

# Environmental Clean Technologies



**Victorian Coal and Energy 2010  
March 2010**

# Environmental Clean Technologies

## Victorian Coal and Energy 2010

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# Corporate Overview



*Commercialising and selling disruptive technologies in the energy and resources sector.*

*Focused on delivering significant environmental and commercial outcomes.*

## CURRENT TECHNOLOGY PORTFOLIO

### *Coldry*

Unique Coal Drying and Water Recovery Technology

An economic method for dewatering lignite and sub-bituminous coals, creating an energy rich Black Coal Equivalent for local consumption or transport to remote markets.

**COMMERCIAL SCALE DESIGN COMPLETE**

**ACTIVE SALES AND MARKETING FOCUS**

### *Matmor*

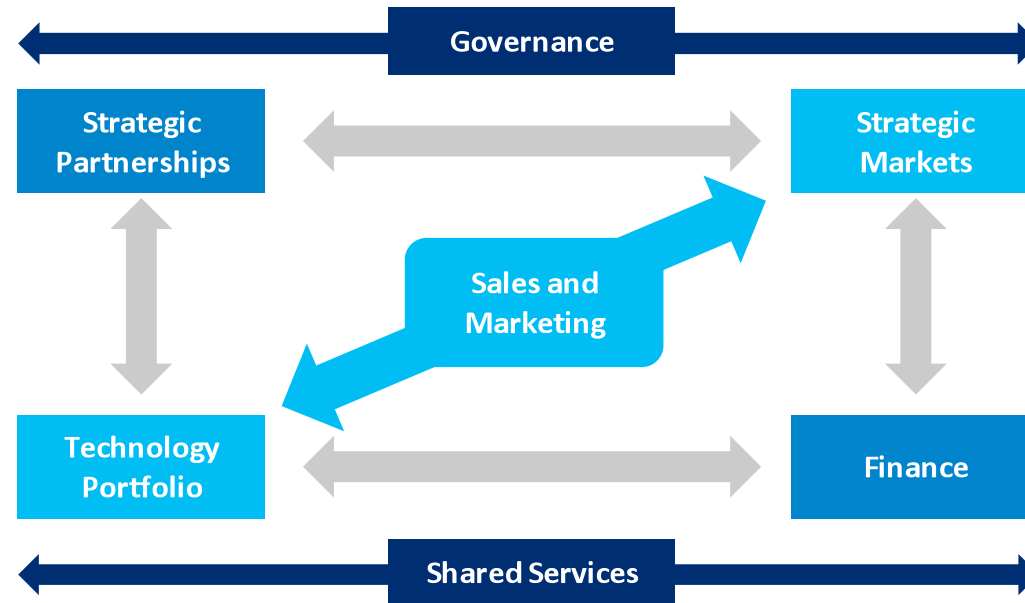
Unique Iron Making Technology

A one-step method for producing low-carbon iron from abundant and low economic value brown and sub-bituminous coals and metal bearing media.

**PRE-COMMERCIAL**

**MARKET INFORMED DEVELOPMENT**

# Strategy and Team to Realise Growth



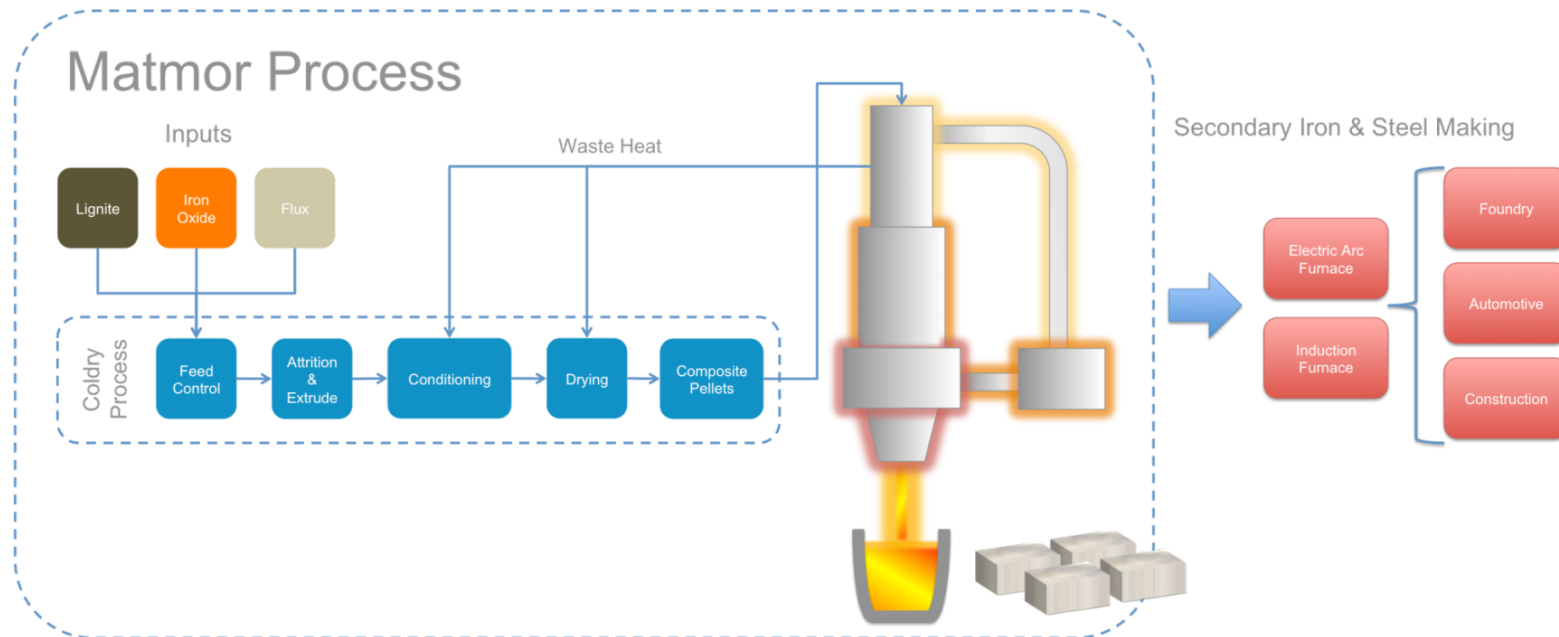
## Board and Executives

<i>Dave Woodall</i>	<i>Chairman</i>
<i>John Hutchinson</i>	<i>Non-Executive Director Deputy Chairman</i>
<i>Dennis Brockenshire</i>	<i>Non-Executive Director</i>
<i>Stephen Carter</i>	<i>Non-Executive Director</i>
<i>Kos Galtos</i>	<i>Chief Executive</i>
<i>Ashley Moore</i>	<i>Business Manager – Coldry</i>
<i>Adam Giles</i>	<i>Manager – Technology Development</i>

## Strategic Partners

<i>Arup</i>	<i>Engineering</i>
<i>MacDow</i>	<i>Construction</i>
<i>Norton Rose</i>	<i>Legal</i>
<i>PKF</i>	<i>Auditing</i>
<i>RSM Bird Cameron</i>	<i>Accounting</i>
<i>Phillip Capital</i>	<i>Financial Advisory</i>
<i>Fortrend</i>	<i>Standby Subscription Agreement</i>
<i>Radar Group</i>	<i>Relations – Investor</i>
<i>Monsoon Communication</i>	<i>Relations – Media</i>
<i>Markstone Group</i>	<i>Political Advisory</i>

# Matmor: The Matmor Process



## The Matmor Process

**A unique method for producing high quality iron from cheap, abundant brown and sub-bituminous coals and metal bearing media such as high and low grade iron ore, mill scale and nickel tailings.**

## Benefits of Matmor

Compared to traditional blast furnace iron making, Matmor has the following benefits:

- Low cost lignite replaces expensive metallurgical coal
- Recirculation of waste gases minimises emissions
- Reduces iron bearing waste such as mill scale and nickel tailings
- Small plant, small carbon foot print
- Ideal product for foundries and steelmaking plants in domestic, regional and global markets

# Matmor: Advancing Matmor

## Advancing Matmor

- Review and assess current state of development (complete)
- Undertake market analysis and create commercialisation strategy (in progress)
- Identify strategic partner(s) to advance scale up
- Scale up through incremental steps:
  - Pilot Plant
  - Commercial Plant
  - Reassess scalability of individual plant versus modular expansion based on target market

## The Case for Development – Raw Material Cost Advantage

Traditional Iron and Steel Making	Combined costs of Iron Ore and Coking Coal per tonne of iron produced (USD)
Mid 2008	316
Mid 2009	202
Current Spot	356

**Combined costs of Unconventional Iron Ore and Lignite per tonne of Matmor estimated between USD 50 to 200.**

**Game-changing iron and steel technology that beneficially utilises lignite and, hence, creates a significant opportunity for Victoria.**

# Coldry: Snapshot

## Coldry: Unique Coal Drying and Water Recovery Technology

### The Coldry Process

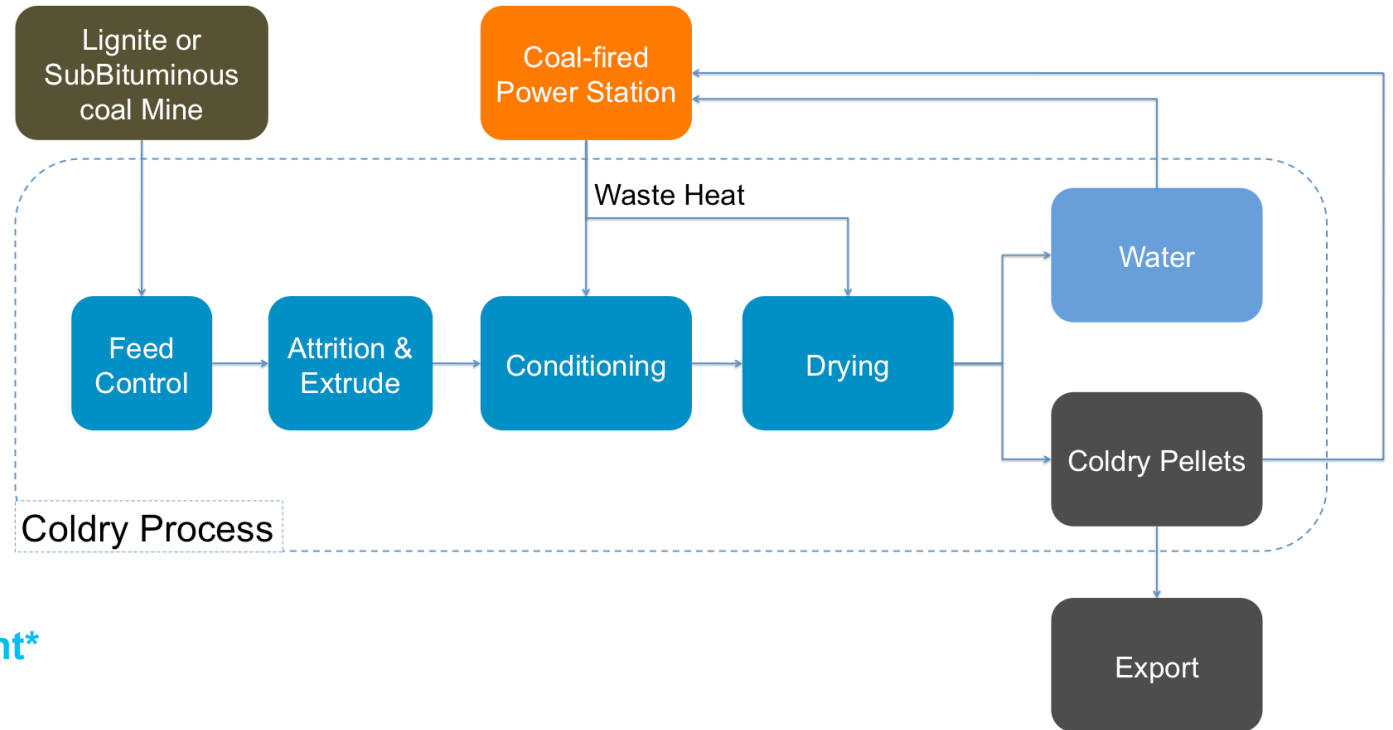
High Gains  
Mechanical  
Low Temperature  
Low Pressure  
Water Recovery options  
Sensitive to the Environment

### The Coldry Plant Design

Immediately Deployable  
Flexible  
Scalable  
Cost Effective  
Power Station Integration Synergies

### Coldry Black Coal Equivalent\*

Stable  
Valuable  
Versatile



# Coldry: The Compelling Case

## Proposition for Power Generators

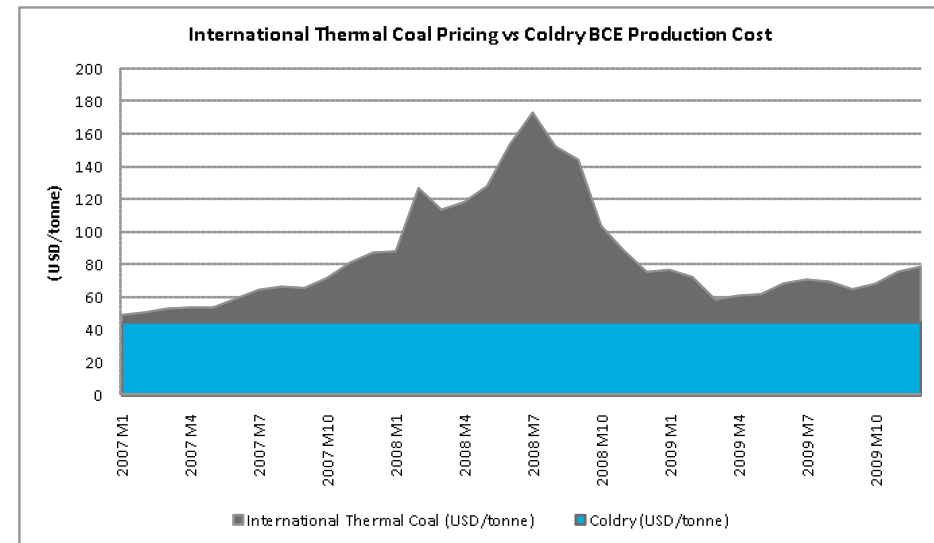
- Reduce fuel cost in power generation
- Gain long-term fuel security and reduce exposure to coal price volatility
- Adopt cleaner coal technology to reduce pollution and carbon emissions
- Access new water for power generation
- Lower Ash deposits, driving cost savings and asset utilisation improvements

## Proposition for Lignite and Sub-Bituminous Coal Miners

- Increased markets by accessing higher-value and larger thermal coal markets
- Extend reserves through efficient resource utilisation

## Proposition for the Coal Trader

- Opportunity to secure new sources of BCE for trade under long-term contracts to thermal coal users
- Opportunity to backward integrate into low cost sources of supply, i.e. buy lower cost deposits and benefit from the output via Coldry implementation
- Opportunity to secure competitive advantage in tight markets



## Indicative Investment Case – Emerging Markets

- **Over 30% ROI and 3-4 year simple payback.\***
- **Coldry BCE produced at sub USD 45/tonne.\***
- **Power generation on Coldry BCE superior to Lignite.**

**Coldry will fuel emerging markets – it supports the growing demand for energy at lower CO<sub>2</sub> emissions than would be otherwise possible.**

\*Typical figures. Economics will vary with input feedstock, Coldry offtake moisture level and local conditions.



# Coldry: The BCE Product

Proximate Analysis of Coldry produced in Victoria, Australia compared to other Australian coals

Feature	Lignite (VIC)	Coldry (VIC)	Black Coal (QLD)	Black Coal (NSW)
Moisture	59.3% wb	12% adb	15.5% adb	3.3% adb
Volatile matter	20% wb	48.9% wb	22.5% wb	26.5% wb
Fixed carbon	19.9% wb	49.1% wb	44.1% wb	46% wb
Ash	0.9% wb	2.4% wb	17.9% wb	24.2% wb
NWSE	2006 kcal/kg ar 8.4 MJ/kg ar 3611 BTU/lb	5874 kcal/kg adb 24.6 MJ/kg adb 10576 BTU/lb	4800 kcal/kg adb 20.1 MJ/kg adb 8641 BTU/lb	5681 kcal/kg adb 23.8 MJ/kg adb 10232 BTU/lb

Note: NWSE – Net Wet Specific Energy, wb - wet basis, adb - air dried basis, ar – as received basis.

## Coldry drives value creation

- Significant increases in net energy content
- Retention of the valuable volatile fractions, ideal feed for gasification processes
- Low ash levels derived from the raw Lignite (similarly with Sulphur)
- Transportation effectiveness – Non-pyrophoric, Low moisture

# Coldry: Development Milestones

## Pilot Plant

- Established batch production in 2004
- Underwent modification in 2007 to achieve continuous production and integration of water recovery system

## Strategic Relationships for Commercialisation

- Entered into strategic relationships with leading organisations to advance Coldry technology:

<i>Arup</i>	<i>Coldry Core Design Partner (Global) Coldry Design Engineer (Global)</i>
<i>McConnell Dowell</i>	<i>Coldry Construction (Australia)</i>
<i>Transfield Services</i>	<i>Coldry O&amp;M (Australia)</i>
<i>Deloitte</i>	<i>Coldry Financial Modelling (Australia)</i>

**Strategic relationships underpin commercialisation in global markets.**

## Commercial-scale Design

- Pilot Plant has informed design of commercial-scale Coldry modules that underpin commercial plants
- Modular design with Containerisable componentry
- Up to 80% prefabricated offsite before assembly

## Ownership of Intellectual Property Rights

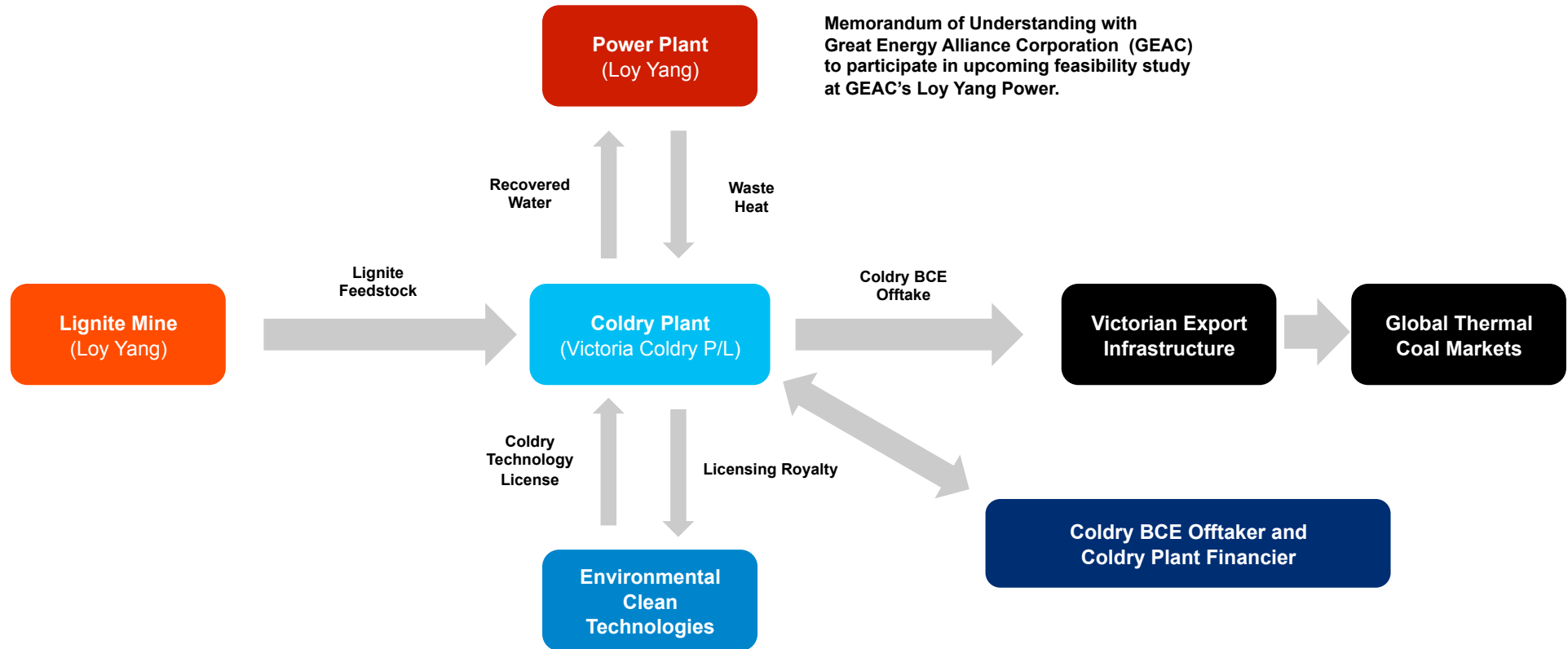
- 100% ownership of Coldry intellectual property
- Covered by patents in all major markets with significant lignite deposits
- Engagement with potential partners and customers covered by standard legal agreements



# Victoria Coldry Pty Ltd: The Project Structure

## The Project SPV

Coldry BCE production phased from 2 MTPA to 20 MTPA over 10 years.



# Victoria Coldry: Status and Timetable

## *Near Term*

- Licence agreements finalised
- Detailed agreements on Feasibility Study scope to include components and detailed design, as well as Tender package preparation
- Commencement of Feasibility study and detailed design works, with expected completion before year end 2010

## *Medium Term*

- Phase 1 operations at 2 mtpa by ~2013
- Phase 2 expansion to 5 mtpa
- Phase 3 expansion to 10 mtpa
- Phase 4 expansion to 20 mtpa



# Victoria Coldry: Benefits for Victoria

## *Unlocking Export Opportunities*

- Employ Victoria's extensive lignite reserves to create a new substantial BCE export market, helping meet growing global coal demand
- Victoria is home to 430 billion tonnes of brown coal (28% of the world's brown coal reserves), with 40 billion tonnes believed to be minable

## *Gateway technology*

Combined with Gasification, Coldry opens the door to

- Advanced Technology Power generation
- Coal to SNG or Liquids
- Coal chemical industries e.g. Urea

## *Estimated Export Value*

20 MTPA of Coldry creates close to AUD2 billion annual export value for Victoria

## *Infrastructure Development and Job Creation*

- Enhanced infrastructure development
  - From 4 million tonnes export freight capacity, expanded to support phase 2 and beyond
- Employment creation and skills development
  - Phase 1 construction >50 jobs, plus 25 direct / 60 indirect position upon operation
  - More as the facility grows

Australia is a significant energy exporter through coal, gas and uranium.

Currently there are 126 MTPA of thermal coal exports (AUD14.4 billion).

Significant new black coal projects are underway.

Current regional distribution of coal exports:

- 60% QLD
- 40% NSW
- 0% VIC

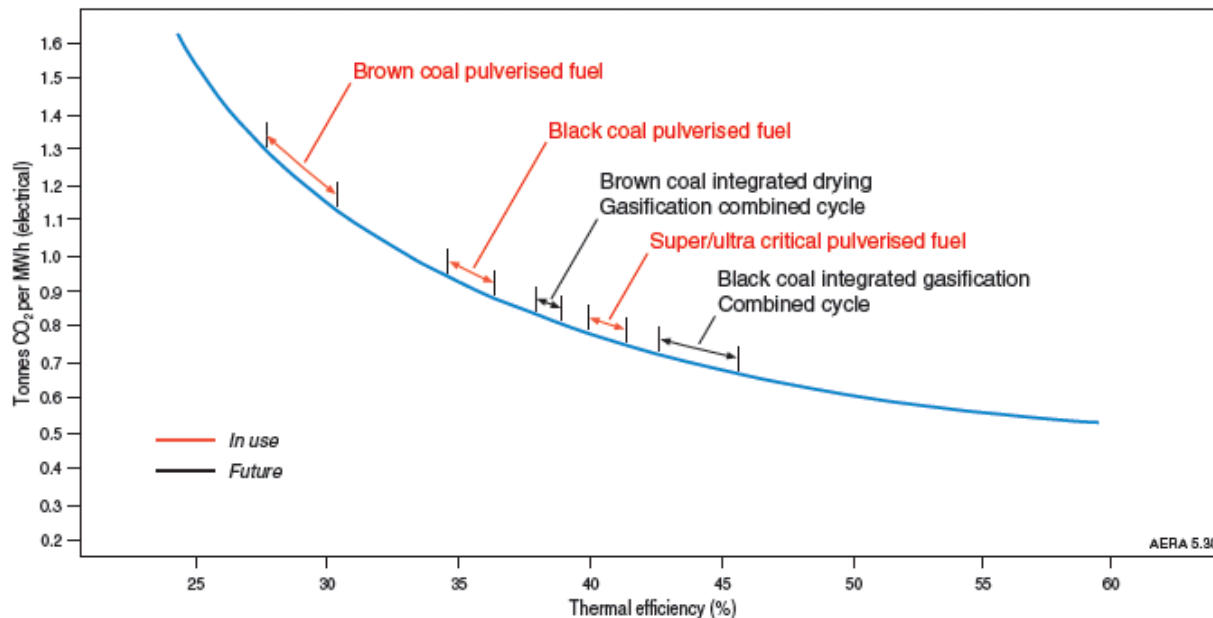


# Victoria Coldry: Benefits for Victoria

## Clean(er) Coal: Reduced Emissions & Enhanced Efficiency

- Reduced emissions in comparison to brown coal powered stations, from the use of a low moisture, high efficiency, high carbon black coal equivalent
- Efficiency enhancement through cooling improvements / reduced evaporative loss
- Integrating Coldry with a black coal power station is a compelling alternative to lignite based power generation options currently available

## Utilising Coldry BCE enables deployment of more efficient proven technologies



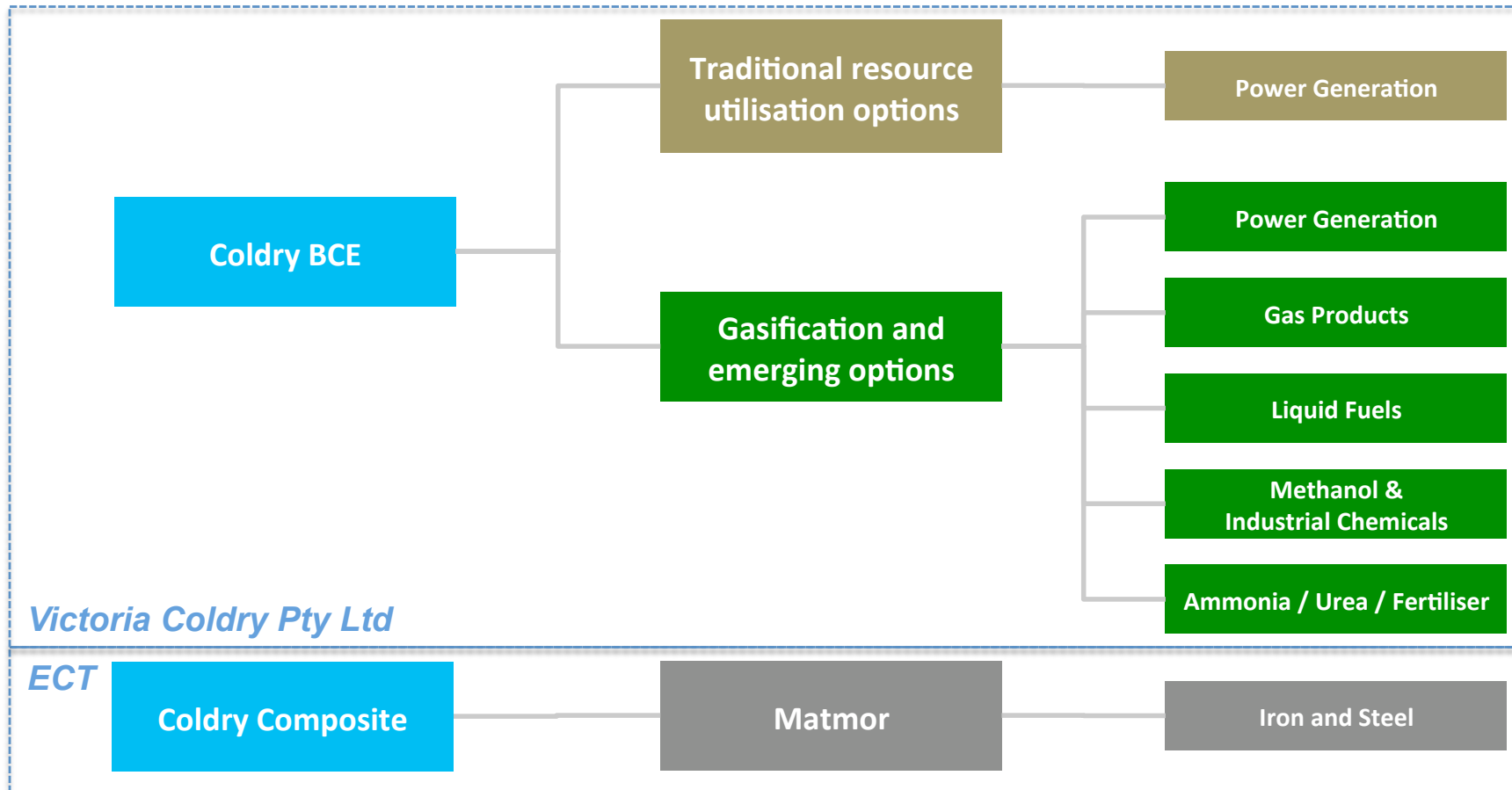
The Coldry process integrates with the most efficient coal technologies currently available – and is likely to integrate with many future black coal technologies in development.

Through reducing emissions produced in combustion in Victoria, Coldry could enhance the commercial viability of CCS.

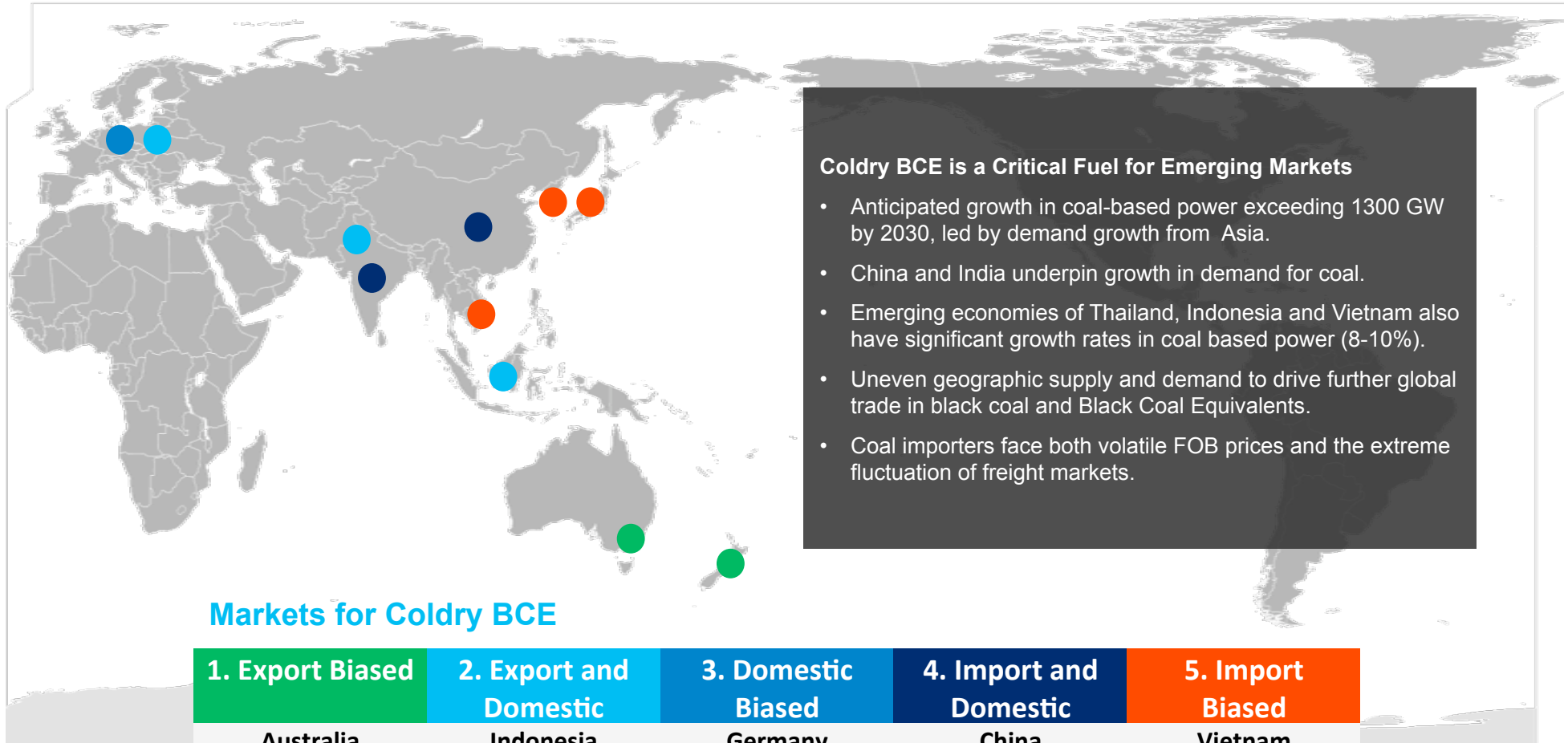
# Coldry: Benefits for Victoria

## *Establishing Victoria as a Global energy and resource leader*

- Development of a local Coldry project enhances Victoria as a leader in emerging cleaner energy technology development and commercialisation.
- The properties of the Coldry BCE make it ideal in coal gasification and other emerging resource utilisation options



# Coldry: Our International Focus



**Coldry BCE is a Critical Fuel for Emerging Markets**

- Anticipated growth in coal-based power exceeding 1300 GW by 2030, led by demand growth from Asia.
- China and India underpin growth in demand for coal.
- Emerging economies of Thailand, Indonesia and Vietnam also have significant growth rates in coal based power (8-10%).
- Uneven geographic supply and demand to drive further global trade in black coal and Black Coal Equivalents.
- Coal importers face both volatile FOB prices and the extreme fluctuation of freight markets.

## Markets for Coldry BCE

1. Export Biased	2. Export and Domestic	3. Domestic Biased	4. Import and Domestic	5. Import Biased
Australia New Zealand	Indonesia Pakistan Poland	Germany United States	China India	Vietnam Korea Japan



# Coldry: Current Global Projects

## GLOBAL COLDRY PROJECTS

### *Poland (PGE Belchatow)*

- Joint Business Case development MoU signed Jan 2010.
- Project will run through 2010 to define the path forward for lignite drying at the largest Lignite Power Station in the world.

### *Coldry East Kalimantan (SPV Established)*

- Heads of Agreement with Alexis Minerals International to produce Coldry BCE – production of 10 MTPA.
- Information Memorandum to be developed to attract funding for feasibility study in 2010.

## GLOBAL BUSINESS DEVELOPMENT

### *New Opportunities*

- Working vigorously with a number of qualified parties to build Business Cases to underpin feasibility investment in India, China, Indonesia and E&W Europe
- Commercialisation underpinned by Coldry Project Localisations

### *Coldry Growth Targets*

- Targeting at least 5 Coldry BCE Plants (3 MTPA) to be in operation by 2015 across key growth markets (China, India and Indonesia).
- Significant growth potential beyond targets through project expansions and additional projects.

