocation are zero.

3.7.3. Further analysis of standalone costs

In addition to calculating SAC at the Secondary and Tertiary connection type level, Vector has also attempted to estimate SAC by capacity class. This has been a relatively subjective exercise as it would have been impossible to accurately determine SAC by capacity group without computing an ODV for each and optimising other costs such as corporate overheads, maintenance etc.

As we note above, the Commission indicated that it accepts that there would be practical constraints on how far this analysis could be taken. Vector considers that the approach, set out below, is a satisfactory demonstration that prices are less than standalone costs – in fact by a large margin, as we graphically illustrate.

As a starting point it is relevant to note that it is unlikely that a sustainable business could be based around serving individual capacity groups. More likely, Vector would serve combinations of groups so we have also included an estimate of the SAC of serving all standard commercial customers only (and no residential customers).

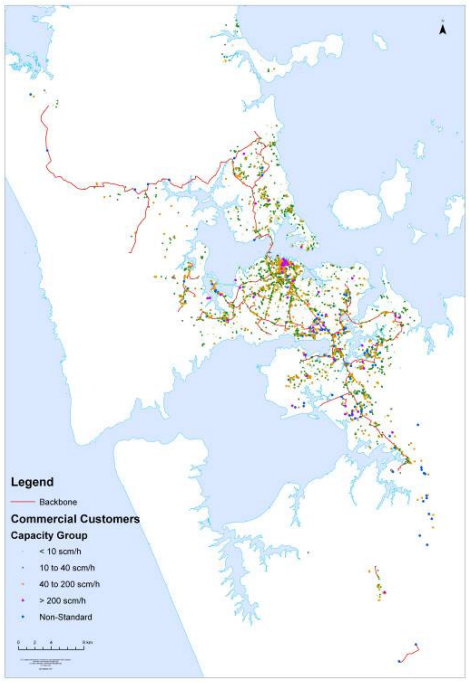
We have illustrated that the proposed prices are consistent with the requirement that prices are less than SAC using two key means:

- We apply a percentage cost reduction to total cost, based on a subjective impression of what costs could be avoided if Vector ceased providing services to other capacity groups except the one under consideration.
- We calculate the costs that would need to be avoided if prices were to exceed stand-alone costs, and query whether it would be feasible to reduce costs by this amount.

The first analysis has been informed by a visual examination of the location of customers in the network map set out below (larger versions are reproduced in Appendix 3 and 4). As the maps illustrates, the commercial and industrial customers that connect to Vector's network are spread through-out Vector's network and not concentrated around transmission gates. Effectively all capacity groups are represented in all corners of Vector's network.

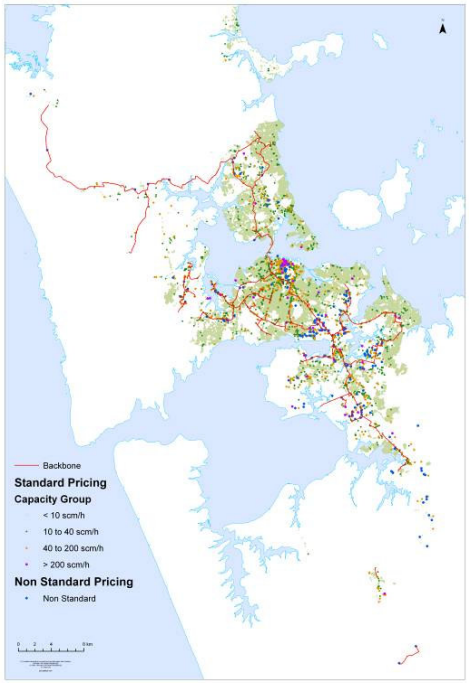
The diagram indicates that the entire backbone network would be required to service the commercial loads, and given they have high loads, we do not believe that there would be any material optimisation of the backbone network. In addition, there would still need to be large amounts of the meshed distribution network to serve their loads. To serve each capacity group individually (or even all commercial capacity groups together) would result in significant diseconomies of customer density, but little reduction in the scale of the network.

Figure 9 – Commercial Customers on the Auckland Gas Network



The same diagram with the residential customers overlaid further indicates the amount of network that would be required to serve a residential group alone.

Figure 10 –All Customers on the Auckland Gas Network



To estimate the SAC for each customer/capacity group we have applied a notional percentage reduction in the total costs determined in the COSM for 2009.[19] Given the spatial analysis above, we do not consider it would be possible to substantially avoid building a lengthy network to serve customers in each capacity group. Nevertheless, we have adopted relatively harsh percentage reductions to total costs to demonstrate that prices fall within even optimistic views of the costs that could be avoided.

As noted above, we also computed the total costs that would need to be avoided for revenues derived from each customer category to be in excess of standalone costs. Table 17 illustrates the outcomes of these approaches:

Table 17 - Comparison of revenues against standalone cost estimates for capacity groups

Load Group	Expected Revenues ($)	Assumed potential percentage reduction in total costs	Standalone costs ($)	Percentage reduction in total costs required for Vector's prices/revenues to exceed SAC
Residential	22,276,469	25%	33,734,328	50%
<10 scm/h	1,596,771	60%	17,991,642	96%
10-40 scm/h	5,350,791	60%	17,991,642	88%
40-200 scm/h	5,901,297	60%	17,991,642	87%
200+ scm/h	1,601,893	60%	17,991,642	96%
All standard commercial	14,450,752	30%	31,485,373	68%
All customers	44,979,104		44,979,104	

In Vector's view, this analysis is a sufficient and practical demonstration that the proposed standard prices and revenues to be recovered from each capacity group do not exceed SAC by a large margin. As the column demonstrating the costs that would have to be avoided for Vector to be pricing above SAC indicates, there would have to be extreme reductions in network costs for Vector to be pricing above SAC. Given the wide geographic dispersion of customers and therefore length of network required, this is infeasible.

In addition, two other factors make it infeasible that Vector's prices exceed standalone costs:

- the price structures that Vector has developed are continuous and are reflective of economies of scale in service provision; and

[19] Which is based on the Authorisation model estimate of costs.

- the total revenue to be collected is constrained by the price cap, which has been determined by the Commission's determination of total costs that can be recovered.

Finally, in regard to non-standard customers, as these customers effectively receive a discount to standard charges, it follows that prices to these customers do not exceed standalone costs.[20] The more relevant test for these customers is the test against incremental costs, which we set out in the section below.

3.7.4. Prices compared with incremental costs for standard Secondary and Tertiary connection-types

Vector has defined incremental cost as the cost of connecting to Vector's existing network. In order to meet the requirements of the Authorisation Vector must demonstrate that its prices are greater than IC.

Pricing at or below the IC is unsustainable in the long term for a network operator. Vector's commercial policy for all connections is that revenue from the customer must be greater than the IC. For non-standard situations customer revenue can be discounted but the floor is set to the incremental costs of connection, otherwise it is uneconomic to connect the customer.[21]

In illustrating that Vector's prices are greater than IC we have divided our analysis into two parts. The first looks at standard customers and the second looks specifically at non-standard customers.

Standard Customers IC Analysis

For standard customers Vector has analysed a number of recent customer connections to establish the average costs of connection. Vector has very few recent examples of Secondary connections to the network as most recent connections have been Tertiary. The data used for the following analysis is therefore based off Tertiary connection types. Given the unique nature of each connection results in a wide range of installation costs, we have divided the connection data into four categories. For ease of understanding we have used the capacity groups.

In order to compare annual revenue with one off connection costs, we have converted the one off IC of connecting to the network into an annualised

[20] It is feasible that Vector would set prices for non-standard customers at higher than applicable standard charges, in the event that costs were higher than applicable standard charges. For example, if the customer was distant from the core network.
[21] Refer to section 3.2 of this document for more details on non-standard pricing

payment[22]. Average annual revenues have been created using proposed 2009 prices and base quantities.

The following chart illustrates that annual customer revenues are greater than average annualised customer connection costs (IC) on the Tertiary network. Although Secondary connections are generally more expensive given the materials used, the gaps between the Tertiary IC and the revenues is large enough that it is unlikely to be an issue. Another important consideration is that Secondary connections are now restricted to larger commercial customers so the residential class, which has the smallest gap between IC and revenue, will not be affected by any cost differences.

[Figure 11 – *average annualised IC costs vs. average annual revenue per customer* for standard Tertiary customers ***…] CI***

Non-standard customers

As detailed in section 4.5.5 Vector's non-standard pricing policy prohibits pricing at levels below the IC of connection. To further illustrate compliance Vector has prepared a high level assessment of existing non standard customers.

The historical connection costs for the majority of the existing non-standard customer base are unknown as Vector's records (inherited from UnitedNetworks) do not hold that information. Vector has therefore proxied the connection costs for non-standard customers by using the replacement costs detailed in the

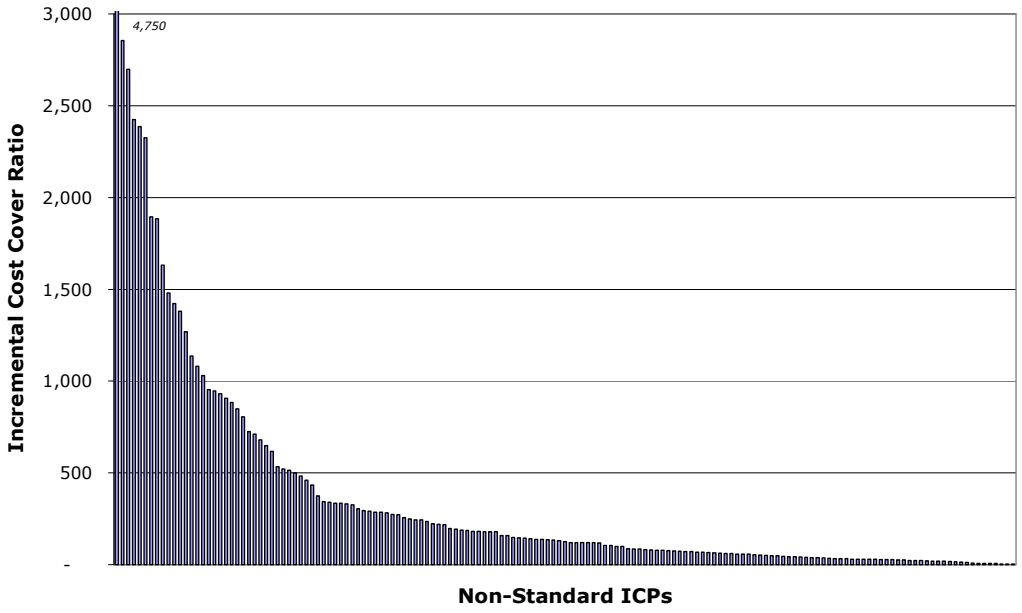
[22] Based on the annual payment that recovers the connection cost over a 60 year average asset-life (Page 39 of 2007 Gas Distribution Valuation Handbook) and the Commission's discount rate of 9.59%. Salvage value is zero for simplicity.

Commission's 2007 Gas Distribution Valuation Handbook and asset information extracted from GIS[23].

Vector has then used the same process for annualising these one off costs as was used for assessing standard customers so that they can be compared to the annual revenue received from each customer.

The graph below illustrates the IC coverage ratio for non standard customers. The IC coverage ratio is the number of times the annual revenue exceeds the annualised connection costs. The range of IC cover is between 2.5 and 4,750 times indicating that none of these non-standard contracts are priced below the IC of establishing their connection.

Figure 12 – Non-standard customer incremental cost coverage ratio



[23] In reality Vector could only perform this analysis for approximately 80% of the 191 non-standard customers that currently exist because of limitations with matching ICP's to network assets in the GIS system.

Section 4: Medium Term Pricing Strategy

4.1. Requirements

In this section we are required to set out:

- Expected price reform and/or restructuring for the remainder of the Control Period;
- Expected price movements for each service class in each remaining year of the Control Period;
- Any further rebalancing that is required to complete the rebalancing between service classes as discussed in Section 3 of this Report;
- Excluded Services:
  - Definition of excluded services and charges for 2009-2010; and
  - Medium term price strategy for excluded services;
- Description of the proposed framework for periodically reviewing underlying service classifications, cost data, cost allocations and other elements that contribute to pricing decisions; and
- Discussion of any expected further pricing development in future years of the Authorisation that may lead to changes in the Pricing Methodology Report.

4.2. Price reform/restructuring for remainder of Control Period

In this section we outline the transitional price structures from 1 October 2009 until the end of the Control Period. Although the template specifies that "price reform and restructuring" and "price rebalances" be dealt with separately, we have consolidated these sections as the transitional arrangements Vector is proposing involve simultaneous reform and rebalancing over time.

Due to concern over customer welfare arising from significant changes to prices, as outlined earlier in this document, Vector's strategy for implementing revised price structures has been to transition to the required price structures over the course of the Control Period. Vector has identified that some price consolidation is necessary as well as the introduction of connection type service classes into prices. Vector has also elected to maintain existing capacity segmentation approaches as these allow scalable price structures, reflect cost drivers, and mitigate further rate shocks from more extensive structural changes.

The price structure Vector intends on implementing by the end of the Control Period has no zonal prices, but contains connection-type service classes and maintains existing capacity based service classes. Vector's target price structure is shown in the table below.

Table 18 - Target price structure at the end of the Control Period

Load Group	Description
GA0R	Residential
GA01	≤10 scm/h
GAS2 GAS3 GAS4	>10 and ≤40 scm/h, Secondary >40 and ≤200 scm/h, Secondary >200 scm/h, Secondary
GAT2 GAT3 GAT4	>10 and ≤40 scm/h, Tertiary >40 and ≤200 scm/h, Tertiary >200 scm/h, Tertiary

Vector's proposed prices for 1 October 2009 transition from existing structures towards the 2012 structure (illustrated above) as far as possible. This has been done considering constraining price changes to customers to 10% and complying with the weighted average price cap.

Following the 2009 changes, and over the remainder of the Control Period, Vector will remove the remaining zones and introduce connection types into price structures. In conjunction with these changes, prices will be set to achieve the revenues indicated by the COSM. That is, prices will be rebalanced over the course of the Control Period.

Vector has forecast a proposal that achieves the outcomes described above whilst ensuring price changes for customers are no more than 10%. The strategy is based on gradually introducing connection types to customer types as zones are removed. This process is initially targeted at Vector's larger capacity customers and will gradually be phased down to smaller capacities as zones for these customers are removed.

In the following tables, Vector has demonstrated our current best estimates of how Vector will transition prices over time. We have expressed the proposed changes in 2009 dollars (i.e., have not indexed the changes for CPI movements) as the interaction between CPI and pass-through cost changes, and the cap on rate shock, makes it difficult to establish the precise movements in prices over time. However, we consider that the proposed prices provide a reasonable guide for customers to understand movements in prices over time.

2009 to 2010 proposed structural changes

Vector's intention is to consolidate zones for the greater than 200scm/h price plans (GA04, GA14 and GA24) into a single zone (i.e. zone will be removed). At

the same time connection type service classes will be introduced allowing the outputs of the COSM to be reflected in prices for these price plans. For the 10-40scm/h and 40-200scm/h price plans zone 1 and zone 2 will be consolidated into a single new zone 1. This will result in the GA13 and GA23 price plans combining and the GA12 and GA22 price plans combining.

Table 19 - Comparison of price structures proposed for 1 October 2009 and 1 October 2010

1 October 2009

Load Group	Description	Fixed	Variable
GA0R	Residential	0.24	0.0256
GA01	≤10 scm/h	0.29	0.0263
GA22	>10 and ≤40 scm/h, Zone 2	0.89	0.0118
GA12	>10 and ≤40 scm/h, Zone 1	1.04	0.0132
GA02	>10 and ≤40 scm/h, Zone 0	1.12	0.0228
GA23	>40 and ≤200 scm/h, Zone 2	2.96	0.0099
GA13	>40 and ≤200 scm/h, Zone 1	3.77	0.0113
GA03	>40 and ≤200 scm/h, Zone 0	4.89	0.0129
GA24	>200 scm/h, Zone 2	8.88	0.0079
GA14	>200 scm/h, Zone 1	11.30	0.0094
GA04	>200 scm/h, Zone 0	14.79	0.0108

1 October 2010

Load Group	Description	Fixed	Variable
GA0R	Residential	0.24	0.0273
GA01	≤10 scm/h	0.32	0.0256
GA12	>10 and ≤40 scm/h, Zone 1	0.98	0.0130
GA02	>10 and ≤40 scm/h, Zone 0	1.14	0.0204
GA13	>40 and ≤200 scm/h, Zone 1	3.26	0.0109
GA03	>40 and ≤200 scm/h, Zone 0	4.24	0.0125
GAS4	>200 scm/h, Secondary	9.68	0.0086
GAT4	>200 scm/h, Tertiary	9.77	0.0087

2010 to 2011 proposed structural changes

In 2011 zones for the 40-200scm/h price plans (GA03 and GA13) will be consolidated into a single zone (i.e. zone will be removed). At the same time connection type will be introduced to extend the ability to reflect the outputs of the COSM into prices. Prices in each zone for the 10-40scm/h price plans will continue to be transitioned towards a single price structure.

Table 20 - Comparison of price structures proposed for 1 October 2010 and 1 October 2011

1 October 2010

Load Group	Description	Fixed	Variable
GA0R	Residential	0.24	0.0273
GA01	≤10 scm/h	0.32	0.0256
GA12	>10 and ≤40 scm/h, Zone 1	0.98	0.0130
GA02	>10 and ≤40 scm/h, Zone 0	1.14	0.0204
GA13	>40 and ≤200 scm/h, Zone 1	3.26	0.0109
GA03	>40 and ≤200 scm/h, Zone 0	4.24	0.0125
GAS4	>200 scm/h, Secondary	9.68	0.0086
GAT4	>200 scm/h, Tertiary	9.77	0.0087

1 October 2011

Load Group	Description	Fixed	Variable
GA0R	Residential	0.24	0.0284
GA01	≤10 scm/h	0.35	0.0231
GA12	>10 and ≤40 scm/h, Zone 1	1.08	0.0143
GA02	>10 and ≤40 scm/h, Zone 0	1.16	0.0180
GAS3	>40 and ≤200 scm/h, Secondary	3.55	0.0119
GAS4	>200 scm/h, Secondary	10.21	0.0091
GAT3	>40 and ≤200 scm/h, Tertiary	3.59	0.0120
GAT4	>200 scm/h, Tertiary	10.75	0.0096

2011 to 2012 proposed structural changes:

In 2012 zones for the 10-40scm/h price plans (GA02 and GA12) will be consolidated into a single zone (i.e. zone will be removed). Connection types will be introduced for the 10-40scm/h price plan and will be in place for all price plans greater than 10scm/h. Vector does not intend on introducing connection type service classes for price plans less than 10scm/h as most of these customers are not of sufficient size to justify the cost of connecting to A or B asset types or are not located in an area near A or B asset types.

Table 21 - Comparison of price structures proposed for 1 October 2011 and 1 October 2012

1 October 2011

Load Group	Description	Fixed	Variable
GA0R	Residential	0.24	0.0284
GA01	≤10 scm/h	0.35	0.0231
GA12	>10 and ≤40 scm/h, Zone 1	1.08	0.0143
GA02	>10 and ≤40 scm/h, Zone 0	1.16	0.0180
GAS3	>40 and ≤200 scm/h, Secondary	3.55	0.0119
GAS4	>200 scm/h, Secondary	10.21	0.0091
GAT3	>40 and ≤200 scm/h, Tertiary	3.59	0.0120
GAT4	>200 scm/h, Tertiary	10.75	0.0096

1 October 2012

Load Group	Description	Fixed	Variable
GA0R	Residential	0.24	0.0280
GA01	≤10 scm/h	0.39	0.0221
GAS2	>10 and ≤40 scm/h, Secondary	1.18	0.0156
GAS3	>40 and ≤200 scm/h, Secondary	3.75	0.0125
GAS4	>200 scm/h, Secondary	11.24	0.0101
GAT2	>10 and ≤40 scm/h, Tertiary	1.19	0.0157
GAT3	>40 and ≤200 scm/h, Tertiary	3.95	0.0132
GAT4	>200 scm/h, Tertiary	11.83	0.0106

As part of the price rationalisation process and the phased introduction of connection-type, Vector will transition customer revenues towards the outcomes of the COSM.

Price movements in each year are determined by the weighted average price cap, which includes CPI adjustments and changes in pass through costs. The overall magnitude of these inputs will determine the extent that Vector is able to rationalise prices to achieve the structural changes outlined above.

At this point in time, Vector's best estimate of the prices that will apply under a completed restructure/rebalance is set out above. Our current expectation is that as long as economic conditions remain weak, we expect that the transition from current prices to those in Table 21 will be a maximum increase of 10% per annum. However, this constraint will be reviewed in future pricing periods as the economic landscape evolves and the ability for Vector to meet the overall price rebalancing by the end of the Control Period is known with greater certainty.

Vector's strategy is to rebalance prices over the Control Period based on the cost allocation model using forecast input information from the Commission's building blocks model used for the Authorisation. At this early stage of the restructure and rebalancing process Vector does not envisage further rebalances based on the COSM at the end of the Control Period. External constraints such as customer responses to price changes, CPI, and pass through costs changes will influence Vector's ability to achieve the rebalance forecasts.

Vector will update its COSM at the end of the Control Period. This will determine what (if any) rebalances are required in future regulatory periods.

4.3. Periodic review

The reality of network service provision is that the costs of providing services and customer usage patterns generally move slowly over time. Given the relatively complex transition structure that Vector has developed to mitigate rate shock issues, Vector does not have any fixed plan to review the underlying service classifications, cost data, cost allocations, and other elements that have

contributed to these pricing decisions within the Control Period. On a year-by-year basis it is difficult to determine whether changes in costs or customer demands are simply statistical variations, or permanent effects. Unless there is a dramatic change in costs or customer behaviour, Vector does not expect to revisit the pricing methodology decisions until the next reset.

However, Vector will be monitoring customer reaction to the proposed price changes. We will be obtaining feedback on the changes through the consultation process with retailers, following the Commission's approval of the pricing methodology. As far as permitted by the Authorisation, Vector will incorporate that feedback in future pricing methodology decisions.

4.4. Expected pricing developments in Control Period

Vector does not expect that there will be further developments in pricing during the Control Period beyond those expressed in this report.

4.5. Excluded services

Section 6.3 of the Authorisation defines the following services as excluded services:

- Disconnection Services;
- Reconnection Services;
- Decommissioning Services;
- Gas connection services – for connecting new customers; and
- Non-standard distribution services that Vector commenced supplying after 30 September 2007 and that satisfy conditions specified in clause 6.3.3 of the Authorisation that the customer is supplied under a non-standard *contract* and the customer is a new non-standard (i.e. not the renewal of an existing customers contract)

Vector has provided below, a summary of our standard definitions for these excluded services (as used in normal network operations) and an indication of what 2009 prices will be for each service, where applicable. These proposed prices are subject to change at any time. Due to the variation in the non-standard services Vector provides, we have prepared a more general discussion of the eligibility criteria and pricing methodology for new non-standard customers rather than presenting a list of every service specification and price. Finally we detail Vector's medium-term pricing strategy for pricing these excluded services.

4.5.1. Disconnection services

There are three types of disconnection services that Vector offers:

- Temporary Disconnection
- Transitional Disconnection
- Permanent Disconnection

Each is defined in turn below. Vector offers all disconnections services free of charge. This is primarily for gas safety reasons in that Vector would prefer to offer these services for free to ensure that gas safety is maintained on our distribution network.

Temporary Disconnection

Defined as the interruption of the gas supply, generally for a short duration, for:

- Non-payment of account, or other commercial reason;
- Equipment replacement or maintenance; and/or
- Maintenance is being carried out on the distribution network by Vector or its service providers.

The service and GMS are classified as active throughout the period of the temporary disconnection:

- The service valve is turned off;
- The service valve is locked in the closed position by applying Vector's and the Retailer's tags;
- The retailer may, at its discretion, decide to disconnect the service valve from the GMS and cap the service valve;

The customer's retailer manages this process.

Indication of 2009 pricing: no charge by Vector for the temporary disconnection.

Transitional Disconnection

Defined as the interruption of the gas supply, generally for an unknown duration, which may be short or long term:

- At the customer's or property owner's request for significant installation or property modifications and alterations;
- At the customer's or property owner's request for minor relocations within property boundaries;
- At the customer's or property owner's request, where the property owner does not require the gas measurement system and/or service riser removed from the site;

- When a property has become vacant;
- Where there are concerns about the safety of the gas installation.

A transitional disconnect isolates a customer's installation from the gas service and is classified as inactive throughout the period of the transitional disconnection:

- The service valve is turned off;
- The service valve is disconnected and capped off from the GMS;
- The service valve is locked in the closed position;
- The service pipe may be disconnected at a safe location whilst completing renovation work within the property boundaries;
- The GMS owner may decide to remove the GMS, particularly if the disconnection is for a long period;

In these situations the gas supply may be required again. The energy retailer manages this process. Under normal circumstances, Vector must receive 3 business days written notice of the transitional disconnection.

Proposed 2009/10 pricing: no charge by Vector for the transitional disconnection.

Permanent Disconnection

The isolation of the gas supply:

- At the property owner's request, where the property owner requires removal of the GMS and service riser from the site;
- At the discretion of the asset owner.

In these situations the gas measurement system will be removed and the service decommissioned:

- Decommissioned definition – the state of a service when it has been made redundant, disconnected from all sources of gas supply and purged clear of flammable gas. The equipment is not suitable for further use without special provisions, such as retesting, being carried out prior to re-commissioning. If the service is to be re-commissioned a new ICP must be created.
- When Vector has decommissioned the service, the last retailer will be notified;

If a gas supply is subsequently required again it will be treated as a new connection application.

The party that receives the request for a permanent disconnection is to advise all other affected parties without delay

Proposed 2009/10 pricing: no charge by Vector for the permanent disconnection.

4.5.2. Reconnection services

This service is defined as the reconnection of a temporary or transitional disconnection, as described above. The retailer offers this service to customers and Vector's contractors undertake the work on behalf of retailers but independent of Vector. That is, Vector's contractors charge the retailer directly. Vector does not offer or price this service and no revenues related to this service are recovered by Vector in any way either directly or through alternative means through our agreement with the contractor.

4.5.3. Decommission services

This is the same service as a Permanent Disconnection as described above.

4.5.4. Gas Connection services

Defined as the provision of a new gas service to a premise where no gas has previously been supplied. These costs are billed directly to the customer or developer.

Vector's standard and non standard criteria apply. Standard criteria only apply to Residential customers that meet the conditions set out below. Non-standard criteria apply to Residential customers that do not meet standard criteria. All Commercial and Non-standard customers are considered non-standard on the Auckland network:

- standard criteria at time of publication-
  - Property is directly fronted by a gas main.
  - Property is fronted by a standard road (refer www.wises.co.nz; white road type only)
  - Service pipe is laid in soft soil conditions
  - The property is not deemed, by Vector, to be in a "rock area" being an area where adverse ground conditions create additional costs;
  - New build connections have an open trench provided
  - An existing property's service pipe length, including the riser, is no more than 20 metre's from the property's gas main fronted boundary to the installed meter position
  - The gas meter is placed on the gas main fronted property boundary

- Standard connection charges at time of publication –
  - The existing property service pipe length within the Customer's boundaries exceeds 20 metres – $30 + GST per additional metre
  - The gas main is located under/within a standard road crossing or located on the opposite side of the road (www.wises.co.nz; white road) - $299 + GST
  - New build property has no open trench provided - $30 + GST per metre (no free metres)
- Non Standard criteria at time of publication -
  - Rock areas where no trench is provided
  - The property has adverse ground conditions or is in a known "rock" area
  - The property is situated on or adjoining a motorway, state highway, urban route or main road (refer www.wises.co.nz; all road types highlighted red, orange and yellow);
  - Access from the road to the property is deemed difficult by Vector, for example, due to retaining walls, trees and steep banks;
  - The gas main in the street is not directly outside the property (requiring a mains extension by Vector)
- Non Standard Connection Charges -
  - All non standard connection charges are Price on Application

4.5.5. New non-standard distribution services

Non standard pricing refers to agreements that Vector has covering particular customers where the pricing structures and charges are different to those published under the standard price book.

Criteria

Vector uses non-standard pricing criteria to perform an initial test of customer suitability for non-standard pricing. Given the unique circumstances of each customer these criteria act as a guideline only and Vector may choose to offer non-standard arrangements in circumstances outside of those listed.

Vector's general criteria are:

- The Annual Quantity (AQ) is greater than 20 TJ per annum (5.6GWh). In general non-standard prices would not be offered below this AQ unless there are exceptional circumstances;

- The AQ is in the range 10 to 20 TJ (2.8 to 5.6GWh) and the connection is within 2 km of a gas transmission delivery point or a competing gas distribution network;
- Inter-fuel substitution is practicable or likely; or
- The customer's consumption profile is unusual.

Pricing approach

The fundamental principle applying to every customer is that pricing needs to recover sufficient revenue to offset incremental costs incurred connecting the customer to the network. This includes direct connection costs and also any upstream augmentations that are required as a result of the additional load on the network.

Flexibility with respect to non-standard customers comes when deriving their allocation of sunk costs associated with the shared network. Standard charges (following a transition to the COSM) have been developed using general allocations of the shared costs so that each customer receives the average amount for their connection-type and customer-type. For non-standard customers a bespoke assessment can be carried out to see what (if any) flexibility may be available with respect to the allocation of these sunk costs, which in turn will result in non-standard pricing.

Non standard pricing is essentially a discount to the standard prices[24]. The level of discount is driven by the customer's alternative supply options (including, where relevant, bypass options). As gas is a discretionary fuel, some customers can point to more cost effective alternatives to achieve the heat outcome that they are after. Where this is the case, Vector has to determine at what discount to standard prices (if any) it is prepared to go to secure the load and the economies of scale to all customers that stem from this load. In effect, Vector is pricing between the incremental cost and uneconomic bypass price.

In addition to revenue, Vector looks at a number of other factors when making this assessment. What these factors are and what weighting is applied to them will be influenced by the circumstances of each individual customer and the commercial considerations at the time.

Historical pricing of existing non-standards:

Non-standard customers connected prior to 30 September 2007 are part of the Controlled Services and are included in the calculation of Vector's annual notational revenue. Pricing decisions relating to many of these non-standard contracts were made for a variety of historical commercial reasons. Often these

[24] Noting that in cases where the customer seeks a customised connection or service level that is greater than that typically provided, more expensive pricing will need to be established to recover those additional costs.

do not align with the current non-standard criteria as detailed above. In addition, given the different ownership and structural designs of the business that have occurred over recent years, information as to the background for the level of discounts provided and the logic that underpinned the commercial realities of the day is unavailable. Accordingly, Vector is constrained in its ability to provide further detail as to how older non-standard prices were set, however, it is clear from Vector's analysis of incremental and standalone costs that these customers' prices fall within the constraints of subsidy-free pricing.

4.5.6. Medium term price strategy for excluded services

Vector's excluded services are largely a product of historical decisions, many still related to decisions made by UnitedNetworks. Vector has recently started a process of revisiting and reviewing these excluded services to align them more closely with Vector's corporate commercial policy and retailer and customer requirements.

Vector has more recently been reviewing our non-standard and new connection services. This review is not fully complete meaning changes to these services and their pricing is likely over the remaining Control Period.

Non-standard agreements

As part of normal business practice Vector will review its non-standard eligibility criteria on an on-going basis. All potential non-standard customers will continue to be assessed on a case-by-case basis.

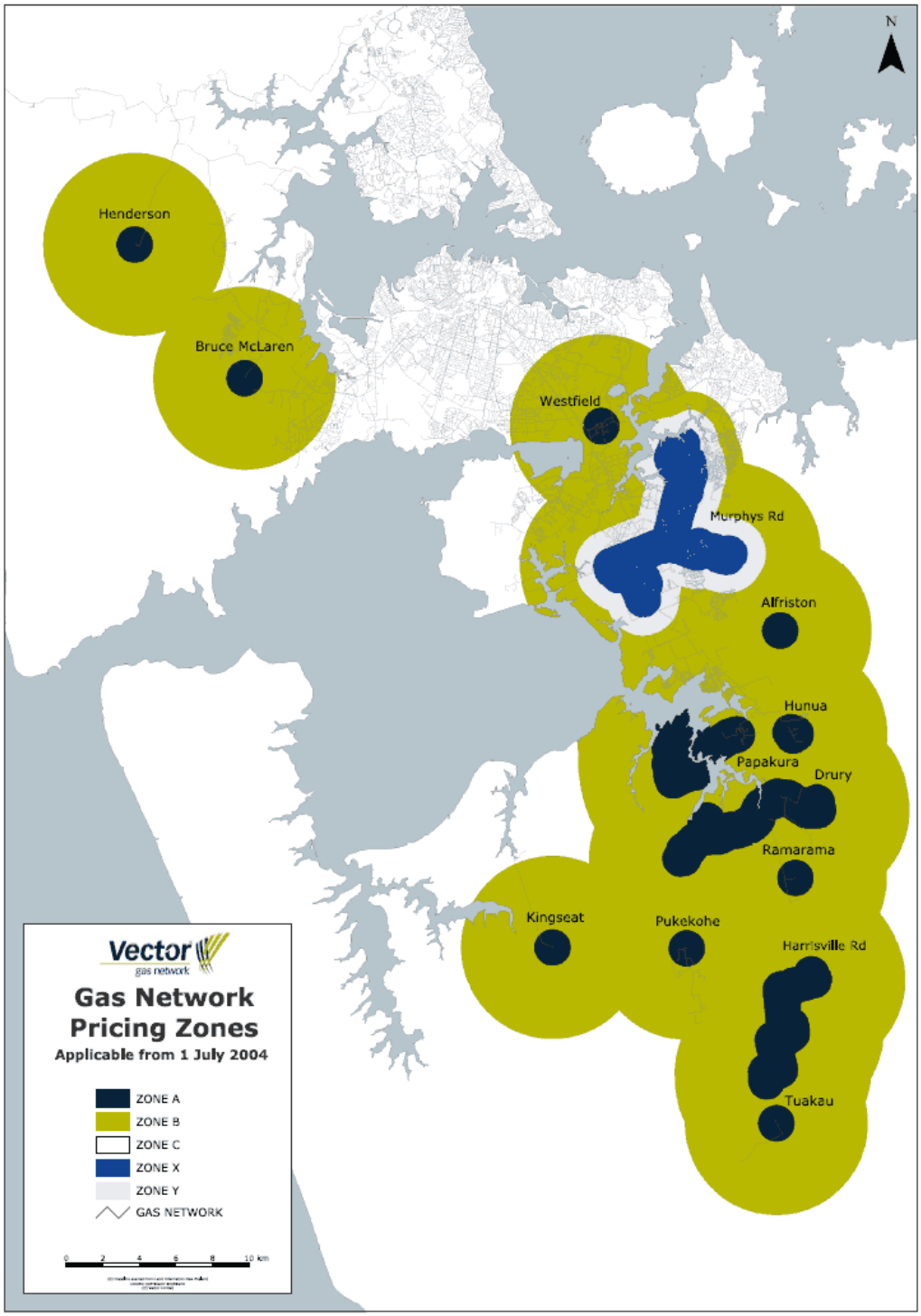
New connections

Residential new connection charges are being revisited to be more cost reflective, especially given rising costs. Residential customers are likely to be charged a per meter rate that depends on whether Vector needs to dig the trench or not, whether the ground is rocky, and the requirement for a road-crossing and related traffic management costs. The details of this pricing have not yet been finalised.

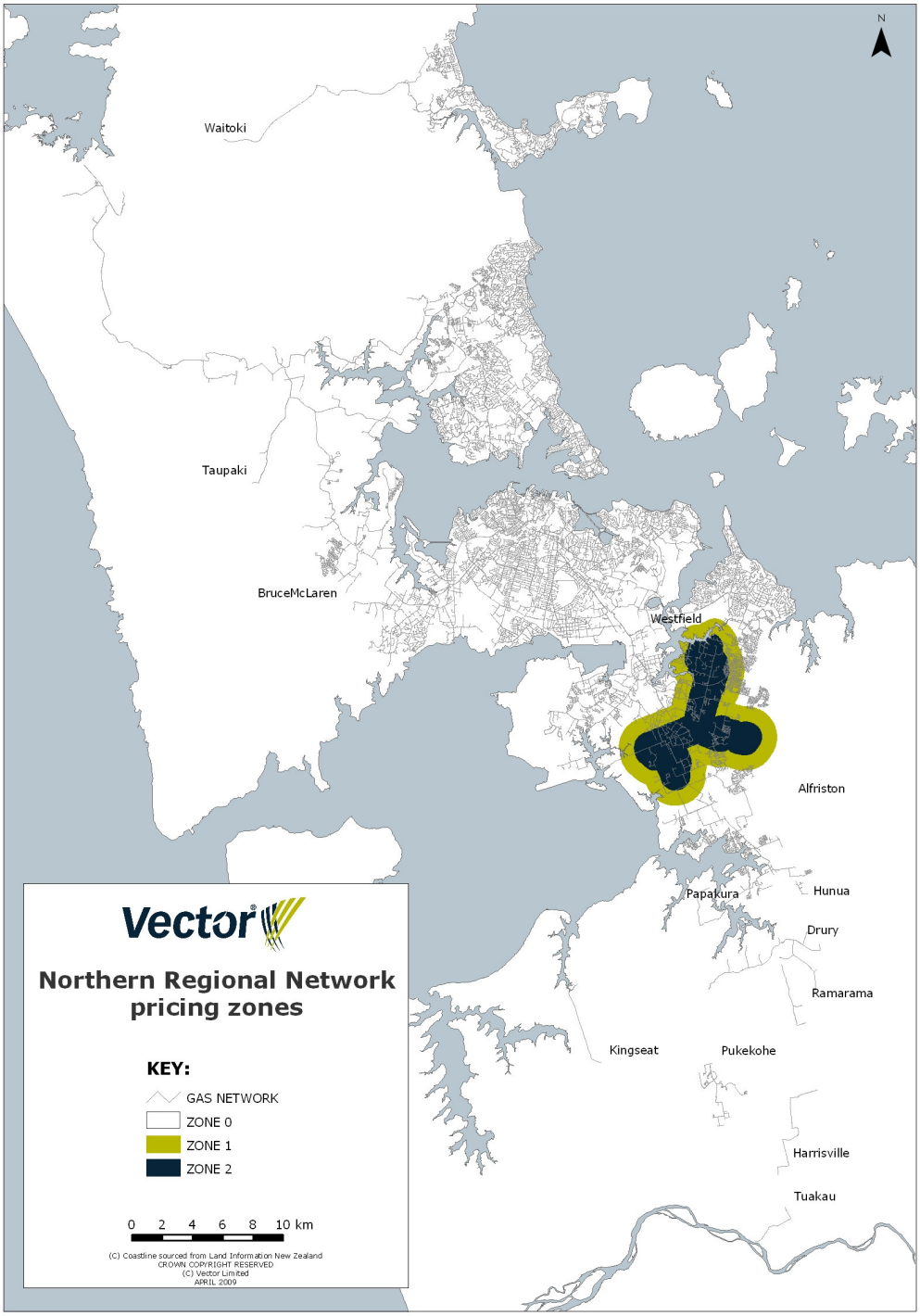
Other excluded services

Vector plans to review the remaining excluded services in the near future (disconnections, reconnections, decommissionings). Vector believes that charges for these remaining services should be broadly cost reflective with some degree of standardisation. Safety issues will also be considered when deciding whether we will directly offer and charge for many of these services.

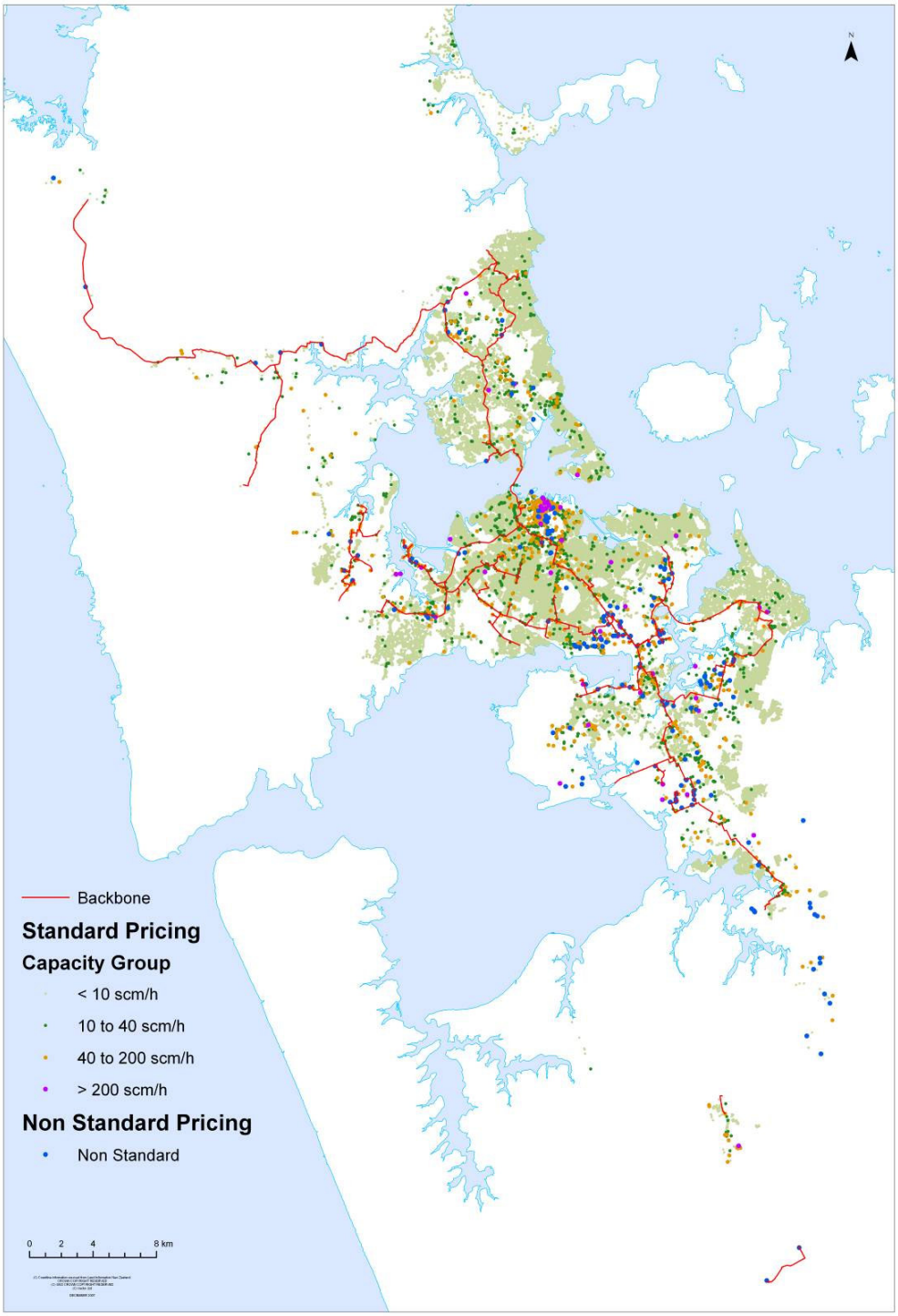
Appendix 1 – Current Auckland Gas Network Pricing Zones (1 January 2009)



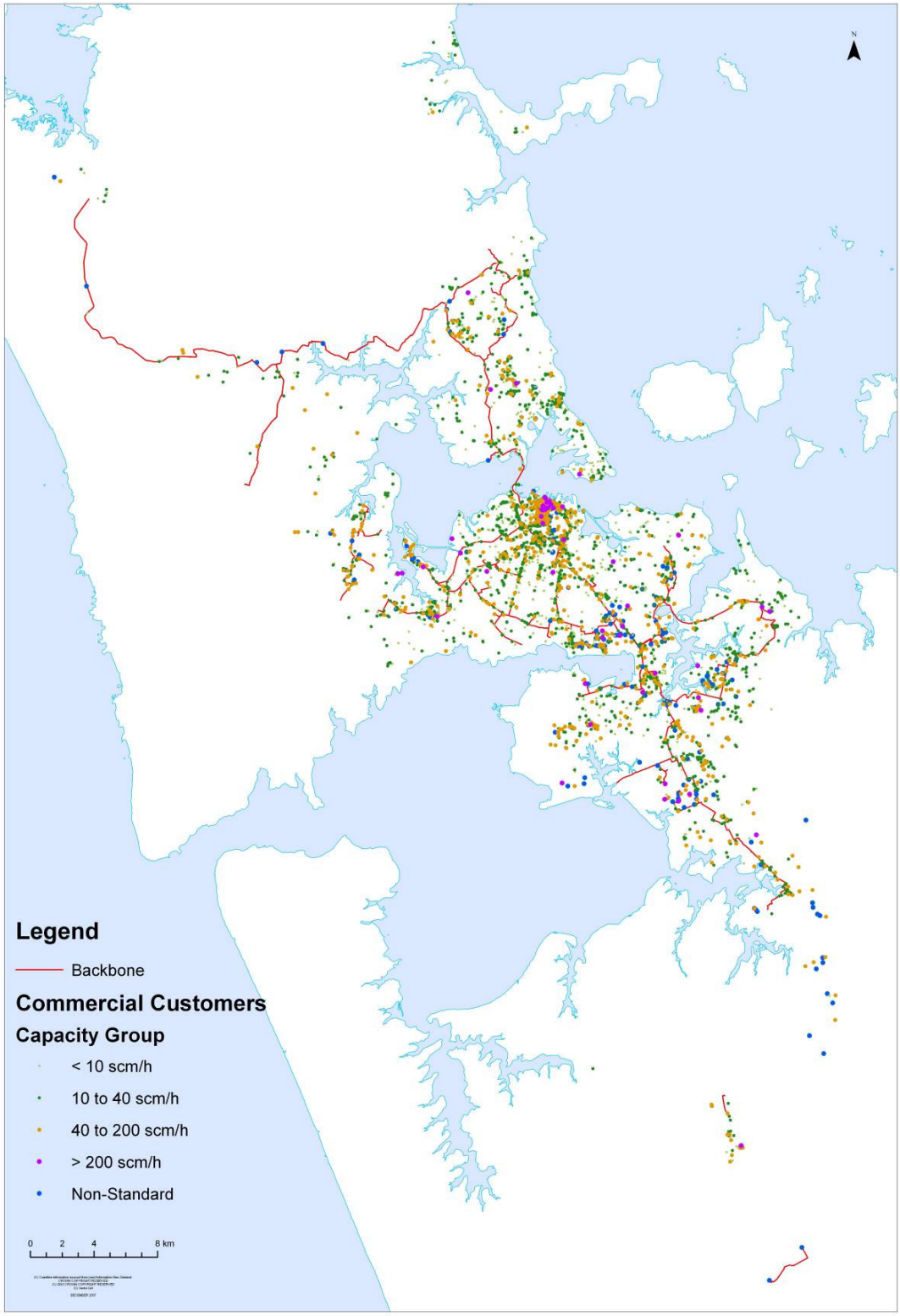
Appendix 2 – Proposed Auckland Gas Network Pricing Zones (1 October 2009)



Appendix 3 – Customer-Types on the Auckland Gas Distribution Network



Appendix 4 – Customer-Types on the Auckland Gas Distribution Network (excluding residential)



Attachment 1 – Directors' Certificate

Attachment 2 – Auditor's Report for Cost of Supply Model