Submission template

Submitting on the *Gas Transitions Plan Issues Paper*

This is the submission template for responding to the consultation document *Gas Transition Plan Issues Paper.* The Ministry of Business, Innovation and Employment (**MBIE**) seeks your comments by **5pm on Thursday, 02 November 2023**.

Please make your submission as follows:

1. Fill out your details under the "Your name and organisation" heading and, if applicable, check the boxes underneath on privacy and confidentiality.
2. Fill out your responses to the discussion document questions. Your submission may respond to any or all of the questions. Where possible, please include evidence to support your views, for example references to independent research, facts and figures, or relevant examples. If you would like to make other comments not covered by the questions, please provide these in the "General comments" section at the end of the template.
3. Before sending us your submission:
   a. delete this first page of instructions
   b. if your submission contains any confidential information, please:
      - state this in the cover page or in the e-mail accompanying your submission
      - set out clearly which parts you consider should be withheld and the grounds under the Official Information Act 1982 (**OIA**) that you believe apply
      - provide a separate version excluding the relevant information for publication
4. Submit your submission by either:
   a. emailing this template as a PDF or Microsoft Word document to gastransition@mbie.govt.nz
   b. mailing your submission to:

      Energy Resources Markets Branch
      Ministry of Business, Innovation and Employment
      15 Stout Street
      PO Box 1473, Wellington 6140
      Attention: Gas Transition Plan Issues Paper submission

Please direct any questions that you have in relation to the submissions process to gastransition@mbie.govt.nz.

Release of Information

Please note that submissions are subject to the OIA and the Privacy Act 2020. In line with this, MBIE intends to upload copies of submissions received to MBIE's website at www.mbie.govt.nz. MBIE will consider you to have consented to uploading by making a submission unless you clearly specify otherwise in your submission. MBIE will take your views into account when responding to requests under the OIA and publishing submissions. Any decision to withhold information requested under the OIA can be reviewed by the Ombudsman.

Submission on the *Gas Transitions Plan Issues Paper*

Name	
Organisation (if applicable)	JGP Projects - www.jgp.co.nz
Contact details	

Release of information

Please let us know if you would like any part of your submission to be kept confidential.

☒ I would like to be contacted before the release or use of my submission in the summary of submissions that will be published by MBIE after the consultation.

☐ I would like my submission (or identified parts of my submission) to be kept confidential, and **have stated below** my reasons and grounds under the Official Information Act that I believe apply, for consideration by MBIE.

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Responses to questions

Chapter 2: Transitioning our gas sector	
1	**How can New Zealand transition to a smaller gas market over time?**
	The current energy layout in New Zealand requires natural gas to support close to 20% of primary energy supply, and in the industrial energy sector this accounts for nearly 30% of industrial energy consumption. Natural gas energy is modestly price compared to competitors, even with ETS implications included. To transition gas energy users to other sources, requires comparably priced energy sources to be available. To transition away from gas will require investment in end user appliances to switch to different energy sources and require additional investment into infrastructure and renewable generation to provide the necessary resiliency to support an additional ~150PJ load on the North Island electricity grid.
2	**What is needed to ensure fossil gas availability over the transition period?**
	Investment certainty is required to ensure fossil gas availability. Investment planning is several years in advance from "gas on" for any gas field development, and unless continued investment into gas fields is undertaken the supply will decline.
3	**What factors do you see driving decisions to invest or wind down fossil gas production?**
	Consumer driven requests for decarbonisation and certified low carbon products, will affect supply chains to decarbonise. Fossil gas is currently the economic means to provide heat for some industries, and if the need to decarbonise surpasses the need for low-cost energy these industries will switch fuel sources and pay higher costs or shut down operations due to being uncompetitive. Forcing industry to shift to electricity will decarbonise the sector but will come at a high capital cost of conversion and increased ongoing energy costs. It will also require electricity infrastructure upgrades – nearly doubling the electricity grid if sizing the upgrade is based on the energy provided by natural gas.
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?**
	To provide this certainty, producers require clear direction for any resource management concerns or permitting/consenting to support existing or new gas fields. The producers need to know the government will not revoke their permitted rights or future expansion rights for existing or new gas fields.
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?**

	Residential consumers represent the largest number of gas consumers, however, consume a low proportion of natural gas. As such, the costs of running the gas networks are shared across many users. Residential consumers are great candidates for decarbonisation through electrification. Vulnerable residential users and small companies who do not have the means to convert away from fossil gas will suffer in the event prices jump rapidly to share pipeline costs. There could be incentive schemes for low-income households to have subsidised conversion from fossil gas to electricity. However, for a majority of consumers the decision to continuing natural gas use in their residences will be a personal choice, as some consumers just prefer natural gas for cooking or heating and are less influenced by decarbonisation decisions.
	Fossil gas and electricity
	What role do you see for gas in the electricity generation market going forward?
6	The role for gas in electricity generation has been highlighted in recent years, as shortfalls in natural gas has led to increased coal power electricity. Gas shortages during winter months caused industrial consumers (contributing to GDP) to curtail output or shut down, in order to free up gas to support electricity generation and support the electricity grid. Gas will continue to be required to firm renewable generation. The need to store considerable quantities of gas and have fast dispatching gas fired peakers will only increase with intermittent renewable generation. The most recent gas peaker built (Junction Road) has seen more usage than would typically be expected for a gas peaker, running nearly baseload. This signals an underlying need for additional renewable generation AND fossil gas peaking plant. As electrification increases, the increased electricity demand will need to be met by generation of any type. It is preferrable from an emissions perspective that any demand increase is met with renewable generation, however, the market has not seen considerable expansion in this regard. There will be a need for gas powered peakers to be constructed and dispatched to service the electricity grid. The worst possible outcome of increased electrification and demand is to dispatch coal fired power generation.
	What would need to be in place to allow gas to play this role in the electricity market?
7	Continued development of gas fired peaking plants, and gas field development. Continued use of contracted volumes of gas to be dispatched from storage to be used during periods where gas fired peakers are needed to support the electricity grid.
	Do you think gas can play a role in providing security of supply and/or price stability in the electricity market? Why / Why not?
8	Gas will be pivotal in providing security of supply for the electricity market. The intermittency of renewables being added to the system and increase in demand will mean there are periods of time where generation shortfalls. This gap should be met by gas generation to limit emissions for periods where renewables are unavailable, as opposed to coal generation. The huge variations between periods of excess and insufficient renewable generation creates highly volatile pricing. Until such a time that strategically placed storage for excess renewable

	power is developed, this volatility will be ever present. At times where renewable generation shortfalls demand, gas typically sets the price cap for electricity. The gas-powered generation will not help reduce electricity prices but will at least help to provide a price ceiling for these periods.
9	**Do you see alternative technology options offering credible options to replace gas in electricity generation over time? Why / Why not?**
	Storage for renewable electricity is the technology to replace gas in electricity generation over time. This storage should be covered by a variety of technologies to improve system resilience. The storage could still be in the gaseous form (through synthetic natural gas, or hydrogen), or pumped hydro or batteries. Each storage asset should be located close to demand centres to reduce criticality of electricity transmission infrastructure. Future scenarios of electrification placing most of the energy demand on the electricity grid and relying on a single route for this critical infrastructure could lead to a significant outage during an extreme weather event. Locating critical generation and storage close to demand centres should help at least to spread and mitigate the risk to multiple infrastructure routes.
10	**If you believe additional investment in fossil gas infrastructure is needed, how do you think this should be funded?**
	Funding can be provided by market instruments, provided the mid to long term regulatory regime is clearly outlined and predictable enough to make sound investment decisions to develop gas fields. A planned transition, with firm dates to wind down gas use will help determine the necessary investment to support gas fields and infrastructure to maintain gas security and affordability until such a date. The investment profile and gas demand profile should not follow the same trajectory, there will need to be a level of investment (likely higher) than the demand that is required.
Chapter 3: Key issues and opportunities	
	Renewable gases and emissions reduction technologies
11	**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?**
	Biogas and biomethane are a 5 to help reduce emissions from the fossil gas system. Biomethane is a direct very low carbon fuel replacement for fossil gas. The overall carbon intensity of biomethane is much less than the carbon intensity of electricity from the grid. If the projects to produce biogas and biomethane also consider the emissions benefits for waste avoidance to landfill, the carbon benefits reach much further into the value chain than just the end energy use. Waste diversion included, carbon benefits for circular biogas production and biomethane projects can be orders of magnitudes more beneficial in carbon reduction terms than alternatives.
12	**Do you see biogas being used as a substitute for fossil gas? If so, how?**

Yes. Any biomethane injected into the reticulated gas network can be used as renewable energy for any gas user on the network, without any modification to their existing appliance or equipment. This allows consumers with sunk capital in gas equipment for heat or processing, or industries in locations where conversion to electricity is prohibitively expensive, to decarbonise without any additional capital spend. This results in an instant demand for any biomethane that becomes available to the reticulated gas network and gas consumers.

The current use for biogas is combustion for electricity. Nearly all existing biogas resources in NZ are currently either used in combustion engines or flared to destroy the methane. The use of biogas in engines produces NOx emissions, which has adverse health effects for nearby residents. Based on 2023 figures the natural gas system is about 2.5 times more carbon intensive than the electricity system. As we expect the electricity grid to become even more renewable and less carbon intensive over time, this gap will continue to grow. Industries and end-users reliant on gas as their source of energy will be left behind. The ability to get this biomethane into the gas grid, as opposed to combusted for electricity will offset a more carbon intensive fuel.

Because biogas and biomethane are produced from organics, which involves additional processing (either as labour, process equipment, wastewater plant operation, landfill operation) the cost of biomethane will be higher than natural gas. This is something that retail domestic consumers may be willing to accept, however, trade exposed industries may have less opportunity to accept these costs. Another cost consideration for existing sources of biogas, is the sunk capital in generators (business as usual) and the electricity price these generators are selling into the market. The existing biogas sources combusted for electricity, influence the value of the raw biogas to the producer to be tied to the electricity price. Any biogas which is currently used for electricity generation will essentially have to be priced to match electricity if it were to be upgraded into biomethane. This is another cost disadvantage for biomethane as opposed to natural gas.

Overseas – green gas feed in tariffs are subsidised by governments to incentivise biomethane production. In the UK the green gas subsidy scheme, includes feed in tariffs with 15 year contract length, and a tiered to encourage small scale projects to be developed as well as larger scale projects. For plants less than 215 TJ/yr (Tier 1), the tariff to the producer is nearly 5.5pence/kWh or $30NZD / GJ. The funding comes from emissions taxes from fossil fuel producers (ie their ETS).

In Denmark, there has been incredible uptake in biomethane producers connected to their gas grid since 2015. This was a direct result of the government feed in tariff offered to biomethane producers for €60/MWh, or roughly $27NZD/GJ, on top of the natural gas price for all biomethane plants commissioned between 2012-2018. This feed in tariff model allows biogas and biomethane producers to have acceptable returns on investment, and provide end users renewable gas at a price comparable to natural gas. A second round of subsidy is currently underway to encourage more biomethane producers to develop projects, with a goal of hitting 100% renewable gas in Denmark's gas system.

By employing a subsidy scheme similar to the UK and Denmark, nearly all New Zealand biomethane development projects should become commercially viable.

The ability for existing gas infrastructure to transport biomethane provides another layer of redundancy in the energy transport model for the country. Simply put, not putting all eggs in one basket. Gas infrastructure is run safely, and subject to very few outages compared to electricity grids. In an era where climate change is unpredictably influencing extreme weather events, the need for an energy system that does not rely on a single type of transmission is more important than ever.

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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?

Hydrogen to decarbonise fossil gas is a 5 in some industries. Hydrogen an important building block in the chemical and steel industry. Particularly in the fertilizer and methanol industry. Short term promise of using green hydrogen as a direct drop in to boost production at the Ballance Kapuni Ammonia fertiliser plant is an amazing example of how this technology can be used to decarbonise a plant tied to use of fossil gas. Project progress unfortunately has been hindered by court action.

Green hydrogen use for steel, requires new processing equipment compared to NZ BAU but it is possible. Green hydrogen use for methanol production, requires new processing equipment compared to NZ BAU, but it is possible. These are the industries best suited to using hydrogen – the hard to abate, highly process driven and hugely emitting industries.

The issue for decarbonising these industries with green hydrogen is the cost comparison to fossil gas. NZ Steel, Ballance, Methanex, Fonterra are the major users of fossil gas, and are all trade exposed industries. The reason these industries have equipment setup for use with fossil gas has been the historically low cost of fossil gas and its carbon dioxide emissions. Cost projections for natural gas prices vary, but as NZ's natural gas industry is minimally influenced by external global factors (war, etc), provided investment into renewing gas fields, the cost can be expected to be relatively stable, and cheap compared to alternatives – electricity and biomass.

The issue with green hydrogen from electrolysis is that the molecules need to be manufactured, with the main input (other than water) being electricity. This conversion from water molecule to hydrogen molecule results in at least 30% of the primary energy being lost due to conversion efficiencies. Electrolyser efficiency will improve only marginally, but regardless, the main variable cost associated with producing hydrogen, is electricity. The cost of hydrogen will ALWAYS be much more than the electricity input cost. The cost of hydrogen is inflated further to the base electricity by accounting for the large capital required for electrolysis equipment, and further compounded by any storage, compression, and transport (either by road, rail, ship or pipeline).

For the industries listed above, which are prime candidates to convert to processes using green hydrogen, the cost barrier is the main issue. Not only will these industries have to adapt their equipment (capital intensive) to use hydrogen, but they will be faced with an energy cost that is 10x more than they are used to. This type of cost increase is not likely to satisfy their shareholders.

	It is unfortunate that the most favourable industries and use cases for green hydrogen, are also the least favourable for the economics of green hydrogen.
	Do you see hydrogen being used as a substitute for fossil gas? If so, how and when?
14	Hydrogen can be used as a substitute for fossil gas. However, the only way to enable this will be to force fossil gas to be priced higher due to ETS implications. By driving up the cost for fossil gas to levels near comparable to hydrogen, this will force trade exposed industries to look elsewhere to run their operations. Unless there is an excess of renewable generation that would otherwise by spilled (essentially causing $0/MWh electricity pricing) where hydrogen production cost will be minimised, the cost of hydrogen will always be prohibitively expensive compared to current and projected natural gas prices. Should these operations move elsewhere, there is a certain effect of carbon emissions leakage resulting from them moving their operations to areas with less stringent carbon pricing.
	What else can be done to accelerate the replacement of fossil gas with low-emissions alternative gases?
15	There is an opportunity to support the circularity of biogas and biomethane by aiding with the waste disposal of organics. This could involve mechanisms banning organics from landfill and thus making anaerobic digestion a favourable disposal method. The waste portion of AD projects will end up competing with landfill costs, so another mechanism is to increase the waste disposal levy, to allow AD plants the ability to charge higher gate fees to offset their more intensive operations. Another key step for the AD and biogas production side is to ensure that liquid digestate produced from anaerobic digestion of organics has a suitable pathway to be used in place of fossil-based fertiliser. Not only does this offset fossil fuel to create the fertiliser, but the ability also to use the digestate locally improves the economics of the operationally intensive AD plant. There is currently no clarity whether digestate can be spread to land, and the consenting of such an activity currently lies with the local councils – which creates differences between project areas and provides no certainty to AD project developers. Digestate as a fertiliser product also introduces additional revenues streams for AD projects, and helps commercial viability.
	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?
16	A renewable gas trading scheme is 5. This is the most critical missing link to help any renewable gas project to progress to commercial viability. Biomethane projects (as they are the nearest term) absolutely require a renewable gas certification scheme to succeed. The ability for a gas user to virtually decarbonise using certificates must be realised to ensure biomethane projects are developed. As the gas grid is currently non-renewable, the certification tracking of green energy in the system should be easier to implement than the electricity grid (as these systems are already set up with a large quantity of varying carbon intensity electricity).

What role do you see for the government in supporting such a scheme?

17 Government should support the green gas certification scheme, through coordination of the Ministry for Environment, Ministry for Business Innovation & employment, and Gas industry Co, GasNZ, gas infrastructure owners, and gas retailers. The effort needs to be collaborative, and will be bespoke to New Zealand, as overseas certification schemes are unclear and full of gaps. The Government can help by also considering renewable gas as part of the ETS, to help those in the mandatory and voluntary carbon markets to realise the benefit of any green gas project.

Carbon Capture, Utilisation and Storage

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?

18 CCUS is a 4. There will be specific applications where CCUS is beneficial. The potential to easily capture biogenic carbon dioxide from biomethane plants is great, the separated CO2 stream is well suited to liquefaction for industrial and food grade applications. To encourage bioCO2 production from biomethane, a predictable carbon dioxide market is required. The CO2 liquefaction plant can be adapted to existing biomethane plants at later stages should the market be proven. Many biomethane plants overseas have been retrofitted to produce food grade CO2 some years after being developed.

CCUS on a more industrial stage will be necessary for industries where other alternatives are not present. The potential to decarbonise a single emitter and re-use the CO2 for a separate use (like in synthetic fuels) could be beneficial for geothermal power producers to reach net zero, but the product would still contain and emit fossil carbon. Whether the carbon dioxide is biogenic or where the CO2 has been re-used from fossil sources, will have implications for carbon accounting of each organisation.

CCUS from flue gas of combustion will be much harder to realise, as the concentration makes these emissions harder to capture. Capture from flue gas ends up being more energy intensive compared to process streams high in CO2 already.

The ability to utilise CCUS in biomass gasification provides a particular edge over other technologies combusting biomass. The ability to process a dedicated stream of carbon dioxide, or produce solid carbon as biochar, can produce tangible carbon neutral or negative projects, as opposed to burning the biomass (which is almost net zero carbon).

Different types of “life extension” to the CO2 has not yet been explored with tangible projects in NZ. However, the technology exists to transform green hydrogen and capture CO2 to reform into synthetic natural gas (SNG) or synthetic liquid fuels. CCUS is a necessary portion to any of these projects. These fuels will be inherently more expensive than their purely fossil based counterparts, but will have reduced carbon intensity.

19	**What are the most significant barriers to the use of CCUS in New Zealand?**
	Regulatory treatment of gaseous and liquid CO2 in pipeline transport has yet to be determined. The carbon accounting framework will be challenging, given these types of projects are not outlined in the existing ETS framework. Market and political appetite for CCUS projects will determine whether these are pursued.
20	**Do you see any risks in the use of CCUS?**
	The utilisation of CO2 should be of minimal risk provided the projects are of sound engineering. There will be a feasible capture limit for CO2 sources, and some emissions will leak as a result. Storage projects in reservoirs have risk in the longevity of solution. Storing CO2 underground indefinitely will be very technically challenging. Storage projects which transform CO2 into geological formations, or biochar as part of the carbon cycle should be explored with priority over using depleted reservoirs.
21	**In what ways do you think CCUS can be used to reduce emissions from the use of fossil gas?**
	As described in 18.
	Options to increase capacity and flexibility of gas supply
22	**What role do you see for gas storage as we transition to a low-emissions economy?**
	Gas storage will increase in importance. Extra emphasis on gas storage will be required, should the electricity grid be supported by gas peaking power plants. As intermittent renewables grow to larger proportion of overall electricity generation, the necessity of any type of energy storage will become increasingly important. Additionally, the ability for low carbon synthetic natural gas (SNG) to be stored and used in existing infrastructure and storage wells is particularly advantageous to this form of fuel.
23	**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?**
	Increased gas storage is a 5. Expansion of existing natural gas storage will be required to support peaking generation, particularly in dry year scenarios. Also there is the potential to store gaseous hydrogen, which is currently being investigated. Hydrogen storage could provide the ability to store excess renewable electricity, as a molecule, for long durations.
24	**What should the role for government be in the gas storage market?**

	Government should provide clear direction on resource management and permitting / consenting certainty for gas storage projects. Clear direction from the government to provide long term certainty will allow the market to guide gas storage investment and use.
25	**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?**
	We agree. The natural gas market in NZ is domestic. It would be a huge government failure should policies lead the country to import natural gas. This would increase the carbon intensity of any industry reliant natural gas, and cause carbon leakage elsewhere. The use of imported LNG as opposed to domestic supply would cause job losses in country, and the economics and GDP of the industry to be given away to another country (likely Australia). The move to use imported LNG would also expose New Zealand to foreign trade issues and increase exposure to price and supply volatility due to geopolitical conflict.
26	**What risks do you anticipate if New Zealand gas markets were tethered to the international price of gas?**
	As witnessed by the closure of NZ refinery, and exposure to international prices for liquid fuels, any tethering of the gas market to overseas pricing would essentially price out industries to be competitive globally. The effect would ripple to de-industrialisation.
General comments	