

THE PETROCHEMICAL INDUSTRY IN NEW ZEALAND

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Abstract

Methanex has two world-scale state-of-art methanol plants in New Zealand producing 10 per cent of the world's methanol. In the future they may have no feedstock. Long-term viability of these important assets will depend on the discovery of new gas reserves to provide feedstock after current committed supplies. An explorer evaluating New Zealand should take into account utilisation of the economic advantage of sunk cost petrochemical plants, along with the usual factors of prospectivity, regulatory regime etc. This paper discusses the methanol market and Methanex Corporation's role in it, and how a successful gas explorer could benefit from Methanex's petrochemical plants.

Introduction

The petrochemical industry in New Zealand consists of urea, methanol and gasoline. From a gas supply perspective, methanol and gasoline are by far the largest user. Methanex predicts in the longer term methanol will be more profitable than gasoline, hence methanol is the end use market this paper focuses on.

The paper discusses firstly, the industry's role in the New Zealand gas market, and secondly an overview of the Asia-Pacific methanol market. Finally I give some general observations about the future of the industry in New Zealand.

The Petrochemical Industry's Role in the New Zealand Gas Market

In 1995 petrochemicals were by far the largest end user of all gas in New Zealand (Fig. 1). Last year they accounted for 45 per cent of the total gas usage. This has been the situation since the mid eighties when the Motunui plant started up. However many forecasts suggest this role will be taken over by electricity early next decade.

The dominance of petrochemicals in the market is due to the historic size of the Maui Field. In the seventies when

development plans for the field were finalised, New Zealand had a minimal local gas market and infrastructure. Petrochemicals have been used as the buffer between practical field draw-down rates and domestic demand.

In Figure 1, methanol and gasoline are grouped to reflect the integrated nature of their manufacture. Since the completion of its fourth distillation column mid last year (DIV), Methanex has had the flexibility to swing all of its production into gasoline or methanol. Gas usage is not altered by this flexibility. The determinant of gas usage by the plants at Motunui and Waitara is the choice of front end rate.

The following photographs are of the plants in Taranaki. Plate 1 shows the 500 000 MT Waitara Valley methanol plant and 10 km away is the Motunui plant (Plate 2). It consists of two identical methanol plants side by side. Together they constitute the largest methanol production site in the world. The five smaller units are the MTG trains where crude methanol (crude meaning it contains water) can be processed into low benzene gasoline. Over the past few years the two distillation units have been added. They enable Methanex the choice of distilling the crude methanol into chemical grade methanol or running it through the MTG units to make gasoline.

The plants are world-scale. The methanol production capacity of New Zealand represents approximately 10 per cent of total world demand. The site is 80 hectares. The product is piped to the port of Taranaki, 42 km away, from where it is shipped in 30 000 MT vessels to market. Virtually all (98%) of New Zealand's methanol is exported.

If we look at forecasts of New Zealand's impending gas gap, it appears the gas supply may have difficulties meeting demand around the turn of the century (Fig. 2).

The reason for the decrease in gas demand in 1995 is lower demand for electricity generation due to 1995 being a wet year. The forecast shown assumes average demands, ignoring annual variation due to such factors as rainfall. I would like to emphasise that Figure 2 illustrates just one supply/demand scenario from an abundance of forecasts Methanex has seen. Many others have higher demand growth (from the domestic market) and the exploration programme underway may prove significant reserves to fill

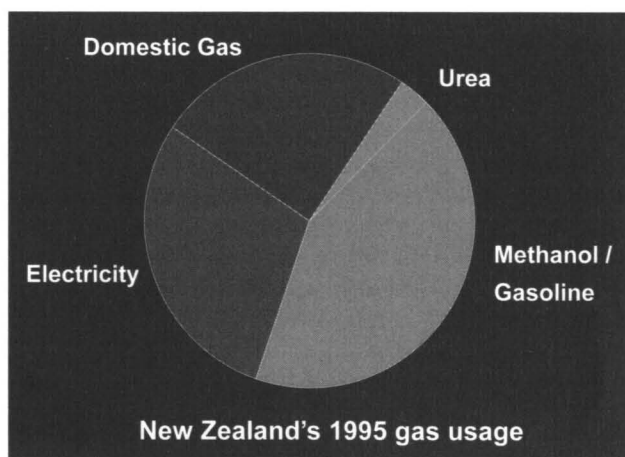


Fig. 1. Petrochemicals are the largest single user of gas in New Zealand.



Plate 1. The 500 000 MT Waitara Valley methanol plant.



Plate 2. Two identical plants exist on the Motunui site.

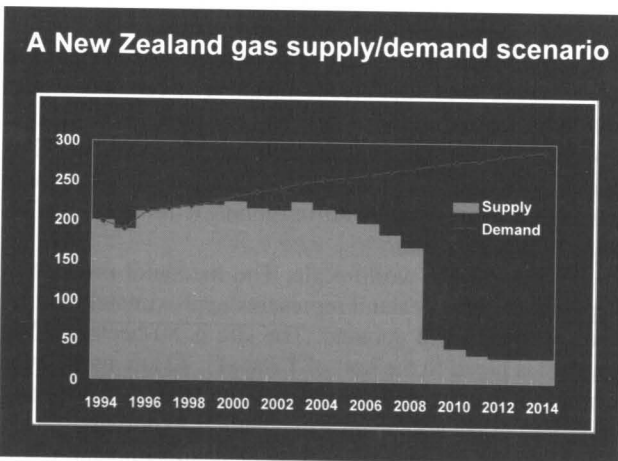


Fig. 2. New Zealand's gas supply may hit limitations around the year 2000.

the gap. Nevertheless the gas supply situation is of grave concern to Methanex and its customers.

If we examine the same supply/demand scenario with one plant closed in the year 2000, we see the limitation is deferred by around 4 years (Fig. 3). One plant at Motunui represents around 5 years growth. The closing of one plant, either over the period of constraint (winter) or permanently, could act as the supply/demand balance. Alternatively if

New Zealand has a much greater gas supply than shown, one methanol plant represents an immediate gas user. Hence the petrochemicals' role in the gas market is one that could significantly alter supply/demand imbalances.

If the petrochemical plants are not able to operate at full capacity, plans need to be made for their future. Methanex is in the middle of a "contingency planning process" at the present time. Our customers are very interested in where their long-term supply is coming from.

In 1995 Methanex confirmed the Motunui plants were relocatable (Plates 3 and 4).

The time has come when we need to investigate whether the environment suits a large petrochemical industry. Hopefully suppliers and users will be frank about their businesses.

To remain in the industry Methanex needs gas, at a competitive price, established in the near term. From Methanex's perspective satisfying its customers and being competitive in the market is critical.

The Asia-Pacific Methanol Market

Due to its close proximity the Asia-Pacific methanol market is the most profitable market for methanol produced in New Zealand. Fortunately over the last few years Methanex has been able to build up an Asia-Pacific customer

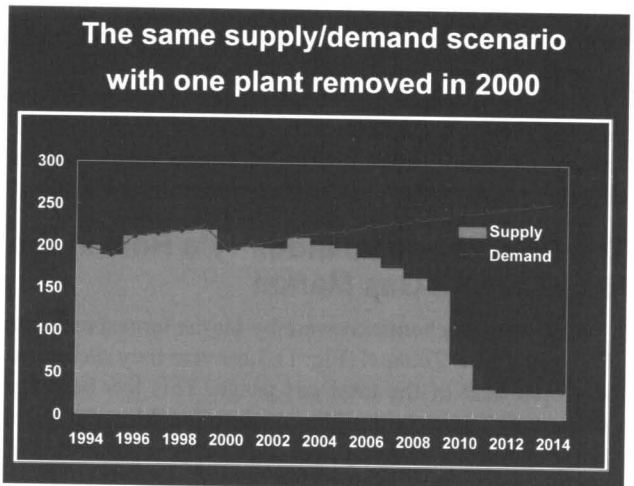


Fig. 3. The closure of the methanol plants could balance supply and demand.



Plate 3. Plant relocated to the Motunui site.

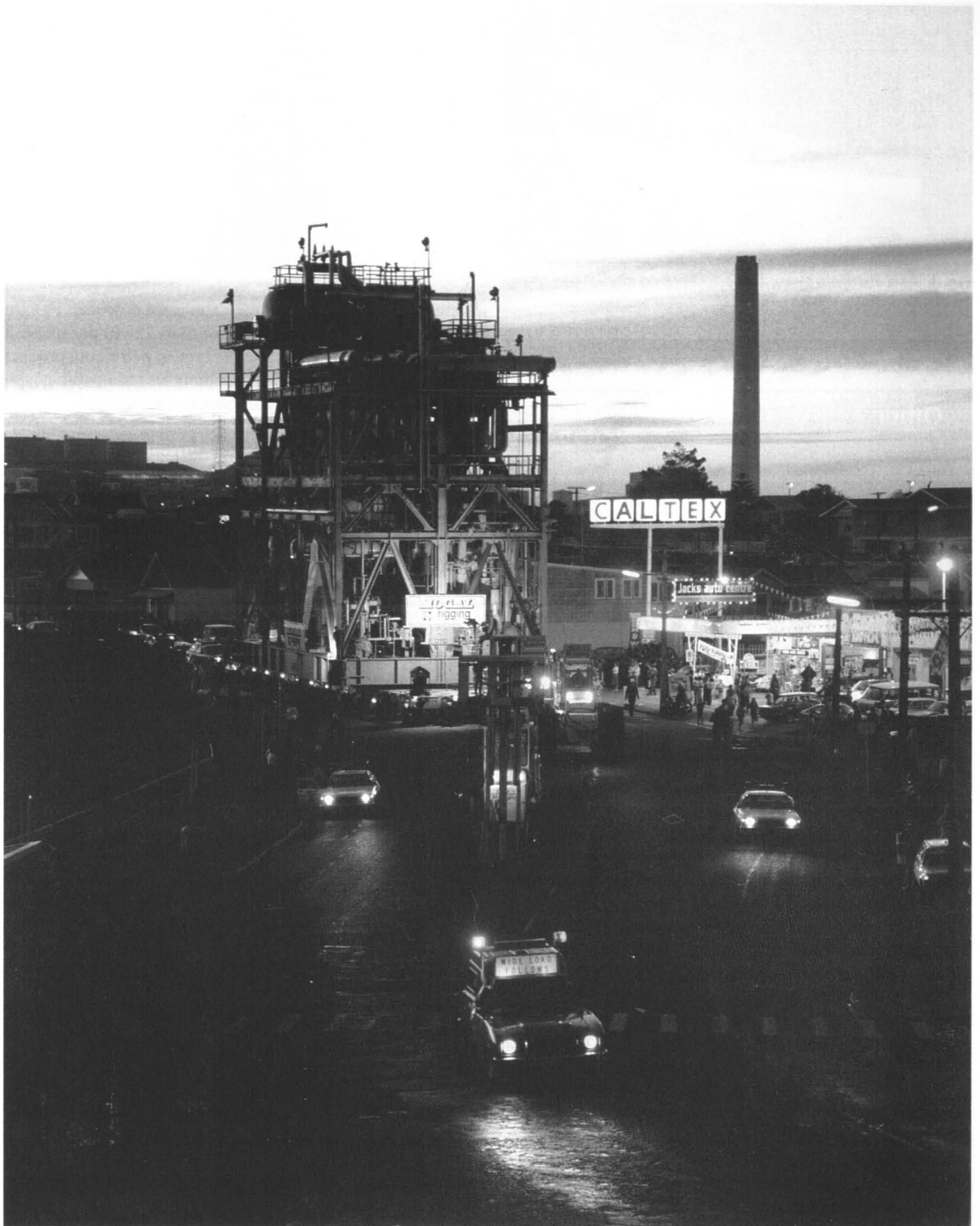


Plate 4. Plant relocated to the Motunui site.

base to the extent that most of New Zealand's methanol is sold in this market.

After a decade of high economic growth in the Asia-Pacific region, growth in consumption of methanol has been impressive. The region's share of the total world market has grown by 10 per cent between the periods 1983 to 1995, to 22 per cent of global demand (Fig. 4). It is forecast to be around 7 million tonnes per annum by 2000,

remembering New Zealand's production capacity is 2.5 million tonnes.

During the past 10 years demand has continued to be dominated by formaldehyde. The major uses of methanol are formaldehyde, acetic acid and MTBE, and these three have shown strong growth.

Japan, Korea Taiwan and China account for 76 per cent of the region's methanol demand (Fig. 5). Similar to gasoline

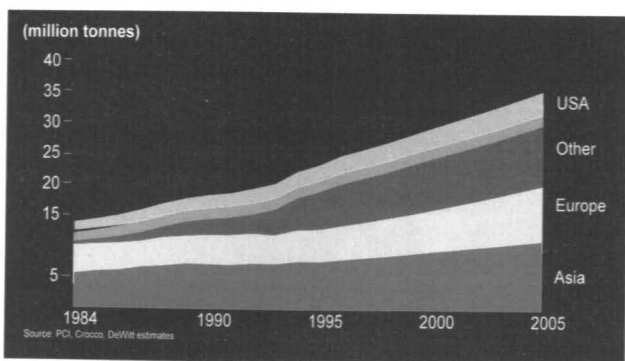


Fig. 4. Asia-Pacific's share of the total world market has grown 10 per cent from 1983 to 1995.

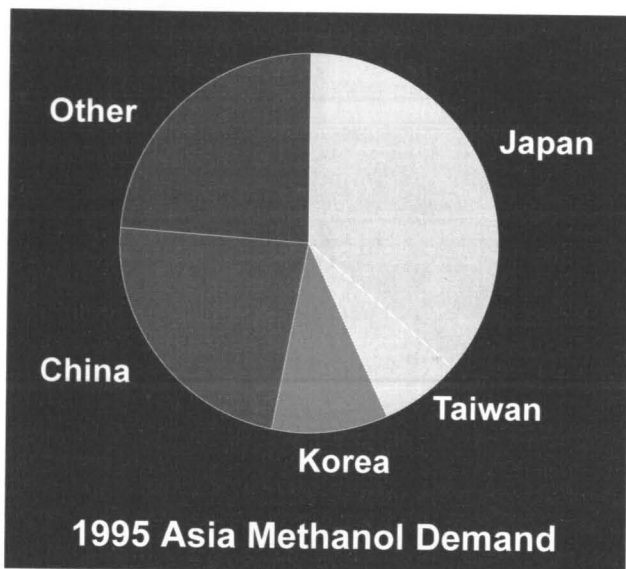


Fig. 5. Japan, Korea, Taiwan and China account for much of the region's demand for methanol.

demand, MTBE growth is difficult to forecast. China's demand for gasoline and octane will have a significant effect on MTBE demand.

Nevertheless formaldehyde is expected to remain the largest use of methanol, and Japan, Korea, Taiwan and China are the main demand locations.

The Asia-Pacific region has many supply alternatives (Fig. 6). These are the export-oriented world-scale methanol plants in natural gas-rich countries like Chile, the Middle East, Trinidad, Venezuela and New Zealand. In the early eighties, these plants forced the shutdown of local methanol producers in Japan, Korea and Taiwan who were using naphtha as feedstock.

Recently significant construction of new capacity has been committed within the region, using gas or in the case of some plants in China, coal (Fig 7).

Within the Asia-Pacific region, supply has very attractive logistics cost. As regards feedstock cost, often LNG has a price-setting influence. Most suppliers within the region have gas feedstock price at around \$US1.25-\$US1.50. However, this is tending to decrease with time rather than increase, as proved reserves in these countries increase and the gas markets and infrastructure become more sophisticated.

New Zealand is within the Asia-Pacific region due to location. However it has similar logistic costs as the Middle East (ie the distance between New Zealand and Japan is the same as the Middle East and Japan)

Generally, whenever methanol prices are either forecast to rise or experience a period of high prices, new methanol projects appear around the globe. There is enough gas waiting for utilisation to meet whatever demand may be projected for methanol. The important thing is to survive the periods of consequential overcapacity, during which the more expensive production cost plants close. For those in the audience familiar with commodities I believe the story may sound all too familiar.

Currently New Zealand compares favourably with other developed countries. For many industries this may be enough; for the methanol industry it isn't because developed countries are often closer to their methanol market and freight is a substantial cost for a methanol producer. Freight costs are typically in the order of \$US 25-40 per tonne. I believe that is at least double the typical petroleum product freight rate. New Zealand is becoming less competitive with many of the new sources of supply (Saudi, Qatar, Chile, Trinidad, Venezuela).

In addition, contrary to the direction of most other developed countries, gas prices in New Zealand appear to be moving upwards.

Apart from freight the major cost component for a methanol producer is gas cost. Figure 8 has some indicative costs for your consideration. Assuming it will not be easy to deliver large amounts of gas at less than a dollar a gigajoule in New Zealand, it appears as though New Zealand is becoming increasingly uncompetitive compared to other "remote" sources of supply. The rise in the exchange rate has had a detrimental effect as regards costs, but this is only one component. It appears that the petroleum explorers among you are getting better at finding and developing gas in remote locations at lower cost. The bad news is that the lower gas prices become in competing locations, the lower the gas price a methanol producer in New Zealand can pay.

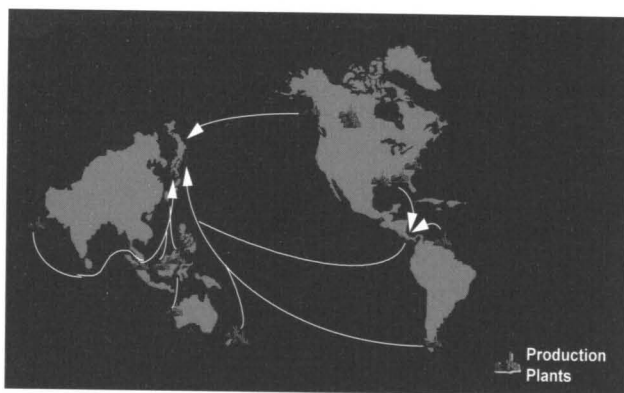


Fig. 6. Multi-supply alternatives.

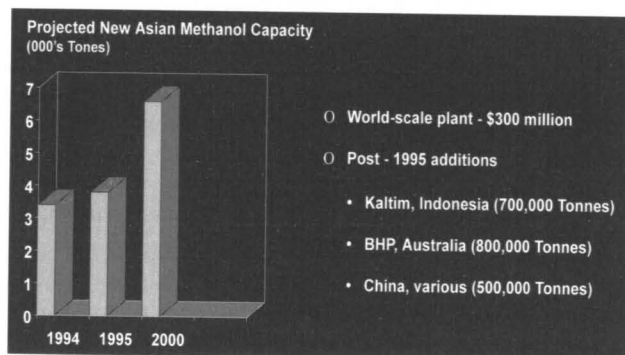


Fig. 7. The regional supply is increasing.

	New Zealand	Australia	Indonesia	Canada	Chile	Qatar
Gas cost (US\$/GJ)	1.30	1.25- 1.45	1.25- 1.50	0.80-2.00	0.75	0.50
Labour (\$US/hr)	31	36-41	12-15	32	15	40
Tax	33%	33%	30%	39%	35% (20-50%)	35%
Other		Accel depn			Accel depn. Credit incentives	10 year tax holidays

Fig. 8. For the petrochemical export market, New Zealand has to be competitive in gas feedstock cost.

Conclusions

We observe the petrochemical industry was developed because a large gas field existed and that unless more large

gas fields are developed some of the industry's capacity may have to be curtailed.

Shutting in capacity is not an easy decision to make. Methanex would certainly prefer to not have to do so. Once the decision is made to shut or relocate some capacity, I very much doubt it will ever be re-established.

In response we have attempted to encourage exploration and secure further long-term low-cost supplies. However we have not been inundated with offers, hence we have examined alternatives, relocation being one.

In New Zealand detailed reserve information is not available in the public arena. Therefore Methanex is relying on direct contact with explorers for information transfer to enable the highest value creative options for the both the petroleum and petrochemical industry to be made. Consequently we want to be open about our business and we welcome communication with any party interested in more details about our business in New Zealand.

Finally, thank you for giving me this opportunity to address you.

Author

SHERRY PEKO is the Energy Supply Manager for Methanex New Zealand Limited, responsible for the gas and electricity supply to the Motunui and Waitara Valley methanol plants in Taranaki. Before joining Fletcher Challenge Methanol (which in 1993 merged with Methanex Corporation), Sherry worked for the Petroleum Corporation of New Zealand, focusing on strategic planning and business development in the energy sector. Sherry has a BSc (Hons) in mathematics from Victoria University in Wellington.