



# Regal Resources Limited Investor Presentation



[www.regalresources.com.au](http://www.regalresources.com.au)

\* not an asset of Regal Resources, adjoins EL4510

For personal use only



# Underground Coal to Liquids

Underground Coal to Liquids (UCTL) aims to convert low rank brown coal / lignite into valuable commodities within the coal seam (“in-situ”):

- crude oil that is acceptable to existing refineries with established benchmark product pricing
- heat for use in electricity generation

Proven above ground Coal to Liquid processes have verified that lignite of the type Regal Resources seeks to target has a conversion ratio of one barrel of oil equivalent per tonne of coal. The substantial world-wide brown coal /lignite deposits are a potential resource target for the UCTL process.

Economic implications on UCTL becoming a proven process are significant.



# Capital Structure

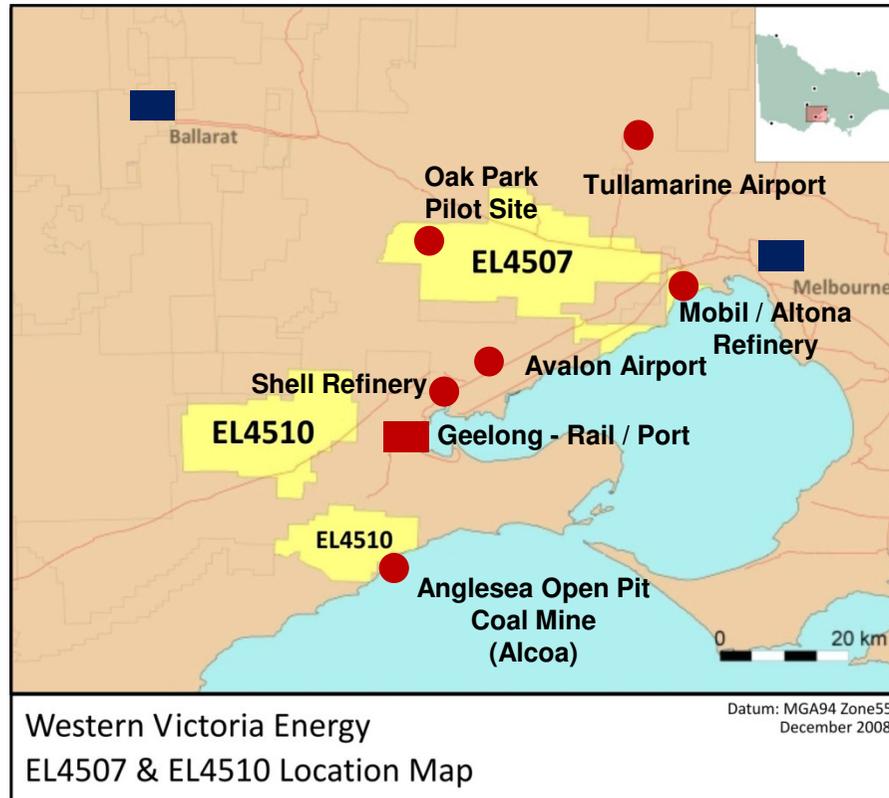
- Regal Resources is an ASX listed company (ASX:RER)
- ASX Listed Shares - 583.6 million
- Listed Options - 313 million six cent options exercisable on 6 November 2011
- Unlisted Options - 170 million six cent options exercisable on 17 March 2014
- Cash Balance - approx \$5 million after recently completed a capital raising
- Regal Resources owns 100% of Western Victoria Energy Pty Ltd (tenement holder of ELs 4507 & 4510, Victoria)
- Western Victoria Energy Pty Ltd owns 100% of Magma Oil Limited, a special purpose company formed to commercialise the world-wide rights of the UCTL process



# Coal Projects - Infrastructure

Two Exploration Licences (ELs) – EL 4507 & 4510

The ELs cover 1406km<sup>2</sup> in the Port Phillip and Torquay Basins -evidence supporting the potential for significant quantities of brown coal / lignite. Royalty of 2.5% payable to Eastern Star Gas on production

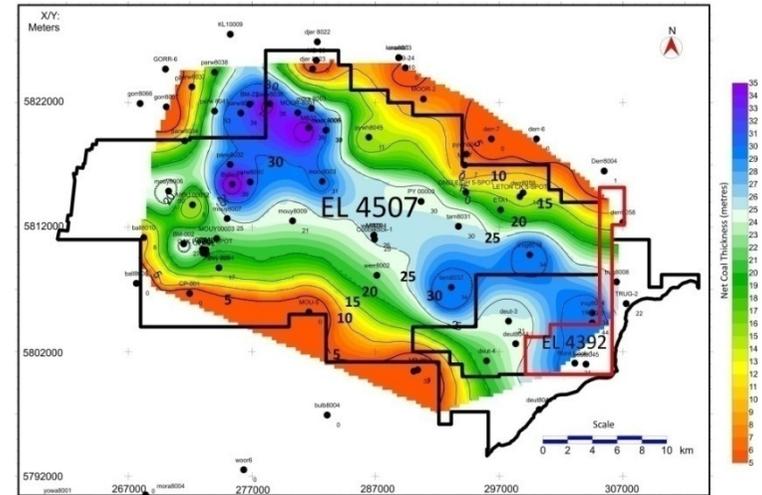


● Significant Local Infrastructure

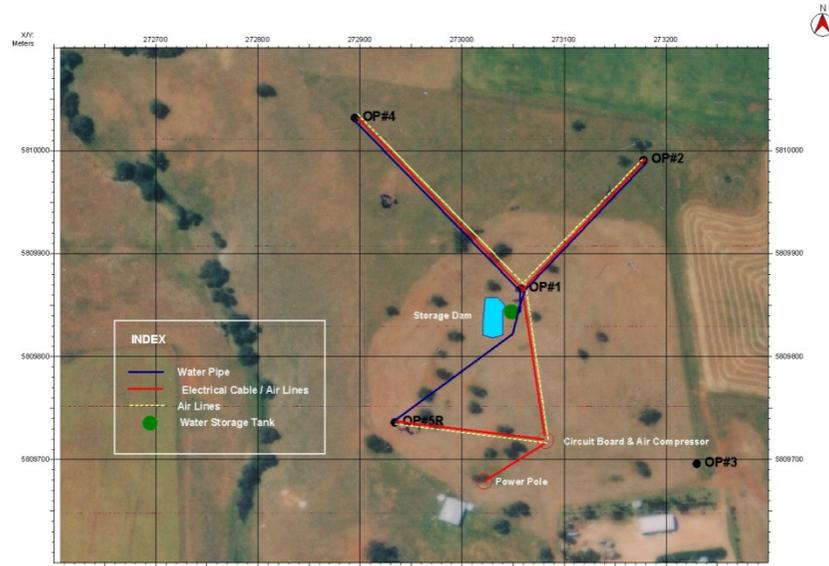


# Coal Projects

- Exploration Licence 4507
- 746 km<sup>2</sup>, located to the west of Melbourne
- covers much of the onshore Port Phillip Basin
- evidence supporting the potential for significant quantities of brown coal / lignite
- Eastern Star Gas drilled eight holes intersecting between 12 to 16 metres of coal from 90 to 95 metres
- numerous SECV drill holes and intersections for water bore drilling
- five existing wells drilled in 2002 - suitable test site for UCTL Pilot Test - Q4 2009, subject to regulatory approval



Western Victoria Energy EL4507 Net Coal Isopach Map (metres) Maddingley Seam Datum: MGA94 Zone55 December 2008

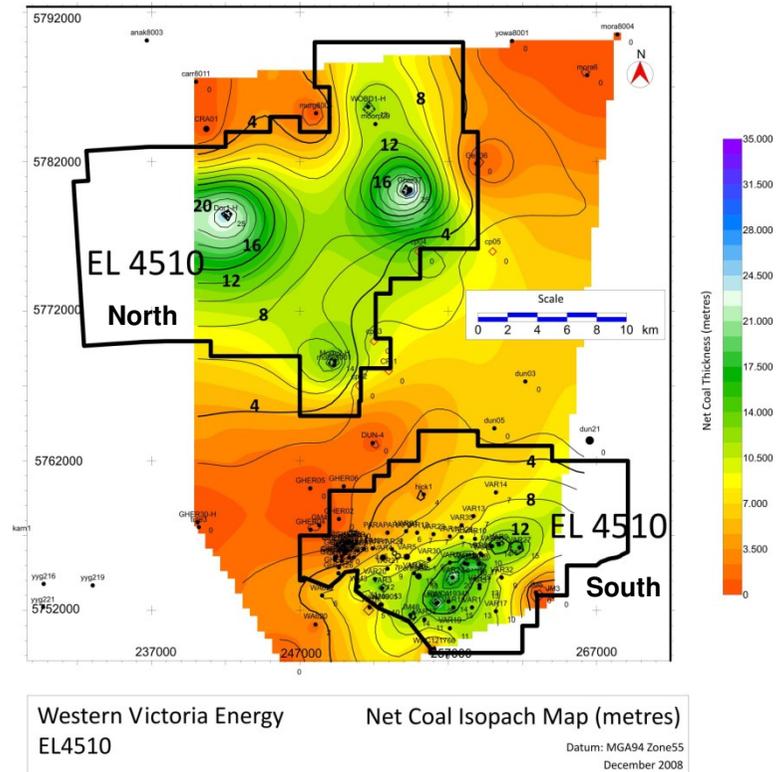


EL 4507 Oak Park Coal Seam Dewatering Pilot Project 5 Scale = 1:7500 0 25 50 75 100 125 m



# Coal Projects

- Exploration Licence 4510
- 660km<sup>2</sup>, located west and south of Geelong
- covers much of the Torquay Basin
- evidence supporting the potential for significant quantities of brown coal / lignite
- Eastern Star Gas drilled Porth Heath 1
- numerous SECV drill holes and intersections for water bore drilling
- substantial upside on exploration to the West by 2D seismic of North tenement



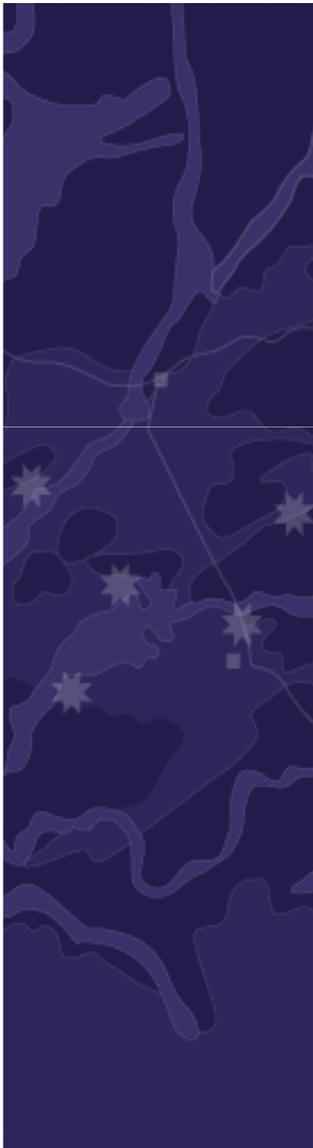
Above: Coal Sample from Porth Heath No. 1 6



# Magma Team

## Rohan Gillespie - Regal Resources, Director

- 25 years experience in business building and project development in the resources and renewable energy sector including CBM, gasification and fuel cell technologies
- Built BHP Billiton's CSM business from inception to \$150m value in three years
- At Renewable Energy Corporation, he secured alliances across three continents in support of a \$200m opportunity pipeline and developed a business model for a 5 megawatt renewable energy product
- Raised \$35m equity from domestic and international investors for Ceramic Fuel Cells Ltd, and developed their market entry strategy
- Two years at Commonwealth Bank of Australia - funding of \$1.2billion across corporate and structured finance products
- Qualifications: MBA - University of Queensland 1991, BEng (Civil) - University of Queensland 1981



# Magma Team

## Edwin Foong - Project Manager

- Over 18 years experience in the power and renewable energy industries
- Headed up Roaring 40s' (and previously Hydro Tasmania's) wind farm development business in Australia and New Zealand where he developed a number of wind farm projects ranging from \$150m to \$300m each. The development role included securing sites, obtaining regulatory approvals, negotiation of project contracts and project financing
- Marketing Manager at Ceramic Fuel Cells Ltd where he provided key input to the company's business plan which raised over \$60m in investment capital
- Engineering Consultant at Sinclair Knight Merz working across the power generation and manufacturing industry sectors
- Qualifications: MBA - Melbourne Business School 2001  
BEng(Mech)(Hons) - Monash University 1990. Graduate of the Institute of Company Directors 2006



# Magma Team

## **Brett Cooper - Regal Resources, Director**

- 30 years experience in funding and developing new businesses and commercialising new technologies
- Expertise in designing and implementing strategic partnerships and prominent companies to implement project opportunities in the infrastructure and property development areas
- Conceived and developed the \$160m International Parking Group
- Conceived the Australian Sustainable Investment Fund with James Fielding Group (then a JV between Mirvac and Leightons)
- Acted as Project Manager for Telstra's \$235m head office development in Melbourne including the successful implementation of a new contractual delivery mechanism

## **Peter O'Dowd - Inventor & EIR Consultant**

- Inventor of the UCTL process
- Over 24 years oil field operation experience with Santos
- Personal passion for chemistry
- Conducted field trial on bacterial enhanced oil production

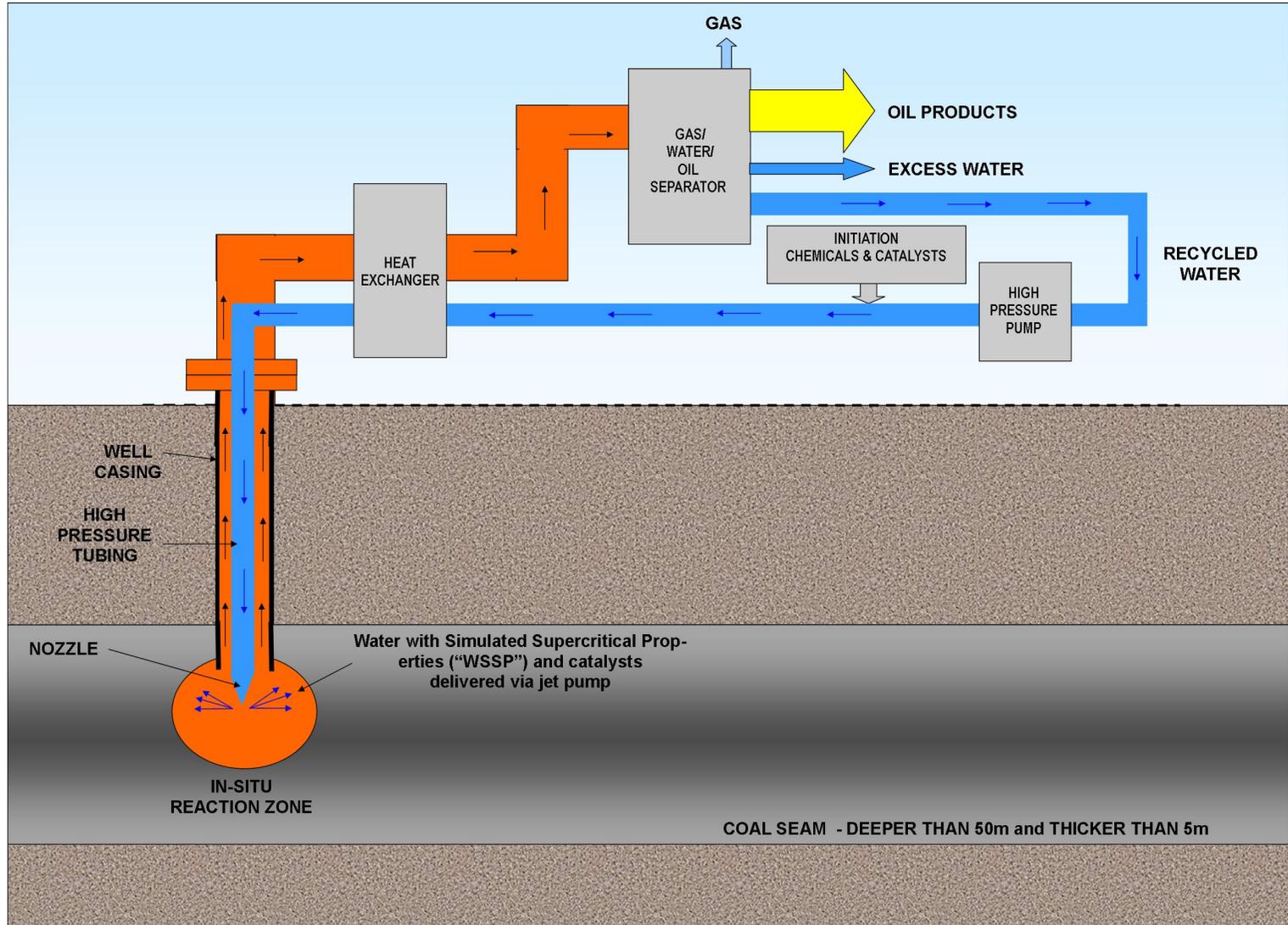


## What is UCTL?

- UCTL is a new process invention that occurs within the underground coal seam (“in situ”), whereby low rank coals are liquefied into crude oil substitute product at 300<sup>0</sup>C. A substantive heat by-product is returned to the surface potentially creating further commercial applications such as electricity generation
- The process has not been attempted previously and is subject to two patent applications (PCT) lodged by the inventor, Mr Peter O’Dowd. One patent covers the overall UCTL process and the second patent covers the delivery of Water With Simulated Supercritical Properties (“WSSP”) which is water with high kinetic energy delivered using a jet pump and purpose designed nozzle
- The liquid hydrocarbons and steam produced from the process are extracted from the below ground coal seam with conventional oil field technology that is inexpensive and readily available
- A technical due diligence review by leading process consultants AMEC (UK) has concluded that the UCTL process is an interesting and innovative process which, if successful, is highly likely to offer significant advantages over competing coal-to-oil technologies



# UCTL Process





# UCTL - Equipment at Production Scale



Jet Pump (can service multiple wells within 2kms)



Tank Battery

Note: Scale of Pilot Plant will fit within 50m x 50m area



Shell & Tube Heat Exchanger

## How does UCTL work?

- Access is gained to the coal seam via existing or new wells drilled in a conventional manner
- Small quantities of the non-toxic initiation chemical and catalysts are introduced into the coal seam that creates a heat reaction, increasing the temperature to over 300°C. This reaction occurs in a confined location within the immediate vicinity of the well. This has been successfully bench tested in a laboratory environment and confirmation of its application in an underground environment will be a component of the Pilot Test
- As the temperatures approaches 300°C the initiation chemicals are gradually replaced with WSSP and the liquefaction of the coal continues. The water content and impurities of brown coal / lignite contribute towards the liquefaction process
- The effectiveness of the WSSP can be up to 200m from the nozzle (to be confirmed by Pilot Test)
- Conversion of coal to oil using supercritical water is a proven process. Supercritical water is water at high pressure and high temperature. WSSP replicates supercritical properties by substituting high pressure with high velocity (kinetic energy)
- Liquefaction products are then extracted from the reaction zone via the annulus of the well and collected and separated using conventional oil well equipment



# Objectives of the Pilot

- Produce long-chain hydrocarbons that are suitable for processing within existing oil refineries without modification
- Verify the liquefaction of the coal produces predominantly liquids and minor amounts of gas and determine the composition of each product stream
- Compare UCTL liquids / gas ratio to that produced under ideal conditions whereby 95% liquids and 5% gas can occur
- Verify and achievement of low percentage of CO<sub>2</sub> emissions as a result of liquefaction at low temperatures (300<sup>0</sup> C) as compared to Underground Coal Gasification (UCG) that occurs at +1000<sup>0</sup>C which generates a higher proportion of CO<sub>2</sub> in the gas produced
- To verify the distance that WSSP can travel from the nozzle/s inside the coal chamber and maintain its supercritical properties to create liquid hydrocarbons and gas

# Process Comparison - Coal Conversion

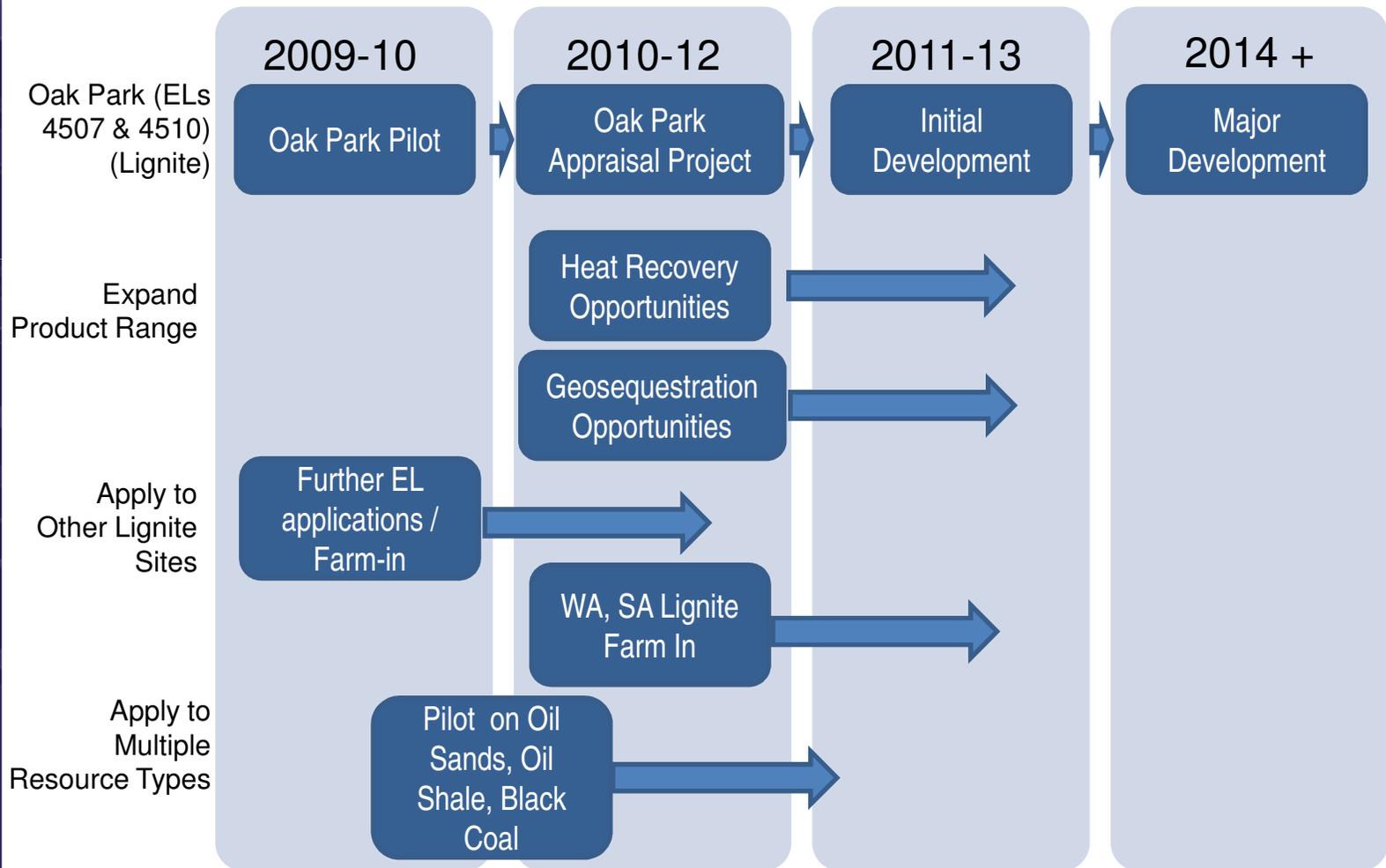
|  | UCTL  | Ignite  | Bergius   | Spitfire Oil  | Fischer-Tropsch   | UCG   |
|--|---|---|---|---|---|---|
| <b>Description</b>                           | <b>Underground</b><br>WSSP based<br>in-situ<br>liquefaction | <b>Above ground</b><br>Supercritical<br>water based<br>liquefaction | <b>Above ground</b><br>High temp and<br>pressure<br>solvent based<br>liquefaction | <b>Above ground</b><br>Medium temp<br>pyrolysis based<br>liquefaction | <b>Above ground</b><br>Indirect<br>liquefaction.<br>Coal>syngas><br>oil | <b>Underground</b><br>“in-situ”<br>gasification |
| <b>Mining of Coal</b>                        | ✓ No  | ✗ Yes   | ✗ Yes   | ✗ Yes   | ✗ Yes   | ✓ No  |
| <b>CO<sub>2</sub> Emissions</b>              | ✓ Lowest  | ✓ Low   | ✗ High  | ~ Med   | ✗ High  | ✗ High  |
| <b>Potential to Sequester CO<sub>2</sub></b> | ✓ Yes   | ✗ No  | ✗ No  | ✗ No  | ✗ No  | ✗ No  |
| <b>CTL Conversion Rate</b>                   | ✓ High  | ✓ High  | ~ Med   | ✗ Low   | ✗ Low   | ✗ Gasification only                             |
| <b>Costs</b>                                 | ✓ Lowest  | ~ Med   | ✗ High  | ✗ High  | ✗ High  | ✗ High (incl liquefaction)                      |

UCTL is the only “in-situ” coal liquefaction process with potential for lowest environmental footprint with the lowest capital and production costs. Confirmation is subject to Pilot Test results



# Implementation & Commercialisation Plan

- Prove up UCTL technology and subsequent initial projects in Victoria
- Expand to multiple sites, products and resource types





# Oak Park Pilot Current Status

- Pilot on time and on budget
- Pilot design and construction
  - Plant design completed, currently sourcing component costs
  - Gearing up for procurement and construction of plant
  - Detailed budget validation due in next few weeks
- Regulatory Approvals
  - Approval process under RD&D provisions of the EPA Act
  - Input received from regulators to complete the application documentation
  - Seeking an 18 month test period
  - Approval expected by September 2009
- Field operations
  - Pilot Test program consisting of discreet runs
    - Series of one hour runs initially
    - Extended runs of up to four hours towards end of test program
  - On schedule to commence Q1 2010
  - Regulators forming Environmental Review Committee (ERC) to track the progress of the Pilot Test and ensure high level of engagement



# Oak Park Appraisal Project

- Timing: 2010 - 2012
- Contingent upon meeting objectives of Pilot
- Continue under Regulatory Approvals from Pilot (with further variations as required)
- Key Value Creation Objective - develop the first certified oil reserves (to SPE's PRMS standard)
- Optimise the process
- Optimise nozzle design
- Trial drilling techniques to improve well yields and manage subsidence
- Demonstrate sustainable production
- Apply for and / or farm-in to other lignite deposits in Australia



## Expand Product Range

- Timing: 2010 - 2012
- Contingent upon meeting objectives of Pilot
- Develop heat recovery systems
  - recover high grade heat from the UCTL process for electricity generation
  - assess distributed generation from heat output using ORC for generating power to the grid
- Develop CO<sub>2</sub> geo-sequestration opportunities
  - to make use of the resulting underground void and residual compounds for carbonation of CO<sub>2</sub>
- Other potential products
  - source of water – UCTL expected to generate excess water (approximately 60% moisture in lignite)



## Pilots on other resource types

- Timing: 2010 - 2011
- Diversify application and increase rate of development by applying UCTL to other resource types
- Multiple Resource Pilots
  - Oil sands (initially target Alberta)
  - Oil shale (initial target QLD)
  - Black coal resources
- Seeking funding from hosts, with associated farm-in and sub-license



# Initial Production Project

- Timing: 2011 to 2013
- Contingent upon initial reserves certification from Appraisal Project
- Key Value Creation Objective - Securing third party capital for the first production scale project
- Located within EL 4507 (Oak Park) and/or EL 4510 (project will be implemented under a Mining Licence and EPA Works Approval)
- Project to be sized at commercial scale
- Secure further resource farm-ins and consider sub-licenses to accelerate roll-out



## First Major Project - From 2014

- Contingent upon success of Initial Production Project
- Of a scale comparable with major global oil projects based on large proportion of EL4507 and EL4510 resource area
- Projects based on repeatable module from Initial Development Project
- Setup transport infrastructure/arrangements and sale of crude oil product to refineries
- Incorporate excess heat recovery for power generation projects
- Incorporate sales of expanded product range



# Disclaimer

This presentation by Regal Resources Ltd ("Regal Resources" or "the Company") [ABN 23 106 294 106] (ASX: RER) contains information describing its objectives and proposals, and matters for testing and analysis. The Company and its subsidiaries have not commenced production or obtained any results from the proposed project to date. The commencement of production (if any) would be subject to completion of a pilot project, using a conceptual method of extracting liquids from coal (the UCTL process described in this presentation), which satisfies the Company's objectives for the project. No forecast or projection of results, production or other outcomes is made in this presentation or by the Company.

The Company has commenced preparation of a pilot project and seeks to establish the potential for use of the UCTL process described in this presentation within tenements held by a subsidiary (EL 4507 and EL4510). The Company also proposes to seek to identify potentially suitable locations for use of the UCTL process elsewhere. No resource or reserve within the meaning of the JORC Code has been described or quantified, and none should be implied as having been identified or as being likely to be identified. The proposed method of extraction is a new process, and no indication can be given as to whether any previously explored resource or reserve will necessarily be suitable for economic development or production by this method. As part of the testing and development of the UCTL process, the Company will seek to identify further criteria for the assessment of potential locations for employing the UCTL process, and in the process may (but does not represent that it will) identify resources which can be estimated or described in accordance with the requirements of the JORC Code. The Company would make announcements to ASX Limited in accordance with the requirements of the JORC Code if exploration results are obtained or if a resource or reserve were to be identified.

The purpose of this presentation is to provide background information to assist in obtaining a general understanding of the Company's proposals and objectives. This presentation is not to be considered as a recommendation by Regal Resources or any of its subsidiaries, directors, officers, affiliates, associates or representatives that any person invest in its securities. It does not take into account the investment objectives, financial situation and particular needs of each potential investor. If you are unclear in relation to any matter or you have any questions, you should seek advice from an accountant or financial adviser.