

# **Shortfall Program – Investor Briefing**



ECT – Technology Development and Commercialisation in the Energy & Resources Sectors

Ashley Moore, November 2011



#### **Disclaimer**

Environmental Clean Technologies Limited has taken all reasonable care in compiling and producing the information contained in this presentation. The Company will not be responsible for any loss or damage arising from the use of the information contained in this presentation. The information provided should not be used as a substitute for seeking independent professional advice in making an investment decision involving Environmental Clean Technologies Limited. Environmental Clean Technologies Limited makes no representation or warranty, express or implied, as to the accuracy, reliability, or completeness of the information provided. Environmental Clean Technologies Limited and its respective directors, employees, agents and consultants shall have no liability (including liability to any person by reason of negligence or negligent misstatement) for any statements, opinions, information, or matters, express or implied arising out of, contained in or derived from, or any omissions from this presentation.



## **Introducing ECT**

#### We will cover:

- A snapshot of who we are and what we do
- An introduction to the unique Coldry & Matmor technologies, and their respective value propositions
- Insight into our commercialisation pathway for the Victorian Coldry project, including a financial breakdown and its bottom line for investors

ASX: ESI / ESIO

Proforma issued capital following completion of Shortfall program:

Shares: 1,570,000,000 Options: 828,000,000

(\$900k already invested / committed, \$1,500k to complete the shortfall program)



#### **Business Focus**

# ECT Develops and Commercialises technologies in the Energy & Resources sector. For context:

### Energy sector:

- Global electricity demand in 2008 was 16,819 TWh, and is projected to grow to ~23,500 TWh by 2020 (for reference, Australia consumed about 240 TWh, or 1.4% of the 2008 total). 41% of Electrical demand is now serviced by Coal.
- Global coal consumption was ~4.9 Bn tonnes in 2008, and is expected to grow to between 5.8 – 6.2 Bn tonnes by 2020. That represents an additional annual consumption about 4x the total exports of Australia.
- In 2010, Chinese coal production grew by 288 million tonnes per annum the same as the total exports of Australia.
- Global Black coal reserves are diminishing in quantity, and are less than those of Brown coal (~48%:~52%), while consumption is skewed in the other direction (~80+%: <20%). This drives pricing pressure, as well as energy security concerns.</li>



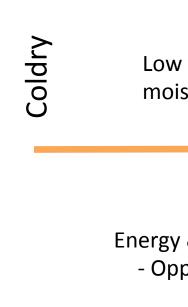
#### **Business Focus**

# ECT Develops and Commercialises technologies in the Energy & Resources sector. For context:

- Resources: Iron & Steel
  - Global Crude Steel production was ~1.4 Bn tonnes in 2010, ~45% of which is produced in China. This consumed ~2.6 Bn tonnes of Iron ore and ~1 Bn tonnes of coking coal
  - As Ernest & Young stated in their report, a key issue facing the Steel industry is "Abundant... iron ore, while lacking in coking coal", with countries such as India facing a four-fold increase in coking coal imports by 2020.
  - Supply & Pricing pressures on both Coking coal and Iron ore will drive fierce competition to secure limited resources, especially in the coking coal segment.



#### **Our Business**



Low value high moisture coals

Loy Yang, Arup, JCS, MacDow, Tincom

High value Thermal Coal, Enhanced Energy Security, \* High Value CO2 reduction potential

Energy & Resources
- Opportunity -

- Technology -

Value Add

Leverage - Partnerships - Global Markets
- Demand -

Matmor

Low grade or stranded Iron ore reserves, Waste streams; Low grade coals

Searching now!

High grade Pig Iron, Scrap replacement, Melt stock, \* High Value CO2 reduction potential



### **Technology Portfolio**

#### **Coldry**

#### Unique Coal Drying and Water Recovery Technology

- An economic method for dewatering lignite and sub-bituminous coals
- Exportable Black Coal Equivalent
- Low cost CO<sub>2</sub> abatement solution



#### **Matmor**

#### **Unique Iron Making Technology**

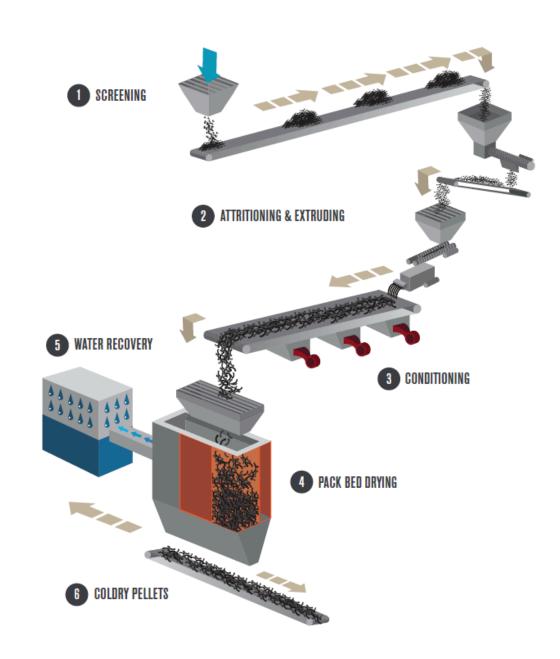
- Primary iron production
- Unique lignite-based process no coking plant required!
- Recover iron from iron ore and waste streams such as mill scale and and nickel tailings





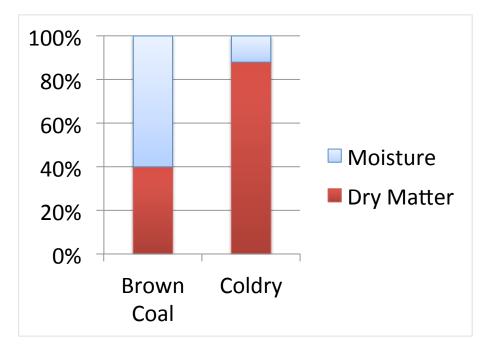
# **Coldry Process**

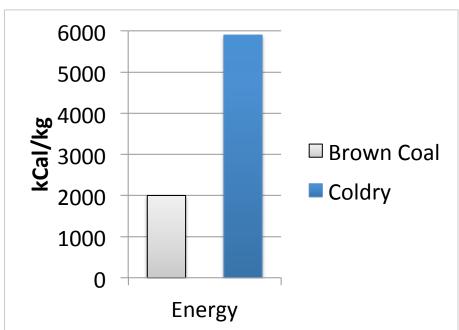
- Coldry Technology is a simple, mechanical process
- Attritioning collapses coal pore structure, mobilising physically trapped water
- Stimulates natural chemistry of brown coal to expel chemically bound water
- Extruded into pellet shapes
- Ejected water migrates to the surface of coal pellets
- Utilising low temperature waste heat from host power station, the surface moisture on the Coldry pellet is evaporated





# **Coldry Product**









# **MATMOR Technology**

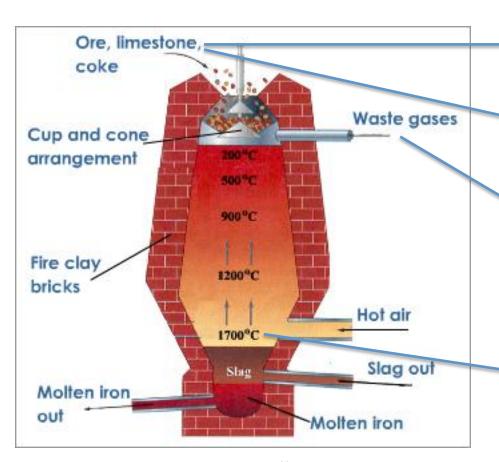
- Unique iron making technology – replaces metallurgical coal with cheap, abundant brown coal
- Uses Coldry process to combine metal bearing media, brown coal and flux prior to smelting via patented MATMOR furnace
- Produces iron billets for secondary steel making
- Status of development test plant (1 tonne per day)
- Next steps scale up to pilot plant (20 tonnes per day)





#### Blast Furnace Iron vs. Matmor

#### Blast Furnace: Status Quo



20-30m tall; 10-12m wide

#### Matmor: New Potential

Coke / Coking coal vs. Lignite \$250 / tonne vs. ~\$10 / tonne

Iron media sources include low cost & waste stream options

Waste gases recirculated to recover energy & reduce overall CO2 emissions

Lower temperatures = Lower energy consumption; typically 1000 degC max

Reduced footprint = Potential for Reduced capital



# **Commercialisation Status - Coldry**

#### Coldry:

- IP secure (Patents granted or progressing well in key markets)
- Pilot Plant operational, & progressively upgraded
- Commercial Detail Design commenced for lead project Victoria Coldry
  - Design for Tender: Deliverables, Timeframe, Value, Next steps
  - First production & revenue: 2014 commissioning
- Product application testing programs in place
- Domestic market applications
  - C-tax hedge / CO2 abatement, Conversion plants



## **Commercialisation Status - Matmor**

#### Matmor:

- IP secure (Australian Patent + back-to-back protection of Coldry)
- Test Plant operational
- Pilot plant design brief complete
- Partner / lead application search
  - Screening and support testing underway
- Move to Pilot plant design when we locate the right partner



# Technology leveraged energy resource project





## **Coldry Project examples**

#### Victoria – Coldry production, use & export:

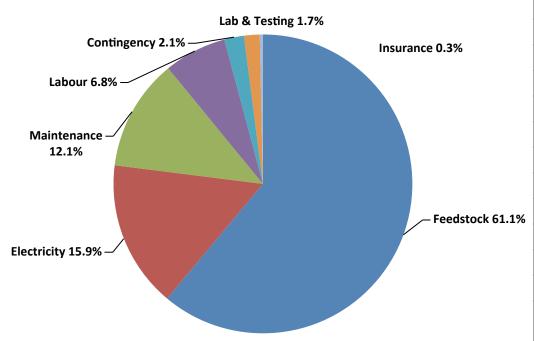
- 1. Resource: Victorian Lignite (400+ Bn tonnes, >2.5Bn at Loy Yang alone)
- 2. Technology Coldry
- 3. Market:
  - a. China coal demand export
  - b. India coal demand export
  - c. Australia electricity demand with CO<sub>2</sub> reduction targets domestic
- 4. Capital Tincom & others

#### China – Coldry production & use:

- 1. Resource: Inner Mongolia (e.g. immediate vicinity reserves of 10+ Bn tonnes in one case)
- 2. Technology Coldry
- 3. Market:
  - a. Additional expansion capacity using higher efficiency generation technology
  - b. Supply within the group to support coal shortages at other stations without efficiency loss associated with consumption of raw coal
  - c. Provision of higher energy raw material to Coal Conversion plants
- 4. Capital Dependent on specific project opportunities



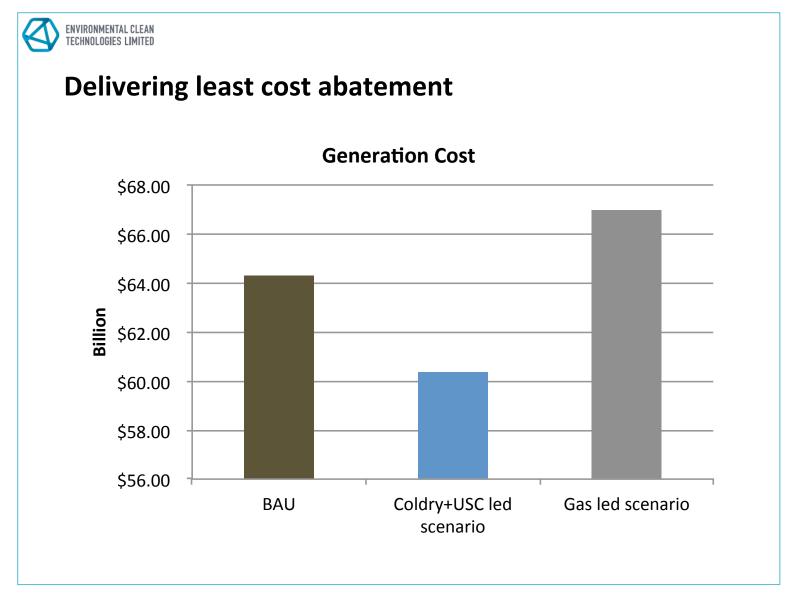
# Indicative cost of production



COSTS	AUD/tonne
Electricity	\$5.56
Maintenance	\$4.70
Labour	\$1.42
Contingency	\$0.63
Lab & Testing	\$0.50
Insurance	\$0.10
<b>Production Cost</b>	\$12.93
Feedstock (est)	\$18.06
TOTAL Ex-Works	\$30.99
Freight	\$40.00
TOTAL COST	\$70.99
Qinhuangdao (5,500 kcal/kg) - 10%	\$117.85
ECT Margin Potential	\$46.86



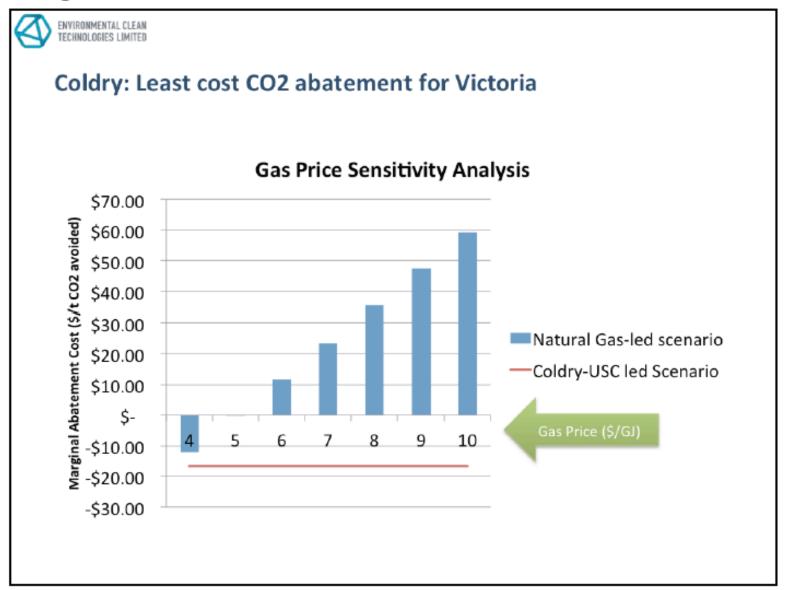
## **Generation cost – cumulative spend 2012-2025**



Slide taken from ECT presentation to "All Energy Conference" Oct 2011



## Mitigation cost vs. Natural Gas costs



Slide taken from ECT presentation to "All Energy Conference" Oct 2011



## **Summary**

- The Company
  - Resource & Energy Focus
  - Technology value add
  - High Value products, High value resource security
- Coldry Technology
  - High Moisture Coal Dewatering
  - Exportable black coal equivalent
  - Cost effective CO<sub>2</sub> abatement solution
- Victorian Coldry Project
  - 2 Mtpa stage 1
  - Cost of production: \$31 per tonne
  - Site: Loy Yang Power Station, Victoria
  - Customers: Tincom, China Datang, Victorian domestic & others



# Thank you

- Ashley Moore
- Chief Operating Officer
- info@ectltd.com.au
- +61 3 9684 0888