Revenue Forecasting Approach: Cross-submission on Reset of Gas Default Price-quality Path

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1 Introduction and Summary

Vector has asked Castalia to review the submissions made on the draft reset of the default price-quality path (DPP) for gas distribution businesses (GDBs) and gas transmission businesses (GTBs) ("the draft gas reset"). This note provides our view on one recommendation made by Powerco: that the "tight" scenario in the Concept Consulting study should be used to obtain a more reliable forecast of the future revenues that GDBs would earn charging current prices.[1]

Powerco's recommendation would address the concerns raised in our report on the draft gas reset about the Commission's proposal to adopt Concept's "moderate" scenario.[2] We highlighted that the Concept scenarios are fundamentally supply driven, and as such fail to account for factors that weaken the outlook for gas demand over the regulatory period. In particular, we believe that the prospect of relatively low electricity prices over the next five years is likely to drive some fuel switching behaviour.

This note investigates the prospects for gas demand in more detail, using the analysis completed by the Ministry of Economic Development in the 2011 Energy Outlook.[3] The Energy Outlook is a long-term planning document that applies relationships between economic growth and energy demand to project future energy use, and then divides energy use into different fuels depending on market share. While we agree with the Commission that this approach is unlikely to work well for near-term forecasting under the DPP, the forecasts in Energy Outlook do account for:

- **The impact that economic growth will have on demand.** Energy Outlook concludes that if annual economic growth is 1 percentage point lower than forecast, then forecast gas demand will fall by 5 percent over the next 15 years. This downside risk is asymmetric: higher than expected economic growth will not materially increase gas demand.

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[1] Concept Consulting, "Gas Supply and Demand Scenarios 2012 – 2027, December 2012, available online at http://gasindustry.co.nz/sites/default/files/consultations/254/gas_supply_and_demand_study_v2.pdf

[2] Castalia, Review of the Draft Decision on the Revised Initial Default Price-quality Paths for Gas Pipeline Services, available online at http://www.comcom.govt.nz/assets/Gas/Gas-Default-Price-Quality-Path/Initial-DPP-for-GPB/Submissions/Vector-Submission-on-Revised-Draft-Decision-on-Gas-Initial-DPP-Appendix-2-Castalia-Report-7-December-2012.pdf

[3] Ministry of Economic Development, New Zealand's Energy Outlook 2011, available online at http://www.med.govt.nz/sectors-industries/energy/pdf-docs-library/energy-data-and-modelling/modelling/energy-outlook/Energy%20Outlook%202011.pdf

- **The relative price of different energy sources.** Energy Outlook calculates the impact that changes in the relative prices of electricity and gas have on demand for each energy source. This confirms that switching opportunities do exist, and helps to better understand the scope for these opportunities.

Although no demand (or revenue) forecast will be perfect, we continue to see good reasons for the Commission to develop its own forecast of gas demand drawing on Concept's analysis. If the Commission is committed to only adopting a single scenario, then we agree with Powerco that the "tight" scenario appears to be the most appropriate scenario to use for resetting the gas DPP.

2 The Purpose of Revenue Forecasting

Forecasting the revenues that would be earned by GDBs at current prices over the regulatory period is a difficult task, and is subject to considerable uncertainty. Experience over the past 15 years has shown that energy markets in New Zealand can change quickly, creating the prospect for very different financial outcomes than expected within a regulatory period.

In the face of this uncertainty, the Commission needs to focus on the purpose of revenue forecasting under the DPP. The objective is to set a price-quality path that provides suppliers with incentives to improve efficiency, while avoiding punishing suppliers for risks that they cannot manage. Demand risk is partially within the control of gas distributors—how prices are structured is clearly one tool that suppliers have to manage demand. However, the risk of demand forecasting errors cannot be managed by suppliers. As a result, under a weighted average price cap approach the risk of demand forecasting errors is borne by suppliers without any improvements in efficiency.

Suppliers have reacted strongly to this risk in response to the draft gas reset. Powerco considers that "the draft Concept study does not adequately consider the growth in the residential and commercial sectors and has consequently produced results that are inconsistent with both the historical trend and current market conditions". Powerco points to evidence of a loss in gas market share (particularly in space heating) to support its view that the scenario adopted in the draft decision is inappropriate. Vector raises similar concerns at paragraph 19 of its submission.

Relating these concerns back to the purpose of revenue forecasting, suppliers are concerned that the Commission's proposed approach penalises them for market conditions beyond their control, rather than providing incentives to increase the utilisation of their assets.

3 Analysis in Energy Outlook 2011

One of the difficulties facing the Commission in the revised gas DPP reset is the lack of available information. This suggests that it is worth considering all available evidence when drawing conclusions. MED's Energy Outlook 2011 provides another source of information that we believe adds some useful perspectives to forecasting the gas revenues earned by GDBs.

The purpose of the Energy Outlook is to inform long-term energy policy decisions, and accordingly the projections in the document are not particularly well-suited to near-term forecasting task facing the Commission. The broad approach in the Energy Outlook is to derive relationships between economic output and total energy use (both are assumed to

grow in line with historical rates), and then to divide energy use into different sources (electricity gas, LPG, liquid fuels).

Economic growth will have an impact on gas demand

The Commission suggests that forecast changes in GDP do not provide a reliable estimate of future gas demand. While we agree with this assessment, economic growth clearly has an impact on gas demand (even if the relationship cannot be reliably modelled). The difficulty in drawing a robust relationship between GDP and gas demand arises because of the other factors that also influence demand for gas. Unlike electricity (which is more closely correlated with GDP), gas is a discretionary fuel source. Total gas demand is also significantly affected by the decisions of a small number of large players.

The analysis in Energy Outlook provides an indication of the likely impacts of economic growth on gas demand. In the *Reference Scenario* in Energy Outlook, GDP forecasts for individual sectors of the economy are used as key inputs for forecasting sub-sector energy demand. These forecasts are sourced from NZIER. The NZIER (and Treasury) forecasts see New Zealand's real GDP increasing by around 50 percent by 2030. These forecasts require annual growth of close to 3 percent for the rest of this decade, trending to around 2 percent per year growth out to 2030.

The impact of different GDP growth rates is tested through sensitivity analysis in Energy Outlook. In the high growth sensitivity case, GDP growth is modelled at 1 percentage point per year above the *Reference Scenario* forecast. In the low-growth sensitivity case, GDP growth is modelled at 1 percentage point per year below the *Reference Scenario* forecast. We note that the actual economic growth rate observed since the forecasts were made has been more consistent with the low growth sensitivity case (remaining below 2 percent).[4] The New Zealand Treasury recently lowered its forecast for economic growth in the coming fiscal year to 2.3 percent.[5]

The expected impact of GDP growth on the direct use of natural gas is shown in Figure 3.1. This illustrates the large scope for worse outcomes for distributors if GDP is less than assumed in the reference scenario—direct demand for gas will be around 5 percent lower from 2015-2030. In contrast, there is little upside if GDP is higher than assumed. In contrast, other energy sources (such as wind and geothermal) face more upside risk than downside risk from any differences between forecast and actual GDP.

[4] http://www.rbnz.govt.nz/keygraphs/Fig2b.html

[5] http://www.treasury.govt.nz/publications/media-speeches/media/18dec12

Figure 3.1: Impact of GDP on Demand Forecasts in Energy Outlook (2015-2030)

Source: MED Energy Outlook 2011 at page 8

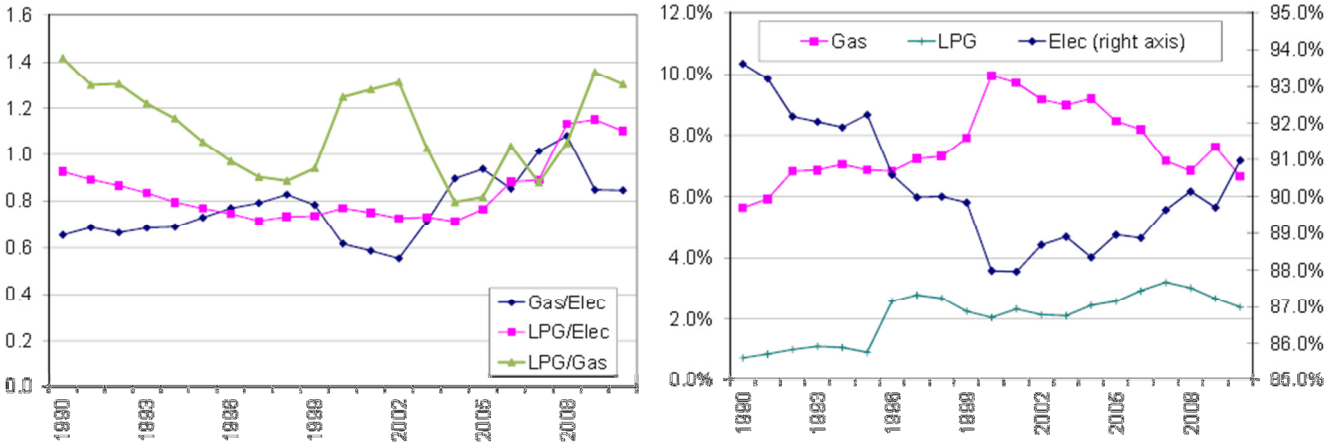
The relative prices of energy also influence demand

The forecasting approach adopted in the Energy Outlook accounts for the impact of relative fuel prices. This supports our view that relative prices are important when forecasting demand for gas in New Zealand because substitutes are readily available, with low switching costs. As noted in our report for Vector on the revised gas DPP reset, the Concept scenarios do not appear to account for the impact of relative prices.

Energy Outlook shows that between 2002 and 2008, the price of gas rose relative to the price of electricity from 0.6 to 0.8 on the fuel price index (shown by the blue line in the left hand graph shown below). This relative increase in gas prices occurred despite significant increases in the price of electricity. The increase in both gas and electricity prices was largely due to the run-down in Maui gas field reserves—electricity generation from gas became more expensive, and reduced supply had an even stronger, direct impact on gas prices.

From 2002 to 2008 the energy market share held by gas fell from 10 percent to just above 6 percent (shown by the pink line in the right hand graph shown below). This decline mirrors the historical trends in residential and commercial gas demand shown in Figure 3 of Powerco's submission.

Figure 3.2: Residential Fuel Price Ratios and Market Shares



Source: MED, Technical Guide: Energy Outlook Modelling, Version 2.0, January 2012

The relationship between relative prices and gas demand clearly only relates to the portion of energy demand that is substitutable—for households that is water heating and space heating, with a potentially greater range of substitution possibilities for commercial users. The Energy Outlook quantifies the impact of these switching possibilities, and estimates that residential electricity demand would rise by 0.01 percent following a 1 percent decrease in the relative price of electricity (compared to gas), and commercial consumption would rise by 0.04 percent following a 1 percent decrease in the relative price of electricity (compared to gas). The Technical Guide to the modelling in Energy Outlook explains that these percentage impacts will be higher for gas because gas demand (PJ) is a much lower proportion of total energy use than electricity.[6]

As discussed in our report for Vector, the electricity market currently faces a number of downward price pressures:

- Significant new geothermal capacity is scheduled for commissioning in 2013
- Several other new generation sites have obtained resource consents, but are not progressing due to a lack of market need
- The schedule for mothballing units at the Huntly power station should contain prices (to levels equal to the costs of keeping the plant operational), and
- Uncertainty remains around the future of the Tiwai Point aluminium smelter, and if the plant closes then New Zealand will have excess electricity supply capacity.

The effect of these factors is directly observed through current trading of electricity futures on the Australian Stock Exchange (ASX). Generators are currently offering to sell electricity out to December 2016 (most of the regulatory period) at prices that are significantly lower than forecast in the Energy Outlook (around $95/MWh).[7]

[6] Ministry of Economic Development, "Technical Guide Energy Outlook Modelling" available online at http://www.med.govt.nz/sectors-industries/energy/pdf-docs-library/energy-data-and-modelling/technical-papers/technical-guide-energy-outlook-modelling-v2-Jan-2012.pdf

[7] See Electricity Authority New Zealand Electricity Hedge Contracts available online at http://www.ea.govt.nz/industry/market/statistics-reports/nz-electricity-hedge-contracts/

4 Conclusion

Forecasting demand for gas in New Zealand is clearly challenging. However, the DPP needs a reliable forecast that is fit for purpose in ensuring that GDBs have incentives to manage demand, but are not penalised for forecasting errors beyond their control. In our view, the revised gas DPP reset does not achieve this objective.

In this note we have reviewed the evidence from Energy Outlook 2011 to work towards a more reliable estimate of gas demand over the regulatory period. This review finds that the risks of differences between forecast and actual economic growth are weighted against GDBs, and supports the prospect of fuel substitution between gas and electricity over the regulatory period.

This leads us to agree with Powerco that of the three scenarios modelled by Concept Consulting, the tight scenario is likely to be the most appropriate. We continue to see the potential for the Commission to use a combination of the tight and moderate scenarios developed by Concept to provide the best forecast of gas demand for resetting prices. While no demand forecast is perfect, this approach would provide greater confidence that the projections reflect the best information available at this time.