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NeuRizer underground coal gasification project – economic considerations

Coal gasification is a polluting, costly and outdated technology. The NeuRizer proposal would bring no economic benefit and significant environmental risks. It should not receive federal or state government approval.

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INTRODUCTION

The Australia Institute welcomes the opportunity to make a submission on the Syngas and Power Generation, Stage 1 Commercial Development, NeuRizer Urea Project, which is currently open for public comment under the Environmental Protection and Biodiversity Conservation (EPBC) Act Public Portal.

The NeuRizer Urea Project is a proposal to produce 'synthetic' gas (or syngas) from underground coal at the site of South Australia's last coal mine, Leigh Creek. The mine, which ceased production in 2015, is located approximately 500km north of Adelaide and 260km north of Port Augusta. The proposal would use 'underground coal gasification' (UCG), also referred to by NeuRizer as 'in-situ gasification' or 'ISG'.

To put the NeuRizer project in context, UCG proposals at Leigh Creek go back to at least the 1980s. A study from that era, on the South Australian Government website, expected proposals to be commercially viable then, emphasising Australia was facing liquid fuel shortages and looking to the USSR's lead on UCG.[1] Forty years later, Australia is the world's largest exporter of liquified natural gas and the USSR is no

[1] Steward and Shedden (1986) *In-situ gasification of coal for electricity, syngas and synfuels*, https://energymining.sa.gov.au/__data/assets/pdf_file/0006/312819/UCG_paper.pdf

more. The changes in energy markets and technology in the next 40 years are likely to be at least as great as those in the last 40. UCG has not developed in Australia since the 1980s and there is little suggestion that it can, or should, in the coming decades.

Also important context is Australia's only other recent UCG project, the Linc Energy project in Queensland. That project caused pollution so severe that charges were laid against five executives of Linc Energy.[2] While those charges were later dropped,[3] the key point is that coal gasification is highly polluting. As discussed below, there are countless contaminated sites in Australia from legacy coal gasification works. The Linc Energy project is also linked to the NeuRizer project via personnel. The Executive Chairman of NeuRizer, Justyn Peters, was the General Manager Environment and Government Relations at Linc Energy.[4] Mr Peters was not one of the Linc executives charged in relation to that project's pollution and The Australia Institute makes no allegation of wrongdoing by Mr Peters.

The NeuRizer Project has two stages. Stage one would construct a small 5 megawatt (MW) electricity generator to be fuelled by syngas produced on site. It is this stage that is currently being assessed under the EPBC Act, most likely due to potential impacts on water resources. This hits the 'water trigger' of the EPBC Act in terms of the Matters of National Environmental Significance (MNES), requiring federal approval.

Stage two is aimed at larger-scale production of syngas to be used as a feedstock for fertiliser production.[5] The South Australian Government's recent Green Paper on the energy transition also lists Leigh Creek as a potential site for hydrogen production from coal reserves.[6]

[2] AAP (2016) *Five Linc Energy executives charged with breaching environmental law*, https://www.theguardian.com/environment/2016/nov/14/five-linc-energy-executives-charged-with-breaching-environmental-law

[3] Chen et al (2021) *Charges against former Linc Energy executives dropped*, https://www.abc.net.au/news/2021-08-17/linc-energy-case-dropped/100382384

[4] NeuRizer (n.d.) *Our leaders*, https://neurizer.com.au/our-business/our-leaders/

[5] NeuRizer (2023) *Environmental Impact Report: Stage 1 Commercial Development: NeuRizer Urea Project - Petroleum Production Licence 269*,

[6] SA Department for Energy and Mining (2023) *South Australia's green paper on the energy transition*, https://www.energymining.sa.gov.au/public-consultations/south-australias-green-paper-on-the-energy-transition

COSTS AND RISKS

The main cost of the NeuRizer Urea Project is the risk of environmental impacts from the project. UCG can have major impacts on soil, water, air quality and greenhouse gas emissions.

These costs can be significant. The Queensland Government has been attempting to recover some of the costs of environmental damage from the failed Linc Energy UCG project, with fines and charges running into the tens of millions of dollars, with headline figures of at least $32 million.[7] These figures do not necessarily reflect the environmental value of the damage done. Depending on the scale and nature of impacts and the valuation method, costs could be measured into the hundreds of millions.

While Australia's recent experience with UCG has been limited (and costly), the country has long experience with syngas production. Before 'natural gas' was piped throughout Australian cities, 'gasworks' were common. At gasworks, 'town gas' (also syngas) was produced from coal and supplied to local areas. Today, gasworks sites are notorious for contamination of soil and water across the nation. Taxpayers, ratepayers, and the natural environment have borne the costs of historic syngas production, costs again likely to run into the hundreds of millions. A basic search of state government publications on this topic finds mention of this issue in South Australia,[8] as well as greater documentation in NSW and Victoria.[9]

Most of the above discussion of UCG and syngas contamination relates to urban or agricultural areas, so does not make detailed consideration of impacts on Indigenous cultural heritage or biodiversity impacts, which may be relevant to the Leigh Creek context. These discussions include minimal consideration of climate change in greenhouse gas emissions from UCG or other syngas projects, neglecting another potentially significant cost.

[7] Moore (2015) *Linc Energy facing $32.5m 'environmental damage' fine*, https://www.brisbanetimes.com.au/national/queensland/linc-energy-facing-325m-environmental-damage-fine-20150610-ghkmqy.html

[8] EPA SA (2016) *Site contamination: Overview fact sheet*, http://www.epa.sa.gov.au/files/12558_sc_overview_info.pdf

[9] EPA NSW (2019) *Former gasworks sites*, https://www.epa.nsw.gov.au/your-environment/contaminated-land/other-contamination-issues/former-gasworks-sites; EPA Victoria (2002) Prevention and management of contamination of land in Victoria, https://www.epa.vic.gov.au/-/media/epa/files/publications/854.pdf

BENEFITS

Stage one

The proposal to construct a 5 MW electricity generator powered by syngas is difficult to understand from an economic perspective. For the reasons provided below, the additional electricity is unnecessary and even if necessary, developing renewable energy would be cheaper and safer.

As noted in the 2023 Environmental Impact Report (EIR),[10] Leigh Creek is connected to the National Electricity Market (NEM) grid by a high voltage cable to Port Augusta. Power requirements in the area appear to be met by this link to the NEM. With the closure of the coal mine, it is likely a considerable expansion in local electricity demand, such as that proposed in the Project's Stage two, could be met by the existing transmission infrastructure.

If new generation capacity is required, it is likely that the easiest, cheapest, and safest way to provide it would be with renewable energy.[11] This could be firmed with the existing grid connection, or with batteries. Leigh Creek is in a designated renewable energy zone, with the Australian Energy Market Operator (AEMO) noting excellent solar and good wind resources, along with potential for pumped hydro and geothermal energy. Although not a priority for development under AEMO's main future scenarios, the potential for energy storage in the area is considered important.[12]

Even with large-scale development under Stage two of NeuRizer's proposal, the cheapest and safest way of delivering electricity would be through renewable energy and storage. Data on the costs of UCG-fuelled small-scale electricity generation is scarce. None is provided in the documentation listed above, which makes detailed economic consideration of the project difficult. The CSIRO GenCost 2022-23 study

[10] NeuRizer (2023) *Environmental Impact Report: Stage 1 Commercial Development: NeuRizer Urea Project - Petroleum Production Licence 269,* https://epbcpublicportal.awe.gov.au/open-for-comments/project-decision/?id=c3133eff-772a-ee11-9966-000d3a7943d3

[11] CSIRO (2020) Renewables still the cheapest new-build power in Australia, https://www.csiro.au/en/News/News-releases/2020/Renewables-still-the-cheapest-new-build-power-in-Australia

[12] AEMO (2020) *2020 ISP Appendix 5. Renewable Energy Zones*, https://www.aemo.com.au/-/media/files/major-publications/isp/2020/appendix--5.pdf?la=en

suggests that even if gas costs could be minimised, small-scale gas generation is simply not competitive with renewable energy.[13]

Thus, despite being labelled "commercial" in the EIR, Stage one does not appear to generate any commercial or wider economic benefit. This is clear from the EIR, which notes NeuRizer would spend $20-25 million in this stage, while generating revenue of just $3.5 million per year in electricity sales (p. 71). Even this sales figure seems optimistic given the competition in the SA electricity market and the transmission challenges highlighted by AEMO for generation at Leigh Creek.[14]

According to NeuRizer Executive Chairman Justyn Peters, the purpose of Stage one is not commercial at all. Instead it is a "risk management process", that aims to "give an awful lot of comfort [for Stage two investors] if they can see it actually operating and producing gas on a daily basis."[15]

Stage two

The basic logic of the Stage two project is that if a large volume of gas can be produced cheaply, this will underpin the development of chemical/fertiliser manufacturing that uses the gas as a feedstock. However, the mere presence of a gas supply does not spur manufacturing development, particularly in locations far from markets and other infrastructure.

This has been most thoroughly demonstrated in the Northern Territory (NT). In 2009 the NT Government's Power and Water Corporation (PWC) contracted to purchase $4 billion worth of gas from the Blacktip project in the Bonaparte Gulf, off Wadeye. This was far more gas than the NT could use, as PWC acknowledged at the time. The NT Government spent a decade and millions of dollars trying to find users for this gas, eventually contracting for a pipeline to existing fertilizer producers at Mount Isa in 2019. During this period, when the NT Government would have given gas virtually free

[13] CSIRO (2023) *GenCost 2023-23: wind and solar remain the lowest cost new build energy generation sources despite inflationary pressures*, https://www.csiro.au/en/research/technology-space/energy/energy-data-modelling/gencost

[14] AEMO (2020) *2020 ISP Appendix 5. Renewable Energy Zones*, https://www.aemo.com.au/-/media/files/major-publications/isp/2020/appendix--5.pdf?la=en

[15] NeuRizer (2023) *Conversation 3 with NeuRizer Ltd Executive Chairman, Justyn Peters*, https://neurizer.com.au/news/neurizer-news/conversation-3-with-neurizer-ltd-executive-chairman-justyn-peters/

to any viable user, no such development occurred and employment in gas-related manufacturing sectors actually declined.[16]

While the NT is the clearest example of the fact that gas supply alone does not generate gas-related manufacturing, the same dynamic is evident across Australia. Australia has become the world's largest supplier of liquefied natural gas, with east coast gas supply tripling in the last decade. This expansion has not generated a manufacturing boom, quite the opposite. There is no clear reason why gas supply at Leigh Creek would prove any different.

LOCAL BENEFITS

The NeuRizer website and EIR highlight potential employment, economic activity and payments to traditional owners as benefits of the project. While such benefits could occur if the Stage two project proceeds, there are far less risky ways of achieving such benefits than through UCG development. If improving employment and other aspects of the Leigh Creek community are policy goals for the South Australian and Australian governments, then direct investment in health, education and other services are likely to be more effective in delivering these benefits. Governments should not leave regional development to the side-effects of capital intensive development, but should pursue development goals directly.

A good example of this has been federal and Western Australian government spending on the expansion of the Ord River irrigation scheme. The WA Auditor General found that the scheme itself had delivered few jobs and benefits despite hundreds of millions spent. Spending on local TAFEs and other social infrastructure, by contrast, had generated lasting benefits.[17]

CONCLUSION

There is no clear economic justification for the NeuRizer Urea Project. Stage one is a loss-making, unnecessary electricity generation scheme. Stage two is a speculative attempt to develop a urea plant in a remote area, far from markets, based only on provision of a gas supply. This kind of project has a thorough history of failure.

[16] See Campbell (2020) *Why onshore gas will not help manufacturing in the NT*, https://australiainstitute.org.au/wp-content/uploads/2020/12/P944-NT-gas-and-manufacturing-Web.pdf

[17] WA OAG (2016) *Ord-East Kimberley Development*, https://audit.wa.gov.au/reports-and-publications/reports/ord-east-kimberley-development/auditor-generals-overview/

These projects offer no apparent economic benefit to the South Australian community, but present significant environmental risks. While some local benefits could be derived from the development, these could be pursued through targeted regional development initiatives, or possibly through the development of the Leigh Creek Renewable Energy Zone. These options would be more likely to deliver benefits, without the major environmental risks of UCG and syngas production.