Pre-Feasibility Study Outlines Low-Cost Green Hydrogen Production

Frontier Energy Limited (ASX: FHE) (**Frontier** or the **Company**) is pleased to announce results from its Hydrogen Pre-Feasibility Study (the "**Study**") completed by Xodus Group for the Company's 100% owned Bristol Springs Project (the "**Project**") located 120km from Perth in the South West of Western Australia.

The Study assessed green hydrogen production powered by the Company's Stage One 114MW solar farm which is expected to produce approximately 4.4 million kilograms of green hydrogen per annum. The highlight of the Study is the low estimated cost (inclusive of capital)[1] of $2.83 per kilogram of hydrogen produced. Based on publicly available data, this is expected to place the Project as one of the lowest cost producers of green hydrogen in Australia.

The low cost is largely driven by the Project's location, which utilises major existing infrastructure surrounding the Project. This infrastructure includes connection to the existing Landwehr Terminal, allowing for excess solar renewable energy to be sold via the South West Interconnected System ("SWIS" - Western Australia's main energy grid) as well as multiple existing water sources meaning there is no requirement for capital intensive infrastructure such as desalination.

HIGHLIGHTS

- **A Pre-Feasibility Study to assess green hydrogen production at the Bristol Springs Project in Western Australia, completed by Xodus Group, shows the Project has the potential to be an early mover, low-cost green hydrogen producer**
- **The power to produce green hydrogen will be sourced from the Company's Stage One (114MW) solar farm (initial capital - $166.3m) powering a 36.6MW alkaline electrolyser (initial capital - $69.9m). This is expected to produce 4.4 million kg of green hydrogen per annum**
- **Total unit cost[1] (inclusive of capital) is forecast at $2.83 per kg of hydrogen produced. This is expected to place the Project as one of the lowest cost producers of green hydrogen in Australia**
  - *The reason for the low cost is access to existing surrounding infrastructure resulting in significantly lower capital costs in comparison to more remotely located projects*
- **Connecting to the SWIS through Landwehr Terminal allows for additional revenue generation from excess power sales, Reserve Capacity Credits (Section 6.1) and Large-Scale Generation Certificates (Section 6.2), whilst also allowing for power to be drawn during periods of low solar energy yields**

[1] *Total unit costs = (total operating costs direct (annual) / annual production) + (total initial capital + total sustaining capital /life of operation production)*

- **The Company anticipates initial hydrogen production to be sold into the domestic market. First movers for offtake are expected to come from long-haul transportation, gas pipelines and energy storage. All markets are within close proximity to the Project**
    - Discussions with potential hydrogen offtake parties have commenced
- **The Company anticipates commencing project financing discussions later this year. Preliminary discussions indicate debt financing of between 60% to 80% is achievable**
- **Additional funding through Government grants and incentives is likely**
- **The Company's renewable Expansion Study is currently being finalised and will be released later this quarter**

Executive Chairman Grant Davey commented: "*Green hydrogen is a unique opportunity to store, move and distribute renewable energy and is set to play a huge role in helping humanity decarbonise the energy we need. The Frontier Energy green hydrogen project is strategically located with suitable land, abundant water, SWIS access, gas pipeline access and transport infrastructure so as to be an Australian leader in ensuring that green hydrogen production and distribution becomes a near term reality*".

Cautionary Statement

The Hydrogen Pre-Feasibility Study (Study) referred to in this announcement has been undertaken to assess the potential production of green energy hydrogen at the Project. It is based on preliminary technical and economic assessments that are not sufficient to support or to provide any assurance of an economic development case. Further evaluation work and appropriate studies are required before the Company will be in a position to develop an economic development case.

To achieve the range of potential project development outcomes indicated in the Study, additional funding will be required. Investors should note that there is no certainty that the Company will be able to raise funding when needed. It is also possible that such funding may only be available on terms that are dilutive or otherwise affect the value of the Company's existing shares.

The Company has concluded that based on the results of the Study and strong market fundamentals there is a sufficient degree of confidence to progress to the Feasibility Study stage. However, given the uncertainties involved, investors should not make any investment decisions based solely on the results of this Study.

Forward-Looking Statements

All statements, trend analysis and other information contained in this announcement relative to markets for the Company, trends in energy markets, production quantities and anticipated expense levels, as well as other statements about anticipated future events or results constitute forward-looking statements. Forward-looking statements are often, but not always, identified by the use of words such as "seek", "anticipate", "believe", "plan", "estimate", "expect" and "intend" and statements that an event or result "may", "will", "should", "could" or "might" occur or be achieved and other similar expressions. Forward-looking statements are subject to business and economic risks and uncertainties and other factors that could cause actual results of operations to differ materially from those contained in the forward-looking statements. Forward-looking statements are based on estimates and opinions of management at the date the statements are made. The Company does not undertake any obligation to update forward-looking statements even if circumstances or management's estimates or opinions should change. Investors should not place undue reliance on forward-looking statements.

Executive Summary

The Project is located in the South West region of Western Australia approximately 120km from Perth and 8km from the town of Waroona. The Company engaged Xodus Group (Xodus) to undertake the Study to assess the opportunity to develop a green hydrogen production facility based on a 114MW solar farm (Stage One). As part of this process, Xodus and consultants EPC Technologies, investigated maximum energy yield from solar and costs for the Project. The key inputs and outputs from the Study are highlighted below.

Table 1: Key Production and Costing Assumptions

Stats	Unit	Key Input/outputs	Source
Life of operation	Years	25	Xodus
Solar			
Total Energy Production (Yr 1)	GWh	250	EPC Technologies
Degradation	%	0.3	EPC Technologies
Availability	%	98	EPC Technologies
Solar Capacity	MW	114	EPC Technologies
Reserve Capacity Allocation	MW	24.5	EPC Technologies
Hydrogen			
Electrolyser – nameplate capacity	MW	36.6	Xodus
Energy required to produce 1kg Hydrogen	KWh	55	Xodus
Water consumption	L / hr	55,000	Xodus
Hydrogen production (pa)	M kg	4.4	Section 2.0
Excess energy sold (pa)	MWh	113,000	Section 3.1
Average target annual load factor (max.)	%	91	Xodus
Actual load factor (applied)	%	75	Section 2.0
Costs – Operating			
Operating costs – Solar	A$ m pa	$3.2m	EPC Technologies
Operating costs – Hydrogen	A$ m pa	$3.5m	Xodus
Operating costs (Power sales/purchases)[1]	A$ m pa	-$4.5m	Section 3 and Section 6
Power Purchases Average Price - $64/MWh	*A$ m pa*	*$7.7m*	*Section 3.2*
Excess Power Sales Average Price $38/MWh	*A$ m pa*	*-$4.5m*	*Section 3.1*
Large Generating Certificates (LGCs) Average Price - $35/LGC	*A$ m pa*	*-$4.7m*	*Section 6.2*
Capacity Credit Average Price -120,000/MW	*A$ m pa*	*-$3.0m*	*Section 6.1*
Total Operating Costs (Direct)[2]	**A$ m pa**	**2.2m[2]**	
Capital			
Stage 1 – Solar	A$ m	$166.3m	EPC Technologies
Stage 1 – Hydrogen	A$ m	$69.9m	Xodus
Total Initial Capital	**A$ m**	**$236.8m**	
Sustaining Costs[3]	A$ m	$11.7m	Xodus
Total Capital Costs		**$248.5m**	

1 – Operating costs (Power sales/purchases) = Power purchased from the grid (during off peak) – Excess power sales (on the grid) – Capacity Credits – Large Generation Certificates). All assumptions regarding each sub cost are outlined in this Study
2 – Excludes Financing, depreciation and corporate costs
3 – Replacement Stack required after 90,000 hours. Replacement of solar panels are inclusive within Operating Costs - Solar

From the Study, it was found that the Project would produce approximately 4.4 million kilograms of hydrogen per annum. Based on the key inputs this would result in a total cost[1] of approximately $2.83 per kilogram of hydrogen produced. The breakdown of the key inputs is illustrated in the image below.

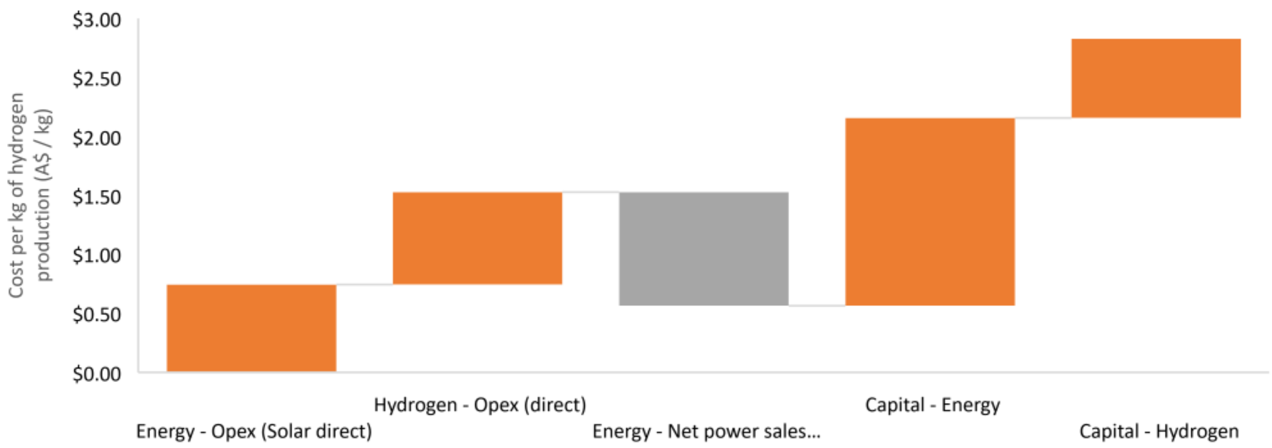

Image 1: Forecast costs per kilogram of hydrogen produced (A$ / kg)

The key highlight of the Study is the low cost for hydrogen production. This low cost is due to the Project's location being surrounded by existing infrastructure, which lowers the capital cost, whilst also allowing for additional income to be generated (through excess energy sales and Reserve Capacity Credits through the connection to the SWIS at the Landwehr Terminal.

Whilst there is limited publicly available information regarding other green hydrogen projects in Australia, due to the infancy of the sector as well as the majority of other projects being owned privately, numerous industry experts have commented on costs for the industry.

This includes the Australian Renewable Energy Agency (ARENA) which has forecast the cost of producing green hydrogen in Australia to be between $6 to $9 per kg based on current electrolyser and renewable energy costs[2].

This costing guidance is supported by the International Energy Agency (IEA) in their Global Hydrogen Review[3], that has similar current costing estimates as highlighted in Image 2 below.

[1] *Total unit costs = (Total Operating Costs Direct (Annual) / Annual Production) + (Total Initial Capital + Total Sustaining Capital /Life of operation production)*

[2] *Source: https://arena.gov.au/blog/australias-pathway-to-2-per-kg-hydrogen/*

[3] *Source IEA: Global Hydrogen Review 2021*

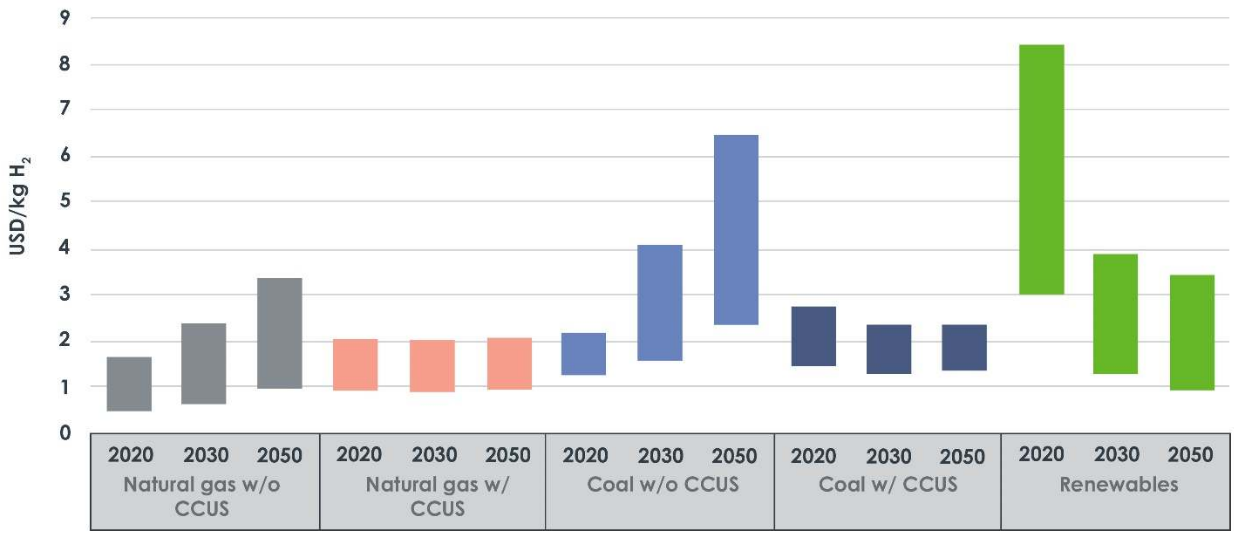

Image 2: Levelised cost of hydrogen production by technology in 2020, and in the Net zero Emissions Scenario, 2030 and 2050 (Source IEA: Global Hydrogen Review 2021)

In addition to the strong result of the Study, several areas have been identified that have the potential to improve the Project's returns and that will be addressed in future studies. These include:

- **Expansion Study -** A number of the key costs for the hydrogen plant are based on the scalability of the plant, therefore achieving a lower overall unit cost through scale economies.
- **Behind-the-meter (BTM) -** Sales of power via a power purchase agreement (PPA) enables the Project to retail excess power cheaper than the grid by avoiding transmission, distribution, and market operator charges. The Company has commenced discussions with various parties regarding this possibility.
- **Reduction in water costs -** The availability of multiple, existing water sources will enable the Company to continue to assess the optimal solution from either existing water schemes or new bore(s) to extract water from the existing aquifer.
- **BTM power supply -** Similar to BTM sales of power, BTM supply of power will be cheaper due to the avoidance of transmission, distribution, and market operator charges. The Company has commenced assessing these options.
- **Oxygen Offtake -** The current hydrogen plant design assumes that all oxygen produced in the process will be vented to atmosphere. The volume of oxygen production is significant. Oxygen can provide an additional revenue stream for the hydrogen plant given there is local demand for oxygen offtake. The Company will continue to assess this in the future. Stage One generates approximately 43Mkg of oxygen per annum.

Contents

1. Stage One Solar Farm (114MW)

Stage One of the Bristol Springs Solar Farm (BSSF) is located on an area of approximately 195 hectares. The site is undeveloped and is predominantly cleared of vegetation from its historical use for intensive agricultural purposes.

EPC Technologies (EPCT) were engaged by the Company to complete a Front-End Engineering Design (FEED) for the solar farm, including basis of design, preliminary solar farm and 330/33kV substation design, bill of materials, PV yield study, as well as a steady state generator model for consideration by Western Power. EPCT has also developed and submitted a dynamic generator model to Western Power.

BSSF is a proposed large-scale solar farm on relatively flat land (previously a pine plantation). The size and locality would suit a centralised inverter system with tracked horizon single axis PV panels.

The site will be integrated to the existing Western Power 330kV transmission network via Landwehr Terminal which is located approximately 4 kilometres north-east of BSSF. BSSF has implemented a modular, plug and play approach to the design topology. This enables BSSF to have a large portion of the materials factory tested prior to installation on site. The capital cost to develop a 114Mw solar Project is estimated at $166m. A breakdown of the solar capital costs is highlighted in Table 2 below.

Table 2: Solar Capital Costs

Capital Item	A$ m
Design / PM / Site Management	4.9
Solar Modules	42.2
Inverters	10.1
Cable	4.1
Tracker System	18.2
Balance of Plant	1.4
Logistics	1.6
Civil / Mechanical Installation	23.9
Electrical Installation	14.5
Testing and Commissioning	1.5
Transmission Connection	23.9
Contingency	20.0
TOTAL	**166.3**

Image 3 below highlights the forecast energy generation for the BSSF on a monthly basis. The total power generation is estimated at 250GWh during the first year of production. Degradation of 0.3% per annum is applied thereafter.

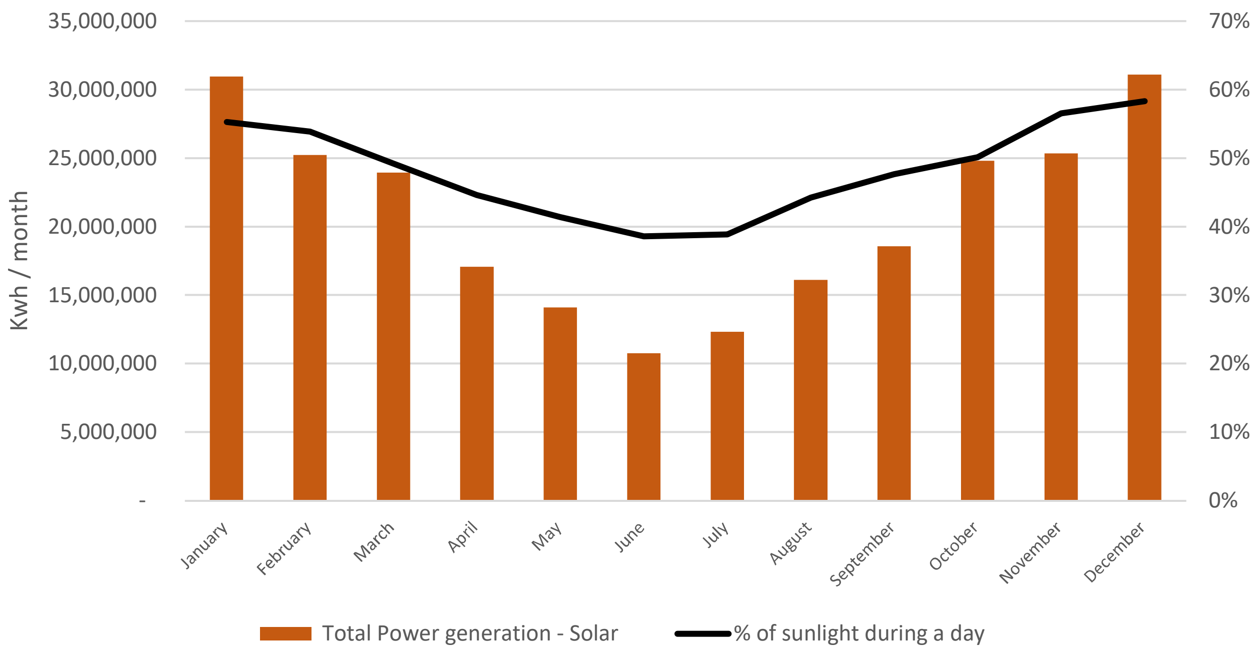

Image 3: Forecasted solar power generation on a monthly basis

2. Stage One Hydrogen Production Facility

The Company's consultants, Xodus, performed a technology assessment to determine the most appropriate hydrogen plant design, with Alkaline Water Electrolyser (**AWE**) selected based on its lower overall cost and robustness to produce green hydrogen at purity >99.98%.

AWE is a mature green hydrogen technology having been available at MW-scale for longer than other leading technologies, including Proton Exchange Membrane ("PEM") Electrolyser. As such, it offers the lowest cost per kW of installed capacity, long-term operational stability and plant life. The reduced price compared to PEM is largely explained by the maturity of the technology and the use of precious metals within the PEM stack.

As electrolyser plants are modular, the selection of AWE at this time does not lock the Company in to a particular technology in the event of future advances. The current size of the modules is approximately 18.3MW. Given the forecast power generation from the solar facility, the current selected size of the facility is 36.6MW (or two modules). The Company will however look to refine the size of the facility in the future by assessing the potential of adding additional modules.

The average annual target load factor for the electrolyser is 91% i.e. allowing 9% for maintenance downtime and planned outages during the "12 peak intervals" for Reserve Capacity Credits (RCC[1]). Stage One was, however, modelled with an average efficiency of 75% due to restraint on energy production and purchased power from the grid (due to

[1] *https://www.aemo.com.au/energy-systems/electricity/wholesale-electricity-market-wem/wa-reserve-capacity-mechanism/certification-of-reserve-capacity*

forecast pricing – Section 3.1 of this Study). At the average annual load factor (91%) this would see production increase to 5.3Mkg compared to 4.4Mkg in the Study.

The location of the hydrogen production facility is anticipated to be in close proximity to the solar farm given the other associated infrastructure such as the Landwehr Terminal, water infrastructure and the Dampier to Bunbury Natural Gas Pipeline.

The forecast capital for the Stage One hydrogen facility is $69.9m. A breakdown of the costs is highlighted in Table 3 below.

Table 3: Hydrogen Capital Cost

Capital Item	A$ m
Civil works and Site	3.6
Water – Process	1.2
Water – Waste	1.1
Hydrogen Processing Facility (Electrolyser)	44.8
Non-Process Infrastructure	0.9
Mechanical Bulk and Fire systems	1.2
Electrical Infrastructure	5.4
Common distribution	0.9
Commissioning Handover	1.2
Owner's Engineer	2.6
Owner's Cost	0.8
Contingency	6.2
Total	**69.9**

3. Grid Connection

Due to the energy profile of solar generation, only energy produced up to the electrical capacity of the electrolyser during the solar production window can be utilised to produce hydrogen without the aid of battery storage.

One of the most significant aspects of the Project is the location, approximately 4km from the Landwehr Terminal, a major connection point into the SWIS. Using the grid as a virtual battery for energy arbitrage would ensure a stable supply of electricity to meet the requisite energy draw of the electrolyser at all times whilst facilitating sales of excess power in other periods.

Image 4: Landwehr Terminal – 33/330kV

3.1 Excess Power Sales

During periods of excess power production, the Company can sell this excess power directly into the balancing market[1] or to a consumer via a PPA. The Landwehr Terminal is on 330kV power lines which provides the Project with connection to many large industrial customers in the South West, stretching from Bunbury and Collie in the south to Kwinana in the north. Many of the companies in this region have committed to decarbonisation of their operations providing an ideal pool of potential customers for Frontier's clean energy.

The Study assumed excess power produced is sold via the SWIS. This pricing assumption (WEM Prices) was based on a report commissioned by the Company from an independent expert in late 2021.

The expert modelled the future WEM market using PLEXOS energy optimisation software. Over the 30 years investment period, the model predicted the price outcome for each 30-minute trading interval based on the dispatch of the lowest cost available generation.

The expert made assumptions about future fuel prices, generation retirement dates and competitive market dynamics (among other things) in preparing this forecast. The average price applied over the life of the Project was $38/MWh.

[1] *https://aemo.com.au/en/energy-systems/electricity/wholesale-electricity-market-wem/participate-in-the-market/information-for-current-participants/balancing-market-participation*

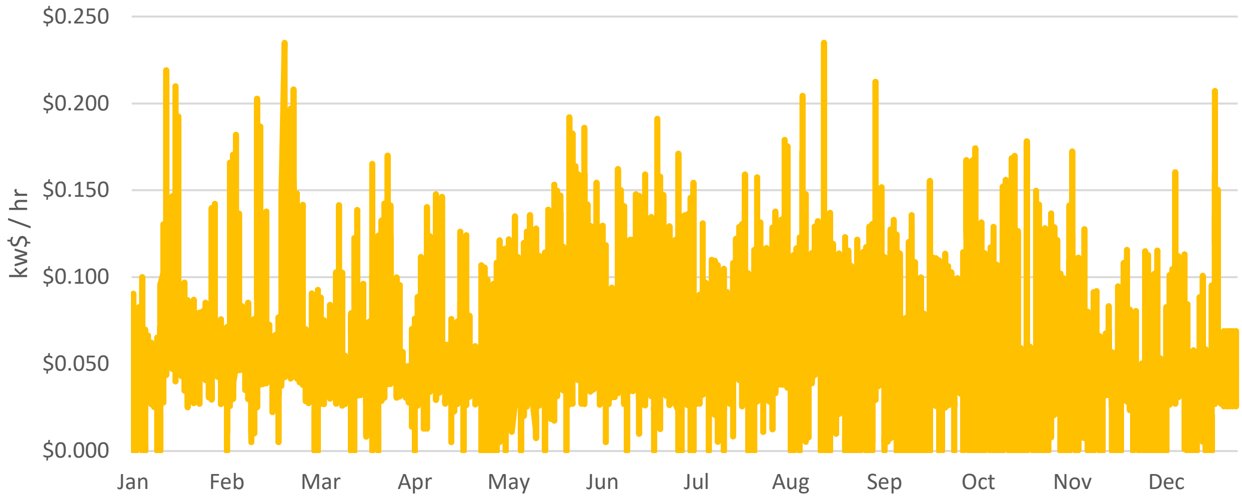

Image 5: Power pricing assumption

3.2 Drawing power from the grid in off-peak

To ensure a more stable supply of electricity to meet the energy draw of the electrolyser, it is assumed that power is drawn from the grid during off-peak times of the day. This allows for the SWIS to effectively act as a battery for the Project.

The pricing assumptions for power drawn are the same methodology as discussed in 3.1 of this Study. However, in addition a $25/MWh to $40/MWh (mid-point $33/MWh) service charge has also been applied to the cost, resulting in an average cost of $64/MWh.

It was assumed that when the power purchase price per MWh is greater than $50/MWh (excluding usage charges) power would not be drawn. This resulted in the modelled annual load factor (utilisation) for the hydrogen facility of 75% compared to the maximum annual load factor of 91% (as outlined in Section 2 of this Study).

3.3 Retirement of Large-Scale Generation Certificates (LGC)

A nominated person for an accredited power station may create Large-Scale Generation Certificates (LGCs) for eligible electricity generated by the power station. Eligible electricity is electricity generated from the power station's renewable energy sources. One LGC can be created per megawatt hour (MWh) of eligible electricity generated by a power station. The amount of eligible electricity generated by a power station is to be worked out in accordance with the LGC general formula[1]. The Study assumed LGC pricing between $25 to $40 per LGC with an average price applied of $35.

To ensure hydrogen remains green, energy imported via the SWIS will result in the retirement of LGCs for every MWh of energy drawn. The Project will generate approximately 240,000

[1] *The nominated person for an accredited power station may create large-scale generation certificates (LGCs) for eligible electricity generated by the power station. Eligible electricity is electricity generated from the power station's renewable energy sources. One LGC can be created per megawatt hour (MWh) of eligible electricity generated by a power station. The amount of electricity generated by a power station is to be worked in accordance with the large-scale generation certificate general formula. https://www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-industry/Power-stations/Large-scale-generation-certificates*

LGCs per year. Stage One assumed power purchased from the grid would be approximately 11.2MW per annum. Image 6 below highlights the forecast of power drawn from direct solar generation and the grid.

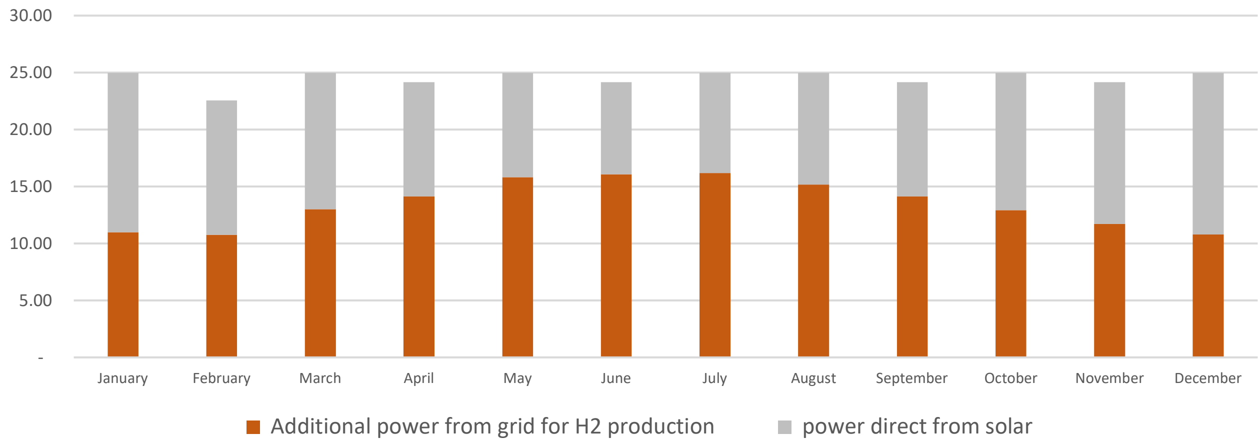

Image 6: Source of power for hydrogen production

Australia's Clean Energy Regulator is developing a Guarantee of Origin scheme. The scheme will enable Australian businesses to sell verified hydrogen from renewable sources. The Guarantee of Origin scheme will measure and display key attributes of how and where a unit of hydrogen is produced including its carbon intensity[1].

In July 2020, the Australian Renewable Energy Agency (ARENA) identified green hydrogen projects to support in Australia. The program identified that in order for hydrogen to be classified "green", production must be 100% powered by electricity that is derived from[2]:

a) on-site renewable electricity generation
b) retirement of Renewable Energy Certificates (RECs) or equivalent certificate
c) contracted electricity derived from a renewable Power Purchase Agreement (PPA), or
d) a combination of the above.

Furthermore, in August 2021, the Department of Industry, Science and Resources published a discussion paper titled 'Hydrogen Guarantee of Origin Scheme'. The paper set out proposed rules for scope 2 greenhouse gas emissions which for the Project would include greenhouse gas emissions from the generation of power sourced by the Project from the grid.

The Greenhouse Gas Protocol[3] identifies a best-practice dual-reporting framework for scope 2 emissions comprising both location-based and market-based reporting. Australia's Climate

[1] https://www.cleanenergyregulator.gov.au/Infohub/Markets/guarantee-of-origin
[2] https://arena.gov.au/assets/2020/04/renewable-hydrogen-deployment-funding-round-funding-announcement.docx
[3] https://ghgprotocol.org/Third-Party-Databases/Australia-Department-of-Climate-Change

Active program has aligned with this reporting practice for participants seeking carbon neutral certification under this program.

For the location-based method, emissions from electricity purchased from the main electricity grid in a state or territory are calculated by multiplying the quantity of electricity consumed by the average grid emission factor in kilograms of CO_2-e[1] emissions per kilowatt hour, for the state or territory in which the consumption occurs. This is the methodology applied in National Greenhouse and Energy Reporting (NGERS)[2] for electricity consumption, where facilities use the National Greenhouse Account factor[3].

For the market-based method, companies who purchase renewable electricity through contractual arrangements (such as through the purchase of Renewable Energy Certificates) are allowed to apply this renewable energy to reduce the emissions of the electricity used in production calculations. This approach means hydrogen production does not have to be physically co-located with or directly connected to the renewable energy generation[4].

Implementation of the market-based method may differ between countries as each country has their own mechanisms to account for renewable electricity claims, however a key principle is a requirement that renewable energy claims cannot be double counted. In Australia, the risk of double counting is mitigated through Renewable Electricity Certificates (e.g. LGCs). One certificate represents a unique claim on the zero emissions attribute of renewable electricity generation (note this is not legislated but how the market has interpreted the use of LGCs in the voluntary market)[5].

3.4 Lithium-ion battery

An alternative to a grid connection is the installation of a lithium-ion battery. The Study however concluded that this option is uneconomic due to the high capital cost, limited available spread in wholesale energy prices in the SWIS and reduced capacity credits for storage facilities of less than 4 hours. The Company has therefore discounted this as an alternative.

4. Water

One of the key elements for green hydrogen production is access to water. Xodus performed a water related technology assessment across water import, treatment and disposal. Given the Project's location there are multiple existing solutions available with capacity. These include:

- Yarragadee freshwater aquifer
- Bunbury Wastewater Treatment plant
- Scheme water supplied by Water Corporation

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[1] *CO2 equivalent, a common unit for the global warming potential of different greenhouse gases*

[2] *Under the National Greenhouse and Energy Reporting Act 2007*

[3] *https://consult.industry.gov.au/hydrogen-guarantee-of-origin-scheme*

[4] *https://consult.industry.gov.au/hydrogen-guarantee-of-origin-scheme*

[5] *https://consult.industry.gov.au/hydrogen-guarantee-of-origin-scheme*

Scheme water is supplied via the Stirling Trunk main, which is approximately 3km from the proposed hydrogen plant location. The Company assumed the cost of water to be $0.0025/litre of water consumed, which is in line with commercial rates. The Company sees further opportunity to optimise solutions for water.

5. Hydrogen Revenue

Governments around the world continue to set ambitious decarbonisation targets and it is expected hydrogen will play a major role in fulfilling these commitments. This includes in Australia, where the Government recently announced proposed changes to legislation that will see Australia's target being to reduce emissions by 43 per cent below 2005 levels by 2030 and achieve net zero by 2050[1].

Today, approximately 120 million tonnes (Mt) of hydrogen is produced and distributed annually of which around 75Mt is pure hydrogen with the remainder being mixed with other gases, predominantly carbon monoxide (CO) in syngas. Approximately 98% of current hydrogen production is from steam methane reforming or coal gasification or similar fossil-fuel origin[2].

In Europe, the European Union (EU) currently uses approximately 9.7Mt of 'grey' hydrogen annually which needs to be decarbonised. Around 95% of all current hydrogen is generated from natural gas and coal and around 5% is generated as a by-product from chlorine production through electrolysis. By 2030, hydrogen demand, under the EU's target, is set to ramp up to 16.9Mt annually[3].

With the existence of hydrogen usage today globally, the world-stage is set for supply of green hydrogen into the existing market.

Whilst the demand for green hydrogen in the long term is clear, the market is still in its infancy. Given this, the Company assessed the most likely earlier adopters for hydrogen in the domestic market.

5.1 Hydrogen blending in natural gas networks

The Dampier to Bunbury Natural Gas Pipeline (DBNGP) is Western Australia's most significant gas transmission asset and provides natural gas to Western Australia.

The Western Australian government announced in May 2022 that, to support the renewable hydrogen industry in Western Australia, it has commenced investigating the implementation of a Renewable Hydrogen Target[4]. This would involve setting targets for

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[1] [1] *https://www.skynews.com.au/australia-news/chris-bowen-defends-new-climate-bill-and-slams-matt-canvan-for-pedalling-lies-about-renewables/news-story/83ef67018a55ae5fb7fcf1c06edd44c9*

[2] *Global CCS Institute, April 2021, https://www.globalccsinstitute.com/wp-content/uploads/2021/04/Circular-Carbon-Economy-series-Blue-Hydrogen.pdf*

[3] *Scottish Government, 2021, https://www.gov.scot/publications/draft-hydrogen-action-plan/pages/2/*

[4] www.mediastatements.wa.gov.au/Pages/McGowan/2022/05/Renewable-hydrogen-target-to-be-investigated-for-Western-Australia.aspx

power retailers to procure a certain percentage of energy fuelled by renewable hydrogen. This would create the first local market which would support emerging hydrogen projects and improve energy grid stability. The work is targeted for completion by late 2022.

Importantly, a possible connection point to the DBNGP is located less than 0.3km from the proposed hydrogen plant location where the DBNGP branches off to provide gas to Alcoa's Wagerup Alumina Refinery.

Image 7: DBNGP connection point

5.2 Replace diesel in the long-haul transportation industry

Given advancements in hydrogen fuel cell electric vehicles (FCEV), most notably in long-haul vehicles, it is likely that long-haul transportation will be an early adopter for the hydrogen industry.

The Western Australian government identified domestically produced green hydrogen as a key part of the strategy to reduce the reliance on diesel, which is all imported. Currently WA imports approximately 6.7 billion litres of diesel per year[1]. The importance of energy security and the dangers of reliance on imports has been emphasised during 2022, most notably in Europe due to the Russia – Ukraine conflict.

Operating a hydrogen FCEV, such as a truck or bus, is comparable to a conventional vehicle, offering similar (or faster) refuelling rates, payload and operational range. Some truck manufacturers like Daimler, which owns Freightliner in the U.S., Toyota Motor Corp., and Volvo AB strongly back the evolution of this model and each is developing new fuel cell engine technology to be powered by hydrogen.

[1] *The West Australian – 6 June 2022*

Image 8: Hyzon Class 8 operates on hydrogen (source: Hyzonmotors.com)

5.3 Hydrogen for Energy Storage

Hydrogen energy storage is another form of electricity storage in which electrical power is converted into hydrogen.

The Company's strategic location and connection to the SWIS enables energy which is produced anywhere on the grid to be stored using hydrogen. The hydrogen plant will draw the energy from the grid to produce and store hydrogen. The design of the facility has capacity to store up 40 tons of hydrogen, the equivalent of 1,333[1] MWh of energy. The hydrogen could be stored potentially at 300 bar pressure in carbon steel storage tanks, technology that is mature and available today.

This energy can then be dispatched again by using the hydrogen as fuel in combustion engines, gas turbines, or hydrogen fuel cells, the latter offering the best efficiency. Efficiencies[2] range from approximately 30% for gas turbines, up to 60% for large scale combined cycle plants and up to 90% for hydrogen fuel cells when heat is also recovered.

In June 2022, the Western Australian Government announced that state-owned coal power stations are to be retired by 2030[3]. The Government, through Synergy, is set to invest an estimated $3.8 billion in new green power infrastructure around the State, including in Collie and regional WA. Hydrogen for energy storage has the potential to play a vital role in WA's future energy mix.

[1] *Energy content of hydrogen. https://www1.eere.energy.gov/hydrogenandfuelcells/tech_validation/pdfs/fcm01r0.pdf*
[2] *https://www.sciencedirect.com/topics/engineering/hydrogen-energy-storage*
[3] *https://www.mediastatements.wa.gov.au/Pages/McGowan/2022/06/State-owned-coal-power-stations-to-be-retired-by-2030.aspx#:~:text=Western%20Australia%27s%20State%2Downed%20coal,Muja%20D%20in%20late%2D2029.*

6. Additional Solar Revenue

Whilst the objective is to produce and sell a higher valued green hydrogen product, during peak energy period excess energy produced at the Project can be transferred back onto the SWIS and sold to generate additional revenue. This power can either be sold via:

- Bilateral agreements with industrial users connected to the grid under PPAs, or
- Traditional sales into the balancing market onto the grid through the Market Operator.

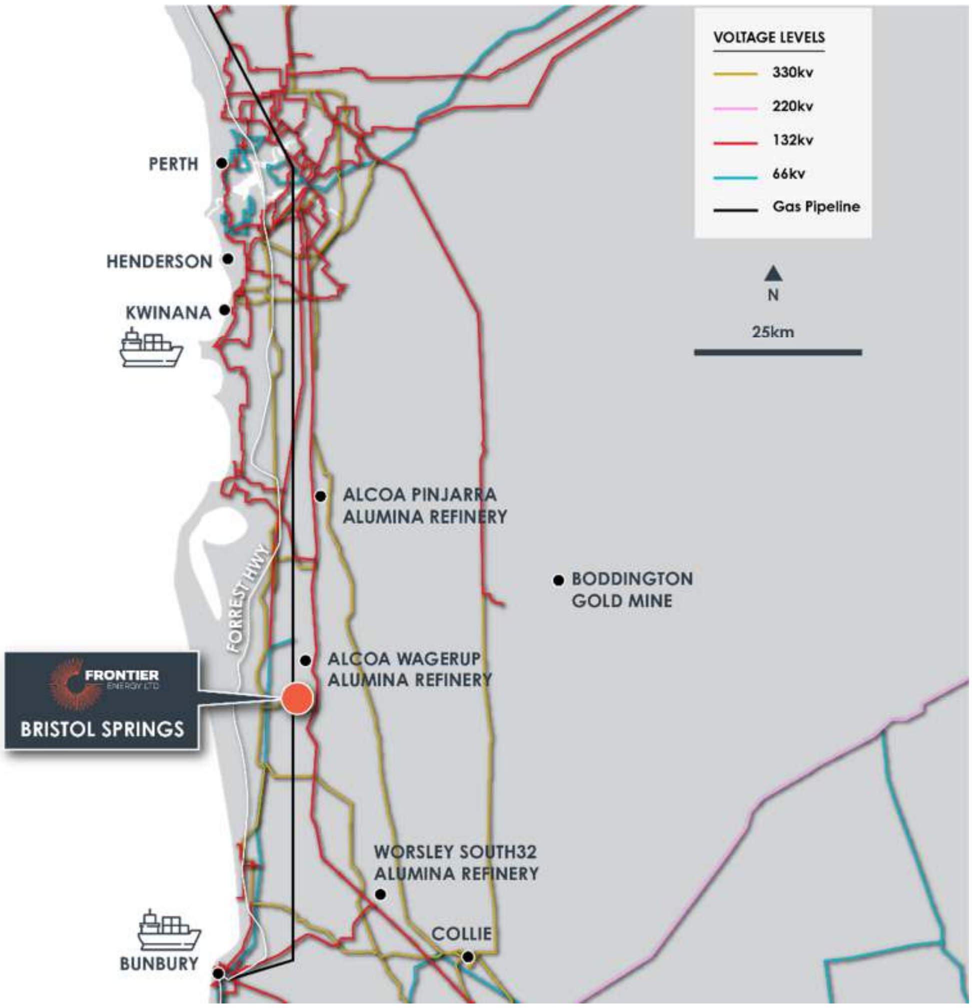

Image 9: Project location showing SWIS and major industries nearby

Expressions of interest for PPAs have been sent to a number of major companies in the region with a view to developing term sheets for PPAs in addition to direct energy sales. The Company will also generate revenue through solar energy generation using the mechanisms summarised in the following paragraphs.

6.1 Reserve Capacity Credits

In addition to selling excess power, being connected to the SWIS via the Landwehr Terminal allows for the Company to participate in the Reserve Capacity Market and benefit from Reserve Capacity Credits under the Reserve Capacity Mechanism (RCM).

The RCM is an administered capacity market and is designed to ensure that there is adequate generation and Demand Side Management (DSM), e.g. controllable load, capacity available in the system to meet forecast peak electricity demand plus a margin to allow for forecast errors or plant failures.

Under the RCM, generation plants and DSM facilities are certified and allocated capacity credits. Electricity retailers are required to procure capacity credits in proportion to their share of the electricity load in the twelve Peak SWIS Trading Intervals[1]. The retailers may meet this obligation by either purchasing capacity credits directly from generators such as Frontier, under bilateral contracts or procuring capacity credits via AEMO at an administered price (known as the Reserve Capacity Price or RCP). The Study assumed $120,000 per MW capacity.

6.2 Large-Scale Generation Certificates (LGC)

The nominated person for an accredited power station may create LGCs for eligible electricity generated by the power station. This effectively is the carbon credit market in Australia. Eligible electricity is electricity generated from the power station's renewable energy sources. One LGC can be created per megawatt hour (MWh) of eligible electricity generated by a power station. The amount of electricity generated by a power station is to be worked out in accordance with the LGC general formula. The Study assumed LGC pricing between $25 to $40 with an average price of $35 applied.

In a recent report, Melbourne based carbon consultancy RepuTex predicted the value of Australian Carbon Credits Units (ACCUs) would grow to between $60 and $105 a tonne by 2032[2].

7. Project Financing

The Company has commenced early-stage discussions regarding project financing and has been advised debt financing of between 60% to 80% through traditional debt providers could be achieved. However, given the importance of the development of a green hydrogen industry in Australia, there are a number of other groups that will likely be able to assist with project development, including:

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[1] *https://www.aemo.com.au/energy-systems/electricity/wholesale-electricity-market-wem/wa-reserve-capacity-mechanism/certification-of-reserve-capacity*

[2] *https://www.reputex.com/research-insights/update-australian-carbon-offset-market-report-accu-price-stabilises-as-participants-remain-watchful/*

7.1 Clean Energy Finance Corporation (CEFC)

The CEFC has a unique mission to accelerate investment in Australia's transition to net zero emissions. CEFC 'invest to lead the market, operating with commercial rigour to address some of Australia's toughest emissions challenges'.

CEFC is working with co-investors across renewable energy generation and energy storage, as well as agriculture, infrastructure, property, transport and waste. Through the Advancing Hydrogen Fund, CEFC is supporting the growth of a clean, innovative, safe and competitive hydrogen industry. As Australia's largest dedicated cleantech investor, CEFC continues to back cleantech entrepreneurs through the Clean Energy Innovation Fund. With $10 billion to invest on behalf of the Australian Government, CEFC works to deliver a positive return for taxpayers across their portfolio.

7.2 Australian Renewable Energy Agency (ARENA)

ARENA was established in 2012 by the Australian Government.

ARENA's purpose is to support the global transition to net zero emissions by accelerating the pace of pre-commercial innovation, to the benefit of Australian consumers, businesses and workers.

In 2019, ARENA launched the Renewable Hydrogen Development Funding Round to help fast track the development of a renewable hydrogen industry. Over $100 million has been conditionally approved to develop three commercial-scale renewable hydrogen projects in Australia.

ARENA has stated these are the key areas they will look to assist companies with in the development of their hydrogen projects:

- feasibility studies or development funding for large-scale electrolyser projects;
- feasibility studies or development funding for export projects;
- commercial-scale deployments of large-scale electrolysers focused on industries and applications with large potential demand for hydrogen;
- demonstration-scale projects involving electrolysers in transport or remote area power systems with hydrogen production replacing diesel generation;
- projects that support the implementation of the National Hydrogen Strategy; and
- projects that demonstrate the use of hydrogen in industrial processes.

7.3 Western Australian Government

The Western Australian Government has arguably been the most proactive of the States to advance a hydrogen strategy. The Government signalled its intention for the development of this industry with the appointment of a Minister for Hydrogen, the Honourable Alannah MacTiernan. To put this into perspective, WA does not have a Minister for either the Iron Ore or LNG industries, despite the State being amongst the largest producers of both globally and adding billions to the State budget annually.

The State has previously outlined an aggressive Renewable Hydrogen Strategy[1] aimed to harness WA's competitive advantages, including world-class renewable energy resources, vast land mass and proud history of exporting energy to international markets. These targets are highlighted below:

WA Government Goals to achieve by 2030:

- WA's market share in global hydrogen exports is similar to its share in LNG today.
- WA's gas pipelines and networks contain up to 10% renewable hydrogen blend.
- Renewable hydrogen is used in mining haulage vehicles.
- Renewable hydrogen is a large fuel source for transportation in regional WA.

In addition, the Government also announced[2] in May that in supporting the growth of a renewable hydrogen industry it would begin investigating the implementation of a Renewable Hydrogen Target.

This approach would set targets for retailers in the SWIS to procure a certain percentage of electricity fuelled by renewable hydrogen, creating a local market which would support emerging hydrogen projects and improve grid stability.

The design of the Renewable Hydrogen Target will draw on elements of the Commonwealth Government's Renewable Energy Target, which has successfully incentivised investment in renewable energy since 2001.

More recently, the Western Australian government announced[3] it would close its last coal-fired power before the end of the decade. This includes the 854MW Muja power station's units near Collie by 2029 and the 340MW Collie plant by the end of 2027. As part of these announced closures, the Government announced plans to invest an estimated $3.8bn in new green power infrastructure around the state.

8. About Xodus

Xodus is a wholly owned subsidiary of Subsea 7 and remains an independently operated company, with the ability to offer partnering solutions together with Subsea 7.

As a global energy consultancy, Xodus unites unique and diverse people to share knowledge, innovate and inspire change within the energy industry. Xodus provides support across the energy spectrum, from advisory services to supply chain advice and all of the engineering and environmental expertise needed in between. Xodus strives to ensure global energy supply as we all work together to realise a net zero world.

Xodus delivers hydrogen support to clients across the project lifecycle; from site selection and feasibility to Front-End Engineering Design (FEED), operations and even

[1] *https://www.wa.gov.au/system/files/2021-01/WA_Renewable_Hydrogen_Strategy_2021_Update.pdf*

[2] *https://www.mediastatements.wa.gov.au/Pages/McGowan/2022/05/Renewable-hydrogen-target-to-be-investigated-for-Western-Australia.aspx*

[3] *https://bia2model.com/science/environment/western-australia-to-become-coal-free-by-2030-with-muja-power-station-to-be-shut-down-coal/*

decommissioning. Xodus's integrated offering provides advice to the industry on emerging regulations, technical advances and commercial due diligence.

9. Next steps

The Company is close to finalising the Expansion Study that assesses the long-term growth potential at the Project. This will also outline the Company's long term road map through the various stages of hydrogen production.

A Front-End Engineering Design for the Hydrogen Facility will shortly commence. This will include developing a phasing plan for the staged build out to 150MW electrolyser capacity. This will be achieved by developing the relevant technical and commercial deliverables. The deliverables will include:

- Site Power Supply and Reticulation
- Water supply, Treatment and Disposal
- Hydrogen production
- Hydrogen offtake facility for gas blending
- Hydrogen offtake facility for trucks
- Balance of plant, site facilities, utilities
- Technical safety and risk modelling

The outcomes from this next phase of the Project will provide a:

- Execution schedule
- Execution plan
- Class 3 Capital Cost Estimate
- Class 3 Operating Cost Estimate

As part of this process the Company will continue to seek offtake agreements with customers.

Authorised for release by Frontier Energy's Board of Directors.

ENDS

To learn more about the Company, please visit www.frontierhe.com, or contact:

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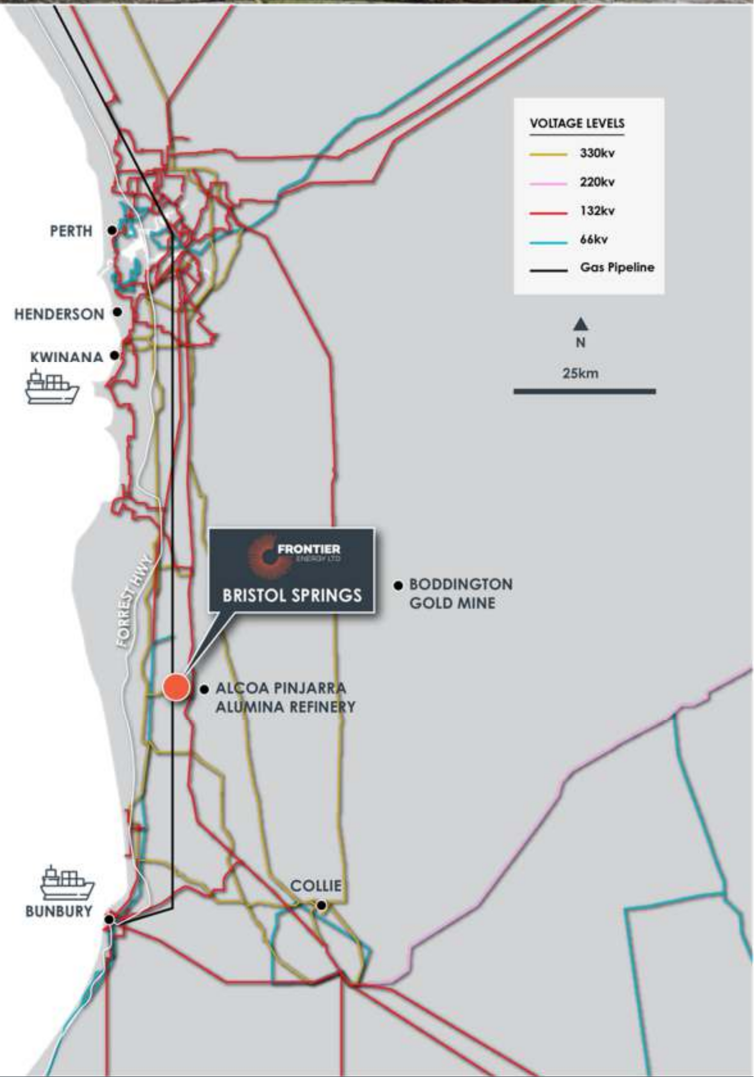
About Frontier Energy

Frontier Energy Ltd (ASX: FHE; OTCQB: FRHYF) is developing the Bristol Springs Green Hydrogen Project (the Project) located 120km from Perth in Western Australia.

The Company completed a Pre-Feasibility Study[1] that outlined the Project's potential to be one an earlier mover and lowest cost hydrogen assets in Australia.

The Project benefits from its unique location which is surrounded by major infrastructure. This reduces both the operating and capital costs compared to more remote hydrogen projects, whilst also being surrounded by likely early adopters into the hydrogen industry in the transition from fossil fuels.

[1]ASX Announcement 4th August 2022



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For a comprehensive view of information that has been lodged on the ASX online lodgement system and the Company website, please visit asx.com.au and frontierhe.com, respectively.