Elixir Energy

ASX ANNOUNCEMENT

ASX : **EXR**

11 May 2023

GOBI H2 UPDATE

HIGHLIGHTS

- Evaluation of bankable quality renewable data indicates project is world class
- Growing development of regional H2 pipeline infrastructure
- Gobi H2 meets ever more stringent green H2 regulatory requirements
- Elixir's Japanese partner now controlled by a Toyota Group member

Elixir Energy Limited ("Elixir" or the "Company") is pleased to attach a detailed presentation providing an update on its Gobi H2 green hydrogen project.

Elixir's Managing Director, Mr Neil Young, said: *"Our ongoing work at Gobi H2 continues to demonstrate the potential world class nature of the project. We now have "bankable" level renewable energy data – which together with location is the key determinant of quality. That data is unsurpassed by any other potential green hydrogen export project we have looked at – and Gobi H2's location is much closer to the world's largest energy importing market. We are very pleased to now welcome a member of the Toyota Group as the new controller of our Japanese partner and look forward to continue to build our relationship with them."*

By authority of the Board:
Neil Young *- Managing Director*
Elixir Energy Ltd (ABN 51 108 230 995)
Level 3, 60 Hindmarsh Square
Adelaide SA 5000, Australia

For further information on Elixir Energy, please call us on +61 (8) 7079 5610, visit the Company's website at www.elixirenergy.com.au

Elixir Energy

Gobi H2 Update

11 May 2023

ASX:EXR

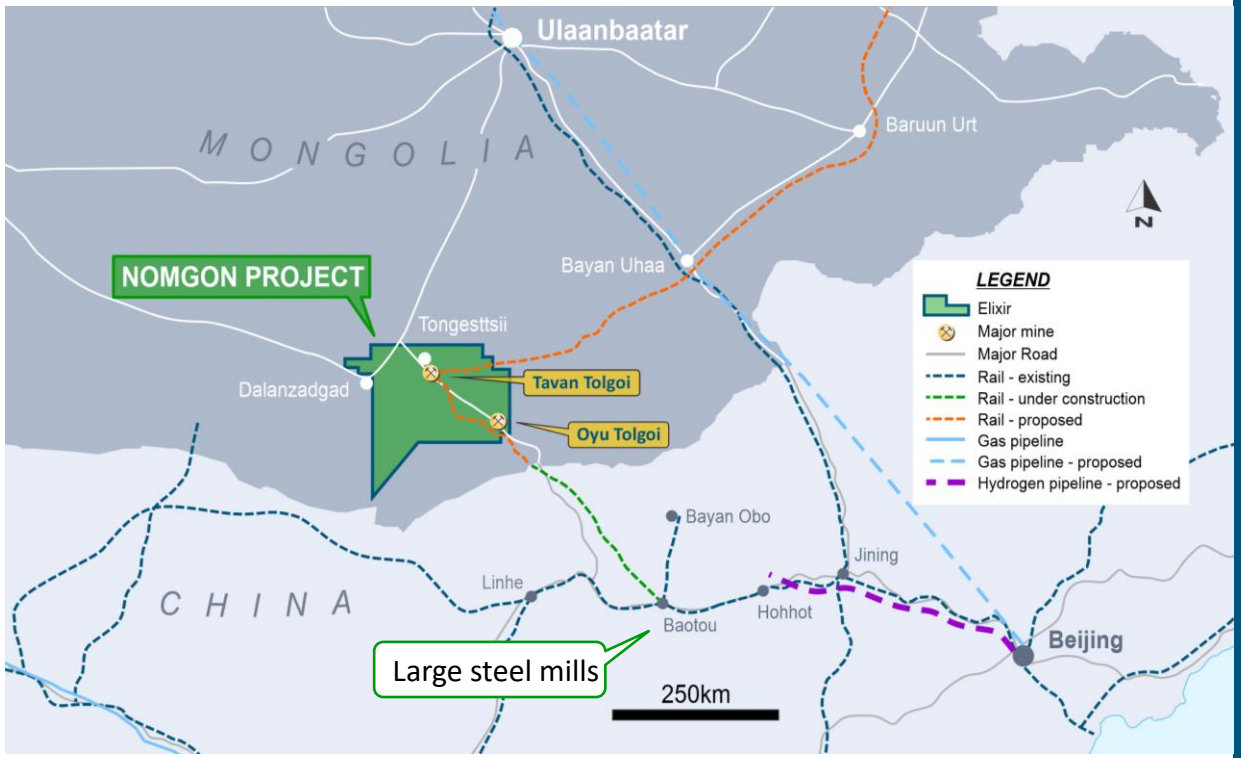
Elixir Energy

Introduction

- Gobi H2 is Elixir's green hydrogen project (i.e. one where hydrogen is produced from renewable electrical energy sources) located in the Gobi region of Mongolia
- Elixir's longstanding experience in Mongolia's energy sector and stakeholder engagement with Governments (at multiple levels), communities, customers, etc, has provided a strong foundation upon which to build the Gobi H2 business
- The strength of the concept behind the project was demonstrated in mid-2022 when Elixir announced the signing of a Memorandum of Understanding (MOU) over Gobi H2 with Japan's SB Energy Corp (SBE)
- Elixir procured a Pre-Feasibility Study (PFS) from global consulting firm AECOM earlier this year to give the parties confidence to advance the project
- The (confidential) PFS results were such that in February 2023 Elixir and SB Energy expanded upon the MOU through the execution of a Term Sheet - which provides an exclusive framework to work towards entering into a binding 50/50 joint venture later in the year
- Green hydrogen infrastructure projects in neighbouring China – including the development of a regional hydrogen pipeline transmission network – can ultimately be expanded Northwards to capture the benefits of the Gobi's exceptional renewable resources

Emerging Regional Hydrogen Infrastructure

- The location of the Gobi H2 project provides ready access to rapidly growing Chinese H2 markets
- Elixir commissioned a study from global energy consultants Rystad Energy which concluded *"the scale of ramp up will likely open up imports from beneficial production sites like Elixir's"*
- Regional H2 transmission infrastructure is already emerging - with e.g. Sinopec's recent announcement of a 400 km H2 pipeline in Inner Mongolia



Elixir Energy

Elixir's Japanese Partner

SB Energy Corp (SBE) recently announced that it has been renamed Terras Energy Corporation (Terras) following the sale of a 85% stake in the company to Toyota Tsusho Corporation (TTC)

With Terras Energy joining the Toyota Tsusho Group, the Group will become one of Japan's largest renewable power generators, with approximately 4,502 MW of wind and solar capacity

TTC is a global diversified trading house that is a member of Japan's Toyota Group. It is also the 100% owner of Eurus Energy, a global renewable energy company with operations in many countries, including Australia

TOYOTA TSUSHO

Requirements for H2 Project Success

1. High quality renewable resources – these are superb for Gobi H2 – top tier globally

2. Costs of renewable energy installations – favourable proximity to manufacturers in China & buying power of Terras

3. Green certification – Gobi H2 meets emerging global (including Chinese) standards

4. Proximity to market – no location better placed to service Chinese import requirements

5. Operational skills – Terras existing wind-farm in the Gobi and Elixir's stakeholder engagement expertise in the region

6. Access to capital – Gobi H2 is well advanced in engaging the IFIs in Mongolia over project finance

7. Scalability – ultimate renewable resources in the Gobi are many, many GWs – and long run demand in China under its net zero plans is enormous

Gobi H2's Renewable Resources

- On 14 October 2021 Elixir published the results of a detailed desktop comparison between the renewable energy resources in the Gobi region and those in other mooted green hydrogen project locations
- In the subsequent period, Elixir has obtained "bankable" standard measurements of the local wind and solar resources in the area of the Gobi H2 project, from both its own equipment and from its partner's operating wind-farm
- The quality of renewable energy inputs are one of the keys to green hydrogen success – this can be seen as equivalent to such measures as grades in minerals or flow-rates in oil and gas
- The following table provides an update on Gobi H2's resources – and again compares these to other locations in Australia and globally which are the proposed sites for green hydrogen projects
- **The table illustrates that Gobi H2 has the best combined renewable energy capacity factor amongst what are considered to be world class locations (as measured by electrolyser utilization under the noted standardization assumptions)**

Renewable Resource Measurements

Site comparison: 10 ktpa Hydrogen production

	Gobi Mongolia	**Ordos** China	**Pilbara** Western Australia	**H2 Magallanes** Chile
Elevation (m)	1,121	1,462	9	37
Average temperature (°C)	8.5	7.4	26.4	5.3
Solar resource (W/m2)	203	174	228	164
Wind resource (W/m2)	347	154	180	1067
Solar utilization (%)	25	23	24	21
Wind "	64	31	27	76
Combined "	46	28	26	46
Solar peak capacity (MW_{DC})	75	108	142	91
Wind peak capacity (MW_{AC})	87	246	375	76
Electrolyzer peak cap. (MW)	73	98	132	75
Electrolyzer util. (%)	***85***	***64***	***48***	***83***

This analysis compares the performance of selected sites for a common production facility (10 ktpa), 25/75 solar/wind average mix. 1:1 average renewable power/electrolyzer power ratio. Site optimization may result in significantly different renewables mix and power ratio assumptions. See the following page for additional notes.

Renewable Resource Measurements - Notes

Assumptions:

1. *Hydrogen is produced from off-grid renewable power, with no battery storage (other than required for system stability). Surplus renewable power beyond electrolyzer capacity is spilled. Annual averages are based on hourly averages for each month.*
2. *The Gobi wind resource (hourly average wind speeds) is based on 3-years of site data (Jan 2020-Dec 2022) and solar irradiation is based on 1-year of site data (Mar 2022-Feb 2023). Solar and wind data for all other sites is derived from the US National Renewable Energy Laboratory database for nearby locations (using hourly averages for each month).*
3. *Solar generation is based on fixed solar PV arrays at a tilt angle corresponding to the site's latitude. The wind turbine hub height is 166 m, and assumes notional Vestas 150-4.2 performance. Solar cell and wind turbine performance are adjusted for ambient conditions (impact on cell temperature and high temperature derating).*
4. *The renewable power mix is 25%/75% average solar and wind power (before ancilliaries and losses). Calculations assume a 1:1 average renewables to electrolyzer power ratio, with 55 kWh/kg electrolyzer efficiency and 92% service factor.*

Pre Feasibility Study

PFS

Earlier this year Elixir commissioned a Pre-Feasibility Study (PFS) into a large scale pilot project for Gobi H2 from global infrastructure consulting firm AECOM

Wind, Solar, Battery

The PFS evaluated various configurations of wind, solar, battery and a grid connection to support a 10 MW electrolyser located at a site proximate to SBE's existing operated windfarm in the South Gobi region

No Technical Issues

No technical impediments to the project were identified – ultimately feasibility is solely a commercial issue

Green Project

A green H2 project is not a "mining" venture under the ASX's Listing Rules and as such is not covered by the expectations of detailed disclosure for PFS results under these Rules

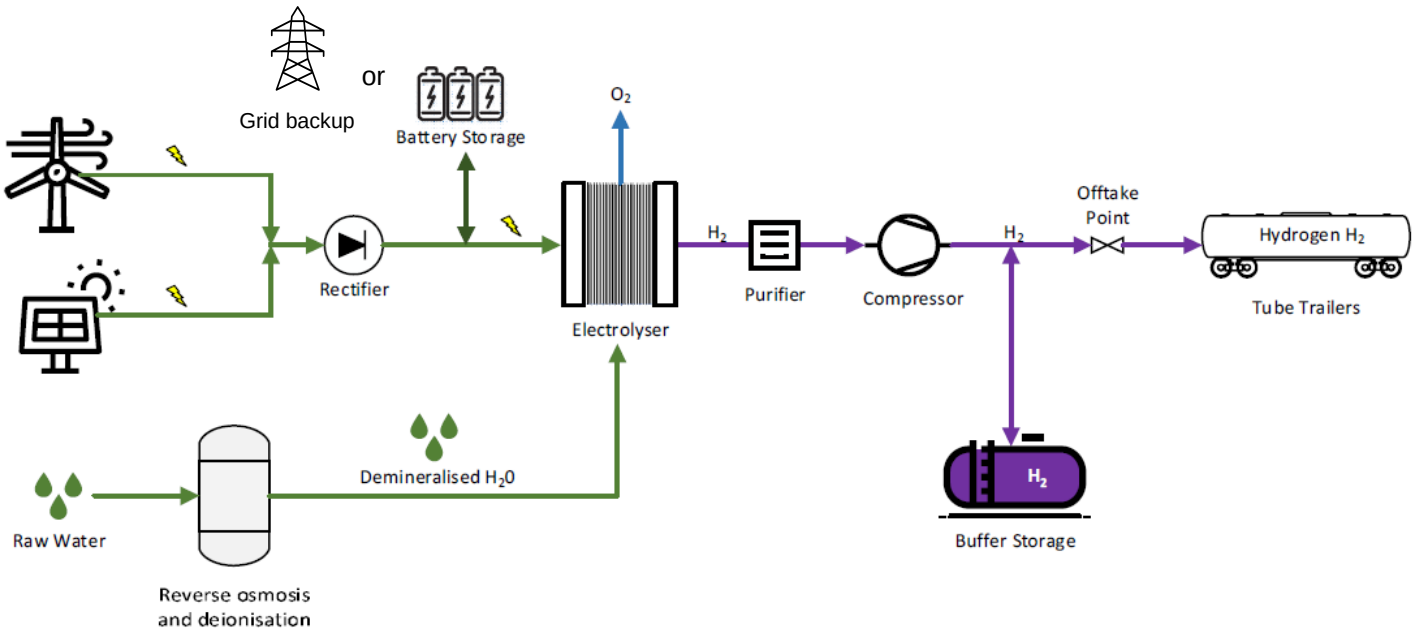
Costs are C.I.C.

Given the nascent nature of the green hydrogen industry and the estimated costs of production are commercial in confidence

Elixir Energy

Pre Feasibility Study – Generic Schemata

The PFS evaluated 4 different combinations of wind, solar, battery and grid connection to compare different levelized costs of hydrogen



Green Hydrogen

- Hydrogen has traditionally only been used in niche markets such as in oil refineries – and has generally been produced from fossil fuels, with resultant large CO2 emissions
- The pursuit of green and blue hydrogen (the latter is still derived from fossil fuels but the CO2 emissions are captured and stored underground) is driven solely by emission reduction aims – there simply is no point in using hydrogen in new markets unless it reduces emission profiles substantially from current fuels
- Globally this is recognized by emerging standards that must be met for hydrogen to be deemed green or blue – each major jurisdiction is developing its own rules, but these are converging towards targets based on maximum CO2 emissions per kg of H2 produced
- Unless a green H2 project can meet these targets – it does not meet its intrinsic aims. Projects which involve grid connections to electricity systems with still significant fossil fuel use (especially for production on the margin) may well struggle to be deemed green
- **The following table illustrates that the Gobi H2 pilot project meets the green definitions of the main global jurisdictions – including China. This is critical to procure customer and project finance support**

Green Certification

Hydrogen production standards: greenhouse gas emissions limits, $kgCO_2e/kg\ H_2$

	EU	USA	China	UK
Standard	CertifHyTM	CHPS	LCH	LCHS
Carbon intensity – "green"	4.4	2.0 production	4.9	-
- "low carbon"	To be defined by end 2024	4.0 life cycle	14.5	2.4
Time frame (power matching)	Calendar month. Hourly from 2030			30 minutes
Comment	Additionality, time and place constraints	Tiered tax credits 3 Mpa, 99% purity		3 MPa, 99.9% purity at plant gate

USA: CHPS = Clean Hydrogen Production Standard; China: LCH = Low Carbon Hydrogen; UK: LCHS = Low Carbon Hydrogen Standard
In addition to meeting the carbon intensity requirement (kgCO2e/kg H2), hydrogen producers will typically need to meet an additionality requirement (that the renewable power is additional to that which would have otherwise existed, as well as being produced in the same time period ("temporal correlation") and geographic area ("geographical correlation"). See additional notes on the next page.

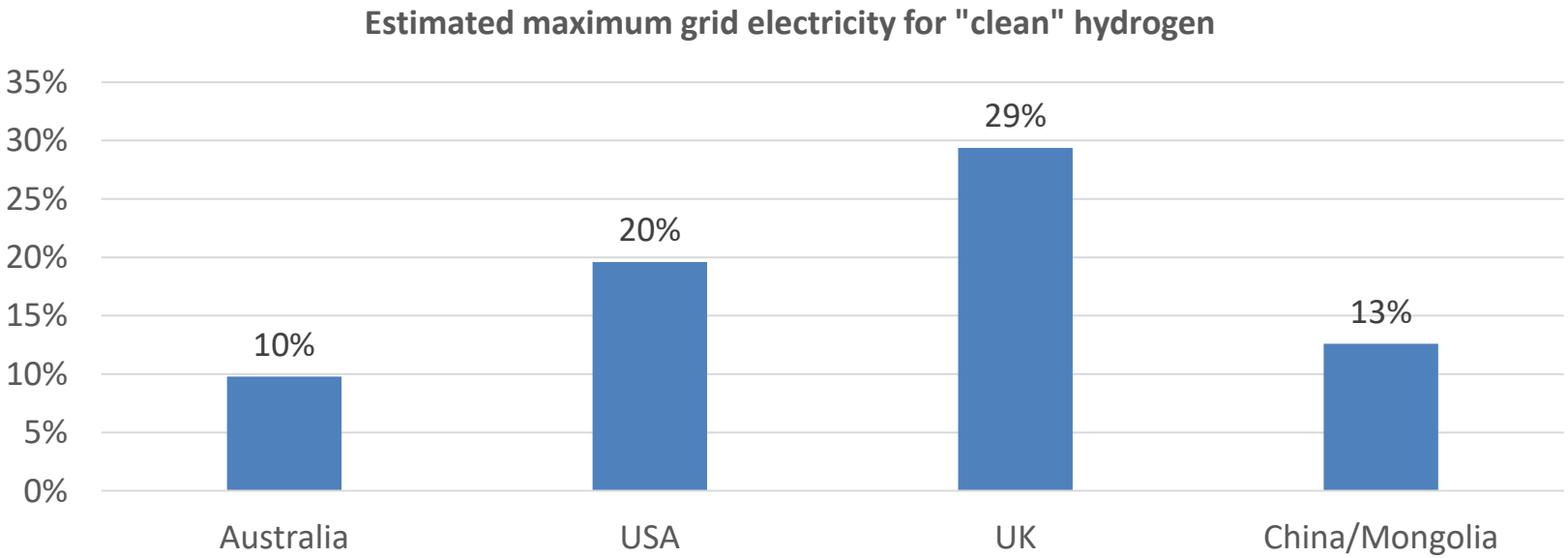
Elixir Energy

Green Certification - notes

1. Green hydrogen is produced from renewable power, while Clean/low carbon may be produced from nuclear or fossil fuels with carbon capture and storage (CCS)
2. Emissions limits include feedstocks (including associated CCS) and hydrogen production up to the hydrogen plant gate, but exclude plant construction, compression / liquefaction / storage / delivery to customer.
3. Information on certification standards was drawn from the following sources:
4. EU: https://www.certifhy.eu/ ; “delegated acts”, Feb 2023: https://climate.brussels/questions-and-answers-on-the-eu-delegated-acts-on-renewable-hydrogen/ for rules to be considered “green” under the Renewable Energy Directive (EU) 2018/2001 (RED II).
5. USA: “U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Draft Guidance”, https://www.hydrogen.energy.gov/pdfs/clean-hydrogen-production-standard.pdf
6. China: “Green Hydrogen Standard in China: Standard and Evaluation of Low-Carbon Hydrogen, Clean Hydrogen, and Renewable Hydrogen”, Dec 2021, https://www.eria.org/uploads/media/Research-Project-Report/RPR-2021-19/15_Chapter-9-Green-Hydrogen-Standard-in-China_Standard-and-Evaluation-of-Low-Carbon-Hydrogen%2C-Clean-Hydrogen%2C-and-Renewable-Hydrogen.pdf)
7. UK: “UK Low Carbon Hydrogen Standard”, https://www.gov.uk/government/publications/uk-low-carbon-hydrogen-standard-emissions-reporting-and-sustainability-criteria
8. Under the EU standard the calendar month basis for the temporal correlation condition until 31 December 2029 suggests that renewable power surplus to electrolyzer requirements can offset non-renewable power sourced at other times during that month.

Green certification – grid power limit

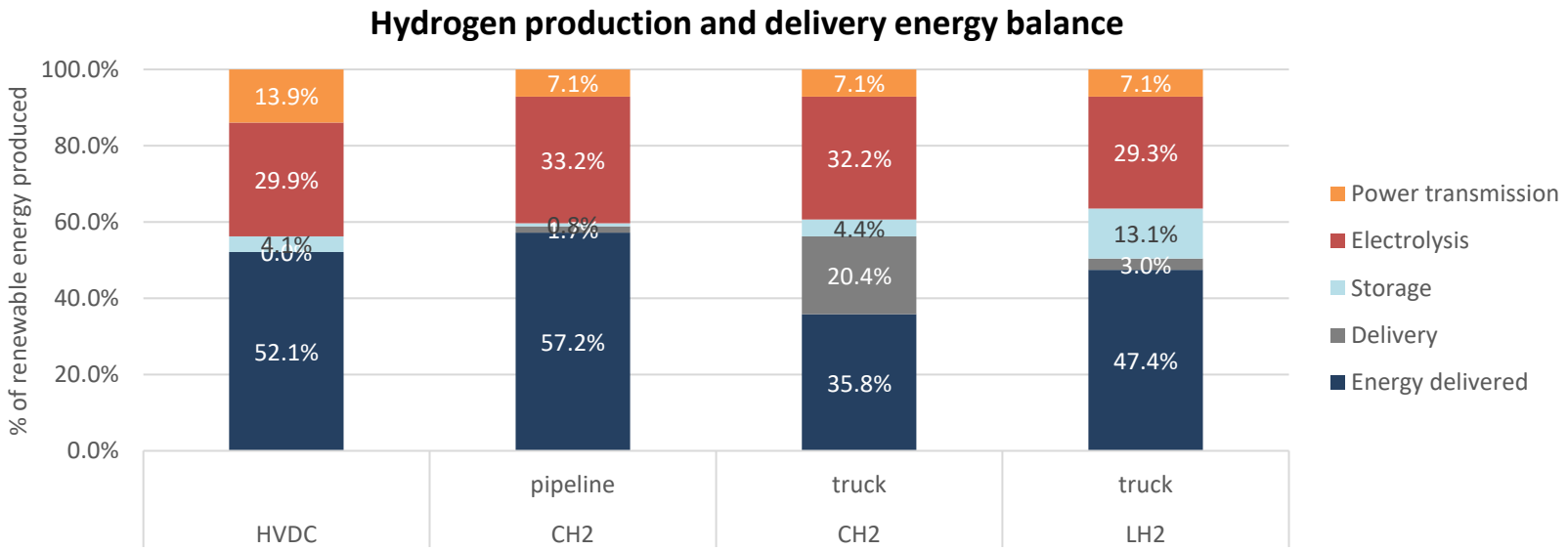
Hydrogen production in Mongolia should retain "clean" status with up to 13% grid electricity supply.



Assumptions: Electrolysis energy consumption of 60 kWh/kg H2 (55 kWh/kg H2 + 10% for ancilliaries). Electrolysis process emissions of 0.02 kg CO_{2e}/kg H_2. Clean hydrogen carbon intensity limit of 4.0 kg CO_{2e}/kg H_2. Electricity grid emissions intensity (kg CO_{2e}/MWh): Australia = 672; USA = 336, UK = 224, China = 522, per IRENA for 2020. Chinese average assumed to apply for Mongolia. Estimates are based on annual average basis for national grids: **n.b. calendar month and hourly averaging for individual electricity bidding zones will result in different limits.** Maximum potential grid contribution may increase with surplus renewable offsets, future grid carbon intensity reductions and renewable generation/electrolyzer capacity optimization.

Green hydrogen delivery

Producing hydrogen in Mongolia and piping to China is more efficient than transmitting power to China for hydrogen production or trucking compressed or liquid hydrogen.



Option 1: Renewable power transmitted 500 km via high voltage direct current prior to green hydrogen production at customer site. Hydrogen compressed and stored at 35 MPa at customer site.
Option 2: Green hydrogen produced at renewables site and compressed and transported 500 km to customer site via 7 MPa pipeline. Hydrogen storage via linepack.
Option 3: Green hydrogen produced at renewables site and compressed and transported 500 km by 25 MPa tube trailers. Trucks powered by hydrogen to retain "green" status at point of use.
Option 4: Green hydrogen produced at renewables site and liquified and transported 500 km by tankers. Trucks powered by hydrogen.
Assumptions: 3.7% energy loss for AC/DC stepup/down/conversion + 3.5% loss/1000 km, 98% availability; 60 kWh/kg H2 electrolyzer efficiency (including ancilliaries), 92% availability; 0.5 kWh/kg H2 pipeline compression requirement; 3.1 kWh/kg hydrogen storage compression requirement; 10.0 kWh/kg hydrogen liquefaction requirement; 0.1%/day "boil-off"; 3.0% trucking delivery losses.

Investment Summary

- ✓ The 2 main drivers of green hydrogen competitiveness are:
  - ✓ The quality of renewable energy resources
  - ✓ Proximity to market
- ✓ All the work done to date on Gobi H2 indicates that it is a world class project with respect to these attributes
- ✓ This conclusion has been supported by the maturing relationship with Elixir's Japanese partner – now controlled by a member of the Toyota Group
- ✓ Green hydrogen is being increasingly regulated around the world – Gobi H2's PFS work indicates it qualifies under these ever stricter rules
- ✓ Moving energy from Mongolia to Chinese markets by pipeline is more energy efficient than by electricity transmission – and a regional hydrogen pipeline grid is already being developed

Important Notice & Disclaimer

This document has been prepared by Elixir Energy Limited (ABN 51 108 230 995) ("Elixir") in connection with providing an overview of its business to interested analysts/investors.

This presentation is being provided for the sole purpose of providing preliminary background financial and other information to enable recipients to review the business activities of Elixir. This presentation is thus by its nature limited in scope and is not intended to provide all available information regarding Elixir. This presentation is not intended as an offer, invitation, solicitation, or recommendation with respect to the purchase or sale of any securities. This presentation should not be relied upon as a representation of any matter that a potential investor should consider in evaluating Elixir.

Elixir and its affiliates, subsidiaries, directors, agents, officers, advisers or employees do not make any representation or warranty, express or implied, as to or endorsement of, the accuracy or completeness of any information, statements, representations or forecasts contained in this presentation, and they do not accept any liability or responsibility for any statement made in, or omitted from, this presentation. No responsibility or liability is accepted and any and all responsibility and liability is expressly disclaimed by Elixir and its affiliates, subsidiaries, directors, agents, officers, advisers and employees for any errors, misstatements, misrepresentations in or omissions from this presentation. Elixir accepts no obligation to correct or update anything in this presentation.

Any statements, estimates, forecasts or projections with respect to the future performance of Elixir and/or its subsidiaries contained in this presentation are based on subjective assumptions made by Elixir's management and about circumstances and events that have not yet taken place. Such statements, estimates, forecasts and projections involve significant elements of subjective judgement and analysis which, whilst reasonably formulated, cannot be guaranteed to occur. Accordingly, no representations are made by Elixir or its affiliates, subsidiaries, directors, officers, agents, advisers or employees as to the accuracy of such information; such statements, estimates, forecasts and projections should not be relied upon as indicative of future value or as a guarantee of value or future results; and there can be no assurance that the projected results will be achieved.

Prospective investors should make their own independent evaluation of an investment in Elixir.

Nothing in this presentation should be construed as financial product advice, whether personal or general, for the purposes of section 766B of the Corporations Act 2001 (Cth). This presentation consists purely of factual information and does not involve or imply a recommendation or a statement of opinion in respect of whether to buy, sell or hold a financial product. This presentation does not take into account the objectives, financial situation or needs of any person, and independent personal advice should be obtained.

This presentation and its contents may not be reproduced without the express written permission of Elixir. All references to dollars, cents or $ in this presentation are to Australian currency, unless otherwise stated.

INVESTORS & MEDIA

Neil Young
Managing Director
info@elixirenergy.com.au
Phone +61 8 7079 5610
www.elixirenergy.com.au

Elixir Energy

www.elixirenergy.com.au