Environment Victoria submission on the Viva Energy Gas Terminal Project EES

Online submission lodged at: https://engage.vic.gov.au/viva-energy-gas-terminal-project

To the Viva Energy Gas Terminal Project Inquiry and Advisory Committee,

Environment Victoria welcomes the opportunity to make a submission on the Viva Energy ("Viva") Gas Terminal Project (the "Project") Environment Effects Statement.

Environment Victoria (EV) is an independent and not for profit organisation that has been campaigning to look after Victoria's environment since 1969. With more than 40 grassroots member groups and 200,000 individual supporters, Environment Victoria represents a growing community of Victorians standing up for a safe climate, healthy rivers and a sustainable future.

The purpose of this submission is to highlight the rationale behind EV's opposition to the Project. We would be grateful to expand on our position in the Inquiry and Advisory Committee (IAC) public hearing process.

We submit that Viva's Environment Effects Statement (EES):

- Lacks methodological rigour in several technical chapters, which downplays of the likelihood and/or impact of a range of risks;
- Fails to justify the need for the Project and to properly address existing and feasible alternatives to manage gas consumption or to source gas;
- Does not make the case that the Project's is aligned with Victoria's existing energy and climate policies.

Due to the flaws we have identified in the EES, we submit that it is not possible for the IAC to assess the real extent of the Project's impacts and whether they could (or would) be managed by Viva. As a result, we believe the IAC should recommend against this Project.

We reserve our right to raise additional matters at the Public Hearings, including having regard to any further information subsequently provided by the proponents for the Project or other interested parties. This submission will focus primarily on:

- Project Rationale and the adequacy, and appropriateness, of the Project to address Victoria's energy security.
- The Project's greenhouse gas footprint and its impact on Victoria's emission reduction efforts, noting the Minister's Reason for Decision[1] and the final EES Scoping Requirements[2] explicitly mention greenhouse gas emissions and "the State's energy needs and climate policy";
- The lack of adequate information on the potential impacts of dredging;
- The safety risks associated with this Project being in the proximity of residential areas.

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[1] https://www.planning.vic.gov.au/__data/assets/pdf_file/0025/506068/Dated-Reasons-for-decision.pdf

[2] https://www.planning.vic.gov.au/__data/assets/pdf_file/0025/506068/Dated-Reasons-for-decision.pdf

1. Response to Viva's Project Rationale

a. Overview

Chapter 2: Project Rationale of Viva's EES describes the status of gas supply and demand on the Australian east coast and tries to make the case for the Project on the basis of energy security, efficiency and affordability.

However, we submit that Viva has deliberately and severely downplayed the existing plans to transition away from gas and their potential to reduce our reliance on this fuel. Further, the EES ignores existing evidence on the balance between supply and demand by grossly overstating existing risks.

While Viva claims that we are entering a 'shortfall period', the EES: (1) fails to explain why the potential shortfall should be met with an increased supply instead of demand side measures, especially considering the current policy environment; (2) does not accurately depict existing forecasts of gas supply; and (3) fails to make the case that a gas import terminal is a net positive for Victoria's energy needs considering its economic, environmental and social impacts.

b. Viva misrepresents AEMO's past forecasts

Two main sources on which Viva bases its claims about a potential gas shortfall are the Australian Energy Market Operator's (AEMO) forecasts in the Gas Statement of Opportunities ("GSOO 2021") and the Victorian Gas Planning Report ("VGPR" 2021). **However, we submit that Viva misrepresents and grossly overstates AEMO's position on those reports.**

In section 2.3.6. of *Chapter 2: Project Rationale* Viva states "The south-eastern Australian states are approaching a shortfall period when local gas supply cannot meet expected demand."[3]

However, AEMO's GSOO (2021) states that if anticipated projects are executed south-eastern Australia should not face gas shortfalls until 2029: "Following the commissioning of the PKGT, available supply to domestic consumers is forecast to be sufficient to meet all consumer demand until 2026 in the Central

[3] https://www.vivaenergy.com.au/ArticleDocuments/1193/VE-EES-CH2_WEB.pdf.aspx

scenario, even without the development of anticipated projects. **With these additional domestic production projects, peak day supply gaps are not anticipated until 2029.**" [4]

c. AEMO's latest forecast show rapid decline in gas demand is possible

The recently released AEMO reports VGPR (2022) and GSOO (2022) presented a shift in supply adequacy forecasts by including different scenarios. The reports analysed the supply and demand balance based on two potential scenarios:

1. "Under the **Progressive Change scenario**, representing a future that delivers action towards net zero emissions through technology advancements and based on current state and federal government environmental and energy policies[.]"; and
2. "The **Step Change scenario** represents a future with rapid consumer-led transformation of the energy sector, and a coordinated economy-wide approach that efficiently and effectively tackles the challenge of rapidly lowering emissions (including electrification of gas heating load), driven by consumer-led change with a focus on energy efficiency, digitalisation and step increases in global emissions policy above what is already committed."

We note that the Step Change scenario is not an outlier but the scenario that AEMO stakeholders identified as most likely to occur. During consultation for the draft 2022 Integrated System Plan (ISP), stakeholders identified Step Change as the scenario they considered to be the most likely pathway for Australia's energy sector.

Annual gas consumption in Victoria under the Step Change scenario is forecast to decrease by 16.8% by 2026 and by 18% on peak demand days.

[4] https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/gsoo/2021/2021-gas-statement-of-opportunities.pdf?la=en (emphasis added).

	2022	2023	2024	2025	2026	Change over outlook
System consumption	191.8	185.3	175.4	174.9	163.7	-14.6%
DTS gas generation consumption	7.8	7.1	4.0	3.5	4.4	-43.0%
Total DTS consumption	199.5	192.3	179.4	178.4	168.2	-15.7%
Non-DTS system consumption	1.4	1.4	1.3	1.2	1.1	-25.6%
Non-DTS gas generation consumption	9.7	8.6	5.7	5.0	6.0	-37.7%
Total Victorian consumption	210.6	202.4	186.4	184.6	175.3	-16.8%

Figure 1. Victorian gas consumption forecast, Step Change scenario in AEMO VGPR (2022). Figures show petajoules (PJ).

Further, despite some supply tightness during winter of 2023 driven by a one-year delay with the Port Kembla gas import terminal, AEMO's latest VGPR report states peak day supply is forecast to be met during the outlook period (until 2026) under the Step Change scenario. This scenario is at risk in the "absence of significant additional policy commencing", but the Victorian government is currently rolling out a program that will reduce gas demand by replacing 250,000 heaters,[5] and the new Gas Substitution Roadmap is scheduled for release in Quarter 2 of 2022,[6] setting a path for the state to reduce gas use significantly (see section 1 e below).

d. Demand reduction capacity to increase energy security in Victoria

The aforementioned forecast gas shortfall has for years fuelled calls for immediate government action to open new sources of gas supply. This pressure from the gas industry has resulted in the Victorian government lifting the conventional onshore gas moratorium, the approval of Narrabri gas field in New South Wales, the approved and confirmed Port Kembla gas import terminal in New South Wales and the recently approved Venice LNG import terminal in South Australia.

This supply-side response overlooks the potential for measures that reduce gas demand to serve as a solution, despite the existing evidence on the benefits of energy efficiency, and the enormous potential that it could have in Australia. AEMO's GSOO (2022) report explicitly states that reducing gas demand is a solution to a supply shortfall:

[5] https://www.heatingupgrades.vic.gov.au/
[6] https://engage.vic.gov.au/project/help-us-build-victorias-gas-substitution-roadmap/timeline/19332

"While both publications demonstrate risks of potential supply shortfalls in 2023, the 2021 GSOO projected shortfalls would be narrowly avoided from new committed supply by winter 2023. ***The 2022 GSOO conversely identifies that steps to transform gas demand and reduce consumption can narrowly avoid peak day shortfalls***, if rapidly deployed as in AEMO's updated Step Change scenario" [7]

According to analysis by energy efficiency specialists Northmore Gordon (2019), commissioned by Environment Victoria, the state of Victoria could reduce its gas consumption by 98 to 113 PJ by 2030 using existing technology and targeted economic support.[8] **This is an even faster rate than AEMO's Step Change scenario.** This would benefit households, commercial users and industry, tested against criteria relating to ease of implementation, cost and applicability. **This report is attached to our submission as an appendix.**

#	Technology	Sector	Ease of implementation	Cost	Applicability	Anticipated gas reduction (PJ/annum)
1	Replace ageing ducted gas heating systems	Residential	Easy	Low-Moderate	Broad	48 PJ
2	Improving building insulation[8]	Residential	Easy	Low	Broad	> 10 PJ
3	Use existing air-conditioners for space heating	Residential	Very easy	Zero cost	Some	5-15 PJ
4	Heat pump hot water	Residential	Easy	Low	Broad	10 PJ
5	Heat pump space heating	Commercial	Moderate	Moderate	Broad	7.75 PJ
6	Industrial gas efficiency	Industrial	Easy	Low	Broad	2.5 PJ to 5.5 PJ
7	Renewable process heating	Industrial	Moderate to hard	High	Some	13.6 PJ
8	High temperature heat pumps	Industrial	Moderate	Moderate	Some	1 PJ to 3.5 PJ
9	Induction cooktops	Residential	Easy	Moderate	Some	0.5 PJ
Total gas demand reduction					**98.35 PJ to 113.85 PJ**	

Figure 2. Summary of gas demand reduction measures. (Northmore Gordon 2020)

[7] https://aemo.com.au/-/media/files/gas/national_planning_and_forecasting/gsoo/2022/2022-gas-statement-of-opportunities.pdf?la=en page 5 (emphasis added)

[8] https://environmentvictoria.org.au/2020/06/03/victorian-gas-market-demand-side-measures-to-avoid-forecast-supply-shortfall/

On an annual basis, the potential avoided gas consumption created by the proposed measures would, based on official data available at the time of the report, be enough to balance Victoria's gas demand and supply even without considering potential interstate gas imports.

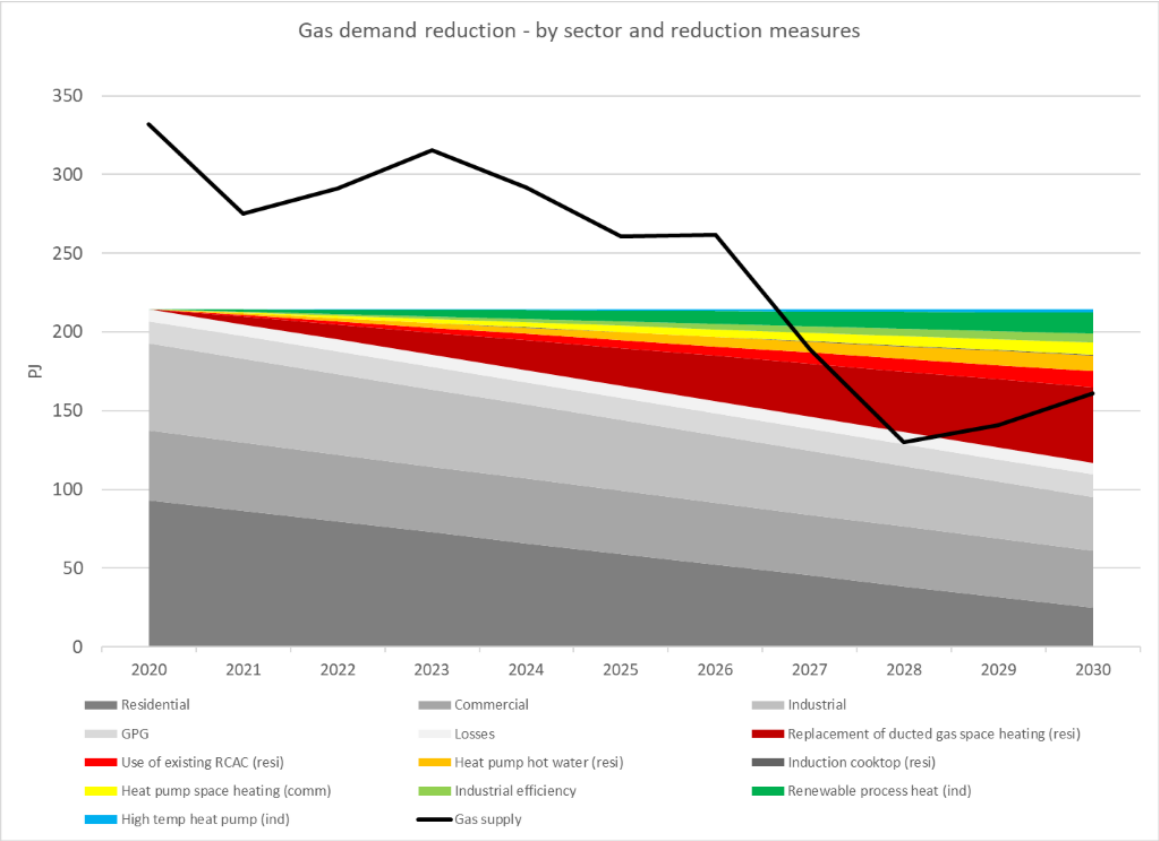

Figure 3. Gas Demand reduction by sector and reduction measures (Northmore Gordon, 2019)

This analysis shows that under the right policy scenario, Victoria could balance its energy supply requirements without the need for new gas fields or the development of gas import terminals. Further, promoting energy efficiency and fuel-switching delivers other benefits on top of increasing energy security.

Demand measures would provide several co-benefits such as reduced energy costs for Victorian households and increased competitiveness for Victorian industry in a low-carbon global economy, and would reduce greenhouse gas emissions by decreasing Victoria's use of gas. Further, pursuing demand-side measures instead of Viva's gas import terminal will preserve the ecological character of Corio Bay

and the Port Phillip (Western Shoreline) Ramsar sites and prevent amenity and health impacts to the local community which has fiercely opposed the Project.

Our submissions on this point are supported by existing literature. There is a mounting body of evidence that supporting energy efficiency and fuel-switching from gas to electricity lowers energy costs for consumers,[9] and reduces greenhouse gas emissions under most scenarios even when the electricity grid is heavily reliant on fossil fuels.[10]

Other previous studies focused on the benefits of electricity over gas include:

- A 2015 study from the University of Melbourne found switching from using gas heating to a reverse cycle air conditioner saved up to $658/year for a large home in Melbourne.[11]
- A July 2018 report from ATA (now Renew) found owners will be between $9,000 to $16,000 better off over 10 years if they establish their new home as all-electric with a 5-kilowatt solar system rather than having both gas and electric connections with no solar.[12]
- A November 2020 report from the Grattan Institute also found that households in Sydney, Melbourne, Brisbane, Adelaide, and Canberra that move into a new all-electric house with efficient appliances will save money compared to an equivalent dual-fuel house.[13]

While Viva claims that their gas import terminal is flexible and would only operate to satisfy existing demand, the reality is that fossil fuel projects like Viva's gas import terminal have an anchoring effect and could be a force against the much-needed transition away from gas.

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[9] https://renew.org.au/wp-content/uploads/2018/08/Household_fuel_choice_in_the_NEM_Revised_June_2018.pdf
[10] https://rmi.org/fossil-gas-has-no-future-in-low-carbon-buildings/ and https://renew.org.au/renew-magazine/efficient-homes/emissions-intensity-of-household-electricity-vs-gas/
[11] https://energy.unimelb.edu.au/__data/assets/pdf_file/0007/1993309/switching-off-gas-an-examination-of-declining-gas-demand-in-eastern-australia.pdf

[12] https://renew.org.au/research/all-electric-solar-homes-save-thousands-over-gas-report/
[13] https://grattan.edu.au/wp-content/uploads/2020/11/Flame-out-Grattan-report.pdf . (Table 5.2, page 45)

e. The Gas Substitution Roadmap could dramatically change Victorian gas demand and go beyond AEMO's scenarios

In February the Victorian Department of Environment, Land, Water and Planning presented their interim findings for the Gas Substitution Roadmap. The Gas Substitution Roadmap is an important part of Victoria's Climate Change Strategy as it will set out the pathways and policies for the gas sector to reduce emissions in line with the state's interim emissions reduction targets of 45-50% by 2030.

According to their findings, under a "central scenario" Victoria would see gas emissions (and consumption) falling to less than half of current levels by 2030. This scenario would dramatically change existing forecasts and eliminate any shortfall risks by reducing gas demand by more than 100 petajoules (PJ) by 2030, in similar terms as stated by the Northmore Gordon report mentioned above. The reduction would be attained by a mix of energy efficiency, electrification and low emission fuels.

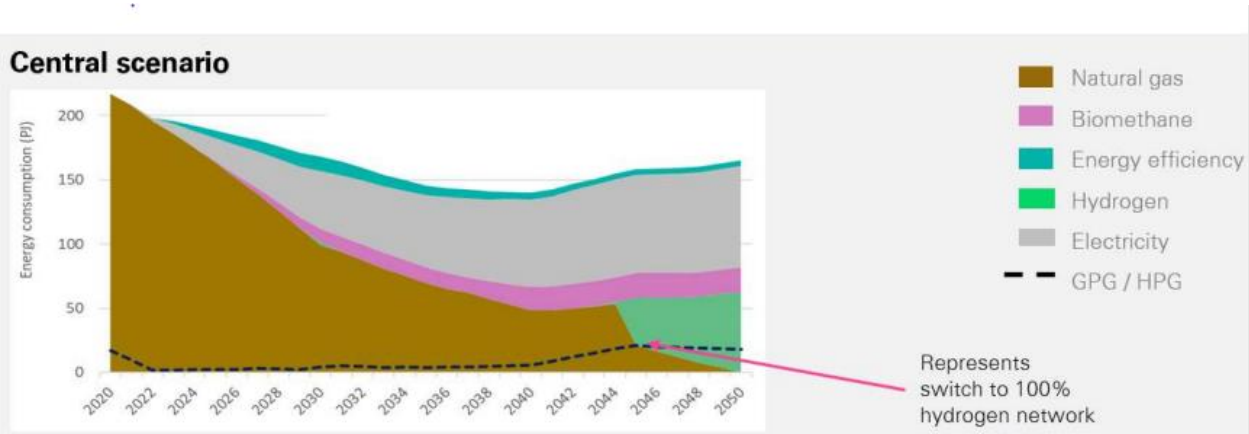

Figure 4. Modelling conducted for stakeholder consultation on the Victorian Government's Gas Substitution Roadmap. Presented in February 2022 by Victorian Department of Environment, Land, Water and Planning.

The Gas Substitution Roadmap is not a departure from existing Victorian climate policy, but rather its articulation.

The modelling shown above is based on achieving 50% emissions reduction in the gas sector by 2030, which would be the sector's pro-rata share of Victoria's 2030 climate targets. The assumptions underpinning this modelling are below.

Interim scenario analysis of transition pathways

Understanding the modelling: scenario definitions

- Four scenarios modelled to understand outcomes under different cost, availability and uptake assumptions

	No Action scenario	Central scenario	Electrified Future scenario	Zero Carbon Fuels Future scenario
Applied emissions constraints	No emissions constraint for gas sector	• 50% emissions reduction by 2030 (from 2005 levels) • Net zero emissions by 2050 • Below 2°C carbon budget		
Technology costs, availability & consumer uptake	Moderate assumptions on technology costs and availability		Assumptions favour electric technologies	Assumptions favour hydrogen technologies
Purpose	Demonstrate magnitude of the task	Demonstrate a plausible combination of pathways	Test pathway sensitivity to assumptions	

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Figure 5. Assumptions in modelling conducted for stakeholder consultation on the Victorian Government's Gas Substitution Roadmap.

While the final report of the Gas Substitution Roadmap has not yet been released, the current available information stands as a very firm indication that **gas consumption in Victoria may reduce by up to half by 2030**.

f. Viva's Project is incompatible with the transition off gas and climate targets

In contrast to the evidence presented above, Viva's EES assumes that Victoria and south-eastern Australia will rely on gas in similar quantities for at least the next two decades. The EES states: "It is anticipated that in the short to medium term, south-eastern Australia will continue to require flexible and

reliable natural gas to meet demand **up to 2040 and beyond**." [14] (emphasis added).

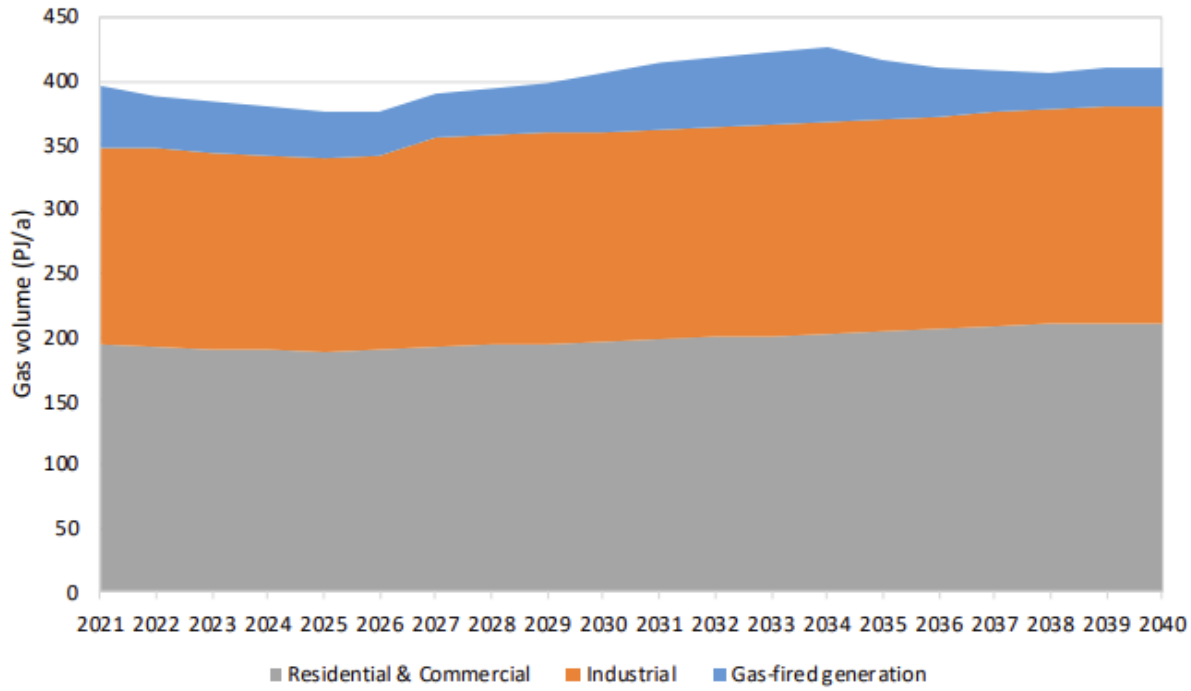

Figure 2-4 Gas demand by market segment south-east Australia Source: EnergyQuest analysis (2021)

Figure 6. Viva's Project gas demand forecast. EES Chapter 2, Figure 2-4

As previously shown, this forecast appears to mischaracterise outdated AEMO reports and is inconsistent with the latest long-term forecasts in AEMO's GSOO and VGPR, as well as modelling for Victoria's Gas Substitution Roadmap.

The Project's forecast of high gas consumption to 2040 and beyond underpins the Project's viability – without this projected demand for gas, the Project is unlikely to be needed for energy security and would be a less attractive commercial proposition.

It's also worth extrapolating what Viva's gas demand forecast means for carbon emissions and testing whether this is compatible with Victoria's climate targets. As mentioned above, Victoria's interim target is

[14] https://www.vivaenergy.com.au/ArticleDocuments/1193/VE-EES-CH2_WEB.pdf.aspx

to reduce emissions by 45-50% by 2030 (based on 2005 levels). This translates into reducing emissions to 63.9 million tonnes (Mt) of carbon dioxide equivalent (CO2e) in the year 2030. The gas sector in 2018 was responsible for 17.4 Mt CO2e, which was about 17% of total emissions in Victoria for that year.[15] If gas sector emissions were to remain roughly the same in absolute terms, they **would constitute 27% of total emissions in Victoria by 2030**. As emissions would have to further decrease by 2040, the gas sector would then constitute an even larger share of total Victorian greenhouse gas emissions.

Viva's assumptions are extremely problematic as the gas sector has a more straightforward path to decarbonisation than other sectors such as agriculture,[16] and sub-sectors such as aviation and shipping.[17] Increasing the burden of emission reductions on these other sectors would increase the costs of abatement and drastically reduce the likelihood of Victoria reaching its net zero emission targets.

Viva's gas forecast also goes against Infrastructure Victoria's advice to the Victorian Government, which concluded that most gas consumption should be substituted by electricity or hydrogen (or a combination of both) if Victoria is going to reach net zero emissions by 2050.[18]

g. Approving a project at odds with climate targets risks 'carbon lock-in'

Projects of this magnitude should be evaluated with a broader lens, as referenced in section 4.1 of the EES Scoping Requirements, which states that the Project should have regard to the 'projected demand and supply in the context of the State's energy needs and climate policy.'

Victoria's key climate legislation, the Climate Change Act (2017) also states: "The Government of Victoria will endeavour to ensure that any decision made by the Government and any policy, program or process developed or implemented by the Government appropriately takes account of climate change … by having regard to the policy objectives and the guiding principles." [19]

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[15] https://parliament.vic.gov.au/file_uploads/Victorian_Greenhouse_Gas_Emissions_Report_2019_prGRqbkV.pdf

[16] https://www.mckinsey.com/~/media/mckinsey/industries/agriculture/our%20insights/reducing%20agriculture%20emissions%20through%20improved%20farming%20practices/agriculture-and-climate-change.pdf

[17] https://www.iea.org/reports/tracking-transport-2020

[18] https://www.infrastructurevictoria.com.au/wp-content/uploads/2021/07/Gas-Infrastructure-Advice-Interim-Report-FINAL-4.pdf

[19] Part 4, Division 1, no. 20 "Decision and policy making". https://www.legislation.vic.gov.au/in-force/acts/climate-change-act-2017/007

In this context, we must evaluate whether it is sensible to approve gas projects in Victoria amid efforts to transition away from it. A crucial question is whether a project is viable if Victorian climate targets are met.

A key concern from an energy transition perspective is that when investments in fossil fuel supply are made, and development paths are chosen, fossil fuel dependence can be entrenched, making it more difficult to move to carbon-free pathways. The IPCC's *Sixth Assessment Report: Mitigation of Climate Change*, released in April 2022, notes in its Summary for Policymakers that: 'The continued installation of unabated fossil fuel infrastructure will "lock-in" GHG emissions'.[20]

In the academic literature, this "carbon lock-in"[21] has been defined to cover three areas:

a) **carbon lock-in associated with the technologies and infrastructure** that indirectly or directly emit greenhouse gases and shape the energy supply;
b) **carbon lock-in associated with governance, institutions, and decision-making** that affect energy-related production and consumption, thereby shaping energy supply and demand;
c) **carbon lock-in related to behaviours**, habits, and norms associated with the demand for energy-related goods and services.[22]

Within this literature, LNG import terminals have been recognised as an emerging challenge for the next phase of the energy transition, when renewables will make up a large share of the electricity sector and other technologies will need to decline. [23] The core risk during this period is that gas import terminals could prolong the status quo reliance on gas even though cheaper and cleaner alternatives exist. This is precisely the challenge Victoria will face during the Project's 20-year timeline. While Viva may argue a gas import terminal is a more 'flexible' infrastructure solution, its existence will still serve to lock in gas and associated pollution according to the above definition – particularly in area c) related to behaviours, given the large number of Victorian households that currently use gas for winter heating.

In summary, while transitioning away from gas would have overall benefits for consumers and the environment, the transition is at risk if an LNG terminal is built based on a business case of high gas

[20] https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf page 37
[21] https://www.sei.org/publications/carbon-lock-in-from-fossil-fuel-supply-infrastructure/
[22] https://www.annualreviews.org/doi/10.1146/annurev-environ-110615-085934
[23] https://www.sciencedirect.com/science/article/pii/S2214629621001523#b0175

consumption until 2040 and beyond. The very existence of the terminal, and the massive new inflow of gas it supplies, would diminish the incentives for decision makers to pursue the necessary climate action at the required speed, entrench existing consumer behaviours to use gas for space heating in winter, and most likely delay the transition off gas.

2. Climate Change and Greenhouse Gases

a. Climate change is a present threat

For millions of Australians, climate change is not a distant future threat but a current dangerous reality, with an increase in catastrophic weather events being the most dramatic effect. The last decade we suffered in Victoria what might have been the worst drought in Australian history, which ravaged our farmers and pushed the Murray-Darling River system to its limit.

This drought – exacerbated by climate change – also created the dry conditions that fuelled devastating summer bushfires in 2019/20. Lives were lost, rural communities destroyed, pristine areas of bush burned, and an estimated three billion wild animals were killed or displaced. [24]

In February of this year, communities in NSW and Queensland suffered two 1-in-1,000-year floods which lasted days, inundated towns and cities,[25] killed 20 people, forced thousands to evacuate and caused damage estimated to top $2 billion.[26]

These record-breaking droughts, bushfires and floods have occurred in a climate that has already warmed 1.1 degrees Celsius since pre-industrial times.

If we continue to emit greenhouse gases at our current level, we will be following a trajectory consistent with Representative Concentration Pathway 8.5 (RCP 8.5), a 'worst-case' scenario that would lead to average global temperature increases of 3.3 to 5.4 degrees Celsius by 2100. [27]

[24] https://www.wwf.org.au/news/news/2020/3-billion-animals-impacted-by-australia-bushfire-crisis#gs.dvts6a
[25] https://theconversation.com/one-of-the-most-extreme-disasters-in-colonial-australian-history-climate-scientists-on-the-floods-and-our-future-risk-178153
[26] https://www.afr.com/politics/floods-damage-bill-set-to-top-2b-20220302-p5a0z5
[27] https://www.pnas.org/content/early/2020/07/30/2007117117

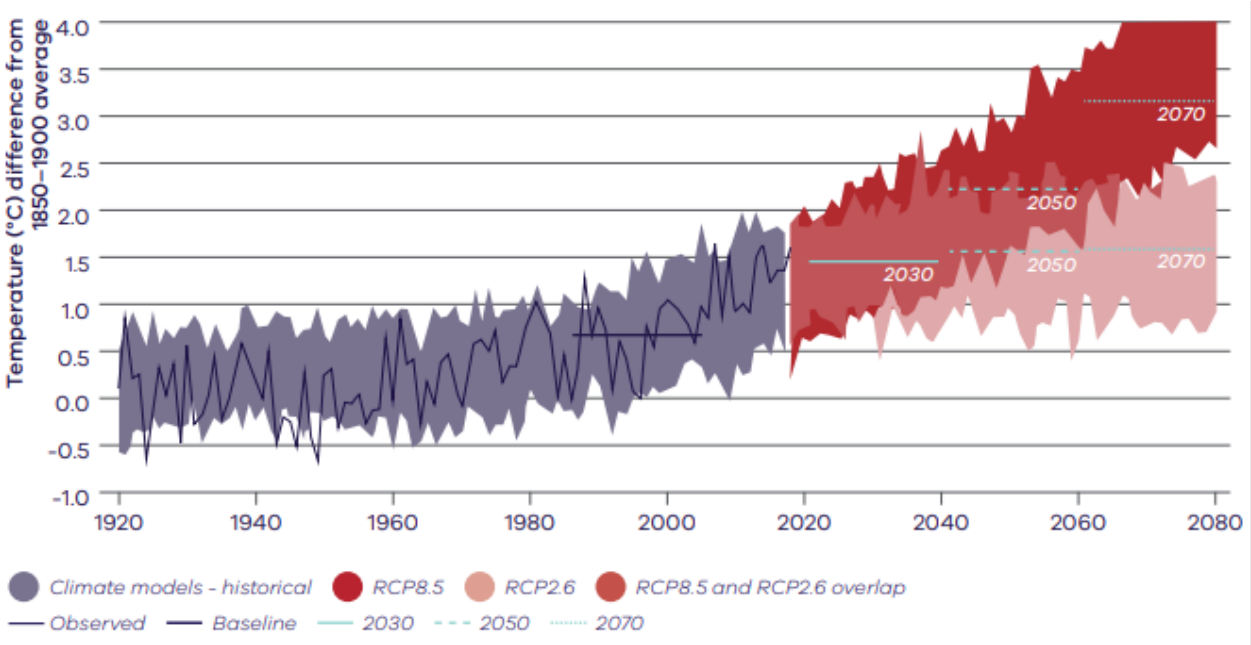

Figure 7. Average annual temperature of Victoria in observations and models relative to the pre-industrial era showing different emission pathways (CSIRO, 2019)

While Viva asserts in its Climate Change Risk Assessment (EES Attachment II) that its Project would be designed to manage the worst-case impacts of climate change,[28] the reality is that we do not know whether the global community could adapt to changes in climate consistent with that emissions trajectory. According to Schellnuber et al (2016), under global warming of 4 degrees Celsius by 2100 "impacts projected for ecosystems, agriculture, and water supply in the twenty-first century could, for example, lead to large-scale displacement of populations, with manifold consequences for human security, health and economic and trade systems." [29]

Contemplating average global temperature increases of 3.3 to 5.4 degrees Celsius by 2100 must force us to reflect on the consequences of continuing to give the green light to fossil fuel projects such as Viva's gas import terminal which make the worst-case scenario a more likely outcome. This is particularly worrisome as the IPCC's 2022 update on climate impacts states that many natural systems, including coral reefs, are *already* approaching hard limits beyond which they will not be able to adapt to increased

[28] End-of-century warming outcomes in RCP8.5 range from 3.3 °C to 5.4 °C (5th to 95th percentile) with a median of 4.5 °C.
[29] https://www.researchgate.net/publication/306037653_The_Challenge_of_a_4C_World_by_2100

temperatures. With further global warming, the IPCC states "losses and damages increase and become increasingly difficult to avoid". [30]

b. Victoria is particularly exposed to the impacts of climate change

Victoria is particularly vulnerable to climate change with observed temperatures tracking towards the upper limit of projections (see Figure 8 below). An acknowledgement of this reality has been included in the preamble of the *Climate Change Act (2017)*: "Victoria is particularly vulnerable to the adverse effects of climate change. Natural disasters are increasing in frequency and severity as a result of the changing climate."

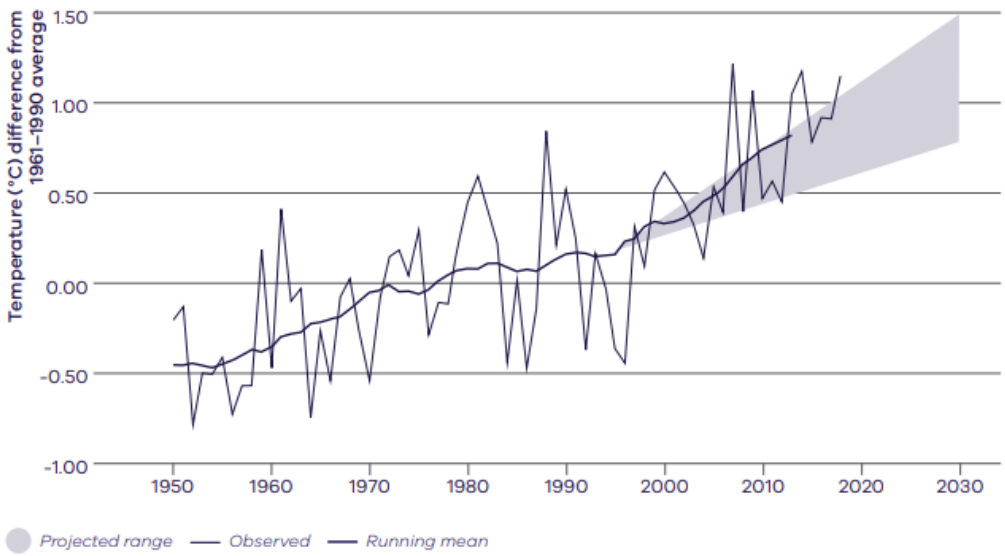

Figure 8. Comparison of the observed average annual temperatures for Victoria with the projected range of change. Shown are observed temperature difference from 1961-1990 average (thin black line) plus the 10-year running average (thicker line), and the projected temperature change to 2030 across climate models and emissions scenarios (relative to a 1986–2005 baseline period). (CSIRO, 2019).

[30] https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf Summary for Policymakers, page 28.

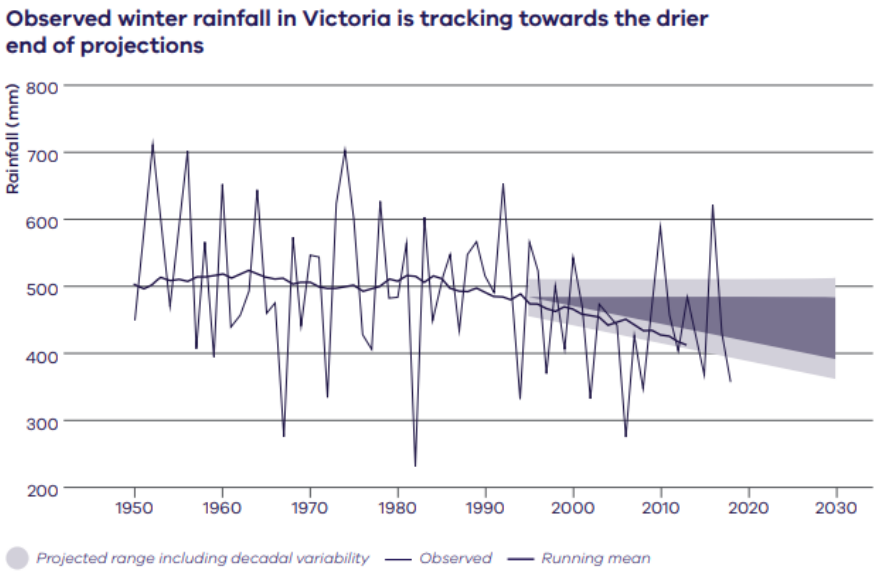

Figure 9. Observed rainfall averaged over Victoria (Australian Water Availability Project; thin black line) plus the 10-year running mean (thicker line), and the projected rainfall change to 2030 across climate models and emissions scenarios (relative to a 1986–2005 baseline period) (dark grey shading) plus an indication of decadal variability (light grey shading; one standard deviation of 10-year running average from the observations). (CSIRO, 2019).

As Figures 8 and 9 show, Victoria has already become hotter and drier and as climate change unfolds, extreme weather events such as intense droughts, bushfires, heatwaves, extreme rainfall events and coastal inundations will become more common.[31]

This will have a wide range of impacts including biodiversity loss, potentially reduced water security, deterioration of our food systems, heat-related health issues and significant damage to key Victorian economic sectors such as agriculture and tourism. [32] [33] [34]

[31] https://www.climatechange.vic.gov.au/__data/assets/pdf_file/0029/442964/Victorias-Climate-Science-Report-2019.pdf
[32] https://www.climatechange.vic.gov.au/__data/assets/pdf_file/0029/442964/Victorias-Climate-Science-Report-2019.pdf
[33] https://www.water.vic.gov.au/climate-change
[34] https://www.necma.vic.gov.au/News-Events/Media-Releases/ArtMID/537/ArticleID/492/Embedding-climate-change-in-agriculture

c. The gas industry has become one of the main drivers behind emissions increases

Despite international commitments such as the Paris Agreement (2015) and increasing evidence that the window of opportunity for limiting climate change to 1.5 degrees Celsius is rapidly closing, annual global greenhouse gas emissions from the energy sector have continued to rise, bouncing back after a brief dip due to the pandemic.[35]

Emissions from natural gas have also increased, growing from 1.8 gigatonnes of CO2e in 2000 to 3.2 gigatonnes in 2021, according to the International Energy Agency.[36] In Australia, the uncontrolled growth of the gas sector – particularly LNG exports – has wiped out most of the progress in other sectors such as in electricity generation during the past few years.[37] [38]

While it is hard to estimate the total emissions of the gas industry in Australia, a proxy could be the fugitive emissions from the gas sector, which increased by more than 50% between 2007 and 2019.[39]

[35] https://www.iea.org/reports/global-energy-review-2021/co2-emissions
[36] https://www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2
[37] https://www.abc.net.au/news/2018-06-21/gorgon-gas-plant-wiping-out-a-year-of-solar-emission-savings/9890386
[38] https://www.theguardian.com/environment/2018/nov/13/problem-in-waiting-why-natural-gas-will-wipe-out-australias-emissions-gains
[39] https://ageis.climatechange.gov.au/Chart.aspx?OD_ID=114088005219&TypeID=3

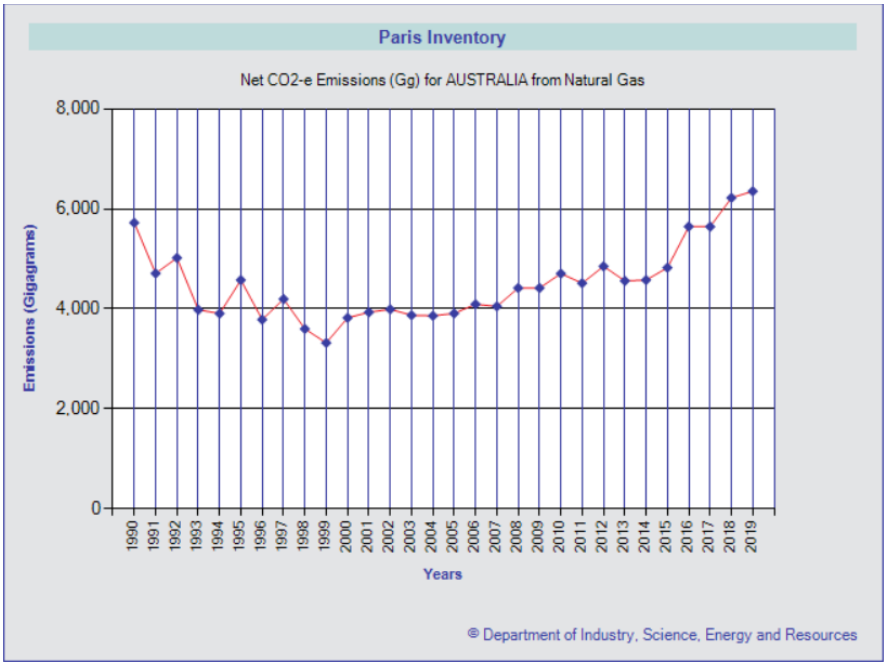

Figure 10. Emissions from the Australian gas sector. Australian Department of Industry, Science, Energy and Resources.

d. The emissions intensity of gas is likely understated

One of the main claims of the gas industry is that gas is cleaner than coal and hence we should adopt it as a "clean fuel". We submit that this argument is deeply flawed, because: (1) as stated above, the gas industry is one of the main forces behind emissions increases, particularly in Australia; (2) climate change is driven by absolute emissions, and if the gas industry keeps growing at its current rate the fact that gas is less carbon-intensive than coal becomes irrelevant; and (3) the assumption that gas itself is less polluting than coal holds true only when considering the final moment of combustion, but not when seen across the full life-cycle, including fugitive emissions.

The claim that gas is a "clean" fuel is based in the fact that gas emits around half the carbon dioxide when combusted in a new, efficient natural gas power plant compared with emissions from a typical new coal power station.[40]

[40] https://netl.doe.gov/projects/files/CostAndPerformanceBaselineForFossilEnergyPlantsVol1BitumCoalAndNGtoElectBBRRev4-1_092419.pdf

This assessment of the climate impact of gas is misleading as drilling and extraction of natural gas from wells, and its transportation through pipelines and/or its liquefaction and re-gasification results in significant gas leakage. Methane, the main component of natural gas, has 34 times the global warming potential of carbon dioxide over a 100-year period and 86 times over a 20-year period.[41] For this reason, the IPCC's *Sixth Assessment Report* concluded that reducing methane emissions is a standout option for achieving near-term climate targets. To date, 111 countries have signed a Global Methane Pledge to reduce methane emissions by 30% by 2030.[42] [43]

One of the main uncertainties around gas production is the level of methane leakage from infrastructure. This is a crucial point: if methane leakage is above 3.2% when it is extracted from the well through to its delivery at a power station, gas becomes just as polluting, if not more polluting, than coal.[44]

Recent studies have shown that we have previously underestimated how much methane is released to the atmosphere during gas production. It has been found that some onshore gas fields in the United States have levels of leakage of 2-17%, far above the 3.2% threshold for gas to deliver any climate benefits.

Despite these findings, the Australian gas industry and National Greenhouse Gas Inventory report far lower emission intensities for unconventional gas emissions than some U.S. gas fields. Existing evidence indicates that this is a result of using default emissions factors instead of more reliable direct measurements.[45]

[41] http://www.climatechange2013.org/images/report/WG1AR5_Chapter08_FINAL.pdf
[42] https://www.globalmethanepledge.org/
[43] https://www.ccacoalition.org/en/resources/briefing-global-methane-pledge
[44] https://www.pnas.org/content/109/17/6435
[45] https://www.climatecollege.unimelb.edu.au/review-current-and-future-methane-emissions-australian-unconventional-oil-and-gas-production

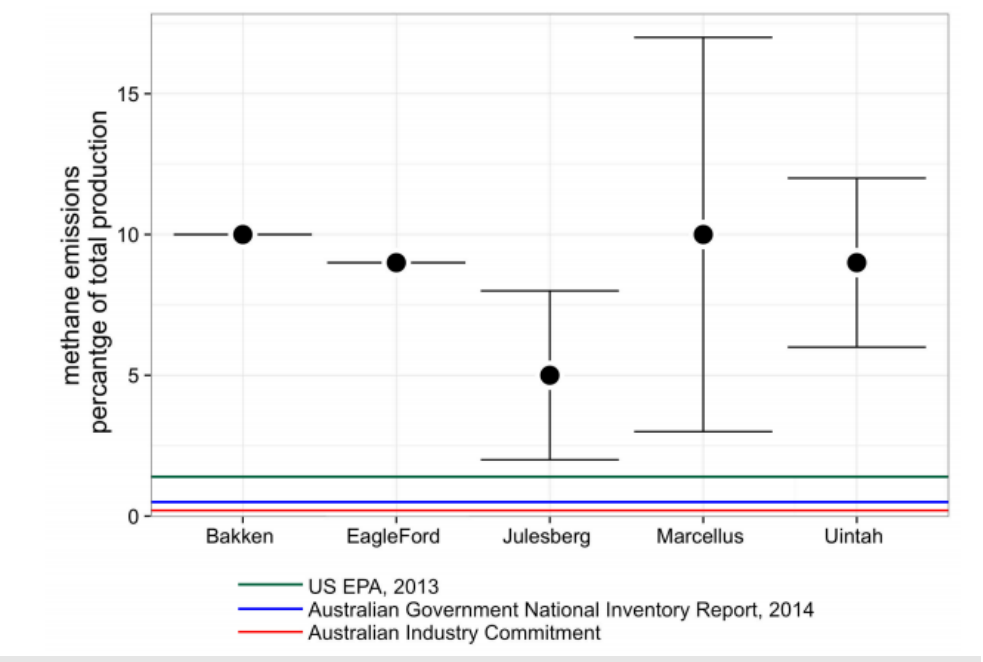

Figure 11. Measured fugitive emissions at US gas fields compared to Australian industry and government reporting (MEI 2016)

Further, analysis conducted to inform Victoria's Gas Substitution Roadmap showed that Victorian households switching from gas to electricity reduced overall emissions, even at current levels of renewable energy in the grid and without additional renewable policies. Because the electricity grid will become less emissions-intensive over time, the environmental benefits of switching away from gas are only going to increase in Victoria.

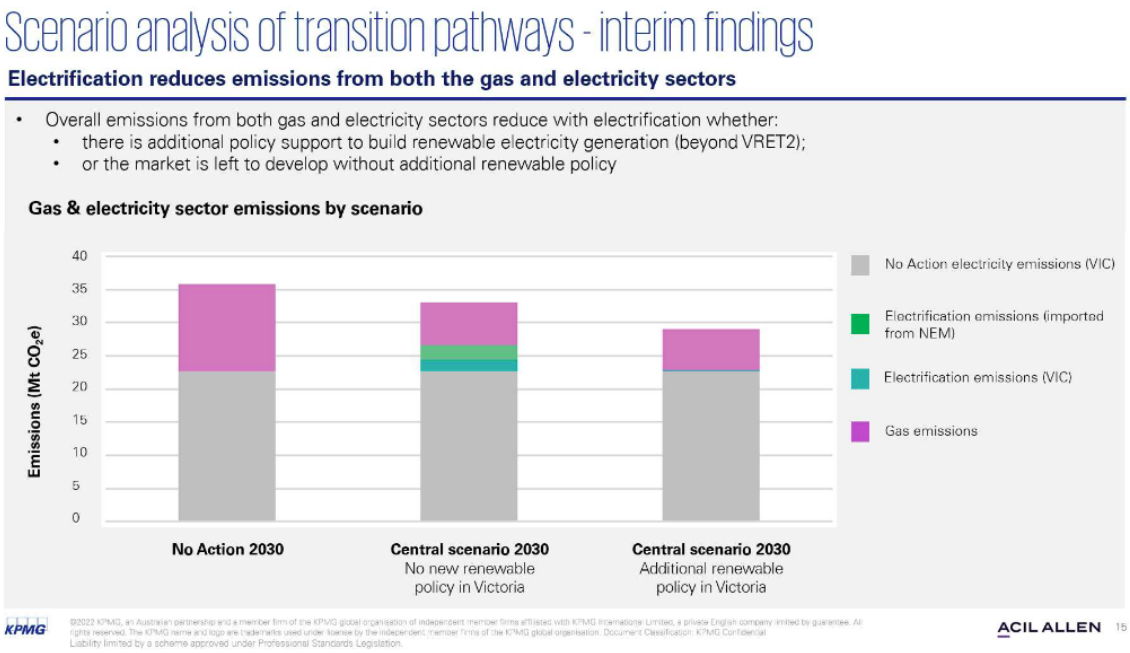

Figure 12. Modelling conducted for stakeholder consultation on the Victorian Government's Gas Substitution Roadmap. Presented in February 2022 by Victorian Department of Environment, Land, Water and Planning.

e. Viva significantly downplays emissions by excluding transport of LNG

Viva estimates that the total annual operations emissions (Scope 1, Scope 2, and 'relevant' Scope 3) of its FSRU operating in open loop mode would amount to just **47,906 tonnes of CO2e, less than nine times the figure reported by AGL in its EES for its Crib Point LNG import terminal, which was 449,390 tonnes.** This is despite both projects having the same import volumes (albeit with a small difference in the number of trips, Viva estimates up to 45 trips to AGL's 40 trips).

Table 11-4: Gas Import Jetty Works operational emissions - open loop and closed loop modes

Emissions source	Project activity	Total annual emissions (t CO_2-e)		
		Scope 1	Scope 2	Scope 3
Stationary fuel	Stationary fuel emissions during operation of the Gas Import Jetty Works (open loop)	55,570	-	-
Transport fuel	Transport fuel emissions during operation of the Gas Import Jetty Works	20	-	389,520
Purchased electricity	Purchased electricity emissions during operation of the Gas Import Jetty Works	-	2,160	210
Fugitive emissions	Fugitive emissions during operation of the Gas Import Jetty Works	1,910	-	-
Gas Import Jetty Works annual operational emissions; open loop		**57,500**	**2,160**	**389,730**
Stationary fuel	Stationary fuel emissions during operation of the Gas Import Jetty Works (closed loop)	236,140	-	-
Transport fuel	Transport fuel emissions during operation of the Gas Import Jetty Works	20	-	389,520
Purchased electricity	Purchased electricity emissions during operation of the Gas Import Jetty Works	-	2,160	210
Fugitive emissions	Fugitive emissions during operation of the Gas Import Jetty Works	1,910	-	-
Gas Import Jetty Works annual operational emissions; closed loop		**238,070**	**2,160**	**389,730**

Table note: The combined loop regasification mode would potentially be used when the ambient seawater temperature is too low for open loop regasification to operate effectively. This has been assumed to be 30 days a year. Should the combined loop be required it would lead to a further 17,370 t CO_2-e per annum in addition to the emissions associated with the open loop mode.

Figure 13. Estimated operational emissions from the EES for AGL's Crib Point gas import terminal project. We have highlighted the emissions from transporting LNG to the site because they represent the largest source of emissions, and constitute virtually the totality of Scope 3 emissions.

This huge difference in greenhouse gas emissions is not caused by different processes but by "creative" climate accounting.

In effect, Viva decided to establish as "Outside Operational Boundary" virtually all Scope 3 emissions, including the transport emissions.

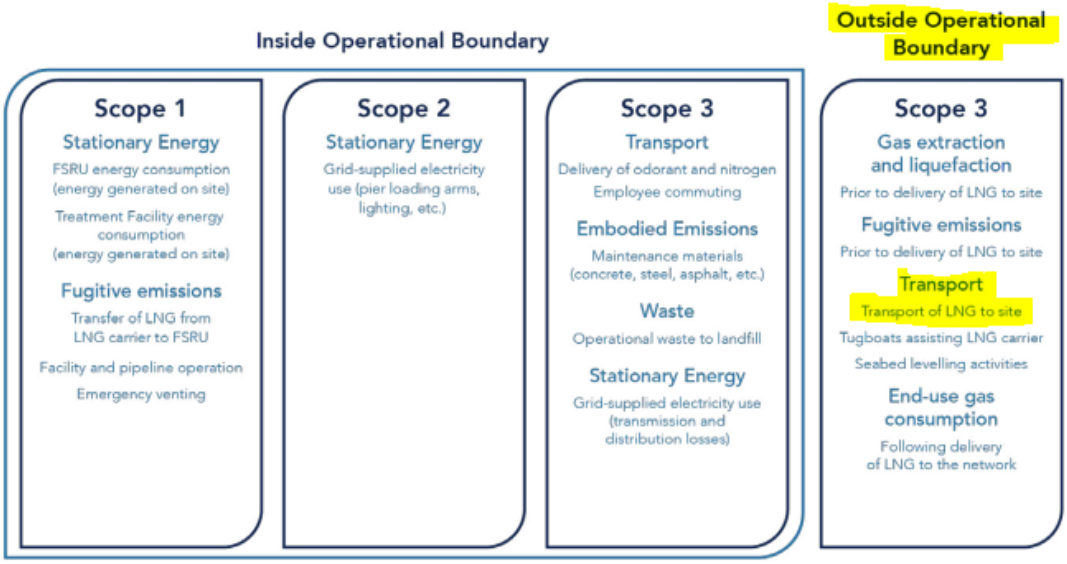

Figure 14. Operational emissions scope boundary, Viva Energy Gas Terminal Project Environment Effects Statement, Chapter 9, Figure 9-3.

Viva's EES justifies excluding emissions from transporting the LNG as follows: "The decisions around the sourcing of LNG cargoes would be made by the customers of the terminal and not by Viva Energy as the operator, therefore the upstream emissions associated with transport of the LNG to the terminal were also not included in the study."

This at odds with the Greenhouse Gas Protocol, the global standard for carbon accounting and reporting. According to the GHG Protocol supplement document "Corporate Value Chain (Scope 3) Accounting and Reporting Standard", companies should account for all Scope 3 emissions and disclose and justify any exclusions. Further, the emissions from transporting the LNG to Geelong would meet the relevance criteria for size, influence, risk, stakeholders, outsourcing and sector guidance (given the only relevant Victorian project did include Scope 3 transport emissions). Finally, this section of the GHG Protocol also explicitly advises against the kind of exclusion that Viva Energy has attempted, stating: "In particular,

companies should not exclude any activity that is expected to contribute significantly to the company's total scope 3 emissions." [46]

In addition, Viva's argument that it has no ability to control where the imported LNG comes from has been undermined by Viva's own actions. In fact, Viva has entered into an MoU with Woodside to supply gas from their fields in Western Australia to their gas import terminal, showing an active role in procuring gas for its terminal operations.[47]

Although this deal is at a preliminary stage and details have not been released, it clearly shows that Viva does have some degree of control or influence over the sourcing of LNG cargoes. Therefore, for the sake of transparency and completeness, Scope 3 emissions from transport should be included in the main GHG emissions assessment.

While Viva tried to exclude transport fuel emissions from their operation boundaries, the company did provide some figures in its *Technical Report C Greenhouse Gas Assessment, Appendix A.* [48] Viva provided figures for fuel transport emissions ranging from 165,500 tonnes of CO2e if gas is sourced from Australia to 553,400 tonnes of CO2e if gas is supplied from Qatar.

If Viva had followed the relevance test of the Greenhouse Gas Protocol, the internationally recognised authority in this space, these transport emissions would be included and the Project's total operating emissions would be 4 or 12 times higher than what Viva has recognised so far.

[46] https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf page 60

[47] https://www.vivaenergy.com.au/media/news/2021/mou-agreed-with-woodside-to-progress-lng-regasification-agreement-viva-energy-signs-heads-of-agreement-for-fsru

[48] https://www.vivaenergy.com.au/ArticleDocuments/1193/VE%20GTP%20TechReportC_Greenhouse%20gas_exhibition.pdf.aspx

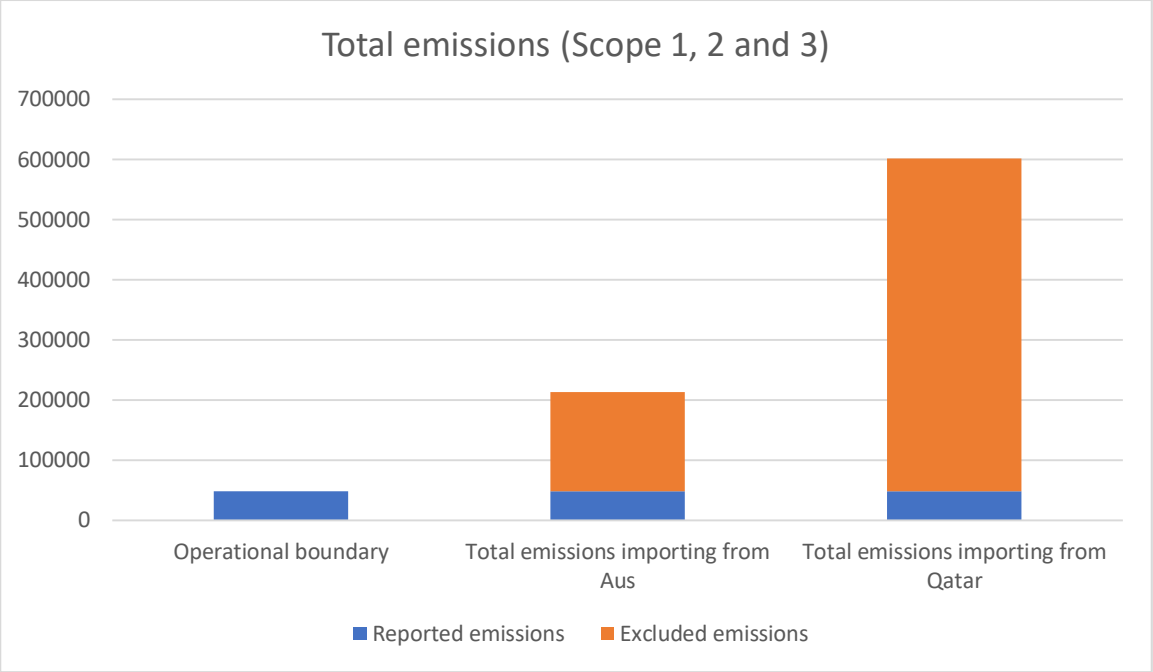

Figure 15. Comparison of Viva's attributed GHG emissions for the gas terminal in open loop mode, showing the large emissions difference when transport is included.

While there is legal uncertainty around how Scope 3 emissions will be treated in the future, these emissions ought to be a consideration for this IAC, especially given the very significant overall volume of emissions associated with the use of Viva's imported gas. As the IAC panel reporting on AGL's Crib Point gas terminal found: "The consideration of Scope 3 GHG emissions associated with upstream transport of LNG to Crib Point is relevant and significantly increases the Project's GHG emissions."[49]

The emissions associated with transporting are a prerequisite for the facility to operate and would not be incurred without its existence. Regardless of whether Viva is the owner or operator of the terminal, transport emissions are highly relevant to the Project and should be accounted for.

[49] https://www.planning.vic.gov.au/__data/assets/pdf_file/0022/517144/Crib-Point-EES-IAC-Report-1-Main-Report.pdf Findings 9.3.4, page 151

In this sense, in NSW the Court of Appeal in the 'Rocky Hill' Case (2019) held that Scope 3 emissions were clearly relevant to the consideration of the environmental impacts of the project and considerations of the public interest.[50]

f. Total emissions associated with this Project are significant

As mentioned above, Viva has chosen to estimate emissions for the gas terminal using a narrow scope that excludes most Scope 3 emissions, especially transport. Viva then uses this misrepresentative figure to argue that the emissions would equate to only 0.01% of Victoria's annual greenhouse gas emissions. However, it must also be noted that the volume of gas to be imported (up to 160 petajoules) is linked to approximately 8.8 million tonnes of greenhouse gas emissions[51] when that gas is burned in homes and businesses, which would equate to 9.6% of Victoria's emissions.[52]

Viva may claim no responsibility for these Scope 3 downstream emissions, but as the carbon lock-in argument in section 1 g) above explains, approving fossil fuel infrastructure has an anchoring effect that reinforces existing consumer behaviours. **A key question for this Project is whether it is compatible with a downward trajectory of emissions.** For that, we submit the answer is no: building this Project will discourage other, better, cleaner options such as reducing gas demand through household energy upgrades and improved commercial and industrial energy efficiency. Essentially, it could lock in Victoria's high gas consumption for decades and hamper Victoria's ability to reduce emissions in a manner consistent with the objectives of the Paris Agreement and the state's 50% emissions reduction target by 2030.

3. The impacts of dredging require further research

The Project has adopted the NADG (2009) guidelines[53] as the basis for assessment of sediment contamination, despite these Guidelines only applying to Commonwealth waters. Port Phillip Bay is

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[50] *Glouscester Resources Limited v Minister for Planning* [2019] NSWLEC 7.

[51] https://www.vivaenergy.com.au/ArticleDocuments/1193/VE%20GTP%20TechReportC_Greenhouse%20gas_exhibition.pdf.aspx Figures from Viva Energy EES Technical Report C, page 56.

[52] Victoria's net emissions in 2019 were 91.3Mt of CO2-e https://parliament.vic.gov.au/file_uploads/Victorian_Greenhouse_Gas_Emissions_Report_2019_prGRqbkV.pdf

[53] https://www.awe.gov.au/environment/marine/publications/national-assessment-guidelines-dredging-2009

outside their jurisdiction and the Victorian EPA's Best Practice Environmental Management (BEPM) Guidelines for Dredging ("Dredging BPEM") should be followed, except for issues upon which the Victorian guidelines are silent.

The Dredging BPEM is clear that the history of contamination in an area to be dredged should be established,[54] and this does not appear to have been done by Viva. There is no reference to the many samples taken to assess sediment contamination in the late 1990s prior to the Geelong Channel Improvement program where the entire 38 km shipping channel was deepened. Data from these analyses would be available from the Port of Geelong.

The Dredging BPEM also makes clear the importance of properly sampling the area to be dredged: "Proponents must ensure that the suite of contaminants analysed and the intensity of sampling adequately characterise the area to be dredged." [55] Considering the dredging location is nearby a refinery wharf, petroleum hydrocarbon contamination is a major concern and Technical Reports B1 and B2 into dredged sediment disposal options fail to highlight these measurements. This is relevant as sediments with high levels of petroleum hydrocarbons could be classified as "prescribed waste" under the *Environment Protection Act 2017* (Vic) and must be disposed to land after dewatering. This process may be needed if contaminant levels are high in the surface sediment to be dredged.

The stratification of sediment sampling and analysis by sediment depth is also inadequate. It is very important that depth stratified sampling occurs and data is presented in a way that identifies which layers are contaminated. This has not been done in a way that is evident in the EES. While depth stratified sampling has been undertaken, in many instances samples were not taken in the 0-0.5 meter depth range, **the depth most likely to be contaminated.** More serious than this omission is the failure to analyse data by sediment depth. This is important to ensure that if contamination is confined to the surface layer that this can be deposited to deeper, less contaminated sediments. Overall, the dredged sediment assessment lacks clarity and further independent research is required to ensure community confidence in the findings.

[54] https://www.epa.vic.gov.au/about-epa/publications/691 Section 3.3.
[55] https://www.epa.vic.gov.au/about-epa/publications/691 page 15.

4. The project's location puts the community at risk

Research by Sandia Laboratories[56] regarding LNG spills determines Hazard Zones around an FSRU or LNG tankers. The risks to the community from an LNG spill do not adequately dissipate until 3.5km from the spill site at the FSRU or transiting LNG tankers. Based on 2016 Census data, it is estimated that **over 30,000 Geelong residents and 8000 residents at Port Phillip Heads** live within 3.5km of the shipping channel and proposed terminal location if LNG is introduced to Corio Bay via Port Phillip Heads.

People within Hazard Zone 1 are at risk of death and significant property damage in the event of a nearby incident. Hazard Zone 2 presents a risk of death to people if exposed for extended periods of time, plus injury and property damage. People in Hazard Zone 3 are at risk of injury from burns if exposed for 30 seconds or longer.

The intensity of the risks and the number of people potentially affected by a catastrophic event should raise the question whether a project of this nature should proceed in the vicinity of a residential area.

5. Stakeholder engagement and social impacts

The EES claims that "Viva Energy used a broad range of engagement and consultation tools". Yet of the thirteen modes provided, ten are solely information provision channels that do not facilitate consultation or engagement. Only three offered any opportunity for dialogue – meetings, community information sessions and business forums. Only 16 local residents attended the first Community Session in February 2021, 6 attended the meeting in May, 13 attended the meeting in July, and 10 attended the meeting in August.[57] Many of these were repeat attendees so it is unlikely that Viva consulted with more than 20 people in Greater Geelong (pop 258,000) or 0.008% of the community. It is hard to argue that this comprises appropriate engagement. Further, such meetings were titled 'Community Information Sessions', clearly implying a one-way delivery of information rather than genuine consultation.

[56] https://www.osti.gov/servlets/purl/882343/

[57] Attendance figures were not in the EES so have been compiled from community updates at: https://www.vivaenergy.com.au/energy-hub/gas-terminal-project/latest-news/gas-terminal-project Attendance figures were not published for the meetings in October and November 2021 or March 2022.

This lack of involvement with Viva's stakeholder engagement process should not be understood as a lack of interest in the Project by the community, as locals have found different avenues to engage with this proposal. *The Geelong Advertiser* has reported that more than 4000 locals have signed a petition opposing the Project and 400 people attended a protest march against the gas terminal on 2 April 2022.[58] This discrepancy between Viva's low community attendance rates and high numbers of people opposing the Project shows that Viva has not adequately addressed community concerns and does not have social licence to proceed.

a. Cumulative impact on public health

The Social Impact Assessment (SIA) within the EES lacks clarity around the cumulative adverse environmental and amenity impacts on the community. These impacts relate to a range of areas, including but not limited to: risks to biodiversity; lost autonomy; unforeseen hazard risks and associated lack of evidence; exposure to noise and light pollution; mental health implications of climate change; and environmental damage.

While the social and cultural impacts on community health are of grave concern to many social interest groups, 'health concerns associated to social health and quality of life, rarely carry over to post decision monitoring' by resource companies in Australia, according to Kinnear, Kabir, Mann & Bricknell.[59]

This evidence supports community concerns that if this Project did go ahead there would be only very low level (if any) monitoring of the long-term human health impacts (both mental, physical and social) by Viva. There was potential for Viva to address this concern through the SIA or any other documentation within the EES. This, however, was not provided at any satisfactory level.

Without the provision of adequate evidence or even acknowledgement of many of these impacts and areas of concern for the community, we submit that Viva has failed to demonstrate it understands the effect this Project will have on the community, and therefore has not performed its duty as the proponent in this EES process.

[58] https://geelongrenewablesnotgas.org/wp-content/uploads/2022/04/Geelong-Advertiser_04Apr22-copy-scaled.jpg
[59] https://www.researchgate.net/publication/280056321

Conclusion

We submit that Viva has failed to make the case that its Project is either necessary or an acceptable way to address Victoria's energy security given our existing climate laws and policy.

Further, we submit that the Project would hinder Victorian efforts to transform our energy systems, serving to maintain the Victorian reliance on polluting gas, making it harder for the state to reduce its emissions over the critical next decade in particular, but also across the intended 20-year life of the Project.

Key points:

On the rationale for the Project we submit that Viva:

- has mischaracterised existing gas market forecasts, by overstating potential supply crunches and understating forecast gas demand reductions in future years.
- puts forward this Project under the assumption that gas consumption will remain stable over the next two decades, demonstrating that the Project's ongoing viability is incompatible and inconsistent with Victoria's existing emissions reduction targets or their articulation in incoming Gas Substitution Roadmap policy.
- does not provide evidence that increasing gas supply would provide greater benefits to Victoria than other approaches such as reducing gas demand through household electrification and energy efficiency.

On the climate impacts of the Project we submit that:

- Viva attempts to understate the impact this Project could have by choosing to exclude most Scope 3 emissions, especially those emissions generated in transporting the LNG to Geelong. When transport emissions are included, the actual operating emissions are between four and 12 times higher, depending on the source of gas.
- The very existence of the Project will serve to lock in high emissions linked to gas consumption in Victoria and could delay necessary policies and programs targeted at reducing gas use.

Ultimately, we submit that this gas terminal should not be approved. We are at a pivotal moment for Victorian gas policy and this Project could derail existing efforts. We urge the IAC to assess the EES according to its merit and recommend against this Project.