NH3 Clean Energy

ASX Announcement | 24 February 2025
NH3 Clean Energy (ASX: NH3)

Pre-FEED Results Indicate Doubling of Value for NH3 Clean Energy's WAH_2 Project

NH3 Clean Energy Limited (ASX:NH3) ('NH3' or 'the Company') (formerly Hexagon Energy Materials Limited ASX:HXG) is delighted to provide a summary of the Preliminary - Front End Engineering and Design ('Pre-FEED') for its flagship WAH_2 Project, together with updated project economics that highlight significant improvements over the Preliminary Feasibility Study[1] ('PFS') results.

A detailed summary of the key aspects of the WAH_2 Project Pre-FEED results is attached to this announcement.

HIGHLIGHTS:

- Efficiencies increase Phase 1 Production Capacity from 600 kTPA to 650 kTPA.
- Ungeared project **Phase 1 Base Case NPV_8** increased from PFS estimate of A$248 M to **A$493 M**.
- Geared company-level Phase **1 Base Case NPV_8 A$603 M**.
- Geared NPV_8 for combined **Phase 1 and 2 Base Case of A$1,140 M**.
- Infrastructure sharing opportunities offer **further capex reduction** and value enhancement and are the subject of ongoing commercial discussions.
- Data room open, multiple potential strategic **parties undertaking due diligence**.
- NH3 continues to advance **discussions with strategic partners**, off-takers, and financiers as it progresses towards FEED-entry, a Final Investment Decision and project development.
- Management will host a **webinar on Tuesday, 25 February 2025** to discuss the Pre-FEED results and project progress (registration details below).

EXECUTIVE SUMMARY

NH3 engaged Petrofac, a leading international service provider to the energy industry, to undertake the pre-FEED technical scope of work in collaboration with Topsoe A/S, the industry leading provider of the core ammonia production technology selected.

The pre-FEED work defined a single base case to take into FEED. The design's flexibility allows for further emissions reduction during operations - allowing the project to meet evolving market demands, regulatory requirements and the eligibility criteria for potential government incentives.

[1] *WAH_2 Project Pre-Feasibility Study Updated Announcement (ASX: 2 August 2023).*

In parallel to the technical Pre-FEED studies, NH3 has significantly developed and de-risked the project by securing preliminary commercial agreements for key elements of the project, including:

- A Key Terms Agreement with DevelopmentWA for the 40 Ha site allocated to NH3 by the WA Government[2].
- Confidential agreements regarding majority gas supply[3] for WAH_2's Phase 1 requirements.
- A Key Terms Agreement with the Water Corporation[4] of WA for the supply of water to the WAH_2 Project.
- A Memorandum of Understanding with the Australian Gas Infrastructure Group[5] ('AGIG') regarding transport of CO_2 to either of the two sequestration sites being considered. NH3 is in separate confidential discussions with both CCS projects, each of which has the capacity to sequester WAH_2 Phase 1 CO_2 volumes.
- A Memorandum of Understanding with Pilbara Ports[6] outlining the collaboration intended to support ammonia export from the WAH_2 Project.

The indicative pricing provided by these agreements and ongoing confidential discussions is reflected in the Pre-FEED economics updating earlier assumptions, increasing confidence and reducing uncertainty.

The results of Pre-FEED demonstrate that the WAH_2 Project exhibits strong economic viability.

The Phase 1 Base Case delivers NPV_8 of A$493 M at an Internal Rate of Return ('IRR') of 11.6%. This Base Case is resilient, retaining positive NPV_8 across key downsides. Project financing would increase equity returns, conservatively increasing Phase 1 Base Case NPV_8 to A$607 M at IRR of 14.4%.

Phase 2 indicates significant growth, with the combined Phase 1 and 2 Base Case delivering an NPV_8 of A$951 M, and an IRR of 12.5%. Project financing could conservatively increase equity returns to A$1,087 M at an IRR of 15.0%.

Identified opportunities related to infrastructure sharing have the potential to improve base case economics further. These will continue to be progressed in parallel to FEED.

NH3's 'keep it simple' integrated design and delivery philosophy (based on the five principles of proven technology, existing supporting infrastructure, established providers, global practitioners and maximum modularization) supports a globally competitive cost of production and has received positive feedback from potential customers.

Meanwhile the competitive position of the WAH_2 Project has been strengthened and the relevance of Phase 2 increased due to electrolysis-based projects struggling with much higher costs which has stalled or terminated many competing projects.

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[2] Hexagon Secures Land for WAH2 Project (NH3:ASX: 15 May 2023).
[3] Hexagon and Chevron Australia agree on Indication of Gas Supply for WAH_2 *Project' (*NH3:ASX: 4 Nov 2024).
[4] WAH_2 Project – Water Supply Key Terms Agreement (NH3:ASX: 11 March 2024).
[5] NH3 Clean Energy and Australian Gas Infrastructure Group sign Memorandum of Understanding on CO_2 Transportation for WAH_2 Project (NH3:ASX: 10 December 2024).
[6] NH3 Clean Energy and Pilbara Ports sign a MOU on Ammonia Shipment for WAH_2 Project (NH3:ASX: 11 February 2025).

NH3’s Chairman Charles Whitfield commented:

> *“*This is a huge step forward in the development and de-risking of the WAH_2 Project. Pre-FEED has provided the level of auditable technical and financial detail that potential strategic partners and customers require to be able to make their engagement decisions. The study has identified many opportunities to improve the economics of the project, not least an 8% increase in output for essentially the same plant and inputs. The scale and projected low cost of production has really started to attract the attention of our target market and international players in the industry. We look forward to progressing the project further as we head into FEED and towards FID.*”*

NH3 continues to advance discussions with strategic partners, off-takers, and financiers as it progresses towards FEED-entry targeted for Q2 2025.

Webinar Details:

- **Date:** Tuesday, 25 February 2025
- **Time:** 11:30am AEDT / 8:30am AWST
- **Registration:** https://us02web.zoom.us/webinar/register/WN_DPJeJXcDQyeSnmbRYycqnQ

This announcement has been authorised for release by the Board of Directors.

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About NH3 Clean Energy Limited

NH3 Clean Energy Limited (ASX: NH3) is an Australian company focused Future Energy project development and Future Energy materials exploration and project development.

The Company is developing a business to deliver decarbonised hydrogen (low-emissions ammonia) into export and domestic markets at scale, via its WAH2 Project. The Company plans to use renewable energy to the greatest extent practicable.

The Company 100% owns the McIntosh Nickel-Copper-PGE project and the Halls Creek Gold and Base Metals project in Western Australia. The Company has an earn in arrangement on its graphite properties.

To learn more, please visit www.nh3ce.com or www.nh3cleanenergy.com

NH3 Clean Energy

WAH_2 Project

Summary Pre-FEED Report

February 2025
Revision 1

Cautionary Statement

Forward Looking Statements

Forward looking statements can generally be identified by the use of forward-looking words such as, 'expect', 'anticipate', 'likely', 'intend', 'should', 'could', 'may', 'predict', 'plan', 'propose', 'will', 'believe', 'forecast', 'estimate', 'target', 'outlook', 'guidance', 'potential' and other similar expressions within the meaning of securities laws of applicable jurisdictions.

There are forward looking statements in this document relating to the outcomes of the Pre-Feasibility Study, the Pre-FEED outcomes and ongoing work on the WAH_2 Project. Actual results and developments of projects and the market development may differ materially from those expressed or implied by these forward-looking statements. These, and all other forward-looking statements contained in this document are subject to uncertainties, risks and contingencies and other factors, including risk factors associated with the hydrogen business. It is believed that the expectations represented in the forward looking statements are reasonable but they may be affected by a variety of variables and changes in underlying assumptions which could cause actual results or trends to differ materially, including but not limited to price fluctuations, actual demand, currency fluctuations, loss of market, industry competition, environmental risks, physical risks, legislative, fiscal and regulatory changes, economic and financial market conditions in various countries and regions, political risks, project delay or advancement, approvals and cost estimates.

Any forward-looking statement is included as a general guide only and speak only as of the date of this document. No reliance can be placed for any purpose whatsoever on the information contained in this document or its completeness. No representation or warranty, express or implied, is made as to the accuracy, likelihood or achievement or reasonableness of any forecasts, prospects, returns or statements in relation to future matters contained in this document. NH3 Clean Energy Limited (NH3CE) does not undertake to update or revise forward looking statements, or to publish prospective financial information in the future, regardless of whether new information, future events or any other factors affect the information contained in this document, except where required by applicable law and securities exchange listing requirements. To the maximum extent permitted by law, NH3CE and its associates disclaim all responsibility and liability for the forward-looking statements, including, without limitation, any liability arising from negligence. Recipients of this document must make their own investigations and inquiries regarding all assumptions, risks, uncertainties, and contingencies which may affect the future operations of NH3CE or its securities.

Gas Supply

NH3CE has not yet secured binding long-term gas supply agreements. There is no guarantee that current gas supply agreements will convert into binding commitments to supply gas over the long term. It should be noted that the WAH_2 Project is contingent on securing long term gas

supply in line with the assumed volumes, timing and price. If this cannot be achieved, there is a risk that the WAH_2 Project may be downgraded, deferred or may not go ahead.

Financing

NH3CE has not yet secured funding for the WAH_2 Project and accordingly to achieve the range of outcomes required for Phase 1, NH3CE will need to secure the requisite funding. The Company is engaged with potential strategic partners and is in the early stages of engaging with financial institutions to determine project financing alternatives. Due to the likely high credit quality of the customer base and the long-term nature of the sales contracts, a 60% debt component project financing target is considered realistic. This would leave approximately A$685mm that the company would aim to raise by alternative means including selling equity participation to strategic partners Phase 1 of the project. The Company will also pursue any available public sector grants or government funding where possible but is not assuming any reliance on these sources.

There is no certainty NH3CE will be able to complete a project financing agreement or sell down part of the Project or to raise the amount of funding when required. It should also be noted that any raise may only be available on terms that may be dilutive to shareholders or otherwise affect the value of NH3CE's shares. If the proposed sell down or funding cannot be achieved, there is a risk that the WAH_2 Project may be downgraded, deferred or may not go ahead.

Executive Summary

Highlights of the results from the pre-Front End Engineering Design (pre-FEED) study:

- Phase 1 production capacity increased from 600 kTPA to 650 kTPA;
- Un-geared project level Phase 1 Base Case Net Present Value (NPV_8) up from A$248 M to A$493 M;
- Un-geared project level Phase 1+Phase 2 Base Case NPV_8 up from A$486 M to A$951 M;
- Geared company level Phase 1 Base Case NPV_8 A$603 M; and
- Geared and optimised Phase 1+Phase 2 NPV_8 A$1140 M.

NH3 Clean Energy's (NH3CE's) WAH_2 Project was conceived with the intention to be the preferred Australian supplier of low-emissions ammonia to the energy transition market in Asia. Specifically, to meet the demand for clean ammonia:

- from Japan and Korea as they look to decarbonise their power generation by co-firing ammonia in their existing thermal generation plants; and
- as an alternative fuel for the fleet of bulk carriers carrying mineral ore from Australia to Asia thereby displacing diesel and bunker oil.

To become the leading producer of clean ammonia for these markets, the management team identified four key performance targets, namely:

- Emissions - emissions intensity bettering 'clean' requirements of customers;
- Production cost – as low as practicable, to deliver a competitive product;
- Production capacity – sized to market;
- Time to market – before 2030.

To achieve these targets, the following core principles were developed to guide the project, based on initial scoping studies:

- Utilise established technology with a track record of reliable industrial scale production;
- Locate the project near to key input and output providers. Including gas supply, water supply, CO_2 sequestration projects, a deepwater port and an appropriate workforce;
- Find a location with as much existing relevant infrastructure as possible;
- Enter into agreements with experienced third parties to provide services to the project rather than building everything in house;
- Maximise modularisation to allow much of the plant to be prefabricated off site thereby reducing engineering risk, cost and timing; and
- Locate in a resource and industry friendly jurisdiction.

The criteria above led to early key decisions to manufacture clean ammonia using gas reforming with CO_2 sequestration, select Auto Thermal Reforming (ATR) as the core technology, and locate the project in the Maitland Strategic Industrial Area (SIA).

These decisions have subsequently been validated by the findings from the Pre-Feasibility Study[1] (PFS) and Pre-FEED, but also by the development of industry with the shuttering of a large number of electrolysis-based projects and the slow progress of projects which are not located close to the necessary components for producing and shipping ammonia.

NH3CE engaged Petrofac, a leading international service provider to the energy industry, to undertake the pre-FEED technical scope of work in collaboration with Topsoe A/S, the industry leading provider of the core ammonia production technology selected. The pre-FEED work defined a single base case to take into Front End Engineering Design (FEED), as summarised below:

- Phase 1 production capacity of 1,800 TPD (equivalent to 650,000 TPA) of ammonia with an emissions intensity of 0.38 kg CO_2/kg NH_3.
- Autothermal reforming technology used to convert natural gas into ammonia.
- Natural gas would be sourced from existing gas producers via the Dampier-to-Bunbury Natural Gas Pipeline (DBNGP) which runs adjacent to the WAH_2 site.
- Water, required primarily for cooling purposes, would be sourced from the Water Corporation making use of existing facilities with some upgrade.
- Process-related CO_2 would be captured, compressed and exported via pipeline to a third-party sequestration site. The CO_2 pipeline would be built, owned and operated by a third-party specialist pipeline company.
- The ammonia produced would be transported via pipeline to storage facilities located near the Port of Dampier and from there to Port of Dampier bulk liquids berth where it would be loaded on to a gas carrier for export or a bunker vessel to provide fuel to iron-ore carriers.

The design's flexibility allows for further emissions reduction by substituting natural gas with syngas for power generation. The mix of natural gas/syngas can be adjusted during operations – allowing the project to meet evolving market demands, regulatory requirements and the eligibility criteria for potential government incentives.

In parallel to the technical Pre-FEED studies, NH3CE has significantly developed and de-risked the project by securing preliminary commercial agreements for key elements of the project, including:

- A Key Terms Agreement with DevelopmentWA for the 40 Ha site allocated to NH3CE by the Western Australia (WA) Government[2].
- Confidential agreements regarding gas supply, representing the majority of WAH_2's Phase 1 requirements[3].

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[1] *WAH_2 Project Pre-Feasibility Study Updated Announcement (ASX: 2 August 2023).*

[2] *Hexagon Secures Land for WAH2 Project (NH3:ASX: 15 May 2023).*

[3] *Hexagon and Chevron Australia agree on Indication of Gas Supply for WAH2 Project' (NH3:ASX: 4 Nov 2024).*

- A Key Terms Agreement with the Water Corporation of WA for the supply of water to the WAH_2 Project[4].
- A Memorandum of Understanding with the Australian Gas Infrastructure Group (AGIG) regarding transport of CO_2 to either of the two sequestration sites being considered[5].
- NH3CE is in separate confidential discussions with both CCS projects, each of which has the capacity to sequester WAH_2 Phase 1 CO_2 volumes.
- A Memorandum of Understanding with Pilbara Ports outlining the collaboration intended to support ammonia export from the WAH_2 Project[6].

The results of Pre-FEED demonstrate that the WAH_2 Project exhibits strong economic viability.

The Phase 1 Base Case delivers NPV_8 of A$ 493 M at an Internal Rate of Return (IRR) of 11.6%. This Base Case is resilient, retaining positive NPV_8 across key downsides.

Project financing would increase equity returns, conservatively increasing Phase 1 Base Case NPV_8 to A$607 M at IRR of 14.4%.

Phase 2 promises significant growth, with the combined Phase 1 and 2 Base Case delivering an NPV_8 of A$951 million, and an IRR of 12.5%. Project financing could conservatively increase equity returns to A$1087 M at an IRR of 15.0%.

Identified opportunities related to infrastructure sharing have the potential to improve base case economics further. These will continue to be progressed in parallel to FEED.

It should be noted that while NH3CE considers securing binding commitments for the inputs of and financing for the WAH_2 Project to be achievable, there is no guarantee that the current agreements and discussions on these matters will convert into firm commitments. If these cannot be achieved, there is a risk that the WAH_2 Project may be downgraded, deferred or not go ahead.

NH3CE is committed to responsible project development, demonstrated by its proactive engagement with regulatory bodies and key stakeholders. This includes seeking 'priority project' status under the WA Government's Lead Agency Framework and implementing a comprehensive stakeholder engagement plan.

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[4] *WAH2 Project – Water Supply Key Terms Agreement (NH3:ASX: 11 March 2024)*

[5] *NH3 Clean Energy and Australian Gas Infrastructure Group sign Memorandum of Understanding on CO2 Transportation for WAH2 Project (NH3:ASX: 10 December 2024).*

[6] *NH3 Clean Energy and Pilbara Ports sign a MOU on Ammonia Shipment for WAH2 Project (NH3:ASX: 11 February 2025).*

The next steps for the WAH_2 Project are to progress strategic partner and customer engagement and then proceed with the single design basis into FEED.

This pre-FEED report demonstrates the WAH_2 Project's strong foundation for advancing to the FEED phase, with a clear focus on risk mitigation, economic optimisation, and strategic positioning in the clean energy market.

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Nomenclature

A$	Australian dollar
AACe	Association for the Advancement of Cost Engineering
ACCU	Australian Carbon Credit Units
AEMO	Australian Energy Market Operator
ACH	Aboriginal Cultural Heritage
ACHIS	Aboriginal Cultural Heritage Inquiry System
AGIG	Australian Gas Infrastructure Group
AHA	Aboriginal Heritage Act
ASU	Air Separation Unit
ATR	Auto Thermal Reforming
AWRP	Advanced Water Recycling Plant
B	Billion
BMIEA	Burrup and Maitland Industrial Estate Native Title Agreement
CCGT	Combined Cycle Gas Turbine
CCS	Carbon Capture and Storage
CEFC	Clean Energy Finance Corporation
CFD	Contract for Difference
CO_2	Carbon Dioxide (chemical formula)
CO_2e	Carbon Dioxide equivalent
COVID	Corona virus disease
DBCA	Department of Biodiversity, Conservation and Attractions
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DWER	Department of Water and Environmental Regulation
DWT	Dead Weight Tonnes
EIS	Environmental Impact Statement
EPA	Environmental Protection Authority
EPBC	Environmental Protection and Biodiversity Conservation
EPC	Engineering Procurement and Construction
FEED	Front End Engineering Design
FID	Final Investment Decision
GJ	Giga Joule
GL	Giga Litre

GT	Gas Turbine
GW	Giga Watt
h	hour
H_2	Hydrogen (chemical formula)
H_{2e}	Hydrogen equivalent
Ha	Hectare
HPTI	Hydrogen Production Tax Incentive
HRSG	Heat Recovery Steam Generators
IBSA	Index of Biodiversity Surveys for Assessments
IEA	International Energy Agency
ILUA	Indigenous Land Use Agreement
IRR	Internal Rate of Return
ISBL	Inside Boundary Limit
JPY	Japanese Yen
JTSI	Department of Jobs, Tourism, Science and Innovation
kg	kilo gram
kL	kilo Litre
KOSPO	Korea Southern Power
km	kilometre
kT	kilo Tonne
KTA	Key Terms Agreement
LAN	Local Area Network
LNG	Liquified Natural Gas
M	Million
m^3	metres cubed
MAC	Murujuga Aboriginal Corporation
MoU	Memorandum of Understanding
MNES	Matters of National Environmental Significance
MT	Million Tonne
MTPA	Million Tonne Per Annum
MW	Mega Watt
NAC	Ngarluma Aboriginal Corporation RNTBC
NAIF	Northern Australia Infrastructure Facility
NEDO	New Energy and Industrial Technology Development Organisation
NH_3	Ammonia (Chemical Formula)

NH3CE	NH3 Clean Energy Ltd
NNTT	National Native Title Tribunal
NPV	Net Present Value
NWU	Nitrogen Wash Unit
OSBL	Outside Boundary Limit
PD	Per Day
PDD	Project Definition Document
PEC	Priority Ecological Communities
PER	Public Environmental Review
PFS	Pre-Feasibility Study
PJ	Peta Joule
PPA	Pilbara Ports Authority
Pre-FEED	Preliminary - Front End Engineering Design
RFSU	Ready For Start Up
RT	Real Terms
SIA	Strategic Industrial Area
T	Tonne
TEC	Threatened Ecological Community
TIC	Total Installed Cost
TJ	Tera Joule
TO	Traditional Owners
TPD	Tonnes Per Day
US$	United States of America dollar
WA	The State of Western Australia
WAGSOO	Western Australia Gas Statement of Opportunities
WAH_2	NH3 Clean Energy Limited's low-emissions ammonia project
WC	Water Closet
°C	Degrees Celsius

1.0 Introduction

NH3CE is an Australian-listed company focused on delivering low-emissions ammonia solutions to support the energy transition. Through its WAH_2 flagship project NH3CE intends to produce low-emissions ammonia to satisfy Asia Pacific demand for sustainable energy over the coming decades.

The pre-FEED was undertaken for the purpose of advancing NH3CE's WAH_2 Project. This report sets out the scope, approach, and key conclusions of the Pre-FEED and identifies a clear pathway through (FEED) to a Final Investment Decision (FID) anticipated in Q2 2026.

NH3CE engaged Petrofac, a leading international service provider to the energy industry, to undertake the pre-FEED technical scope of work in collaboration with Topsoe A/S, the industry leading provider of the core ammonia production technology selected. The pre-FEED work screened a number of development options, and at its conclusion defined a single base case to take into FEED with some optimisation opportunities identified which will be evaluated as part of FEED.

Refinement of engineering, plant optimisation and ongoing mitigation of project risks will be the focus of FEED studies that are expected to commence in Q2 2025.

Supporting information is referred to using footnotes and a list of the supporting references is included in the appendix.

2.0 Market Context

More than 70 countries, including the biggest polluters (China, the United States, and the European Union) have set net-zero emission targets[7], driving the energy transition and increasing demand for low-emissions energy. Hydrogen (H_2) and ammonia (NH_3) are each forecast to play a major part.

H_2 is an energy carrier with the potential for near zero greenhouse gas emissions – although it has low energy density and remains challenging and energy intensive to store and transport. NH_3 offers an effective means of H_2 transport with higher energy density and more stable chemical properties and is particularly attractive where the end-use requires NH_3 – this is the case in the WAH_2 Project's target markets of NH_3-fired power generation and marine bulk carriers.

Global H_2 demand was 97 MT H_2e in 2023 with NH_3 making up approximately a third of this demand[8] (noting that that 1 T H_2e is equivalent to ~5.7 T NH_3). Low emissions hydrogen is less than 1% of current demand, however the International Energy Agency (IEA) forecasts[9] that, based on announced projects, global low-emissions H_2 demand could reach 49 MTPA by 2030. Due to technical and economic challenges of long-distance H_2 shipping, most export projects are focussing on NH_3 as the means of transport.

2.1 Target Market

Strong demand for low-emissions NH_3 is forecast in the Asia Pacific especially Japan and South Korea for power generation. Japan[10] is targeting imports of 3MTPA of low-emissions NH_3 by 2030, rising to 30 MTPA by 2050. South Korea[11] is aiming to generate 3.6% of its power from NH_3 by 2030, increasing thereafter.

To realise these targets, Japan expects to invest JPY 300 B (A$3.4 B) per year to establish supply chains for low-emissions H_2 and NH_3[12]. Similarly, during FY2021, spending on H_2 projects by the South Korean government totalled almost US$702 million (A$1 B)[13].

The most attractive sources of supply will have low cost of production with stable economic and political systems. Low-emissions NH_3 produced by reforming natural gas and sequestering the

[7] United Nations, Climate action
[8] IEA Global Hydrogen Review 2024
[9] IEA Global Hydrogen Review 2024
[10] METI Ammonia Strategy and Policy in Japan
[11] S&P Platts 'South Korea to commercialize ammonia-fuelled power generation by 2030
[12] IEA Green innovation fund – METI funds hydrogen supply chain
[13] Macquarie perspectives, a clean start: South Korea embraces its hydrogen future

associated CO_2 has a significantly lower cost of production than the alternative of electrolysis of water using electricity from renewable sources and is expected to dominate supply over the next decade[14,15].

The global price of conventional (not low emission) NH_3 was volatile during COVID and Ukraine, however it has stabilised more recently to the US$400-550 /T range at the end of 2024[16].

The market for low-emissions NH_3 is in its infancy and, as such, future prices are uncertain. To stimulate the investment necessary to establish supply of low-emissions NH_3, prices will have to be sufficient to cover the producers' cost of supply and are expected to reflect a premium over conventional, high-emissions, NH_3.

Market Index providers have estimated the premia required by blue and green NH_3 over conventional ammonia using assumptions for capital and operating costs.[17] These indicate that blue ammonia would command at least a US$45/ T premium, supporting an estimate of around USD600/tonne. Green ammonia however requires much greater pricing levels in the US$900 – 1000 /T range, supporting the assumption that in the medium-term blue projects will be most likely to move forward.

NH3CE has engaged with potential customers through Pre-FEED and has received consistent recent feedback that a low-emissions NH_3 price of ~US$600/ T would be considered competitive.

Long-term sales and purchase agreements are expected to be required to provide price and revenue stability for investors and producers. Initiatives such as the Japanese Government's Supply Chain Subsidy[18] that facilitate stable prices for suppliers of low-emissions NH_3 for use in the Japanese power sector are likely to be instrumental in enabling such contracts.

Trials of cofiring of coal-fired power stations with 20% ammonia were successfully completed at the 1GW JERA Hekinan facility in Japan in June 2024[19]. Operating a single 1.2GW power station at 20% cofiring on a consistent basis would require 0.6 million tonnes of NH_3 per annum. This is the entire output of WAH_2 Phase 1 and demonstrates the potential size of the low emissions ammonia market.

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[14] S&P Global, going big for blue hydrogen
[15] Forbes, blue hydrogen isn't the climate enemy, it's part of the solution
[16] BusinessAnalytic.com Ammonia Price Index
[17] Platts Ammonia Price Chart Monthly average price, January 2025 ($/mt)
[18] GR Japan 2024 https://grjapan.com/sites/default/files/content/articles/files/Japan%27s hydrogen and ammonia policy - overview and key developments %28final%29_1.pdf
[19] JERA https://www.jera.co.jp/en/news/notice/20240626_1954

Beyond Japan, the Korean government awarded the first contract for H_2/NH_3 fired power to Korea Southern Power (KOSPO) in 2024 under the Clean Hydrogen Portfolio Standard[20]. Further procurement processes are expected in 2025 highlighting the broader appeal of low emissions NH_3 in Asia.

Marine bunkering is another promising potential market. The Pilbara is one of the largest bulk carrier terminals in the world with hundreds of vessels operating on the iron ore trade from Northern Australia to Asia. If just 18 of these vessels were converted to 100% ammonia fuel, it would consume the entire output of the WAH_2 project phase 1.

Successful ship-to-ship ammonia transfers were completed in the Pilbara in 2024, demonstrating the viability of the concept. A joint 2023 study undertaken by Pilbara Ports, Yara Clean Ammonia and Lloyd's Register estimated that the total requirement in this region would reach 1 to 1.5 million tonnes of ammonia by 2035[21].

The low emissions ammonia market is still very early stage, however the combination of technical feasibility, government support and emissions reduction targets suggest that it will develop at a rapid pace over the balance of this decade and that natural gas-based production, with carbon capture and storage, will lead the way in developing the supply chain for this important new fuel source.

2.2 Emissions Criteria

The WAH_2 Pre-FEED design will produce ammonia with an emissions intensity of 0.38 kg CO_2/kg NH_3 'gate-to-gate' in base case operation. Upstream emissions, associated with the Project's gas feedstock, are estimated to be less than 0.1 kg CO_2e/kg H_2e (equivalent to 0.02 kg CO_2/kg NH_3).

This comfortably betters customers' emissions requirements for clean ammonia. Notably:

- Japan's Basic Hydrogen Strategy defines clean ammonia as ammonia with an emissions intensity of ≤0.87kg CO_2e/kg NH_3 'well-to-gate'[22]; and
- Korea's Clean Hydrogen Certification scheme defines clean Hydrogen and ammonia as having a carbon intensity of ≤4.0kg CO_2e/kg H_2e[23] (equivalent to 0.71 kg CO_2e/kg NH_3) 'gate-to-gate'.

[20] https://ammoniaenergy.org/articles/korea-southern-power-selected-as-final-bidder-in-national-clean-power-auction/
[21] https://www.gcformd.org/successful-ship-to-ship-ammonia-transfers-pave-the-way-for-ammonia-bunkering-in-the-pilbara-region/
[22] https://www.spglobal.com/commodity-insights/en/news-research/latest-news/energy-transition/061424-japan-tightens-low-carbon-ammonia-standards-to-align-with-europe-us
[23] https://www.argusmedia.com/en/news-and-insights/latest-market-news/2573134-south-korea-h2-power-auction-excludes-some-nh3-projects

The design's flexibility allows for further emissions reduction by substituting natural gas with syngas for power generation. An emissions intensity of 0.10 kg CO_2/kg NH_3 'gate-to-gate' could be achieved if 100% syngas was used in power generation and fired heaters.

This flexibility should allow the Project to meet evolving market demands, regulatory requirements and the eligibility criteria for potential government incentives.

2.2 Regulatory Support

The Japanese Government has been allocating significant funding to establishing supply chains for low-emissions hydrogen and ammonia, including:

- The Supply Chain Subsidy Program which includes US$60 B (A$89 B) of funds earmarked to establish international low-emissions hydrogen and ammonia supply chains, with much of the funding expected to be allocated to projects outside Japan;
- JPY$98.9 B (A$1 B) for FY2022 research and development activities that include verification testing for co-firing of ammonia in coal-fired power plants; and
- Establishment of the Green Innovation Fund with a budget of JPY$2 trillion (A$21 B)[19] to be administered by the government-controlled New Energy and Industrial Technology Development Organisation (NEDO).

In Australia, potential sources of Government funding and incentives include:

- The WA State and Commonwealth Governments have allocated A$140 M to progress the Pilbara Hydrogen Hub. A little over half of which has been allocated to a multiuser NH_3 or H_2 pipeline from the Maitland SIA to the Port of Dampier.
- Opportunities associated with the Australian Government relate to the Australian Government's Regional Hydrogen Hubs Program, the CEFC's Advancing Hydrogen Fund, and the Northern Australia Infrastructure Facility.

It is not yet clear whether the WAH_2 Project could be eligible for the planned Hydrogen Production Tax Incentive (HPTI) based on the Consultation Paper[24] issued by Treasury in 2024. This contemplates incentives of A$2 /kg of 'renewable' hydrogen produced with an emissions intensity of .6 kg CO_2/kg H_2 or less (and is 'agnostic' of the manufacturing pathway).

The pre-FEED studies suggest that WAH_2 could meet the required emissions intensity by using the flexibility of the pre-FEED design to use syngas, rather than natural gas, for power generation (Section 4.1).

[24] Hydrogen Production Tax Incentive Consultation Paper, Australian Government Treasury, June 2024

3.0 Project Overview

3.1 Objectives

NH3CE's WAH_2 Project aims to provide low-emissions ammonia which will be exported for co-firing in coal-fired power stations in Japan and South Korea (to assist those countries to decarbonise) and used domestically as a shipping fuel (to help decarbonise the transport of Australia's mineral ore exports).

The project will prioritise price competitive and reliable supply of material volumes of certified low-emissions ammonia, starting in 2029.

3.2 Basis of Design

The WAH_2 project has been specifically designed to meet the needs of the energy transition.

NH3CE's 'keep it simple' integrated design and delivery philosophy minimises costs, time to production and mitigate project delivery risks and is based on five principles:

- **Proven Technology**
  Leveraging well-established, industry-tested solutions to minimise technological risks and ensure operational reliability.
- **Existing Infrastructure**
  Utilising available infrastructure to reduce capital expenditure and accelerate project timelines, while benefiting from established operational frameworks.
- **Established Providers**
  Partnering with experienced, reputable suppliers and service providers to ensure quality, reliability, and adherence to industry best practices.
- **Global Practitioners**
  Engaging world-class experts and consultants to bring international best practices and cutting-edge insights to the project.
- **Modularisation**
  Implementing a modular construction approach to minimise on-site scope, reducing local environmental impact, optimise project timelines through parallel off-site fabrication, and leverage existing import facilities at the Port of Dampier.

The Pre-FEED basis of design for the project is summarised in Table 1.

Table 1 WAH_2 Base Case basis of design

Project detail	Description
Site	Maitland SIA, Western Australia
Production Capacity *Phase 1* *Phase 2*	 650,000 T NH_3/year Additional 650,000 (Total 1,300,000) T NH_3/year
NH_3 production technology	Topsoe SynCOR Ammonia™ Auto Thermal Reforming
Facility Availability	24 hours a day, 365 days a year, 95% availability
Design Life	25 years
Cooling water system	Closed loop
Power generation	2 x Siemens Energy SGT-700 gas turbines 2 x pressure Heat Recovery Steam Generators (HRSGs) 1 x steam turbine
Fuel gas for power generation	100% natural gas (base case) Flexibility to blend to 100% syngas
Natural gas supply	Purchased from 3rd-parties Delivered via Existing Dampier to Bunbury Natural Gas Pipeline
Water supply	Purchased from Water Corporation Delivered by WAH_2-owned water pipeline
CO_2 capture technology	BASF OASE® CO_2 removal system
CO_2 emissions intensity	0.38 kg CO_2/kg NH_3 (base case) Flexibility to reduce if syngas used for fuel
CO_2 transport and sequestration	900,000 T CO_2/year Exported via 3rd-party new-build pipeline Sequestered in 3rd-party sequestration site
NH_3 export pipeline	New build pipeline (WAH_2-owned in base case, potential to be 3rd-party)
NH_3 storage and loading	Near port storage tanks and loading pipeline (WAH_2 new build in base case, potential to use existing)
Port Facilities	Port of Dampier Existing bulk liquids facilities

3.3 Site Overview

The WAH_2 project was specifically designed to be the most attractive clean ammonia project in Australia by seeking to minimise overall project capex and opex. The location of the project is a key factor in the project costs and therefore selection took into consideration:

Proximity to key inputs (gas, water, port facilities)

- Benefitting from existing or contemporaneous infrastructure
- A resource friendly environment with a trained workforce.

To this end, the project was strategically positioned in the Pilbara region of Western Australia. A location that offers a secure operational environment, low geopolitical risks and existing efficient shipping routes to key markets. The region has over 40 years of established energy export partnerships between Australia and the Asia-Pacific region.

NH3CE has been allocated a 40-hectare site in the Maitland Strategic Industrial Area (SIA) by the Western Australian Government and has executed a Key Terms Agreement for an Option to Lease and Lease with DevelopmentWA. The Option to Lease has been agreed in-principle with final approvals pending document finalisation.

The project's location provides significant commercial benefits offering cost-effective access to essential services and infrastructure including gas supply, water supply, port facilities, CCS providers via established infrastructure corridors.

The site is proximal to Karratha allowing a daily drive-in, drive out workforce during operation.

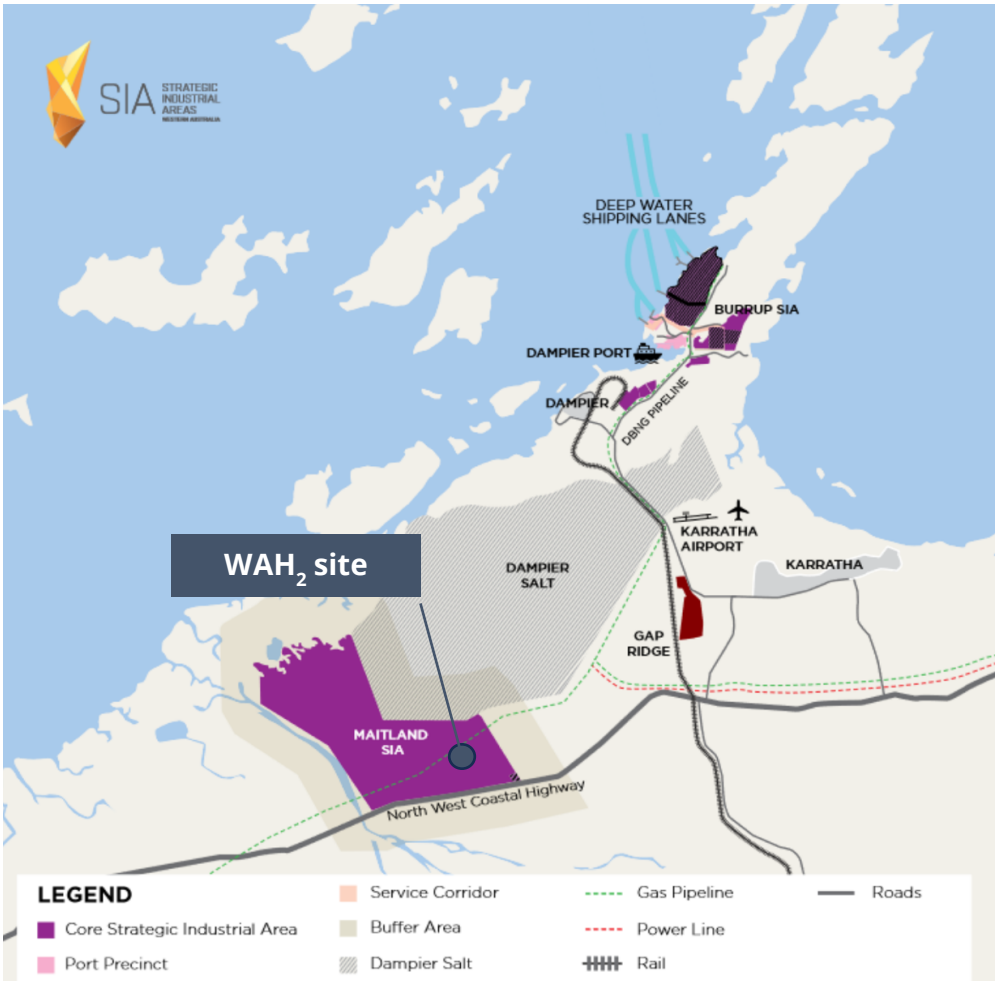

Figure 1 Location of the WAH_2 project site

The 40 Ha site can comfortably accommodate both Phase 1 and Phase 2 of the WAH_2 Project, as shown by the preliminary site layout in Figure 2.

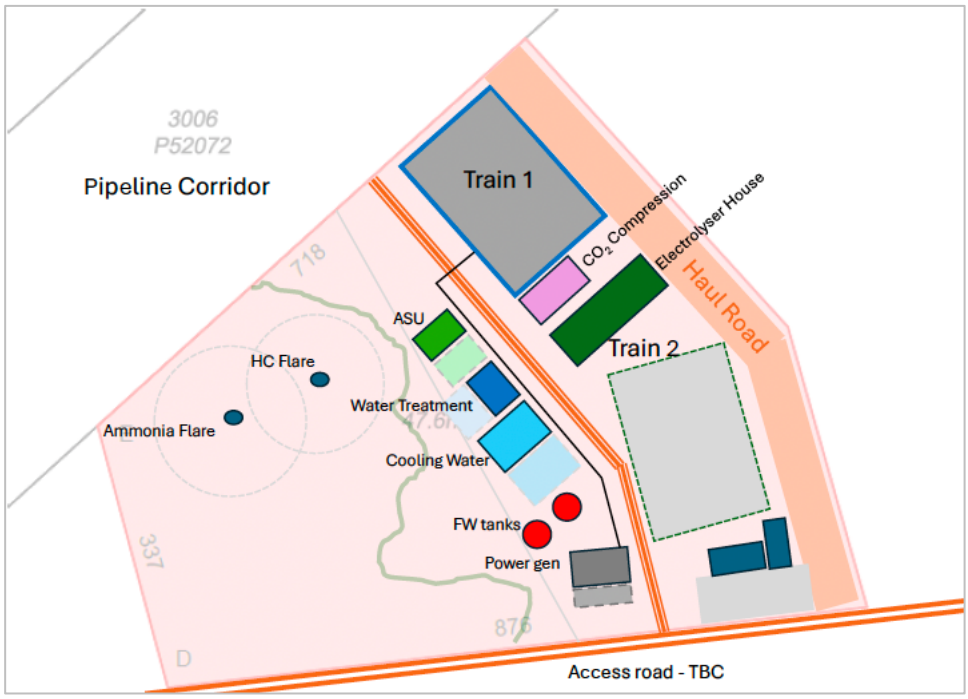

Figure 2 WAH_2 Project preliminary site layout

3.4 Commercial and Technical Integration

Through Pre-FEED, NH3CE has progressed a series of confidential commercial discussions in parallel to the technical scope of work which have supported simplification of project scope and reduction of project risk in several key areas.

The most significant impacts on engineering relate to water supply (ref. Section 4.2.2 Water), CO_2 transportation (ref. Section 4.3.2 CO2 Capture and Compression), and the potential for shared ammonia transport, storage and loading infrastructure (ref. Section 4.4.2 Ammonia Storage and Loading).

Commercial discussions have also resulted in indicative prices being provided for key services and inputs – which update assumptions made during the PFS and reducing commercial uncertainty. This includes gas supply, water supply, CO_2 transportation and CO_2 sequestration. These confidential prices are reflected in the WAH_2 Pre-FEED economics.

Discussions with potential customers have confirmed market expectations regarding the price of competitive clean ammonia, the volumes required and timing of supply.

3.6 Schedule

The WAH_2 project aims to provide price competitive and reliable supply of material volumes of certified low-emissions ammonia starting from 2029, to support customers' decarbonisation commitments.

Target milestones include:

- Start of FEED Q2 2025;
- FID Q2 2026;
- Engineering, Procurement, and Construction (EPC) and commissioning spanning approximately three years; leading to
- Start-Up (RFSU) 2029.

These are illustrated, together with the key deliverables required to support FEED-entry and a Final Investment Decision at the end of FEED.

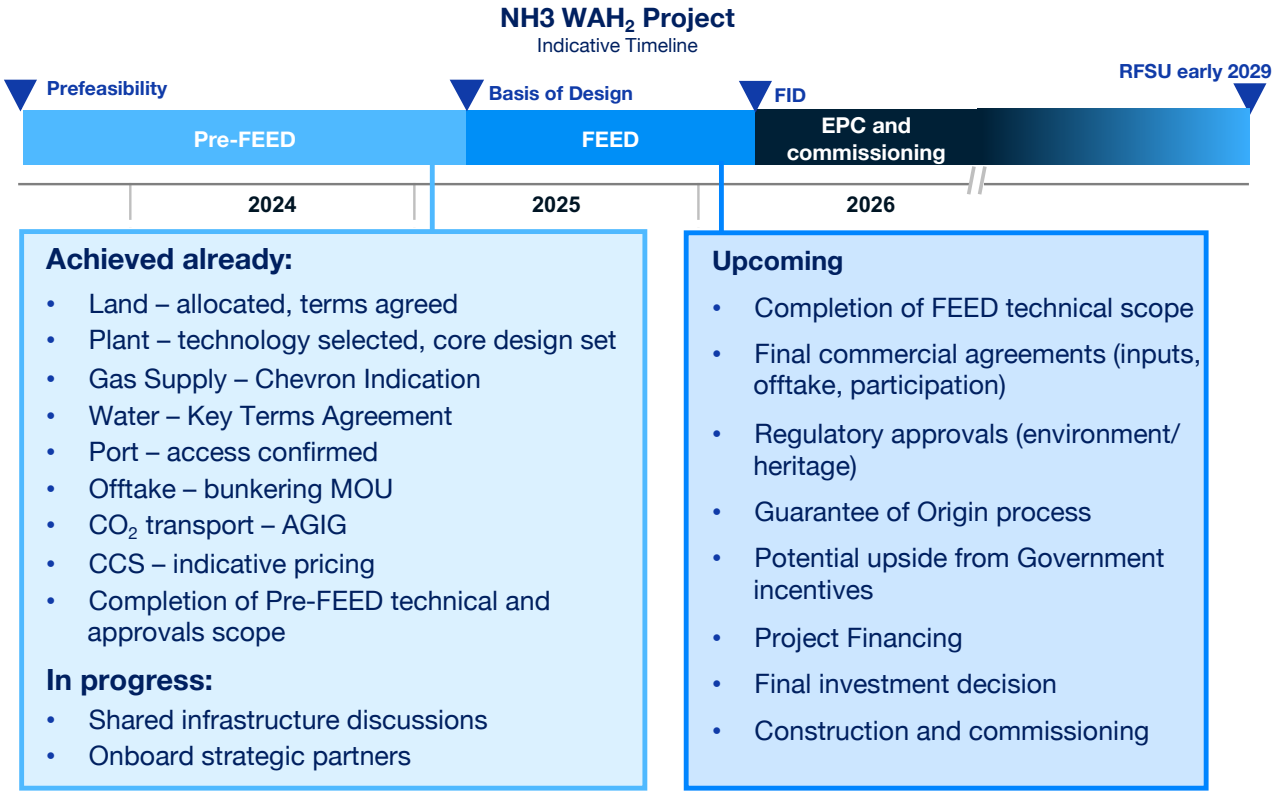

Figure 3 WAH_2 Project timeline

4.0 Technical Assessment

The Pre-FEED engineering studies were driven by three primary objectives: mitigating technical risk, reducing economic uncertainty, and ensuring a cost-effective facility design that offers both operational flexibility and scalability for future expansion.

A diverse array of design options was evaluated and the conclusions used to define a single, optimised design case to take into FEED.

Key areas of Pre-FEED focus included:

- Identifying emission sources and investigating opportunities for emission reduction;
- Analysing the inter-relationships and trade-offs between production volumes, emissions intensity, and energy efficiency;
- Evaluating relative benefits of using natural gas and/or syn-gas for power generation and heating applications; and
- Exploring the potential of electrical heaters as an alternative to traditional fired heaters.

This approach has positioned WAH_2 at the forefront of innovative and pragmatic design in the clean ammonia industry.

The design to be taken into FEED preserves operational efficiency and offers flexibility with an ammonia product that can have a range of carbon intensity - to cater for varying customer preferences and in consideration of eligibility criteria for potential government incentives.

4.1 Design Overview

The Pre-FEED design for WAH_2 has a production capacity of 1,800 TPD (equivalent to 650,000 TPA) of ammonia with an emissions intensity of 0.38 kg CO_2/kg NH_3.

The design uses proven autothermal technology to convert natural gas into ammonia. Natural gas would be sourced from existing gas producers via the Dampier-to-Bunbury Natural Gas Pipeline which runs adjacent to the WAH_2 site.

Water is required, primarily for cooling purposes, and would be sourced from the Water Corporation making use of existing facilities with some upgrade.

Approximately 99% of process-related CO_2 would be captured, compressed and exported via pipeline to a third-party sequestration site. The CO_2 pipeline would be built, owned and operated by a third-party specialist pipeline company and located in the existing infrastructure corridor.

The ammonia produced would be transported via pipeline, using the existing infrastructure corridor, to storage facilities located near the port of Dampier. From there, the ammonia would

be transported by pipeline to the Bulk Liquids Jetty at the Port of Dampier where it would be loaded on to a gas carrier for export or a bunker vessel to provide fuel to iron-ore carriers.

The ammonia pipeline, storage and loading facilities are all included in the Pre-FEED base case design. Opportunities are being progressed regarding the potential for a multi-user ammonia pipeline to be provided by a third party, and the potential for a commercial agreement for the project to use existing, third-party ammonia storage and loading infrastructure. Each of these would reduce the capital cost of the project.

The design's flexibility allows for further emissions reduction by substituting natural gas with syngas for power generation. This would reduce the volume of syngas available for ammonia synthesis and therefore reduce the volumes of ammonia produced and increase the cost of the product.

An emissions intensity of 0.10 kg CO_2/kg NH_3 could be achieved if 100% syngas was used in power generation and fired heaters.

The plant has been designed so that the mix of natural gas/syngas used for power generation can be adjusted during operations – allowing the project to meet evolving market demands, regulatory requirements and the eligibility criteria for potential government incentives.

4.2 Feedstock and Utilities

4.2.1 Natural gas

Natural gas is required as feedstock for the process, to heat the process and to provide power to the plant. It would be supplied via a new tie-in to the existing DBNGP which runs immediately adjacent to the WAH_2 site.

The operator of DBNGP is aware of the WAH_2 Project and its requirements. They have confirmed that a new hot tap is possible and can be achieved without interruption to the operation of the DBNGP. They have also advised the approximate cost which has been included in the WAH_2 cost estimate.

The total gas requirement for Phase 1 Base Case is 57 TJ/d (20 PJPA), this reduces somewhat if syngas is used in addition to natural gas for power generation.

NH3CE intends to source gas from a portfolio of suppliers. This helps manage gas supply risk and makes it easier for suppliers to accommodate WAH_2.

During Pre-FEED NH3CE entered into confidential non-binding agreements regarding gas supply to WAH_2, representing almost 85% of WAH_2's Phase 1 requirements for a 10-year supply

period starting in 2029 with options to extend for an additional 5 years (including the announced agreement with Chevron Australia[25]).

The confidential pricing in these agreements is reflected in the WAH_2 Pre-FEED economics.

NH3CE is engaged in ongoing confidential discussions with additional gas producers to secure preliminary agreements for the remaining gas supply.

It is intended that such agreements will be matured into binding gas supply agreements during FEED to support WAH_2 Project FID.

The Australian Energy Market Operator's (AEMO) independent outlook for the WA gas market demonstrates that WA has sufficient discovered gas to supply the WAH_2 Project in the longer term.

Considering AEMO's most recent Western Australia Gas Statement of Opportunities (WAGSOO)[26]:

- As of June 2024, WA Conventional 2P gas reserves totaled 66338 PJ, and WA Conventional 2C gas resources gas totaled 51488 PJ. These figures do not include unconventional gas resources which have the potential to add substantial additional volumes in the longer term.
- Total WA gas demand from 2025 to 2034 totals 30407 PJ in the Progressive Change Case outlook. This includes gas for domestic supply, LNG export and LNG processing.
- Total WA gas demand in 2032 is 2528 PJ in the Progressive Change outlook.

The AEMO outlook extends until 2034. Past this point gas demand is likely to decline or remain flat.

- No additional Liquified Natural Gas (LNG) plants are expected to be built in WA after Pluto train 2 (which is already included in AEMO's forecast) and existing LNG trains will start to reach the end of their design life.
- Gas demand related to power generation is expected to decline as the penetration of renewable power increases and grid-scale battery storage increases.

Therefore, annual WA gas demand post 2034 is not expected to exceed 2800 PJPA, including the WAH_2 project. Existing 2P reserves are sufficient to extend WA gas production at this rate until ~2046 and existing 2C resources have the potential to extend production at this rate for a further 18 years – well past the operational life of the WAH_2 project.

[25] *Hexagon and Chevron Australia agree on Indication of Gas Supply for WAH_2 Project (ASX 4 November 2024)*
[26] WAGSOO 2024 Western Australia Gas Statement of Opportunities

4.2.2 Water

The Phase 1 Base Case requires a water supply of 1378 kL/d (0.48 GLPA), primarily for cooling purposes, but also steam generation, potable supply and firewater.

During Pre-FEED, NH3CE executed a confidential non-binding Key Terms Agreement (KTA) with the Water Corporation of WA for the supply of 1450 kL/d of water to the WAH_2 Project. A binding Water Supply Agreement is currently being negotiated and would be enacted in parallel to FID.

This has allowed the desalination plant and associated pipelines to be removed from the WAH_2 project scope, thereby reducing capex and project scope, simplifying regulatory approvals, and leveraging existing Water Corporation infrastructure.

Under the agreement, Water Corporation would provide continuous water supply and WAH_2 would pay a tariff for the supply and would contribute to the capital cost of an upgrade to existing Water Corporation water treatment facilities.

The confidential tariffs (which are not considered material to the project economics) and capital cost contribution are included in the WAH_2 Pre-FEED economics.

Water Corporation would supply water from the upgraded Advanced Water Recycling Plant (AWRP) water treatment plant, located approximately 22 km from the WAH_2 site.

Figure 4 Location of Water Corporation Facility relative to WAH_2

Water would be supplied at the boundary to the AWRP at sufficient pressure to flow to the site. The WAH_2 Project would install a pipeline from the AWRP to the plant site, which is anticipated to run along existing easements.

The water would be treated to a high standard, but as largely reclaimed water it is not considered potable and is not dosed with chlorine. The WAH_2 Project scope includes the facilities necessary to further treat the water to meet the project's needs. The optimal water treatment method will be determined during FEED after evaluation of opportunities to minimise water waste and power consumption.

Water supply of 1450 kL/d represents a 20% margin over the anticipated requirements of WAH_2 Phase 1 (Table 2), providing security of supply and the flexibility to debottleneck production.

Table 2 Estimated WAH_2 facility water use and availability

User	Consumption	Notes
Inside Boundary Limited (ISBL) Denim Water Make-up	42,574 kg/h / 42.7 m^3/h	
ISBL Steam System Blowdown	1,686 kg/h / 1.7 m^3/h	
Cooling Water Blowdown	1,903 kg/h / 1.9 m^3/h	0.01% of circulation rate
Potable & Plant Water	2,000 kg/h / 2.0 m^3/h	Assuming 1 hose running @ 1.8m^3/h plus a washbasin/Water Closet (WC)
Expected Continuous Usage	48,163 kg/h / 48.3 m^3/h	
Available Water Supply	60.4 m^3/h	1450 kL/day
Water Use	48.3 m^3/h	
"Surplus" Water Supply	12.1 m^3/h	(20% margin)

WAH_2 Phase 2 would require a separate water supply agreement that would be negotiated when the timing of Phase 2 is confirmed. It is considered likely that additional water supply sources, such as new third-party desalination plant(s) could be developed in time for Phase 2 supply.

4.2.3 Power

The WAH_2 Project would self-generate the power to meet its on-site requirements. These have been estimated from HYSIS simulations supported by vendor information from the major consumers (such as the Air Separation Unit (ASU).

The total Base Case on-site power demand is 66 MW of which 54 MW would be generated from gas-fired turbines with the balance generated from waste heat recovery and steam (Table 1Table 3). Power requirements are slightly lower if syngas replaces natural gas in the gas turbines.

Table 3 Estimated WAH_2 Phase 1 power requirement

Processing Block	Pre-FEED Base Case (MW)
Ammonia production (ISBL)	12.3
Air Separation Unit	28.4
Water supply & pre-treatment	1.0
Cooling water supply and cooling	5.6
Cooling water circulation	4.1
CO_2 Compression and conditioning	11.1
Ammonia liquefaction at storage	1.9
Liquid ammonia export loading pump	0.2
Air compressor	0.1
CCGT auxiliary power requirement	0.8
Waste water treatment	0.1
Power requirement at WaterCorp for pumping	0.01
Total Power Requirement	**65**
Power generation from Topsoe steam export	5.0
Power generation from waste heat recovery on Gas Turbine (GT)	6.7
Net Power Requirement	**54**

The most appropriate power generation solution was selected considering its ability to meet the power load and an appropriate balance between emissions efficiency and unit cost of generation.

The potential to use renewable power for some or all WAH_2's requirements was investigated during Pre-FEED including discussions with potential renewable power providers. However, incorporating renewable power in the Pre-FEED design was not viable due to the variability of renewable power supply coupled with the prohibitive cost of firming power supply. The Phase 1 design is sufficiently flexible to incorporate future supply of renewable power if viable and the optimal power solution for Phase 2 will be determined at the time.

The Phase1 power solution uses combined cycle gas turbines (CCGTs) in a 2x1 configuration comprising:

- 2 Siemens Energy SGT-700 gas turbines;
- 2 two-pressure Heat Recovery Steam Generators (HRSGs); and
- 1 steam turbine.

To reach the optimised design, four different power plant operating scenarios were considered:

- **Standard Operating Conditions** - ambient temperature 35°C, 49.4% relative humidity.
- **Extreme Heat Mitigation** - ambient temperature 48.4°C, 16.8% relative humidity.

- **Operational Flexibility** - ambient temperature 35°C, 49.4% relative humidity, one CCGT down for maintenance.
- **Maximum Resilience** - ambient temperature 48.4°C, 16.8% relative humidity, one CCGT down for maintenance.

The power plant design maintains WAH_2 plant performance across both normal and abnormal operating scenarios, underlining NH3CE's commitment to efficient and reliable clean energy production.

4.3 Production Facility

4.3.1 Ammonia Production

During Pre-FEED multiple process design cases and technology alternatives were evaluated before determining the single design to take into FEED. The selected Pre-FEED case uses proven technology with a production capacity of 1800 TPD (650,000 TPA) of ammonia with an emissions intensity of 0.38 kg CO_2/kg NH_3.

ISBL engineering was undertaken by Topsoe with Petrofac responsible for Outside Boundary Limit (OSBL) scope and integration across the entire project.

A key focus during Pre-FEED has been the optimisation of the ASU, which is the single largest power consumer, and therefore responsible for significant emissions, as well as being a significant cost centre. Two vendor options have been considered to inform design optimisation. The Nitrogen Wash Unit (NWU) also received considerable attention, particularly it's interaction with the ASU which provides its source of nitrogen.

The overall design is described in a series of process flow diagrams, equipment lists and package data sheets, as summarised in Table 4.

The entire process facilities were modelled in HYSIS, with the HYSIS model tuned to match the ISBL information. The model included key utilities such as power generation and steam systems as optimising the overall energy balance for this project is fundamental to its success. These sub-flowsheets were again tuned using vendor information to ensure accuracy.

Table 4 Key technical documents generated during pre-FEED

Document Type	Description
Process Flow Diagrams ISBL	Desulphurisation and Reforming
	CO Conversion
	OASE CO_2 Removal
	Purification and Compression
	Ammonia Synthesis Loop
	Ammonia Refrigeration
	Fired Heater

	Process Condensate Stripping
	Steam Balance – Part 1
	Steam Balance – Part 2
Process Flow Diagrams OSBL	Gas Pre-Treatment
	Water Treatment - Closed and Open Drains
	Water Treatment – Inlet and Potable Water
	Water Treatment - Demin Water
	Water Treatment – Water Distribution Systems
	Cooling Water Systems
	Firewater
	Air Separation Unit
	Air Systems
	Electrolysis:
	Ammonia Export
	CO_2 Export
	Power Generation
	Vent/Flare/Blowdown System – Hydrocarbon
	Vent/Flare/Blowdown System – Ammonia
Equipment List	Combined Equipment List (ISBL and OSBL)
Package Data Sheets	Combined Cycle Power Generation
	CO_2 Compression package
	Nitrogen Wash Unit
	Air Separation Unit

4.3.2 CO_2 Capture and Compression

There are two main sources of potential CO_2 emissions associated with the production of ammonia – those associated directly with the manufacturing process, and those associated with generating the power the manufacturing process requires.

Almost all (~99%) of process-related CO_2 would be captured using the proven BASF OASE® amine-based CO_2 removal system – recommended by Topsoe and validated as the most appropriate choice for WAH_2 Phase 1 through discussions with other vendors.

Post capture and prior to transportation, oxygen is removed from the CO_2 to prevent bacteria growth, and the CO_2 is dehydrated to prevent the formation of carbonic acid.

The CO_2 would be compressed for transport in dense phase to the sequestration location. A discharge pressure of ~140 barg will be required to ensure that the CO_2 remains in dense phase through the transmission pipeline. This is planned to be achieved using a four-stage, intercooled integrally geared compressor. Potential opportunities to reduce the discharge pressure, and power required for compression, will be investigated during FEED.

During Phase 1, 2546 TPD of CO_2 would be transported and sequestered (equivalent to 0.90 MTPA). This would double once Phase 2 is online.

4.3.3 CO_2 Export and Sequestration

The CO_2 would be exported via pipeline, located in an existing infrastructure corridor, to a third-party sequestration site.

During Pre-FEED, NH3CE executed a non-binding Memorandum of Understanding with the AGIG regarding the construction of pipelines for the transportation of CO_2 from the WAH_2 Project to either of the two sequestration sites being considered (see below). The pipelines would be built, owned and operated by AGIG with WAH_2 paying a CO_2 transportation tariff.

The MOU leverages AGIG's expertise in gas infrastructure has allowed the CO_2 pipeline to be removed from the WAH_2 project scope, thereby reducing capex and simplifying approvals.

The MOU contemplates concurrent FEED studies on the WAH_2 Project and CO_2 pipeline to support the negotiation of a Definitive CO_2 Transportation Agreement prior to the project's and pipeline's respective FIDs.

Confidential indicative tariffs have been provided by AGIG and are included in the WAH_2 Pre-FEED economics.

The WAH_2 Project is located, by design, almost equidistant between two nearby sequestration projects - the Santos owned and operated Devil Creek-Reindeer CCS Project (~30 km to the west) and the Woodside operated North West Shelf-Angel CCS project (~37 km to the north).

NH3CE is in separate confidential discussions with both CCS projects, each of which has the capacity to sequester WAH_2 Phase 1 CO_2 volumes and is being developed on a similar timeline to WAH_2.

WAH_2 would pay a tariff for the sequestration service provided has received confidential indicative pricing that is reflected in the WAH_2 Pre-FEED economics.

NH3CE intends to select the most appropriate CCS provider during FEED.

4.4 Product Export

4.4.1 Ammonia Pipeline

The WAH_2 plant would produce liquid ammonia at -33°C and atmospheric pressure.

The ammonia would be transported as a liquid via a pressurised pipeline to a storage site located near the Port of Dampier.

While the WA State and Commonwealth Governments have allocated funding for a potential multi-user hydrogen or ammonia pipeline as part of their A$140 M commitment to the Pilbara Hydrogen Hub, it has been assumed in the Pre-FEED design that the WAH_2 project would build, own and operated the ammonia export pipeline. The potential for a third-party multiuser pipeline represents an improvement opportunity that will be progressed during FEED and is the subject of ongoing engagement with Depart of Jobs, Tourism, Science and Innovation (JTSI).

Due to the length of the pipeline (~34km) and high ambient temperatures of the region, it was considered unrealistic to insulate and prevent temperature rise. Based on similar pipeline operating temperatures in the region, a temperature of 32.5°C was used as a basis for calculations (assuming shading along the pipeline). HYSIS modelling confirmed that if the pipeline operated above 13 barg, reducing the pressure on entry to the storage tanks would drop the temperature to -33°C thereby avoiding flashing and the requirement for a boil off gas compression system.

Pumps will be required to generate the ammonia pipeline entry pressure. The discharge pressure of the pumps is estimated at 15 barg and will be confirmed during FEED once the pipeline profile, exact routing and flow assurance has been confirmed.

Figure 5 Ammonia pipeline route from Maitland SIA to export terminal

4.4.2 Ammonia Storage and Loading

Cryogenic, atmospheric storage will be required close to port. The pre-FEED design allows for two 27,000 m^3 storage tanks for Phase 1 – one to produce into and one to load from. A third tank would be required for Phase 2. Ammonia would be transported from storage to port via

a cryogenic rundown pipeline that would be recirculated to maintain the required low temperature.

There are existing ammonia storage and loading facilities located close to the Port of Dampier which have spare capacity. NH3CE is in confidential discussions with the owner of that infrastructure (Yara Pilbara) regarding the potential for WAH_2 to use that existing infrastructure rather than building new facilities. This represents an improvement opportunity that will be progressed during FEED.

The Port of Dampier is an established deep-water port that is operated and managed by Pilbara Ports (PPA). Discussions with PPA have confirmed that:

- The port has an existing bulk-liquids berth with the capacity to accommodate vessels of 25,000 to 50,000 DWT;
- The port is familiar with NH_3 handling and currently exports liquid NH_3 via this berth;
- Increasing the scale of NH_3 exports is identified as an opportunity in the Port of Dampier Land Use Master Plan 2030[27] and supported by the PPA;
- The WAH_2 Project could install its own NH_3 loading infrastructure on the existing bulk liquids jetty and berth, or could use the existing infrastructure if an appropriate commercial agreement could be negotiated with the owner (Yara Pilbara); and
- The existing berth could accommodate the requirements of at least Phase 1 of the WAH_2 Project based on forecast utilisation.

The Port of Dampier has all the facilities expected of a world class port including security zones, notification processes, vessel traffic service, compulsory pilotage limits, anchorages, mooring areas, main channels, pre-established passage plans, barge alongside port facilities and emergency procedures.

In January 2025, NH3CE executed a non-binding Memorandum of Understanding with Pilbara Ports outlining the collaboration intended to establish operational arrangements and binding agreements to support ammonia export from the WAH_2 Project.

[27] Pilbara Ports Authority, Planning, and development

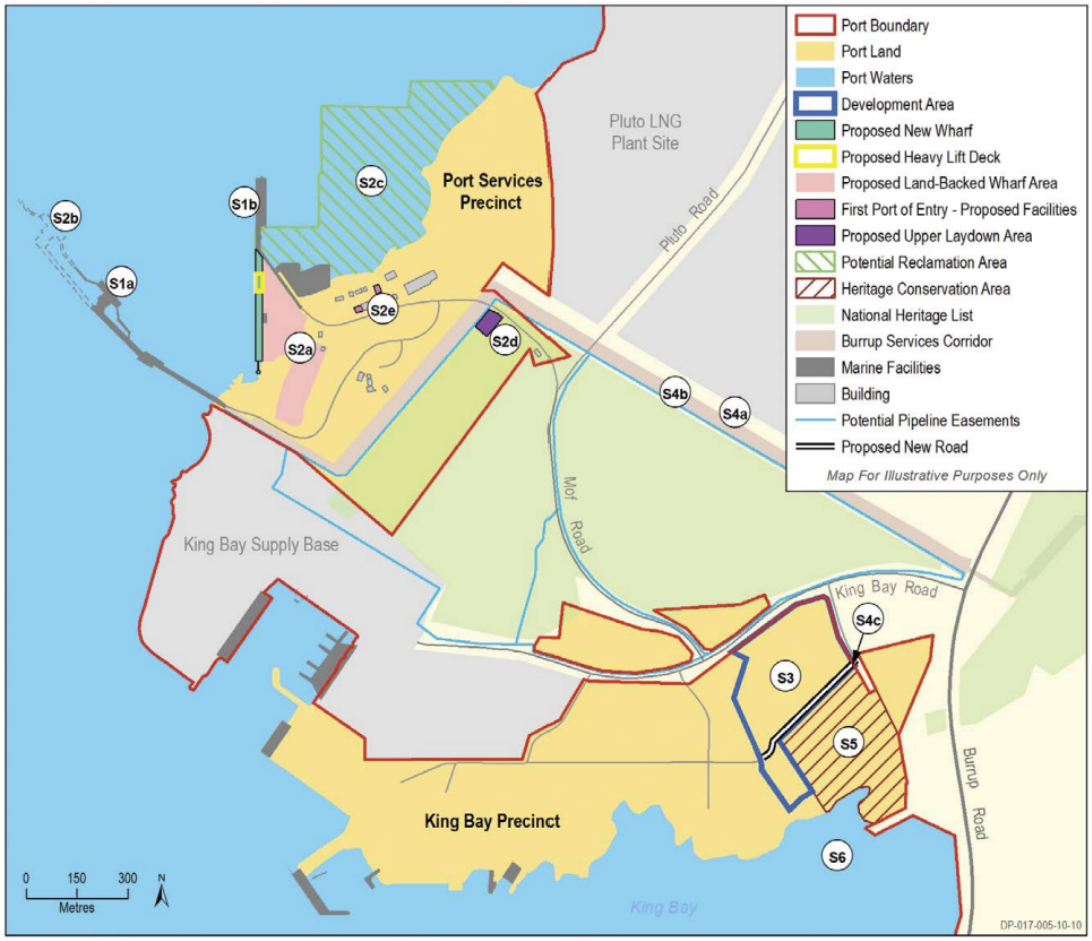

Figure 6 Port of Dampier land use master plan 2030

5.0 Regulatory Approvals

5.1 Regulatory Framework

In terms of jurisdictions, the WAH_2 Project, while mostly located onshore WA, will also include WA Coastal waters for offshore NH_3 offtake activities close to the Port of Dampier.

Projects in WA State waters and onshore are subject to both Commonwealth (Federal) and Western Australian (State) legislation. Key legislation includes the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (*EPBC Act*), the *Native Title Act 1993* (Cth), the *Environmental Protection Act 1986* (WA) (*EP Act*) and the *Planning and Development Act 2005* (WA).

The WA Government has developed a Lead Agency Framework[28] to facilitate an effective approvals process for major projects within WA. All proposals within the Lead Agency Framework receive a level of case management consistent with its complexity, potential impacts or its significance to the State. The coordination of approvals for a proposal is administered by a single nominated lead agency that will consult on each proposal with relevant agencies. Within the lead agency, a designated case officer or manager is assigned (depending on the proposal category) to guide the proponent through the whole-of-government approval process. The type of proposal that lead agencies have responsibility for depends on the nature of the project, under the Lead Agency Framework as shown in Figure 7. For the WAH_2 Project, the lead agency is likely to be JTSI based on the project scope and location.

[28] Lead Agency Framework, https://www.wa.gov.au/government/publications/lead-agency-framework

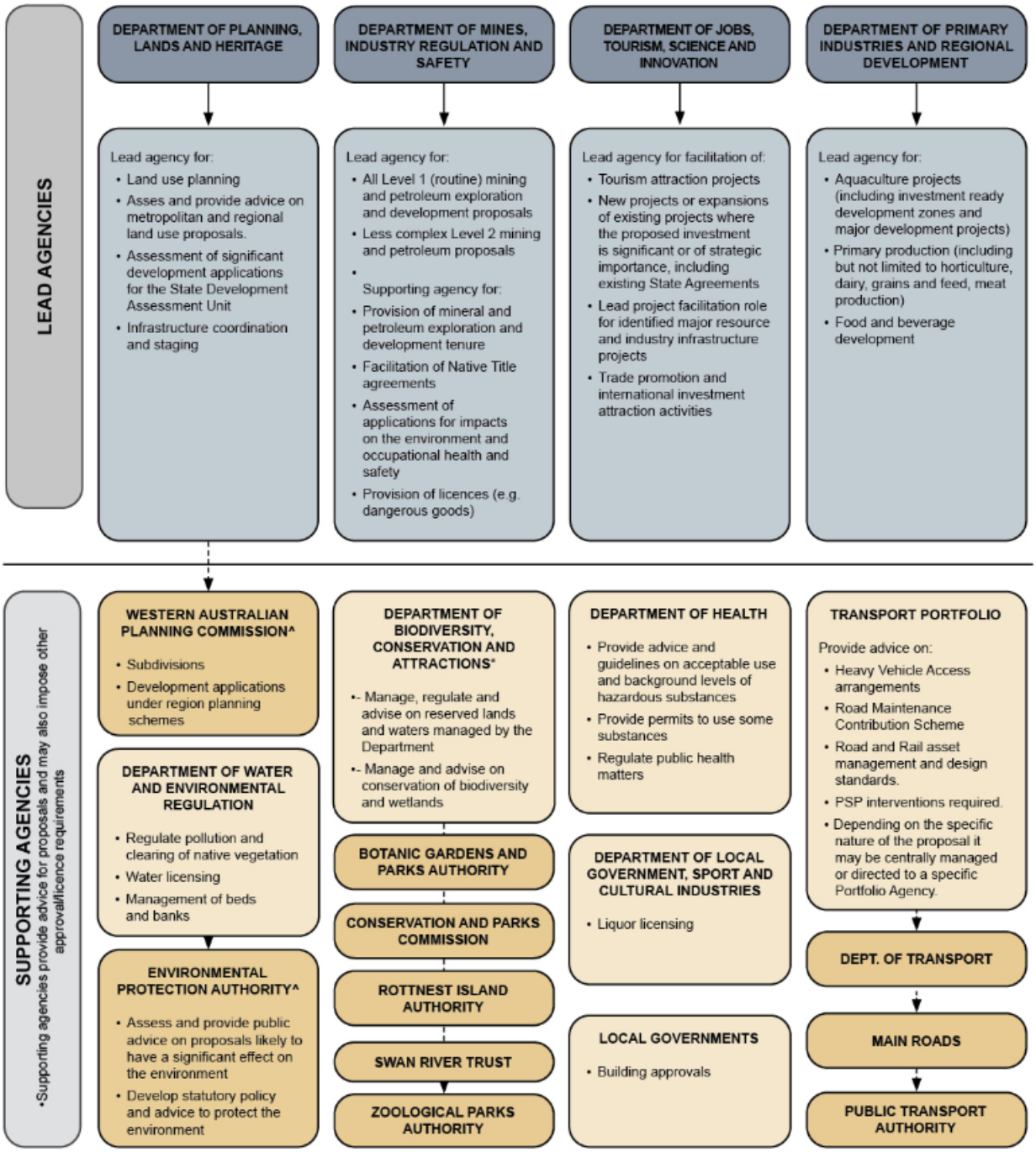

Figure 7 Lead agency framework departmental responsibilities

^NOTE: The Environmental Protection Authority and the Western Australian Planning Commission are independent statutory authorities. The Department of Water and Environmental Regulation provides administrative support to the Environmental Protection Authority. The Environmental Protection Authority reports to the Minister for Environment. The Department of Planning, Lands and Heritage provides administrative support to the Western Australian Planning Commission. The Western Australian Planning Commission reports to the Minister for Planning.

***NOTE:** The Botanic Gardens and Parks Authority, Conservation and Parks Commission, Rottnest Island Authority, Swan River Trust and Zoological Parks Authority are independent statutory authorities. The Department of Biodiversity, Conservation and Attractions provides administrative support. The Rottnest Island Authority reports to the Minister for Tourism. The Botanic Gardens and Parks Authority, Conservation and Parks Commission, Swan River Trust and Zoological Parks Authority report to the Minister for Environment. The Conservation and Parks Commission has, in some cases, a legislative role to provide formal advice for lead agency approvals.

Under the Lead Agency Framework, proposals are submitted in the form of a Project Definition Document (PDD) and are assessed and categorised as Level 1 (routine), Level 2 (complex) or State Significant, as shown in Figure 8. The level assigned will determine the level of case management assistance provided by the lead agency and the type of reporting required.

Initial indications from DJTSI suggest that for a proposal with the complexity of the WAH_2 Project a Level 2 proposal classification is anticipated.

Figure 8 Lead agency framework proposal classification

The key offshore and onshore regulatory approvals required for the WAH_2 Project are shown in Figure 9.

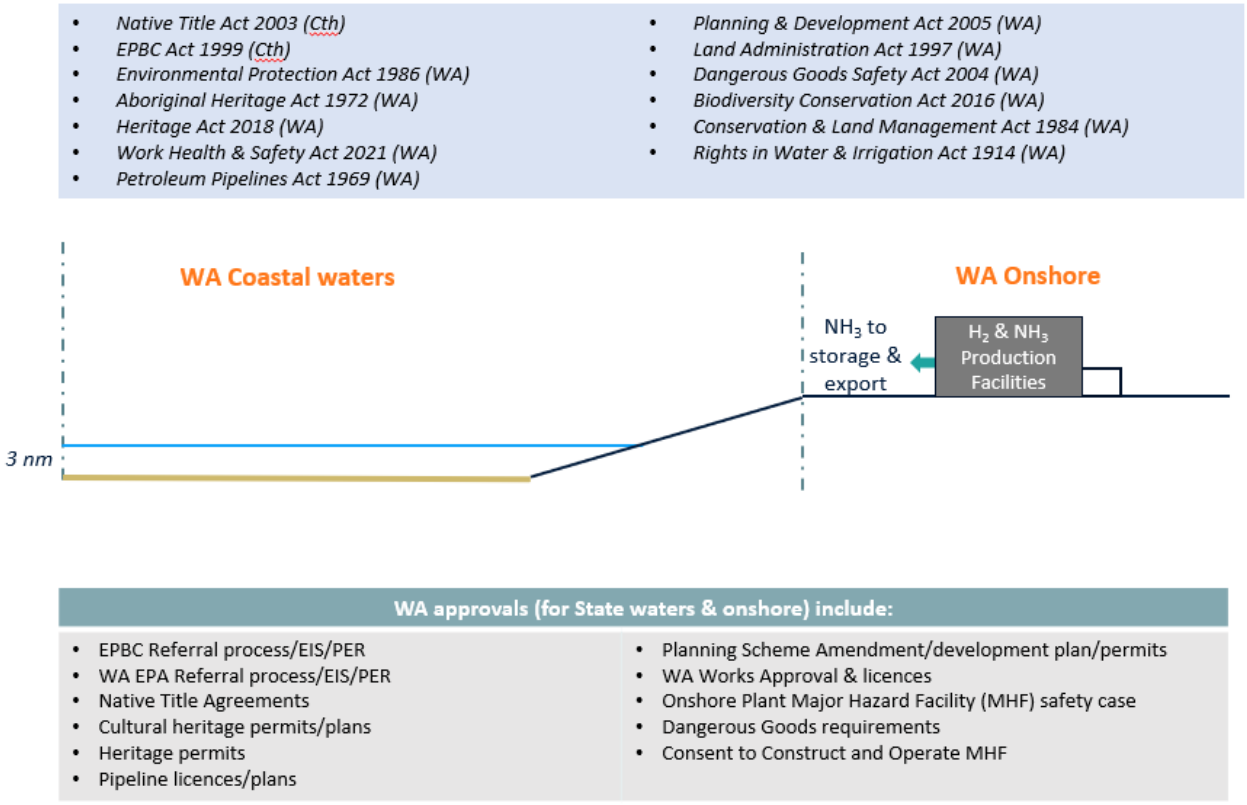

Figure 9 WAH_2 key legislation and regulatory approval

A Regulatory Approvals Register has been developed to capture and track progress of all regulatory approvals.

The anticipated timing of regulatory approvals is summarised in Figure 10 below.

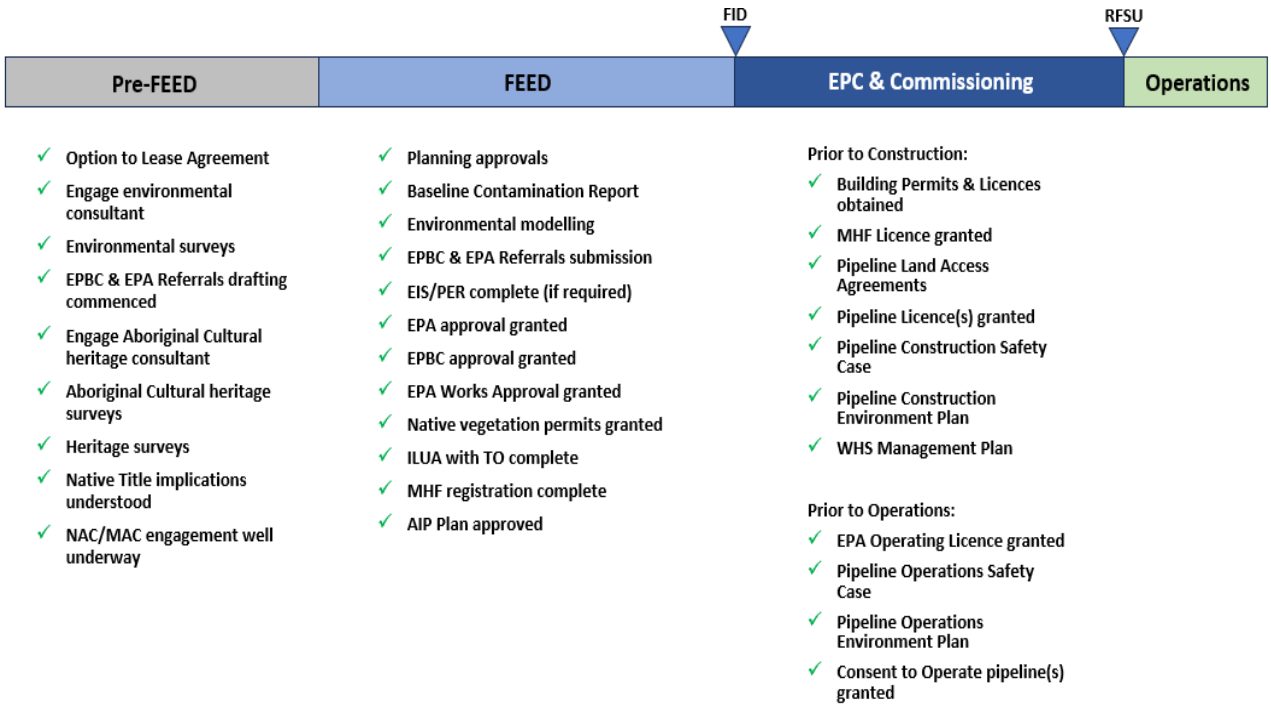

Figure 10 WAH_2 indicative regulatory approval timeline

5.2 Environment

5.2.1 Environmental Referrals

The Commonwealth *EPBC Act*, (Environmental Protection and Biodiversity Conservation) applies to offshore (Commonwealth and State) and onshore activities where an activity may impact Matters of National Environmental Significance (MNES), and is administered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Under the *EPBC Act*, a referred action will be determined as a controlled action, not a controlled action 'particular manner' (the action must be undertaken as specified in the referral decision), not a controlled action, or clearly unacceptable. A controlled action will require further assessment through an Environmental Impact Statement (EIS) or Public Environmental Review (PER) process and based on the scope and planned location of the WAH_2 Project at Maitland SIA, this level of assessment should be anticipated.

The Environmental Protection Authority (EPA) is an independent authority whose operations are governed by the *Environmental Protection Act 1986* (*EP Act*). *The Department of Water and Environmental Regulation* (DWER) supports the EPA in conducting environmental impact assessments and developing policies to protect the environment. DWER is also responsible for administering the native vegetation clearing provisions under the *EP Act* and the *Contaminated Sites Act 2003* which may be applicable to the WAH_2 Project if contamination occurs during project activities.

The *EP Act* Part IV (*Section 38*) makes provisions for the EPA to undertake environmental impact assessments of significant proposals, strategic proposals and land use planning schemes. Proponents are not required to refer programs under the *EP Act* where they are not considered as having the potential to result in a significant environmental impact.

A bilateral agreement is in place between the Commonwealth of Australia and the WA Government relating to environmental assessments, which allows the Commonwealth Minister for the Environment to rely on specified WA environmental impact assessment processes in assessing actions referred under the *EPBC Act*.

Whilst an *EPBC Act* (Cth) referral and an *EP Act* (WA) referral is likely to be required for the WAH_2 Project, if the project scope is limited to the Maitland SIA location further assessment (for example via a PER under the *EPA Act*) many not be sought. The environmental approvals pathway will be confirmed following flora and fauna surveys (ref. Section 5.2.4 Environmental Surveys).

5.2.2 Works Approval and Licences

In addition, under the *EP Act*, industrial premises with the potential to cause emissions and discharges to air, land or water known as 'prescribed premises', trigger regulation and require Works Approval and licences. This will be the case for the onshore ammonia production facility and potentially the facilities at the Port of Dampier due to the presence of large volumes of ammonia.

5.2.3 Native Vegetation Clearing

A specific clearing permit is required for the clearing of native vegetation, under *Part V Division 2* of the *EP Act* and the *Environmental Protection (Clearing) Regulations 2004* if the WAH_2 Project is not assessed by the EPA under Part IV of the *EP Act* (i.e. through a PER or similar).

The *Biodiversity Conservation Act 2016* (*BC Act*) provides greater protection for threatened species and ecological communities, with certain activities (e.g. clearing of threatened flora) requiring authorisation from the WA Minister under Section 40 of the *BC Act*. The Act is administered through the Department of Biodiversity, Conservation and Attractions (DBCA).

5.2.4 Environmental Surveys

The WAH_2 Project will result in a loss of some flora and vegetation through clearing to construct the development. According to results provided by DevelopmentWA, existing environmental investigations of the Maitland SIA have found that the flora present within the estate does not form any statutory constraint to development.

NH3CE has undertaken a flora and vegetation desktop study of the land allocated for the development. No Threatened or Priority Listed Flora or Threatened Ecological Community (TEC)

have been identified. The desktop study has identified one Priority Ecological Communities (PEC) that intersects with the development envelope within the allocated 40ha land parcel.

NH3CE plan to undertake flora and vegetation surveys in 1H 2025 in accordance with *EPA technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (2016)* and *EPA Instructions for preparing data packages for the Index of Biodiversity Surveys for Assessments (IBSA) (2020)*, to further assess the area. The surveys will be low-impact and non-invasive to determine vegetation types, vegetation condition, weed species and the location of any vegetation or flora of conservation significance within the area.

The WAH_2 Project will also result in the loss of some fauna habitat through clearing to construct the development. According to DevelopmentWA, existing environmental investigations of the Maitland SIA have found that the fauna present within the estate does not form any statutory constraint to development.

NH3CE has undertaken a fauna desktop study of the land allocated for the development against the *EPBC Act* Protected Matters Report using the Protected Matters Search Tool. The following threatened fauna species have been identified within the development envelope:

- Northern Quoll (Dasyurus hallucatus).
- Ghost Bat (Macroderma gigas).
- Pilbara Leaf-nosed Bat (Rhinonicteris aurantia, Pilbara form).
- Night Parrot (Pezoporus occidentalis).

NH3CE plans to undertake fauna surveys in 1H 2025 accordance with *EPA technical guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (2020)* and *EPA Instructions for preparing data packages for the IBSA (2020)*. The surveys will be low-impact and non-invasive to confirm any fauna or fauna habitats within the area.

5.3 Heritage

5.3.1 Native Title

The Commonwealth *Native Title Act 1993* recognises the rights and interests of Aboriginal people with respect to land and waters and sets out a procedure for making a claim for a determination of Native Title. The *Native Title Act 1993* also provides for compensation to Native Title holders when past and future acts in relation to land are validated. Native Title can exist with other interests in land, such as Crown Land and pastoral leases. However, if Native Title has been extinguished (e.g. freehold land), it cannot be revived except in limited circumstances.

The National Native Title Tribunal (NNTT) has been established as an independent Commonwealth Government agency to assist people to resolve Native Title issues over land and waters.

On 16 February 2021, the *Native Title Legislation Amendment Act 2021* (the *Amendment Act*) received the Royal Assent. The *Amendment Act* amends the *Native Title Act 1993* and the *Corporations (Aboriginal and Torres Strait Islander) Act 2006* to improve native title claims resolution, agreement-making, Indigenous decision-making and dispute resolution processes.

In 2005 the Ngarluma people were determined to have native title rights and interests in relation to the Ngarluma Native Title Area (which includes the Maitland SIA). Following the determination the Ngarluma Aboriginal Corporation RNTBC (NAC) was established to hold, protect and manage the determined native title. The Native Title Claim WCD2005/001 sets out the rights and interests of the of the Ngarluma people over the land and waters of the Maitland SIA. Proponents are under obligation by the State to enter into an Indigenous Land Use Agreement (ILUA) with the NAC. Consultation commenced with the NAC in May 2023 and an initial engagement meeting was held in July 2024 to introduce NH3 Clean Energy and the WAH_2 Project, discuss access requirements (including the process to obtain NAC consent for the Section 91 Licence under the *Land Administration Act 1997*) and ongoing heritage requirements including negotiation of an Indigenous land Use Agreement with the NAC.

The Burrup and Maitland Industrial Estates Agreement (BMIEA) is also applicable to the Maitland SIA and the Murujuga Aboriginal Corporation (MAC) oversees its implementation and contractual obligations. Proponent obligations under the BMIEA include annual payments, support for Indigenous employment and contracting outcomes, and support for social and community programs.

Native Title implications may also need to be determined for the yet-to-be-constructed gas supply pipeline (under the future act assessment process) and over the land required for the facilities at the Port of Dampier if not already covered by a Native Title agreement.

Native Title discussions related to the development of infrastructure in the Maitland to Burrup infrastructure corridor are being managed by the State Government.

5.3.2 Aboriginal Cultural Heritage

The management of Aboriginal heritage in Western Australia is governed by the *Aboriginal Heritage Act 1972* (AHA). A new *Aboriginal Cultural Heritage Act 2021* (*ACH Act*) came into force on 22 December 2021, however it was subsequently repealed in November 2023 and the *Aboriginal Heritage Act 1972* was restored as the legislation that manages Aboriginal heritage in Western Australia. Under the *AHA Act*, approval is only required where there is potential for any harm to an Aboriginal site.

In most cases, an Aboriginal heritage survey, or at the very least consultation with the Traditional Owners (TO) and a search using the Aboriginal Cultural Heritage Inquiry System (ACHIS), will determine whether approval is required and whether there are any expectations or access arrangements in place that may involve traditional owner participation in survey and ground disturbing activities.

There are now four types of authorisations:

- Section 18 consent – for more significant impacts and harm to Aboriginal sites
- Section 16 authorisation – for excavation purposes (generally related to research)
- *Regulation 7* approval – to bring plant and equipment to an Aboriginal site
- *Regulation 10* consent – for more minor activities and impacts.

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* is additional Commonwealth legislation for the protection of Aboriginal sites, if the Environment Minister is satisfied that said sites are being ineffectively protected under State or Territory legislation. Provided the requirements of the WA AHA are adhered to, the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* is unlikely to be relevant for the project.

Anthropological and archaeological surveys are planned for 1H 2025 within the land allocated for the project. These surveys are expected to be undertaken with NAC Traditional Owner participants through pedestrian transect and in-field recording to a 'site identification' level. This will involve a determination of any site boundaries and sufficient information to make assessments of significance and management and site location recommendations.

Ethnographic survey(s) over these areas will involve on-country discussions regarding the landscape generally, as well as seeking comment on any archaeological sites or landscape features identified as important by the participants to identify any cultural significant places, support any heritage agreements and identify any required regulatory approvals as a result of the survey findings.

6.0 Commercial Assessment

6.1 Key Terms and Assumptions

The key assumptions and sensitivities upon which the economic evaluation is based are summarised in the table below. Capex, gas price, ammonia price and CO_2 transport, and sequestration fees have all been quoted in Real Terms 2024 and are assumed to escalate with inflation.

These assumptions reflect the results of Pre-FEED technical studies and confidential indicative prices provided by third parties for key inputs and services. Individual prices have been bundled to protect confidentiality

No potential government incentives have been included in the economic evaluation.

Table 5 WAH_2 key economic assumptions[1] and sensitivities

	Base Case	Sensitivity
Project cost estimate	AACE Class 3/4 (-/+30%)	Capex +/- 30% Opex +/- 30%
NH_3 price (FOB Dampier)	US$600 /T	+/- US$50 / T
Average portfolio gas cost	A$ 8.0 /GJ	+/- A$1.00
CO_2 net transport and sequestration cost[2]	A$ 36 /T	+/- A$15
Exchange rate	A$/US$ = 0.66	+/- 10%
Inflation rate	3%	N/A
Discount rate	8%	+/- 1%

[1] Costs and prices all RT 2024 and assumed to escalate with inflation
[2] Sequestration cost plus transportation cost less ACCU value

6.2 Cost Estimate

6.2.1 Capex

The capex and opex estimates have been developed in line with AACE Class 3/4 (- 30/+30%) with an 80% confidence interval by Petrofac, who has significant experience in both hydrogen and ammonia projects.

The costs reflect NH3CE's 'maximum modularisation' philosophy which is intended to minimise the scope of work on site, site costs, weather impact and exposure to labour issues.

Capital cost estimates for the complete ISBL were derived from 2024 budget quotes obtained from Topsoe A/S for the total installed cost (TIC) of an 1800 TPD low-emission

ammonia plant based on Topsoe's ATR technology, and from competing providers for the TIC of the ASU. These have been deconstructed using Petrofac norms and adjusted to reflect Pilbara conditions.

For the equipment packages and pipelines OSBL, the size, capacity, and material of each major equipment item within each package have been modelled using HYSYS process simulation. Costs were then derived using Petrofac norms for the total installed cost of equipment packages and weight allowances for bulk materials. Increased construction rates have been applied to account for the high labour rates in the remote Pilbara region.

The capital cost estimates include indirect costs which cover FEED, studies and surveys, detail engineering, project management, procurement, construction management, a construction camp for 2000 people, commissioning support, vendor representatives, spares, freight including line pipe, first fills, insurances, certification and inspection.

The cost estimates include 30% contingency and an EPC markup at 7.5%.

The Class 3/4 capex estimate for Phase 1 is A$1,712 M, with a further A$1,515 M for Phase 2 giving a total of A$3,227 M for the complete project (all figures Real Terms 1/1/25). Table 6 provides a breakdown of these costs.

The water treatment costs include a contribution to upgrading some Water Corporation infrastructure that will be used to supply water to the WAH_2 Project.

Table 6 WAH_2 Base Case capex estimate (real terms, 1st Jan 2025)

WAH_2 Pre-FEED Base Case - capital costs	**Phase 1**	**Phase 2**
	A$M	**A$M**
Ammonia Production Licensor Package	745	745
GT Power Generation	199	150
Air Separation Unit	127	127
Cooling Water System	28	28
Water Supply Pipeline	12	-
Water Treatment	51	46
Water Discharge Pipeline	-	-
Gas Import Pipeline incl. DBNGP hot tap	29	-
CO_2 Compression	91	82
CO_2 Pipeline	-	-
Ammonia Pipeline	62	-
Ammonia Storage and Export	55	25
Plant Utility Supply	192	192
General Piperack, etc.	120	120
Total	**1,712**	**1,515**
GRAND TOTAL (Phase 1 plus Phase 2)		**3,227**

The WAH_2 Pre-FEED cost estimated was benchmarked, using publicly available data, against a nearby greenfield ammonia and urea project that is currently under construction. This showed a good correlation, providing additional support for the WAH_2 cost estimate.

6.2.2 Opex

Fixed operating costs include plant operations and maintenance, insurance and taxes, and land lease costs. Petrofac has leveraged its extensive experience in plant operations to estimate plant operations and maintenance as 3% of capex, and insurance and taxes as 1% of capex. Land lease costs reflect the Key Terms Sheet that NH3CE has executed with DevelopmentWA.

Variable operating costs include the cost of natural gas supply (for process and plant power generation), water supply, any power purchased from the grid, and CO_2 transport and sequestration. The quantities of gas, water, purchased power and CO_2 have been calculated by Petrofac based process simulation and mass balance analysis. The unit costs are based on confidential indicative pricing from third parties and market analysis, as summarised in Section A specific clearing permit is required for the clearing of native vegetation, under *Part V Division 2* of the *EP Act* and the *Environmental Protection (Clearing) Regulations 2004* if the WAH2 Project is not assessed by the EPA under Part IV of the *EP Act* (i.e. through a PER or similar).

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determine vegetation types, vegetation condition, weed species and the location of any vegetation or flora of conservation significance within the area.

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Total opex is estimated to be A$271 M/yr for Phase 1 (of which A$69 M is fixed), increasing to A$521 M/yr (A$130 M fixed) once Phase 2 is operational. A breakdown of these costs is provided in Table 7.

Table 7 WAH_2 Base Case opex estimate

WAH_2 base case - annual Opex	**Phase 1**	**Phase 1 & 2**
	A$M	**A$M**
Fixed		
Operations & Maintenance	51	97
Insurance & Taxes	17	32
Land Lease	0.8	0.8
Total fixed	**69**	**130**
Variable		
Natural Gas	166	332
Water supply and grid-purchased power	4	8
CO_2 transport and sequestration[1]	32	51
Total variable	**202**	**391**

[1] Sequestration tariff plus transportation tariff less ACCU value

The capital cost estimate includes all commissioning costs (A$30 M for Phase 1). Once commissioned the plant would start production immediately and operating costs would be funded out of revenue, supported by long-term offtake contracts. Production ramp up is expected to be rapid and has not been modelled in detail at this stage of the project. An indicative sensitivity to show the impact of ramping up Phase 1 from 50% to 100% production over two months has been included in Table 8.

Table 8 WAH_2 Phase 1 net cash flow before tax

	Ramp-up sensitivity* (A$ M/yr RT '25)	Steady state (A$ M/yr RT '25)
Annual Revenue	546	570
Annual Fixed Opex • Plant opex • Land lease	69	69
Annual Variable Opex • Gas purchase • Water and grid power • CO_2 transport and sequestration	194	202
Annual Net Cash Flow Before Tax	260	275

* Indicative production ramp up from 50% to 100% capacity in first two months of year

6.3 Base Case Improvement Opportunities

Several opportunities for cost reduction, efficiency improvement and value enhancement were identified during pre-FEED studies. These will be matured through FEED through the planned technical work and ongoing, confidential discussions with third parties.

The key opportunities relate to:

- **Power generation design**
  - There is the potential for enhanced energy recovery from the steam generated by the project (by using steam turbines in combination with the gas turbines). This would result in lower gas consumption for power generation, thereby reducing operating costs.
- **Process optimisation**
  - Optimising plant design to reduce gas feedstock requirements, increase energy efficiency and debottleneck production.
- **Shared infrastructure and third-party provision of services**
  - **NH_3 export:** The WA Government is investigating the potential for a multi-user NH_3 pipeline connecting Maitland SIA to the Port of Dampier. If established, such a pipeline should offer a lower-cost ammonia export solution.

- **NH_3 storage and loading:** NH3CE is in confidential discussions with the owners of existing ammonia storage and loading facilities to progress the opportunity for WAH_2 to share those existing facilities rather than build its own dedicated infrastructure. This would reduce the capital costs of the project, offset to some extent by a tariff paid to use the existing infrastructure.

- **Potential government funding and incentives**
  - The WA State and Commonwealth Governments have allocated A$140 M to progress the Pilbara Hydrogen Hub. A little over half of these funds have been allocated to a multiuser NH_3 or H_2 pipeline such as that envisaged above.
  - Opportunities associated with the Australian Government relate to the Australian Government's Regional Hydrogen Hubs Program, the CEFC's Advancing Hydrogen Fund, and the Northern Australia Infrastructure Facility.
  - It is not yet clear whether the WAH_2 Project could be eligible for the planned Hydrogen Production Tax Credit based on the Consultation Paper[29] issued by Treasury in 2024.
  - Opportunities associated with the Japanese Government relate to the Supply Chain Subsidy Program, the Green Innovation Fund and potential financing from Japanese development banks.

6.4 Value Proposition

6.4.1 WAH_2 Phase 1

The Pre-FEED economic analysis for the WAH_2 Project demonstrates a significant improvement from the Pre-Feasibility stage[30], with reduced uncertainty and enhanced financial prospects.

Phase 1 of the project, in the base case scenario, delivers A$493 M NPV_8 (100% project) at an IRR of 11.6%.

The sensitivity analysis in Figure 11 reinforces the project's resilience. It shows that the Phase 1 project NPV remains positive (green) for all downside outcomes and the project NPV increases substantially for upside outcomes. It is intended that contracts will be structured to avoid downside where practicable – for example long-term contracts with stable pricing, and aligning any price reviews in gas purchase contracts with price reviews in ammonia sales contracts.

[29] Hydrogen Production Tax Incentive Consultation Paper, Australian Government Treasury, June 2024

[30] *WAH_2 Project Pre-Feasibility Study Updated Announcement (ASX: 2 August 2023).*

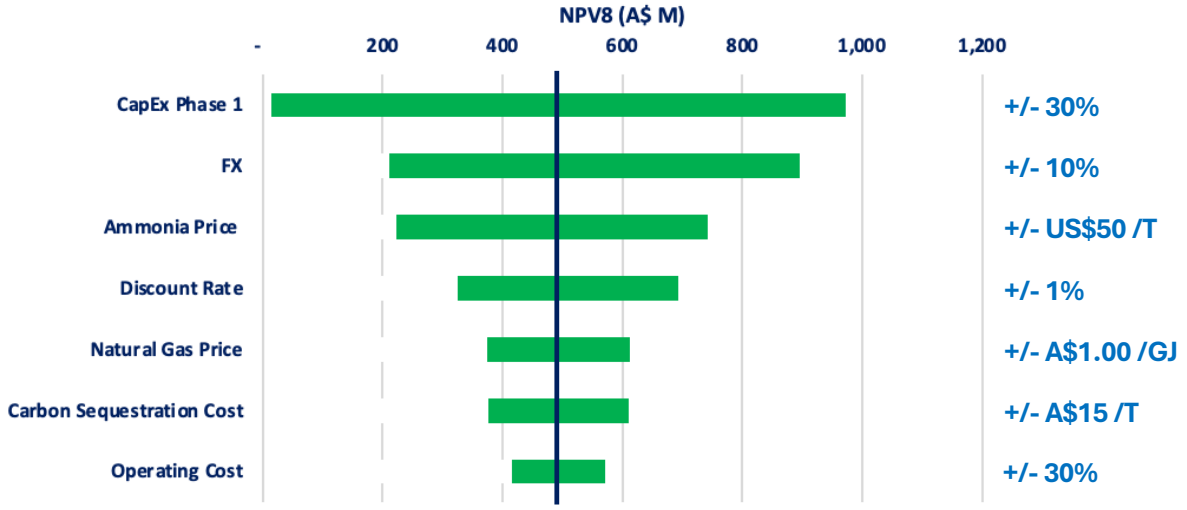


Figure 11 WAH_2 Phase 1 Base Case sensitivity analysis (100% project)

Opportunities have been identified to improve base case economics related to the potential sharing of pipelines, storage and loading infrastructure. Indicatively, these have the potential to increase Phase 1 NPV_8 to A$575 M, lift IRR 12.5%, and deliver a project that is increasingly robust to all key downsides (Figure 12).

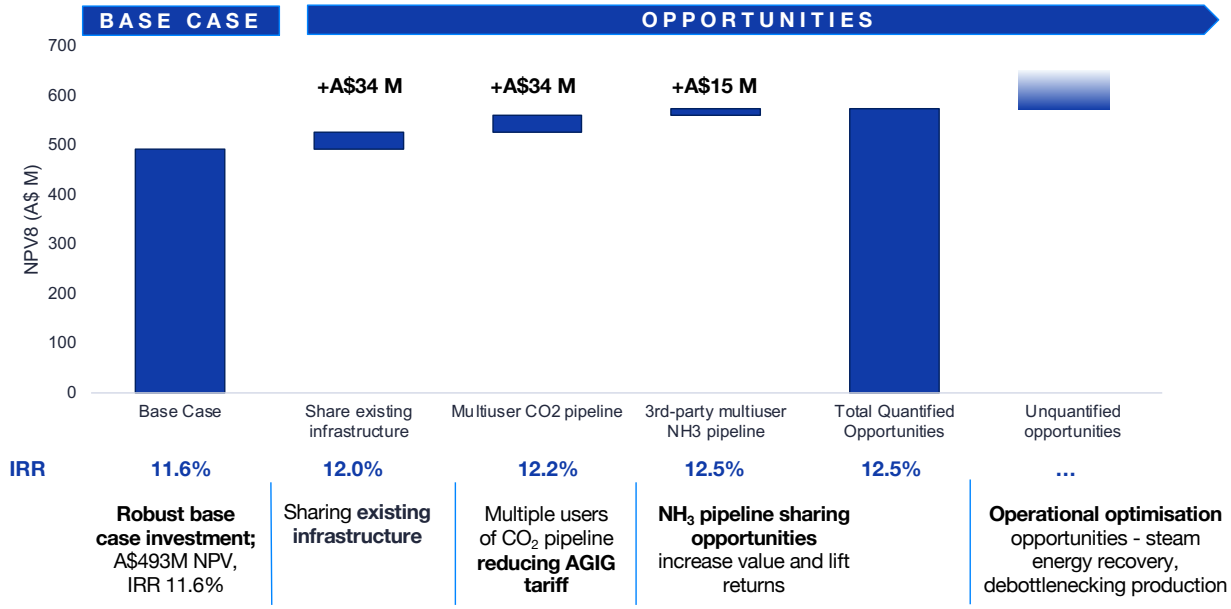


Figure 12 WAH_2 Phase 1 Base Case improvement opportunities (100% project)

This economic profile positions the WAH_2 Project as an attractive investment opportunity in the clean ammonia sector, with a solid Phase 1 Base Case and significant upside potential. The project's ability to maintain positive returns under various market conditions is an advantage in the evolving clean energy landscape.

6.4.2 Project Finance

While the financial structuring of the WAH_2 Project is yet to be finalised, it is considered likely that project finance will be part of the solution.

The potential economic impact of project financing was assessed using conservative assumptions of 60% debt finance at an 8% (RT) interest rate. This had the effect of increasing Phase 1 equity NPV_8 by around A$110 M (100% project) and boosting equity IRR by ~3.0% (Figure 13).

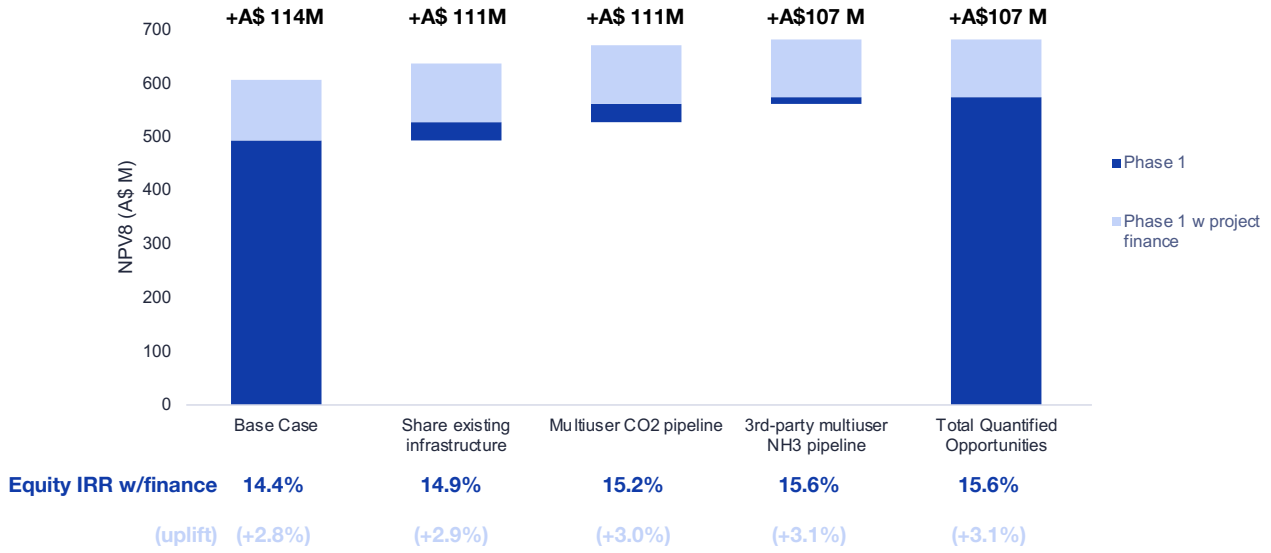


Figure 13 WAH_2 Phase 1 indicative impact of project financing (100% project)

Project financing has the potential to significantly improve the scale and efficiency of investors' equity returns while maintaining a balanced risk profile for the project.

The most appropriate means of leveraging debt finance to optimise the capital structure of the project will be determine during FEED.

6.4.3 WAH_2 Phase 2

Phase 2 would double the capacity of the WAH_2 project but cost less than Phase 1 as it can make use of the existing gas, water, CO_2 and NH_3 pipelines. As such, it adds significant value and increases capital efficiency.

The combined Phase 1 and Phase 2 Base Case development delivers an NPV_8 of A$951 M (100% project) at an IRR of 12.5%. Indicatively, this could increase to A$1012 M NPV_8 at 13.0% with infrastructure sharing (Figure 14).

Figure 14 WAH_2 Phase 1 and Phase 2 Base Case and improvement opportunities (100% project)

The two-phase development strategy for WAH_2 allows the project to scale its production, and manage capital expenditure, in line with market development.

No potential government incentives have been included in the economic evaluation.

6.4.4 Economic Summary

The results of the economic analysis are tabulated below for ease of reference.

Table 9 WAH_2 Project economic summary

	Ungeared Project		**With Project Finance** (60% debt at 8% RT)	
	NPV_8 (A$ M)	**IRR** (%)	**NPV_8** (A$ M)	**IRR** (%)
Phase 1				
Base Case	493	11.6	607	14.4
With infrastructure Sharing opportunities	575	12.5	682	15.6
Phase 1 + Phase 2				
Base Case	951	12.5	1087	15.0
With infrastructure Sharing opportunities	1012	13.0	1140	15.7

6.4.5 Cash Flows

The underlying cash flows for the Phase 1 Base Case and the combined Phase 1 and Phase 2 Base Case are shown in Figure 15 and Figure 16 and illustrate the free cash that would be generated by the 100% project.

The cash flow analysis is based in part on current assumptions for the timing, volume and price of gas supply. If these assumptions are not achieved, there is a risk that the production target may be downgraded and the cash flow position may deteriorate. If that occurs, it may impact NH3CE's funding options and/or the WAH_2 Project may be downgraded, deferred or may not go ahead.

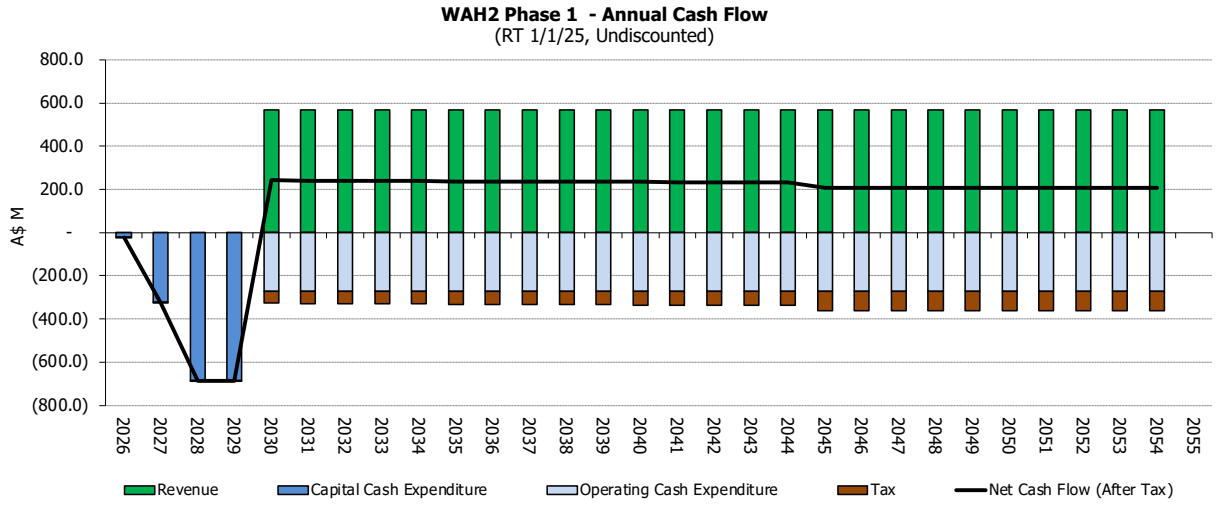


Figure 15 WAH_2 Phase 1 Base Case - Annual cash flow (100% project)

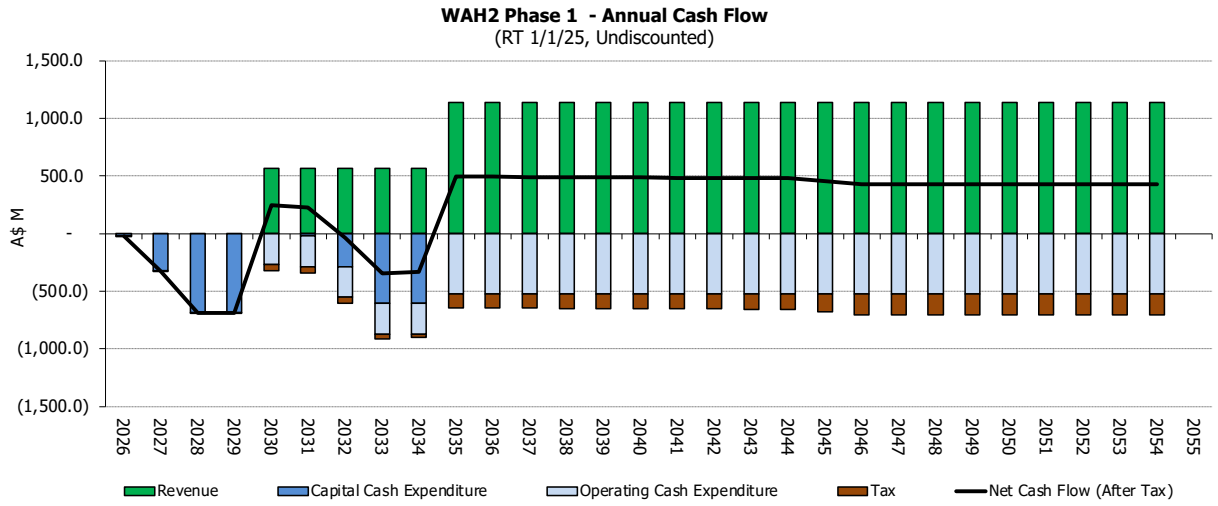


Figure 16 WAH_2 Phase 1 and Phase 2 Base Case - Annual cash flow (100% project)

7.0 Project Execution

7.1 Approach

NH3CE's 'keep it simple' integrated design and delivery philosophy minimises costs, time to production and mitigate project delivery risks and is based on five principles:

- **Proven Technology**

  Leveraging well-established, industry-tested solutions to minimise technological risks and ensure operational reliability.

- **Existing Infrastructure**

  Utilising available infrastructure to reduce capital expenditure and accelerate project timelines, while benefiting from established operational frameworks.

- **Established Providers**

  Partnering with experienced, reputable suppliers and service providers to ensure quality, reliability, and adherence to industry best practices.

- **Global Practitioners**

  Engaging world-class experts and consultants to bring international best practices and cutting-edge insights to the project.

- **Modularisation**

  Implementing a modular construction approach to minimise on-site scope, reducing local environmental impact, optimise project timelines through parallel off-site fabrication, and leverage existing import facilities at the Port of Dampier.

7.2 FEED Scope and Delivery

NH3CE plan to progress with a single design basis in FEED that preserves flexibility to optimise emission intensity and production costs in line with evolving customer preferences (and eligibility criteria for potential government subsidies).

FEED technical studies and concurrent commercial discussions will focus on addressing remaining high and moderate risks to ensure that risks are appropriate prior to FID. This will include:

- Negotiating definitive commercial agreements[31] (based on existing preliminary agreements) for key inputs and services;

[31] Conditions precedent to include WAH_2 final investment Decision

- Gas supply, water supply, CO_2 transportation, CO_2 sequestration, and Port of Dampier access.

- Negotiating definitive commercial agreements[20] for ammonia offtake and WAH_2 Project participation;
- Maturing opportunities related to a potential shared ammonia export pipeline and to sharing existing ammonia export infrastructure to further lower unit costs;
- Optimising plant design to reduce unit capital and operating costs – with a particular focus on steam heat recovery and debottlenecking production;
- Executing Option to Lease with DevelopmentWA over allocated land;
- Securing primary environmental and heritage regulatory by executing the Regulatory Approvals Plan;
- Exploring opportunities related to Government funding and incentives; and
- Building and maintain stakeholder support by executing the Stakeholder Management Plan.

The key technical deliverables of the FEED phase of the WAH_2 Project are:

- An execution strategy that optimises efficiency of delivery whilst minimising associated capex;
- Engineering to sufficient level to enable an EPC (or equivalent) cost-estimate or tender;
- An overall project cost estimate of AACE Level III accuracy (+/- 20%); and
- Design, Operation, and Maintenance strategies to minimise future opex costs.

As a result of the 'maximum modularisation' philosophy being adopted for WAH_2, the level of control of the build (in terms of materials, quality, cost and schedule) is much higher than with a stick-built construction philosophy. This is expected to result in increased cost estimate accuracy of the modules which should flow through to an increase in the overall estimate accuracy (to +/- <20%). Particular focus will be placed in this area part way through FEED once the execution philosophy has been detailed.

As was the case for Pre-FEED, the FEED scope has been divided into stages as shown in Figure 17 below. The deliverables from each stage will be used to refine the scope and cost of the next phase. This ensures that the scope of work remains appropriately focused, unnecessary work is avoided, and engineering costs are minimised.

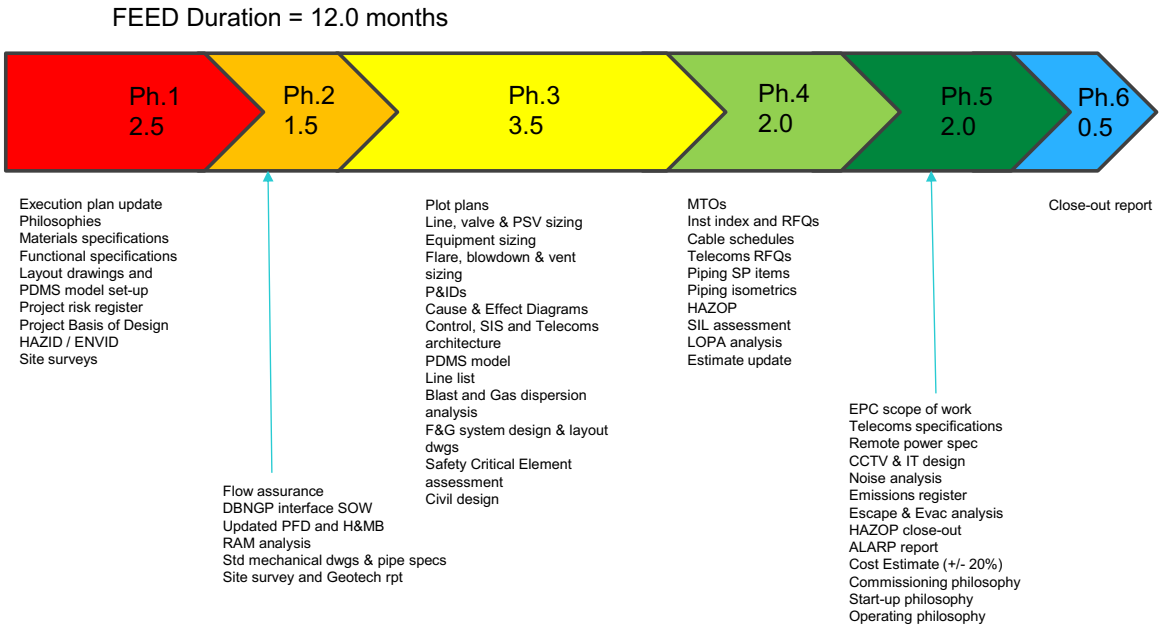


Figure 17 WAH_2 FEED phases and deliverables

It is intended that Petrofac will Asset Solutions Australia Ltd, supported by Petrofac's global organisation, will deliver FEED engineering scope over a 12-month period with appropriate support from Topsoe A/S as core technology provider.

The FEED delivery organisation has been designed.

7.3 Construction and Commissioning

NH3CE intends to adopt best industry practices to execute the WAH_2 Project, driven by the following key principles:

- Minimise site work (and maximise productivity) by maximising off site pre-fabrication;
- Utilise prefabricated materials for work scopes where applicable and feasible;
- Streamline the number of subcontract packages to reduce redundancy in site management and over-all heads, whilst keeping appropriate command of the site;
- Coordinate heavy lifts to ensure economical use of heavy cranes and equipment;
- Maximise pre-commissioning and testing at fabrication shop;
- Close coordination with logistics to ensure delivery constraints incorporated into design; and
- Identify risks early and develop effective preventative and mitigative controls.

Modularisation will be key to success and modular scope will be maximised as far as practicable during design within the constraints identified through a logistics survey.

Notwithstanding the above, the project involves heavy and/or bulky equipment requiring site activities for installation, assembly, and welding, such as the reformers. There is also rotary

equipment such as steam turbines and compressors that require site works for assembly and alignment.

A construction sequence will be developed to optimise progress by creating work fronts for multiple disciplines, with specific focus on piping and electrical. Other ideas will be investigated, such as:

- Precast at a suitable location, such as centralised pre-cast facilities within an allocated temporary construction facility area or within the region; and
- Heavy lift items to be grouped and performed through specialised heavy lift subcontractor/service providers.

The Karratha area is used to working with modularised plant. Modules are typically fabricated overseas and brought onshore at Dampier. For the WAH_2 project the modules will be pre-commissioned as far as practicable, and consideration will be given during the design phases to Local Area Network (LAN) and wireless control systems to reduce the amount of labour-intensive cabling activities on site.

There are sufficiently skilled people to operate and maintain the facility living in the Karratha area. During construction, consideration will be made of competing projects to ensure efficient use of the available resource pool of skilled labour.

7.4 Stakeholder Management

NH3CE has identified and prioritised relevant stakeholders and established an appropriate plan to deliver stakeholder support for WAH_2.

Community consultation is an important aspect of NH3CE's activities and is also a requirement of certain legislation. The Company's communication activities will be guided by the following principles which underpin its approach to stakeholder engagement more generally:

- No surprises: Inform and engage stakeholders early in the process, and ensure they remain fully informed.
- Be inclusive: Ensure stakeholders have easy access to relevant clear and concise information about the project, ensuring all communications use language (e.g. non-technical) appropriate for each audience.
- Be honest and act with integrity: Always use facts and speak the truth. If the answer is not known then the question will be taken on notice, the appropriate parties spoken with, and a response provided promptly.
- Be responsive: Respond to all stakeholders in a timely manner and make every effort to resolve issues to the satisfaction of all involved.
- Be a part of the community: Use the project to contribute to stronger local communities and provide tangible economic and social benefit.
- Honour all obligations: Do what you say you are going to do and deliver on promises made to stakeholders.

Stakeholders have initially been identified based on a detailed review of the regulations and the respective regulatory authorities, a review of previous and existing similar projects and the experience of the project team. The stakeholder listing for the WAH_2 Project will be regularly updated as the project progresses and additional stakeholders are identified.

Stakeholders have been categorised to reflect their interest in and influence on the WAH_2 Project and prioritised accordingly, as summarised in Figure 18 below. It should be noted that some individual stakeholders within a group may have different priorities and therefore different categorisations (such as different departments within Federal or State governments).

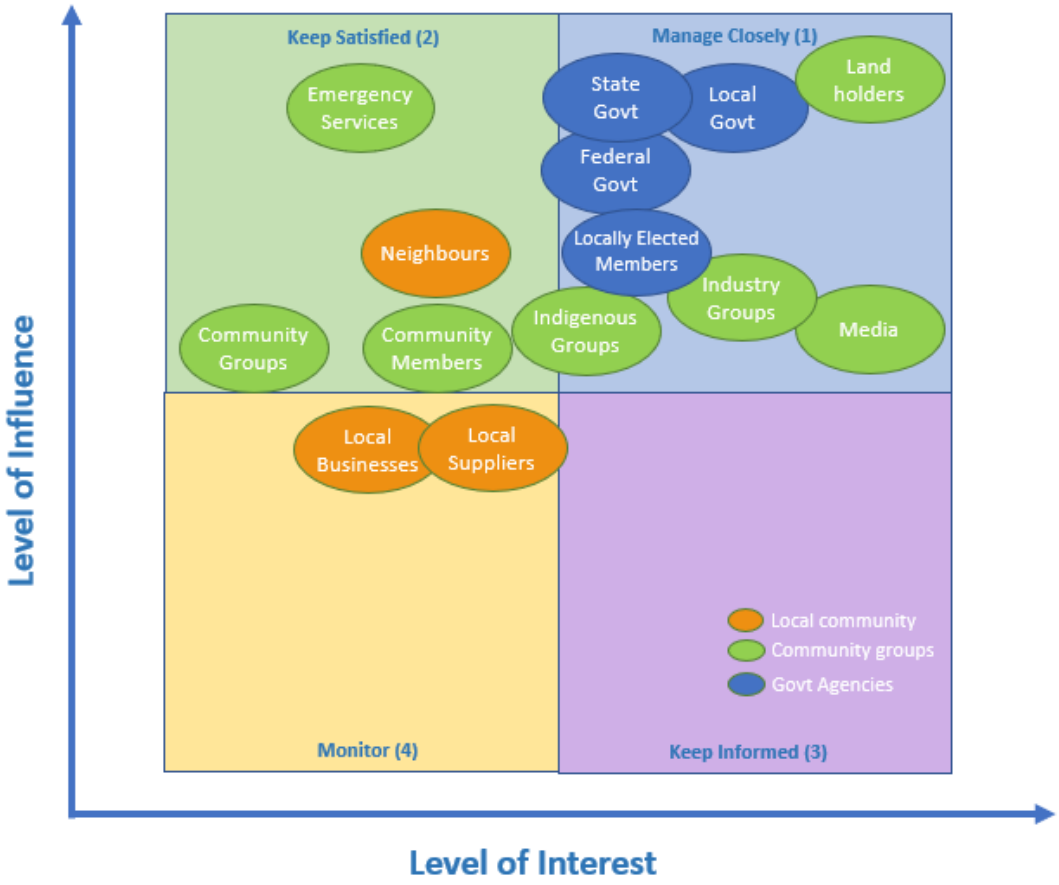


Figure 18 WAH_2 stakeholder group prioritisation

A communication log for the WAH_2 Project has been developed to capture all engagement that is undertaken with stakeholders. The log includes the date, contact details and a summary of the type of engagement that has been undertaken. In addition, any actions are recorded for monitoring and close out. The log is regularly reviewed and updated to ensure ongoing and meaningful engagement is carried out and any actions are followed up.

Appropriate processes are in place to protect confidentiality of stakeholder information.

This log will be required to support environmental and other approvals and provide appropriate evidence of consultation.

8.0 Risk Management

As part of NH3CE's risk management system, risk assessments are completed across project stage gates so latest risks are identified, understood and appropriate mitigation plans in place.

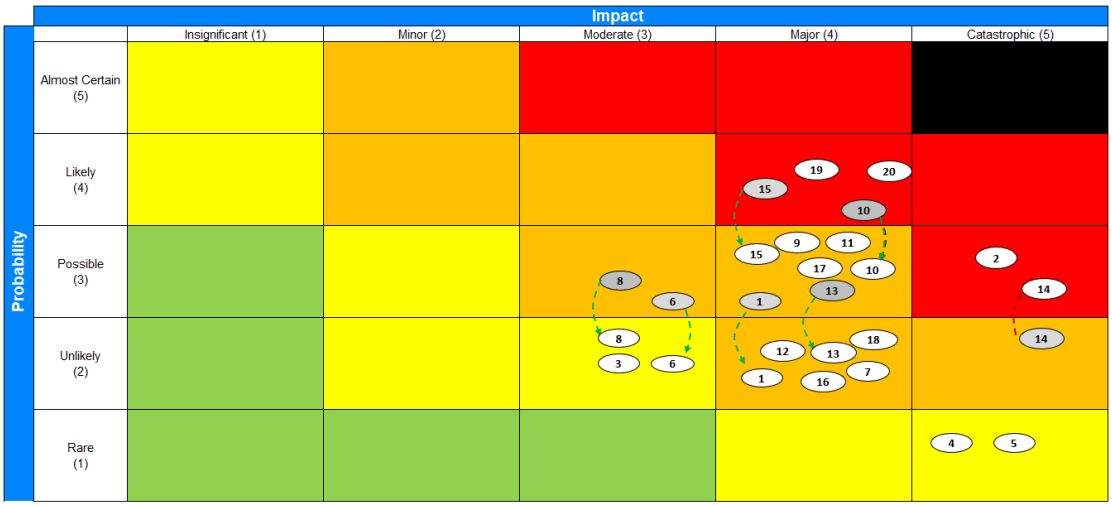
The key risks associated with the project have been identified and appropriate preventative and mitigative controls identified. Many of the controls identified relate to activities planned prior and during the FEED stage of the project.

Figure 19 summarises the key project risks, with those controls in place, at the end of Pre-FEED in February 2025 (white ellipses). The PFS assessment, where different, is shown by the grey ellipses. The Pre-FEED work has been effective in reducing key project risks associated with:

- Project delivery – simplified project scope and improved project definition;
- Gas supply – securing preliminary agreements with Chevron Australia regarding supply of 33 TJ/d and with another producer (that wishes to remain confidential) for 15 TJ/d (together, almost 85% of Phase 1 requirements);
- Port Access – confirmation of availability at existing Port of Dampier bulk liquids facilities and execution of an MOU with Pilbara Ports intended to establish operational arrangements and binding agreements supporting clean ammonia export from the WAH_2 Project;
- Competing clean ammonia projects in WA – lack of progress on competing projects, significantly increased cost of potential electrolysis-based projects;
- Suboptimal plant design – trade-offs evaluated, design optimised and supported by integrated process model; and
- Modularisation – confirmed module import capability at Port of Dampier, confirmed viability of transport route to site.

Two risks were elevated to key risks during FEED to ensure appropriate focus on mitigation. These relate to:

- Inability to secure regulatory approvals in a timely manner; and
- Inability to secure timely access on acceptable terms to the infrastructure corridor.



1. Local clean NH3 supply outweighs regional demand forcing future prices down
2. Inability to secure NH3 customers at an acceptable price
3. Increasing regulatory obligations through project life resulting in increases to cost of production and/or social license to operate
4. Inability to transport toxic NH3 from Maitland SIA to Port of Dampier given existing human populations at Karratha and Dampier
5. Inability to secure land in Maitland SIA (or Ashburton North SIA)
6. Sub-optimal plant design results in bottlenecks, constraints, and higher-than-necessary unit production costs
7. Inability to secure water at an acceptable cost including securing access corridors for water infrastructure to utilise seawater
8. Inability to transport large size/weight modules from port to Maitland SIA using existing transport corridors
9. Uncompetitive unit cost of production challenges project economics and sanction
10. Unable to secure sufficient volumes and acceptable price of natural gas
11. Inability to access timely and functional carbon sequestration site at acceptable price
12. Inefficient or impractical export logistics erode revenue and create process bottlenecks
13. Port does not have required infrastructure for NH3 export
14. Inability to secure project partners and/or finance
15. Significant delays due to poor project delivery, poor delivery of associated services (eg. CCS, power, pipelines)
16. Stakeholder oppositions causes project delay or cancellation (eg. Government or public perception changes)
17. Inability to secure or generate competitively priced power
18. Unacceptable emissions profile of product
19. Inability to secure regulatory (environmental and heritage) approvals in a timely manner
20. Inability to secure timely access on acceptable terms to the infrastructure corridor

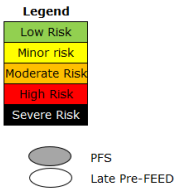


Figure 19 PFS (June 2023) to Pre-FEED (Jan 2025) risk assessment outcomes

At the conclusion of Pre-FEED, the most significant remaining risks relate to the Project's ability to secure:

- Ammonia customers at an acceptable price – this is being mitigated through engagement with multiple buyers, keeping project costs as low as practicable, pursuing any applicable government incentives, and seeking customer commitment prior to project milestones (conditional at FEED entry, unconditional at FID);
- Timely environmental and heritage approvals – mitigated by limiting project scope as far as practicable, obtaining flora, fauna and heritage surveys to guide project planning and applications for approval, early and ongoing engagement with the relevant authorities and traditional owner groups. NH3CE is also seeking for WAH_2 to be categorised as a Level 2 (and priority) project under the WA Government's Lead Agency Framework;
- Timely infrastructure corridor access on acceptable terms – this is being mitigated through ongoing dialogue with the WA Government JTSI, active participation in the Maitland Industry Reference Group and ongoing engagement with other industry participants regarding the potential for shared infrastructure and potentially aligned recommendations to government regarding shared infrastructure; and

- Project partners and/or finance – mitigated by developing a robust investment proposition supported by pre-FEED and commercial agreements and adopting an 'open book' approach to showcase the credentials of the project and support informed decision making using a virtual data room.

Error! Reference source not found. below provides additional detail of how key risks were mitigated through pre-FEED and planned future mitigations and controls.

Table 10 Pre-FEED risk assessment details (as of Jan 2025)

#	Risk identified	Risk rating (Jun'23)	Learnings and mitigations mid Pre-FEED	Risk rating (Jan '25)	Future mitigations identified
1	Local clean NH_3 supply outweighs regional demand forcing future prices down	12	• Lack of progress on competing projects, including shelving of Mitsui/Wesfarmers Midwest project • Significant increase in cost of electrolysis-based projects. Many proponents walking away (including Fortescue, Origin, Woodside)	8	• Continue with phased development philosophy to match production capacity with evolving market needs • Maintain project schedule to leverage first mover advantage • Continue to seek long term contracts; explore contract pricing alternatives to mitigate market risk • Ongoing monitoring of development of regional H2/NH3 market P5
2	Inability to secure NH_3 customers at an acceptable price	15	• Consistent feedback from potential customers that <US$600/T NH_3 competitive	15	• Ongoing customer engagement with multiple buyers to communicate progress, reinforce credentials and confirm expectations • Seek to keep unit costs as low as practicable • Seek appropriate customer commitment prior to project limestones (Binding at FID) • Ongoing review of Japan's METI price offset mechanism
3	Increasing regulatory obligations through project life resulting in increases to cost of production and/or social license to operate	6	• Increased ASU power requirements increase base case emissions above PFS - still below 'clean' threshold • Usual social license to operate parameters to be managed	6	• FEED design includes flexibility to tailor emissions intensity to requirements • Continue to monitor plant carbon emissions output • Progress land surveys and environmental approvals
4	Inability to transport toxic NH_3 from Maitland SIA to Port of Dampier given existing human populations at Karratha and Dampier	5	• Ongoing government discussions on multi user infrastructure for NH_3 supportive of transport to Port of Dampier • JTSI's infrastructure corridor development plan includes NH_3 pipeline	5	• Ongoing collaboration with JTSI • Thorough assessment of access corridors during FEED

5	Inability to secure land in Maitland SIA (or Ashburton North SIA)	5	• Option to Lease terms agreed with DevelopmentWA • Ministerial approval in place to approve OtL once wording finalised • Planning completed for land surveys	5	• Execute Option to Lease • Complete land surveys
6	Sub-optimal plant design results in bottlenecks, constraints, and higher-than-necessary unit production costs	9	• Optimisaton opportunities evaluated through Pre-FEED by Petrofac and Topsoe • Integrated process model developed to evaluate trade-offs • Appropriate design basis set for FEED	6	• Evaluate optimisation opportunities associated with service provider interfaces (e.g. power requirements for CO_2 compression) • Continue to mature opportunities to share infrastructure and optimise plant design
7	Inability to secure water at an acceptable cost including securing access corridors for water infrastructure to utilise seawater	8	• Key Terms Agreement executed with WaterCorp for 100%+ of Phase 1 requirement • Water supply Agreement close to finalisation • Requirement to pay for water infrastructure upgrade and FEED	8	• Seek terms in Definition Agreement to provide NH_3 appropriate influence over scope and cost of FEED and execution • Seek terms in Funding Agreement to influence project performance and limit exposure to cost overruns
8	Inability to transport large size/weight modules from port to Maitland SIA using existing transport corridors	9	• Confirmed appropriate facilities at Dampier Port to land modules • No major constraints on route from Dampier to Maitland	6	• FEED to include module weight/dimension optimisation • Detailed route analysis • Proactive engagement with authorities to secure approval in principle prior to FID
9	Uncompetitive unit cost of production challenges project economics and sanction	12	• Reduced project scope and spend through use of third-party services (related to desalination plant and associated pipelines, CO_2 transmission pipeline) • Uneconomic to use third-party power gen or to incorporate renewable power • Exposed to lower multi-user tariffs for CO_2 transport (and potentially NH_3 transport) • Pre-FEED cost update supported by vendor quotes	12	• Pursue opportunity to use Yara's existing underutilised NH_3 storage and loading infrastructure rather than build new • Pursue opportunity for multiuser NH_3 pipeline to reduce ammonia transport unit costs • Appropriate incentives in FEED and EPC contracts • FEED contractor experienced in integration of development and operations and development

10	Unable to secure sufficient volumes and acceptable price of natural gas	**16**	• Indication of supply agreed with Chevron for 33 TJ/d, acceptable price, included in economic model • MOU with Strike for 15 TJ/d, price range consistent with economic model • Ongoing discussions with other existing producers	**12**	• Progress additional MOUs for Pilbara gas supply • Convert preliminary agreements to binding GSPA's prior to FID
11	Inability to access timely and functional carbon sequestration site at acceptable price	**12**	• Active engagement with the two potential CCS providers • Detailed technical details and term sheet with pricing provided by STO, 100% of requirements for 20 years, negotiation of outstanding terms ongoing • WDS JV restructure completed, commercial engagement imminent • CO_2 transportation MOU executed with AGIG (who would BOO CO_2 pipeline)	**12**	• Parallel negotiations with providers to maintain competitive tension • Secure one MOU prior to FEED entry - to address co-ordination of projects' timing • Convert MOU to binding CCS service agreement prior to FID
12	Inefficient or impractical export logistics erode revenue and create process bottlenecks	**8**	• MOU progressed with PPA to formalise joint work to progress arrangements for NH_3 to access Port of Dampier bulk liquids jetty and handling facilities • Confirmed efficient logistics using conventional gas carriers and existing port infrastructure.	**8**	• Execute MOU and then action joint work • Negotiate formal agreements prior to FID (Port facilities Agreement, potential Construction Agreement and appropriate Leases/Licenses)
13	Port does not have required infrastructure for NH_3 export	**12**	• PPA has confirmed current Dampier liquids jetty utilisation <30%. Able to take WAH_2 Phase 1 volumes with no expansion. • Some expansion may be required for Phase 2 • Near-port storage location may be required if use of existing, underutilised Yara storage and loading facilities cannot be agreed	**8**	• Progress port access MOU and action joint work (per risk 12) • Progress commercial discussions with Yara regarding use of existing storage and loading facilities • Engage with Pilbara Ports and other nearby landowners for potential fallback storage locations

			• Room for NH_3 loading lines and arms on jetty if use of existing Yara facilities cannot be agreed		
14	Inability to secure project partners and/or finance	**10**	• Discussions to date indicate financing available for 'credible projects' • Potential strategic partners interested in 'credible projects' • Completion of Pre-FEED key demonstration of credibility (technical work and preliminary commercial agreements)	**15**	• Robust investment proposition and credible business plan supported by Pre-FEED and commercial agreements • Open book approach to showcase credentials of project and support informed decision making • Open data room once pre-FEED complete (Feb '25)
15	Significant delays due to poor project delivery, poor delivery of associated services (e.g. CCS, power, pipelines)	**16**	• Use of proven Topsoe technology and design cases • Whole-of-plant process model built to ensure successful integration • Maximum modularisation to minimise cost and schedule risks • Commercial agreements with established providers to de-risk inputs/service delivery (e.g. gas, water, CCS, CO_2 transport)	**12**	• Use of experienced EPCM for delivery of plant • Continuity of lead engineer and technology provider • Ensure appropriate organisational capability and capacity in NH_3, contractors and project participants • Seek contractual commitments from all parties to meet required project milestones and targets with appropriate incentives/penalties
16	Stakeholder oppositions causes project delay or cancellation (e.g. Government or public perception changes)	**8**	• Key stakeholders confirmed, level of influence and support or opposition assessed • Stakeholder management plan developed	**8**	• Proactive engagement with key stakeholders to build relationships and lobby, in line with plan
17	Inability to secure or generate competitively priced power	**12**	• Self-generating power significantly lower cost than importing third-party power • Gas-fired powergen plus heat/steam from exothermic ATR process the most appropriate solution • Gas supply agreements include acceptable pricing, included in economics	**12**	• Convert preliminary gas agreements to binding GSPA's prior to FID • Plant designed with ability to incorporate renewable power once viable to do so

			• Currently uneconomic to incorporate renewable power			
18	Unacceptable emissions profile of product	**8**	• ATR technology with amine-based CO_2 capture the most appropriate solution • Uneconomic to capture emissions from gas powergen or fired heaters • Pre-FEED base case emissions intensity 0.38 kg CO_2/kg NH_3	**8**	• Single design basis for FEED with flexibility to reduce emissions by blending syngas and natural gas for powergen and heaters • Secure low-CO_2 feed gas, certified by suppliers • Consider offsets to cover any emissions above commitments
19	Inability to secure regulatory approvals in a timely manner	**NA**	• Regulatory Approvals plan developed • Approvals scope and risk reduced by removal of desalination plant and associated pipelines and CO_2 pipeline from project scope • AES engaged on environmental approvals • Flora/Fauna/Heritage surveys designed. Execution pending S91 License approval (NAC final approval outstanding) • NAC engagement hampered by executive changes	**16**	• Pursuing WAH_2 inclusion in WA Govt's Lead Agency Framework as a priority project. Project Definition Document submitted to JTSI • Obtain flora, fauna and heritage surveys to guide project planning and support approvals • Timely execution of Regulatory Approvals Plan • Ongoing engagement with relevant authorities and traditional owner groups
20	Inability to secure timely access on acceptable terms to the infrastructure corridor	**NA**	• Ongoing engagement with JTSI, DevelopmentWA and Maitland SIA Industry Reference Group participants • JTSI support for ammonia pipeline as part of Pilbara Hydrogen Hub Govt funding • Environmental and Heritage surveys completed over full length of Maitland-Dampier corridor	**16**	• Proactive engagement with JTSI to support and expedite Govt decision making • Engagement with other project proponents to seek aligned recommendations to Govt including shared infrastructure • Pursuing WAH_2 inclusion in WA Govt's Lead Agency Framework as a priority project.

9.0 Way Forward

9.1 Financing

NH3CE's WAH_2 Project is focused on meeting the needs of two high growth markets for clean ammonia. Firstly, Northeast Asia's well flagged demand for low-emissions ammonia as countries like Japan and Korea introduce ammonia to their fuel mix for power generation to displace thermal coal. Secondly, the conversion of maritime transport, specifically bulk carriers to clean fuel in replacement of diesel/fuel oil bunker fuel. As such, NH3CE anticipates that the WAH_2 Project will be progressed in partnership with major Japanese and Korean energy producers, traders and multi-national entities.

Phase 1 of the WAH_2 Project has an estimated capital cost of A$1,712M (100% basis). NH3CE is already exploring funding alternatives and will provide more detail as these discussions become more concrete. The following factors are driving the funding structure:

1) A meaningful percentage of the ammonia produced by Phase 1of the Project is likely to be sold under long term offtake contracts (up to 15 years) with high credit quality corporate and government counterparties (e.g. via the Japanese government "CFD" (Contract For Difference) scheme. Due to the long-term security of the revenue, the Project will be able to be funded by a large percentage of project finance (a working case assumption of 60% debt).
2) The Company is exploring alternatives for the balance of the equity component of the financing and as previously stated, would look to sell down a percentage of project ownership to help to fund this portion. The Company will also pursue any available public sector grants or government funding where possible - but is not assuming any reliance on these sources.

Since the completion of the PFS, NH3CE has been in ongoing discussions with potential strategic investors and offtake customers. The completion of the Pre-FEED technical work and financial analysis in conjunction with the commercial agreements that have been put in place (as described in this report), mean that a comprehensive data room is now available to strategic parties under confidentiality agreements.

NH3CE anticipates that binding agreements would be finalised and come into effect prior to FEED and FID. The financing assumptions have therefore been made on this basis, though with flexibility around the specific nature of these agreements.

The project has been specifically designed with the ability to expand production in stages to be able to respond to the actual rate of demand growth. Prima facie, Phase 2 would replicate the first stage production volume of 650ktpa of ammonia and would come on steam 5 years after Phase 1. Although the actual volume and timing could be modified prior to Phase 2 FID. The capex for Phase 2 should be slightly less than that of Phase 1 due to

the commonality of elements of the plant and infrastructure. Financing of Phase 2 would depend on timing relative to Phase 1 as it may be partly funded out of retained earnings or a financing strategy similar to that of Phase 1 if accelerated.

The pathway to development and requisite funding requirements is outlined as below:

1) FEED:

Indicative expenditure A$20M. NH3CE is currently exploring funding pathways for the FEED stage and alternatives include:

1) Proceeds from offtake options from customers;
2) Proceeds from participation options from strategic partners; and
3) Equity investment at Company and / or Project level.

Due to the Project de-risking following a partnership announcement of a type described above and subsequent revaluation of NH3CE, at this point NH3CE's expectation is to be sufficient to raise financing required to fund the Project through to FID.

2) Phase 1 build and commission:

Assuming a debt/project finance : equity ratio of 60:40 the equity component of the project would be in the region of A$685M. Indicatively, this project could be funded through a sell down of a proportion of equity to strategic. NH3CE believes sufficient financing routes would be open to it to finalise the project.

In addition to conventional financing sources, NH3CE is also pursuing additional low-cost funding from 'green' financing sources including dedicated environmental funds and initiatives. Particular focus for NH3CE will be on low-cost/concessionary finance & incentives provided by:

- The Australian Government (including the Regional Hydrogen Hubs Program, the Northern Australian Infrastructure Facility, and the Clean Energy Finance Corporation's Advancing Hydrogen Fund);
- The Governments of customer countries (for example Japan's Supply Chain Subsidy Program); and
- Japanese and South Korean and banks and export credit agencies.

Other sources of finance available to NH3CE include, but are not limited to, commercial and investment banks, investment and/or private equity funds, trading houses, royalty and streaming financiers, government investment funds/treasuries, equipment financiers, convertible and/or hybrid financiers.

Reference is made to the cautionary statement with respect to financing at the beginning of this report.

8.2 Path to FID

The project has progressed to plan through 2024 with the completion of Pre-FEED and the announced outline agreements for project inputs including gas (Chevron), water (WaterCorp), CO_2 Pipeline (AGIG), port access (Pilbara Ports Authority) and land allocation (Development WA). In addition, as outlined above, confidential discussions and due diligence processes regarding NH_3 offtake and project participation are under way.

Based on the positive pre-FEED outcomes, NH3CE is progressing strategic partner discussions to facilitate the commencement of FEED Studies in the second quarter of 2025. The completion of FEED and the advancement of commercial agreements should allow targeting FID in Q2 of 2026 which if made would lead to targeted first production in 2029.

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