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19 July 2011

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**RE: Carbon Energy Limited – Corporate Presentation** 

Carbon Energy Limited (ASX Code: CNX) is pleased to provide a copy of the US Corporate Presentation.

Yours Faithfully

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Prem Nair CFO & Company Secretary



# **Carbon Energy**

ASX: CNX OTCQX: CNXAY Low cost, low emission energy has arrived Andrew Dash CEO & President July 2011





## **Important Statements**

#### **Disclaimer**

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#### **Competent Persons**

The information in this presentation (where it relates to resources) is based on information compiled by Dr C. W. Mallett, Executive Director Carbon Energy Limited who is a member of the Australian Institute of Mining and Metallurgy. Dr Mallett has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Dr Mallett consents to the inclusion in the presentation of the matters based on his information in the form and context in which it appears.

The reserve estimates used in this document were compiled by Mr Timothy Hower of MHA Petroleum Consultants, Colorado, USA, a qualified person under ASX Listing Rule 5.11. Mr Hower has consented to the use of the reserve information contained within this document in the form and context in which it appears.





# **Carbon Energy**

Carbon Energy is a world leader in advanced coal technology. Our business is transforming stranded coal resources into high-value fuels with lower emissions to meet the increasing global demand for new, low cost, alternative energy sources.

#### **Strategic Objectives**

Resource:	Build an International Portfolio of Coal Assets Suitable for UCG
Technology:	Apply Superior UCG Technology
Markets:	Supply UCG Syngas to High-Value Downstream Markets





## Carbon Energy Equity Overview (ASX: CNX) (OTCQX: CNXAY)

Shares on issue 698.5 million

Market Capitalisation: AU\$154 million (@ AU\$0.23ps)

US\$160 Million

OTCQX ADR (1 ADR = 20 Ordinary Shares) Price: US\$4.38

Quoted on the OTCQX in June 2011

Admitted to S&P/ASX 300 Index September 2008

- S&P/ASX Energy Index
- S&P/ASX Oil and Gas Explorers Index

Major Corporate and Institutional Shareholders

- Corporate (Incitec Pivot Limited) 9.6%
- Institutional 9%
- Pacific Road Resources Fund 9%
- Pacific Road Investor 4.9 %
- CSIRO 4%





# **Differentiating Advantages**

#### **CARBON ENERGY is:**

- An Australian Stock Exchange (ASX) Listed Company, and also quoted on the OTCQX
- Specialising in the production of cleaner energy and chemicals feedstock from its Underground Coal Gasification (UCG) syngas.

#### **CARBON ENERGY has:**

- 668 Million Tonnes JORC Resource AUSTRALIA (Indicated: 218 Million Tonnes, Inferred: 450 Million Tonnes with a 2 metre thickness cut-off)
- 103 Million Tonnes JORC Resource CHILE \* (Measured: 26 Million Tonnes, Indicated: 37 Million Tonnes, Inferred: 40 Million Tonnes with a 2 metre thickness cut-off)
- Equating to 7,710 PJ recoverable gas \*\*

#### **CARBON ENERGY's Commercial Targets:**

- 1,000 Million Tonnes Inferred Resource in UNITED STATES
- 500 Million Tonnes Inferred Resource in TURKEY

#### **CARBON ENERGY to:**

- Prove commercial power generation from UCG syngas
- Continue to build a targeted portfolio of resources in high-value energy markets
- Accelerate commercial scale development

\*Upon completion of agreed milestones Carbon Energy has the right to a contributing 30% interest in the Mulpun deposit in Chile.

\*\*Carbon Energy calculation based on estimated energy content of the coal and 50% recovery (that takes into account pillars, losses and a gasification efficiency of 80%)





Resource	Technology	Markets
Stranded	Transformed	Downstream
Coal	into	Product
Resources	Syngas	Markets











## **Key Partnerships**

DYNO Dyno Nobel	Australian listed, International Fertiliser and Explosives Manufacturer	Extensive experience in downstream ammonia production, plant design and project delivery
GRUPO ANTOFAGASTA MINERALS	Chilean based, International Copper Mining Company listed London Stock exchange	Coal resource owner with local expertise and networks. Significant human resources and mining capabilities
ARCADIA Energy Trading	Australian-based subsidiary of Farahead Holdings Group (incl. Golar LNG Ltd, Arcadia Petroleum Limited, Frontline Limited and Seadrill.)	International energy trading experience
ENDÜSTRÍ A.Ş.	A Turkish construction, transport and mining corporation.	Vast coal rights in Turkey
	Major Indian Corporation with interests in power generation, coal mining and trading.	Largest trader of imported coal in India with over 50% market share, and is currently developing a coal tenement in Australia





## Resources

Transforming Stranded Coal into Valuable Product Gas

Project	Commercial Target <sup>1</sup> (million tonnes)	JORC Resource <sup>2</sup> (million tonnes)	Recoverable Gas <sup>3</sup> (PJ)
Queensland, Australia		668	6,680
Mulpun, Chile <sup>4</sup>		103	1,100
Wyoming, United States	500	By Jun 12	5,000
Total	500	771	12,780

#### Notes

- 1. Carbon Energy target
- 2. JORC compliant Competent Person: Dr C. Mallett
- 3. Carbon Energy calculation based on estimated energy content of the coal and 50% recovery (that takes into account pillars, losses and a gasification efficiency of 80%)
- 4. Carbon Energy has the right to a 30% contributing interest in the Chile deposit upon completion of agreed milestones





## **Resource Reserves**

**Positions & Possibilities** 

Company	3P Reserves (QLD) vs. Recoverable UCG Syngas (PJ)
APLNG (Origin/ConocoPhillips)	15, 561
QCLNG (BG led JV)	9,804
Shell LNG (Shell/PetroChina)	10,380
GLNG (Santos led JV)	7,720

Carbon Energy (all projects)	12,780
	12,700





## Resource

#### **Assessment Criteria**

Criteria	Description
Coal resource	Suitable for Carbon Energy's UCG technology
Location	Close to markets or close to infrastructure to access markets
Market	Market demand for UCG syngas products (e.g. power, chemicals, liquid fuels) at attractive prices Revenues and profits can be repatriated to Australia
Regulation	A regulatory pathway for UCG projects
Counterparty	A strong counterparty that brings additional capability to projects (e.g., coal resources, capital, access to markets)
Commercial Terms	Carbon Energy earns an equity interest in the resource Carbon Energy's Intellectual Property is protected Fair and equitable value to each party Little or no restriction to Carbon Energy's other interests
Sovereign Risk	Separation of executive and legal Ability to repatriate profits Strong environment and safety standards



## $key \text{Seam}_{\scriptscriptstyle{\mathbb{R}}}$ Low cost, low emission and low impact technology

Carbon Energy's keyseam<sub>®</sub> technology transforms stranded coal into high-quality gas, providing our market advantage.

**key**seam<sub>®</sub> creates a low-cost, low-emission and low-impact pathway for delivering a new generation of commercial scale energy projects through more efficient, cleaner utilisation of deep coal resources; unlocking a previously inaccessible energy source with a minimal environmental footprint.

Site selection and panel design using advanced geological modeling and an unrivalled understanding of ground behavior following on from 10 years of research and development by the CSIRO – Australia's leading research agency

3 years of trials in readiness for commercialization

#### keyseam<sub>®</sub> the key to unlocking value





# YEVE arkets.

## keySeam<sub>®</sub> Unlocking a previously inaccessible energy source

Controlled in-panel reaction

Utilising deep coal

Produces energy-rich Gas (syngas)

Leaves rock ash in-situ



Cuts carbon emissions

Minimizes surface disturbance

20 times more energy vs. CSG

Preserves groundwater





## $key \text{Seam}_{\mbox{\tiny \ensuremath{\mathbb{R}}}}$ Producing energy with a lower environmental impact

#### 6 Significant Environmental Advantages of keyseam®

- 1. Maximises resource efficiency by extracting 20 times more energy from the same resource when compared to Coal Bed Methane (CBM) production.
- 2. Minimises surface disturbance by extracting the energy from coal through a series of boreholes rather than mechanical excavation used in conventional mining methods.
- 3. Preserves groundwater quality by operating the gasification process below the hydrostatic pressure and not pumping groundwater to the surface. Maintaining the surrounding groundwater pressure acts as containment for the gasification process and ensures that syngas flows to the surface under pressure via the Production Well.
- **4. Leaves rock and ash underground** in the coal bed, originally mixed with the coal.
- 5. Cuts carbon emissions by producing syngas-fuelled electricity with 10-20% less CO<sub>2</sub> emissions than traditional coal-fired power plants whilst reducing the cost of carbon capture.
- 6. No fraccing process or chemicals.









## UCG vs. CBM

	Underground Coal Gasification (UCG)	Coal Bed Methane (CBM)
Energy Source	Coal	Gas in coal
Process	Gasification	Extraction of water
Product	Syngas (hydrogen, methane & carbon monoxide	Methane
Energy Recovery	About 85% of the energy in coal	About 5% of the energy in coal
Waste Water	Relatively small quantities of water	Large quantities of water
Water Treatment Process Produces	Clean water and CO2	Clean water and low volumes of hyper-saline water (brine)

Source: Industry sources and Madison Williams and Company



# ergy markets.

## Markets - What are the global opportunities ?

#### • UCG offers a bridge to sustainable energy

- Energy demand is increasing worldwide and energy security will continue to be of increasing importance.
- The International Energy Agency forecast that coal will maintain its position as the leading source of power generation globally for at least the next 25 years.
- The World Energy Council\* estimates UCG could potentially increase recoverable global coal reserves by as much as 600 billion tonnes.



UCG has scale and cost base to be 10% of global energy supply

\* AUSTOCK Securities, Sustainable Energy – Tangible Solutions will prevail over International Regulatory Uncertainty, July 2011

\* 2007 Survey of Energy Resources





## Markets - Syngas & CO<sub>2</sub> Product Opportunities







## Markets - Indicative Power Generation Costs (Including Proposed Carbon Tax)

UCG provides a low cost alternative



UCG @ \$2/GJ
NG @ \$5.50/GJ
NG @ \$7.50/GJ

SRMC - Short Run Marginal Cost (Fuel plus O+M)



# Version

# **Current Projects**





# Vestor

## Queensland, Australia

## The Development of Australia's first commercial syngas-fuelled power station

Exploration Permits for Coal over 2,000 km<sup>2</sup>

668 Million tonnes (450 Million tonnes Inferred and 218 Million tonnes Indicated with 2 metre cut-off) of JORC compliant coal resource

## 668 Mt can support gas production of 6,680 PJ which could generate \$2.5 billion p.a. for 15 years (@\$5.50/GJ)

#### Short-term commercialization

- Power Generation into National Electricity Market
- Synthetic Natural Gas

#### **Medium-term commercialization**

- Chemicals (e.g. ammonia)
- Liquid fuels







# **Queensland Operations Update**

#### **5MW Power Station**

- Successfully initiation of UCG Panel 2
- Successful transition to operation of horizontal injection and horizontal product wells
- Confirmation of the integrity of the new horizontal well design and anchoring system
- Achieving excellent gas quality for sustained periods, with heating valves exceeding target range of 5-6MJ/m<sup>3</sup>
- Introduction of UCG syngas for the engines is continuing testing



5MW Power Station at Bloodwood Creek, Queensland.



# Chile – Mulpun Project

#### A market highly dependant on imported fuel with spot electricity prices up to \$220 per MWh

- 103 Million Tonne JORC Resource (Measured: 26 Million Tonnes, Indicated: 37 Million Tonnes, Inferred: 40 Million Tonnes with a 2 metre thickness cut-off)
- Agreement with Antofagasta Minerals S.A. to jointly assess and develop a coal deposit in Mulpun (near Valdivia)
- Located in southern central Chile, 800km south of Santiago
- Focusing on Power Generation
  - Chilean electricity demand growing by 8% annually
  - Currently reliant on imported coal, LNG and Diesel

#### **Key Phase 1 Deliverables Achieved**

- Hydrological Model development
- Site selection for the Pilot Project
- Environmental Approval for the Pilot Project

Site works for the first UCG Panel in Chile are progressing well and water monitoring wells are currently being drilled.





# United States – Wyoming & Montana / North Dakota

Targeted drilling program to fast-track establishment of Inferred Resource

Wyoming Exploration Rights - 44mi<sup>2</sup> (113km<sup>2</sup>)

Montana/Nth Dakota Exploration Rights - 171mi<sup>2</sup> (276km<sup>2</sup>)

- Exploration License with Option to Lease Agreements
- Contract includes Off-Take Agreement for CO<sub>2</sub> for use in Enhanced Oil Recovery - generating additional revenue stream
- Key Development Milestone:
  - 500 Million Tonnes Inferred Coal Resource
  - 100 Million Tonnes Indicated Coal Resource
- Planned production of electricity, synthetic natural gas (SNG) and CO<sub>2</sub> for Enhanced Oil Recovery (EOR)
- 500 million tonnes of coal resource can support gas production of 5,000PJ which can generate \$1,800 million each year for 15 years (@\$5.50/GJ)
- Sites located close to existing infrastructure natural gas, electricity and CO<sub>2</sub> pipelines



Located Southern Wyoming Established UCG Regulatory Framework Exists

Located Across Montana and North Dakota Border UCG Regulatory Framework currently under evaluation by Montana State Government.

Sources: NYMEX, FERC, AEMO and Carbon Energy analysis

◦ carbonenergy

www.carbonenergy.com.au





# Turkey – Amasra

50/50 JV with Hema Endustri, one of the 17 companies in the diversified Hattat Group, one of Turkey's leading companies.

- Government approval for UCG Pilot
- Pilot planning commenced
- Key Development Milestone: 500 Million Tonnes Inferred Resource
- Planned production of lower-emission power and synthetic natural gas (SNG)
- Attractive Power and Gas Prices\*USD\$70/MWh and USD\$7.30/GJ
- Turkey is one of the fastest growing economies in Europe but imports about 70% of its energy needs



Located on Northern Turkish Coast Government approval for UCG pilot in place

Close to existing infrastructure and mining operations

\* Sources: TETAS, BOTAS Turkish State Owned Petroleum and Pipeline Corporation





## **Milestones**

Queensland, Australia	Status	Target
Installation of additional monitoring wells	$\checkmark$	ACHIEVED
Initiation of UCG Panel 2	$\checkmark$	ACHIEVED
Establishment of consistent gas flow	$\checkmark$	ACHIEVED
Introduce syngas to engines and conduct testing		CURRENT
Testing Engines and Production of Electricity		AUG 2011
Complete overhead powerlines to grid		OCT 2011
Export Electricity		OCT 2011







## **Milestones**

Mulpun, Chile	Status	Target
Hydrological Model Development	$\checkmark$	ACHIEVED
Site Selection for UCG Pilot	<b>V</b>	ACHIEVED
Land Acquisition	<b>V</b>	ACHIEVED
Environmental Approval for UCG Pilot	$\checkmark$	ACHIEVED
Market Study – Commercial Application of UCG Syngas for Power & Natural Gas	<b>V</b>	ACHIEVED
Establish JORC Resource	<b>V</b>	ACHIEVED
Construction of Access Roads, Drilling Pads, Lay Down Areas, Site Office & Accom.		OCT 2011
Drilling of Water Monitoring Wells & Baseline Environmental Monitoring		OCT 2011
First Gas Production		MAR 2012
COMPLETE IN PROGRESS	SE	
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## **Milestones**

New International Projects	Status	Target
Submit Joint bid with Adani to Coal India	<b>V</b>	ACHIEVED
Complete Acquisitions for Projects in the United States and Europe	<b>V</b>	ACHIEVED
Establish US Office	<b>V</b>	ACHIEVED
Preliminary Resource Assessment (WY, USA)	<b>V</b>	ACHIEVED
Exploration to Target: 500 Million Tonnes Inferred (WY, USA)		JUN 2012
Environmental Baseline Monitoring (WY, USA)		END-2012







# Summary

#### Resource

- Established Resource in Australia & Chile
- Exploration to Commence in Wyoming, USA in 2<sup>nd</sup> half 2011

#### Technology - keyseam<sub>®</sub>

- 3 Years Operational Experience in Australia
- Panel 2 Performance Exceeding Expectation
- UCG Syngas to Electricity in the coming months

#### Markets

- First Revenue targeted for October 2011 in Australia
- Acceleration of commercialization in Chile
- Discussions commenced for Wyoming Off-take





# Thank You

# Carbon Energy

### Low-cost, low-emission energy has arrived

### Andrew Dash CEO & President





# Appendix

### **Unit Conversions**

1 GJ = 0.95 Million Btu 1 PJ = 1,000,000 GJ 1 boe = 42 Gallons (159 litres) = 5.8 Million Btu = 6.1 GJ

10,000 boe/day = 61,000 GJ/day = 22.3 PJ per annum

100 Million Tonnes = 1,000 PJ recoverable gas = 20 PJ per annum for 50 years = \$110 Million per annum @ \$5.50/GJ