



**carbonenergy**

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Carbon Energy Limited  
ABN 56 057 552 137  
Carbon Energy (Operations) Pty Ltd  
ABN 61 105 176 967

## ASX / Media Announcement

13 June, 2013

### **Carbon Energy Wins Advanced Clean Coal Technology Award**

Carbon Energy (ASX:CNX, OTCQX:CNXAY) is pleased to announce the Company has been awarded the Advanced Clean Coal Technology Award for its proprietary keyseam® underground coal gasification (UCG) technology.

The award was announced at the 10<sup>th</sup> Clean Coal Forum in Beijing on 13 June 2013, at which Carbon Energy presented. A copy of the Company's presentation is attached.

**ENDS**

For and on behalf of the Board

Morné Engelbrecht  
Acting Chief Executive Officer

**For more information please contact Andrew Crook on +61 419 788 431  
or refer to our website at [www.carbonenergy.com.au](http://www.carbonenergy.com.au)**

## **About Carbon Energy**

Carbon Energy specialises in underground coal gasification (UCG). Our proprietary keyseam® technology is the key to unlocking new energy sources, transforming stranded, deep or otherwise uneconomic coal resources into high-value fuels with lower carbon emissions.

Carbon Energy delivers end-to-end UCG services from initial project assessment through to commercial project development, operations, site decommissioning and rehabilitation.

Carbon Energy achieved Proof of Concept of its keyseam technology following 10 years of research by Australia's premier scientific research agency, the Commonwealth Scientific and Industrial Research organisation (CSIRO), 5 years of in-field trials and over \$100 million investment in technology development.

By successfully proving our keyseam technology, we have earned a reputation for delivering consistent, high quality product gas which can be used for many purposes including power generation, fertilisers and production of pipeline quality gas. keyseam maximises resource efficiency, whilst minimising surface disturbance and preserving groundwater quality.

Carbon Energy also has previously announced the following assets:

- 2.0 Billion tonnes<sup>1</sup> of coal JORC Inferred Resource in southeast Queensland's Surat Basin;
- 743PJ<sup>2</sup> of Certified 2P syngas reserves in southeast Queensland's Surat Basin; and,
- 910 Million tonnes<sup>3</sup> of coal JORC Inferred Resource at its Bridger, Wyoming USA farm-in area.

The Company is headquartered in Brisbane, Australia, listed on the Australian securities Exchange (ASX) as CNX and is quoted on the OTCQX International Exchange as CNXAY in the United States. Carbon Energy has UCG projects in Australia, China, Chile, Turkey and the United States.

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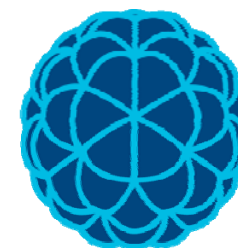
<sup>1</sup> See CNX ASX/Media Announcement 2 April 2013. CNX is not aware of any new information that would materially affect the Resources stated.

<sup>2</sup> See CNX ASX/Media Announcement 8 December 2009. CNX is not aware of any new information that would materially affect the Reserves stated.

<sup>3</sup> See ASX/Media Announcement 23 January 2013. CNX is not aware of any new information that would materially affect the Resources stated.

# CARBON ENERGY

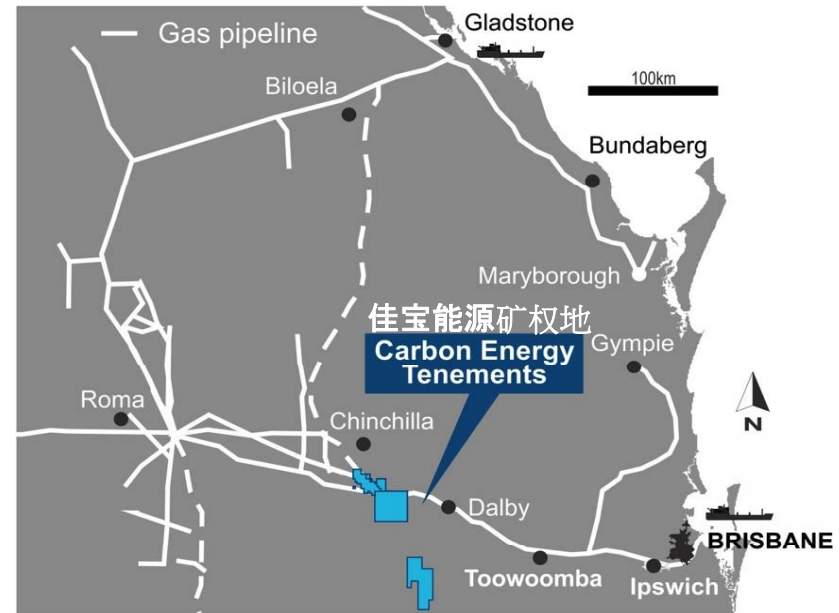
## 佳宝能源公司



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# COMPANY OVERVIEW 公司概况

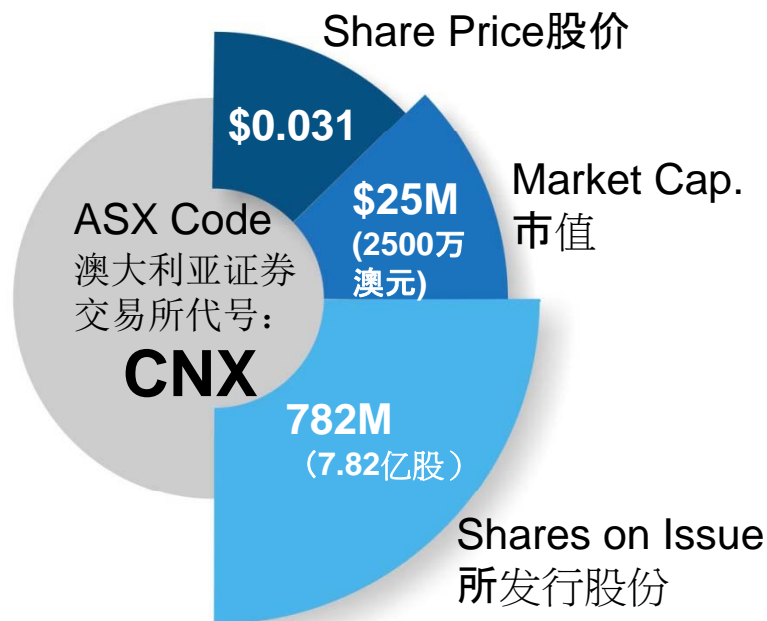
- Carbon Energy is **ASX and OTCQX Listed**
- 佳宝能源公司是一家在澳大利亚证券交易所和美国OTCQX上市的公司
- **Underground coal gasification (UCG)** technology company
- 公司提供煤炭地下气化 (UCG) 技术
- Licenses proprietary **keyseam UCG technology** - CSIRO Technology
- 授予其专有的**keyseam**煤炭地下气化技术的使用许可——澳大利亚联邦科学与工业研究组织开发的技术
- Provides **UCG engineering services**
- 提供煤炭地下气化工程服务
- **100% owner** of substantial coal and gas assets in the Surat Basin, Australia
- 是澳大利亚苏拉特盆地大量煤炭与天然气资产的100%所有者



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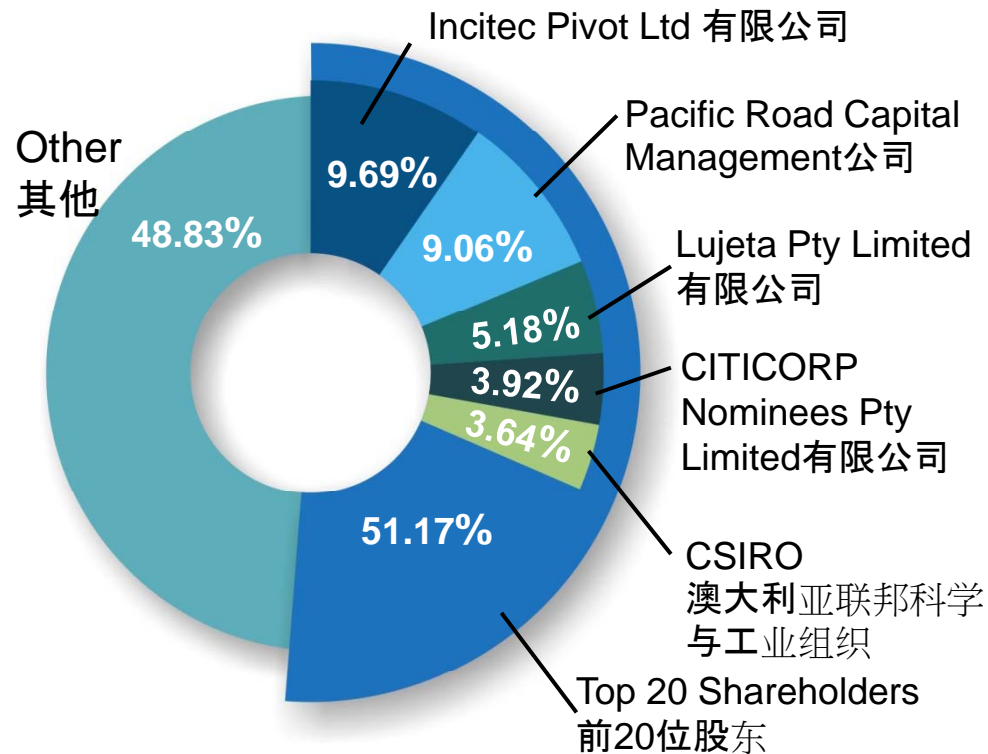
# CORPORATE OVERVIEW 公司概况

## Capital Structure\* 资本结构\*



\*As at 8 May 2013  
截止2013年5月8日

## Major Shareholders 主要股东



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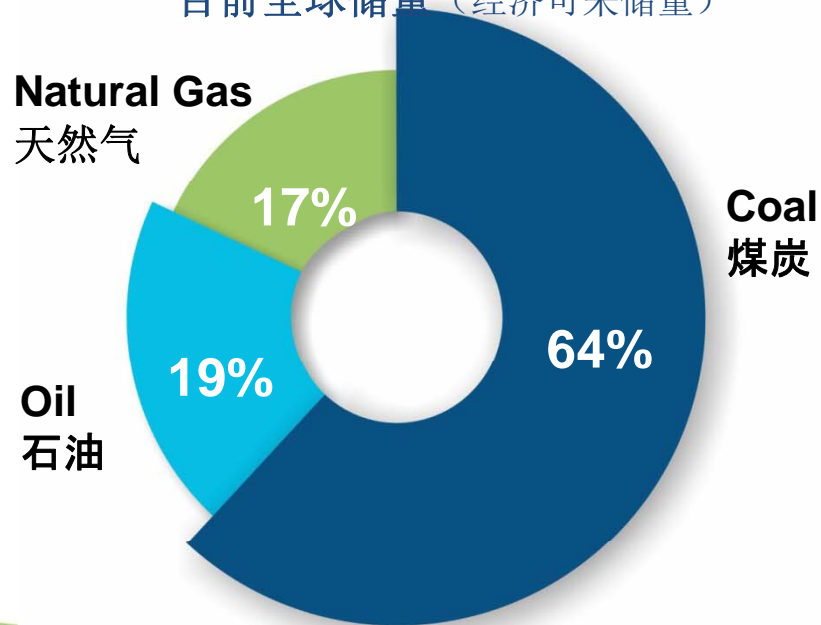
# COAL RESOURCES WORLDWIDE 全球煤炭资源

**International Energy Agency Clean Coal Centre** – “UCG is now being recognised all around the world as a clean, viable, and economic method of accessing and using coal reserves previously considered unrecoverable.”

国际能源署洁净煤中心——“煤炭地下气化技术目前是全球公认的一种清洁、可行并可经济地充分利用曾被认为是无法开采的煤炭储量的方法。”

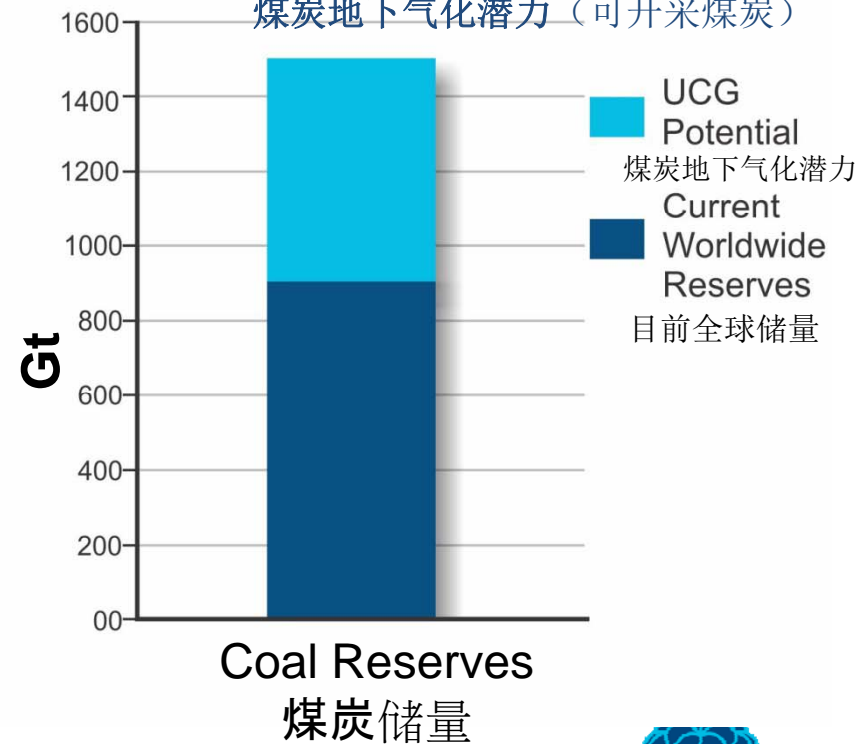
## Current Worldwide Reserves (economically recoverable)

目前全球储量（经济可采储量）



## UCG Potential (Coal recoverable)

煤炭地下气化潜力（可开采煤炭）



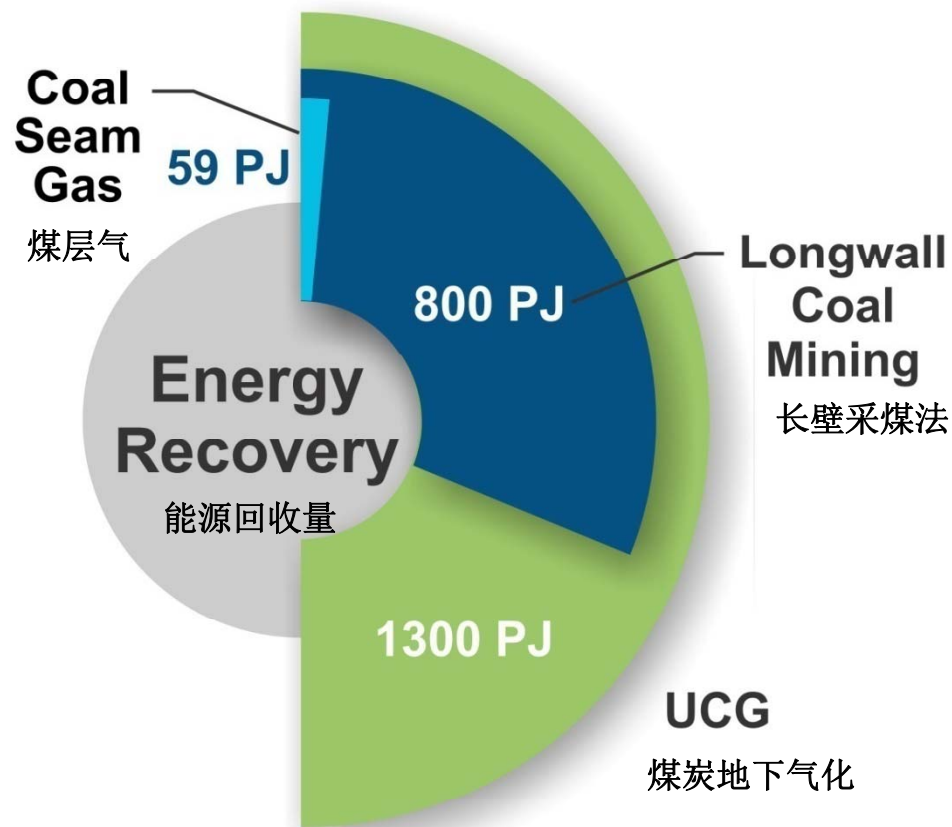
Source: “Underground coal gasification” Gordon R Couch July 2009 IEA Clean Coal Centre  
来源：国际能源署洁净煤中心Gordon R Couch于2009年7月发表的《煤炭地下气化》



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# ENERGY RECOVERY COMPARISON

## 能源回收比较



Source: "Underground coal gasification" Gordon R Couch July 2009 IEA Clean Coal Centre  
Energy extract from a typical 12km<sup>2</sup> deposit)

来源：国际能源署洁净煤中心Gordon R Couch于2009年7月发表的《煤炭地下气化》  
(从典型的12平方公里煤层所提取的能量)



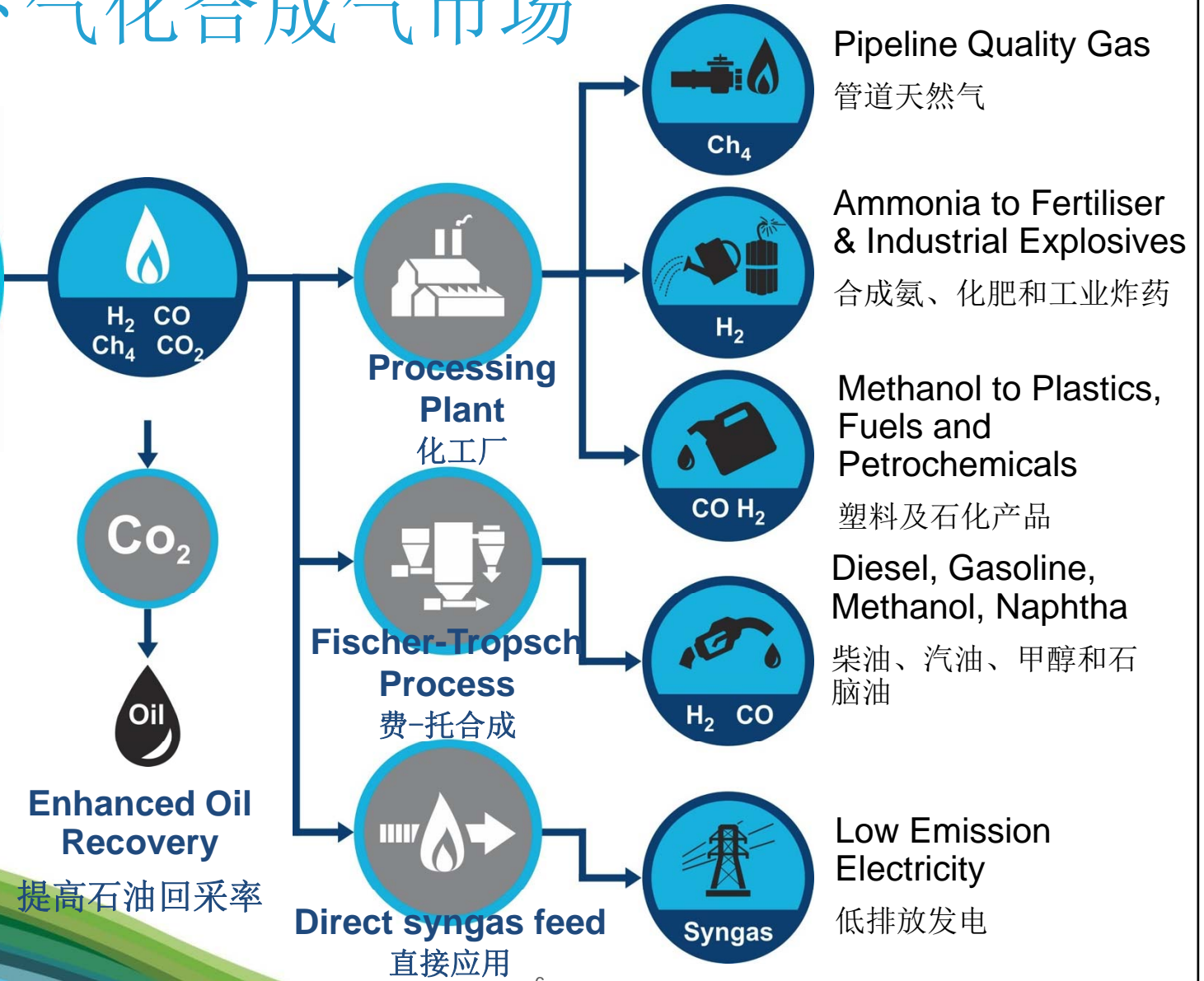
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# UCG SYNGAS MARKETS

## 煤炭地下气化合成气市场



**keyseam  
Technology**  
keyseam技术



**Enhanced Oil Recovery**  
提高石油回采率

**Direct syngas feed**  
直接应用

**Pipeline Quality Gas**  
管道天然气

**Ammonia to Fertiliser & Industrial Explosives**  
合成氨、化肥和工业炸药

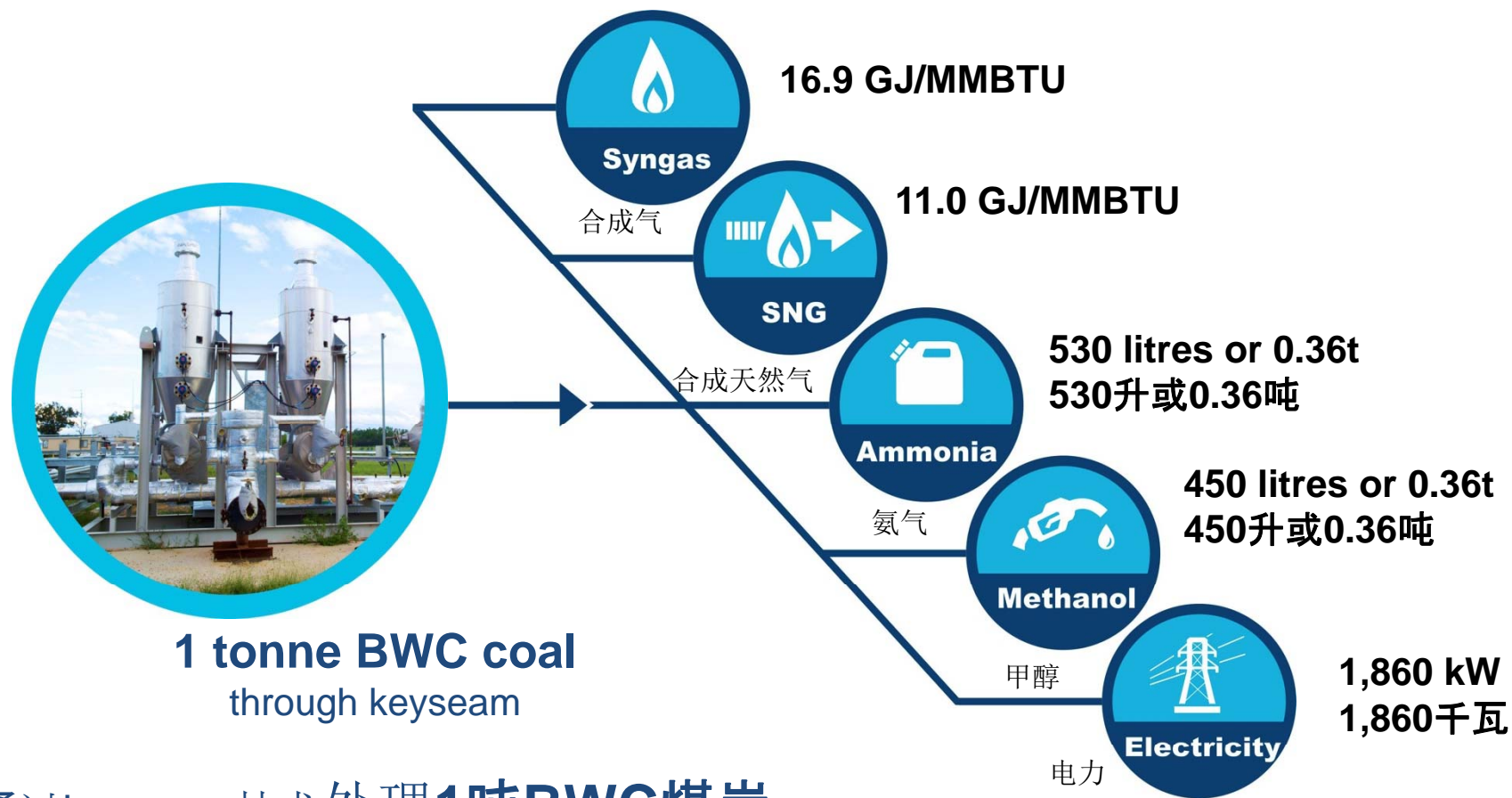
**Methanol to Plastics, Fuels and Petrochemicals**  
塑料及石化产品

**Diesel, Gasoline, Methanol, Naphtha**  
柴油、汽油、甲醇和石脑油

**Low Emission Electricity**  
低排放发电



# KEYSEAM PRODUCT KEYSEAM产品



1 tonne BWC coal  
through keyseam

通过keyseam技术处理1吨BWC煤炭



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# STRATEGIC VALUE DRIVERS

## 战略价值驱动因素

佳宝能源公司



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**Licensing Technology  
& Technical Services**  
技术许可授予与技术服务



**UCG Syngas Reserve  
Development in QLD**  
昆士兰煤炭地下气化合  
成气储量开发

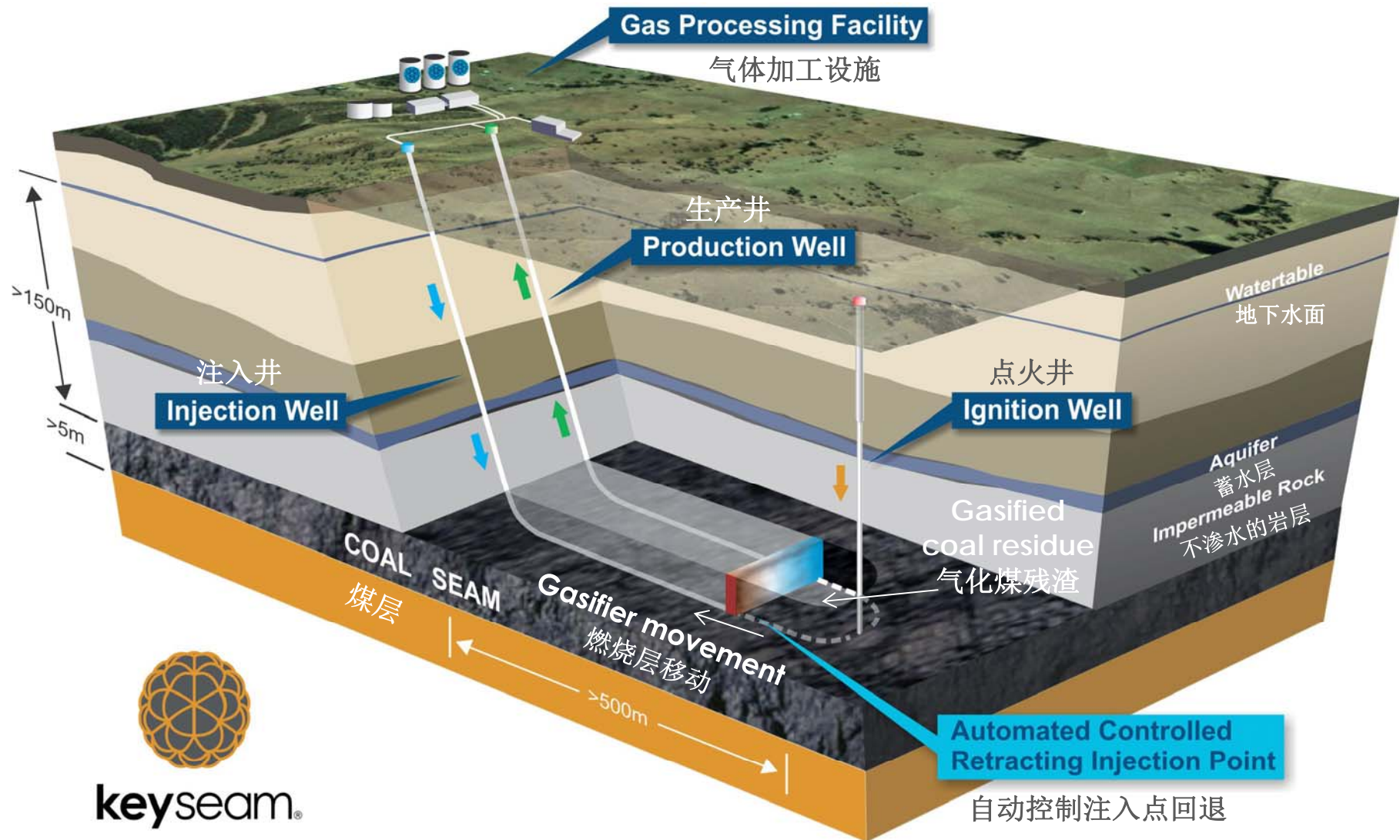


**Surat Basin  
Thermal Coal  
Commercialisation**  
苏拉特盆地  
动力煤商业化



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# keyseam UCG: keyseam煤炭地下气化技术:



keyseam®



# PROOF OF CONCEPT KEYSEAM

## KEYSEAM概念验证



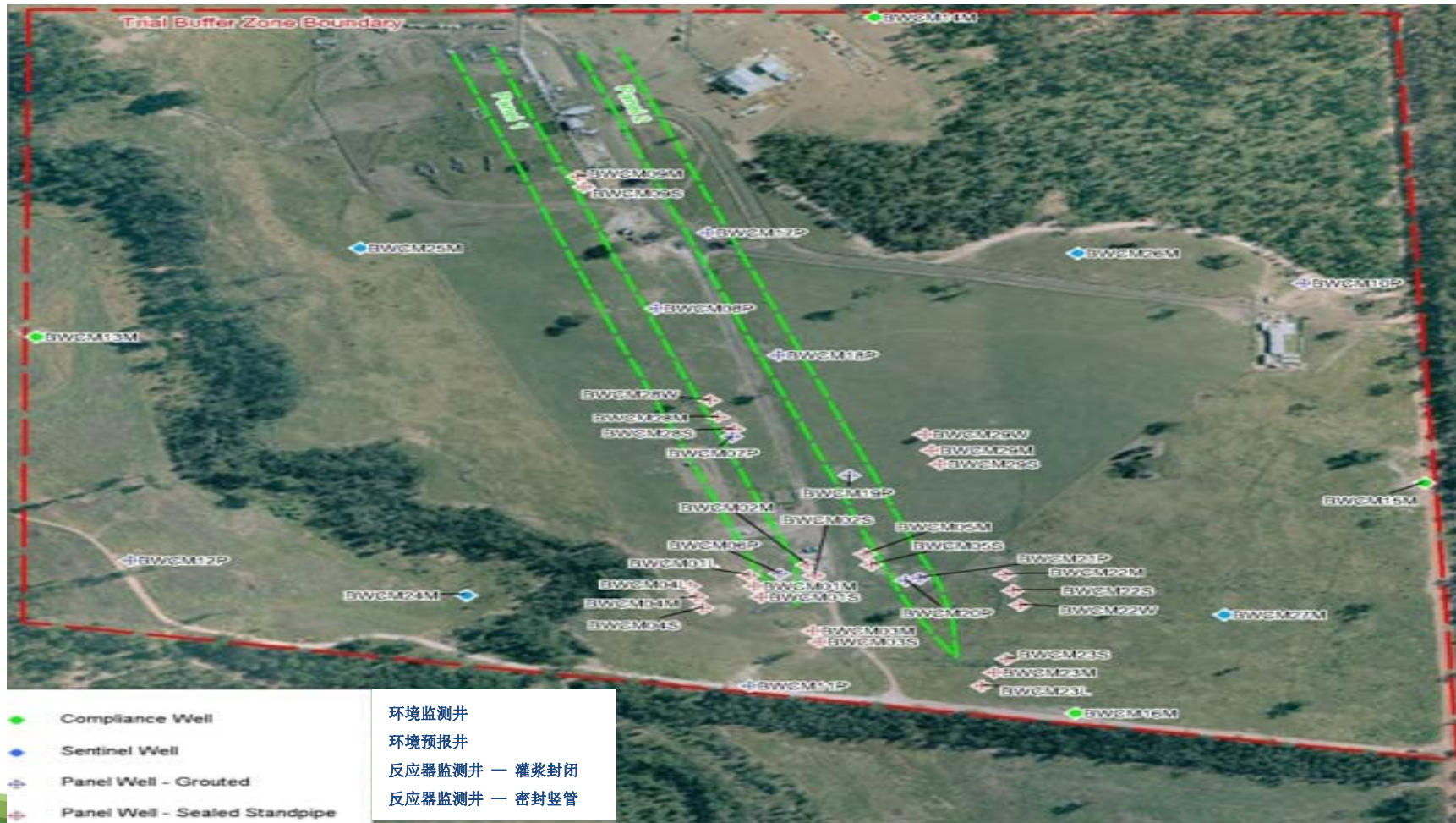
**Carbon Energy has achieved Proof of Concept and has demonstrated:**  
**佳宝能源公司的技术已通过“概念验证”并成功示范了：**

- Drilling and construction 钻井和施工建设
- Ignition and commissioning 点火和试运行
- **Over 5 years of in-field operation 5年多的实地运行**
- **20 months continuous production 20个月的持续生产**
- **Consistent production of high quality syngas**
- 持续稳定的生产高质量合成气
- Operation of 1.5 MW Power Station
- 运行1.5兆瓦的发电站
- Connected, synchronised to the local grid
- 与本地电网连接并同步
- **Validation of gasification model prediction**
- 验证了气化预测模型
- **Environmental management**
- 环境管理
- **Independently verified**
- 已经过独立验证



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# BLOODWOOD CREEK SITE 红木溪现场



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# BLOODWOOD CREEK SITE 红木溪现场



Power Station 发电站



Ignition Well 点火井



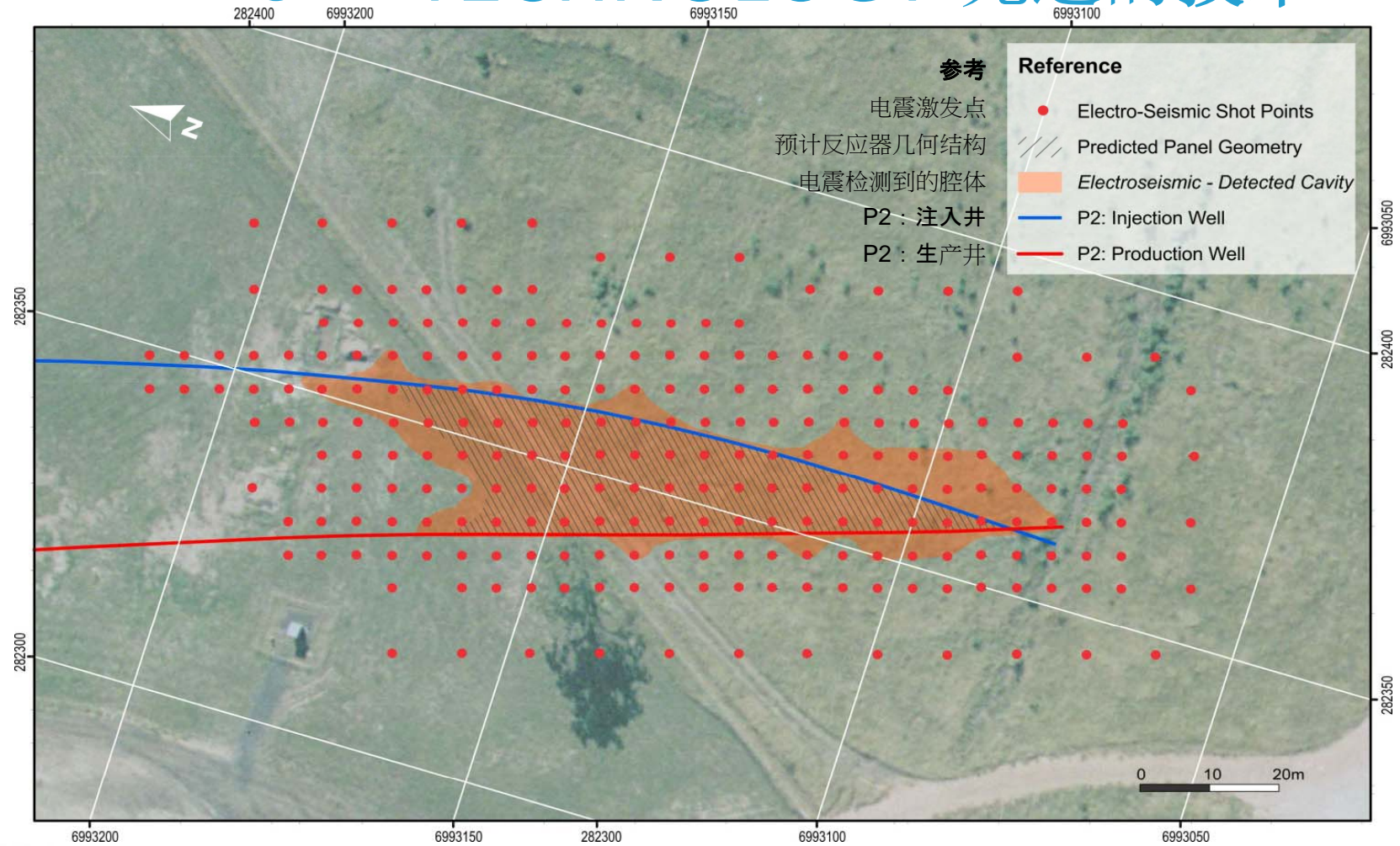
Injection Well 注入井

Knock-out Pots 气液分离器

Product Well 生产井



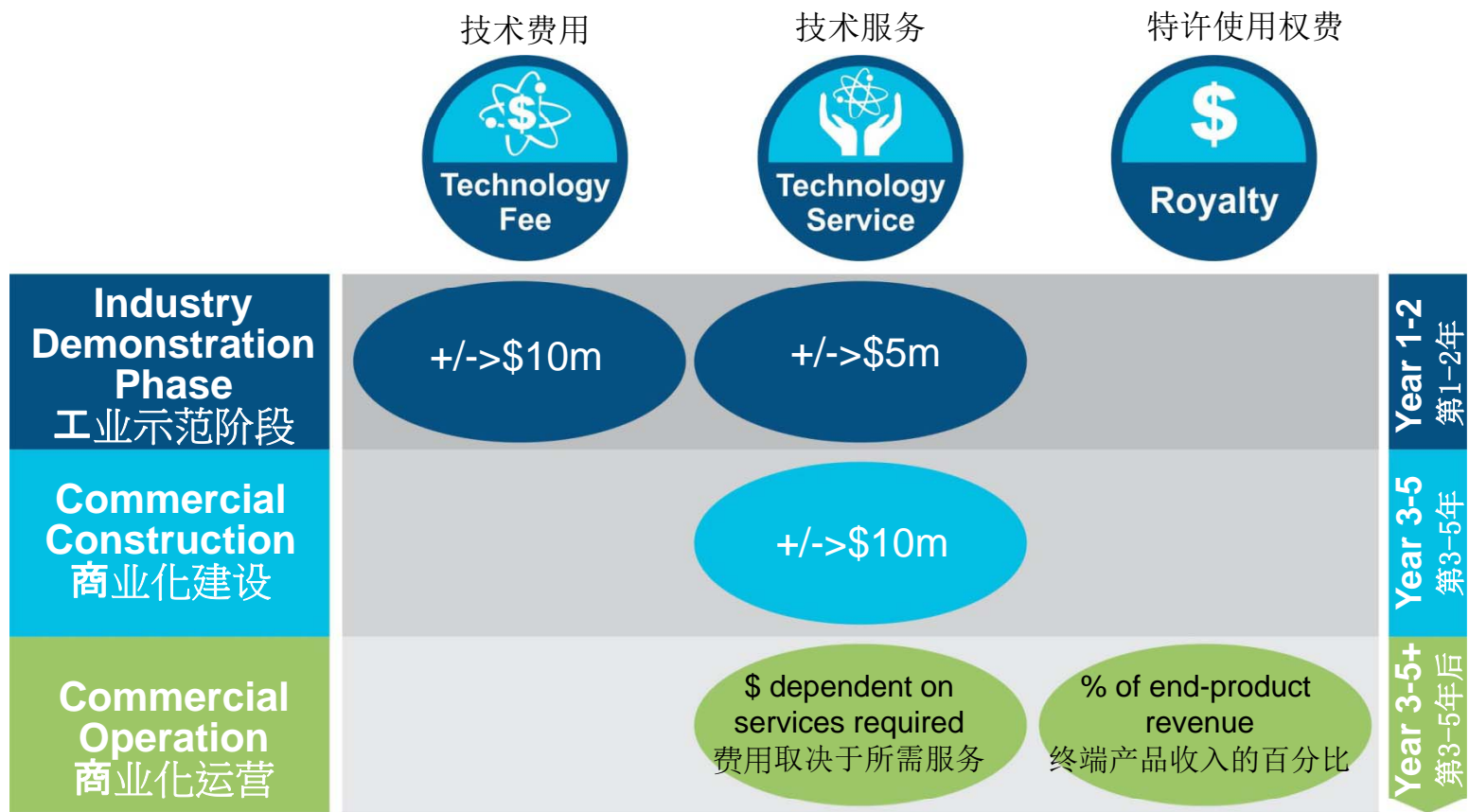
# ADVANCED TECHNOLOGY 先进的技术



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# KEYSEAM LICENSING MODEL

## KEYSEAM 技术许可授权模式



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# LICENSING TECHNOLOGY 授予技术使用许可

## SHANXI COAL TRANSPORTATION & SALES GROUP

### 山西煤炭运销集团

#### New Approach — Shanxi Sanyuan Coal 新合作—— 山西三元煤业

- Definitive Agreement signed 17 October 2012
- 于2012年10月17日签署《最终协议》
- CNX does not provide development capital
- 佳宝能源公司不提供开发资金

#### The Project - Stage 1 项目第一期

- Demonstration UCG Panel adjacent to Changzhi city
- 在长治市附近建立煤炭地下气化示范采区
- Recommendation for Carbon Energy's keyseam technology provided by Peking University
- 佳宝能源公司的keyseam技术由北京大学推荐

#### The Project - Stage 2 项目第二期

- Development of major commercial projects with a minimum production rate of 30 PJ p.a of syngas.
- 最低合成气年产量为30PJ的大型商业项目开发

#### Commercial Structure 商业化结构

- Upfront technology fee
- 预付技术费
- Ongoing technical & engineering service fees
- 持续技术与工程服务费
- Royalties
- 特许使用权费



# LICENSING TECHNOLOGY 授予技术使用许可

## ZHENGMEI GROUP 郑煤集团

### New Approach — Zhengmei Group 新合作—— 郑煤集团

- **MOU and TSA signed**  
07 May 13
- 于13年5月7日签署《谅解备忘录》和《技术服务协议》
- **Zhengmei Group among China's top 500 Enterprises**
- 郑煤集团属于中国500强企业
- **Government approved project**
- 政府批准的项目

### The Project - Stage 1 项目第一期

- Industrial Demonstration UCG Panel
- 煤炭地下气化工业示范采区
- **Technology fee payable in full on success of Demonstration project**
- 示范项目成功后需全额支付技术费用

### The Project - Stage 2 项目第二期

- Development of commercial scale project
- 商业规模项目开发

### Commercial Structure 商业化结构

- CNX does not provide development capital
- 佳宝能源公司不提供开发资金
- **Technology fee of \$10 million** (partly paid in advance in escrow, 100% release on success of Demonstration project)
- 1000万澳元技术费用（部分费用提前支付至托管账户，示范项目成功后100%释放资金）
- **Ongoing technical & engineering service fees**
- 持续技术和工程服务费
- **Ongoing royalties**
- 持续特许使用权费



# CHINA LOCATION MAP

## 中国项目位置

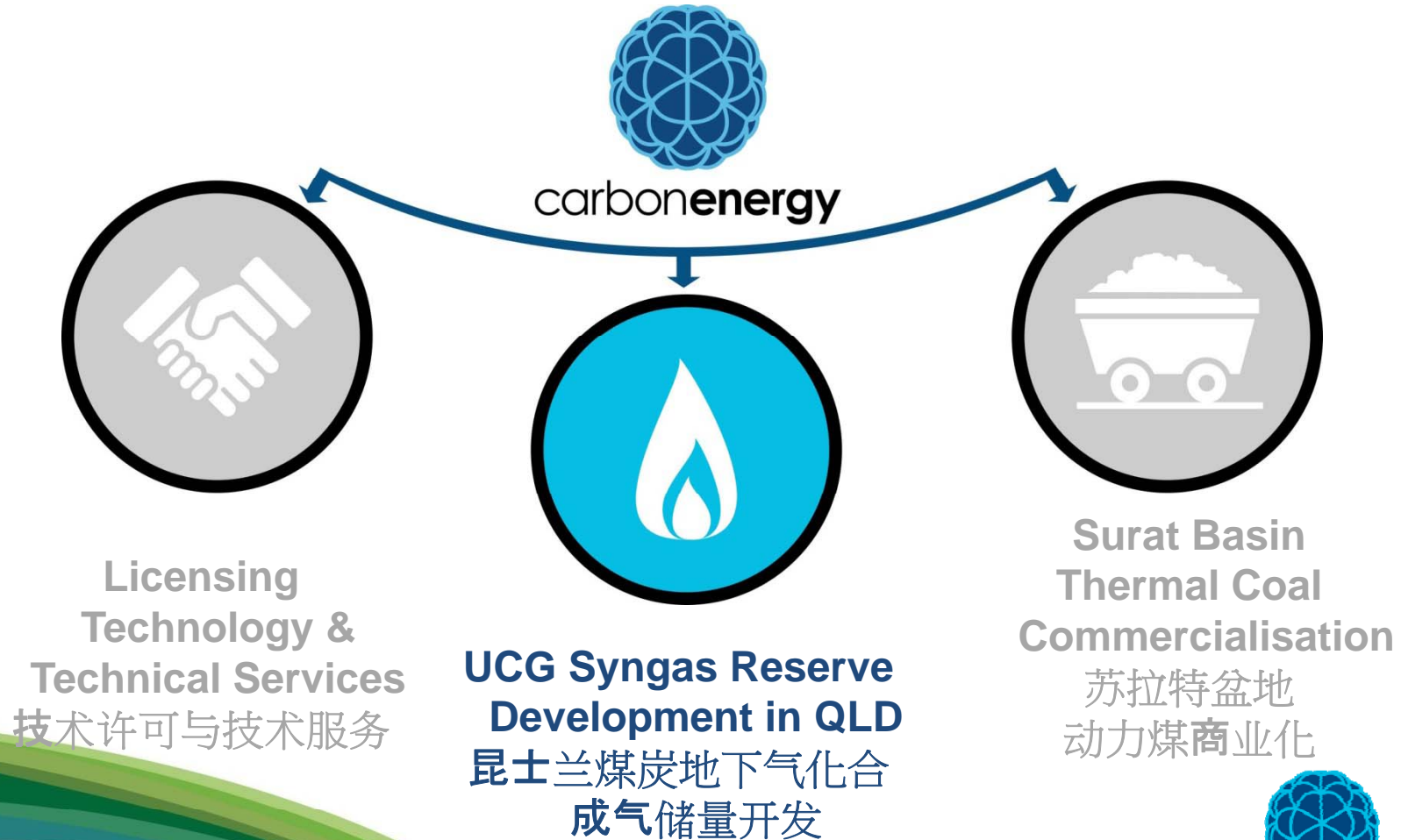


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# STRATEGIC VALUE DRIVERS

## 战略价值驱动因素

Carbon Energy is moving toward the next phase of development through the following three strategies 佳宝能源公司正通过以下三大战略进入下一个阶段发展



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# WORLD'S ONLY CERTIFIED SYNGAS RESERVE

## 全球唯一经证实的合成气储量

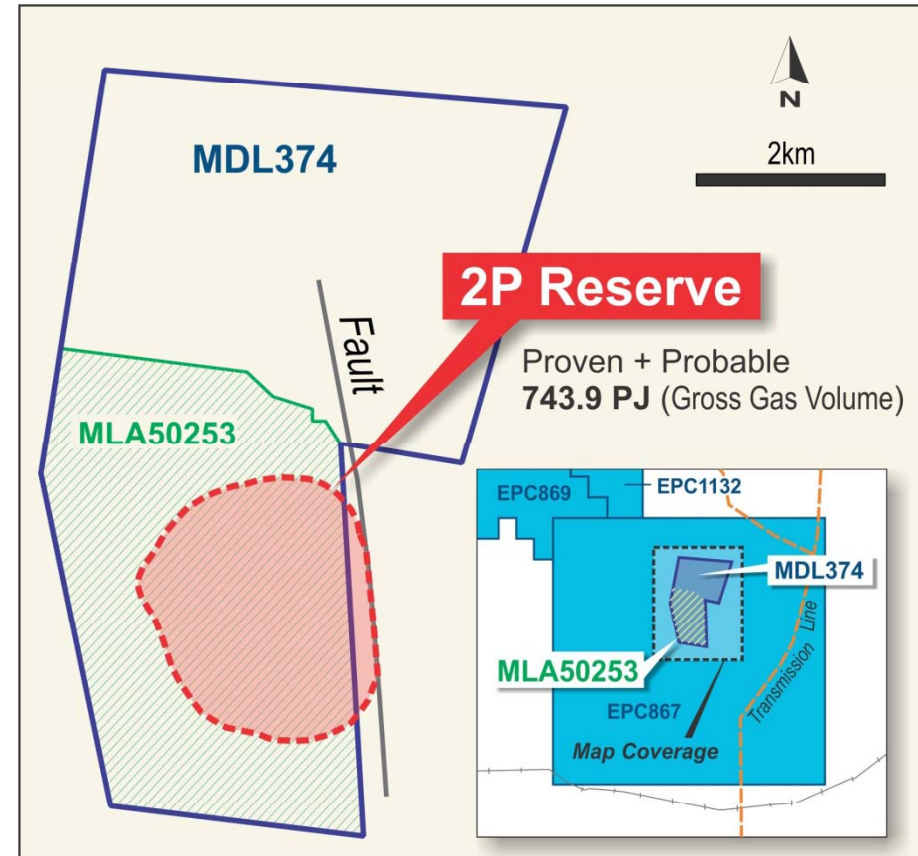
### Snapshot 简介

**Location** Surat Basin, Queensland  
**位置** 昆士兰州苏拉特盆地

**Asset** 743PJ 2P (784Bcf) & 1,042PJ 3P (1.1 Tcf) syngas Reserves  
**资产** 合成气储量分别为743PJ 2P (784Bcf) 和1042PJ 3P (1.1 Tcf)

**Downstream Markets** SE Queensland gas markets: ammonia, power generation, methanol, LNG export markets  
**下游市场** 昆士兰东南部燃气市场：氨气、发电、甲醇、液化天然气出口市场

**Infrastructure** Access to major infrastructure  
**基础设施** 连通主要基础设施



Carbon Energy 2P Resource area Bloodwood Creek  
佳宝能源公司红木溪区域2P资源

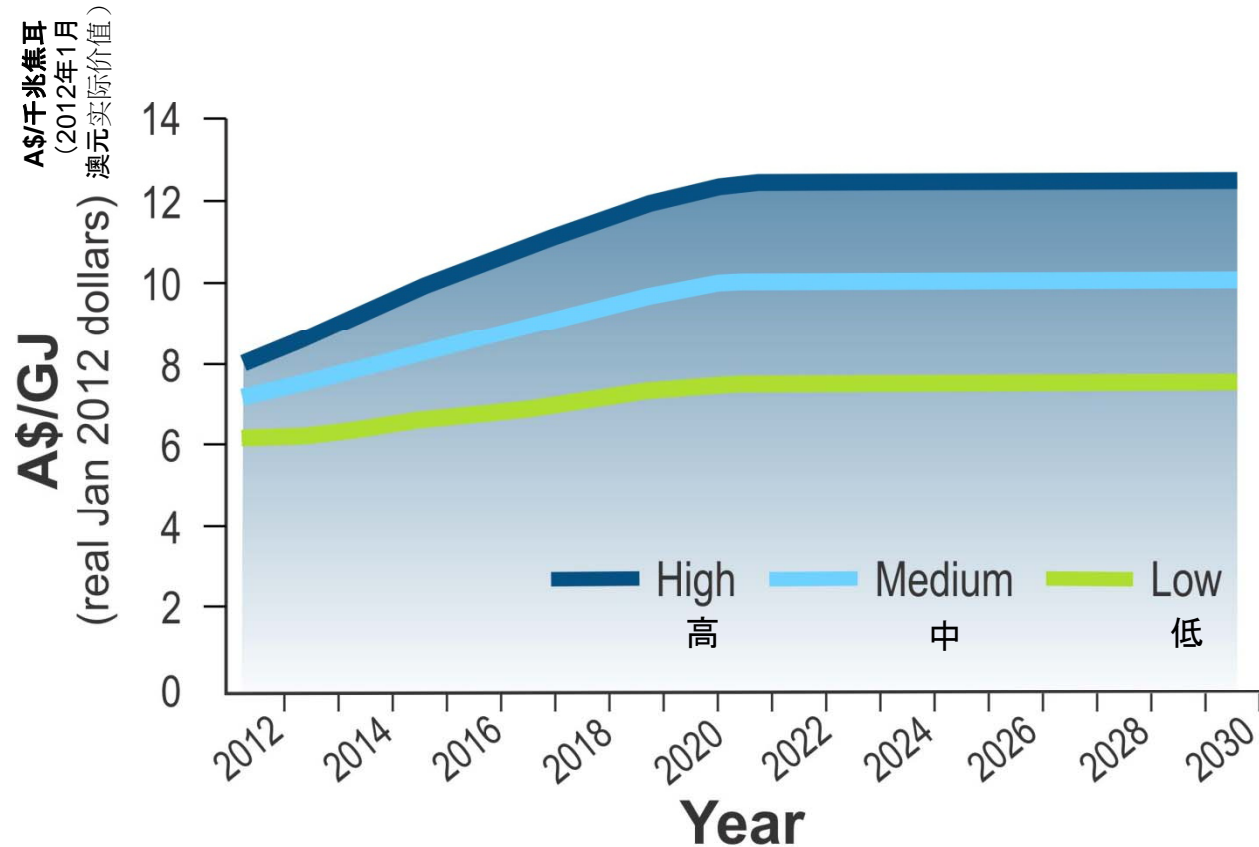


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# STRONG EAST COAST DEMAND – DOMESTIC & EXPORT

## 东部沿海地区需求高——国内市场和出口

- **Large scale LNG Developments – 2014/15**
- **大型液化天然气开发——2014/15年**
- **Declining production from east coast conventional gas**
- **东部沿海地区常规天然气产量下降**
- **Domestic industrial gas users unable to renew long term contracts**
- **国内工业气体用户无法续签长期合同**



*“The Queensland Market lacks liquidity, with gas in short supply for new contracts both pre and post 2015”*

*“昆士兰市场缺乏流动性，在2015年前后对新用户会出现天然气供应短缺情况。”*

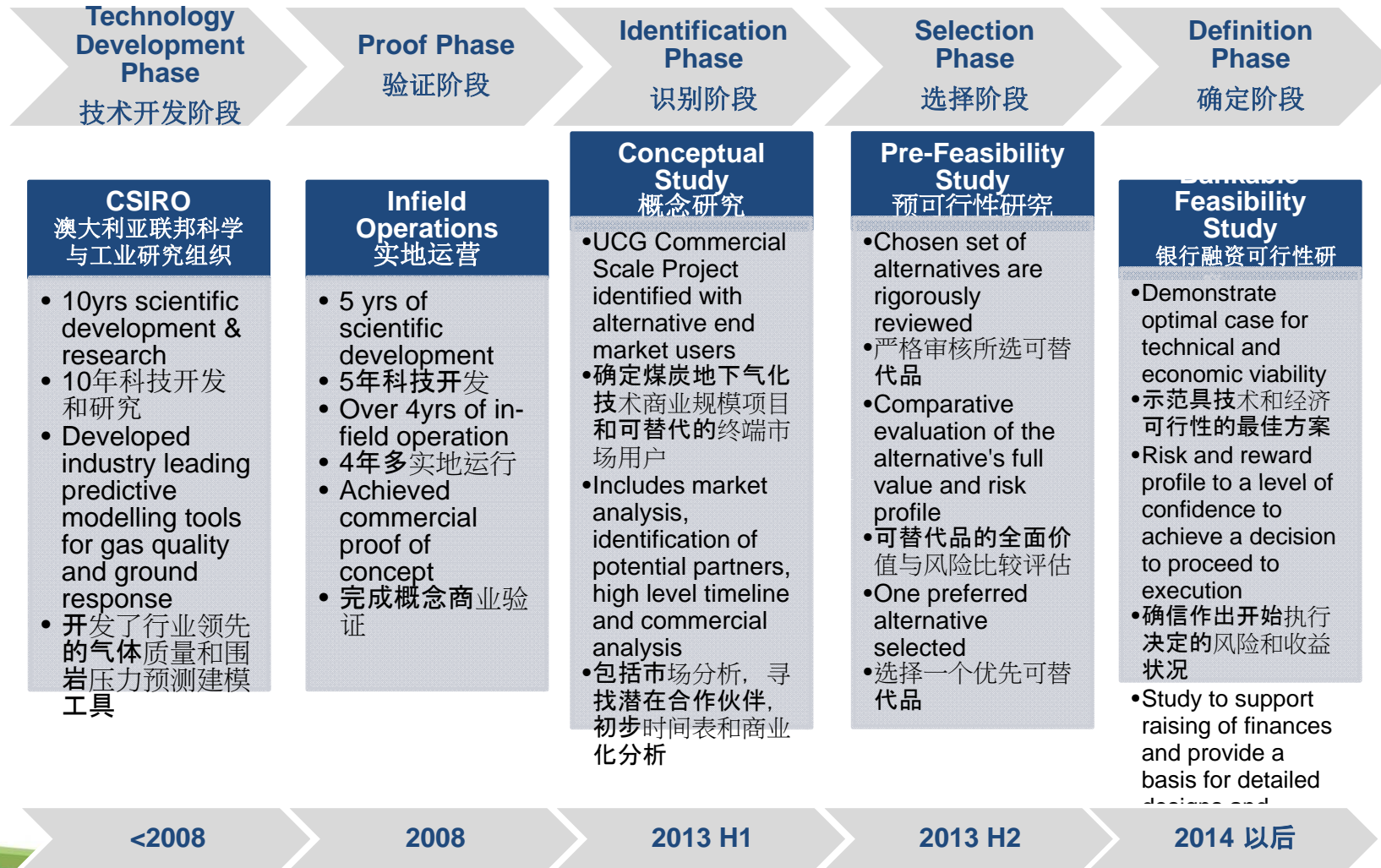
The Queensland Government, 2012 Gas Market Review  
昆士兰政府《2012年燃气市场评述》



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# PROJECT DEVELOPMENT PHASES 项目开发阶段



设计和施工提供基础的研究



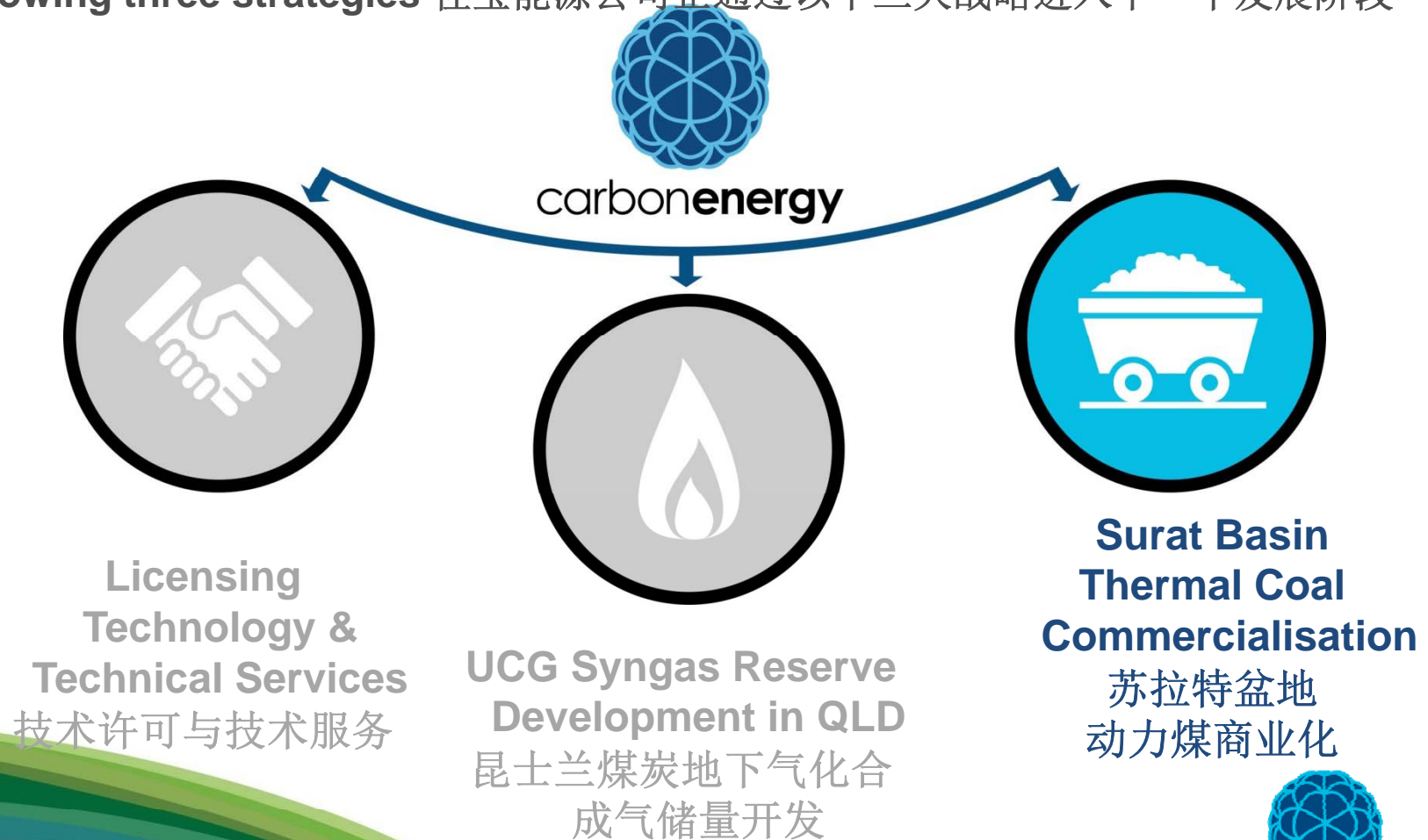
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# STRATEGIC VALUE DRIVERS

## 战略价值驱动因素

Carbon Energy is moving toward the next phase of development through the following three strategies 佳宝能源公司正通过以下三大战略进入下一个发展阶段



# SURAT BASIN COAL COMMERCIALISATION

## 苏拉特盆地煤炭商业化



### Snapshot 简介

Resource  
资源

- 2.0Bt JORC Inferred
- 按JORC标准推断资源量达20亿吨
- 21Bt Exploration Target
- 210亿吨勘探目标

Product  
产品

- Export thermal coal  
出口动力煤
- ~ Gross CV 6,200 kCal/kg
  - ~ 总热值6200千卡/公斤
  - ~ 11% ash
  - ~ 11% 灰分

Potential output  
from 3 Longwall  
Mining areas  
三大长壁开采区  
的潜在产量

- 15 million product tonnes p.a.
- 每年1500万吨产品
- 4.5m mining height
- 4.5米开采高度

FEL 1 Concept  
Study Total  
Production Cost  
前期设计第一阶  
段概念研究  
生产成本

- A\$81 per tonne FOB
- 离岸价每吨81澳元
- A\$23.45 per tonne at the pit head
- 井口成本为每吨23.45吨

Distance to port  
到港口距离

- +400km to Gladstone
- 距离格莱斯通港口400多公里
- +250km via Port of Brisbane
- 距离布里斯班港口  
250多公里

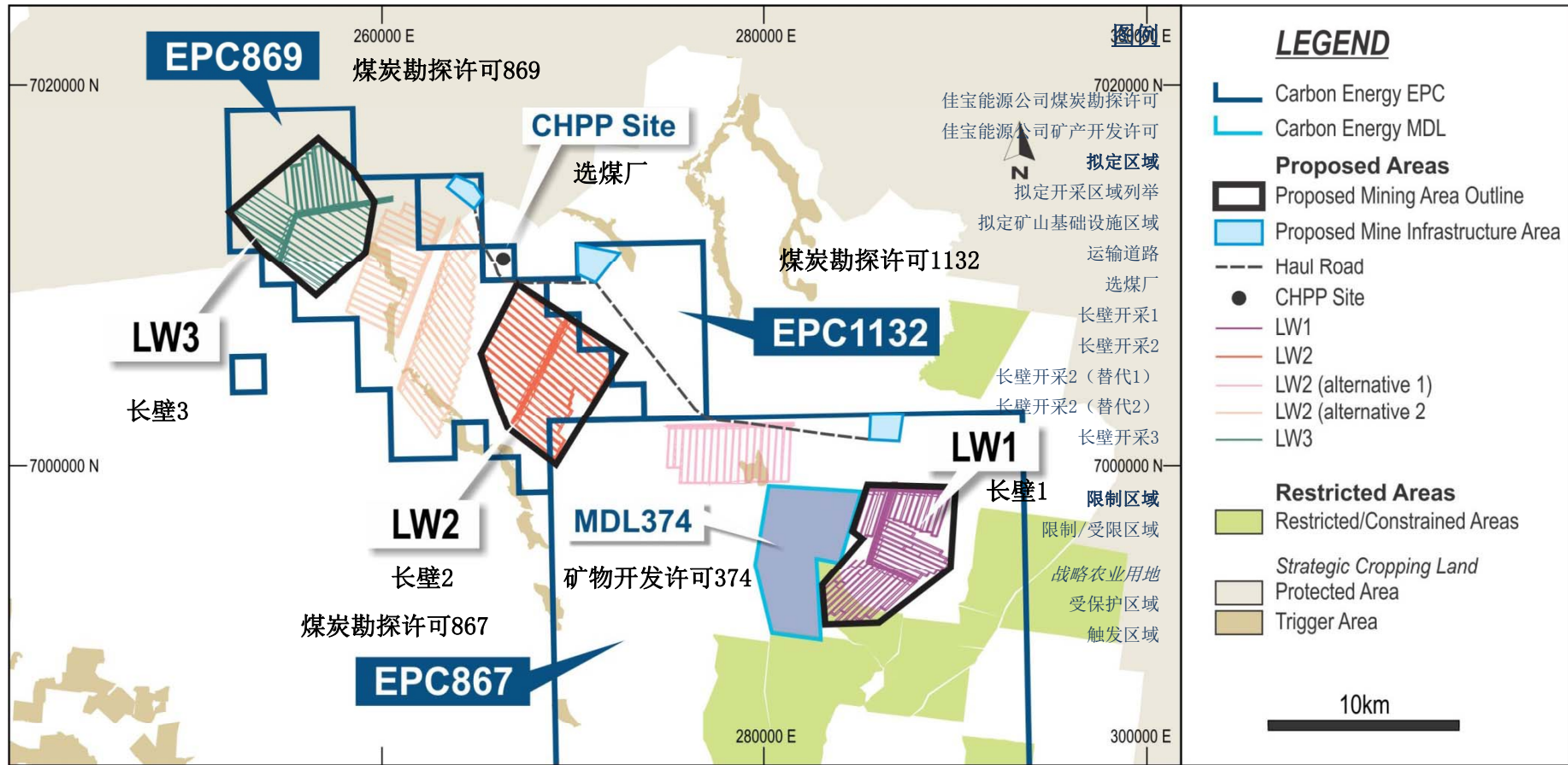
Infrastructure  
基础设施

- Access to major infrastructure
- 连通主要基础设施



# CONCEPTUAL MINE PLAN LAYOUTS

## 矿山规划概念布局



Eastern Surat Coal Project – LONGWALL DESIGNS FOR PROPOSED MINE AREA

苏拉特东部煤炭项目——拟定开采区域的长壁开采设计



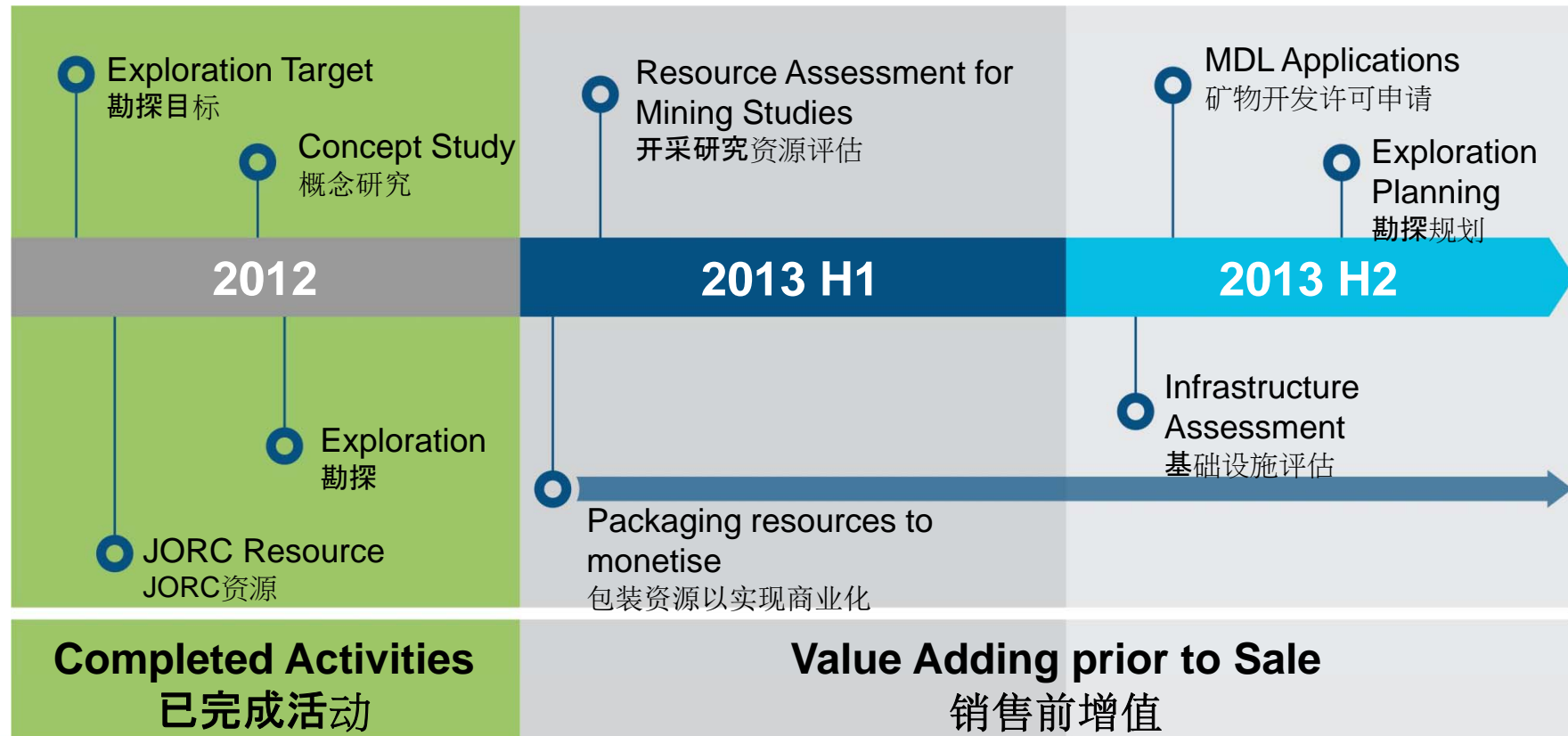


# COAL STRATEGY TIMELINE

## 煤炭战略时间表

Seeking Commercial Partners for potential sale or partnership opportunities

寻找潜在销售或合作伙伴机会或商业合伙人



# KEY MESSAGES 关键信息

- **Positioned to capitalise** on investment in technology development
- 有望从技术开发投资中获益
- **Successful operation** completed and further confirmed through recent survey
- 已成功完成运行并通过近期调查进一步验证
- **Strong international interest especially from Asia** in keyseam UCG technology
- Keyseam煤炭地下气化技术在国际上备受关注，尤其是在亚洲
- **World recognition** that UCG is clean, viable, and economic
- 全球公认：煤炭地下开采是一种清洁、可靠并经济的方法
- **Large uncommitted UCG syngas Reserve** in Queensland
- 昆士兰州拥有大量可开发的煤炭地下气化合成气储量
- **Large thermal coal JORC Inferred Resource** in Surat Basin, QLD with plans to value-add and monetise
- 在昆士兰州苏拉特盆地拥有大量按JORC标准推断的动力煤资源，且已有相应增值和商业化计划



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