LEIGH CREEK ENERGY Limited

Investor Presentation

April 2016

Employees and Contractors running seismic lines on site in February 2016 at PEL 650, Leigh Creek Energy Project, South Australia.

Disclaimer

This presentation has been completed by Leigh Creek Energy Limited. It may contain forward looking statements that are subject to risk factors associated with the energy industry. It is believed that the expectations reflected in these statements are reasonable but they may be affected by a variety of changes in underlying assumptions which could cause actual results or trends to differ, including but not limited to: price fluctuations, actual demand, currency fluctuations, drilling and production results, reserve estimates, loss of market, industry competition, environmental risks, physical risks, legislative, fiscal and regulatory developments, economic and financial market conditions in various countries and regions, political risks, project delay or advancement, approvals and cost estimates amongst other items, and the cumulative impact of items.

This presentation may also contain non-IFRS measures that are unaudited but are derived from and reconciled to the audited accounts. All references to dollars, cents or $ in this presentation are to Australian currency, unless otherwise stated.

Mineral Resource Statement

Estimates of Mineral Resources reported in this announcement were initially reported and released to the ASX on 8 December 2015. Leigh Creek Energy Limited is not aware of any new information or data that materially affects the information included in the 8 December 2015 announcement and all the material assumptions and technical parameters underpinning the estimates in that announcement continue to apply and have not materially changed.

Gas Resources Statement

Gas Resources reported in this announcement were initially reported and released to the ASX on 8 January 2016. Leigh Creek Energy Limited is not aware of any new information or data that materially affects the information included in the 8 January 2016 announcement and that all the material assumptions and technical parameters underpinning the estimates in that announcement continue to apply and have not materially changed. All Estimates are based on the deterministic method for estimation of petroleum resources.

Introduction and Overview

- Leigh Creek Energy Limited (ASX: LCK) is an emerging ASX listed energy company focused on developing its 100% owned Leigh Creek Energy Project ("**LCEP**").

- LCK's LCEP is located at Leigh Creek, 550km north of Adelaide, over and around a former coal mine area.
  - Independent PRMS ISG Gas Resources Certification of 2,963.9 PJ 2C – see ASX release 8 January 2016.
  - 80 PJ pa of ISG gas for a project life of approximately 30 years, produced from coal using a process known as in-situ gasification ("**ISG**") with commercial production in 2019.
  - Gas will be sold as raw syngas for electricity or cleaned to pipeline quality methane.


Image: PEL 650 looking north towards Lobe C

Introduction and Overview

- Presently obtaining all necessary regulatory approvals to allow ISG demonstration producing ISG gas targeted for year end 2016.
- Actively engaged with potential pipeline gas and electricity buyers for long term contracts and potential farm-in partners to monetise gas and reduce equity needs.
- The market for pipeline gas in eastern Australia is tight with shortages forecast and new supply options required to meet demand forecasts as a result of:
  - Existing producing fields in decline, Queensland and Cooper Basin commitments to export LNG projects and concerns over the long term viability of the coal seam gas industry.
- The South Australian State Government is supportive of ISG and has developed a clear legal and regulatory framework to guide ISG operations which has significantly de-risked the LCEP.
- Leigh Creek has significant existing infrastructure in place.

Image: LCEP Laydown area July 2015

Tier 1 Partners in-place

Power Generation

- HoA signed with **Shanghai Electric Group** – one of the worlds largest manufacturers of gas fired and steam turbines and generators and one of the largest corporations in the Peoples Republic of China. Power will be required for the LCEP itself and for supply to external customers (mines and industrial).

Pipeline

- Work ongoing with **APA Group** Limited, Australia's largest pipeline owner and operator, following HoA signing in 2015.

Looking towards Lobe C from the old train line

Corporate Overview

Capital Structure

Exchange Listing Details	Exchange	ASX: LCK
Ordinary Shares on Issue[1]	No.	230,519,472
Share Price (as at 16 Mar 16)	A$/share	0.28
Market Capitalisation	**A$m**	**64.5**
Debt	A$m	*Nil*
Cash (post Treasury Share Sale)[2]	A$m	1.6
Enterprise Value	**A$m**	**62.9**
52 Week High	A$/share	0.420
52 Week Low	A$/share	0.135

Share Price Performance

Top Shareholders (6 Apr 16)

Holder	Shares Held	% of IC
Allied Resource Partners Pty Ltd[3]	104,767,190	45.4%
CITIC Australia Pty Ltd	17,242,855	7.5%
Total	**135,975,280**	**52.9%**

Notes:

1. Excludes 14,250,000 unlisted options outstanding with exercise prices ranging from A$0.212 to A$1.50 per share.
2. Cash as at 29 Feb 16.
3. Escrowed for 2 years from 3 Jul 15.

Source: ASX and Bloomberg as at 6 Apr 16. Company Announcements.

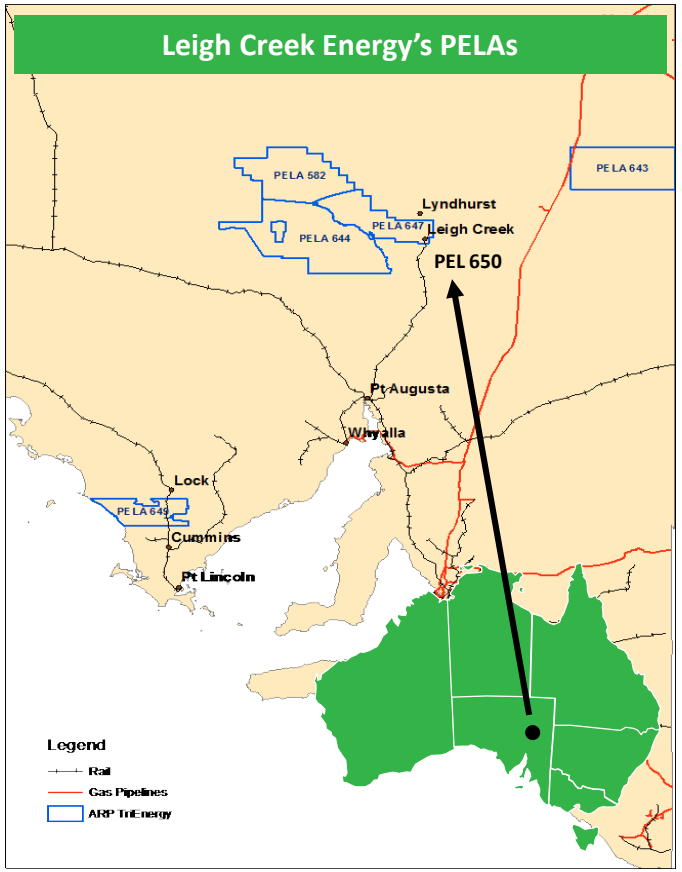
Leigh Creek Energy Project ("LCEP")

LCK's LCEP is located at Leigh Creek, 550km north of Adelaide, over and around a former coal mine area and will develop coal resources that are unable to be accessed by open-cut mining.

- 100% owned by Leigh Creek Energy Limited
- Situated on PEL 650 in the area of the existing Leigh Creek open cut mine owned by Alinta Limited (closed Nov 15)
- Independent PRMS ISG gas resource announced 8 Jan 16

Category	1C	2C	3C
ISG Gas Resource	2,747.7 PJ	2,963.9 PJ	3,303.1 PJ

- Independent JORC Inferred Coal resource of 377Mt announced 8 Dec 15
  - Modest drilling aiming to upgrade this
- Site infrastructure already in place with major pipeline 125 km away, sealed roads, airport, power and rail
- Target demonstration of gas by year end 2016
- Commercial gas / electricity production intended for 2019
- Targeting pipeline gas delivery at approx. A$2.50/GJ (including D&A)



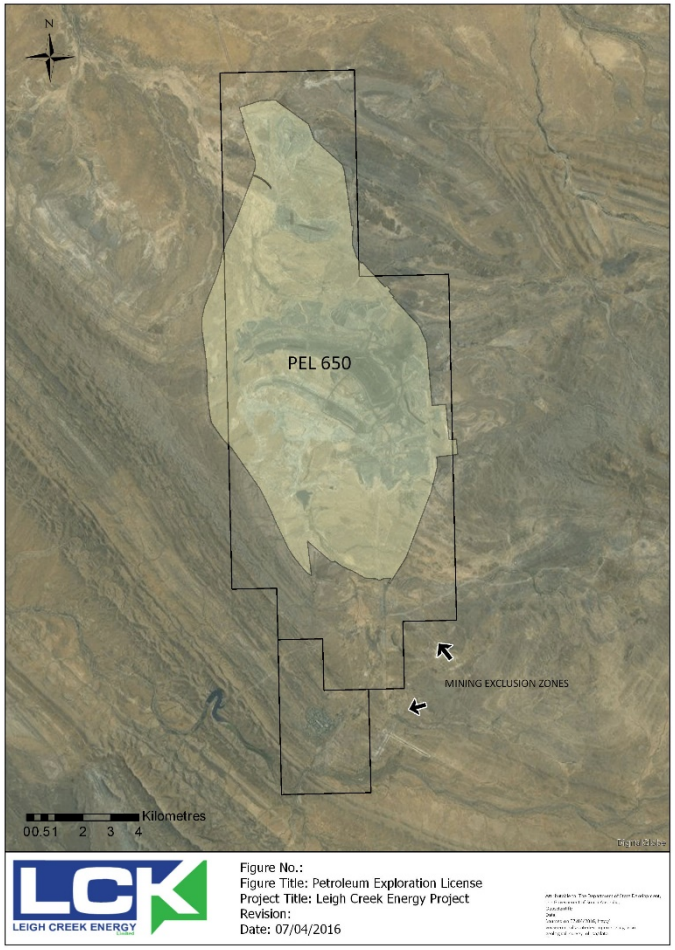
Leigh Creek Coal Field

Produced coal at up to 2.5 Mtpa for captive power station 250km south at Port Augusta. Mine closed in Nov 2015 and Power Stations to close in May 2016.

- LCK's LCEP is situated on PEL 650 in the area of the existing Leigh Creek open cut coal mine owned by Alinta Limited
- PEL 650 (100% owned by LCK) operates within the Petroleum Act

Infrastructure:

- LCEP is ideally located with ready access to infrastructure in the area. Existing infrastructure includes the following:
  - Major pipeline 125 km away (alternate routes being assessed)
  - Power from grid and transmission lines
  - Sealed road
  - Airport
  - Rail
  - Fresh water dam
  - Township of Leigh Creek is 20km south



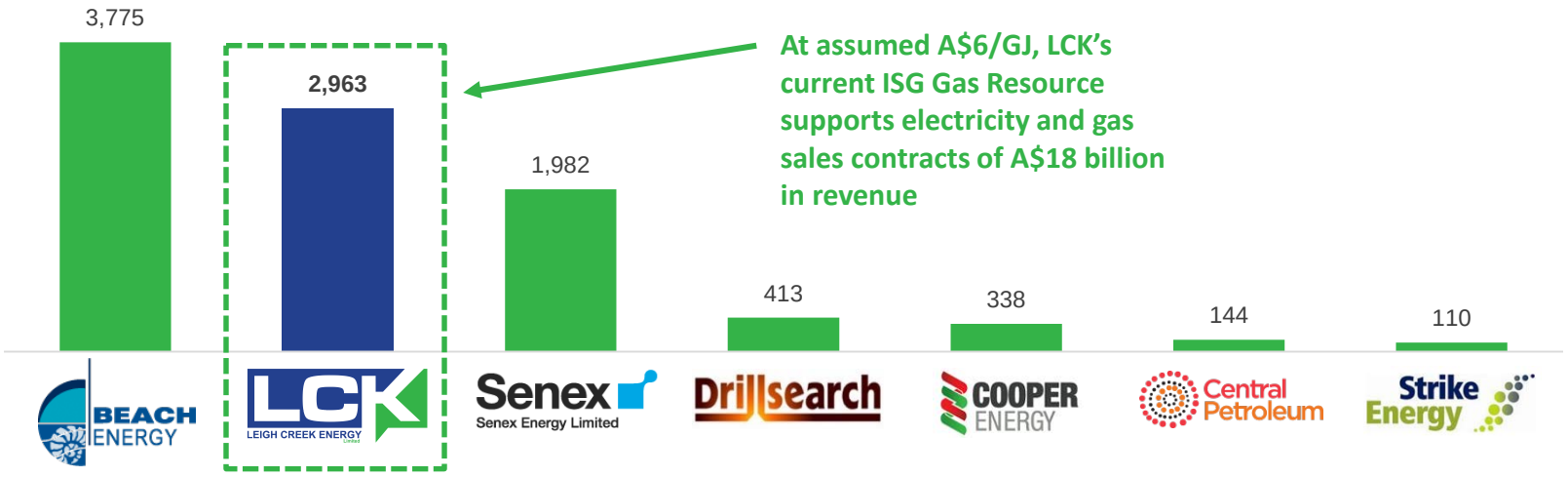
LCEP – Independent Gas Resources

Independent PRMS Assessment of 2,963.9 PJ 2C ISG Gas Resource announced during January 2016. Assessed by MHA Petroleum Consultants LLC of Denver, USA.

- Major milestone for LCK in the achievement of SPE-PRMS ISG Gas Resources Certification
- MHA Petroleum Consultants LLC of Denver, USA certified the following Resources:

Category	1C	2C	3C
ISG Gas Resource	2,747.7 PJ	2,963.9 PJ	3,303.1 PJ

- 2C Resource Comparison (PJ) of select ASX listed Energy Players[1]



Notes:
1. Refer to Leigh Creek Energy Limited announcement on 8 Jan 16 for further information and notes.

Source: Company Announcements.

Gas Resources

LCK is trading at 2.7 cents per GJ of 2C gas resources at a time of gas shortages and when gas transactions (historic) have been done at up to $1:00 / GJ in the ground.

- LCK has a comparatively low market capitalization considering the quantity of certified gas resources.
- Gas supply shortages as highlighted by AGL's forward contracts profile, will put pressure on pricing and valuations.

AGL – Australia's largest energy retailer:

- Is needing to find over 150 PJ of gas pa to fill its forward book.

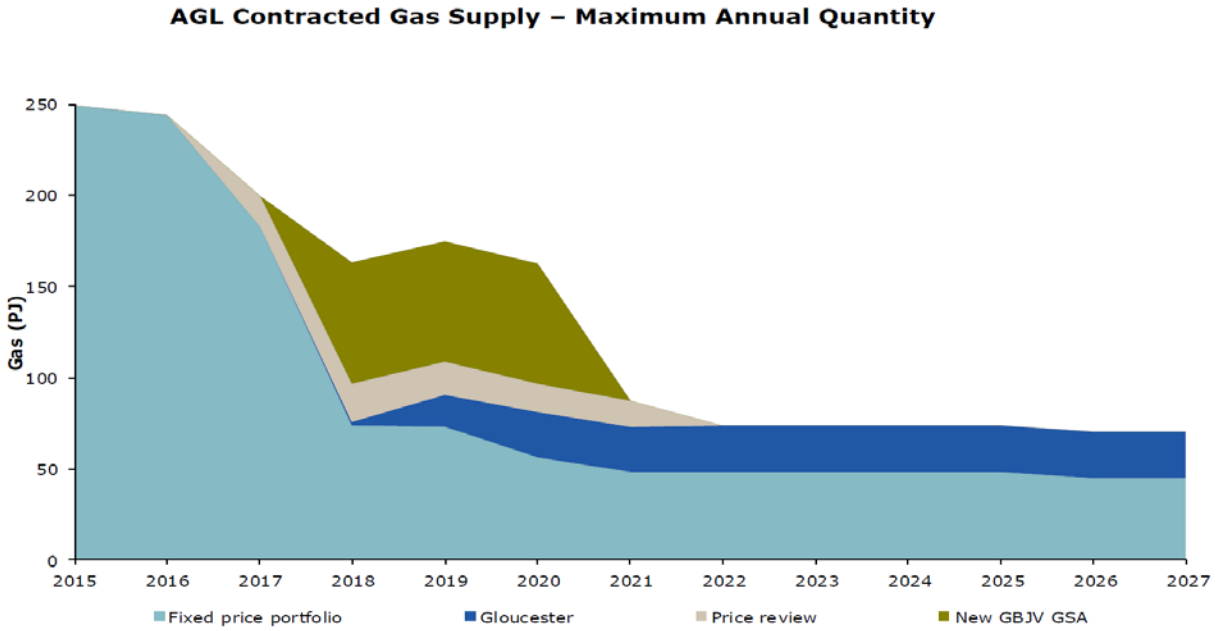


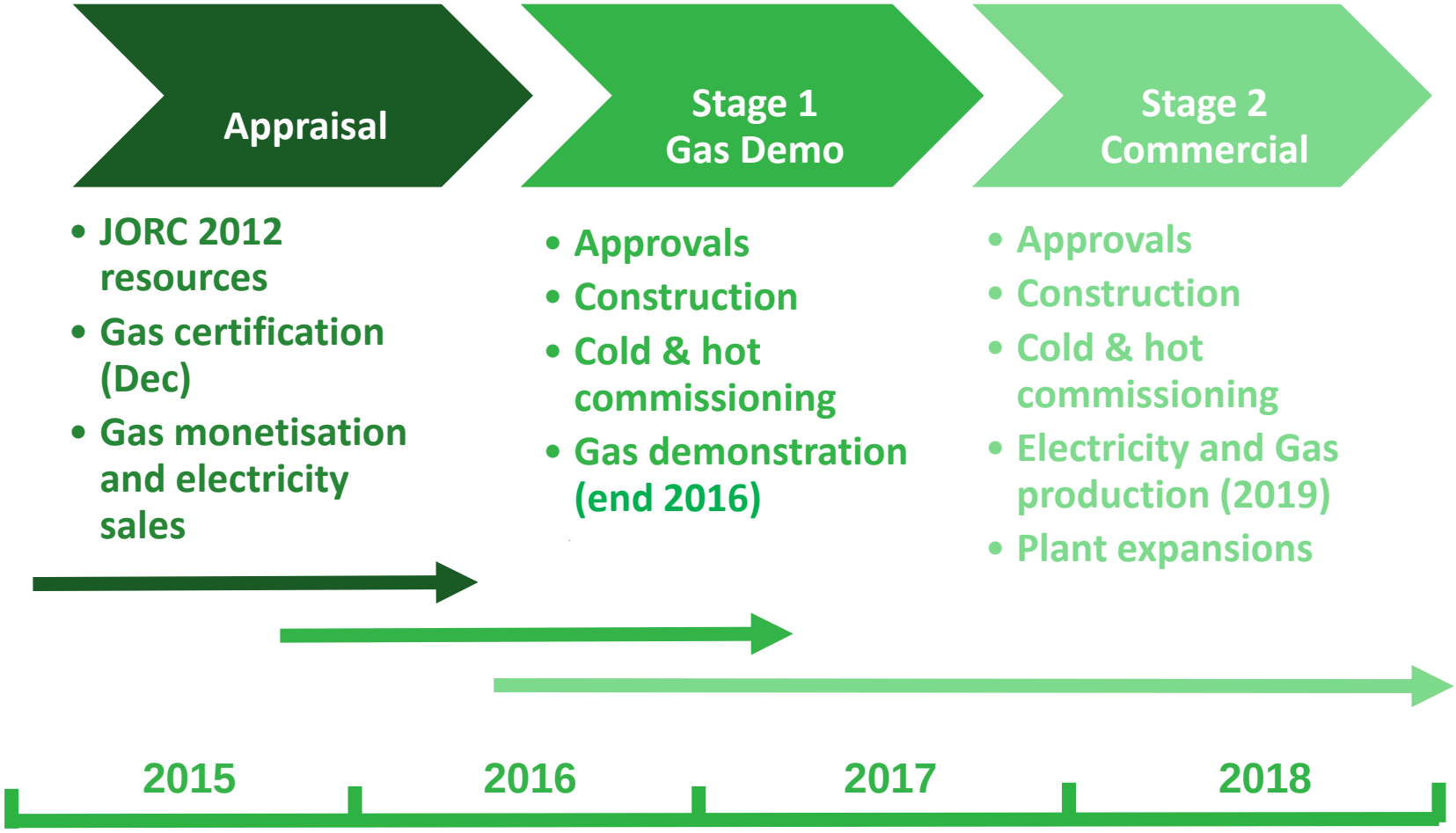
Figure: AGL Future Gas Contracts.
Source: AGL ASX Release dated 9 April 2015.

Recent Progress

Milestones and workflow completed and underway by LCK.

Status	Event	Comment
Complete	Formal approval SA Govt.	PEL 650 granted 18 Nov 2014
Complete	Reverse listing on ASX	LCK on 3 July 2015
Complete	Capital markets advisor	EAS Advisors LLC (New York) mandated
Complete	East coast gas market	Engaged customers, data room (ongoing)
Complete	Gas Storage License	GSEL 662 granted (gas storage exploration license)
Complete	Infrastructure partner	HoA with APA re pipeline and infrastructure.
Complete	JORC Inferred Coal Resource	377 Mt with upside by infill drilling
Complete	Gas Resources 2C	2,964 PJ recoverable certified
Complete	Sell Treasury shares.	Sold for an average price A$0:229 per share (paid $0:037)
Complete	Electricity project partner	Shanghai Electric Group - China
Underway	Independent research report	Nearing completion
Underway	Gas monetisation	Sales contracts expected and partners approaching LCK (for farm-ins)
Underway	Electricity sales	Secure electricity supply agreements

LCEP Stages



Stage 1 – Gas Demonstration

Target gas production demonstration year end 2016 at LCEP.

Outcome:

- Demonstrates to government and community that ISG can be completed both:
  - Safely; and with
  - Minimal impact to the environment.

Data Obtained Allows:

- Government to approve Stage 2 Commercial Project;
- Optimisation of plant design;
- Operating costs discovery (in terms of minor constituents within gas).

Indicative Timeline For Stage 1 Gas Demo:

Date	Event
Mid 2016	Stage 1 gas demo approval
End 2016	Stage 1 gas demo

Stage 1 – Gas Demonstration Costs

Total expenditure estimated at A$18 million.

- Aim to pre-order long lead time items
- Plant skid mounted for re-use

ISG Demo Cost Breakdown	
Items	**A$ m**
Site assessment, environmental base line studies, water monitoring wells.	5.0
Plant and equipment, skids, thermal oxidiser, diesel storage.	10.0
Administration and staffing (excluded staffing in above)	3.0
Total	**18.0**

ISG Demo cost not indicative of full commercial project costs – can not extrapolate – full field commercial costs a fraction of demonstration on a per ISG gasifier basis, as:

- Demo drill mobilisation and other costs are “one offs” and not amortised over multiple items.
- No discount on vertical and horizontal well drilling cost.
- Stand alone waste water / gas destruction tower (“thermal oxidizer”).
- One off production and injection well heads (vs order for many).
- Short ISG gasifier life (2-3 months planned).

Stage 2 – Commercial Gas & Electricity Production

Outcome:

- Produce electricity and methane:
  - Power for LCEP, mines to west and industrial customers
    - ✓ HoA with Shanghai Electric Group
    - ✓ Planning underway for 300 – 600 MW power
    - ✓ ISG Gas cost targeting $1:00/GJ (partially cleaned syngas)
    - ✓ Electricity via syngas (limited gas cleaning required) – so low cost.
    - ✓ At full syngas production of 80 PJ pa the LCEP needs ~200 MW for its own needs.
  - Gas into new pipeline linked to east coast markets
    - ✓ Aim for 80 PJ pa output for > 20 years.
    - ✓ Targeting~$2:50/GJ
    - ✓ Pipeline spec gas is >93% CH_4 (methane).
    - ✓ Production may ramp up – dependent on nature of sales contracts.

Partners:

- Pipeline – working with APA following HoA in 2015
- Power – working with Shanghai Electric Group following HoA (April 2016).
- Power – in discussion with major customers of power.
- Gas – in discussion with major customers of gas (methane).

Timelines:

- Intended approvals ~ Sept quarter 2017
- 18 month construction time and long lead time item procurement.

Stage 2 – Commercial ISG Capex & Opex

- Capital expenditure estimates have not been finalised and are indicative and **considered conservative at this stage**. The A$ fall has increased some cost estimates by ~30%.

- Many large capex components can be funded externally via BOO formats (build own operate) e.g. gas pipeline ($400m), power station ($450m), oxygen plant ($450m). This has the **potential to remove $1.3 billion from spend.**
  - ✓ Some of these items lend themselves to infrastructure like funding and gearing whereby the return on the equity proportion can be considerable.

- Total spend is estimated at between $2 billion and $2.4 billion – varying with the size of external power sales.
  - ✓ Many components of plant can be geared to improve returns.

- The large scale of the LCEP reduces **depreciation and amortisation levels to below $1:50/GJ** (as the project has over an est. **>20 year life**).

- **Opex** is targeted to be ~$80m pa at full production of 80PJ pa = **A$1:00/GJ**, made up of;
  - Staffing and admin
  - Maintenance
  - Electricity, and
  - Catalysts and reagents.

LCEP – External Electricity Sales

- **Low Capex and Opex opportunity**
  - ✓ Raw syngas (partially cleaned) can be fed to latest generation of boilers, for steam turbine to power generation.
  - ✓ Avoids full cleaning cost (vs producing methane).
  - ✓ Air blown ISG is lower cost (vs oxygen) and lower capex
  - ✓ **~$1:00/GJ fuel into power station (estimate)**.
  - ✓ Equity needs very modest for ISG production of raw syngas.

- **Shanghai Electric Group – HoA**
  - ✓ Tier 1 power partner – one of the largest manufacturers on planet.

- **Electricity contracts**
  - ✓ Interest from major power buyers
  - ✓ LCK intends to write long term contracts.

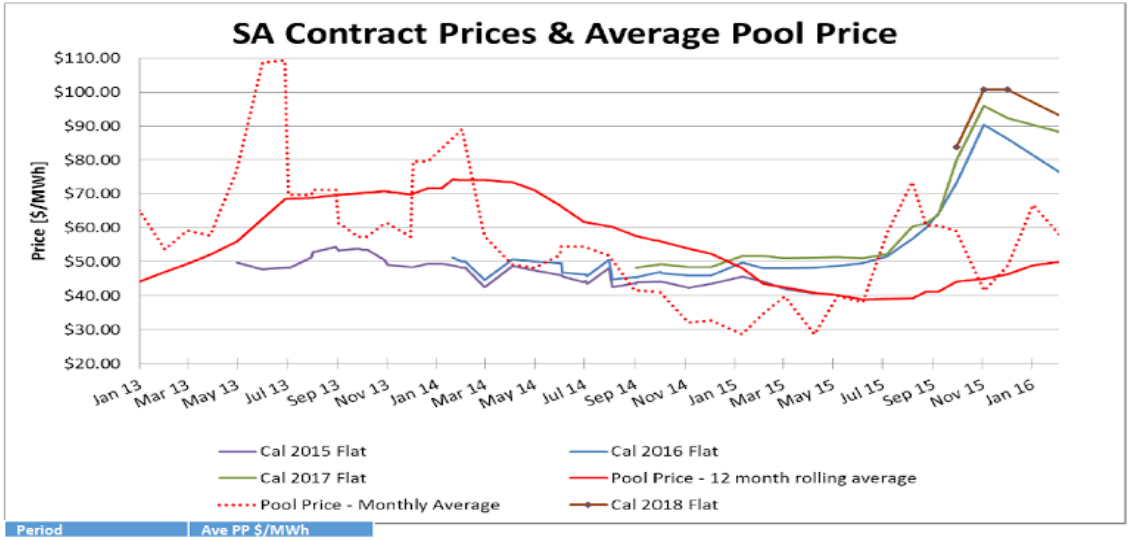
~9 GJ of gas energy required to produce 1 MWhr of electricity.

Electricity South Australia

- Price offers up > 100% - Coal fired generation shuts May 2016
- Gas fired generation has turned down with gas shortage and higher gas prices
- Wind energy dominating SA supply is intermittent and destabilises transmission
- **Manufacturing and mining must live with interruptions and higher cost electricity**

SA Wholesale Prices

CQ Partners



Period	Ave PP $/MWh
2010	40.28
2011	37.41
2012	44.21 (6mth carbon)
2013	71.68 (carbon)
2014	48.13 (6 mth carbon)
2015	49.58

Slide 7

Figure: South Australian Wholesale Prices

Source: CQ Partners – Electricity Procurement in SA

Mines to West – 100 - 400MW demand

- **BHP (147km)**
  - ✓ Olympic Dam.
  - ✓ Possible expansion
- **Oz Minerals**
  - ✓ Prominent Hill
  - ✓ Carrapateena (awaiting decision to build)
  - ✓ Possible future – copper smelter and refinery.

Image: Mines near Leigh Creek

News Flow

Operational and other milestones.

	Date	Event
✓	December 2015	Independent expert assessment of coal JORC
✓	December 2015	HoA infrastructure with APA; pipeline, gas storage.
✓	January 2016	Independent expert PRMS ISG gas resources
✓	April 2016	HoA Electricity with Shanghai Electric
✓	April 2016	Independent analyst research
✓	April/May/June 2016	Electricity and gas heads of agreement/contracts signed
✓	May 2016	Water monitoring wells / infill drilling aiming to increase resources
✓	Dec half 2016	Gas monetisation (farm in partners)
✓	Sept Quarter 2016	Stage 1 gas flaring approval
✓	Ongoing	Realising value of remaining gas in ground
✓	End 2016	Stage 1 gas flaring
✓	TB confirmed	Pre-order long lead time plant
✓	Mid 2017	Stage 2 commercial electricity and gas approvals
✓	Mid 2017 - early 2019	Construction
✓	1st half 2019	First electricity and gas production

Frequent electricity / gas shortage, gas industry corporate action and high priced gas / electricity contracts news anticipated

LCEP – Low Costs and High IRR

- **LCEP expected to be low on cost curve, cost to produce;**
  - partially cleaned raw syngas is ~$1:00/GJ
  - pipeline spec gas (methane) is ~$2:50/GJ

- **Capex optimisation underway**
  - ✓ Supported by EAS Advisors LLC, New York

- **Funding options available**
  - ✓ If (and as) gas monetisation offsets capex (from Farm-in by majors).
  - ✓ If other parties (Build Own Operate) pipeline, power station and part of gas plant (particularly the oxygen plant).
  - ✓ With gearing.
  - ✓ If LCK BOOT's assets – build and sell off when project cash flow commences.

Project Funding

LCK has multiple funding options:

Sources:

1) Sale of Treasury Shares (now complete)
   - ✓ **Raised ~A$3m > cost**
2) Early gas monetisation of resources in ground (farm-outs)
   - ✓ **Discussions underway – with a number of companies regarding farm ins.**
3) Equity needs modest (if gas monetisation successful)
4) Infrastructure debt
5) Project finance debt
6) Factoring R&D (Research & Development) rebate (45% of applicable expenditure).
   - ✓ **Intending to raise up to A$5 million (reducing need for equity).**

Gas monetisation:

1) Common energy project funding
2) Eastern Australian gas shortages and high gas prices supportive
3) Electricity shortages in South Australia

Project Funding – Farm-out

Discussions underway with major energy companies – farm out opportunities will be assessed:

- ✓ One of our "gas monetisation" strategies
- ✓ Potential to significantly reduce LCK's equity needs
- ✓ Profit on sale would likely utilise tax losses of ~A$40m

Discussions will now be advanced

- No metric or matrix determined for farm-out as yet.
- Likely include component related to existing PRMS ISG 2C Gas Resources of 2,964 PJ (almost 3 billion GJ) recoverable

Board believes gas shortage is getting worse on east coast

- ✓ LCK gas assets have strategic as well as intrinsic value.

Valuation:

- LCK is trading at $0:027 / GJ market cap per unit of gas resources vs historic transactions of up to $1:00/GJ.
- **Implies up to near 40x upside** (but this can not be guaranteed).

Gas in Play

- **ACCC inquiry**
- **Regulator**
  - Gas shortage to hit by 2018 – calls on energy industry to develop assets.
- **Acquisitions**
  - Qld Investment Corp buys IONA 27 PJ gas storage (VIC) $1.7bn (40x pre-tax)
  - Santos proposed takeover / then rights issue / China's ENN buys stake in STO.
- **New Pipelines**
  - North East Gas Interconnect (NEGI) – NT to Mount Isa
    - Pipeline size reduced due to lack of gas supply !
- **Mergers**
  - Beach Energy now merged with Drillsearch
- **Other**
  - Santos "needing to buy significant quantities of 3rd party gas" (refer to risk section of recent presentation released 9 Nov 15)
    - China's ENN buys stake in Santos

LCEP Additional Opportunities

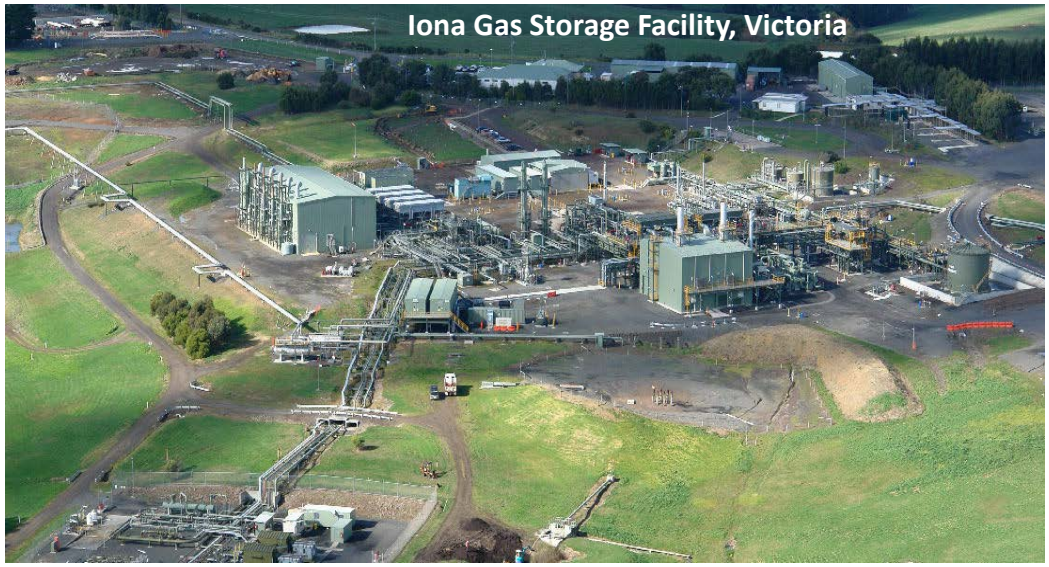
Value add:

1) Gas Storage Exploration License

- GSEL 662 obtained by LCK
- Recent Iona Gas Storage (Victoria) purchase of 23.5 PJ storage for A$1.78 billion

2) Fertiliser

- Made from waste product hydrogen
- 100% nitrogen based fertiliser & explosives imported into SA



Next Steps

- **Electricity and Gas marketing:**
  - ✓ Alert buyers
  - ❑ Monetise some energy in ground (farm ins)
  - ❑ Electricity and gas contract book ramp up
- **Design & Approvals:**
  - ❑ Stage 1: Gas demo – end 2016
  - ❑ Stage 2: Commercial – electricity and gas
  - ❑ Stage 3: Fertiliser (possibly)
- **Intended Funding:**
  - ✓ Sale of Treasury shares (15m shares)
  - ❑ Gas monetisation (farm outs)
  - ❑ Equity / project debt
  - ❑ R&D factoring


Image: Looking west over PEL 650

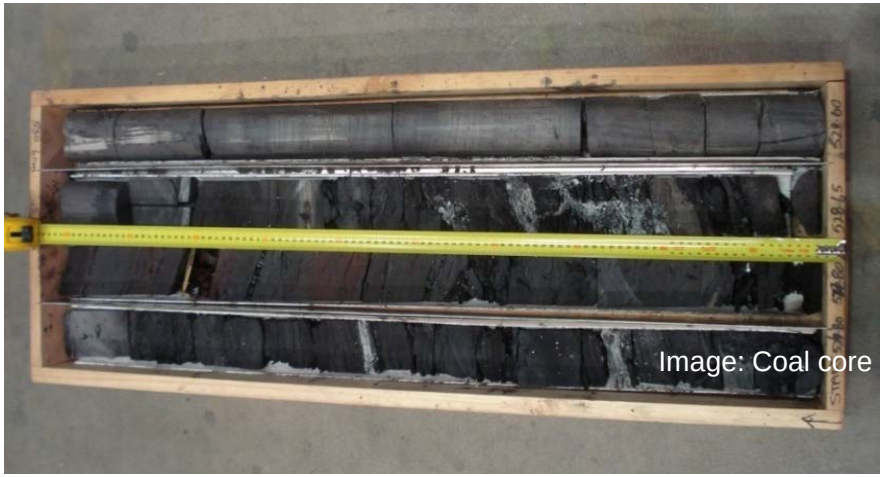


Image: Coal core

Appendix 1 – Low Liquidity

LCK has a "tight" share register.

LCK Share Register				
Shareholder	**#**	**%**	**Escrow**	**Details**
Allied Resource Partners Pty Ltd ("**ARP**")	104,767,190	45.45	**Yes**	2 years till 4 Jul 2017 [15 months away]
Former ARP TriEnergy shareholders ("**TriE**")	33,544,493	14.55	**Yes**	1 year till 4 Jul 2016 [3 months away]
CITIC	17,242,855	7.48	No	
Other	73,964,934	28.62	No	
Total	**230,519,472**	**100.00**		

Appendix 2 – Corporate Targets

Objectives over 4 years from listing July 2015.

- ✓ Develop company **organisation structures, systems & processes.**
- ✓ **Safety** culture systems developed & maintained.
- ✓ Complete independent **2C gas resource 2,964 PJ recoverable.**
- ✓ Establish and maintain a "**social license**" to operate.
- ✓ Partner with **tier 1 electricity (Shanghai Electric Group) and pipeline (APA Group)** players.

1) Sign **electricity and gas sales** contracts.
2) Finalise **Farm-in partner** thus providing much of the equity for project.
3) Successfully **complete gas demonstration** (Stage 1) at LCEP.
4) Develop **commercial electricity & gas operation** (Stage 2) at LCEP.
5) Identify and acquire **further ISG related assets** (long term).

Appendix 3 – Other Tenements

Held within ARP TriEnergy (100% owned)

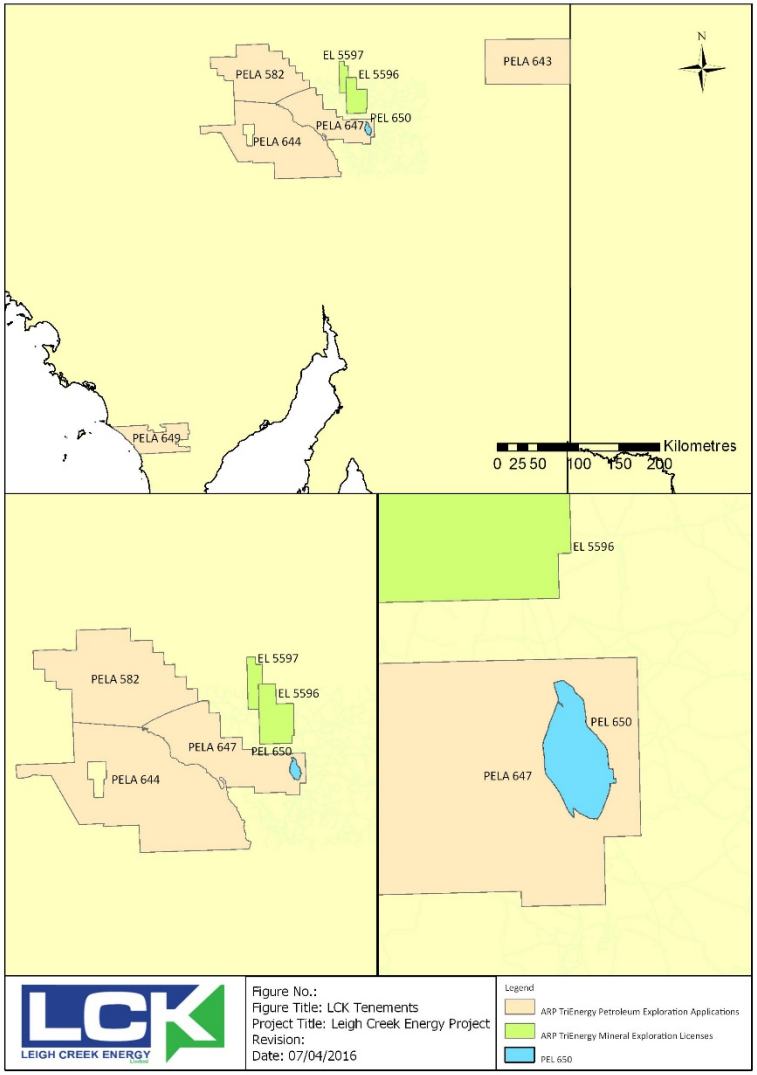
.

PELA's

- **582 –** To NW of Leigh Creek – possible shale gas, possible oil prone in northern section
- **643 –** SE Cooper Basin, possible deep coal on NW flank of basin
- **644** – West of Lake Torrens and over Olympic Dam
- **647 –** Extends NW of Leigh Creek
- **649 –** West coast of Eyre Peninsula, located over the Polda Basin

EL's

- Nth of Leigh Creek: **EL5596 & EL5597**



Appendix 4 – LCEP outside GAB

Great Artesian Basin – sub-surface fresh water source that moves from the high-rainfall NE Queensland to the dry SE Central Australia (desert).

- Nationally significant on water & environmental grounds
- Creates both State & Federal environmental legislative & regulatory interest
- **LCEP located outside the GAB** (to the south)
- Sub-surface **water at Leigh Creek coal mine is saline**

**Source: Australian Government – Environmental Resources Information Network (ERIN)*

Appendix 5 – Supportive Government

Strong support for ISG in SA

- Specifically contemplated & supported by Petroleum & Geothermal Energy Act.
- December 2012 Unconventional Gas Policy:

  "… issue can be mitigated through careful project design, site selection and monitoring." "ISG has enormous potential for harnessing the energy of coal resources that would otherwise be too expensive or difficult to reach."

Department (DSD) policy & collaborative culture moves projects from exploration to production:

- Well organised administration;
- One-Stop-Shop service;
- Inter-departmental agreements with referral agreements; and
- **Designated response times.**

PGE Act allows incremental approvals & progress

LCEP – Supportive Environment

- **South Aust. government**
  - ✓ ISG legislation in place
  - ✓ No issues re. overlap of tenements at LCEP
  - ✓ 1-stop-shop for fast track
- **Location benign**
  - ✓ Existing mine site
  - ✓ Salt water at depth
  - ✓ Outside Great Artesian Basin
  - ✓ Remote from major centres

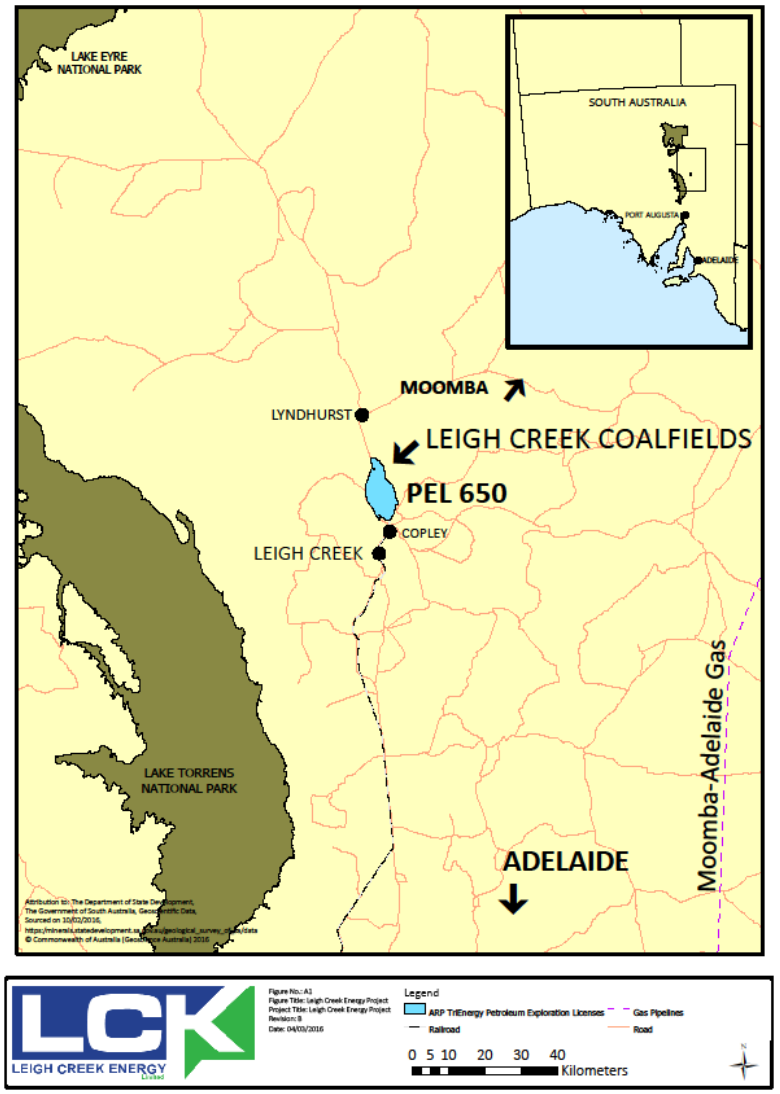
South Australia highly rated by Fraser Institute Global Petroleum Survey 2015 – top 5 for "Geological Database" and top 8 for "Small Reserve Holder Comparisons".

Stakeholder Engagement

- **Working with all Stakeholders - Local and Regional**

- **Adnyamathanha Traditional Land Association (ATLA)**
  - ✓ Adnyamathanha are the people of the broader region

- **Both parties seeking positive engagement**
  - ✓ Regular communications
  - ✓ Maximising employment and business opportunities
  - ✓ Mutual respect
  - ✓ Shared benefits



Appendix 6 – Gas in Ground Sales

Previous gas in ground sales.

Buyer	Seller	Date	Interest %	Price A$m	Reserve 3P PJ	Price Paid 3P A$/GJ	Notes
AGL	AJL/MPO	Dec-08	70/30	370	380	0.97	AJL = AJ Lucas MPO = Molopo
AGL	SGL	Dec-08	100	171	54	3.17	SGL = Sydney Gas
AOE	PES	Dec-08	100	673	1,241	0.54	AOE = Arrow Energy PES = Pure Energy
Conoco Phillips	ORG	Sep-08	50	6,000	5,069	1.18	ORG = Origin Energy
Petronas	STO	May-08	40	2,114	1,600	1.32	STO = Santos
QGS	SHG	Aug-08	100	811	1,097	0.74	QGS = Qld Gas SHG = Sunshine Gas
Shell	AOE	Jun-08	30	644	938	0.69	
Weighted Avg. Price Paid A$/GJ						**1.04**	

Appendix 7 – Fiscal Inputs

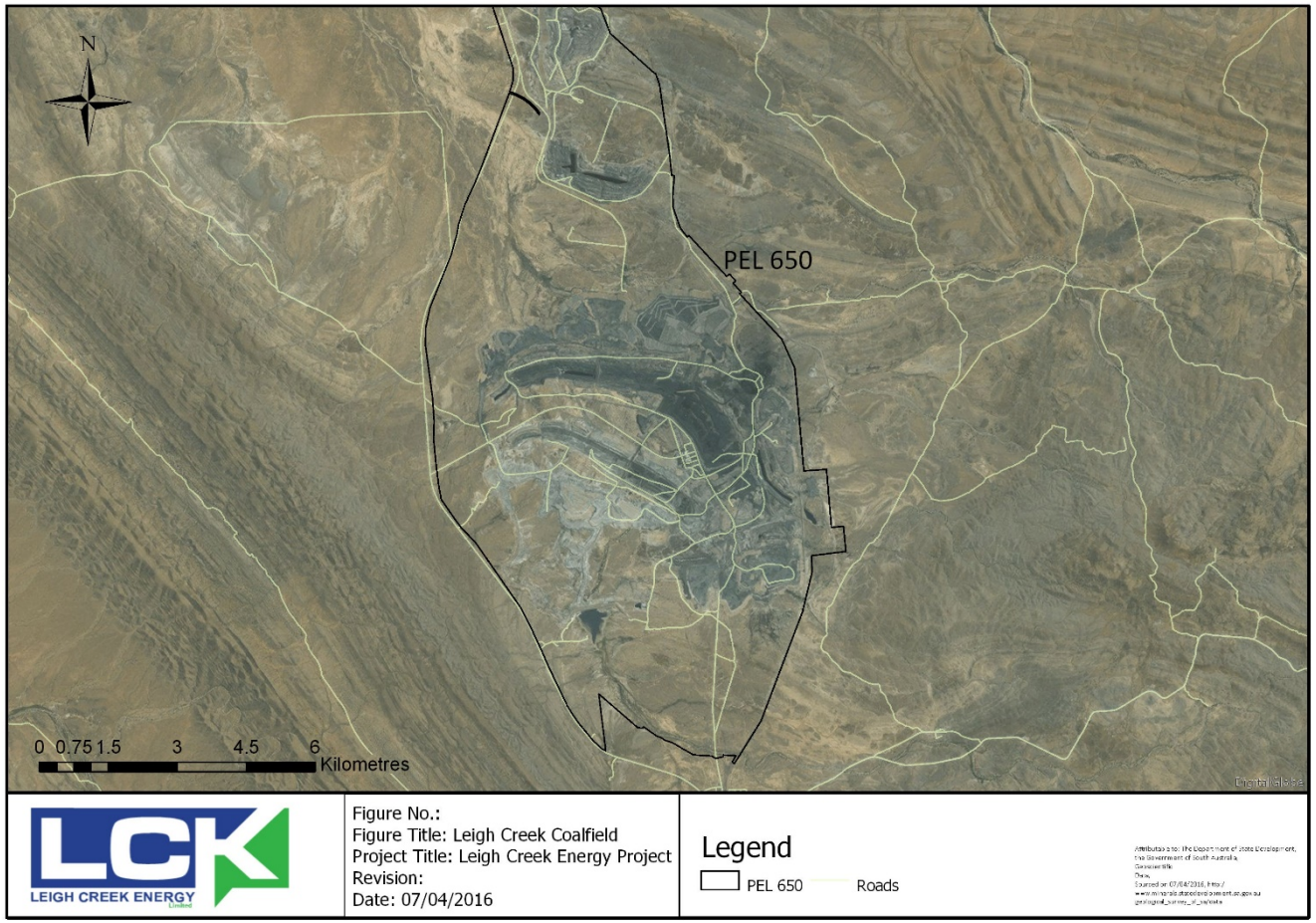
Key fiscal inputs are as tabled:

Inputs	Unit	#	Notes
Corporate Tax Rate	%	30	Australian Federal Government
State Royalty – South Aust.	%	10	Well head value less certain costs – likely to end up closer to 7%
TriE Royalty (Founders)	$/GJ	0:30	Real $ gas price 31 Dec 2014 basis or 3% whichever is greater, or $0:15 real 31 Dec 2014 if gas price < $6/GJ.

Appendix 8 - Leigh Creek Coal Field

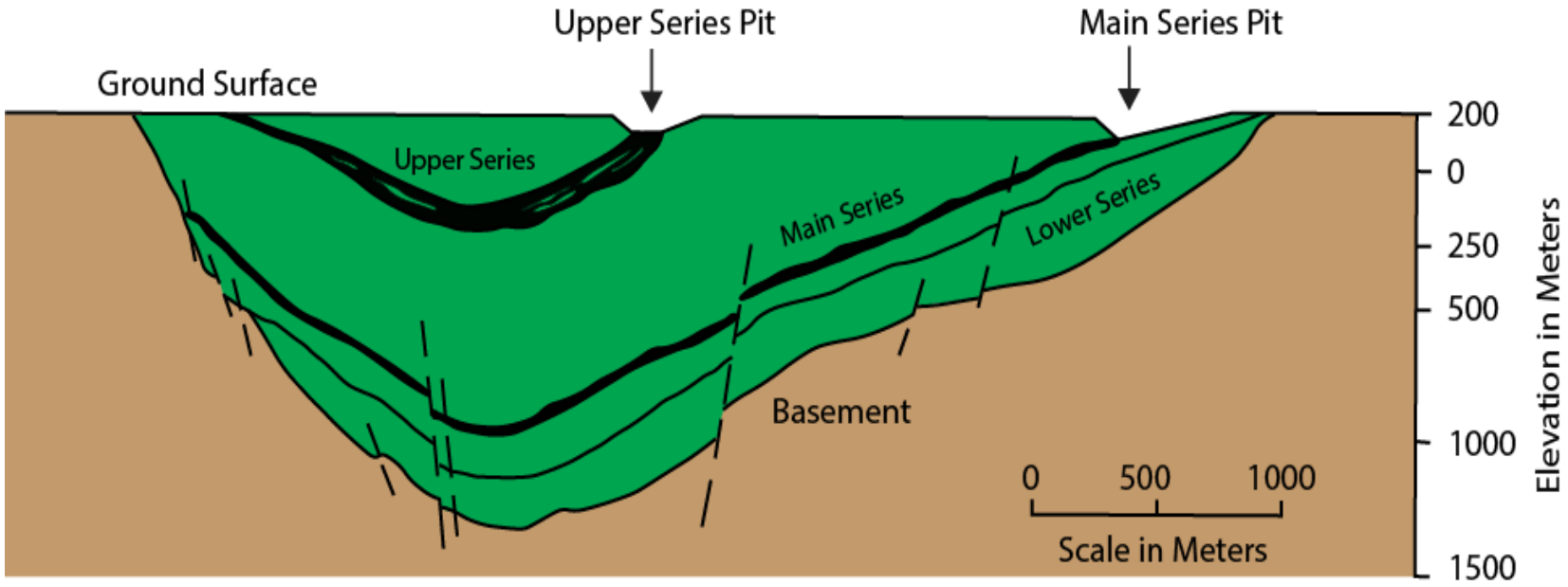
Produced coal at up to 2.5mtpa for captive power stations 250km south at Port Augusta. **Mine closed Nov 2015** and Power Stations to close (May 2016).

- PEL 650 operates within Petroleum Act.
- Likely to obtain useful existing infrastructure
- New LCK seismic Feb 2016.



Coal Seams

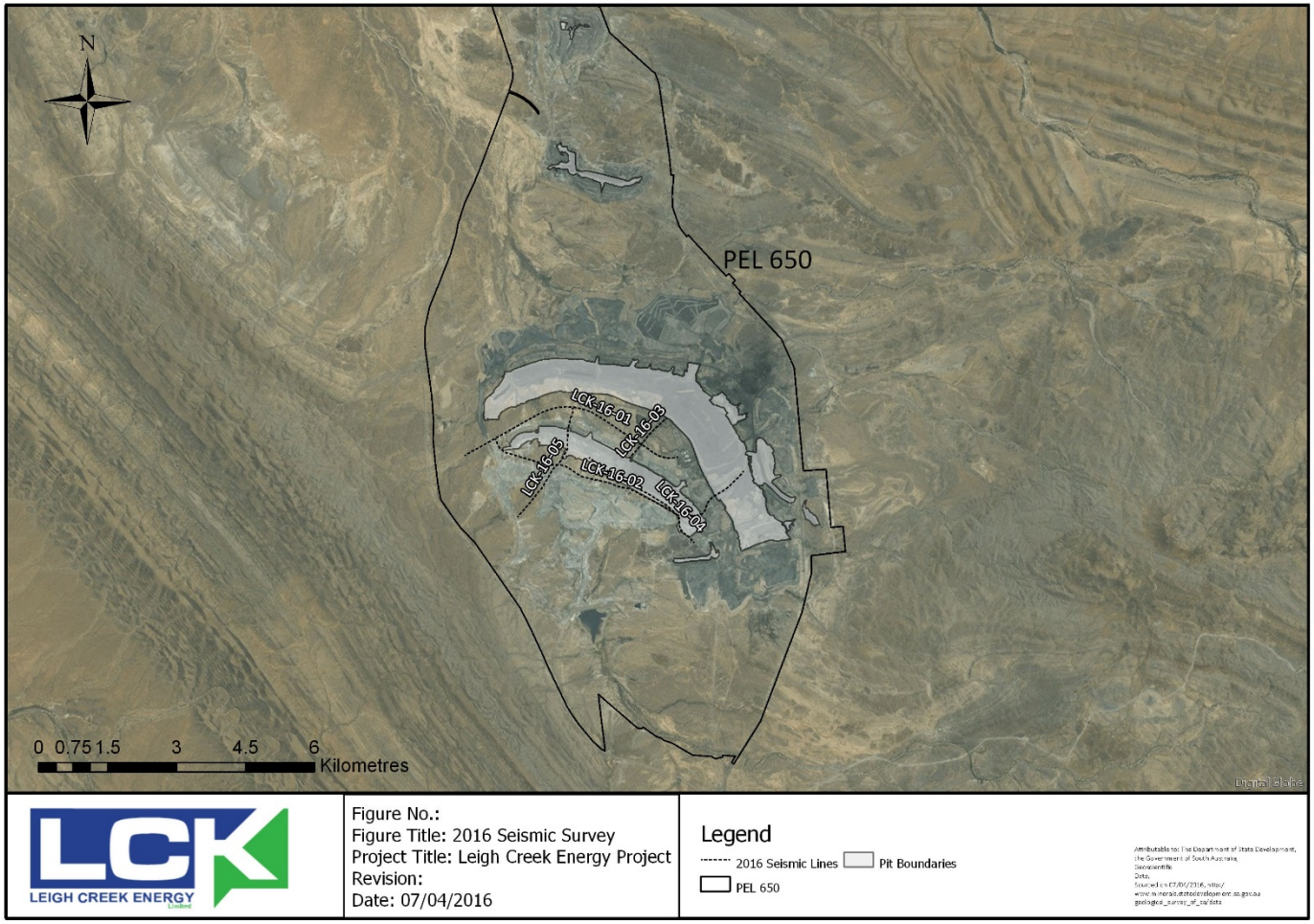
Area of coal covers approximately 5 x 3.5km in area with the Main Series coal seam being up to 18m in thickness in the open cut mine.



- Focus on deeper part of Upper seam, Main seam and Lower Series seam
- No prior holes in deepest point of coal basin (infill upside to resources)

Flare Site Identification

The 2D seismic survey shot Feb 16 imaged the Leigh Creek Telford coal basin to depths up to 1km. The total length of the lines shot was approximately 18.5km and supported previous results.



Appendix 9 – Prior LCEP ISG Work

Study 1985 Golder Associates - Results favourable for ISG:

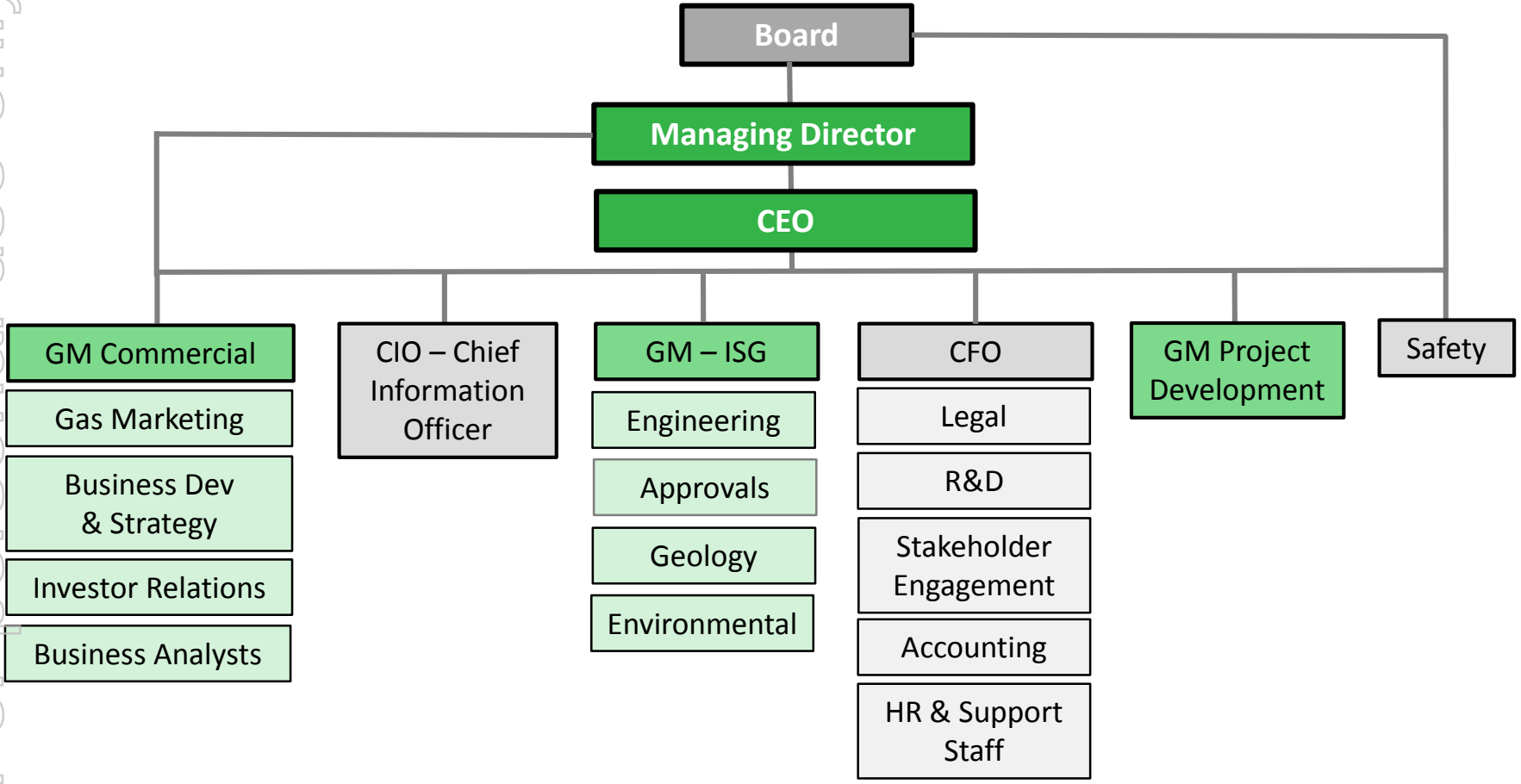
- "..confirmed the thickness and continuity of the Main Series coal seam, …, with good agreement achieved between seismic and drill hole data."
- "…results suggest that both groundwater inflow and groundwater drawdown will be acceptable."
- "..roof rock was considered to be of sufficient strength to provide controlled caving without suppressing" the ISG process.
- Major faults can be avoided. Minor faults "should therefore have little effect on the continuity of the gasification process."
- "…good correlation exists between the boreholes and seismic traverse."
- "…substantial additional evidence of the suitability of the Main Series coal seam for gasification."
- "The obvious possibility involves recovery from the Main and Lower Series over the full seam length."
- "Based on a very preliminary assessment of deep seismic survey data, the Main Series seam down dip of the area proposed for gasification appears to maintain its thickness and continuity."

Appendix 10 - Board and Management

Name	Title	Profile
Justyn Peters	**Executive Chairman**	Lawyer, former experienced Senior Manager with Linc Energy and Queensland Government and Federal agencies. Representative of ARP
David Shearwood	**Managing Director**	Mining engineer, post graduate qualifications in finance and HR. 30 years experience in funds management and investment banking. Representative of ARP
Greg English	**Non-Exec Director**	Mining Engineer and lawyer, with experience at Leigh Creek coal mine and with oil and gas contracts
Phil Staveley	**CEO and CFO**	CPA. 30 years experience in energy and resources, 15 years experience in CFO / CEO positions in Australia and Overseas. Formerly with Schlumberger, Normandy Mining and Centrex Metals.
Justin Haines	**GM Technical**	Mining engineer, Geologist, Project engineer. Formally head of technical with Carbon Energy Limited (CNX), who successfully demonstrated ISG in Australia
Jordan Mehrtens	**Company Secretary**	Lawyer and other qualifications in Finance and Urban and Regional Planning. Has worked with the LCEP since its commencement.
TBA	**Non-Exec Director**	*Pending*
TBA	**Non-Exec Director**	*Search underway – energy construction experience*

Organisational Structure

Team presently being built and organisational capability being enhanced.



Appendix 11 – Gas Shortage (Australia)

- Eastern Australia has demand trebles with 3 new LNG plants in Queensland
- New LNG plants secured most existing gas resources 80% non-conventional (predominately CSG – coal seam gas.
- Australia gas users are short gas e.g. AGL, Santos
- Gas production cost to rise from historical A$2-3/GJ to long term marginal cost of A$6-8/GJ
- Gas shortage remains even after LCEP is in full production
- At present there is no gas available to feed expansion of QLD LNG

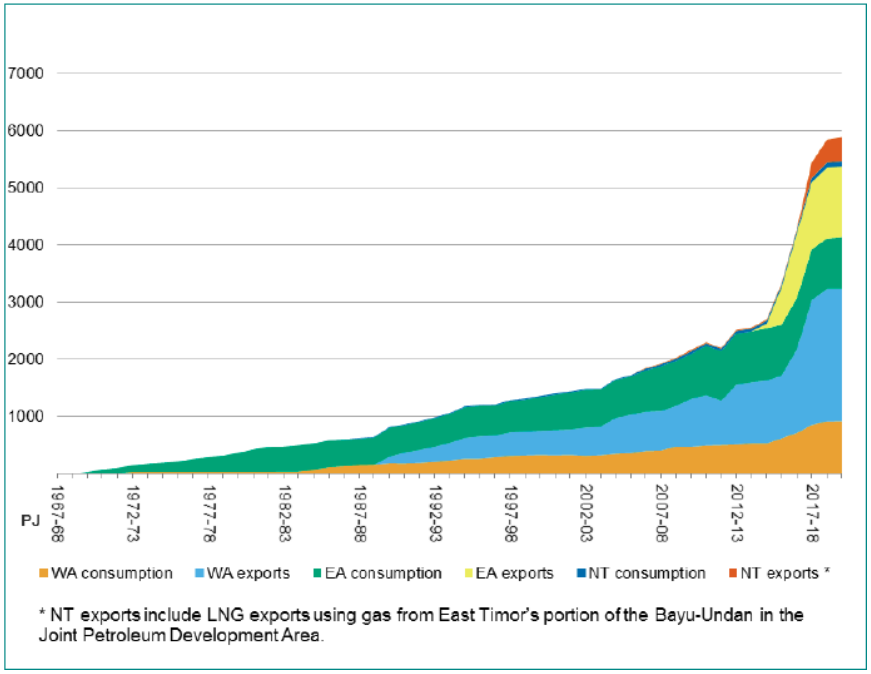


Figure: Domestic gas consumption and LNG exports with projections from 2014-15

Source: Oakley Greenwood Gas Price Trends Review December 2015 Commissioned by the Commonwealth of Australia.

Gas Shortage – Long Term

- Global LNG supply presently influenced by larger number of new projects starting:
  - 7 in Australia!
- Spot LNG price has fallen and remains low
- Over time gas demand keeps rising
  - Population growth
  - Rising GDP; and
  - Move to cleaner energy
- Gas supply falls with natural reservoir declines
- LNG shortage estimated at 260Mtpa by 2033
- **Global gas shortage looming long term**

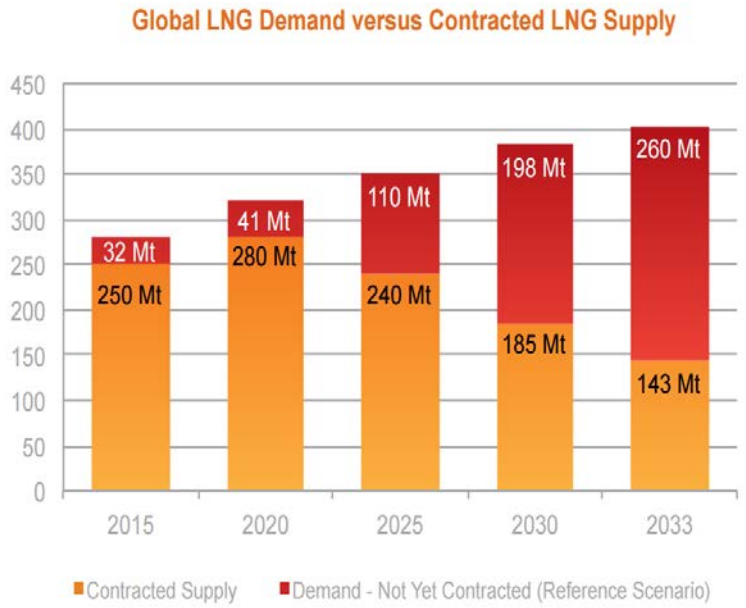


Figure: Global LNG Demand vs Contracted LNG Supply

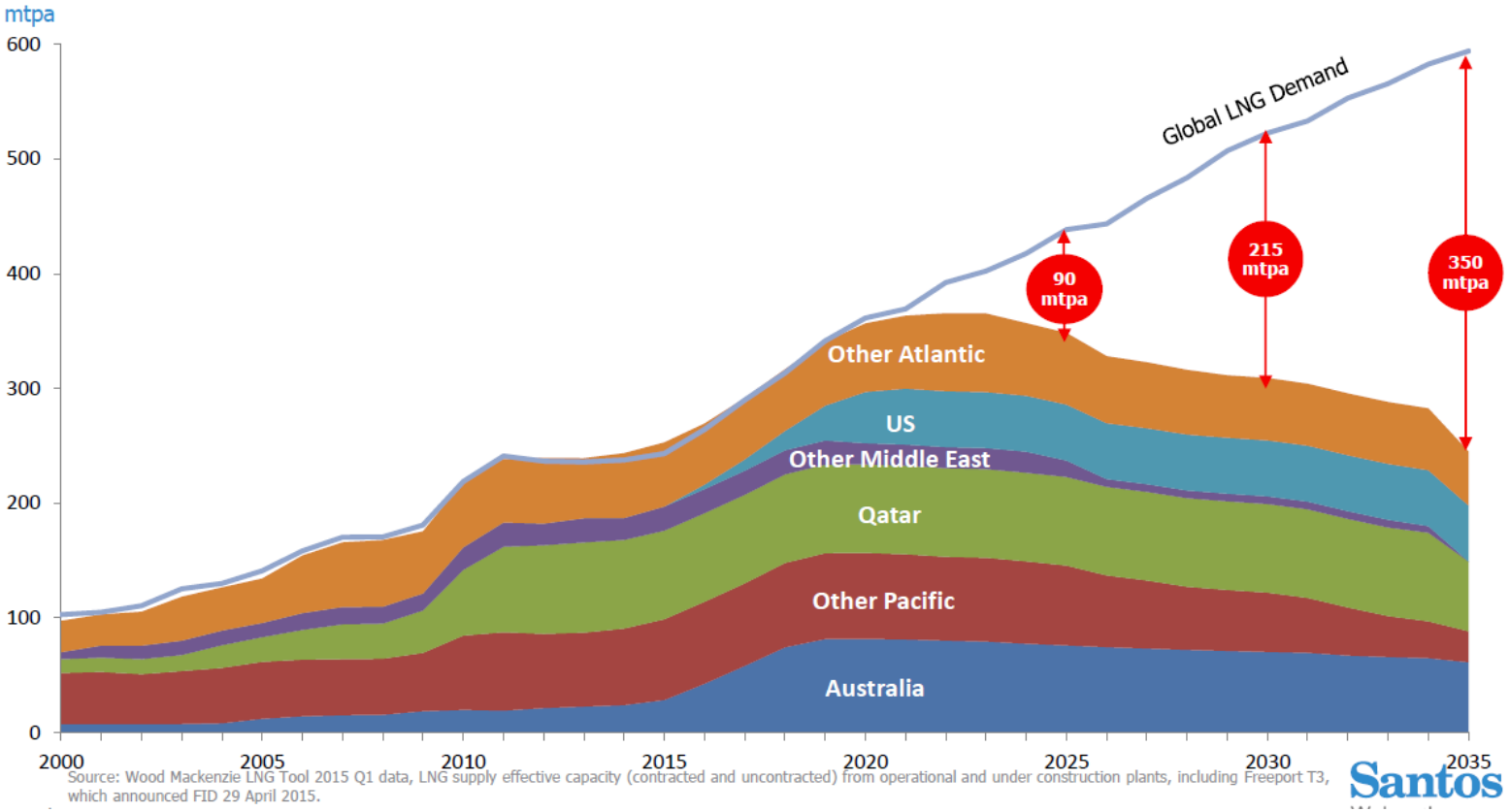
Source: Australian Energy Market Operator (AEMO) 2013 "Projections of Gas Demand for LNG export from eastern and south eastern Australia" prepared by Core Energy Group.

Global LNG Demand and Supply outlook

Global LNG demand and supply outlook

A gap between LNG supply and demand continues to widen into the next decade

Global LNG demand vs. LNG supply by region



Source: Wood Mackenzie LNG Tool 2015 Q1 data, LNG supply effective capacity (contracted and uncontracted) from operational and under construction plants, including Freeport T3, which announced FID 29 April 2015.

Santos

Source: Santos; Macquarie Australia Conference – May 2015 – Santos ASX Release 6 May 2015.

Gas Price in Eastern Australia

- Recent wholesale gas sales prices estimated at A$7/GJ (pre-pipeline change)
- Contracted gas supply developed ahead of LNG project start-up
- Gas supply capability rises cause short term over supply
  - ❖ “Ramp-up gas”
- LCK uses A$8/GJ for internal forecasts vs medium estimate of A$10/GJ

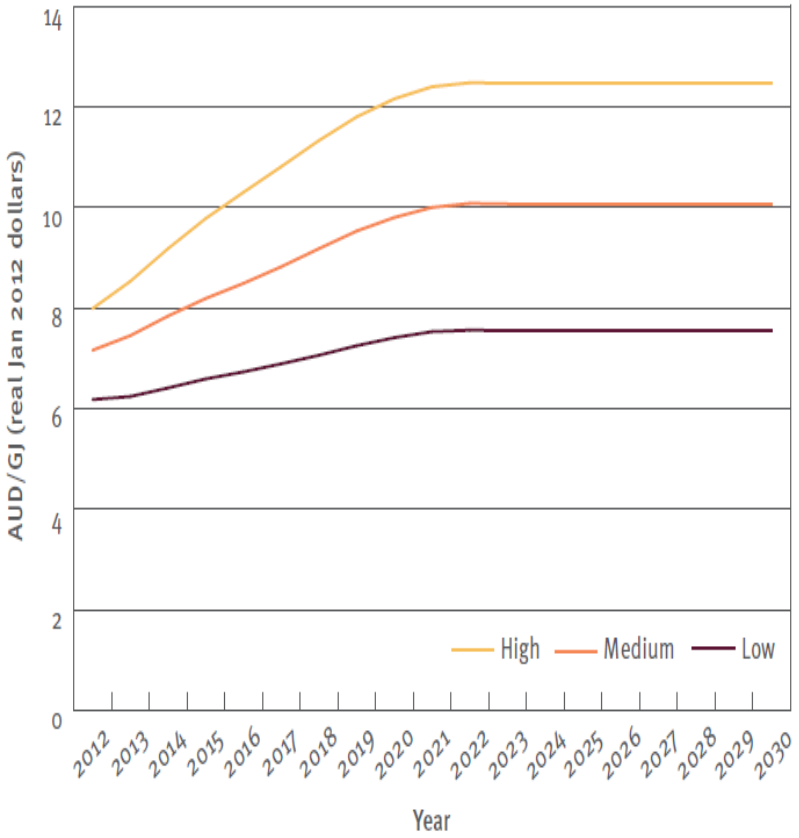
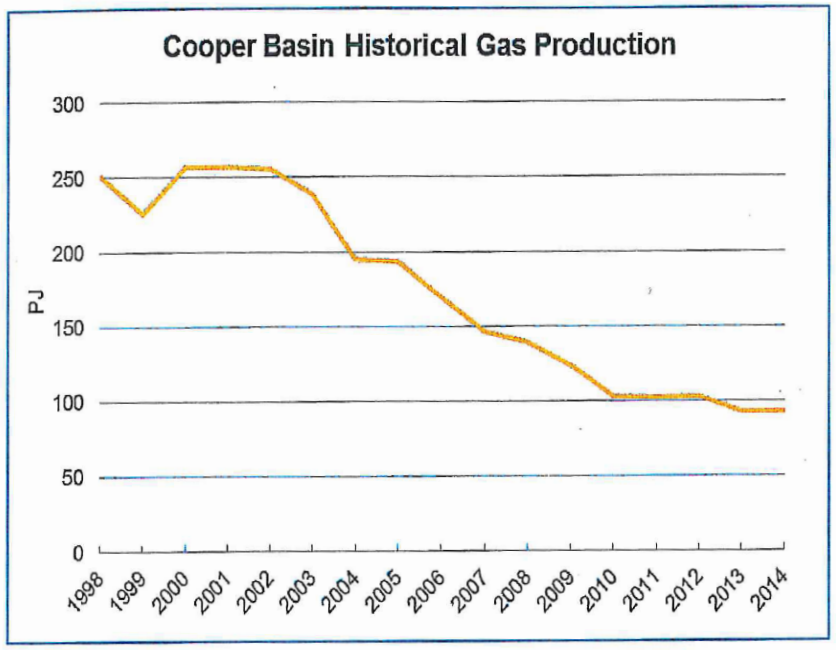


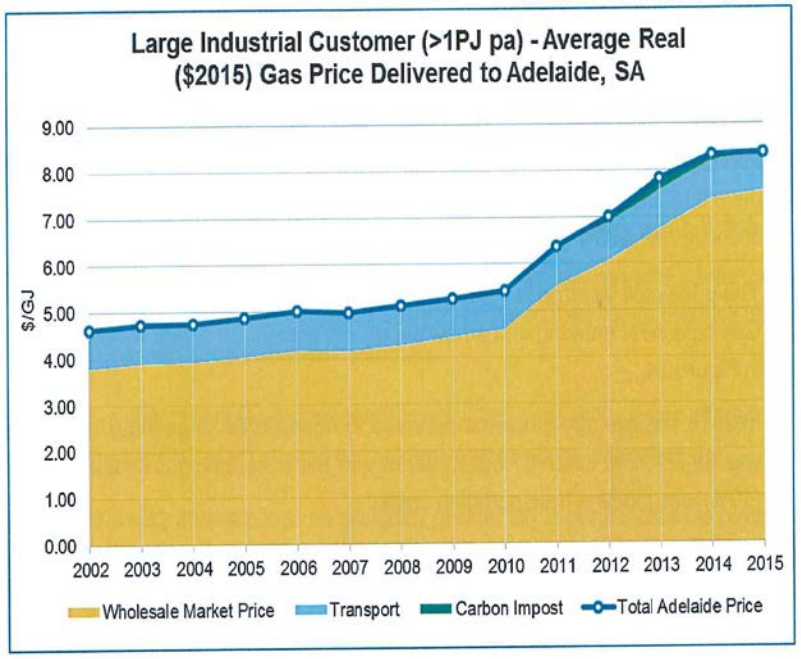
Figure: Range of Queensland long-term ex fixed gas contract price outcomes ($/GJ)

Source: Queensland Department of Energy and Water Supply 2012 Gas Market Review

Gas Price in South Australia

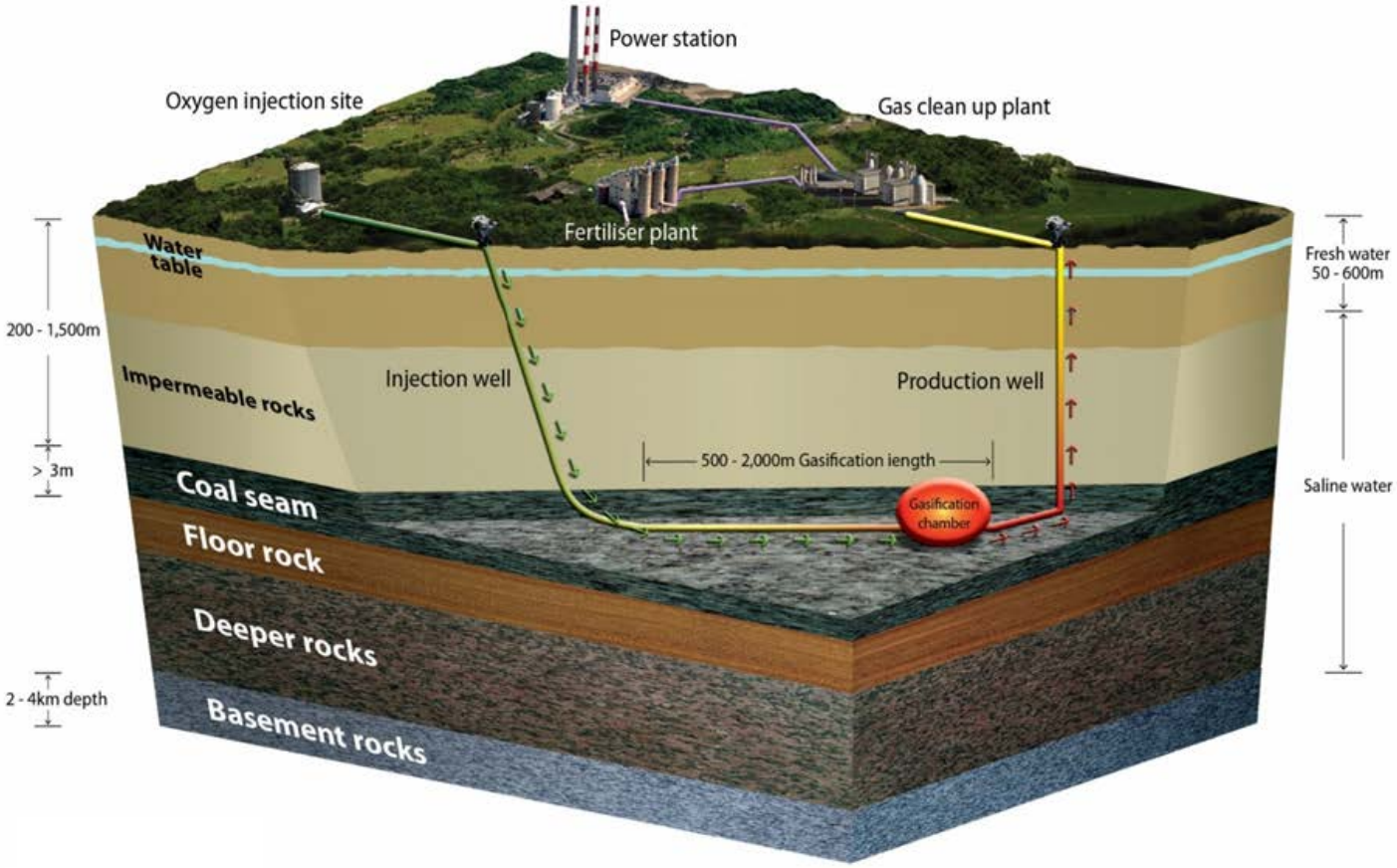
- Almost double over recent years
- Customers reporting inability to obtain offers for long term gas supply
- Supply crunch looks to hit about 2019 – as LCEP starts
- Cooper Basin gas output falling despite gas price rising – hinting at high costs for new supply.





Figures: Cooper Basin Historical Gas Production and South Australian large industrial customer gas prices components
Source: Oakley Greenwood Gas Price Trends Review December 2015

Appendix 12 – In-Situ Gasification ("ISG")



ISG Gas Details

LCEP will utilise 2 styles of gas processing to optimise capital and operating costs:

Power generation

Air fed ISG to produce **Raw Syngas** (low heat value as it contains ~44% Nitrogen)

- Water (and some hydrocarbons) removed
- Acid forming gases removed (sulphur and CO_2)
  - To produce **Clean Raw Syngas.**
- **This low cost gas (est at A$1:00/GJ including D&A - will be burned to produce steam to generate low cost power for use on site and external sale).**

Methane production

Oxygen fed ISG to produce Raw Syngas (high heat value)

- Water (and some hydrocarbons) removed
- Acid forming gases removed (sulphur and CO_2)
- Other minor impurities removed.
  - To produce **Clean Syngas** (CH_4 = methane, H_2 = hydrogen and CO = carbon monoxide).
- Methanation process converts Clean Syngas to predominately **Methane (CH_4)**.
- **Methane (CH_4) sent via pipeline to customers at est A$2:50/GJ (includes D&A).**

ISG is Real

Commercial Operation:

- Angren, Uzbekistan – 60 years of operation
- Eskom, Majuba, South Africa – co-firing power station with syngas

Australia experience:

- Linc Energy – demonstration facility, 11 years
- Carbon Energy – demonstration facility, 5 years

Swan Hills, Canada

- Demonstration facility
- Deep ISG in salt water – 1,200m deep
- Utilising standard oil-field equipment

Swan Hills ISG Project

Conclusions from the partially government funded Swan Hills ISG trials (Canada)

"There is no scale-up required to move into commercial project development"

"Planned future developments of ISG will involve simple replication"

"Ready for replication based deployment in commercial project developments"