Due Diligence and Valuation Report

Arrowhead Code:	94-01-01
Coverage initiated:	26 11 2015
This document:	26 11 2015
Fair share value bracket:	AUD0.031 to AUD0.040[i]
Share price on date:	AUD0.021[ii]

Analyst Team

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Company:	Environmental Clean Technologies Limited
Ticker:	ASX:ESI
Headquarters:	Victoria, Australia
Managing Director:	Ashley Moore
Website:	http://www.ectltd.com.au/

Market Data

52-Week Range:	AUD 0.006 – AUD 0.028[iii]
Average Daily Volume:	8,051,539[iv]
Market Cap. on date:	AUD 55.0 MM[v]

Financial Forecast Data (in AUD)

	'16E	'17E	'18E	'19E	'20E	'21E
High profit/ (loss) MM	(1.8)	1.3	2.8	2.9	3.0	3.0
High EPS AUD	(0.07)	0.06	0.12	0.12	0.12	0.13
Low profit/ (loss) MM	(1.8)	1.0	2.0	2.2	2.3	2.3
Low EPS AUD	(0.07)	0.04	0.09	0.09	0.09	0.10

Fiscal Year (FY) 1st July – 30th June

Summary

Environmental Clean Technologies Limited (ECT) is an Australia-based firm which is focused on bringing its key technologies – Coldry and Matmor technologies – to commercialization.

ECT holds 100% ownership of Intellectual Property Rights to both Coldry and Matmor technologies.

Key Technologies – Coldry

The Coldry process produces high-grade coal equivalents by removing moisture content from low-grade coal such as lignite. The output is a stable product with high energy and low moisture content equivalent to black coal. The product could be easily stored and transported and has lower carbon emissions.

Compared to other technologies to densify brown coal, the uniqueness of the Coldry process lies in its lower processing costs due to application of various features such as utilization of waste heat. The modular nature of the technology further allows for flexibility in expansion as needed, thus eliminating the need to commit to bulk capacity while setting up a plant.

Key Technologies – Matmor

The Matmor process produces primary iron through the reduction of iron oxides. Similar to Coldry, Matmor has a simple design, and is cost-effective. The process uses Coldry's output instead of the more-expensive coking coal as a reducing agent.

Compared to the traditional blast furnace route to produce iron, Matmor benefits from lower cost of feedstock owing to usage of low-grade coal in the process. Further, Matmor could also process iron ore fines and various iron oxide feed that is not suitable for production through the conventional blast furnace process.

Indian Integrated Project

ECT is currently focusing on its Indian project with NLC and NMDC, involving application of both technologies. The company aims to capitalize on the growing energy and infrastructure requirements in the region, coupled with the need for cost-effective production of power and iron.

The company is currently aiming to set up a demonstration plant for Coldry, and a pilot plant for Matmor. Full commencement of the Coldry plant in India is expected by 2017, followed by the Matmor plant.

A part of the output of the Coldry plant will be used for production through Matmor, while the remaining output is expected to be sold in the local market.

Valuation

We believe that ECT's portfolio of technologies makes it uniquely positioned to utilize low-grade coal (more abundant but less usable) in high-

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margin, value-added applications. The technologies' cost-effectiveness and simple implementation would result in higher margins with low capital intensity.

The company's target markets include countries which are net importers of coking coal but have huge resources of low-grade coal which cannot be readily utilized for high-value applications. ECT plans to initially target mine and power stations owners; however the application of its technology caters to a wide range of target customers.

We believe that the company's Indian Project will serve as the global launchpad for its technologies. If successful and operational, the number of installations could increase multifold.

Our valuation estimates are based on risk-adjusted intrinsic value of Coldry and Matmor plants in the Indian integrated project. Given due diligence and valuation estimations based on Discounted Cash Flows, we believe that Environmental Clean Technologies' fair share value lies between AUD 0.031 and AUD 0.040.

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Company Presentation

Listed on the Australian Stock Exchange (ASX: ESI), Environmental Clean Technologies (ECT) is working on developing leading-edge coal and iron-making technologies to convert lower quality products into high-end, value-added products. It focuses on two technologies, namely:

I) Coldry: The Coldry process reduces moisture content of low-quality coal and enhances its energy content, resulting in a high quality output called Black Coal Equivalent (BCE).

II) Matmor: Matmor is a process of producing high-quality iron using inexpensive and abundant brown coal and waste iron fines and slimes, rather than expensive coking coal and high grade iron hematite, in blast furnaces.

The company is currently focusing on India, owing to the expected growth of coal/ iron demand driven by industrialization and urbanization in the region. It also plans to expand operations to countries like Australia, Germany, Poland, Indonesia, China, etc. at a later stage.

ECT has been partnering with and engaging into strategic alliance with various EPC, financing, research and advisory parties to support the technological and commercial development of the processes.

Financial Summary: As of FY15, the company's cash balance, coupled with the R&D incentive receivable amounts to ~AUD2MM. The company also issued 2.18MM options, which can be exercised within a span of 2 years (1,286MM and 896MM options exercisable at AUD0.009 and AUD0.015 respectively).

The company does not have any operational revenues, and as such, the company might be required to raise additional funds to meet expenses till the Coldry plant becomes operational (expected by CY17). However, the company has been successful in raising funds historically when required. The options, if exercised, could also provide potential financing.

Portfolio and Premiums

Promising portfolio of technologies: Both processes in the company's portfolio – Coldry and Matmor – are cost-effective alternatives to the current methods of upgrading coal and producing iron, respectively.

- *Cost effective and easy integration:* The cost-effective technologies and ease of adaptability makes the process more lucrative to potential customers. This is due to the following:
  - Low temperature and low pressure requirements: Coldry uses waste heat as low as 40°C, and the Matmor process operates below 1000ºC, compared to a blast furnace which operates at around 1500ºC.
  - Synergy: ECT also enjoys cost synergy between the processes – the Coldry process is used to combine the required ingredients to form the feedstock for the Matmor process (replacing expensive coking coal).
  - Low capital cost: Both Coldry and Matmor plants have lower capital intensity compared to the current processes. The modular nature of the project makes setting the plants easier, as the capacity can be easily upgraded as needed based on customer requirements, instead of a one-time commitment for a large capacity. Matmor is relatively simpler and more efficient as it requires low energy and has low construction cost relative to conventional processes.
  - Lower feedstock costs, achieved through the technologies' ability to utilize low value raw materials.
- *100% ownership of IP of technologies:* Along with patents to technologies, ECT has also secured its Intellectual Property (IP) rights for both technologies in almost all the major markets.
- *Environmental adherence:* The company's technologies are environment-friendly, and application of the Coldry products to power generation is able to reduce CO_2 emissions by about 5%-30% and also reduce other environmental effects. The Coldry process itself has a zero-carbon footprint and the Matmor process has the potential to reduce CO_2 emissions from crude steel production by more than 25%.

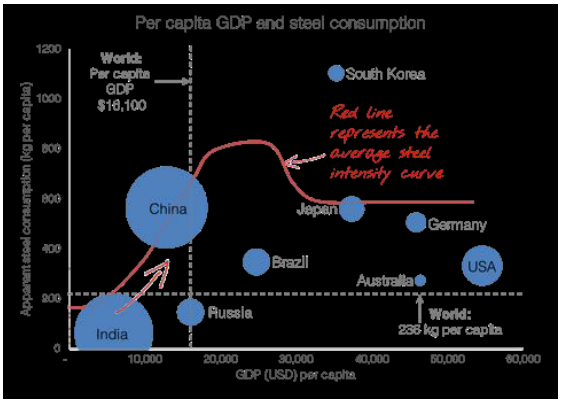
India, an ideal project location: The company's technologies of creating solutions for value-addition to low-grade coal gels well with the significant demand for coal and steel in India owing to its increasing infrastructure and power needs. India is estimated to have reserves of about 43 BT of lignite, of which 80% is found in the state of Tamil Nadu, where the company is setting up its first project.

- India is currently one of the top five producers and consumer of coal and iron/steel.
- While India's coal-based energy production is projected to double by 2030, India's steel consumption rate is expected to grow the highest in world at 7.3% in 2016.

India's Lignite Reserves (April 2013)[vi]

State	Lignite Reserve (MMT)	% Of Total
Tamil Nadu	34,348	79%
Rajasthan	5,690	13%
Gujarat	2,722	6%
Pondicherry	417	1%
J&K	28	0%
Kerala	10	0%
W. Bengal	3	0%
Total	43,216	100%

Global Steel Consumption



Partnership with PSUs to reduce execution risk: To capitalize on the opportunity in India, ECT has partnered with two public sector undertakings (PSUs) – Neyveli Lignite Corporation (NLC) and National Mineral Development Corporation (NMDC). NLC is the custodian of lignite reserves in India; NMDC is India's largest iron ore mining company. Both these firms are government-controlled firms, which brings a lot more credibility to the tie-ups.

Company's Portfolio and Risks

Technological Risk: The company faces technological risks with respect to full commercial exploitation of the technology as well as the possibility of better competing technologies in future. While promising, both Coldry and Matmor technologies are yet to be commercialized at large scale and a degree of uncertainty is inherent until they become fully operational. The company is planning a demonstration plant for Coldry, whereas Matmor is in the pilot stage and would be fully developed after the roll-out of Coldry.

Matmor dependent on Coldry: The Matmor process uses the Coldry process to prepare its key inputs, and hence, the success of Matmor is critically dependent on the success of the Coldry project.

Nascent stage of the life cycle: ECT is a relatively new company with no operational revenues and cash flows, and hence, is exposed to financial and execution risk.

Regulatory/Political risk: The company could face risks due to changes in government legislation/policies, delay in tripartite agreement with NLC, NMDC due to government rules and regulations, political unrest in the region/country.

Price and rate risk: ECT's potential revenues will be exposed to both commodity prices and exchange parity. Though ECT has formed a subsidiary in India to carry out Indian operations, there might be exchange parity when consolidating the results with the Australian parent company.

Company's Corporate Strategy

Focus on India project: The company has currently zeroed in on India for the launch and global commercial rollout of its technologies. It aims to start off operations first in India due to the underlying demographics leading to economic potential, coupled with huge lignite reserves and expected rising demand. ECT will commence first with Coldry technology and then work up to completion of the Matmor project. This will de-risk any aspect of the Coldry process, which will eventually be a part of the Matmor process as a feed control.

Geographic expansion: ECT plans to focus on the Australian Coldry project, as well as other target geographies, including:

- Coldry: Germany, East European countries (Poland, Serbia, etc.), Turkey, Indonesia, Thailand and China, according to the low rank coal availability.
- Matmor: Australia, Indonesia, China, USA and Poland, based on combinations of steel market, raw material availability, and strategic need.

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News

- **Results on effectiveness of Coldry pellets encouraging:** On August 24, 2015, the company announced results from an independent study stating the effectiveness of Coldry pellets as a superior feedstock to produce high-grade PCI coal product post further upgrading. The company also announced that it is in the process of developing an array of project financing options.
- **Advancement of Coldry and Matmor technologies in India:** On August 19, 2015, the company announced that the clearance processes for the tripartite collaboration agreement signed in India is nearing conclusion. ECT plans to formally sign the agreement shortly thereafter. The company is looking at a range of financing options for its Indian project and will receive a draft terms sheet comprising AUD30MM worth debt based finance package. The funds are expected to help in project development activities in India and other locations.
- **Coldry and Matmor project enters 'Stage 1' :** On July 8, 2015, the company informed that while Indian government-clearance formalities pertaining to the tripartite collaboration agreement with Neyveli Lignite Corporation and National Mineral Development Corporation are in process, it is continuing work on Stage 1, constituting the preliminary aspects required for the Indian integrated Coldry-Matmor project.
- **Appointment of Director:** On June 5, 2015, the company announced the resignation of Mr. McEwin from the board. Mr. Barry Richards accepted the offer to join the board as a Non-Executive Director. ECT's Chairman, Mr. Glenn Fozard, has been offered an executive role in the company and will be responsible for commercial, capital and other project related tasks.
- **Alliance with Coal Energy Australia:** On June 05, 2015, ECT announced a strategic alliance with Coal Energy Australia (CEA), wherein both companies will cross-promote each other and combine technologies to provide higher outcomes. Initially, ECT will be focusing on India and CEA on Indonesia; they plan to expand to different geographies eventually after a progressive review.
- **Indian tripartite agreement update:** On May 05, 2015, the company announced its intent to enter a tripartite collaboration agreement with Neyveli Lignite Corporation and National Mineral Development Corporation, for the development of Coldry and Matmor technologies. The company has appointed Platinum Road to carry out a detailed corporate strategic review with the focus on aiding strategic and institutional investment funds in the company. ECT also announced an extension of the existing FAST finance loan through Platinum Road, its strategic finance partner.
- **Coldry Patented in India:** On April 22, 2015, the company announced that it has formally received the Indian Coldry Patent Certificate. The company now owns Coldry patent in seven nations, including Australia, Canada, China (including Hong Kong), Europe, New Zealand, USA and India.
- **Talks with Indian PSU's in advance stage:** On March 18, 2015, ECT announced the progression of activities in the Coldry and Matmor technologies and that it has entered into advance stage of negotiation with Neyveli Lignite Corporation and the National Mineral Development Corporation of India. On the Coldry front, the company improved upon the Coldry pellet quality, while Thermax, its Indian EPC and engineering partner, is in the process of improving the efficiency of the heat exchange systems and aligning the configuration of raw materials for Coldry output. On the Matmor front, the company is looking to partner with some potential, internationally renowned engineering company.
- **Incorporated in India:** On February 17, 2015, the company announced the completion of its 100% owned Indian subsidiary named 'Environmental Clean Technologies Development and Services India Private Limited' (ECT India).
- **Completion of Coldry Patent process in India:** On February 9, 2015, ECT announced that it has completed all the stages of the patent process in India, thereby permitting the company to continue with activities even before the patent is formally granted.

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Listing Information

Environmental Clean Technologies Limited is listed on the Australian Securities Exchange (ASX: ESI) since 2006 and is headquartered in Victoria, Australia.

Contacts

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Major Shareholders [vii]

Equity Holder	No. of Shares Held (Million)	Percentage Holding
LJ & K Thomson PL	103.5	4.06
Elgar Park PL	93.8	3.68
Segal Danny + Jennifer R	90.0	3.53
Menzies Super PL	80.0	3.14
Marbrijen PL	55.2	2.17

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Management and Governance

Personnel	Designation	Current and total Experience
Glenn Fozard	**Chairman**	Glenn Fozard was appointed Chairman of the company in November 2013. He has held an advisory position in the company for over five years and has been instrumental in capital-raising exercises. Mr. Fozard has a significant experience spanning over 13 years in the finance sector. He is the founding member of Greenard Willing, a specialist financial advisory firm. Prior to his role with the company, Mr. Fozard held the position of Director with Trafalgar Community Bank in the Risk and Audit division. He worked with Maquarie Bank Limited for five years and held various senior manangement and sales roles.
Ashley Moore	**Managing Director**	Ashley Moore has been a part of the company since 2009. He held the position of COO, Executive Director (2011-2013) before becoming the Managing Director (2013-Present). He is an industry veteran in Manufacturing, Supply Chain, Sales and Industrial Marketing and has a global experience in all the fields. Previously, he has worked with Cabot Corporation and Delta EMD (Pty) Limited.
David Smith	**Non-Executive Director**	David Smith joined the company as Director in February 2015. Prior to that he has worked with Herbert Smith and Corrs Chambers Westgarth. At present, he holds the position of Vice President in Bicycle Network and is a Partner at Gadens law firm. Mr. Smith has a strong legal and commercial background spanning 24 years and has an extensive Intellectual Property experience. He is a member of the Intellectual Property Society of Australia and New Zealand and the Licensing Executives Society. Mr. Smith has helped companies with IP agreements development, licensing, collaborative research agreements and international negotiations. He holds a degree in B.Com and LLB (Hons.) from the University of Melbourne.
Barry Richards	**Non-Executive Director**	Barry Richards has a significant industry and commercial background of about 30 years. He asists companies by providing practical experience in major project development and delivery apart from providing expertise in contract, operational and maintenance stages of a project. He currently holds the position of Managing Director with Mercus Pty Ltd, and previously was a part of Operations and Maintenance Management with the State Electricity Commision of Victoria. He also held Contract and Business Development role with Siemens/ Silcar.
Adam Giles	**Operations Manager, Company Secretary**	Adam Giles has been a part of the company since 2005. His long-term involvement with the company and consequently, with the Coldry and Matmor technologies, has helped him provide a strategic assistance to the company. He has about 20 years of management experience across public and private sectors. Prior to joining the company, Mr. Giles held the position of Manager at Caracob Pty Limited and was the Contact Centre Manager for Tenix Solutions.

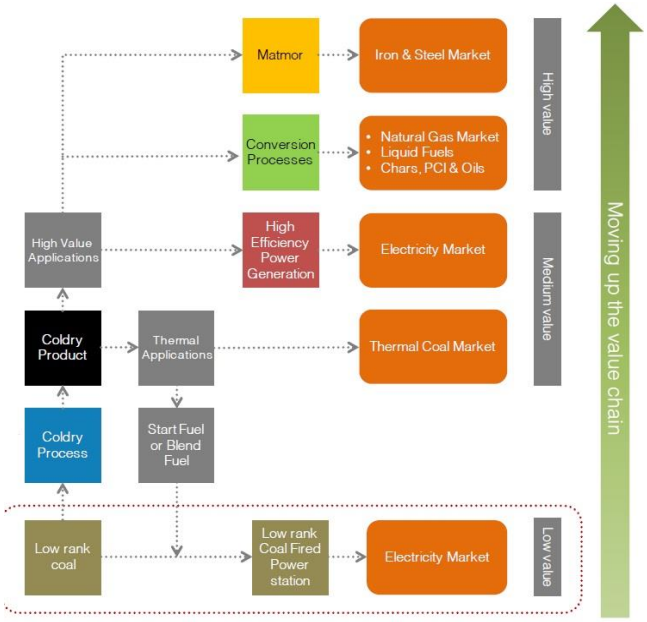
Proprietary Technologies and Key Project

Overview

ECT holds 100% intellectual property rights in Coldry, which produces high-grade coal equivalents from low-grade coal, and Matmor, which produces primary iron using the Coldry product in lieu of expensive coking coal.

The company is developing these technologies to commercialization. It is currently focusing on its Indian Project, to be set up along with two Indian PSUs.

Company's Technological and Project Portfolio

Business Model	*Project overview*
	**Primary Technologies** • **Coldry** • 100% IP ownership • Key Product – Black Coal Equivalent pellets • Key Markets – EU, Germany, Turkey, China, Southeast Asia • **Matmor** • 100% IP ownership • Key Product – Customized Iron Product • Key Markets – Australia, China, USA, Poland, Indonesia **Key Project** • **Indian Integrated Project** • 33% share. reamining share held by project partners – NLC and NMDC • Integrated plant (Coldry + Matmor) • Current status: Working on demonstration plant for Coldry and Pilot Plant for Matmor
Source: Company filings	*Source: Company filings*

Coldry – Technology and Process

IP Ownership: 100%

Primary Output: Black Coal Equivalent pellets

Primary Raw Material: Low-grade coal

USP: Cost-effective, high-value process

Summary: Coldry is an efficient pre-drying process, which produces high-value coal pellets from low-grade coal varieties such as lignite. The process involves full utilization of waste heat, which further reduces processing costs. The technology is modular, and the capacity can be expanded as needed, providing greater flexibility in implementation and plant set-up.

The Coldry product is a stable product which has high energy content and lower moisture content, equivalent to black coal. Further, the product can be easily stored and transported and has lower carbon emissions.

The Coldry technology is a one-of-a kind process, and potentially opens up new opportunities for owners of low-grade coal assets owing to its wide

variety of applications. ECT is targeting mines and power stations owners to commercialize the project, as the technology could be easily integrated with existing plants.

IP Rights: ECT acquired IP of Coldry technology in June 2009 from Calleja group. Currently, ECT holds patents to Coldry technology in almost all major economies – Australia, Canada, China, Europe, New Zealand, USA and India.

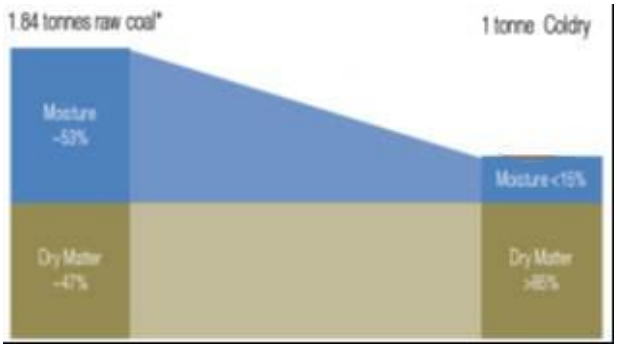
Acquisition terms: The IP was acquired from Calleja for a consideration of AUD$1MM, along with 55MM shares and 110MM options.

Key Features: The Coldry product is a high-value, stable product which is ideal for storage and transportation. Generated from low-grade coal, the product could be deployed for all the applications suitable for high grade coals.

Enhanced net energy content: The Coldry product has a significantly higher energy content compared to the low-grade coal – with the energy content increasing by up to 285% (compared to lignite with 60% moisture content).

Lower moisture content: The Coldry product has ~85% lower moisture content compared to the input (lignite)

Moisture reduction



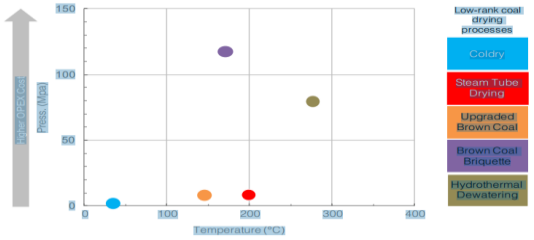
Source: Corporate presentation, Sept 2015

Reduced CO_2 emissions: The process enables reduced CO_2 emissions in power generation by 5%-15%. Further reductions are possible when implementing combustion systems upgrades.

Margins: Coldry technology could potentially generate higher margins due to its cost effectiveness compared to peers. The Coldry process has a low processing cost of US$7.2/T (excl. cost of raw coal), and benefits from:

- *Lower Opex:* Due to low temperature (40^{0}C) and pressure involved in the process

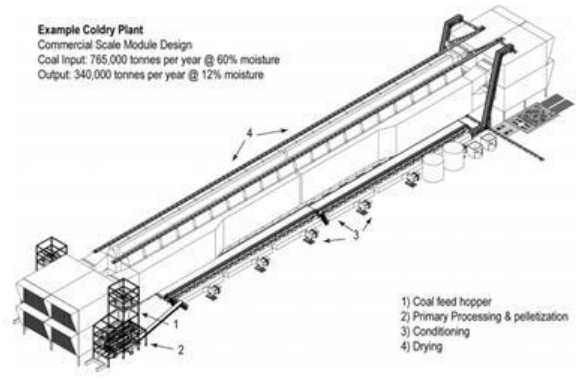
Cost comparison with competitors



Source: Corporate Presentation, Sept 2015

- *Modular design leading to easy integration:* The process is simple and mechanical and can be deployed in modules, making it suitable for remote installations and easier integration with existing coal mines.

Coldry – Sample Plant



Source: Corporate Presentation, Sept 2015

Coldry – Process Overview: Coldry is a cost-effective process to upgrade *low grade coal* (brown coal, with high moisture content and low calorific value) into black coal equivalent (with low moisture content and high calorific value).

The process can generate stable coal pellets output through:

- *Brown coal Densification:* A process that destroys the internal porous structure and mobilizes structurally-trapped water to prevent moisture re-absorption
- *Waste Heat utilization: Using* waste heat from an industrial facility or power plant at a low temperature (~40^{0}C) to remove moisture.

Conversion from Raw Coal to Coldry: The Coldry process involves the following steps:

Coldry Process

Source: Corporate Presentation, Sept 2015

- *Screening & Feed Control:* Milled raw coal is screened before it goes to the feeder, to ensure a uniform size (<8mm). A small quantity of water is added to the feeder along with the coal.
- *Shear & Attrition:* The raw coal is subjected to mechanical shear in a mill attritioner where coal particles are reduced further into a coal paste. Water inside the coal, both chemically trapped and physically absorbed into the coal structure is released during the process.
- *Extruding:* The coal paste is extruded into coal pellets.
- *Conditioning:* The extruded coal pellets undergo warm air toughening on a conditioning conveyer wherein the pellet strength is increased before they are discharged to the main dryer.
- *Continuous Packed Pad Drying:* The moist pellets are subjected to further drying up of moisture and further strengthening in a pack bed dryer at low temperature via waste heat.
- *Water Recovery:* Water removed from coal can be recovered from the process (optional)
- *Coldry Pellets:* The final products of black coal equivalent in the form of high energy Coldry pellets are ready for use/ transport.

Product types: Three different grades of pellets are extruded through the Coldry process, namely, Gateway, Domestic and Export – with varying degrees of toughness:

- *Gateway:* Most basic version of the product, used for front-end feedstock.
- *Domestic:* Standard Coldry product, can withstand handling and transportation in local markets with minimal generation of fines.
- *Export:* Premium grade, can withstand multiple handling points over long distances.

Potential clients and applications: The Coldry process provides a low-cost alternative to coal drying – the product can be used in a variety of applications encompassing various stakeholders, including:

Stakeholders	Application
Brown Coal Power Plants	- Lower coal demand by operating on a blended energy source - Lower water losses, and recovery of high-quality water for boiler feedwater
Black Coal Power Plants	- Higher energy security - Have more flexibility over input costs
Owners of Brown Coal Assets	- Have multiple applications than traditional ones for brown coal - The new, value-added applications have the potential to generate higher margins
Coal Traders	- Additional commodity for trade
Coal Chemical Plants	- Lower the cost of dewatering - Retains important volatile matter

Current Project: Benefitting from the simple design, ECT is currently focusing on *mine and power station owners* to integrate Coldry technology with their existing plants.

Currently, the company is focusing on the *Indian Integrated project*.

Matmor – Technology and Process

IP Ownership: 100%

Primary Output: Primary Iron

Primary Raw Material: Iron oxide (including in the form of fines), Coldry product (conversion of low-grade coal through Coldry process)

USP: Low-cost alternative

Summary: Matmor is a low cost, low emission process to produce primary iron from various iron oxides. The process has a simple design, and is cost-effective compared to the traditional blast furnace owing to the lower cost of feedstock.

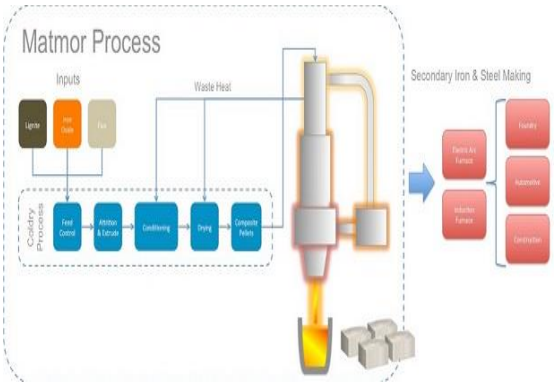
In the Matmor process, the expensive coking coal is replaced by output from the Coldry process. Further, the project can be used to process a wide range of iron oxide feed – from using fines and low-grade ores which are not suitable for the blast furnace based process.

Matmor iron is expected to be a supplement/ substitute to scrap metal feedstock employed in Electric Arc or Induction Furnaces. The company is currently focusing on advancing the process to Pilot Plant stage with a capacity of 8KTpa.

IP Rights: ECT acquired IP of Matmor technology from Calleja group in December 2014 for a consideration of AUD$4.5MM in equity and cash.

Matmor – Process Overview: Matmor is a cost-effective process to produce solid iron. The process has the unique feature of using low-grade brown coal as the reducing agent.

Matmor Process



Source: Corporate Presentation, Sept 2015

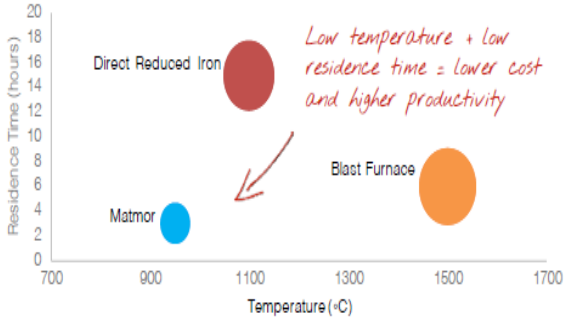
Key Steps:

- *Pellet Production:* The extruded mixture of iron ore and lignite from Coldry process is hardened and evaporated moisture is removed.
- *Processing in Matmor retort:* The inputs are fed into the Matmor retort, wherein the remaining moisture is removed. The process uses coal as combustible gas – these are ignited at the base of the retort. The pellets are discharged at the base of the retort, containing carbon along with iron and ash.
- *Producing liquid metal:* The pellets are run through hot air to produce liquid metal and slag. The liquid metal is then poured to an induction furnace where billets are produced as per customer's requirements.

Key Features: Compared to the conventional route of making iron through the blast furnace, Matmor benefits from the lower operating costs, lower capital costs and lower emissions.

- *Low opex due to low-grade coal as feed:* Matmor process uses lower grade coal, whose prices are significantly lower than the expensive coking coal used in traditional iron ore making process through blast furnace. Lower cost iron ore feedstock also contributes to this advantage.
- *Lower Capex due to Simple Design:* Capital requirements are estimated to be less than half of a traditional blast of equal capacity as the former requires smaller foot print and lower temperature materials for construction.
- *Lower emissions:* Apart from lower capital and production costs, Matmor produces high quality iron consistently with lower emissions and integrates well with existing downstream steel making.

Comparison of Matmor wrt competing technologies



Source: Corporate Presentation, Sept 2015

Matmor Products: The Matmor products have low iron content (>95%). Further, the product could be customized based on customer requirements to the following:

- DRI pellet
- HLM (Hot Liquid Metal)
- Solid iron

Project Stage: ECT is currently developing Matmor Test Plant in Melbourne, which it aims to develop to pilot plant stage.

Test Plant: The test plant has a capacity of 1T/day or 40kg/hour. Stage 1 of the test plant is completed as of date, while Stage 2 being planned to commence in 2015.

Matmor Test Plant

Source: Corporate Presentation, Sept 2015

Pilot Plant: Following the completion of Stage 2 test plant, the company aims to advance the project to pilot plant scale, with an estimated capacity of 8 KTpa (1T/ hour).

Indian Integrated Project

Company's interest in the Project: 33%

Technologies Involved: Coldry and Matmor

Location: Nevyeli, Tamil Nadu, India

Current Stage: Coldry (Demonstration Plant); Matmor (Pilot Plant)

Key Catalyst: Execution of tripartite agreement with project partners (currently awaiting final clearance from Government of India)

Summary: ECT is developing an integrated Coldry and Matmor project in India to capitalize on the growing energy and infrastructure requirements in the region, coupled with the need for cost-effective production of power and iron.

ECT is en-route signing the tripartite collaboration agreement with NLC and NMDC, with two of three requisite Indian ministerial approvals cleared. Following this, it plans to set up a demonstration and pilot plant for Coldry and Matmor respectively.

A part of the output of the Coldry plant will be used for the production through Matmor, while the remaining output is expected to be sold to the local market. Whilst not finalized yet, it is expected that NLC, NMDC and ECT will contribute equally to the costs and receive an equal ownership of the plant.

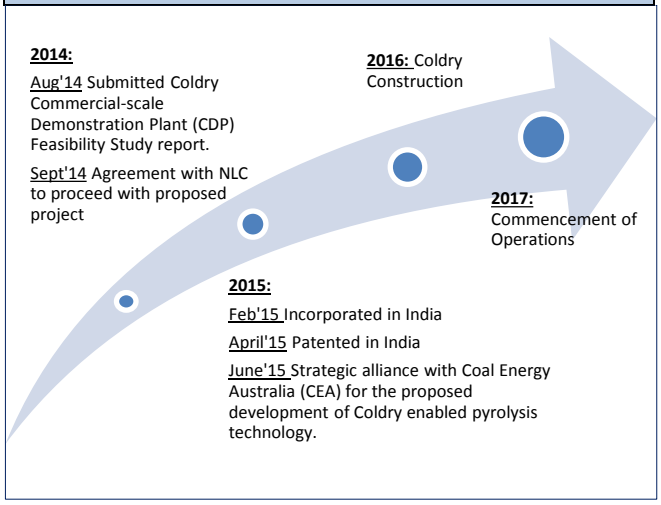
Project Development Partners: The company has partnered with two Indian PSUs – NLC and NMDC – as its project development partners for India project. Both PSUs enjoy the "Navaratna" status offered by the Indian government, which gives them greater operational autonomy.

- *Neyveli Lignite Corporation (NLC):* NLC is the project host and lead partner on Coldry. Founded in 1956, NLC is an Indian government-owned lignite mining and power generating company. It operates the largest open-pit lignite mines in India, presently mining 24MMT of lignite and operates power plants with total capacity of 2,740 MW.
- *National Mineral Development Corporation (NMDC):* Founded in 1958, NMDC is a state-controlled mining company owned by the Government of India and is under the administrative control of the ministry of steel. It is India's largest producer and exporter of iron ore, producing about 30 MMT of iron ore from its three existing mines in India.

Project Status – Coldry Demonstration Plant: The feasibility study for the Coldry project is completed, and the company is currently awaiting tripartite agreement with its project partners. Following this, construction of the demonstration plant is expected to start by 2016.

The Coldry project is expected to initially commence with a demonstration plant of a relatively smaller capacity to define and validate the business model and the key operational and financial metrics to its project patterns. Following the successful demonstration, the plant would be ramped up to full capacity.

Project Schedule – Coldry

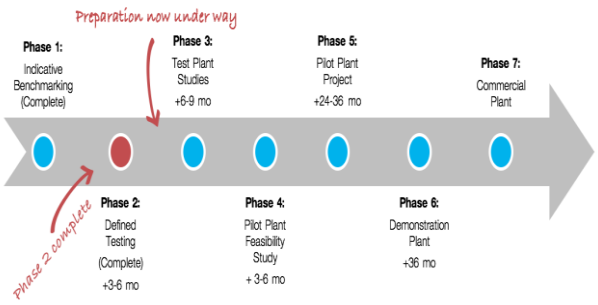


Project Status – Matmor Pilot Plant: Similar to Coldry, ECT is awaiting execution of tripartite

agreement to commence work on the setting up the pilot plant in Neyveli. ECT is currently looking for an Indian metals production engineering firm to partner as a design engineer.

During this phase, the company had performed a number of formulation changes, and achieved an average of ~90% yield (ranging from 85%-99%).

Project Stage – Matmor



Australian PCI Project

Company's interest: 100%

Summary: ECT is also planning to construct an integrated Coldry plant in Victoria, Australia, with a capacity of more than 200KTpa to produce high-grade PCI coal from lignite.

The company is currently planning to undertake Techno Economic Feasibility study on the project.

See important disclosures on page 22 of this report.

Commodities and Markets Overview

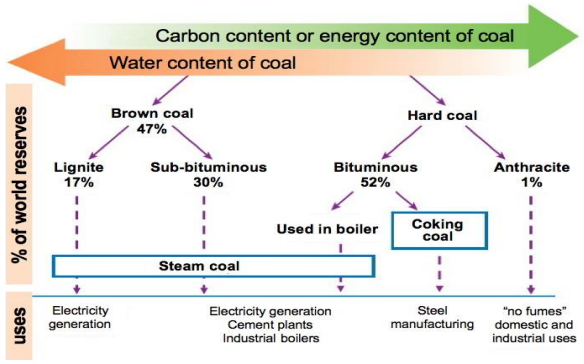
Coal [viii]

Chemistry and Properties

Coal, a combustible black or black-brown colored sedimentary rock, mainly constitutes carbon and hydrocarbons. It also contains varying amounts of oxygen, nitrogen, sulfur, ash and moisture.

Based on the amount of carbon content and heat producing ability, coal is classified into four types – peat, lignite, bituminous, and anthracite.

Types of Coal and their Uses

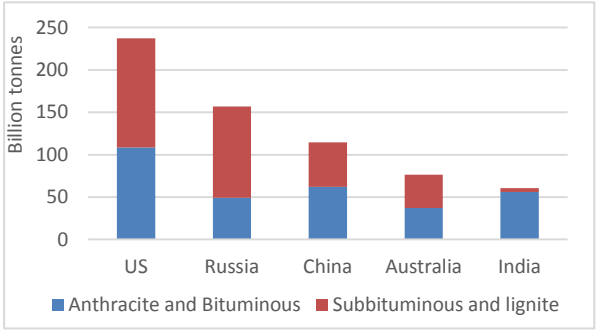


Source: IFP Panorama, 2010

Sources and Production

Sources: Coal reserves are found all over the world in swampy areas like forests, marshes, areas near oceans, peat bogs and lagoons. Out of an estimated 892BT of proven coal reserves worldwide, the biggest reserves are in the USA, Russia, China, Australia and India (constituting ~75% of total world's reserves).

Coal reserves (FY2014)



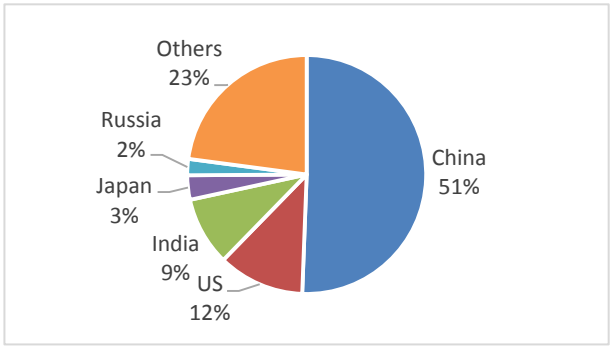
Source: BP statistical review of world energy 2015

Production: Coal is produced across the world, with Asia-Pacific accounting for about 70% of the total world production. According to BP Statistical Review, China is a major producer of coal, producing about 47% of the world's coal.

Top Coal Producers		
Country	***Mn tonnes oil eq.***	***% share***
China	1,844.6	47%
US	507.8	13%
Indonesia	281.7	7%
Australia	280.8	7%
India	243.5	6%
Russia	170.9	4%
South Africa	147.7	4%
Total World	**3,933.5**	**100%**

Demand: As per the BP Statistical Review of world energy – 2015, Asia-Pacific constitutes for more than 70% of the total global consumption of coal; China alone contributed to more than half of world's consumption in FY14.

Top 5 Coal Consumers (FY2014)



Source: BP statistical review of world energy 2015

Applications: The energy derived out of coal is mainly from the solar energy trapped inside these plants. Different types of coal have different uses.

Electricity Generation: About 40% of world-wide electricity is generated using steam/thermal coal.

Steel and cement production: Coal alongside iron is used as raw materials in production of steel. It

also acts as a source of heat producing energy to produce cement.

Paper and Aluminum Industry: Coal is used by alumina refineries and paper manufacturers in large quantities as an energy resource.

Chemicals and Pharma Industry: Byproducts of coal are used in the production of various chemicals and pharmaceuticals.

Other uses: Coal has several other uses in all forms – in manufacturing of soap, fiber, rayon, cooking fuel etc.

Market Trends: Prices and drivers

Coal has always been a cheaper fuel as compared to oil and gas. Due to its abundant supply and relatively stable pricing, it is the most affordable choice of fuel in developing countries.

Coal demand heavily depends on growth in the power sector and industrialization. In FY14, total world coal production declined by 0.7%, whereas consumption increased by 0.4%. India recorded the largest increment in both coal production (+6.4%) and coal consumption (+11.1%).

Coal price trend in the last 5 years

-

Source:InfoMine.com

Iron [ix]

Chemistry and Properties

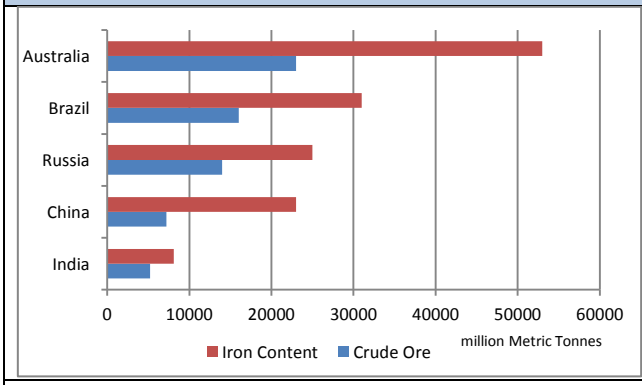
Iron (Fe), by mass, is the most abundant element on Earth, known to exist in various forms of iron ore such as hematite, magnetite, taconite, limonite, etc. It is a lustrous, ductile, malleable, silver-gray metal. Iron is chemically very active. It rusts in damp air and dissolves readily in diluted acids.

Commercially available iron is classified based on purity and the abundance of additives - wrought iron, cast iron, steel, etc.

Sources and Production

Sources: The largest iron ore reserves are located in Australia. Brazil has the second largest iron ore reserves in the world, followed by Russia, China and India. These five countries alone make up for about 75% of the world's total iron ore reserves.

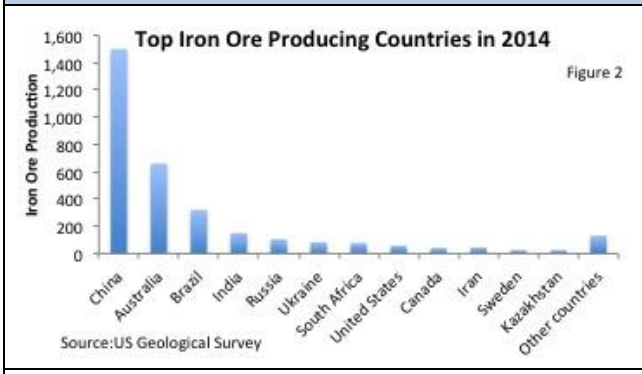
Iron Ore reserves (FY 2014)



Source: BP statistical review of world energy 2015

Production: According to data from the US Geological Survey, the top five iron ore producing countries control approximately 85% of production and 73% of reserves. The largest producer of iron ore in the world is China, followed by Australia, Brazil, India, and Russia. Four companies dominate global iron ore production namely, BHP Billiton, Vale, Rio Tinto, and Fortescue Metals Group.

Iron Production (FY 2014)



Source: US Geological Survey 2015

Demand: More than half of the demand for iron and steel comes from China. However, Chinese consumption of iron and steel is declining due to slowdown in construction and manufacturing activity. Nevertheless, according to Rio Tinto, global steel demand (main use of iron ore) is slated to grow on an average 2.5% annually for the next 15 years. Emerging markets are expected to take on an expanded role, with the mining company predicting that non-Chinese steel demand will rise 65% by 2030.

Top 20 Iron Consumers (2013)

Figures in MMT
Source: Ironorefacts.com

Applications

Iron is the most widely used of all metals. It is majorly used to manufacture steel. Its low cost and high strength make it indispensable in engineering applications such as the construction of machinery and machine tools, automobiles, the hulls of large ships, and structural components for buildings.

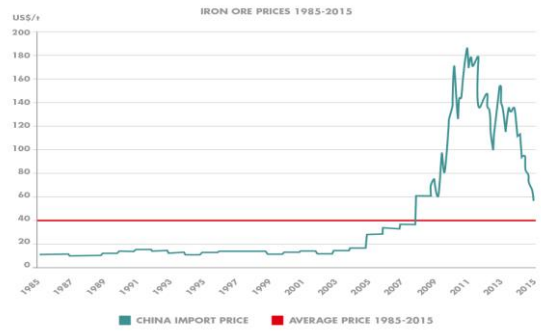
Iron, along with other elements, is used in the construction of nuclear reactors, treatment of sewage systems, as a colorant, for textiles and paints, and animal feed additives.

Different grades of iron are used in different sectors. Wrought iron which is rust-resistant and can be molded very easily is widely used for making household things such as fencing, arbors, and furniture. Cast iron, which has a uniform heating property, is used for manufacturing long lasting kitchen utensils, Dutch ovens, cake pans and cornbread trays. Metallic iron is used for making permanent and electro-magnets.

Market Trends: Prices and drivers

Iron ore prices have been falling due to high supply and low demand. Companies are in fact increasing output to benefit from economies of scale as prices remain above their production costs. On the other hand, demand is under heavy pressure as construction activity slows in largest consumer China.

Commodity price trend 1985-2015



Source:Ironorefacts.com

See important disclosures on page 22 of this report.

Value

The Fair Market Value for Environmental Clean Technologies Limited shares stands between AUD82.0MM and AUD103.5MM.

The Fair Market Value for one of Environmental Clean Technologies Limited publicly traded shares stands between AUD0.031 and AUD0.040.

Environmental Clean Technologies Limited Balance Sheet Forecast

CONSOLIDATED BALANCE SHEET

all figures in '000 AUD, unless stated differently

Low bracket estimates

year ending June 30	***2016E***	***2017E***	***2018E***	***2019E***	***2020E***	***2021E***
Total Current Assets	1,932	1,590	2,166	2,691	5,681	8,647
Total Non-Current Assets	13,856	20,182	26,655	33,299	32,560	31,901
TOTAL ASSETS	**15,789**	**21,772**	**28,821**	**35,990**	**38,241**	**40,549**
Total Current Liabilities	4,503	4,503	4,503	4,503	4,503	4,503
Total Non-current Liabilities	869	869	869	869	869	869
TOTAL LIABILITIES	**5,372**	**5,372**	**5,372**	**5,372**	**5,372**	**5,372**
Total Shareholders' Equity	10,417	16,400	23,449	30,618	32,869	35,177
TOTAL LIABILITIES and EQUITY	**15,789**	**21,772**	**28,821**	**35,990**	**38,241**	**40,549**

Important information on Arrowhead methodology

The principles of the valuation methodology employed by Arrowhead BID are variable to a certain extent, depending on the sub-sectors in which the research is conducted. But all Arrowhead valuation researches possess an underlying set of common principles and a generally common quantitative process.

With Arrowhead commercial and technical due diligence, the company researches the fundamentals, assets and liabilities of a company, and builds estimates for revenue and expenditure over a coherently determined forecast period.

Elements of past performance such as price/earnings ratio, indicated as applicable, are mainly for reference. Still, elements of real-world past performance enter the valuation through their impact on the commercial and technical due diligence.

Arrowhead BID Fair Market Value Bracket

The Arrowhead Fair Market Value is given as a bracket. This is based on quantitative key variable analyses such as key price analysis for revenue and cost drivers or analysis and discounts on revenue estimates for projects, especially relevant to projects estimated to provide revenue near the end of the chosen forecast period. Low and high estimates for key variables are produced as a valuation tool.

In principle, an investor comfortable with the high brackets of our key variable analysis will align with the high bracket in the Arrowhead Fair Value Bracket, and, likewise, in terms of low estimates. The investor will also note the company intangibles to analyze the strengths and weaknesses, and other essential company information. These intangibles serve as supplementary decision factors for adding or subtracting a premium in investor's own analysis.

The bracket should be taken as a tool by Arrowhead BID for the reader of this report and the reader should not solely rely on this information to make his decision on any particular security. The reader must also understand that while on the one hand global capital markets contain inefficiencies, especially in terms of information, on the other, corporations and their commercial and technical positions evolve rapidly. This present edition of the Arrowhead valuation is for a short to medium-term alignment analysis (one to twelve months). The reader should refer to important disclosures on page 22 of this report.

Information on the Environmental Clean Technologies Limited valuation

Environmental Clean Technologies Valuation Methodology: The Arrowhead fair valuation for Environmental Clean Technologies is based on Discounted Cash Flow valuation method (DCF) for its Indian Integrated Project. We have separately forecasted the metrics for Coldry and Matmor projects to arrive at project-level valuations. This, adjusted for Cash and R&D tax incentive receivable, is used to arrive at Implied Equity Value for the company.

Time Horizon: The Arrowhead fair valuation for Environmental Clean Technologies is based on a DCF method. As the company's technologies could be re-used over time horizon, we have assumed a longer time horizon compared to other mining firms where we assume it till the Life-of Mine. While revenue is expected to ramp up significantly during the 2017-18, the later years are heavily discounted and have a marginal effect on valuation, which are included primarily to present a full project cycle situation.

Underlying Business Plan: The company holds 100% IP of Coldry and Matmor technologies, and is aiming to commercialize these technologies with its first project – Indian Integrated Project. The Coldry plant is expected to be operational by CY2017, while Matmor pilot plant is expected to complete by mid-2017.

Terminal Value: Terminal Value is estimated to depend on a terminal growth rate of 0%, representing the maturity, technology change and prospective competiveness in the business.

Prudential Nature of Valuation: This Arrowhead Fair Value Bracket estimate is a relatively prudential estimate, as it discounts the eventuality of the company installation of any additional other than from its Indian Integrated Project.

Key variables in Environmental Clean Technologies' revenue estimations

We have based our valuation for ECT based on Coldry and Matmor plants to be installed in its Indian Integrated Project. The company would generate revenue through fees from licensing its technologies, as well as margins from installation and maintenance of the plants.

Further, we assume that the company would retain its ownership in the Indian Integrated Project, and thus, would get a share of profits based on its stake in the plants. We assume Indian Integrated project to have equal ownership by NLC, NMDC and ECT.

Key Variables which are used to arrive at HIGH and LOW bracket estimates are as follows:

Variable 1 – Plant Capacity and Timelines

HIGH BRACKET: We estimate Coldry would be fully operational by CY17 at a capacity of 250KTpa.

We estimate that Matmor pilot plant (8 KTpa) would be completed within six months after Coldry (mid-17), and would be ramped up to full capacity of ~200KTpa (estimated) by CY20.

LOW BRACKET: We have discounted our estimates by 25KTpa to arrive at Low Bracket estimates.

(in KTpa)	Coldry (CY17)	Matmor (CY20)
Low	225	175
High	250	200

Variable 2 – Margins from Plant Operations

HIGH BRACKET: We have estimated EBITDA margins of Coldry project in line with Company presentation.

Given the early stages, margin details for Matmor plant not reported; we have estimated the margins of US$125/T for Matmor, based on its relative savings with respect to traditional blast furnace operations.

LOW BRACKET: To arrive at Low Bracket estimates, we have discounted our estimates by US$5/T and US$25/T for Coldry and Matmor respectively.

(in US$/T)	Coldry	Matmor
Low	30	100
High	35	125

Variable 3 – Capex

We have estimated capex for Coldry plant and Matmor pilot plant in line with company's estimates.

For full-scale Matmor plant, we estimate capex to be 50% of capital costs for a traditional blast furnace. We use the blast furnace capital costs of US$211/T (as of 2010) [x], adjusted for cost inflation.

Variable 4 – P/NPV

Given the different stages of the Coldry and Matmor, we have discounted the NPV of these projects with P/NPV multiple to account for the inherent project risks, including the current stage and the timelines to bring the projects to commercialization. The P/NPV multiple, in conjunction with company's interest in the project, is used to determine the implied equity value.

P/NPV multiple	
Coldry	0.90x
Matmor	0.45x

Variable 5 – Exchange rate

We have used a US$/AUD conversation rate of 1.40.

Analyst certifications

I, Samarth Agrawal, certify that all of the views expressed in this research report accurately reflect my personal views about the subject security and the subject company.

I, Kanniga Rajamanickam, certify that all of the views expressed in this research report accurately reflect my personal views about the subject security and the subject company.

Important disclosures

Arrowhead Business and Investment Decisions, LLC received fees in 2015 from Environmental Clean Technologies Limited for researching and drafting this report and for a series of other services to Environmental Clean Technologies Limited, including distribution of this report and networking services.

Aside from certain reports published on a periodic basis, the large majority of reports are published by Arrowhead BID at irregular intervals as appropriate in the analyst's judgment.

Any opinions expressed in this report are statements of our judgment to this date and are subject to change without notice.

This report was prepared for general circulation and does not provide investment recommendations specific to individual investors. As such, any of the financial or other money-management instruments linked to the company and company valuation described in this report, hereafter referred to as "the securities", may not be suitable for all investors.

Investors must make their own investment decisions based upon their specific investment objectives and financial situation utilizing their own financial advisors as they deem necessary. Investors are advised to gather and consult multiple information sources before making investment decisions. Recipients of this report are strongly advised to read the information on Arrowhead Methodology section of this report to understand if and how the Arrowhead Due Diligence and Arrowhead Fair Value Bracket integrate alongside the rest of their stream of information and within their decision taking process.

Past performance of securities described directly or indirectly in this report should not be taken as an indication or guarantee of future results. The price, value of, and income from any of the financial securities described in this report may rise as well as fall, and may be affected by simple and complex changes in economic, financial and political factors.

Should a security described in this report be denominated in a currency other than the investor's home currency, a change in exchange rates may adversely affect the price of, value of, or income derived from the security.

This report is published solely for information purposes, and is not to be considered as an offer to buy any security, in any state.

Other than disclosures relating to Arrowhead Business and Investment Decisions, LLC, the information herein is based on sources we believe to be reliable but is not guaranteed by us and does not purport to be a complete statement or summary of the available data.

Arrowhead Business and Investment Decisions, LLC is not responsible for any loss, financial or other, directly or indirectly linked to any price movement or absence of price movement of the securities described in this report.

Valuation

WACC

Risk-free rate	1.6%	[xi]
Beta	0.7	[xii]
Risk premium	8.4%	[xiii]
Additional Risk Premium	0.0%	[xiv]
Cost of Equity	7.1%	
Terminal Growth Rate	0.0%	

	Project Stage	Capacity	Margins
Max value	*Please refer to the Key Variable Section*		
Min value			

FCFE (High) Time Period -->

	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
EBITDA	-	3,325	7,678	6,678	22,180	39,243	39,243	39,243
Tax	-	(854)	(2,159)	(1,859)	(6,510)	(11,629)	(11,629)	(11,629)
Capital Expenditure	(5,067)	(7,600)	(7,500)	(7,500)	-	-	-	-
Free Cash Flow	**(5,067)**	**(5,128)**	**(1,982)**	**(2,682)**	**15,670**	**27,614**	**27,614**	**27,614**
Present Value of FCF	**(5,349)**	**(5,051)**	**(2,080)**	**(2,491)**	**11,101**	**18,533**	**17,312**	**16,171**

FCFE (Low) Time Period -->

	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
EBITDA	-	2,810	6,366	5,366	18,086	32,086	32,086	32,086
Tax	-	(699)	(1,766)	(1,466)	(5,282)	(9,482)	(9,482)	(9,482)
Capital Expenditure	(5,067)	(7,600)	(7,500)	(7,500)	-	-	-	-
Free Cash Flow	**(5,067)**	**(5,489)**	**(2,900)**	**(3,600)**	**12,804**	**22,604**	**22,604**	**22,604**
Present Value of FCF	**(5,349)**	**(5,376)**	**(2,850)**	**(3,211)**	**9,004**	**15,109**	**14,114**	**13,184**

In the model, the valuation is continued to the year 2028, from which point the terminal value is established.

Arrowhead Fair Value Bracket

in AUD '000, unless otherwise stated	High	Low
Implied Enterprise value	**101,502**	**79,920**
+Cash[xv]	2,055	2,055
Equity Value Bracket	**103,557**	**81,975**
Shares Outstanding (in millions)[xvi]	2,619	2,619
Fair Value Bracket (AUD)	**AUD 0.040**	**AUD 0.031**
Current Market Price (AUD)	**AUD 0.021**	**AUD 0.021**

Notes and References

i *Arrowhead Business and Investment Decisions (ABID) Fair Value Bracket. See information on valuation on pages 19-23 of this report and important disclosures on page 22 of this report*

ii *Bloomberg as on 25-Nov-2015*

iii *Bloomberg as on 25-Nov-2015*

iv *3-month average volume from Bloomberg as on 25-Nov-2015*

v *Bloomberg as on 25-Nov-2015*

vi *Press information bureau, GoI*

vii *http://www.ectltd.com.au/top-40-shareholder-as-at-30-september-2015/*

viii *World Coal Association – www.worldcoal.org*
BP Statistical Review of World Energy 2015
Infomine.com
IFP Panorama, 2010

ix *Ironorefacts.com*
US Geological Survey 2015

x *http://www.etsap.org/E-techDS/PDF/I02-Iron&Steel-GS-AD-gct.pdf*

xi *Bloomberg as on 16-Nov-2015*

xii *Arrowhead Estimate*

xiii *Bloomberg as on 16-Nov-2015*

xiv *Arrowhead Estimate*

xv *Company's cash and cash equivalents (incl. Research and development tax incentive receivable) as at 30st June 2015*

xvi *Bloomberg as on 25-Nov-2015*