1 December 2023

Attention: Gas Transition Plan Submissions
Energy Resources Markets Branch
Ministry of Business, Innovation and Employment (MBIE)
15 Stout Street
PO Box 1473, Wellington 6140

By e-mail to: gastransition@mbie.govt.nz

Methanex New Zealand Limited (Methanex) – Consultation on Gas Transition Plan Issues Paper

Methanex welcomes the opportunity to respond to the consultation document issued by the Energy Resources Markets Branch of MBIE in August 2023 *"Gas Transition Plan Issues Paper"* (the Consultation Document).

For background on Methanex, our operations and features of our business that are relevant to the gas transition please see Appendix 1.

Decarbonisation not degasification

The aim of a transition for the gas sector is to reduce emissions in a manner that supports the country's path to net zero emissions by 2050. This is an emissions reduction goal, not a goal to phase-out or eliminate gas from the New Zealand energy system and needs to be viewed in a broader context. Too often the Consultation Document uses language and framing that encourages a reduction in gas use as if that were synonymous with reduced emissions[1]. The Consultation Document also has a disproportionate focus on gas use in the electricity sector, which is smaller, in decline and has a higher emissions intensity than the chemicals sector.

In chemical manufacturing the distinction between gas use and emissions is particularly relevant. Most of the gas Methanex purchases does not result in emissions; approximately two thirds of the carbon associated with Methanex's gas use is exported as methanol and does not contribute to New Zealand's emissions. When all three of Methanex's plants are running there is approximately 60 PJ of zero emission gas demand already in New Zealand[2]. To give a sense of scale this would equate to about ~40% of the 2022 gas market of 145 PJ[3].

The goal of reducing the size of the gas market is even more inappropriate when considering the Waitara Valley methanol plant is currently idled due to a lack of gas (which itself constitutes >10% of New Zealand's gas market). Having this plant idled not only impacted New Zealand GDP, balance of payments and employment but according to MBIE's own analysis[4] it will increase global emissions as

[1] The document references the "phase out" of fossil gas, assumes gas demand decline is a good thing for emissions and starts its consultations with a question about how to make the sector smaller.
[2] Total gas demand is 90 PJ per year across Waitara Valley, Motunui 1 and 2.
[3] Figure E.3: Natural gas | Ministry of Business, Innovation & Employment (mbie.govt.nz)
[4] 07_Methanol Applications.pdf (beehive.govt.nz), page 6.

the lost methanol production from New Zealand will be made up with increased coal-based production overseas.[5]

In a domestic context, increased gas availability has well-known but underappreciated benefits[6] in lowering emissions through New Zealand's energy transition by displacing coal-use at Huntly power station (potential to halve emissions in the short term), allowing some companies to focus on higher-emitting coal retirements[7] and allowing important infrastructure to remain while alternative gasses (H2 and biogas) are developed. However, gas also has important longer-term applications:

- Chemical manufacture has few alternatives at the scale required to satisfy the needs of modern society. Directing gas consumption away from applications that burn gas (e.g., electricity generation) to chemical manufacture has the potential to reduce New Zealand emissions from gas by two thirds.
- There is no existing alternative to gas for peaking in power generation. Gas peaking plays an important role in managing intermittent renewable generation, lowering the cost of electricity, and thereby supporting the electrification of the rest of the economy. Judicious use of gas in relatively low-volume, high-impact applications like electricity peaking is likely an appropriate long-term use of New Zealand's carbon budget.

Advancements in carbon neutral pathways, such as CCUS and electrification technology, will enable low emission petrochemical manufacture in future.

Supply Vs Demand-led Transition

In July this year, MBIE published the gas industry's annual reserves update showing a significant decline in both gas reserves and resources. With reserves at historic lows, lower than even after the Maui reserves write-downs in the early 2000s, Methanex sees continuity of gas supply as the key issue for the Gas Transition Plan.

Taranaki is a mature gas province and technical and geological factors will have played a role in the recent trend of declining reserves (since 2021). However, it is also true that reserves classifications (and to a lesser degree resources) require that the social, environmental, economic, political, legal, regulatory, and contractual conditions (known as the "above ground" factors) are in place for the reserves to be produced.[8] It is likely that the deterioration of "above ground" factors over recent years has also played a role in the declining estimates of reserves and resources in the Taranaki basin.

For this reason, it would be a mistake to see the future of gas supply from Taranaki as being driven solely (or perhaps even primarily) by geology. Upstream development is significantly influenced by technology and investment climate, which is in turn influenced by the enabling regulatory regime.

Methanex believes that the New Zealand upstream sector is at a pivotal moment. Getting the "above ground" factors right will enable gas to play the role that is required of it for the decades-long energy transition. Conversely, a failure to adjust current industry settings and trends could see the premature

[5] See Appendix 1 for a discussion on EITE industries and carbon leakage (page 22 and 23).
[6] For example, there have been no Climate Change Commission recommendations to examine the potential to displace coal with gas across the economy.
[7] As an example, Fonterra's preferential decarbonisation of coal sites is referenced here: Gas shortage risks climate goals – Fonterra | Energy News *"If there isn't certainty of gas supply, we may need to start transitioning our 76 gas boilers and air heaters to renewable alternatives sooner than the Commission's pathway of 2037 onwards, which would almost certainly impact the speed at which we transition off coal."*
[8] SPE Petroleum Resource Management System guidelines (version 1.03), page 38

decline of the industry and result in a chaotic, supply-led transition with worse economic and emissions outcomes.

All the analysis of the New Zealand energy system of which Methanex is aware has identified a long-term need for gas beyond its use in the chemical industry and it will be difficult to meet these needs without the scale that the chemical sector provides.

- The NZ Business Energy Council and the Energy, Efficiency and Conservation Authority (EECA), in both their Tui and Kea scenarios indicate that gas will be required out to 2050+.[9]
- Energy Resources Aotearoa has published reports showing the need for continued use of gas in electricity generation (authored by Energy Link) and a long-term role of gas in New Zealand that is consistent with emissions aspirations (authored by Castalia).[10]
- The Climate Change Commission assumed continued long-term gas use and questioned the cost-effectiveness of the 100% renewable electricity target.[11]
- Similarly, the IEA questioned the value of achieving the 100% renewable electricity target[12]
- The New Zealand battery project itself acknowledged the need for additional peaking and while gas peaking isn't specified, it is hard to imagine what other type of peaking could play that role[13]
- The Boston Consulting Group concluded that gas would likely be required for electricity generation out to ~2040. [14]
- Renewable power generators such as Meridian[15] and Mercury[16] have highlighted the need for gas for New Zealand's electricity sector transition.

Given the criticality of gas to the energy transition, it is important that there is robust availability of gas over many years to ensure that the transition can be "demand-led". This means having sufficient gas supply to ensure that there is time for current users of gas to build, develop and implement low carbon solutions that will deliver on the country's emissions goals at a pace that is commensurate with their ability to execute change. A "demand-led" transition can be consistent with New Zealand's net-zero ambitions[17].

In contrast, a "supply-led" transition will see gas availability end prematurely, not allowing current users sufficient time to find alternatives leading to economic dislocations, de-industrialisation and likely worse local and global emissions outcomes.

Methanex sees four actions that need to happen in the short-term to start rebuilding confidence in the upstream gas development industry to ensure continued investment and sufficient gas supplies to enable a "demand-led" transition:

- Be pragmatic in the implementation of the Decommissioning Security requirements under the CMA.

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[9] New Zealand Energy Scenarios TIMES-NZ 2.0 | EECA (go to data explorer and plot by fuel type)
[10] See Energy Link report here: 243 (energyresources.org.nz) and Castalia report here: 237 (energyresources.org.nz)
[11] Ināia tonu nei: a low emissions future for Aotearoa, page 280, paragraphs 44 and 45
[12] https://iea.blob.core.windows.net/assets/124ce0b0-b74e-4156-960b-bba1693ba13f/NewZealand2023.pdf, page 9.
[13] www.mbie.govt.nz/dmsdocument/26297-new-zealand-battery-project-progressing-to-the-next-phase-proactiverelease-pdf, page 8, paragraph 44.
[14] Climate Change In New Zealand | The Future Is Electric | BCG, page 12
[15] Gas, demand response critical to transition – Meridian | Energy News
[16] New gas-fired electricity generation needed now to reduce emissions | BusinessDesk
[17] See Castalia report commission by ERA here: 237 (energyresources.org.nz)

- Repeal the offshore exploration ban and restore the purpose of the CMA to promote resource development.
- Incentivise the upstream sector (possible new entrants and existing players) to increase gas availability.
- Improve public understanding about the role that gas needs to play in the energy transition. This should be done in a bi-partisan manner to prevent ongoing policy flip-flops.

Paris Agreement

While Methanex recognises that New Zealand's net zero targets and Nationally Determined Contribution (NDC) under the Paris Agreement are ambitious commitments, we believe New Zealand should make an additional commitment to achieve its goals in a way that won't predictably make global emissions worse through carbon leakage[18].

In a world where demand for methanol is increasing[19], New Zealand risks weakening its reputation as an environmental leader if it achieves its targets by undermining its indigenous industry. Domestically, many New Zealanders want to feel proud of achieving net-zero emissions, want to contribute positively to solving a global problem and do not want to export emissions for others to manage.

Hard-to-Abate Industries

Like steel, aluminium, urea and other base industrial products, methanol is a fundamental building block used by all societies, today and in the future, including in New Zealand. Demand for methanol continues to grow as a commodity chemical used in the manufacture of essential everyday applications and in low-carbon energy technologies such as solar panels, wind turbines and electric vehicles. Global demand for methanol is also increasing in clean-burning fuel applications.

The chemicals industry, including methanol manufacture, is "hard-to-abate"[20], meaning that the technical and economic challenges associated with decarbonisation are significant and it will take longer than other sectors of the economy to decarbonise (e.g., compared with transport or electricity generation).

Decarbonising methanol production at existing plants is not easy because the technology is locked in at the time of designing the plants, at which stage the most efficient technology is used to maximise the conversion of natural gas (a costly input) to methanol and hence produce the lowest quantity of CO2 emissions. There haven't been major changes in methanol technology and hence any process efficiency improvements are hard won and incremental.

Step-changes in emissions performance at existing plants can only be achieved through using different inputs (electricity, biogas, green and blue hydrogen) or by capturing and sequestering emissions. These technologies have significant cost and scale challenges.

Notwithstanding the challenges outlined above, there are multiple routes to improve and even eliminate emissions from methanol production:

1. Process efficiency improvements
2. Increased electrification of the process (with renewable power)
3. Biogas as a feedstock

[18] See Appendix 1, page 22 and 23 for more information on carbon leakage.
[19] See page 11 to 13: Methanex Investor Presentation
[20] https://www.iea.org/reports/achieving-net-zero-heavy-industry-sectors-in-g7-members/executive-summary (Para. 4)

4. Carbon Capture, Utilisation and Storage[21]
5. Green and blue hydrogen for process heat

The decarbonisation routes outlined above are not mutually exclusive and in some cases are complementary. They also do not have to be implemented all at once; a transition can be phased in line with the capability and resources of the country and aligning with the development of the green methanol market.

The investments required in the above technologies are significant and require confidence that the existing gas-based business is viable through the transition period. If the competitiveness of hard-to-abate industries is threatened in New Zealand (e.g., by lack of gas or ETS costs above international comparators) this can be a significant barrier to pursuing large decarbonisation investments more aggressively.

Emissions Intensive Trade Exposed Sector

Methanex makes methanol from gas, the lowest emission production method currently deployed at scale, globally. The industry's marginal supply source is coal-based methanol production with approximately five times the emissions of gas-based production. If New Zealand's methanol production were to cease, it would create space in the market for, and stimulate increased production from, coal-based supply with the associated increase in global emissions.

Because Methanex competes with global producers with unpriced emissions it is important that NZ ETS costs do not get too far out of line with international comparators. Currently, Methanex's competitiveness with respect to carbon costs is maintained through an industrial allocation regime that means that its New Zealand operations are not exposed to the full NZ ETS cost. But this protection is declining while our main international competitors' emissions remain unpriced. This means there is a limit to the extent that New Zealand ETS costs can incentivise decarbonisation before threatening the competitiveness of domestic industry.

The industrial allocation regime should be adjusted such that the level of protection is correlated with the industry-specific leakage risk.

Green Methanol

The methanol market is seeing strong growth in the marine fuel segment which is becoming an increasingly important market.[22] This growth is driven by the aspiration of shippers to decarbonise their fleets with green methanol (methanol made from biogenic and/or renewable sources). Global shipping makes up about 3% of the world's emissions and the International Maritime Organisation has ambitious plans to decarbonise.[23]

With its highly renewable electricity grid, substantial bioresources and existing methanol manufacturing capability, New Zealand has the potential to contribute to the global green methanol industry. To replace all New Zealand methanol production with green methanol would require very large quantities of electricity and/or biogas (or other biogenic sources of carbon). This represents an enormous development opportunity for the country but will take time and relies on a healthy gas market to enable this transition.

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[21] ERA reports see CCS as making a significant contribution to affordable decarbonisation. Castalia-2035-2050-Vision-for-Gas-Final-Report-31MarchUpdate.pdf (energyresources.org.nz)

[22] See Appendix 4 for additional detail.

[23] See link: IMO's work to cut GHG emissions from ships

Electricity Security of Supply

Methanex supports gas being used to provide peaking services in the electricity generation sector. Our view is based on the various entities and reports that have analysed the New Zealand Electricity system and concluded that gas is the best options to firm up electricity supply from intermittent renewable generation (see page 3 of this letter for references).

However, gas for electricity peaking cannot underpin gas development due to it being highly intermittent in demand and relatively small in scale. Methanex has a role to play in underpinning investment in the upstream gas development with material, long term and relatively low-emission use of gas.[24] This demand supports the development of gas resources, which in turn, results in increased gas availability for peaking and other applications.

Methanex has also played a role in freeing up gas in winter for power generation over the last three years. Industry consultants have even suggested that Methanex's demand response should become a structural feature of the gas-electricity sector.[25]

Concluding Remarks

The New Zealand chemical sector provides an essential global commodity, contributes to global emission mitigation and New Zealand's wealth and wellbeing. There are options for the sector to decarbonise in line with New Zealand's emission reduction goals, but as a large, hard-to-abate sector the transition to net zero will require decades, massive capital and capability investment and confidence in the sector to achieve these decarbonisation goals.

Current gas reserves and resource estimates do not instil confidence that required quantities of gas will be available through the transition. But these estimates evolve over time and are dependent on "above ground factors" as much as on geological factors. If New Zealand gets these settings right, it is likely that the gas required to underpin a "demand-led" transition for New Zealand will be developed.

While decarbonisation is pursued and alternative feedstocks (such as biogas, electricity, and green hydrogen) are developed incrementally over time, Methanex will continue to play a role in supporting investment in gas supply by being the long-term stable demand that developers can rely on. This has benefits to the wider energy system as the gas developed provides energy security and affordability benefits to the rest of the energy sector.

Over time Methanex can play a similar role in supporting the development of electricity, green hydrogen and biogas with long term stable demand as we increasingly pursue a growing market for green methanol.

Thank you for the opportunity to submit and we would welcome the opportunity to discuss any of the matters raised in this letter.

Yours sincerely

[24] See page 4 of OMV's submission on first emissions reduction plan: Response 672424008 to Climate action for Aotearoa - He Pou a Rangi » Climate Change Commission - Citizen Space (climatecommission.govt.nz)
[25] Future is electricity report, page 105: Climate Change In New Zealand | The Future Is Electric | BCG

CONSULTATION SUBMISSION

Consultation Question 1:
How can New Zealand transition to a smaller gas market over time?

Methanex The question is not targeted at the objective of New Zealand's energy transition which is to reduce emissions and not necessarily to reduce the size of the gas market. While there is a correlation between gas use and emissions the two are not the same. A large proportion of gas use in New Zealand does not generate emissions and new technologies will evolve to reduce emissions further. A more sustainable transition that enhances the wealth and welfare of the people while achieving the country's emissions goals is more likely if we focus on the primary problem of emissions.

This is particularly the case for Methanex and the manufacture of methanol. It is not appropriate to support a reduction in the size of the petrochemical portion of the New Zealand gas market as maximising local production also maximises New Zealand's contribution to limiting global methanol industry emissions. For an explanation as to why maximising New Zealand production minimises global emissions, see Appendix 1, sections on: EITE entities, ETS costs and National vs global decarbonisation.

At a minimum, New Zealand should aim to ensure that its gas resources are developed to increase petrochemical production in conjunction with investments in lowering emissions. This will not only result in increased production but support emission reduction by enabling investment in emission reduction developments e.g., electrification, CCUS and green hydrogen.

Gas Market General

The New Zealand gas market, excluding chemical manufacture[26], has decreased in size over the last decade and this trend is expected to continue. The decline has mainly occurred in the power generation sector with new-build renewables displacing gas- and coal-fired power generation from base-load applications. Methanex expects this trend to continue until gas-fired generation's remaining role will be in flexible applications. Namely, it will play a role in providing "dry year cover" and firming up intermittent wind and solar with intra-day generation (see question 7 for how Methanex can play a role supporting gas availability for such services).

To a lesser degree, industrial, commercial, and residential market segments will see gas displaced from low and medium temperature heat applications (e.g., with heat pumps or biomass). De-industrialisation has also contributed to declining demand in this sector (e.g., with the closure of the refinery at Whangarei).

Apart from reductions due to deindustrialisation, the above trends are largely driven by technology and accelerated by New Zealand's carbon pricing regime. In general, these changes have contributed to reduced global emissions, increased domestic resilience and the change has occurred at affordable prices.

Given New Zealand's bi-partisan support for carbon pricing via the ETS, ongoing renewable electricity development and continued technological advancement we expect the above trends in power generation, industrial, commercial, and residential sectors to continue. The single biggest contribution

[26] Methanex considers that Waitara Valley remains part of the gas market as if there were sufficient gas available, we would aim to restart production.

to shrinking the use of gas in these sectors is likely to be plentiful, renewable electricity supply available at affordable prices in the locations where customers need it.

Consultation Question 2 & 3:
What is needed to ensure fossil gas availability over the transition period? What factors do you see driving decisions to invest or wind down fossil gas production?

The most recent MBIE reserves data demonstrates that the outlook for gas production is riskier than it has been for many years. To some extent, this result reflects technical challenges, but it is also likely partially the product of an investment and regulatory climate for gas development in New Zealand that has constrained the industry.

In the absence of exploration over the last half decade, no new entrants into the basin and all the activity being concentrated in a few existing operators, the production outlook for the upstream oil and gas in New Zealand is skewed to the downside. Disappointing appraisal and development results across the industry cannot be balanced by exploration upside outcomes when exploration has all but ceased.

In addition, the regulatory environment may have played a role in recent reserves downgrades as ETS costs, decommissioning security requirements and other policy headwinds mean economic viability tests required to book reserves may not have been met.

In Methanex's view, prompt action is required to restore confidence to the upstream gas sector and ensure gas availability over the transition period. Required actions include the following four items:

1) Ensure draft decommissioning security guidelines are fit-for-purpose application. In addition, a comprehensive review of the legislation should be initiated to ensure that it is consistent with overseas practice and not unnecessarily deterring investment.
2) Restore confidence in the sector by repealing the offshore exploration ban and reinstating the purpose of the Crown Minerals Act to promote the development of the nation's resources. These would meaningfully signal a change of direction, even if the practical outcomes in terms of increased production would take years to manifest.
3) Incentivise the upstream sector (possible new entrants and existing players) on how to increase activity.
4) Build social consensus and bi-partisan support on the need for gas for an extended transition period. This would involve recognition of the need for a demand-led transition, the role of gas in the energy sector, its contribution to the country and its role in mitigating emissions.

In addition, upstream developers need to remain confident that there will be a demand for their gas. If Methanex is operating with at least two plants, it can, to a very large degree, provide the gas offtake certainty required by upstream developers. For Methanex to be confident of continued operation its New Zealand cost base needs to be internationally competitive. This is especially true for ETS costs which most of the global methanol industry do not yet face. While Methanex currently receives an Industrial Allocation of ETS units, the amount is decreasing and is not tied to the emissions leakage risk of our industry. For New Zealand to remain competitive in methanol production ETS costs must remain internationally competitive with relevant jurisdictions.

Consultation Question 4:

Does the Government have a role in enabling continued investment in the gas sector to meet energy security needs? If yes, what do you see this role being?

The government can play a useful role recognising and articulating the need and advantages of a demand-led transition over a supply-led transition and implementing policies that ensure disruptive supply constraints aren't the primary driver of decarbonisation.

A demand-led transition is one where alternatives to gas are developed and implemented by users of gas so that their businesses and lives can continue but in a way that produces fewer emissions. Demand-led transitions allows change at pace dictated by: policy, economics, technical and practical implementation constraints.

In contrast, a supply-led transition is where the pace of transition is governed by the pace of decline in gas supply. Currently we are in a supply-led transition. This is best illustrated by the 20 PJ of Waitara Valley gas demand that was idled, with the loss of 75 well-paid jobs, due to lack of gas supply. In 2018 Methanex asked PWC to estimate the economic contribution to New Zealand and the report suggested there are more than ten times as many indirect jobs supported by our activities than direct employees. Supply-led transitions are more likely to be chaotic and costly as users of gas are cut off prior to having alternatives in place and reductions are less likely to be sustainable (e.g., in the case of Waitara Valley, we assess that the lost production has been replaced globally by higher-emitting coal-based production).

To date, there has been some focus on accelerating the demand side of the transition (e.g., the ETS works primarily on the demand side and initiatives such as GIDI directly incentivise demand reduction), but there is also a need to focus on ensuring sufficient supply.

Supply can be enhanced by implementing policies and messaging that are supportive of gas development, provided its use is in-line with the country's emission reduction goals. The previous section outlined tangible and specific measures the government can take that could be important in building the confidence to invest in the continued supply of gas.

The government also has a role to play to ensure that ETS settings are stable and supportive so that participants can be confident that CO2 supply-demand dynamics are the primary drivers of pricing rather than unpredictable policy interventions.

Methanex is generally supportive of the ETS as the primary tool to drive decarbonisation in New Zealand. Within the overall ETS framework it is important to ensure that hard-to-abate Emissions Intensive Trade Exposed (EITE) entities are not excessively disadvantaged with respect to international comparators. The failure to do so could lead to the unintended deindustrialisation of large parts of the economy.

In practical terms this means EITE companies and industries should only be exposed to ETS costs that reflect the emissions leakage risk for their specific industry. Currently, this is done by an industrial allocation scheme that provides protection for a portion of companies' ETS costs where they face competition from international competitors who do not incur the same carbon costs as domestic producers. However, this scheme does not factor in the specific competitive circumstances of each industry and applies the same amount of protection across different industries based solely on their emissions intensity (it is not based on an industry-specific assessment of the risk of leakage).

In addition to the above, our answers to question 2 and 3 indicate specific actions the government could take to support the continued availability of gas supply.

Consultation Question 5:
Does the Government have a role in supporting vulnerable residential consumers as network fossil gas use declines? If yes, what do you see this role being?

Methanex does not see a specific government intervention required in the residential gas market.

Electricity Generation, Consultation Question 6:
What role do you see for gas in the electricity generation market going forward?

Based on numerous industry reports[27] and industry commentary[28], Methanex supports the recommendation for gas for flexible electricity generation rather than base-load generation. This could both be as a contribution to addressing the "dry year" problem or as a flexible tool to support intermittent solar and wind generation.

Methanex does not see the potential for new base-load gas fired generation and expects existing base-load generation to move to ever-more flexible roles in the electricity market.

With the decline of base-load gas generation, the electricity sector can no longer provide the long-term stable demand required to underpin upstream development. Upstream development is highly capital intensive and requires consistent offtake of the gas once the fields are developed to ensure that a return can be earned on any investment[29]. The petrochemical sector continues to shoulder the responsibility for providing offtake certainty for gas developers to ensure electricity security of supply.

Electricity Generation, Consultation Question 7:
What would need to be in place to allow gas to play this role in the electricity market?

Based on the tightness of the North Island Capacity Margins in recent years, additional flexible generation in the upper North Island will be required to support the electricity system. For this to be built, there would need to be long-term confidence on the part of the investor in the viability and support for flexible gas-based generation.

Any new gas-based peaking generation capacity will likely require flexible gas arrangements to support it. The most obvious solutions for flexible gas supply are for the increased use of gas storage and demand response, which is likely available within the Taranaki region[30]. Such a project would require long-term confidence on the part of the investor, for which a primary consideration will be the long-term availability of affordable gas supply.

[27] See references outlined on page 3.
[28] See references on page 3 to Mercury and Meridian statements.
[29] See page 4 of OMV's submission on first emissions reduction plan: Response 672424008 to Climate action for Aotearoa - He Pou a Rangi » Climate Change Commission - Citizen Space (climatecommission.govt.nz)
[30] https://www.energynews.co.nz/news/natural-gas/136619/nzs-gas-goals-are-within-reach-gic

In recent years, Methanex has provided a demand response solution in winter to free up gas for power generation. Between 2021 and 2023 Methanex made available, on average, approximately 4 PJ per year of winter gas for power generation. Methanex estimates that its demand response in the gas market enabled between 150 and 200 MW of winter electricity generation capacity (depending on where the gas was used and over what time period it was used in winter). When our plants are operating at high capacity utilisation (i.e., high gas availability) it is easier to flex demand and the extent of the possible response greater than if we are operating at reduced rates.

Currently Methanex's demand response tends to occur when circumstances allow or demand it. If a longer-term more structural solution is seen as desirable, then it may be possible to develop commercial terms that allows gas to be offered into the market more predictably, but as yet, the demand for long term arrangements is not apparent.

Electricity Generation, Consultation Question 8:

Do you think gas can play a role in providing security of supply and/or price stability in the electricity market? Why / Why not?

Provided investment confidence can be reinstated into the upstream, it is plausible that the peaking and flexibility arrangements required for gas to play a role in providing security of supply could be arranged. As discussed above, the availability of gas is, to a very large extent, determined by "above ground" factors and if these are appropriate, then gas is likely to be available for as long as it is needed.

However, the challenge to rebuild investor confidence in the New Zealand upstream sector is significant and will require concerted and sustained effort. Please see answers to questions 2 and 3 for what Methanex's views as important priorities for re-building confidence in the upstream.

Electricity Generation, Consultation Question 9:

Do you see alternative technology options offering credible options to replace gas in electricity generation over time? Why / Why not?

As discussed above, wind, solar and geothermal will continue to displace gas generation from base-load generation but intermittent renewable technologies are not currently able to provide the energy security required, which gas provides.

Regarding flexible generation, our understanding is that batteries and demand response are the leading source of new non-gas short term (intra-day and daily) flexibility tools and that these are currently thought to be insufficient (or too expensive) to meet the growing need for flexibility.

Renewable solutions to dry year demand such as the Lake Onslow project have proven to be challenging, expensive and take too long to implement.[31] Over time , a portfolio of options to replace coal at Huntly may emerge as long-term solutions to the dry year problem including some of the options considered as part of the New Zealand Battery project[32] and the project currently considered by Genesis to use black pellets at Huntly.[33]

[31] https://www.energynews.co.nz/news/pumped-hydro/135737/investigation-157b-onslow-scheme-continue

[32] New Zealand Battery Project – progressing to the next phase (mbie.govt.nz), page 15, indicates the portfolio option includes biomass, flexible geothermal and hydrogen production/storage

[33] https://www.energynews.co.nz/news/electricity/143162/genesis-mulls-geothermal-steam-black-pellets

Consultation Question 10:
If you believe additional investment in fossil gas infrastructure is needed, how do you think this should be funded?

As discussed above, there needs to be urgent investment in additional gas supply. This should be provided by private enterprise and enabled by enduring regulatory frameworks with bi-partisan support so that investments are not left stranded and energy security compromised. In addition, mechanisms that provide companies with recourse if the terms of their licence are changed by subsequent governments will likely be required.

There may also be a need for additional peaking and gas flexibility arrangements, and these too should be funded with private investment. To the extent required, these should be enabled with market mechanisms designed to incentivise the required level of supply security and be given confidence that their investments will not be undermined by subsequent governments.

Biogas, Questions 11 and 12:
On a scale of one to five, how important do you think biogas is for reducing emissions from fossil gas? Why did you give it this rating? Do you see biogas being used as a substitute for fossil gas? If so, how?

Methanex sees biogas as playing an important role as a replacement feedstock for methanol manufacture. Green methanol made from biogas is a premium product with remarkable growth potential[34] and both biogas and bio-methane are "drop-in fuels" for green methanol production from existing facilities. For this reason, Methanex would rate biogas as a five in importance.

The biogas manufacturing process creates a mixture of biogenic CO2 with biomethane, both of which are ideal feedstocks for green methanol manufacturing. Biogas produced near our facilities in Taranaki could be transported directly to our plants and does not need to have the biogenic/renewable CO2 removed. This reduces costs and adds value as the carbon in the CO2 is used in the green methanol production.

Biomethane is biogas with the CO2 removed so that it meets existing pipeline specifications. While this is a costly and unnecessary step for methanol manufacture, it is required where the biogas source is distant from the plant and transport via existing pipeline networks is required.

The biogas report published with the Gas Transmission plan indicated a limited quantity of biogas available and possible competing uses for that resource. [35] While this is likely a fair representation of the situation today, and it is unlikely for biogas to ever completely satisfy current demand for gas, the report does not analyse deeply the potential for land-use change and potential technological pathways to increase supply. Similarly, costs are likely to reduce once infrastructure is built and scale is achieved. Denmark is instructive as an example of the scale of biogas production that can be

[34] See Appendix 4.
[35] https://www.mbie.govt.nz/dmsdocument/27267-gas-transition-plan-biogas-research-report-february-2023-pdf

achieved and with investment and different land use approaches. With approximately 40% of the land area of the North Island it has biogas production of ca. 30 PJ and growing.[36]

Methanex recommends that pathways to expand the bio-energy resource base be investigated. For example, through improved aggregation, collection and use of agricultural and horticultural waste. This may generate important co-benefits around water quality and reduced on-farm emissions. Given the complex systems level changes, diverse stakeholders and the long timeframes required to build momentum for change, this could be an area suitable for government leadership.

For many possible biogas applications e.g., residential gas use, low/medium process heat and power generation, there are alternatives to burning gas. In contrast, the manufacture of methanol requires the constituent elements found in biogas (carbon and hydrogen) for which there are few alternatives. Or, put bluntly, burning biogas is a waste of a valuable resource.

Specific biogas challenge

Biogas development and production from landfill is currently not facilitated by the ETS regime. Under current arrangements, if a landfill operator burns landfill gas, their ETS liability is reduced to reflect the lower GHG warming potential of CO2 compared to methane. However, if a landfill operator sells the methane to a third party, they receive no such credit and neither does the third party when they burn the gas.

The failure to recognise the value of converting waste methane to CO2 when it is transferred to a third party artificially increases the cost of waste gas streams. This should be addressed through modification of the regulations.

Hydrogen, Question 13 and 14:

On a scale of one to five, how important do you think hydrogen is for reducing emissions from fossil gas use? Why do you think this? Do you see hydrogen being used as a substitute for fossil gas? If so, how and when?

There is potential for hydrogen to be used for high temperature process heat applications, or a replacement for fossil fuels in electricity generation and as an input to chemical manufacture. Today, Methanex uses surplus hydrogen created during the process of manufacturing methanol to reduce the requirement for gas to create process heat. The challenge with green hydrogen is generally not the ability to use it, but the ability for it to be supplied at a scale that is meaningful and at a cost that is competitive. For this reason, Methanex would rate green hydrogen in New Zealand as a three in importance in the short term but higher in the long term.

Green hydrogen when combined with a suitable CO2 source (ideally biogenic) can be used in the manufacture of green methanol. In fact, methanol production is widely thought to be one of highest priority uses for green hydrogen (see Michael Liebreich's green hydrogen ladder).[37]

The potential to replace gas with hydrogen in methanol manufacture is dependent on large amounts of affordable (i.e., competitive in international terms) renewable electricity being available on site for

[36] Danish biogas production sets new domestic record — EnergyWatch

[37] https://media.licdn.com/dms/image/C4D12AQGZn7uGsIhRwg/article-inline_image-shrink_1500_2232/0/1629024258457?e=1693440000&v=beta&t=bGtcY2ehAmYTn3LYGZWf_-Icl9Q64JuVF_BQ7ekrpk8

large scale electrolysis. This will require a significant build-out of electricity generation and transmission infrastructure and would not likely be possible at scale until well into the future.

Despite the green methanol market opportunity, hydrogen production for methanol manufacture is economically very challenging. However, e-methanol manufacture (see Appendix 1) is a focus area for the company and work is being done to understand the potential for viable transition pathways as technology and cost curves progress. Hydrogen's use in methanol manufacture is more of an economic challenge than a technical one.

When using green hydrogen as a feedstock, most of the existing plant can be retained and it is only the first stage of processing that is replaced. This means that it is possible to convert incrementally to green methanol as the demand for the product evolves.
The existing methanol manufacturing capability and infrastructure, together with its highly renewable electricity grid and substantial bio-resources are a potential comparative advantage for New Zealand in the manufacture of green methanol.

Hydrogen & Biogas, Question 15:
What else can be done to accelerate the replacement of fossil gas with low-emissions alternative gases?

In applications related to power generation, high-temperature process heat as a feedstock for chemical manufacture hydrogen can be readily used. The key to acceleration is to lower costs to the point where it is affordable and to build scale to the point where it can meaningfully substitute for natural gas.

For at least the medium term, hydrogen and biogas are only partial replacement feedstocks because of the scale and cost of production required compared to the current capacity. If incentives are developed and the green methanol market continues to develop in terms of depth and price, Methanex could provide the firm, long-term demand required to stimulate the investment needed for the expansion of the biogas and electricity sectors, playing a role that is analogous to what it already does in stimulating investment in gas production.

The transition to alternative feedstocks does not have to, and most likely cannot, be done as a one-off exercise. Methanex's facilities could transition incrementally over time, leveraging existing assets, using some combination of natural gas, biogas, green hydrogen, and CO2 feedstock. There is an emerging market for green fuels, including green methanol, where customers recognise the premium nature of the product compared to traditional fossil-based fuels. It is important that production of green fuels matches the relevant customer demand and willingness to pay, to avoid economic losses that will undermine lower emission markets' development.

New Zealand appears to have important elements of a competitive advantage in green fuel manufacture: existing manufacturing infrastructure, a highly renewable electricity grid with scope for growth and substantial biomass resources. This supports the prospect of green methanol development, but it remains to be seen whether these elements are sufficient to build a cost-competitive green fuels manufacturing export industry in New Zealand.

Gas Trading, Question 16 and 17:

On a scale of one to five how important is a renewable gas trading to supporting the uptake of renewable gases? Why have you given it this rating? What role do you see for the government in supporting such a scheme?

The ability to certify renewable gases is an important enabler for the development of the industry. Biomethane has the same properties as methane from fossil sources and it is only the certification that differentiates the product. Methanex would rate certification of renewable gases as a five in importance but having a New Zealand-specific standard as a low priority (one).

Methanex can also certify its production facilities and combined with certified biogas make certified green methanol. Methanex's production is mostly exported, and our overseas customers will not be familiar, nor want to become familiar with, New Zealand-specific certification standards. For this reason, Methanex will seek certification against an ISCC standard[38]. In Methanex's operations at Geismar in the USA, certified green methanol can be produced using existing facilities and the product has been used as a net-zero green shipping fuel for a trans-Atlantic voyage.[39]

The government could play an important role in ensuring that New Zealand adopts existing internationally recognised certification rather than reinventing the wheel here. While Methanex may be the first to face the issue of international recognition of certification, it may become an issue for other export-oriented New Zealand businesses seeking to demonstrate their carbon footprint to customers.

CCUS, Questions 18-21:

On a scale of one to five how important do you think CCUS is for reducing emissions from fossil gas use? Why did you give it this rating? What are the most significant barriers to the use of CCUS in New Zealand? Do you see any risks in the use of CCUS? In what ways do you think CCUS can be used to reduce emissions from the use of fossil gas?

Methanex and methanol manufacture can play an important role as a sink for carbon emitted by other industries. CO2 is an input to methanol manufacture where it is incorporated in the product i.e., it is not emitted, but rather exported as methanol. Utilising CO2 in this manner is potentially a higher-value alternative to storing captured CO2 in underground formations.

The main barriers to increased usage of CO2 by Methanex are the costs of capture, the availability of transportation infrastructure to our site and uncertainty of the gas supply outlook.

In relation to carbon storage (rather than utilisation), it is widely understood that CCUS will play a role in decarbonising the world's hard-to-abate industries[40], hence it makes sense to have CCUS as a tool in New Zealand's decarbonisation toolkit. However, due to lack of gas availability we would rate CCUS as a low priority for Methanex (two), though that could change if the long-term gas outlook improved substantially or the Government back-stopped investment.

[38] ISCC is International Sustainability & Carbon Certification

[39] Methanex and MOL Complete First-Ever Net-Zero Voyage Fuelled by Bio-Methanol - Methanex | Methanex

[40] Insert IEA reference.

Methanex is investigating CCUS in North America where the opportunity is supported by plentiful gas availability, existing infrastructure (transportation and storage) and government incentives (e.g., Inflation Reduction Act).

Storage, Questions 22 to 24:

What role do you see for gas storage as we transition to a low-emissions economy? On a scale of one to five, how important do you think increasing gas storage capacity is for supporting the transition? Why did you give it this rating? What should the role for government be in the gas storage market?

Gas storage can play an import role in enhancing gas market security of supply by providing flexibility, but it is not a source of energy itself. For storage to be useful, there needs to be plentiful and affordable gas available at least for part of a year and for an investment in a gas storage facility to occur there needs to be a line-of-sight to robust, long term gas supplies.

Methanex sees gas having a critical role in peaking for electricity; gas storage is a key tool to enable the fast intra-day supply required to support peaking for electricity.

Alternatively, New Zealand's indigenous methanol manufacturing capability, existing storage facilities and the ability of many peaking plants to be converted to methanol fuel, there may be value in investigating the use of methanol as a fuel for electricity peaking. This is not a common practice world-wide, but has been done[41], and New Zealand's unique features mean that it may be a viable here.

The key role of government is to ensure the incentives are in place for electricity generators to provide the level of electricity reliability that society demands. It is also important that developers of storage and peaking capacity have confidence that their investments won't be undermined by future policy changes.

LNG, Questions 25-26 LNG:

Our position is that LNG importation is not a viable option for New Zealand. Do you agree or disagree with this position? If so, why? What risks do you anticipate if New Zealand gas markets were tethered to the international price of gas?

New Zealand has gas resources that have been sub-optimally developed in recent years because of a lack of new participants, new acreage and policy headwinds. Priority should be given to discovering and developing New Zealand's natural resources to develop and maintain our industry, facilitate an energy transition, and support affordable and secure energy for the country.

If New Zealand were to resort to LNG importation, that would represent a failure of New Zealand's domestic energy policy. LNG has a higher cost than domestic supply, higher emissions than domestic supply, has long international supply chains, competition for access to product from the world's wealthiest consumers (Europe, Japan and Aisa), will not support domestic industry and will not contribute to the economy to the same extent that indigenous supply does in terms of jobs, GDP, balance of payments and tax.

[41] Israel-Methanol-to-Power.pdf

Appendix 1: Background on Methanex NZ

Methanex Corporation is the world's largest producer and supplier of methanol and has significant production capacity in Taranaki, New Zealand. Methanex operates the Motunui site with two methanol production plants and the currently mothballed Waitara Valley site. Methanol produced in New Zealand by New Zealanders, from indigenous feedstock, has been an important part of the country's economy for more than 40 years.

Methanol is a fundamental building block used by all economies, including in New Zealand. Demand for methanol continues to grow as a commodity chemical used in the manufacture of essential everyday applications and in low-carbon energy technologies such as solar panels, wind turbines and electric vehicles.

Global demand for methanol is also increasing in clean-burning fuel applications. Methanol can deliver immediate emissions improvements through its use as a clean-burning fuel for marine applications, biofuel manufacture and fuel blending in vehicles. Blending methanol into petrol also enhances vehicle performance and efficiency and improves air quality.

Methanol in New Zealand is produced from gas, the lowest emission production method currently deployed at scale globally. Methanex is also actively evaluating lower-carbon production opportunities and is committed to becoming more efficient and generating fewer emissions. For example:

- A new position on our global executive leadership team dedicated to Low Carbon Solutions was established this year, demonstrating our commitment to identifying and executing opportunities for lower carbon methanol production.
- Our production facility in Louisiana, USA has achieved international certification for bio-methanol production and fuelled the world's first trans-Atlantic net-zero tanker voyage.
- Our joint venture with Carbon Recycling International established the world's first renewable methanol plant using emission-to-liquids technology in Iceland.
- In 2022, Methanex New Zealand announced a decarbonisation project that will reduce its domestic emissions by 50,000 tonnes per annum which is now complete.

We believe in developing and implementing solutions that make incremental improvements in the short term, while simultaneously working towards longer-term carbon-zero solutions. We are investigating opportunities in our industry to produce lower carbon methanol from biomass or synthesised from green hydrogen and carbon dioxide, using biomethane as a feedstock or by capturing and using or storing emissions generated in the production process.

A "hard-to-abate" industry

Chemical manufacturing, including methanol production, is considered a "hard-to-abate"[42] industry, meaning that the technical and economic challenges associated with decarbonisation are significant and it will take longer than other sectors of the economy to decarbonise. For example, it will take longer than for transport or electricity generation, both sectors where technical and economic solutions exist for many of their decarbonisation challenges.

[42] https://www.iea.org/reports/achieving-net-zero-heavy-industry-sectors-in-g7-members/executive-summary (Para. 4)

In part, this is because methanol production requires gas to create temperatures of ~950 °C so that chemical reactions required to form methanol can take place. These temperatures are not achievable at scale, within the existing plant and with commercially deployable alternatives.

In addition to using gas to create high temperatures, natural gas is used in combination with water (in the form of steam) as the source of the hydrogen and carbon oxides that make up the constituent elements of methanol. About two thirds of the gas used by Methanex is used as feedstock to the process and ends up as the final product that is exported. Sourcing these elements from green sources (e.g., green hydrogen from electrolysis and biogenic CO2) is not yet done at sufficient scale to replace natural gas and is not yet economic.

Globally, governments recognise the difficulty of decarbonising "hard-to-abate" industries and tend to allow more time for transition by moderating carbon charges on these industries and providing financial incentives to implement not-yet-commercial decarbonisation technologies.

Scale and Timeframe

The focus of the gas transition plan is the period to 2035, with a view to meeting 2050 emissions targets. The potential for Methanex New Zealand to decarbonise is different for the core period to 2035 and for the longer-term outlook to 2050.

For the period to 2035, gas will be required throughout as the primary fuel and feedstock to sustain operations. Incremental decarbonisation opportunities will be available to reduce the energy intensity of the operations, but gas will remain primary and essential.

In the period from 2035 to 2050 and beyond, gas will still be required, but there is the possibility to undertake projects that are sufficient to decarbonise significant portions of the New Zealand operations and materially reduce the reliance on gas. This could be done by undertaking many smaller projects and developing alternative feedstocks (biogas, hydrogen) over many years or by undertaking a few very large projects.

For both the core period to 2035 and in the longer-term, unlocking decarbonisation opportunities will require the right investment environment (plentiful gas, renewable electricity, biogas, biogenic CO2 and appropriate incentives). It will also require the ongoing development of the green methanol market over time to give the right price signals to enable development of alternative feedstocks which are more expensive than gas. But even with optimal investment conditions, it is difficult to accelerate deep decarbonisation, due to the lead time required to build up the feedstock availability e.g., sufficient green hydrogen would require a multi-GW-scale build-out of renewable power generation capacity.

Value to New Zealand of methanol manufacture

While the time required for transition is long, in that period Methanex continues to make a contribution:

- High-quality direct and indirect employment
- Export revenues, tax paid and GDP contribution
- Safe, responsible corporate citizen that contributes to local community
- Provides the required long-term stable offtake at the scale required to develop gas, to the benefit of the wider industry
- Could play a similar role for the development of new large-scale renewable electricity generation, biogas or other transition technologies
- Provides resilience and flexibility to the New Zealand energy system
- Reduction in global emissions (see Emissions Intensive Trade Exposed Entity section below)
- Opportunity for a post-transition, long term sustainable business.

Methanex provides over 230 highly skilled people with careers, indirectly supports another 3,000 jobs and the domestic industrial supply chain, delivers export earnings that are significant on a national scale and contributes meaningfully to regional New Zealand. Almost all the direct jobs, and half of the indirect jobs are created within Taranaki (2% of jobs in the region).

Because of the highly capital-intensive nature of the business, Methanex's employment is highly productive; many times the average employment productivity rate of the country. The high productivity means Methanex can pay wages and benefits to staff and contractors that are higher than the national average.

Methanex's activities support over $800 mln in GDP which constitutes about 8% of the Taranaki GDP. Methanex's product is mostly exported, making a positive contribution to the country's balance of payments and Methanex has been a net taxpayer over many years.

As a Responsible Care® company, Methanex prides itself on its safety performance (injury rates are much lower than other traditional New Zealand industries) and seeks to positively impact the community around us. For example, in December 2022 Methanex committed $ 2 mln to support a new neonatal unit for Taranaki.[43]

Longevity of New Zealand gas supply

Ensuring that there is a long-term outlook on gas supply is critical for decarbonisation prior to 2035 and beyond. Robust quantities of gas for years into the future is required to justify the very significant capital expenditure required for most decarbonisation projects.

If there is a consistent threat of insufficient gas and/or threat of regulatory intervention to reduce the competitiveness of the industry, it is difficult to justify investing hundreds of millions of dollars in decarbonisation. Despite this uncertainty, Methanex has demonstrated its willingness to invest for decarbonisation. In 2023, Methanex New Zealand is delivering a project that will reduce its domestic emissions by 50,000 tonnes per annum.[44] However, the outlook for further similar investments is challenged by a deteriorating outlook for natural gas supply driven by current policy settings.

[43] Methanex Makes NZ$2 Million Investment in Neonatal Unit to Support Taranaki, New Zealand Community | Methanex Corporation

[44] https://www.methanex.com/news/release/methanex-invests-in-technology-to-reduce-emissions-at-new-zealand-site-by-over-50000-tonnes

In the long term, it may be possible to develop the very large quantities of electricity, biogas and CO2 to sustain the plants independent of natural gas. But it will take decades for the supply chains to be built up and the opportunity for such a sustainable long-term industry based on alternative feedstocks will not be realised if there is insufficient gas to maintain a viable business in the meantime. This makes continued gas supply a critical enabler of the energy transition.

Emissions Intensive Trade Exposed (EITE) entities and emissions leakage

In addition to providing value to the country and community, Methanex's operations around the world play an important role in limiting the global emissions profile for the industry.

Methanex makes methanol from gas, the lowest emission production method currently deployed at scale globally. The industry's marginal supply source is coal-based methanol production with approximately five times the emissions of gas-based production. If New Zealand's methanol production were to cease, it would create space in the market for, and stimulate increased production from, coal-based supply with the associated increase in global emissions.

The above phenomenon is called "emissions leakage" and industries and companies that are exposed to it are called Emissions Intensive Trade Exposed (EITE) entities. The key characteristics of EITE entities is emissions costs, usually as a result of energy consumption, make up a very significant proportion of their revenue (i.e., "emissions intensive") and they cannot pass the cost of carbon onto their customers because they will be undercut by entities in other jurisdictions that don't face a carbon charge (i.e., "trade-exposed").

To illustrate the scale of the global challenge associated with coal-based methanol production, recent analysis of methanol capacity additions in China[45] concluded that there have been more coal-based methanol capacity additions in each of the last few years than all of New Zealand's total gas-based production capacity.

These coal plants are the global marginal suppliers, don't always run at maximum rates and can flex as market demand and prices require.

ETS Costs

Very few methanol-producing countries impose emissions pricing on their chemical manufacturers. Even under the EU ETS, often considered the most rigorous carbon pricing regime in the world, chemical manufacturers receive free allocations of ETS units.[46] Producers operating in our key markets (Asia, Oceania) do not price CO2 emissions from chemical manufacture, including coal-based production with far greater emissions, and are not foreseen to in the near-to-medium term.

This means that with the current phase-out rate of Industrial Allocations of free units (Methanex currently receives 87% free allocation, declining at 1% pa this decade) already imposes a disproportionate burden on methanol production in New Zealand.

The burden of the New Zealand ETS costs must not exceed Methanex's ability to respond, both in terms of timing and the extent of the carbon cost imposed. A rapid and disproportionate (cf. with

[45] Internal analysis from Methanex China team.

[46] Allocation to industrial installations (europa.eu)

global comparators) increase in ETS costs would undermine the competitiveness of the New Zealand operations and would discourage investment.

For example, the very significant increase in the ceiling price of the New Zealand ETS undermined confidence that ETS costs will remain within a range that will facilitate transition rather than trigger curtailment. As do proposed changes to refocus the system on gross emissions rather than net emissions. This is a radical change to a bi-partisan legislation that was designed for stability over a decades-long transition.

National vs global decarbonisation

In the above discussion on EITE entities and ETS costs Methanex assumes that the objective of any decarbonisation action or policy is to contribute towards lower global emissions and that any domestic action that results in a predictable increase in global emissions is undesirable.

While the global perspective is the only sensible perspective to take from an analytical point-of-view, the incentives embedded in the ETS need fine-tuning to ensure outcomes that make sense from a global view are delivered.

Methanex notes that the legislative direction in recent years has prioritised delivery of national targets, risked possible decarbonisation through deindustrialisation and risked delivery of poorer global outcomes. For example:

1) Deteriorating outlook on access to gas supply, driven in part by a challenging regulatory environment.
2) Programmed decline in Industrial Allocations is not industry-specific so may be too fast for some industries (and too slow for others)
3) The dramatic increase in ETS ceiling prices has considerably reduced (or practically removed) this protection from excessive ETS costs.
4) The proposed removal of direct support for decarbonisation (GIDI) by a new government.
5) 2023 reform of the industrial allocation scheme reduces incentives for decarbonisation amongst EITE industries.

Unless the above policy trends are specifically tuned on a sector-by-sector basis to avoid emissions leakage, the accomplishment of New Zealand's national targets may result in global emissions increases..

Notwithstanding some disconnect between a national target setting process and the required industry-specific understanding of emission leakage risks, it cannot be the intention that New Zealand exports its emissions and industry overseas. This view is supported by the Zero Carbon Act's purpose to *"contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels"*[47]. The global focus at the very purpose of the Zero Carbon Act is correct and speaks strongly to New Zealand's need to reach its targets in a way that doesn't leave the world worse off.

Or put another way, it is difficult to see how the country can achieve its aspiration to be a climate leader if it meets Paris targets by deliberately eliminating lower-emission New Zealand production, knowing it will be replaced by higher-emitting producers overseas.

[47] Insert Section 3 Purpose, clause (1)(a)(i)

Decarbonisation Incentives

Recent legislation to change the settings on the Industrial Allocation regime reduced incentives for companies to make investments that would result in a step-change reduction in emissions. Any decarbonisation investments that generate significant surplus units can have the surplus removed through "rebaselining" and with it, any forecast return on the investment.

In addition, the incoming government is likely to revoke direct funding mechanisms such as GIDI. This means there is little incentive to decarbonise beyond the energy savings that might be obtained. These savings without an ETS benefit or government assistance are unlikely to be sufficient to justify significant investment.

For certain technologies, e.g., biogas and e-methanol production, where natural gas is replaced with a green feedstock the resultant product may receive a price premium that will support investment. However, given the incentives offered elsewhere in the world it is unlikely that this premium alone will justify deep decarbonisation of Methanex New Zealand.

Green Methanol Opportunity

The methanol market is undergoing significant change. Typically, global methanol production is used as both an input to the chemical manufacturing industries and as a fuel (an energy carrier) in roughly equal amounts. Increasingly, methanol is being seen as a fuel for shipping and demand is growing.

This demand growth in methanol is being driven by the potential to develop green methanol production which, on a lifecycle basis, can have net-zero emissions. Methanol produced from biological sources and green hydrogen is one of the few options for decarbonising the shipping industry that makes up approximately 3% of global emissions.

Methanex has been industry leading in developing methanol as a shipping fuel[48]. See Appendix 4 for further information.

New Zealand would seem to have the key elements required to become successful in the production of green methanol:

- A highly renewable electricity grid
- Substantial bio-resources
- Existing methanol manufacturing infrastructure and capability

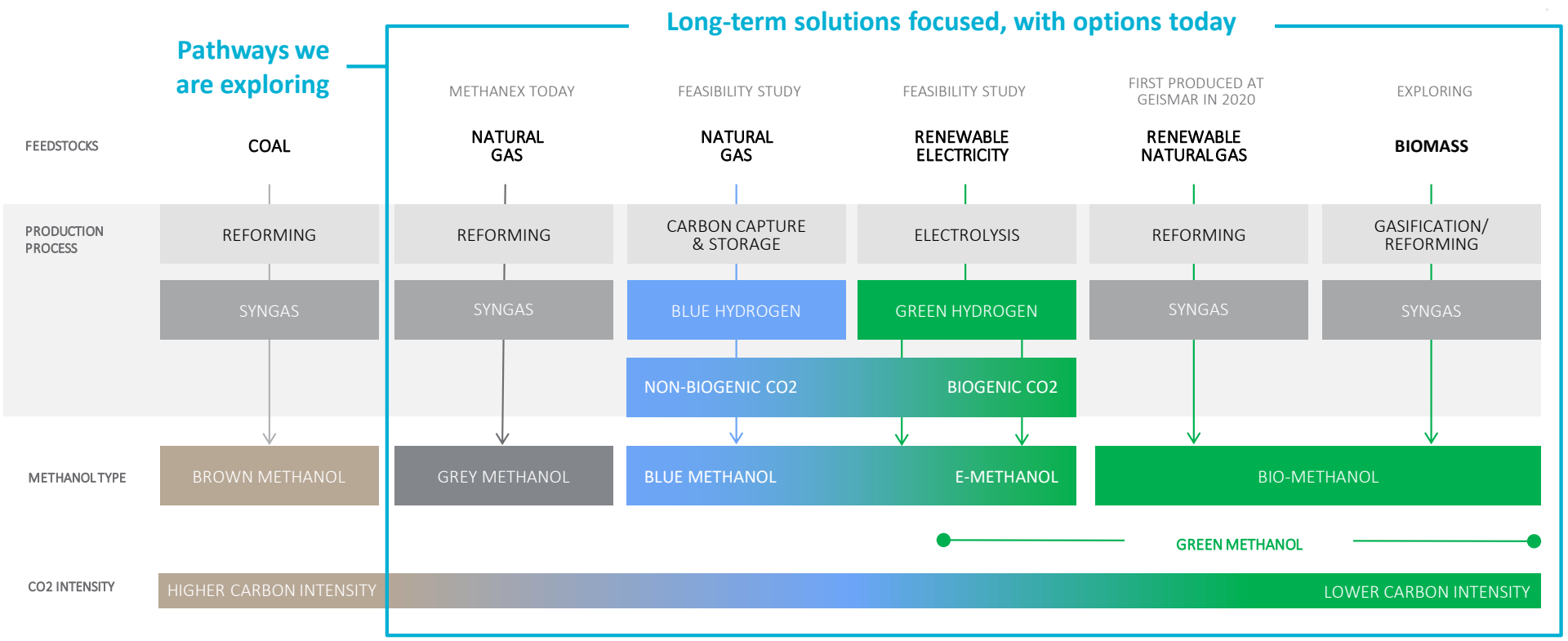
Incremental transition

While the scale of electrification, hydrogen production and/or biomass resources required to effect deep decarbonisation is daunting, the transition is aided by the possibility of incremental change. In practice, the various decarbonisation routes are complimentary, can be implemented in manageable increments and transitioned over time (if the right investment conditions are in place).

This is particularly true over the period to 2035 where "big bang" initiatives are unlikely to be sufficiently matured. However, the possibility for an incremental, long-term, transition requires ongoing gas availability for years to come.

[48] https://www.methanex.com/news/release/methanex-and-mol-complete-first-ever-net-zero-voyage-fuelled-by-bio-methanol

Appendix 2: Routes to Methanol Manufacture



Methanol production costs by technology route

Range of production costs for different forms of methanol : USD per tonne of methanol

Enablers

E-methanol and biomethanol require material quantities of green electricity or biomass

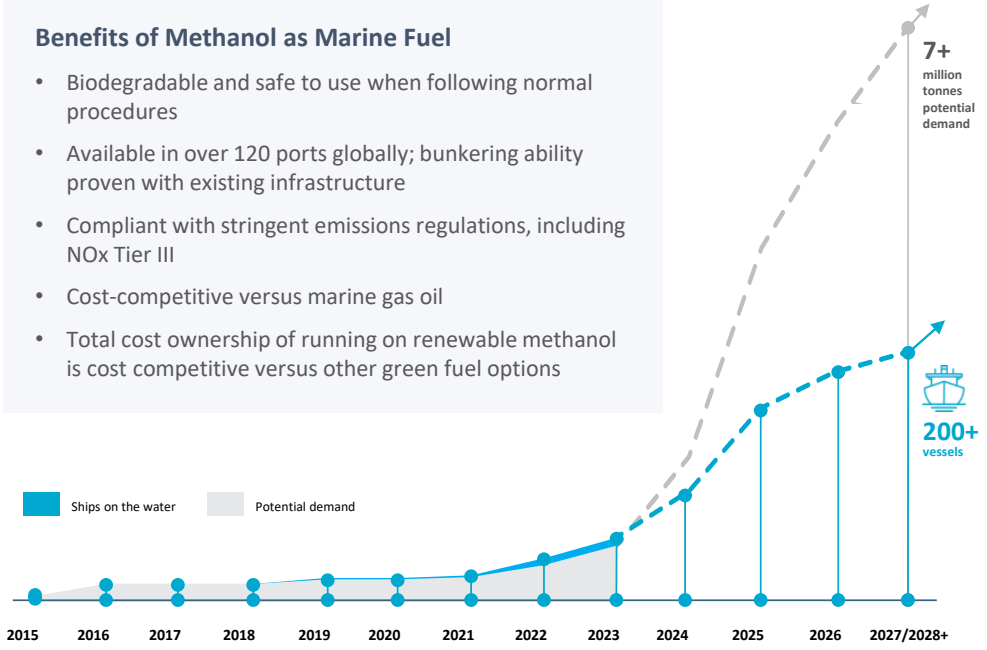
Green methanol customers understand that it is a premium product

Growing Interest in Methanol as a Marine Fuel

- Over 200 dual fueled vessels are expected to be on the water by 2028
- Helping the shipping industry meet their decarbonization goals

Benefits of Methanol as Marine Fuel

- Biodegradable and safe to use when following normal procedures
- Available in over 120 ports globally; bunkering ability proven with existing infrastructure
- Compliant with stringent emissions regulations, including NOx Tier III
- Cost-competitive versus marine gas oil
- Total cost ownership of running on renewable methanol is cost competitive versus other green fuel options



[1] Based on orders as of February 2023,if all ships run on methanol 100% of the time

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