



## The solution to Australia's urea supply concerns

NeuRizer (ASX: NRZ) aims to address the supply shortage of urea in Australia by becoming the leading sovereign producer in the domestic market through its flagship project, the NeuRizer Urea Project (NRUP). NRUP will have a fully vertically integrated production facility with the capacity to produce up to 2Mtpa of urea, matching Australia's annual demand. It is strategically located to access domestic target markets in a direct and inexpensive manner.

NRUP will have the capability to produce 30+ years of urea, and likewise, its inputs (syngas, power, CO<sub>2</sub>) are all available on site (ie a vertically integrated project) which will minimize its commodity risk and place its opex costs in the lowest cost quartile of global urea producers. It would also leverage on-site infrastructure to ensure further cost-savings and reduce its cost of transportation and time-to-market to key consumption regions (vis-à-vis imports).

### En route to achieve commercialisation by 2025

NRZ has finalised EPCC agreements and licensed the required technologies from leading firms, such as DL E&C, KBR and Stamicarbon. It has commenced Stage 1 development, plans to proceed to Stage 2 in 2023 and reach commercialisation by 2025.

The company is well on track towards achieving this goal. It has already finalised a five-year binding take-or-pay offtake agreement for the sale of 500Mtpa to a foreign customer for a total of A\$1.5b (based on forecast prices). And it has already received a letter of support from a major ECA to fund circa A\$1.5b (in debt) of its total capex costs of A\$2.6b.

### Valuation range of \$0.37-\$0.60 per share

We have valued NeuRizer at A\$0.37 per share base case and \$0.60 per share optimistic case using the DCF approach. Please see pages 20 for our key assumptions and page 21 for the key risks.

Year to June (A\$m)	2023F	2024F	2025F	2026F	2027F
Sales (m)	0.1	0.1	224.7	357.7	568.5
Opex (m)	-15.9	-16.6	-136.8	-201.0	-250.1
Adjusted EBITDA (m)	-15.9	-16.5	27.6	66.2	197.8
EBITDA margin (%)	n.m.	n.m.	12.3%	18.5%	34.8%
NPAT (m)	-15.9	-11.6	4.9	20.2	88.5
NPAT margin (%)	n.m.	n.m.	2.2%	5.6%	15.6%

Estimates: Pitt Street Research

Share Price: \$0.14

ASX: NRZ

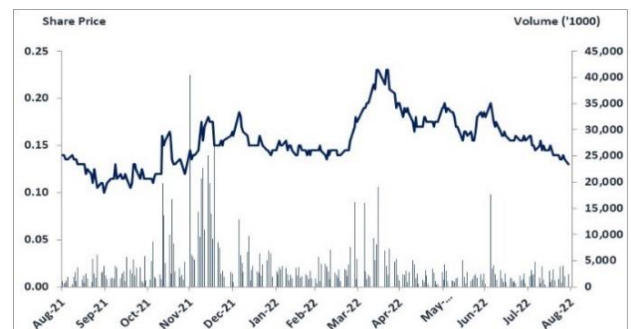
Sector: Materials

15 September 2022

Market Cap. (A\$ m)	147.3
# Shares outstanding (m)	1,052.0
# Share fully diluted (m)	1,052.0
Market Cap Full. Dil. (A\$m)	147.3
Free Float	67.6%
12-months high/low (A\$)	0.26/0.10
Avg. daily volume ('1000)	4,024.6
Website	www.neurizer.com.au

Source: Company, Pitt Street Research

### Share price (A\$) and avg. daily volume (k, r.h.s.)



Source: Thomson Reuters, Pitt Street Research

Valuation metrics	
DCF fair valuation range (A\$)	\$0.37-\$0.60
WACC	8.53%
Assumed terminal growth rate	0.5%

Estimates: Pitt Street Research

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## Table of Contents

Executive summary	3
Introducing NeuRizer (ASX: NRZ)	6
Key reasons to look at NRZ	7
Urea – growing worldwide demand hit by a global supply shortage	9
<i>The need to expand crop production volumes is driving the demand</i> .....	9
<i>Increasing input prices have impacted the global urea supply</i> .....	9
<i>The cascading effect of the global urea crisis on Australia's supply chain</i> .....	11
The global issue of sustainability	12
NeuRizer could be a breakthrough player in Australia's wholesale fertiliser landscape	12
A strategic location and favourable geology for NRUP	13
Operating cost advantages through a self-sufficient urea production process	14
<i>Access to funds from diverse sources to meet capex needs</i> .....	14
On the path of commercialisation from 2025	15
<i>Secured A\$1.5b offtake agreement for 50% of initial production</i> .....	16
<i>Plans to adopt a new corporate structure after commercialisation</i> .....	17
Established ESG processes coupled with carbon neutral status	17
NRUP could generate a pre-tax NPV of A\$3.3b	18
Need to augment supply to meet growing demand	19
Competitive Landscape	20
Valuation of A\$0.37-\$0.60 per share	21
<i>Differences between base and bull cases</i> .....	22
<i>Re-rating NRZ</i> .....	22
<i>Risks</i> .....	22
Experienced Leadership Team	23
Appendix I – Analyst certification	24
Appendix II – Glossary	24
Appendix III – Major Shareholders	26
Appendix IV – Key Milestones	26
General Advice Warning, Disclaimer & Disclosures	27



## Executive summary

**Who is NeuRizer?** The Adelaide-based NeuRizer Ltd is developing the NeuRizer Urea Project (NRUP) in South Australia. This project covers the old Leigh Creek Coal Mine, 550 km north of Adelaide, which for many decades provided thermal coal for a power station at Port Augusta before the mine closed in 2015. NeuRizer will now use in-situ gasification to produce syngas from the deep Leigh Creek coal seams, and use this syngas to produce urea, a commonly used fertiliser. A Pre-Feasibility Study published in November 2020 valued the NeuRizer Urea Project at A\$3.4bn pre-tax, using a 9% discount rate. A Bankable Feasibility Study is now being completed. Until March 2022 the NeuRizer Urea Project was called the Leigh Creek Energy Project.

**What is urea?** Urea is an organic compound with chemical formula  $\text{CO}(\text{NH}_2)_2$ . The product is widely used in fertilisers as a source of nitrogen. The main feedstock for the world's urea production is methane gas ( $\text{CH}_4$ ), which is first converted to ammonia under high temperatures and pressure, and then into urea with the addition of carbon dioxide ( $\text{CO}_2$ ). Current global production of urea is around 220 million tonnes a year, with the most competitive producers being located in the Gulf States of the Middle East, which have leveraged their ample supplies of gas to produce urea.

**What is the process that NeuRizer will use to produce urea?** The NeuRizer Urea Project will see syngas produced from the coal at Leigh Creek via in-situ gasification, which can then provide the feedstock gas for urea. Syngas is simply synthetic gas produced by gasification of a carbon-containing fuel. In-situ gasification sees coal seams heated to very high temperatures via air fed through inlet wells to provide oxidation to the gasification reaction, and allowing syngas to flow to the surface. The hydrogen molecules from the syngas and nitrogen from air can then be converted to ammonia ( $\text{NH}_3$ ), and the ammonia converted to urea by the addition of  $\text{CO}_2$ . NeuRizer intends to produce granular urea for ease of storage and shipment.

**Why is the NeuRizer Urea Project potentially so valuable?** NeuRizer's reserves at Leigh Creek are estimated to contain 1,153 petajoules (PJ) of proven and probable (2P) syngas, assessed independently using the Petroleum Resource Management System (PRMS) process<sup>1</sup>, but this is obtained from only a fraction (specifically, 31%) of the known coal reserves at Leigh Creek. For the Preliminary Feasibility Study, NeuRizer modelled a 30-year project life producing around 1 million tonnes p.a of urea. The project is capital intensive, with a total capital cost of about A\$2.6bn. However the NPV, at a 9% discount rate, is A\$3.4bn pre-tax with an Internal Rate of Return (IRR) of 30%. The key to the success of the product is a nominal production cost of only A\$109 per tonne, driven by the low cost of producing syngas. This notionally puts the NRUP in the lowest cost quartile globally for urea production. The average sales price of the urea in the PFS is north of A\$400 a tonne.

**How will NeuRizer manage the issues around carbon reductions in the Australian economy?** The NeuRizer Urea Project is being designed to be carbon neutral from first production. Approximately 75% of the  $\text{CO}_2$  from gasification is required in the urea manufacturing process. Combined with the Carbon Capture and Storage (CCS) aspect of the project, and the use of

*NeuRizer's reserves at Leigh Creek are estimated to contain 1,153 petajoules 2P syngas*

<sup>1</sup> Petroleum Resources Management System (PRMS) is the standard system developed by the Society of Petroleum Engineers (the petroleum division of the American Institute of Mining, Metallurgical, and Petroleum Engineers) for the consistent and reliable estimate of hydrocarbon resources.



***The technologies to be used at Leigh Creek are tried and tested***

renewables, carbon farming and the potential sale of food grade CO<sub>2</sub> will reduce if not eliminate the need for any long term carbon offsets. This well-defined program has been carefully designed to ensure the project, is carbon neutral. We think this strategy, in line with guidance from the Task Force on Climate Related Disclosure<sup>2</sup> (TCFD), will help secure the debt funding by satisfying the ESG requirements of numerous potential financiers. In March 2022 NeuRizer was awarded Climate Active certification for its business operations by Climate Active, a partnership between the Australian Government and Australian businesses to drive voluntary climate action<sup>3</sup>.

**How credible is the technology behind the NeuRizer Urea Project?** The first thing to appreciate about the NeuRizer Urea Project is that it does not use untried methods and technologies. In-situ gasification was first developed in the Soviet Union in the 1930s, with the rich Angren coal basin in Tashkent Region of eastern Uzbekistan having produced syngas continuously since commissioning in the mid-1960s. The typical output from Angren is 3.6 m<sup>3</sup>/m<sup>3</sup> from 4 metre thickness seams around 110 metres below the surface<sup>4</sup>. All that is needed for production of ammonia from gas is the Haber-Bosch process, which was first used on an industrial scale in 1913 in BASF's Oppau plant in the German city of Ludwigshafen<sup>5</sup>. Synthesis of urea from ammonia is based on Wöhler process, which dates from 1828.

**How realistic is the 2P syngas reserve estimate at Leigh Creek?** In order to establish that Leigh Creek had the 2P reserves it is talking about, NeuRizer ran a Pre-Commercial Demonstration plant for 40 days in 2018 that used in-situ gasification to produce syngas from the Main Series, one of three distinct coal measures in the Leigh Creek field. The success of this programme provided the basis for a PRMS reserve estimate announced in April 2019 that was performed by Denver-based MHA Petroleum Consulting. MHA is a unit of Sproule, the reputable energy consulting firm from Calgary. The fact that the Upper and Lower Series coals weren't tapped in the 2018 programme suggests further significant resource upside.

**How realistic is the ability of NeuRizer to go carbon-neutral?** As we noted above, the NeuRizer Urea Project's urea production process requires substantial CO<sub>2</sub>, which will be provided on site. Carbon Capture and Storage projects have been worked on since the 1970s, and the rapid development of the science and practice of CCS has allowed a number of successful plants to emerge over the last decade or so. A great example is the Century Plant of Occidental Petroleum<sup>6</sup> near Fort Stockton in Pecos County, Texas. This plant was commissioned way back in 2010. Other large and successful CCS plants in North America include Shute Creek (ExxonMobil, LaBarge, Wyoming), Great Plains Synfuel (Basin Electric Power Cooperative, Beulah, North Dakota), Petra

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<sup>2</sup> See [fsb-tcfd.org](https://www.fsb-tcfd.org). The Financial Stability Board (see [fsb.org](https://www.fsb.org)) is an international body hosted and funded by the Bank for International Settlements to monitor and makes recommendations about the global financial system. The FSB created the TCFD to develop recommendations on the types of information that companies should disclose to help investors and others assess and price risks related to climate change.

<sup>3</sup> See [climateactive.org.au](https://climateactive.org.au)

<sup>4</sup> Source: Xiao et. al. (2019), *Monitoring and Control in Underground Coal Gasification: Current Research Status and Future Perspective*, Sustainability 2019, 11(1), 217; <https://doi.org/10.3390/su11010217>.

<sup>5</sup> [basf.com/ca/en/who-we-are/history/1902-1924.html](https://www.basf.com/ca/en/who-we-are/history/1902-1924.html).

<sup>6</sup> Houston, Tx, NYSE: OXY, [oxy.com](https://www.oxy.com).



Nova (NRG Energy<sup>7</sup>, Thompsons, Texas) and Boundary Dam (SaskPower, Estevan, Saskatchewan). The fact that the CCS facilities intended for the NeuRizer project had already logged 15,000 hours of continuous operation before the April 2022 announcement suggests that this project can work.

**How can the NeuRizer Urea Project expect to produce urea so cheaply?** The key to low cost ammonia and urea is the price of the gas inputs, which is why the Gulf States have such a strong competitive advantage. Most plants around the world have to buy their gas externally. The decision to develop an integrated operation means that NeuRizer can capture very low gas production costs. The expected low cost of NeuRizer syngas comes about through a combination of the quality of the coal in the Main Series, which has a high methane content, the thickness of this measure (20 metres), and the relatively shallow depth (480-1000+ metres). As for the low cost of the urea end-product, this has been costed by ThyssenKrupp's consulting arm, ThyssenKrupp AG<sup>8</sup> being the renowned German engineering conglomerate.

**Is the average urea selling price suggested by NeuRizer realistic?** Tracking Australian urea prices back to 2007<sup>9</sup>, the price has usually been between A\$300 and A\$400 a tonne. Issues around sources of the commodity from 2020 pushed the price up to around A\$1,250 a tonne in late 2021, and while prices have eased since then they were still above A\$850 a tonne in July 2022. With urea globally subject to high gas prices for the foreseeable future – a combination of under-investment in traditional gas fields over the last decade, and high ongoing demand for LNG as countries seek to improve energy security – we think NeuRizer's PFS estimate of A\$410 per tonne is very reasonable.

**How does NeuRizer expect to get its project funded and built?** The engineering partner for NeuRizer is DL E&C Co. Ltd, a South Korean engineering company which is part of the Daelim *chaebol*<sup>10</sup> and has a 9% equity stake in NeuRizer. It is basically the Daelim relationship that will allow the NeuRizer Urea Project to proceed in its present form. *Chaebols* are business conglomerates, mostly family-run, that have dominated South Korea's economy throughout that country's history. The extent of capabilities within a typical *chaebol* are what allows the grouping to get projects up and running<sup>11</sup>. Daelim has a long history of operating successfully in this environment. It was, for example, the first group to make locally designed motorcycles in Korea, starting in the late 1970s, in a business unit now called DNA Motors<sup>12</sup>. We predict NeuRizer's relationship with Daelim will play out well for three reasons:

- DL E&C Co. is committed, under a July 2022 agreement, to offtake worth half the annual production of the plant;
- DL E&C Co will build the plant;

*NeuRizer is being back by Korea's Daelim conglomerate*

<sup>7</sup> Houston, Tx., NYSE: NRG, nrg.com. NRG is an integrated energy company that generates via natural gas, coal and nuclear, among others.

<sup>8</sup> Essen, Germany, FWB: TKA, thyssenkrupp.com.

<sup>9</sup> Source: Index Mundi.

<sup>10</sup> dlholdings.co.kr/en/index.do.

<sup>11</sup> For background see *The Rise of the Korean Economy* by Byung-Nak Song, Oxford University Press, 1997.

<sup>12</sup> dnamotors.co.kr/eng/motorcycle/main.do.



- A South Korean bank, at DL E&C Co.'s encouragement, has provided a letter of support to NeuRizer indicating subject to Final Investment Decision and negotiation of commercial terms, to fund 70% of the capital costs.

**What is the current state of play of the NeuRizer Urea Project?** NeuRizer is currently completing a Bankable Feasibility Study for the project and DL E&C Co has commenced Front End Engineering and Design (FEED) work on of the downstream, or above-ground manufacturing facilities for the project.

**Why is NeuRizer stock undervaluing the potential of the NeuRizer Urea Project?** The capital costs of NeuRizer Urea Project are significant, and we think this is the main reason for the discount.

**Why can NeuRizer stock potentially re-rate?** We see four main reasons for NeuRizer stock can re-rate

- The globally traded price of urea remains high, thanks to export bans from Europe, especially Russia and Ukraine. We expect the price of urea over the medium to long term to settle well above historic levels;
- The project has the makings of a project finance package, thanks to the letter of support from the South Korean bank we noted above;
- The Bankable Feasibility Study is expected to publish in early 2023;
- There is potential to move to Final Investment Decision and project funding over the course of the next 12-18 months.

*We expect the price of urea over the medium to long term to settle well above historic levels*

## Introducing NeuRizer (ASX: NRZ)

NeuRizer is an Australia-based chemicals company that is building a urea production project, NRUP, in South Australia to meet the demand-supply gap in the domestic and foreign markets.

Urea makes up 37% of all fertilisers' demand and 50% of all AdBlue demand in Australia. To meet this, Australia imports 95% of its urea requirements (2mtpa) from China, the Middle-East and from other Asian producers. However, macro-level uncertainties have inflated the price of urea and its inputs to record levels. In the short term, this has cut off Australia's imports entirely and forced the only domestic producer to announce the closure of its facility in 2022. Looking longer-term, global population growth and rising GDP levels will lead to increased food crop production, which will drive the global demand for urea at a CAGR of 1.5% until 2050.

NRUP will be built as a fully integrated facility which will leverage on-site deep coal resources to produce its supply of urea inputs for 30+ years (Figure 1 on page 7). That is likely to eliminate the commodity risk associated with the price of inputs, to produce 1mtpa of urea (with the potential to double the capacity) from 2025 to become the leading supplier in the domestic market.





Figure 1: Engineering design of NRUP



Source: Investor Presentation – July 2022, Investors, Company Website

The project will have significant cost advantages over the industry. It will enable NeuRizer to produce inputs at A\$1 per GJ and limit its production costs to A\$109 per tonne, placing it in the lowest quartile of the global industry's cost curve. The capital costs (of A\$2.6b) incurred in developing NRUP will be covered with the existing cash resources, equity investments and debt. The company has already received a letter of support from a foreign bank to provide up to A\$1.5b.

NeuRizer is in Stage 1 of the development process. It plans to proceed to Stage 2 in 2023 and commence production in 2025. To pursue this, it has formed valuable relationships with leading construction and engineering services companies such as DL E&C, Kellogg Brown and Root and Stamicarbon. NeuRizer has also secured a five-year take-or-pay agreement with Daelim Co Ltd to provide 500kpta for A\$1.5b while the rest can be delivered to the domestic markets. The project could also potentially earn an NPV of A\$3.3b at an IRR of 30% over the course of its commercial life, based on a PFS.

The design of NRUP incorporates carbon emission control process which it is planned to enable it to achieve carbon-neutral status from first operations and for the life of the project. NRZ as a corporate entity has already achieved carbon-neutral status in 2022.

## Key reasons to look at NRZ

### A huge opportunity to capture the Australian market

Australia meets its annual urea demand of 2mtpa primarily through imports from China, the Middle East and from other Asian producers as its only domestic producer caters for 5% of the demand. However, China has banned exports to control domestic prices, while Australia's biggest producer has announced plans to close its facility by the end of 2022. Australia's precarious supply chain position represents an opportunity for NeuRizer to gain a major chunk of the market through its 1mtpa facility.



### **A fully vertically integrated facility offers significant competitive advantages**

The major cost inputs into the manufacture of urea are gas feedstock, power, and CO<sub>2</sub>. NRUP will use the site's deep coal resources of 301.2mt to produce 1,153 PJ of syngas (gas feedstock) at A\$1 per GJ, which will restrict its operating costs to A\$109 per tonne (lowest quartile in the global urea producers' cost curve). We observe that there is 301.2mt in the middle seam alone. Additionally, the exclusive licence from the South Australian government to leverage the existing infrastructure will result in cost savings of A\$50-70m. At the same time, the on-site train line will provide a direct and economical route to the company's target markets.

### **NRZ has partnered with reputed contractors and secured the necessary permits**

The company has appointed DL E&C, a leading South Korean construction and engineering services company which has completed more than 600 projects, as an EPCC partner for the CCS unit and Stage 2 (downstream, or above ground) of the NRUP. It has also signed agreements with Kellogg Brown and Root, a well-known technology and engineering company, to license ammonia technology and Stamicarbon, a leader in fertiliser plant technologies, to license urea technology. NeuRizer has also obtained a South Australian Petroleum Production License (PPL) allowing it to create a petroleum resources and commence upstream development.

### **NRZ has signed offtake agreement to de-risk project and ensure certainty of sales**

NeuRizer has signed a five-year agreement with Daelim Co Ltd, a subsidiary of DL E&C to supply 500ktpa of urea after commencing production in 2025, which could generate a total of A\$1.5b. The contract provides the company with a definite source of revenue and will enable it to cover operating and finance costs involved in Stage 2, thus helping to partly de-risk the project.

### **Potential coverage of 70% of Urea plant costs**

The company has received a letter of support from a prominent South Korean ECA to provide A\$1.5b (70% of the Urea plant's costs). It has also engaged with potential equity investors to raise further funds to cover the balance and secured equity financing to meet the needs of Stage 1 development.

### **NRUP's carbon neutral commitment will attract ESG investors**

NRUP's facility is being designed to produce urea in a carbon-neutral manner over the 30+ years of operations. NRZ achieved carbon-neutral status in 2022 and has received a Climate Active Certification, which makes it an attractive option for potential ESG investors. NRZ is a member of the highly accredited United Nations Global Compact and has had its emissions reduction strategies verified by the Task Force on Climate Related Disclosures (TCFD) framework.





## Urea – growing worldwide demand hit by a global supply shortage

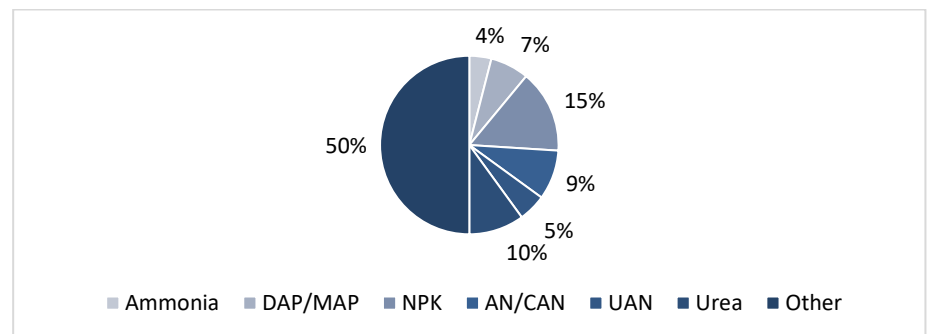
### The need to expand crop production volumes is driving the demand

The global population is projected to increase by 2 billion(bn) to 9.7b over the next 30 years and this is poised to create increasing pressure on limited land resources for farming. This, coupled with the improving GDP of countries worldwide, especially developing countries, is resulting in a surge in demand for food. Hence, there is a pressing need for nitrogen-based fertilisers, as they improve crop quantity in comparison to phosphorus and potassium fertilisers, which enhance the quality of crop and with it, the food produced from crops.

Urea is a popular fertiliser (Figure 2) due to its high nitrogen content at 46% and accounts for half of the world's demand for nitrogen-based fertiliser products. Urea represents half of all the nitrogen-based fertiliser products. It is easy to transport and is quickly absorbed by plants as it can be dissolved in water. Urea is also used as a key ingredient in the manufacture of plastics, drugs and diesel exhaust fluid (also known as AdBlue). The global annual demand for urea stands at 220Mtpa and is expected to grow at a CAGR of 1.5% until 2050.

*Demand for Urea expected to grow at a CAGR of 1.5 in the next three decades*

Figure 2: Share of Urea in total Nitrogen-based Fertilizer products (in %)



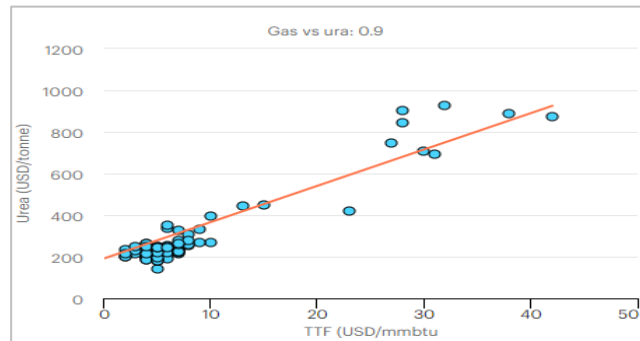
Source: Investor Presentation – April 2021, Investors, Company Website

### Increasing input prices have impacted the global urea supply

The market dynamics and prices in the urea market are influenced by a plethora of inter-twined macroeconomic factors, including prices of the natural gas since they account for 70-80% of the urea production costs (Figure 3).



Figure 3: Correlation between prices of urea and natural gas

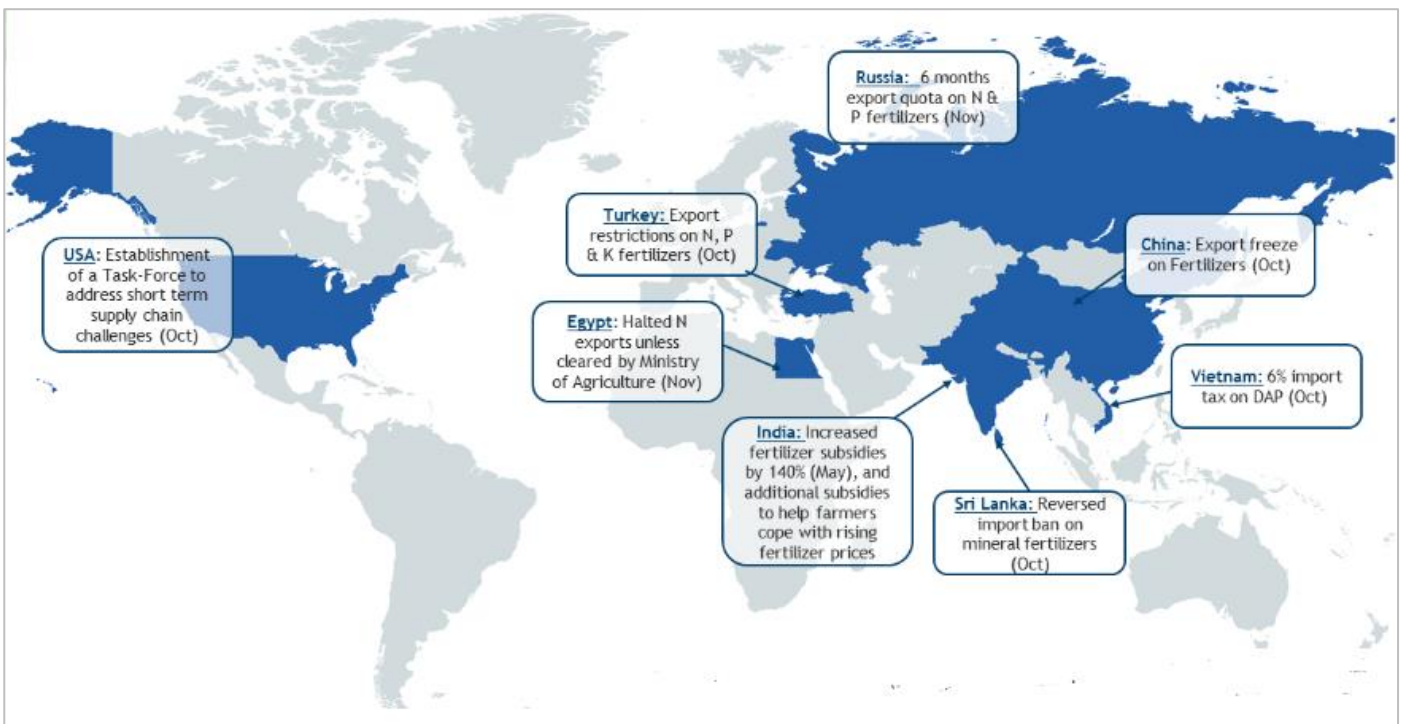


Source: 'How the Energy Crisis is exacerbating the Food Crisis', IEA

High price of inputs, change in trade policies and geo-political situations have driven price of urea to record levels

Soaring natural gas in the last two years have forced urea producers to limit production. This is a critical issue especially in Europe. At the same time, a confluence of other factors such as a strong recovery in demand for food crops following the COVID-19 pandemic outbreak and adverse weather conditions, have put further pressure on the demand/supply situation. This has triggered a domino effect leading to record-level prices of urea which have necessitated a change in trade and export policies (to safeguard domestic interests) and thus, compounded the problem of higher prices. Supply chain issues have had an impact too (Figure 4).

Figure 4: A change in fertilizer-related policies to cope with the supply shortage



Source: 'Why Are Fertilizer Prices So High?', IFA

Sanctions placed on Russia, and its conflict with Ukraine, both key agricultural producers and exporters of urea, in recent months have exacerbated the already fragile supply situation and have sparked fears of a food security crisis across the globe, especially in Urea Importing economies.



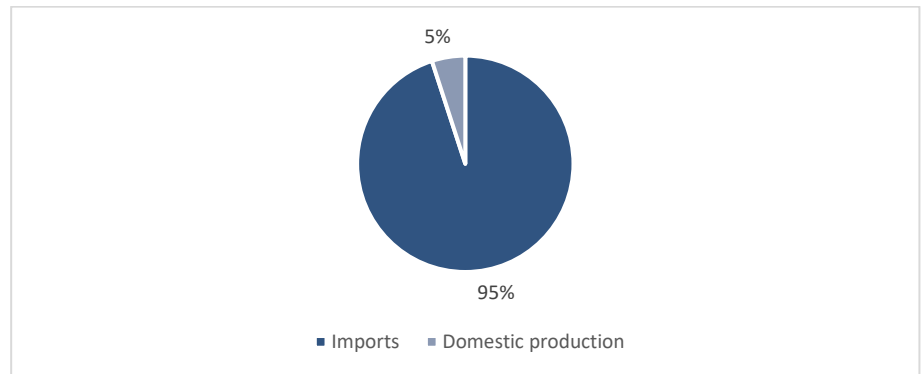
*Urea is a critical component for crop production and road transportation*

### **The cascading effect of the global urea crisis on Australia's supply chain**

Urea is a key part of Australia's agriculture industry, as it accounts for 37% of all the fertilisers utilised in Australia. It is also used as a key ingredient in diesel exhaust fluid (known as AdBlue), which is mandatory for use in almost 50% of the country's truck fleet.

Australia's urea fertiliser sales are at 2Mtpa, which is less than 2% of global sales. However, as Figure 5 on page 11 depicts, only 5% of the demand is serviced through the only domestic producer (Incitec Pivot) which produces urea using the expensive east coast gas. For the remaining 95% of Australia's demand, it is dependent on imports from Asian countries (primarily China) and the Middle East.

Figure 5: Sources of supply of urea for the domestic market



Source: Investor Presentation – March 2022, Investors, Company Website

**Imports from China, which make up 95% of Australia's supply, have been cut off completely**

The heavy reliance on imports has placed Australia in a vulnerable supply chain position. The susceptibility was exposed in 2021 after China completely banned urea exports to control domestic prices in response to the global urea crisis. To make matters worse, Australia's biggest domestic producer, Incitec Pivot, which produces 290Ktpa (around 15% of the country's demand), announced that it would close its facility in response to the rising prices of natural gas. At the time, the Australian government managed to avert a chaotic situation in AdBlue supply by securing supplies from Indonesia, Japan and other Asian countries in the short term, and by paying IPL to produce AdBlue for a few months in 2021. However, the sudden disintegration of the country's urea supply chain has alarmed the relevant authorities and left them scrambling for change to reduce the over-dependence on external supply sources.

**Fertilizer producers are facing increasing pressure to reduce carbon footprint from production**

### The global issue of sustainability

Production of fertilisers is an energy-intensive process (it makes up 30% of energy input in crop production), and commonly used nitrogen fertilisers use fossil fuels as an energy source and contribute 2.4% of the total global greenhouse gas emissions. Stricter carbon emission regulations have come into force in the EU and have pushed players such as Yara and OCI to commit to carbon neutrality by 2050. Australia has its own objective of becoming a carbon neutral nation by that year and is investing in research and training centres to develop 'green' processes for the Chemical Industry.

The focus on reducing emissions has brought the nitrogen producers and agriculture and food industry under scrutiny and influences investing decisions.

### NeuRizer could be a breakthrough player in Australia's wholesale fertiliser landscape

NeuRizer, listed on ASX, is developing a urea production project, NeuRizer Urea Project (NRUP). The company aims to partly fulfil Australia's urea demand in a sustainable way, such that it becomes the sovereign supplier of Urea to the domestic market.

Formerly known as Leigh Creek Energy, the company changed its name to NeuRizer in March 2022 to better reflect its vision. The name 'NeuRizer' represents nitrogen fertiliser ('N'), the new approach to producing urea



through a carbon neutral process ('Neu') and crops that rise from the surface through the application of urea ('Rizer').

### A strategic location and favourable geology for NRUP

NRUP, located 550km north of Adelaide, covers 93km<sup>2</sup> of the former Leigh Creek Coalfield. It contains 1,153 PJ of wholly owned 2P syngas reserves and 301.2Mt of indicated and inferred coal resources - but we observed on page 5, this is just the middle seam, so there is likely further resources at NRUP. The company intends to prove further resources by gaslifting the upper and lower seams.

Even if this is not the case, these resources are sufficient to operate a 1Mtpa urea plant for more than 30 years, along with a reliable supply of syngas due to the nature of resources and local geology. We note it has a PRMS (Petroleum Resources Management System) certification for the middle seam, obtained in March 2019. To obtain this, a company must demonstrate a commercial quantity and quality of gas.

Figure 6: Close proximity of NRUP to key domestic markets



Source: Investor Presentation – July 2022, Investors, Company Website

**NRUP is located ideally to address key domestic markets which make up ~85% of demand**

The site has access to existing road and rail infrastructure for transport to domestic and export markets (Figure 6). The facility is located ideally to distribute urea from Port Augusta through an existing direct on-site train line to high-consumption target markets of South Australia, Victoria, and New South Wales (consume 1.7Mtpa out of total domestic consumption of 2Mtpa).

The target market for NRUP would be domestic users, providing benefits of lesser transport duration and associated costs (imports cost an additional US\$15-30 per tonne and take 24 days to reach), as well as international





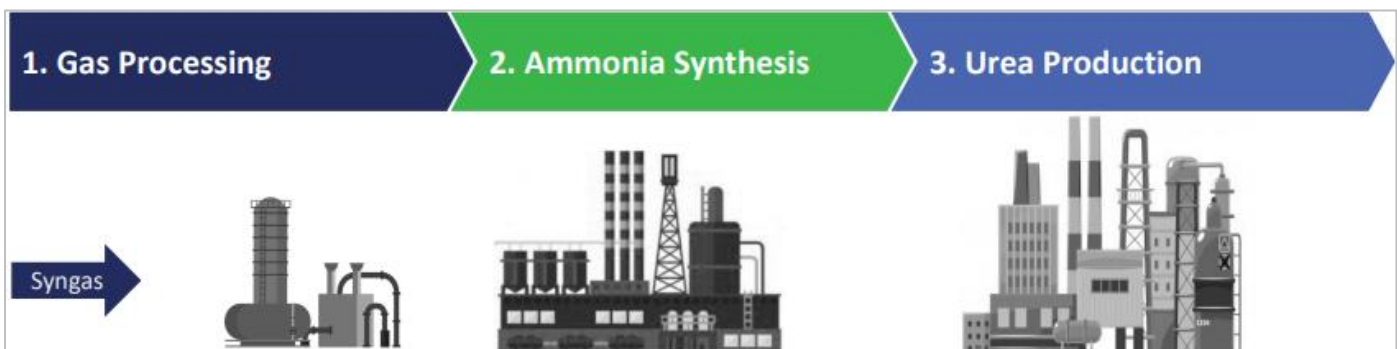
fertiliser traders and distributors as ports accessible from the Leigh Creek site are central to the main Australian urea markets.

## Operating cost advantages through a self-sufficient urea production process

The production facility will have an initial capacity to produce 1Mtpa of high-quality urea at a low cost, with scope for the addition of capacity to ramp up production to 2Mtpa (totalling Australia's annual demand) in the future. NRUP will be built as a fully vertically integrated facility with upstream (underground) and downstream (on-surface) plants which will enable it to produce on its own the required inputs of gas and power, at the urea production site, instead of procuring them from the market, thus eliminating the associated commodity and supply risks.

The production process would use the coal resources at the Leigh Creek Coalfield site to derive the primary inputs (Ammonia, Carbon Dioxide) and produce urea through the following steps (Figure 7).

Figure 7: NRUP's process of urea production



Source: Investor Presentation – April 2021, Investors, Company Website

**Operating costs of NeuRizer  
will be in the lowest quartile in  
the industry**

- The 301.2Mt of 2P coal site will be leveraged and put through a process of in-situ gasification (ISG). ISG will entail heating the coal resources underground in gasifier chambers to high temperatures by air/water fed through inlets to produce 1,153 PJ of syngas (over the commercial life of NRUP). ISG is also an essential precursor to obtaining PRMS certification.
- The syngas will be processed above ground in an on-surface gas processing facility to produce Hydrogen, Nitrogen and Carbon Monoxide.
- Hydrogen and Nitrogen will be converted into Ammonia in an Ammonia production plant.
- CO<sub>2</sub> is produced in these stages and is stored on site for later use in the manufacturing process.
- The Ammonia will then be combined with Carbon Dioxide produced in the previous stages in a Urea Production Plant to form Urea.

The project falls in the lowest cost quartile of global urea producers as the average nominal operating cost for the urea plant is forecasted to be at A\$109/tonne as syngas can be produced for A\$1 per GJ. Additionally, the licence obtained by NeuRizer in June 2022 to exclusively utilise the existing infrastructure at the site will enable it to further save A\$50-70m in replacement costs.

## Access to funds from diverse sources to meet capex needs



**Letter of Support from an ECA  
for a A\$1.5b loan (70% of Stage  
2 capital costs)**

The construction of the NRUP facility is estimated to entail a capital expenditure of A\$2.6b across the two stages of development:

- Construction costs related to **Stage 1** and expenses incurred in the IBFS (Initial Bankable Feasibility Study) and subsequent final BFS (Bankable Feasibility Study) of **Stage 2** will be covered through the company's existing cash resources, private placements and financing agreements. NeuRizer raised A\$6m (excluding fund-raising fees) in January 2021, A\$7.5m (net of costs) in December 2021 and has access to three A\$5m (net of costs) tranches as part of a drawdown funding agreement with Energy Exploration Capital Partners (EECP). The company reported cash and cash equivalents at A\$8.3m at the beginning of CY22, and it further raised A\$2.9m from a private placement in March 2021 and A\$14.4m through a strategic investment from its Stage 2 EPCC partner, DL E&C, for 9.1% stake in July 2022.
- Capital costs related to **Stage 2** (the larger, more capital-intensive phase) will be funded through a combination of debt and equity. The company has already received a letter of support from a South Korean ECA to cover 70% of the costs of the urea plant (~A\$1.5b) (subject to the FID). The capital costs associated with building power plants and gas fields in **Stage 2** will be covered similarly – by taking on debt and offering an equity stake.

## On the path of commercialisation from 2025

After receiving the Petroleum Production Licence and the Associated Activities Licence in November 2020, NeuRizer laid the groundwork for its flagship project by establishing relationships with reputed EPCC partners, technology licensors & advisors to lead development in two stages (Figure 8 on page 16).

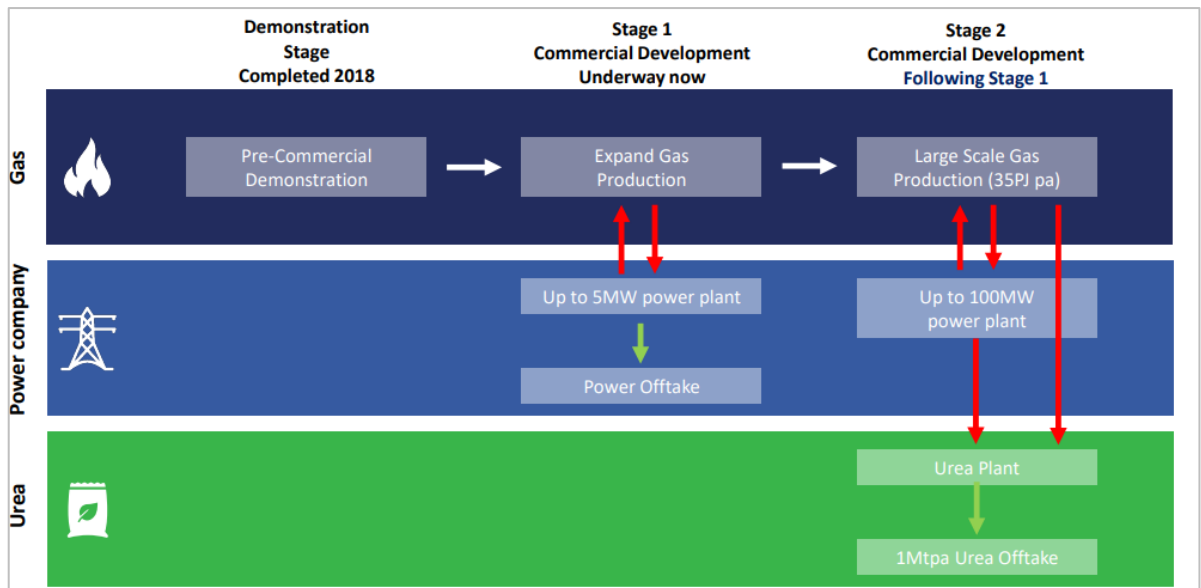
Stage 1 of development would involve:

- Construction of gasification wells to produce syngas
- 5MW gas fired power generation plant

Stage 2 of development would involve:

- Expansion of gasification wells
- 100MW gas fired power generation plant
- Ammonia facility
- Urea facility
- Logistics and transportation arrangement

Figure 8: Commercialization pathway



Source: Investor Presentation – April 2021, Investors, Company Website

It has commenced the engineering work on Stage 1 of the project. It has partnered with inGauge Energy Pty Ltd, Australia’s leading onshore drilling company, to develop gasifier wells and Prudentia Process Consulting Pty Ltd, a multi-discipline engineering services provider, for commissioning the 5MW power plant.

NexantECA, a reputed advisor in the industry, has also completed an IBFS for Stage 2 and is now conducting the BFS for Stage 2 (expected in 1Q CY23), which will confirm the project’s economics and determine the FID.

DL E&C, a leading construction projects company in South Korea and NeuRizer’s long-term partner and shareholder (acquired a 9% stake in July 2022), will commission the CCS unit (Stage 1) and the engineering and construction work (Stage 2).

NeuRizer has also started evaluating debt financing options with PwC (debt advisor) and engaging in discussions with potential investors.

### Secured A\$1.5b offtake agreement for 50% of initial production

The company aims to commence commercial production from 2025. It has already secured a long-term offtake agreement with South-Korea-based Daelim Co Ltd, a subsidiary of DL E&C. Revenue from the five-year contract for the supply of 500Ktpa of urea (50% of its production capacity in the initial years) will be at index-linked prices.

Based on the 2024 forecast of CRU, an independent forecast team, the agreement would generate a revenue of A\$1.5b for US\$424 per tonne, while current prices suggest a revenue of A\$2.8b could be earned. The contract would enable the company to partly de-risk the project by leaving it well-positioned to cover the operating and financial costs involved in building the urea plant as part of the Stage 2 construction.

With a long-term, stable source of export revenue confirmed, NeuRizer could sell the other 50% of the initial production level at the prevailing market rates to the domestic market.

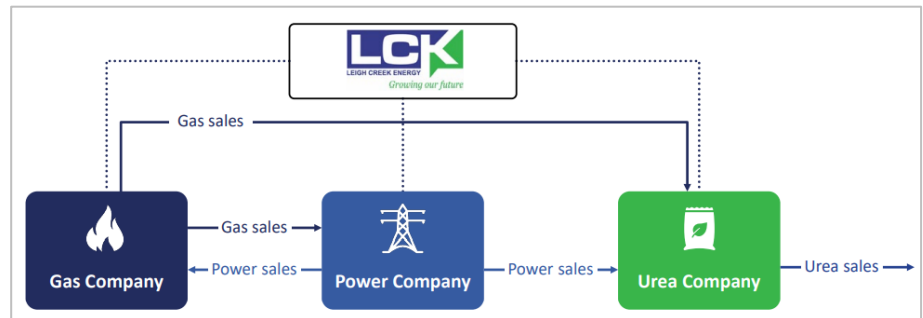
**Signed agreement for sale of 500Mtpa for five years could generate A\$1.5b**



## Plans to adopt a new corporate structure after commercialisation

On reaching the production stage, the company would split its fully integrated facility into three operating companies – one to supply syngas, one to ensure power supply and one to produce urea, under legally controlled internal contractual agreements (Figure 9).

Figure 9: Proposed corporate structure after commercialization



Source: Investor Presentation – April 2021, Investors, Company Website

## Established ESG processes coupled with carbon neutral status

### Achieved carbon neutral status in 2022

The production of Urea is a carbon-intensive process which generates 3 tonnes of carbon dioxide per tonne of urea. NeuRizer, however, is committed to changing the status quo and has incorporated the objective of carbon-neutral operations in the front-end engineering design process. It will ensure that 75% of the carbon dioxide produced in the initial steps of the process gets re-used to produce urea at the end. To manage the rest of it, NRUP will be equipped with a CCS (Carbon Capture and Storage) unit to store the remaining carbon underneath the ground.

NeuRizer will also implement soil carbon sequestration projects and offset any additional carbon generated in the transportation and other auxiliary processes by earning carbon credits or implementing carbon farming projects.

The company has already achieved carbon neutral status in 2022 (8 years before its initial target) and has been awarded the Climate Active Certification by the Australian government. The commitment to reduce carbon emissions will also attract investors looking to fund ESG projects. At this stage, we have not included these soil carbon sequestration projects in our model but observe that this could offer future upside potential beyond our initial model.



## NRUP could generate a pre-tax NPV of A\$3.3b

**NRUP could generate an NPV of A\$3.3b at an IRR of 30%**

In 2020, NeuRizer concluded a pre-Feasibility study (PFS) to assess the technical and financial viability of the NRUP. It highlighted the huge financial value that can be extracted from the project. The study makes conservative assumptions to estimate the net revenue that the company would generate per tonne of urea produced. It assumes annual production levels of 1Mtpa for the commercial life of the project (30+ years), even while NRUP retains the possibility of expanding capacity to 2Mtpa in the medium term. The PFS assumed that urea produced would be sold at A\$410 (US\$280) per tonne, based on CRU 2024 price estimates, even though the recent market prices are much higher (around US\$908 per tonne).

Leveraging the benefits of its vertically integrated facilities, the company will incur pre-tax operating costs of A\$109 per tonne (without considering inflation) and a total capex of A\$2.6b over the life of the project. The capex will be funded through a combination of debt and equity sources. Consequently, the company will generate pre-tax net cash flow of A\$219 per tonne of urea produced or pre-tax EBIT of A\$599m per annum. Finally, assuming a 9% discount rate, the project will generate a Pre-tax NPV of A\$3.3b at an IRR of 30% over the commercial life of NRUP.

**Figure 10: Project assumptions in the PFS Study**

Project Assumptions	Figures
Syngas produced per year	35 PJ
Debt:Equity Ratio	70:30
Interest Rate	6.0%
Inflation Rate	2.5%
Repayment period (in years)	20 years
Discount Rate	9%
Corporate tax rate	30.0%

Source: PFS Study, Investors, Company Website

**Figure 11: Project Financial Metrics in the PFS Study**

Project Financial Metrics	Figures
Capex	A\$2.6b
Net Revenue/tonne	A\$410
Pre-Tax Opex/tonne	A\$109
LOM average EBITDA/annum	2.5%
LOM average EBIT/annum	20 years
Leveraged Pre-Tax NPV	9%
Leveraged Pre-Tax IRR	30.0%
Leveraged Pre Tax Payback Period	4 years

Source: PFS Study, Investors, Company Website





### Need to augment supply to meet growing demand

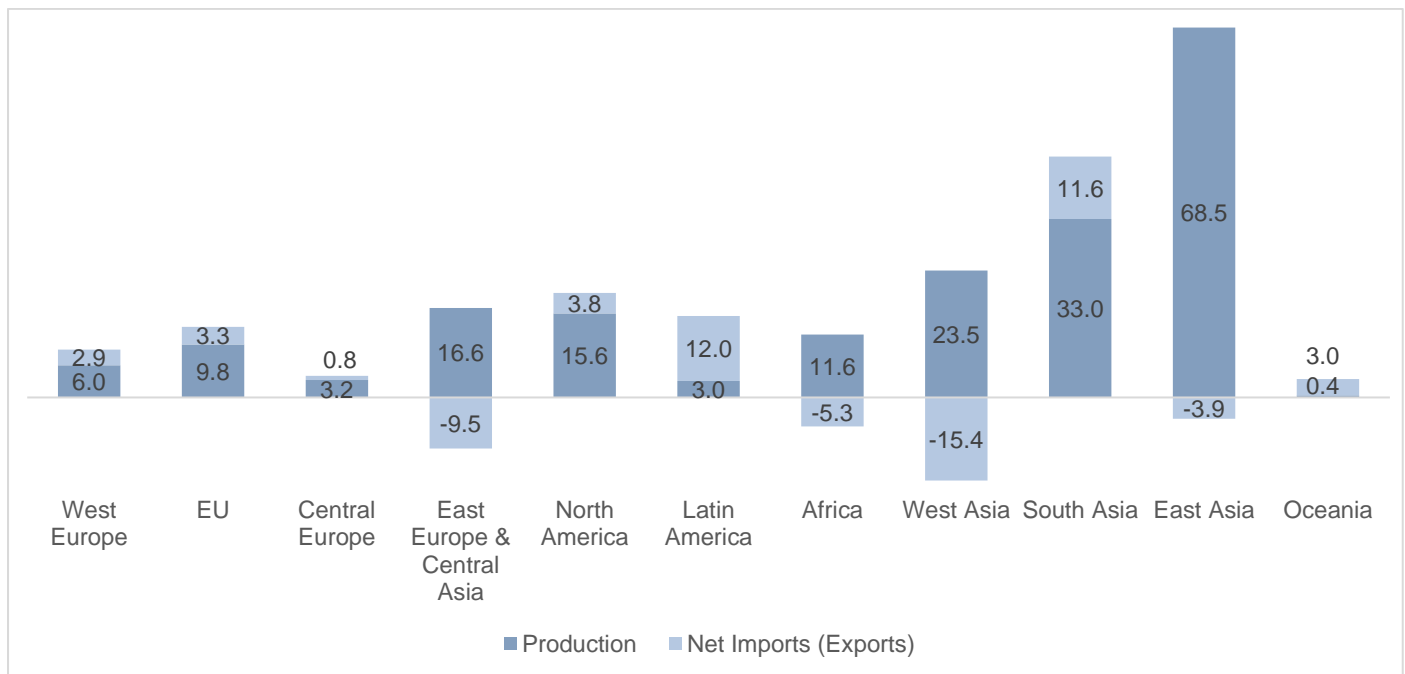
On a global level, approximately 220Mtpa of urea is required to be produced to meet the demands of the various end-user industries, such as agriculture, pharmaceuticals and plastics.

The bulk of the huge annual demand is fulfilled by East Asian and South Asian countries, followed by the other parts of Asia, North America and Africa. Countries based in West Asia, Central Asia and Africa are also leading exporters. In contrast, South Asian and North American countries have to import urea, on top of their production, to meet domestic requirements.

Other regions such as the EU, Central Europe (excluding EU), Latin America and Oceania do not have a large established market for urea production. They have to largely rely on imports to meet the demand (Figure 12).

**East Asian and South Asian countries are the largest producers of urea**

Figure 12: Production and Net Imports of Urea by region (2020)



Source: 'Urea Stats 2009-2020', Nitrogen Products, IFA

Note: Production + Net Imports (Exports) = Consumption

China, India, Russia, Indonesia and the U.S. have traditionally been the top producers. India and the U.S. have high consumption levels and rely on imports, whereas China, Russia and Indonesia are all net exporters. As a result, when exports from China and Indonesia were cut in the last year, there was a shortage of supply in the global economy. Prices of urea were pushed to record levels and encouraged importing nations to develop/augment their domestic capacities.



## Competitive Landscape

We believe that NeuRizer is in direct competition with all Australia-based Urea producers, which are either in the development or production stage and can meet at least part of the domestic demand.

Currently, Incitec Pivot, is the biggest producer in Australia, with 290Ktpa, and a direct competitor to NeuRizer. Apart from domestic producers, it will also have to compete with players based in Asia, which are capable of supplying Urea to Australia, albeit with an added transport cost. Since Urea is a low-cost product, importing it from players in far-away Asian countries or other continents is more costly due to higher transportation costs unless they are leading players with a distribution network in Australia, such as Nutrien or Yara.

In naming these companies, we hope to depict that there is a significant market for urea and fertilisers generally. To select peers, we have chosen a list of players which are in the production or development stage and operate in Australia or Asia:

*NeuRizer faces competitions from new and established players*

- **Incitec Pivot (ASX: IPL):** It manufactures and distributes industrial explosives, industrial chemicals and fertilisers in Australia, the US, Canada, Turkey and other international territories. The company has a total capacity to produce 290Ktpa urea in Australia. It manufactures a range of fertiliser inputs and products, including ammonium phosphates, ammonia, urea, Sulphuric acid and superphosphates, at six manufacturing sites across eastern Australia. IPL is the only domestic manufacturer of ammonium phosphates and urea.
- **Nutrien (TSE: NTR):** It provides crop inputs and services and offers potash, nitrogen, phosphate and sulphate products. It managed a Revenue of US\$ 1,064 m in 1H 2022. The company also distributes crop nutrients, crop protection products, seeds and merchandise products through approx. 2,000 retail locations in the US, Canada, South America and Australia.
- **Yara International (YAR: ODL):** It is a Norway-based leading manufacturer which offers nitrogen-based fertilisers, including urea, urea ammonium nitrate, calcium ammonium nitrate and compound fertilisers that contain plant nutrients. Yara has multiple plants with a total urea production capacity of 5.4Mtpa, a part of which it exports to Australia. It generated US\$3.4b from sales of urea fertilisers in 2021.
- **Pt Pupuk Indonesia:** It is a state-owned Indonesian company, one of Asia's largest fertiliser production players. It operates urea production facilities through five of its subsidiaries and can produce 9.3Mtpa of urea. It exports a portion of its production to India, Mexico, Philippines, the US, Australia and South Korea.



## Valuation of A\$0.37-\$0.60 per share

*We Value NRZ at A\$0.37 base case and A\$0.60 bull case*

Our basic valuation approach for NRZ is as follows:

- **We value NRZ at A\$0.37 per share base case and A\$0.60 per share optimistic case, using the DCF approach.** We have relied to a significant extent on the Feasibility Study of November 2020 but used other sources to determine inputs, such as our internal policy for discount rates, and CRU forecasts for the urea price.
- **Urea extracted and production:** We have assumed the NRUP commences production in FY25, at 50% capacity, gradually ramping up to 75% in FY26, then 100% by FY27 and remaining there for the life of the project. We assumed a perpetual production capacity of 1mt.
- **Urea Price:** We have utilised urea pricing forecasts of CRU made available to us by NeuRizer over the next 3 years. Starting with A\$372.2 in CY22 and assuming an average of 4% growth over time, but with growth significantly skewed over the first six years – reaching A\$640.8 by CY28.
- **Operating costs:** We have used the same figures provided in the November 2020 Feasibility Study to CY30, where the forecasts ended. From there, we assume 2.5% growth per annum.
- **Capital Costs:** We assume \$761m in start-up capex is needed, based on the 2020 Pre-Feasibility Study (inclusive of both urea and syngas start-up costs). We assume 60% of this amount is spent in CY2024 with the balance equally split across CY25 and CY26. We also assume sustaining capex of \$60.3m annually in line with the company's forecasts.
- **Funding:** We assume it is funded 50-50 by debt and equity with a 6% cost of debt. Accordingly, we have accounted for a higher number of shares on issue than is currently the case – we assumed 50% of the \$761m in start-up capex required is funded by equity and it raises funds at the current share price of 14c a share.
- **Discount rate and terminal value growth rate:** We have used a WACC of 8.53%. This is derived from a risk-free rate of Return of 3.6%, in accordance with the 10-year government bond, a 1.13 beta and a 7.0% equity premium. Our standard equity premium is 5% but we add another 2% on to resources companies that do not have their entire funding requirements in place. We note we typically add another 1-2% on for jurisdictions with high levels of sovereign risk but we have not in this instance given Australia's low risk. The terminal growth rate is 1%.

**Figure 13: DCF valuation for NRZ**

Valuation (A\$)	Base case	Bull case
Present value of FCF	335	631
Present value of Terminal FCF	1,076	1,076
<b>Enterprise Value</b>	<b>1,339</b>	<b>1,707</b>
Net debt (cash)	(8)	(8)
<b>Equity value (A\$)</b>	<b>1,419</b>	<b>1,715</b>
Shares outstanding (post financing)	3,866	2,873
<b>Implied price (A\$ cents)</b>	<b>0.37</b>	<b>0.60</b>
Current price (A\$ cents)	0.14	0.14
Upside (%)	162.2%	326.4%

*Estimates: Pitt Street Research*



### Differences between base and bull cases

The two differences between our base and bull cases are:

- **A higher urea price:** We assume a 20% premium to the CRU forecasts provided to us by the company.
- **A capital raising at a premium:** We assume the company can raise capital at 20c a share rather than the current price of 14c per share, thereby decreasing the number of shares issued and increasing the share price than what it otherwise would be. Prior to financing, the implied price is \$1.24-\$1.49 per share (accounting for DL E&C Cos soon to be issued shares equating to 9.1% of the company).

### Re-rating NRZ

We believe NRZ is undervalued at its current market capitalisation and may see a re-rating based on the following factors:

- 1) A supply shortage in the market which has driven up price of urea
- 2) Finalizing the A\$1.5b financing suggested by a South Korean ECA
- 3) Completing the BFS and confirming the attractive project economics
- 4) Securing equity financing with investors to cover the remaining costs
- 5) Making the FID and moving ahead with Stage 2 construction towards commercialization

### Risks

- **Global price of urea:** The sales of a Urea producers is determined by two factors: volume of sales and the price in the market. The global price of urea is determined by demand and supply factors and can be highly volatile, as witnessed since 2021. The ban on exports by China and sanctions on Russia have pushed prices to record-levels, which bodes well for producers. In the coming years, if there is excess supply in the market, then the price of urea would fall which would consequently lower producers' sales.
- **Competition:** In addition to NeuRizer, two other companies, Perdaman Chemicals and Strike Energy, are developing urea production projects in Australia to fill the supply-side gap in the market. The shortage of supply in the Australian market will attract new domestic players and established foreign players to enter the market which could make it difficult for NeuRizer to capture a large share. But, the company's low production cost could help it in good stead.
- **Funding risk.** A critical factor for the success of the company is the completion of project financing in a timely manner. We have assumed that the company will commence production and secure funding on schedule. However, if there are delays due to funding challenges, this will affect cash flows and viability of the project.



## Experienced Leadership Team

NeuRizer Limited's current leadership team has extensive experience:

- **Executive Chairman Justyn Peters** has valuable experience in the ISG industry. He has an extensive industry network, having managed investments into Australian mining, energy, and infrastructure projects through offshore investing entities and structured various deals. He has also worked with industry representative bodies and for various state and federal environmental departments and authorities in the mining industry.
- **Managing Director Phil Staveley** is a qualified Accountant and has accumulated over 30 years of experience in the resources sector. He spent his initial years in the oil and gas industry, worked with Schlumberger and South Australian Oil and Gas Company. He held various finance, M&A and commercial roles in his ~10 years stint at Normandy Mining Ltd. He has served in strategy and corporate finance roles in the mining industry at executive positions.
- **Non-Executive Director Zheng Xiaojiang** is a senior finance executive and has valuable experience in the finance sector in Australia and China. He oversaw the investment in NeuRizer by China New Energy which is NeuRizer's largest shareholder.
- **Non-Executive Independent Director Murray Chatfield** has a wide array of experience across financial sector, entrepreneurial, commodity, technology and service facing sectors which will be crucial in executing the strategy and growth plans of NeuRizer. He specialises in various financial fields such as finance, treasury, accounting, operational efficiency, risk management, legal and regulatory compliance, and direct financial market interaction.
- **Non-Executive Director Zhe Wang** is an Energy and Thermal Physics engineer, who serves on NeuRizer's board as a nominee of China New Energy Limited. He has 8+ years of executive management experiences and also serves on the board of Beijing Raise Mind Technology Ltd. He has a diverse skill set which covers Coal Combustion, Renewable Energy Applications and Steel Sinter fields.
- **Non-Executive Director Mr Yoo** has held senior management positions at DL E&C for over 20 years and currently serves as their Vice President. He has extensive knowledge of the EPC Business. He has previously held the position of Chief Executive of Sales and Marketing Office for Oil & Gas and Power Plant Business of Daelim.
- **Company Secretary Jordan Mehrtens** has over 7 years of experience in providing regulatory, compliance and other analytical advice. She is a member of the Governance Institute of Australia and Australian Mining and Petroleum Law Association and has been a part of NRUP since its inception.





## Appendix I – Analyst certification

Stuart Roberts, lead analyst on this report, has been an equities analyst since 2002.

- Stuart obtained a Master of Applied Finance and Investment from the Securities Institute of Australia in 2002. Previously, from the Securities Institute of Australia, he obtained a Certificate of Financial Markets (1994) and a Graduate Diploma in Finance and Investment (1999).
- Stuart joined Southern Cross Equities as an equities analyst in April 2001. From February 2002 to July 2013, his research speciality at Southern Cross Equities and its acquirer, Bell Potter Securities, was Healthcare and Biotechnology. During this time, he covered a variety of established healthcare companies, such as CSL, Cochlear and Resmed, as well as numerous emerging companies. Stuart was a Healthcare and Biotechnology analyst at Baillieu Holst from October 2013 to January 2015.
- After 15 months over 2015–2016 doing Investor Relations for two ASX-listed cancer drug developers, Stuart founded NDF Research in May 2016 to provide issuer-sponsored equity research on ASX-listed Life Sciences companies.
- In July 2016, with Marc Kennis, Stuart co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Life Sciences companies.
- Since 2018, Stuart has led Pitt Street Research's Resources Sector franchise, spearheading research on both mining and energy companies.

Nick Sundich is an equities research analyst at Pitt Street Research.

- Nick obtained a Bachelor of Commerce/Bachelor of Arts from the University of Sydney in 2018. He has also completed the CFA Investment Foundations program.
- He joined Pitt Street Research in January 2022. Previously he worked for over three years as a financial journalist at Stockhead.
- While at university, he worked for a handful of corporate advisory firms.

## Appendix II – Glossary

**AdBlue:** It is diesel exhaust fluid used to reduce the amount of air pollution created by a diesel engine.

**ASX:** Australian stock exchange

**ATP (Authority to prospect):** A permit needed to explore for petroleum, oil, coal seam gas and natural gas.

**BFS (Bank Feasibility Study):** Bankable Feasibility Study is a comprehensive forward analysis of a project's economics to be used by financial institutions to assess the creditworthiness for project financing and would include: Final drilling, geological studies, resources calculations and sampling.

**CAGR:** It refers to compound annual growth rate, the annualized average rate of revenue growth between two given years, assuming growth takes place at an exponentially compounded rate.

**CCS (Carbon capture and Storage):** CCS or carbon capture and sequestration is the process of capturing carbon dioxide (CO<sub>2</sub>) before it enters the



atmosphere, transporting it, and storing it (carbon sequestration) for centuries or millennia.

**Climate Active certification:** Climate Active certification is awarded to businesses and organisations that have credibly reached a state of achieving net zero emissions, otherwise known as carbon neutrality.

**CRU (Commodities Research Unit):** CRU offer independent, reliable commodity news, market analysis, prices and consulting across mining, metals, and fertilizer global markets.

**ECA:** It refers to 'Export Credit Agency'. ECA is a specialist financial institution that offers financing for domestic companies' export operations.

**EPCC:** It refers to 'Engineering, Procurement, Construction and Commissioning', a type of contract awarded to contractors, in which they undertake the construction of large-scale, infrastructure projects.

**ESG:** It refers to 'Environmental, Social and Governance'. It is a set of factors which are used to evaluate the sustainability and ethical impact of a business' operations.

**FID (Final investment Decision):** FID is the point in the capital project's planning process when the decision to make major financial commitments is taken.

**GJ:** It refers to 'Gigajoule'. GJ is a unit of measurement of energy consumption which equals one thousand million joules.

**HOA:** A 'heads of agreement' is an initial, non-binding document that establishes the basic framework for a partnership or transaction.

**IBFS (Initial Banking Feasibility Study):** It is an assessment of the practicality of a proposed project/plan.

**IP:** It refers to 'Intellectual Property'

**IRR: Internal rate of return** is a financial metric used to assess the profitability of an investment or project.

**ISG (In-situ gasification):** It is the chemical conversion of deeply-buried coal in its original coal seam into a mixture of hydrogen, carbon monoxide, carbon dioxide and methane by creating the right process conditions in the coal seam to cause a series of chemical reactions to occur.

**Ktpa:** It refers to 'Thousand tonnes per annum'

**NPV:** Net present value is the difference between the present value of cash inflows and the present value of cash outflows over a period.

**NRUP:** It refers to 'NeuRizer Urea Project', NeuRizer's flagship project for building a urea production facility.

**PFS:** A pre-feasibility study is a preliminary systematic assessment of all critical elements of the project – from technologies and costs to environmental and social impacts.

**PJ:** It refers to 'Petajoule'. PJ is a unit of measurement of energy consumption which is equal to one million gigajoules.

**PEL:** It is a license which provides the license holder with the exclusive rights to explore for specific minerals within the specified license area.

**Mtpa:** It refers to 'Million tonnes per annum'



### Appendix III – Major Shareholders

Investors	Ownership (%)
China New Energy Group Limited	12.9%
Citicorp Nominees Pty Ltd	11.9%

Source: Bloomberg'

### Appendix IV – Key Milestones

Time period	Milestone
July 2022	Signed a binding offtake agreement for 500kpta with Daelim Co Ltd for a potential contract value of A\$1.5b
June 2022	Executed an infrastructure utilisation licence agreement with the South Australian Government for the exclusive use of existing infrastructure at Leigh Creek Coalfield in Northern South Australia
	Entered into a placement agreement with DL E&C Co to raise A\$14.4m for a 9.1% stake
May 2022	Announced that Santos Limited will farm-in and take operatorship of Cooper basin permit to ATP 2023
April 2022	Announced appointment of Kellogg Brown and Root as ammonia licensor for NRUP
	Announced appointment of Stamicarbon as the urea licensor for NRUP.
March 2022	Raised US\$ 2.9 m from Share Purchase Plan and Placement
	Commenced site works to support geotechnical investigations associated with the construction of the NRUP
	Awarded Climate Active certification for its business for net zero carbon emissions
	Approved renaming of the company to NeuRizer Ltd and updated AS ticker name to ASX: NRZ
February 2022	Announced carbon neutral status of NRUP
	Applied for a patent to protect its IP rights pertaining to predicting and controlling syngas operations
	Commenced factory acceptance testing on Leigh Creek's Siemens power generators for Stage 1 construction of the NRUP
December 2021	Explored opportunities to produce domestic AdBlue to address chronic supply shortages
	Completed a private placement to Energy Exploration Capital Partners LLC of US\$20m
October 2021	Appointed EMM Consulting Pty Ltd to assist with the downstream development approval process of the NRUP
	Expressed intention to register with the Federal government's emissions reduction fund
September 2021	Awarded a PEL 676 in South Australia Cooper Basin Oil and Gas Acreage
July 2021	Awarded an EPCC contract to DL E&C for Stage 2 of NRUP
June 2021	Completed a private placement of US\$18m to Australian and global investors

Source: ASX Announcements, Investors, Company Website

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