

Tuesday, 13 August 2019: ASX ANNOUNCEMENT (ASX: LCK)

## LCK Signs a Heads of Agreement to Commence ISG in China

### *Announcement Summary:*

- LCK signs a binding Heads of Agreement to commence ISG in China with a focus on hydrogen and fertiliser production
- LCK invited to apply for admission to Shanghai International Energy Exchange

Leigh Creek Energy Limited (“LCK”, or “the Company”) is pleased to announce that it has signed a Heads of Agreement (“HoA”) to commence In-Situ Gasification (“ISG”) in China with China New Energy Ltd (“CNE”). In addition, LCK has been invited to apply for admission as a member of the Shanghai International Energy Exchange by China Lian Cai Petroleum Investment Holdings Limited, a shareholder of the exchange. This HoA originated due to the successful Pre-Commercial Demonstration (“PCD”) and production of significant amounts of gas that ultimately led to the 2P reserve designation of 1,153 PJ by independent third-parties.

### *Binding Heads of Agreement with China New Energy Ltd*

LCK is pleased to announce it has signed a binding Heads of Agreement (“HoA”) with China New Energy Ltd (“CNE”) to develop In-Situ Coal Gasification (“ISG”) in China.

CNE was established to partner with overseas companies with demonstrated growth prospects, strong project and commercial management expertise, and commercial opportunities that align with its strategic investment objective. CNE has been the major shareholder in LCK since March 2017.



*CNE's Vincent Wang and LCK's Justyn Peters*

From the first investment in LCK, CNE has understood that there is a considerable opportunity that exists in taking LCK’s ISG process to China. CNE is not just an investor, but a strategic partner with aspirations to produce gas in China with LCK in the future. Now that the PCD has demonstrated the ability to produce

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quality gas and the project is moving towards its commercial phase, LCK has been able to move forward on its strategy to enter the Chinese energy market.



CNE steel mill

The HoA establishes the process to develop a full commercial agreement through a joint working group to formalise documentation through to the formation of a joint venture company. A major focus of the LCK and CNE Joint Venture Agreement (“JVA”) will be the production of hydrogen and fertiliser using ISG methods for use in China and potentially abroad.

CNE has commercial interests in large underground coal resources in Shanxi, which it plans to develop under this JVA. It is the aim of both partners to have the Joint Venture formalised before the end of 2019 and to commence the appropriate preparatory work for an initial ISG project during the last quarter of 2019. The HoA does not preclude LCK from providing services to other Chinese companies with suitable coal assets in China. Evaluation of suitable coal deposits has already commenced with several locations already identified.

LCK’s ISG process is proven to create a hydrogen-rich synthesis gas (“SYNGAS”). This was demonstrated during the recent PCD operation. Data collected from the PCD gas stream revealed that hydrogen was up to 33% of the gas stream. The process can be optimized to produce up to 45% hydrogen. Under this JVA LCK has the first mover advantage and the opportunity to become a player in the vast new energy, hydrogen market in China.

### The Hydrogen Economy in China

It is forecast that by 2020 as much as 72 billion m<sup>3</sup> of hydrogen will be used as energy and the gross industrial output value of the industry will reach RMB 300bn (US\$44.4bn). (*The Blue*



CNE fertiliser plant

*Book on the Infrastructure Development of the Hydrogen Energy Industry of China 2016*).

It is anticipated that between 2020 to 2025, the expected industrial output of the hydrogen industry will be RMB 1,000bn (US\$148bn) and it is anticipated that there will be 50,000 fuel cell vehicles running in China, served by 200 refilling stations. From 2026 to 2035, it is expected that the industrial output of the industry will increase to RMB 5,000bn (\$740bn), and it is anticipated that there will be as many as 1,500 hydrogen refuelling stations to fill the 15 million fuel cell vehicles. By 2050, hydrogen could potentially constitute as much as 10% of the energy supply in China with a total demand of 60 million tonnes of hydrogen, and an annual economic output of more than RMB 10,000bn (\$1,480bn) (Source: China Hydrogen Alliance released its first *White Book on the China Hydrogen Energy and Fuel Cell Industry* (25<sup>1</sup>)).

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## About CNE

In March of 2017, CNE invested in LCK and became its largest shareholder. Today, CNE holds 24.24% of the shares outstanding in LCK. CNE is a British Virgin Islands (“BVI”) incorporated company based in Hong Kong with large asset holdings in mainland China.

CNE owns and has commercial interests in the following assets in China:

- Steel Mills producing 2 million tonnes of steel per annum (owns)
- A fertiliser plant
- 3 Gas Fired Power Stations
- 4 Coking and PCI Mines
- Thermal Coal Leases



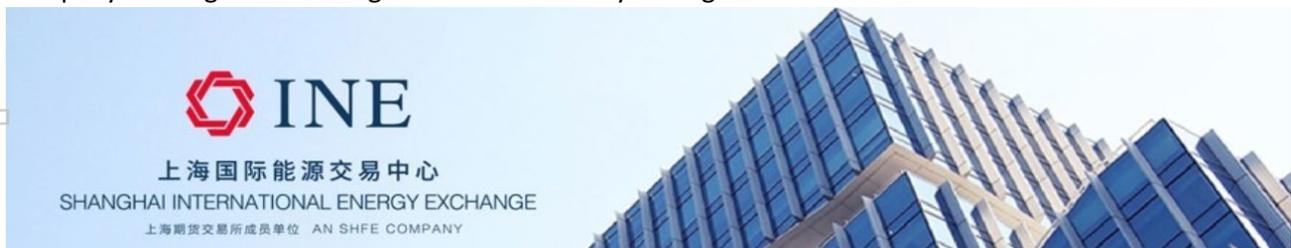
CNE steel mill

## Shanghai International Energy Exchange

LCK is also pleased to announce it is in formal discussions with the Shanghai International Energy Exchange Co., Ltd., (“INE”) after being invited by China Lian Cai Petroleum Investment Holdings Limited, who is a shareholder of the INE. This will allow LCK and CNE to directly trade its gas on the exchange and is a very large next step in advancing towards monetization of its sizable 2P reserve.

The INE is an international exchange that is jointly initiated and established by relevant entities including the Shanghai Futures Exchange. INE operates the listing, clearing, and delivery of energy derivatives including crude oil, natural gas, petrochemicals, and more. Its aim is to assist in price discovery, risk management, and asset management for energy producers, distributors, consumers and investors, so as to facilitate the optimal allocation of energy resources and promote economic development.

LCK would be one of only a select few gas companies on the exchange and has potential to provide the Company with significant recognition and credibility throughout China.



## Executive Chairman Justyn Peters Stated:

*“The HoA with CNE is exciting as it presents a huge opportunity for LCK to move into such a large energy market as China and it is my pleasure to be able to share this news with our shareholders. This HoA also gives us an opportunity for a quicker path to revenue. CNE is a large privately-owned company with assets in mainland China. CNE is also our largest shareholder and this agreement shows that, not only are they investors in the company, but*

*have actively worked with LCK to gain a strong foundation in China and positioned LCK for considerable growth. This was always the strategic intention when CNE became a shareholder and we are pleased that strategy is now underway. China is a nation that is rich in coal with large resource of stranded coal that are suitable for ISG. China is also rapidly moving to a “Hydrogen Economy” and is spending billions of dollars on that new energy strategy. Leigh Creek’s ISG process has proven that it has the potential to produce massive amounts of hydrogen as a standalone commodity or to be used in the manufacture of fertiliser. The development of ISG in China represents a great opportunity for LCK to be a major player in these emerging and important industries. We are proud of our relationship with CNE and the opportunity to join the Shanghai International Energy Exchange giving us direct access to the Chinese energy market. I would like to thank our two China-based directors who have worked hard on seeing our China strategy coming to fruition and look forward to even bigger and better news in the near future.”*

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**About Leigh Creek Energy**

*Leigh Creek Energy Limited is an emerging energy company focused on developing its Leigh Creek Energy Project (LCEP), located in South Australia. The LCEP will produce synthetic natural gas and/or ammonium nitrate products (fertiliser and industrial explosives) from the remnant coal resources at Leigh Creek, utilising In Situ Gasification technologies, and will provide long term stability and economic development opportunities to the communities of the Upper Spencer Gulf, northern Flinders Ranges and South Australia.*

*The Company is committed to developing the LCEP using a best practice approach to mitigate the technical, environmental and financial project risks.*

**Resource Compliance Statement**

*The information in this announcement that relates to the 2P Syngas Reserve was detailed in an announcement lodged with ASX on 27 March 2019 and is available to view at [www.lcke.com.au](http://www.lcke.com.au). The Company confirms that it is not aware of any new information or data that materially affects the information included in that announcement and that all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed. All estimates are based on the deterministic method for estimation of petroleum resources*

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# Fast Facts

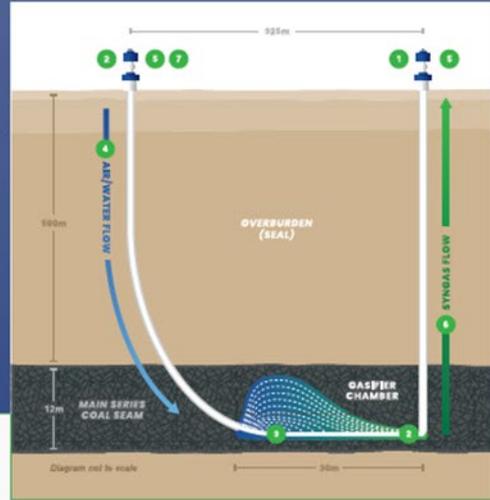
1,153 PJ syngas - largest uncontracted gas reserve available to eastern Australia

## How does the ISG process work?

The In-Situ Gasification (ISG) process converts coal, through a series of chemical reactions, from its solid state into a gaseous form, resulting in the generation of syngas, or synthetic gas.

Syngas comprises energy gases, such as methane, hydrogen and carbon monoxide with variable amounts of inert gases, such as carbon dioxide and nitrogen.

1. Outlet well is drilled to intersect coal seam.
2. Inlet well is drilled and steered to link up with outlet well.
3. Initiation tool is placed down the inlet well to heat the coal and starts the gasification process.
4. Addition of air and water creates a series of chemical reactions transforming coal to syngas.
5. Process is controlled by using inlet well to manage the flow of air and water
6. Syngas will flow up through the outlet well and is analysed on the surface.
7. Process is stopped by turning off air and water supply from the inlet well.



The demonstration plant was located in the heavily modified Telford Basin in the former Leigh Creek Coalfield.

## What is the Leigh Creek Energy Project?

The project location at the now closed Leigh Creek Coalfield was initially identified as a highly favourable location for In-Situ Gasification using environmental, technical and commercial criteria.

The coal reserve is technically suitable for undertaking ISG in a safe manner minimising environmental impact, and the local area is well serviced by existing and useful infrastructure.

The State Government Regulator's Independent Assessment Report concluded that "... the Leigh Creek site represents one of the strongest opportunities for low risk commercial UCG anywhere in the world."

## What was LCK's Pre-Commercial Demonstration?

LCK's Pre-Commercial Demonstration (PCD) commenced Q4 2018 and concluded Q1 2019 and had five main objectives:

- ✓ Demonstrate safe and environmentally responsible ISG operations.
  - ✓ Produce syngas comprising Methane (CH<sub>4</sub>), Hydrogen (H<sub>2</sub>), Carbon Monoxide (CO) and Nitrogen (N<sub>2</sub>).
  - ✓ Produce syngas at over 1 million cubic feet per day.
  - ✓ Capture information required to upgrade the existing Petroleum Resources Management System (PRMS)
- 2,964 PJ 2C resource to 2P reserve.
- The PCD was deemed a success having met or exceeded all objectives, taking the company another step closer to commercial operations.



LCK's PCD facility.

## Leigh Creek Energy milestones



1,153 PJ Leigh Creek Energy's 2P syngas reserve



LCK's 1,153 PJ of syngas could power all 9.9 million Australian homes continuously for 2.8 years



## What is a 2P Reserve?

The project has a PRMS reserve of 2P 1,153 PJ, which is now the largest uncontracted gas reserve available to eastern Australia and larger than what is commercially available in the entire Cooper Basin (ACCC, 2018).

LCK's certification comes after having successfully extracted gas at economic flow rates at its PCD.

The size of the reserve

indicates that LCK has multiple commercialisation paths, mainly the sale of synthetic natural gas in the Australian East Coast market and/or using the gas to manufacture ammonia-based fertiliser products. There is potential for a 2P increase beyond 1,153 PJ. The remaining 1,469 PJ 2C can also be upgraded to 2P status with further drilling and gasification trials in the other coal seams.