



Capital Raising Update

19 November 2019: Environmental Clean Technologies Limited (ASX: ECT) (ECT or Company) provides the following update to shareholders in regard to its current capital raising program.

Highlights:

- Entitlement applications close 5pm (AEST) Tuesday 19 November 2019
- Shortfall process to commence from Wednesday 20 November 2019
- Company presentation attached to support lead manager, CPS Capital's marketing of shortfall to new investors
- Additional pre-commitment by strategic partner
- Answers to Frequently Asked Questions (FAQ) to date
- Progress with insurance claim may provide improved timeframe and delivery for key plant upgrades.

ECT confirms that the entitlement offer application deadline closes at 5pm (AEDT), Tuesday 19 November 2019.

Applications received after this time will still be considered for the next few days, allowing for delays in postage and payment clearance timeframes and all applicants are encouraged to submit payment before 5pm today via BPAY to secure their allocation. Existing shareholders can apply for shares under the offer shortfall.

On closure of the entitlement offer, should the full amount of entitlement not be taken up, then lead manager, CPS Capital will formally open the shortfall period from Wednesday 20 November 2019 through to 5pm Tuesday 26 November 2019. All enquiries for shortfall should be made direct to the Company via info@ectltd.com.au or to Michael Soucik at CPS Capital.

A presentation, attached to this announcement, will be used by CPS in their marketing of the Company to prospective shortfall applicants. The Company encourages all shareholders and prospective investors to read the presentation along with the Replacement & Supplementary prospectus.

Glenn Fozard, ECT Chairman commented, "The pricing of this issue has been designed to represent considerable value to any existing shareholders or new investors taking up this offer via their entitlements or the shortfall. The dilution effect of such an offer is off-set by the heavy value built into the offer. We recognise not every shareholder is able to participate at this time, but we encourage all existing shareholders and new investors to closely consider the Offer as the Company's prospects, through the prospectus, uses the funds to propel the Company into a period of establishing strong operational earnings."

"At minimum subscription of this entitlement issue, the Company will have no uncovered debt and will have funds to deliver a Coldry and char plant which will generate considerable earnings of up to \$3M per annum. We are entering a phase of operational earnings, enough to keep the potential of HydroMOR, COHGen and CDP alive and well".

“We have unfinished business in India developing HydroMOR and other projects of interest to our Indian relationships. We have emerging relationships with the Japanese, in pursuit of hydrogen solutions, for both Coldry and COHGen, and we are continuing the feasibility study for the build of a large Coldry plant at Yallourn in Victoria’s Latrobe Valley, including the potential integration of our waste-to-diesel technology, ‘CDP’. However, the next 12 months will be laser focused on generating earnings from our existing investment in our plant and technology suite.

“After spending more than \$50 million on developing our technology suite since 2007, it’s time to realise the returns on our investment and only then, direct these returns into furthering our R&D and project development for future growth.”

As has been advised to the market in previous announcements, the metrics for determining performance of the board and executive will be largely based on the upgrades project at Bacchus Marsh for the next 12 months without ignoring other metrics of performance like share price.

Pre-commitment

The Company is pleased to advise that the Calleja Group has agreed to a pre-commitment of ~\$228k.

Frequently Asked Questions (FAQ)

Q: How much debt will the Company have after the minimum subscription is met?

A: Upon reaching minimum subscription, the Company will have paid out and converted all debt into shares except for the 2018/19 R&D loan, which is expected to be paid out in the coming weeks via the ATO tax refund. This will leave only the 2019/20 R&D loan currently at ~\$268,000 which, as has been the case for the last four years, is secured against and repaid from the yearly ATO refund under the R&D tax incentive program.

Q: Will my entitlement application be accepted if I don’t make the cut-off for applications?

A: Remitting your funds via BPAY is the surest way of having your application accepted. The Company will make allowance of a few days beyond the 19 November 2019 close date to allow for reasonable postage and payment processing delays.

Q: Are the directors participating in the issue?

A: Yes, Glenn Fozard and Ashley Moore are participating in the Offer.

Q: Can I apply for shortfall even though I didn’t take up my rights?

A: Yes, all existing shareholders and new investors can apply for shares under the shortfall offer. Any New Shares not applied for under the Entitlement Offer will become Shortfall Shares. The Directors reserve the right, in conjunction with the lead manager, to issue any Shortfall Shares at their discretion within 3 months after the Closing Date (Shortfall Offer). It is an express term of the Shortfall Offer that applicants for Shortfall Shares may be required to accept a lesser number of Shortfall Shares allocated to them than applied for. If a lesser number is allocated, excess application money will be refunded without interest as soon as practicable after the Closing Date.

Q: If I apply under the offer, either through my entitlements and / or as part of any shortfall, will my application monies be accessed by the company prior to meeting minimum subscription?

A: All application monies will be held in trust until minimum subscription is met. If minimum subscription is not met, then application monies will be returned to all applicants.

Insurance Update

Further to the Company's recent update (11 November 2019), which confirmed the formal acceptance of the insurance claim and initial claim payment of \$200,000, the Company is pleased with the continued progress with the remediation of its Bacchus Marsh site, development of the scope and quotes for re-instatement of damaged plant and the alignment of these works to the broader proposed upgrades which support our current capital raising program.

The Company held initial estimates the overall claim to be between \$2.0 and \$2.5 million, with the internal budgets for rebuild assuming the lower end of this range. Working through the development of detailed scope of works and firm quotes now indicates that this figure may increase materially.

The submission of formal claims on the central component (re-instatement of the Coldry facility) are due in approximately 10-14 days and will then be reviewed by the insurers and advisers prior to confirmation of final payment amounts.

ECT's COO Jim Blackburn commented, "As we move through this process, we remain well-supported by our insurers, their advisers, and those external engineering firms preparing the core scope and quote details. We have revised our original upgrade timeline from August 2020 to November 2020 however there now appears to be some opportunities to make up lost ground as the plant designs and implementation plans mature. We are grateful for the dedicated work of our engineering team and look forward to making a start on re-construction as soon as the claims process concludes."

Further updates on the recovery and upgrade activities will be provided in due course.

For further information, contact:

Glenn Fozard – Chairman info@ectltd.com.au

About ECT

ECT is in the business of commercialising leading-edge energy and resource technologies, which are capable of delivering financial and environmental benefits.

We are focused on advancing a portfolio of technologies, which have significant market potential globally.

ECT's business plan is to pragmatically commercialise these technologies and secure sustainable, profitable income streams through licensing and other commercial mechanisms.

About Coldry

When applied to lignite and some sub-bituminous coals, the Coldry beneficiation process produces a black coal equivalent (BCE) in the form of pellets. Coldry pellets have equal or superior energy value to many black coals and produce lower CO₂ emissions than raw lignite.

About HydroMOR

The HydroMOR process has the potential to revolutionise primary iron making.

HydroMOR is a simple, low cost, low emission, hydrogen-driven technology which enables the use of 'low value' feedstocks to produce primary iron.

About COHgen

The COHgen process has the potential to deliver a lower cost, lower emission method for hydrogen production from brown coal.

COHgen is currently advancing through fundamental laboratory development to inform its patent application ahead of scale up and commercialisation.

About CDP-WTE

The catalytic depolymerisation-based waste-to-energy process converts ‘low-value’ resources into higher-value diesel and other valuable by-products.

CDP-WTE can be deployed as a standalone solution or integrated with the Coldry process to deliver higher-value, lower-emission energy solutions to lignite resource owners.

Areas covered in this announcement:

ECT (ASX:ECT)	ECT Finance	ECT India	Aust. Projects	R&D	HVTF	Business Develop.	Sales
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ENVIRONMENTAL CLEAN
TECHNOLOGIES LIMITED

Corporate Presentation

November 2019

*“Bridging the gap between today’s use of
resources and tomorrow’s zero-emissions future”*



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This presentation contains "forward looking statements" which involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of ECT, industry results or general economic conditions, to be materially different from any future results, performance or achievements expressed or implied by such forward looking statements. In particular, certain forward looking statements contained in this material reflect the current expectations of management of the Company regarding among other things: (i) our future growth, results of operations, performance and business prospects and opportunities; (ii) expectations regarding the size of the market and installed capacity of our Coldry and HydroMOR plants; (iii) expectations regarding market prices and costs; and (iv) expectations regarding market trends in relation to certain relevant commodities, including benchmark thermal coal and metallurgical coal prices and foreign currency exchange rates.

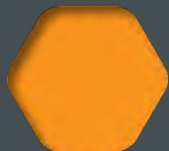
Forward looking statements are only predictions and are not guarantees of performance. Wherever possible, words such as "may," "would," "could," "will," "anticipate," "believe," "plan," "expect," "intend," "estimate," "aim," "endeavour" and similar expressions have been used to identify these forward looking statements. These statements reflect the Corporation's current expectations regarding future events and operating performance, and speak only as of the date of this material. Forward looking statements involve significant known and unknown risks, uncertainties, assumptions and other factors that could cause our actual results, performance or achievements to be materially different from any future trends, results, performance or achievements that may be expressed or implied by the forward looking statements, including, without limitation, changes in commodity prices and costs of materials, changes in interest and currency exchange rates, inaccurate geological and coal quality assumptions (including with respect to size, physical and chemical characteristics, and recoverability of reserves and resources), unanticipated operational difficulties (including failure of plant, equipment or processes to operate in accordance with specifications or expectations, cost escalation, unavailability of materials and equipment, delays in the receipt of government and other required approvals, and environmental matters), political risk and social unrest, and changes in general economic conditions or conditions in the financial markets or the world coal, iron and steel industries.

The materiality of these risks and uncertainties may increase correspondingly as a forward looking statement speaks to expectations further in time. Although the forward looking statements contained in this material are based upon what the Company believes to be reasonable assumptions, the Company cannot assure investors that actual results will be consistent with these forward looking statements. These forward looking statements are made as of the date of this material and are expressly qualified in their entirety by this cautionary statement. We do not intend, and do not assume any obligation, to update or revise these forward looking statements, unless otherwise required by law. Prospective purchasers are cautioned not to place undue reliance on forward looking statements. This presentation is for information purposes only and does not constitute an offer to sell or a solicitation to buy the securities referred to herein.



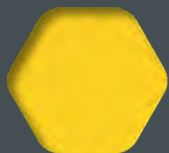
Economic innovation - the 'gateway' solution

Our technology will take low-value resources like brown coal at \$10 pt and transforms it into chemically enhanced fuel pellets to create hydrogen, steel, fertiliser, metcoal and syngas. Increasing value of the product by up to 100x.



Unique Market Positioning

We aim to transform mature markets that are being ignored (lignite, mill scale, etc) and delivering products into high growth, emerging markets (like hydrogen, low emission steel and recycled diesel).



Energy & Resource Solutions

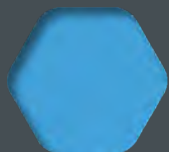
Innovative solutions for lignite resource owners, enabling access to low or zero emissions applications and a more valuable use for their resource than simply electricity. Valuing a lignite reserve on the products produced using ECT technology could potentially see a re-rating of the resource 5-10x.



Best in class for low emissions

Our technologies have one thing in common; they are best in class for low emissions:

- Coldry is the only zero-net emission lignite drying technology that is economical
- HydroMOR is the lowest emissions steel technology that is more cost effective than blast furnace or coal DRI
- COHgen has the potential to vastly reduce CO₂ emissions in the production of hydrogen
- CDP-WTE has the lowest emissions and waste discharge profile of all waste-to-diesel technologies



Potential to generate earnings from high margin products and services

Domestic market solutions for industrial heat and steam sector that could deliver compelling savings on total cost of ownership and production of char and syngas targeting \$2-\$3m earnings per annum.

Revenue Model – Potential Sources of Revenue



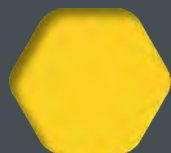
Sale of Energy Products and Services

The sale of energy products, including solid fuel, diesel, syngas and char. The provision of energy services, including boiler installations, financing, operations and maintenance.



Technology IP Royalties:

IP royalties represent an intended primary income stream to ECT in the future. Current model for potential India project is based on industry benchmark pricing for replacement product equivalents and the installed plant capacity



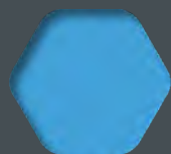
Original Equipment Manufacturing & Detailed Design (project specific):

ECT aims to develop and secure global agreement(s) (and ongoing income from) the manufacture of specific Coldry and HydroMOR equipment in addition to vending design services for each project.



Engineering, Procurement & Construction:

ECT works with global EPC providers who can be contracted to each project either directly by the project entity itself or indirectly through ECT where appropriate, aiming to generate revenue on contract value



Operations & Maintenance:

Similarly, ECT will work with global O&M providers to be contracted to each project either directly by the project entity itself or indirectly through ECT where appropriate, aiming to generate revenue on contract value

Corporate Overview

Issued Capital (7 Nov 2019)	
ASX Code	ECT
Shares (pre-issue)	4,800 M
Market Capitalisation	~\$4.8 M
Share Price	0.1¢
2018-19 Trading Range	0.1¢ - 1.6¢

Cash & Debt (as at 30 June, 2019)	
Cash	\$387 k
Current Assets (total incl cash)	\$2.38 M
Short term Debt	\$2.1 M
Current Liabilities (total incl debt)	\$2.88 M

Top Shareholders (7 Nov 2019)		Holding	%
1	LI & K THOMSON PTY LTD <LIT & KT SUPER FUND A/C>	255,000,000	5.31%
2	SUPERIOR COATINGS (AUST) PTY LTD	116,496,292	2.43%
3	MR GREGORY MILTS	101,130,368	2.11%
4	A & K MOORE NOMINEES PTY LTD <MOORE SUPERANNUATION A/C>	81,212,842	1.69%
5	ELGAR PARK PTY LTD <ELGAR PARK SUPER FUND A/C>	80,632,379	1.68%
6	MADDINGLEY BROWN COAL PTY LTD <MADDINGLEY MINE A/C>	63,325,370	1.32%
7	HSBC CUSTODY NOMINEES (AUSTRALIA) LIMITED	56207808	1.17%
8	CHALLENGE ROOFING PTY LTD <CHALLENGE ROOFING S/F A/C>	56,003,012	1.17%
9	MR EMILIO MOSCA & MRS ANNA MOSCA <MOSCA SUPER FUND A/C>	54,000,010	1.12%
10	P G FAMILY SUPER CUSTODIAN PTY LTD	53,434,923	1.11%
Total		917,443,004	19.1%



Key People



Glenn Fozard

Executive Chairman

Glenn has a strong commercial background and over 16 years experience in finance and capital markets at both board and executive level. With a deep understanding of tailored financial solutions for SMEs in the R&D, Cleantech and Agricultural sectors, he supports the company with valuable guidance in the technology development, risk management and capital raising areas. Glenn has worked with ECT for over seven years and continues to support the business in the executive role of Business Development and Corporate Finance.



David Smith

Non-executive Director - Chair of Audit and Risk Committee

David has a strong legal and commercial background, having practiced commercial law for over 25 years including nearly 21 years as a partner in national firms. He leads the intellectual property and technology group at Gadens Lawyers. He has assisted many companies with protecting their intellectual property, IP commercialisation agreements, collaborative research agreements and international negotiations. This year David was recognised as a 'Best Lawyer - Intellectual Property' for the third year running.



James Blackburn

Executive Director, Chief Operating Officer

James has a strong executive background as a corporate development practitioner with over 18 years experience in governance, operational, and technical roles across research, investment and corporate services disciplines. James has core responsibility for ECT Corporate Services and Operations and plays a key role in the company's commercialisation programs.



Ashley Moore

Executive Director, Group Chief Engineer

Ashley is a Chartered Professional Engineer, with extensive experience in all facets of manufacturing, plant operations, supply chain management, sales and marketing and major project delivery from 30 years in industry. Ashley joined the company in October 2009 as Business Manager, Coldry. Ashley was appointed to the role of Chief Operating Officer of the company in August 2011, and then to Managing Director in 2013, transitioning to his current Group Chief Engineer role mid-2017 to focus on delivery of the India project. Ashley re-joined ECT's Board in September 2019.

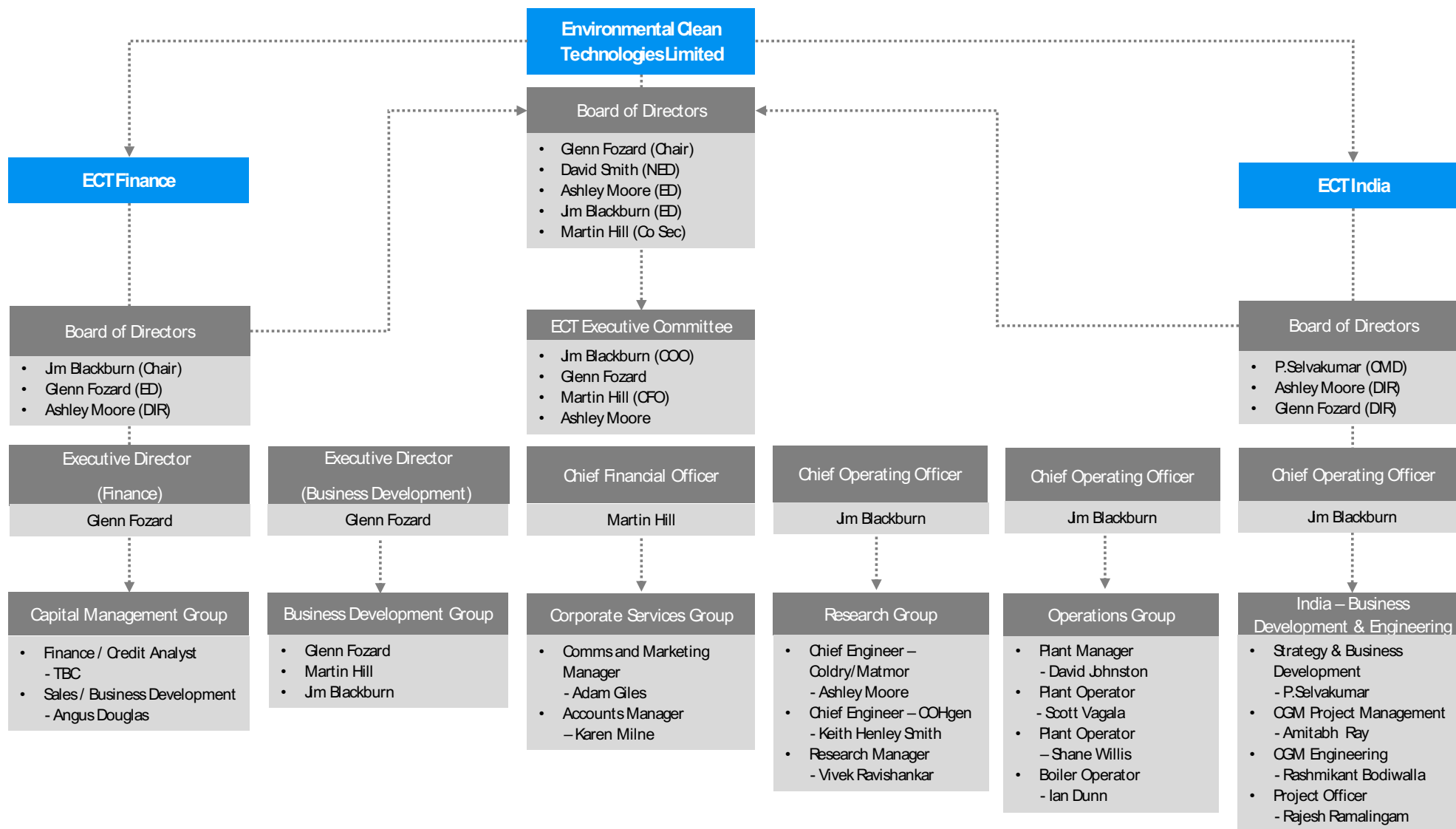


Martin Hill

Chief Financial Officer & Company Secretary

Mr Hill has extensive experience in the areas of general management and accounting across a range of industries including manufacturing, finance and service providers. The role of CFO & Company Secretary encompasses the key responsibility areas of finance, accounting and governance with a focus on managing these functions across multiple business units and projects.

Organisation Structure



Solving Environmental Problems in the Resources Sector

The world is transitioning from a heavy industrialisation phase, where access to lower cost inputs was the priority, toward a technology driven paradigm that aims to reduce the impact of that industrialisation in the continued pursuit of economic growth.

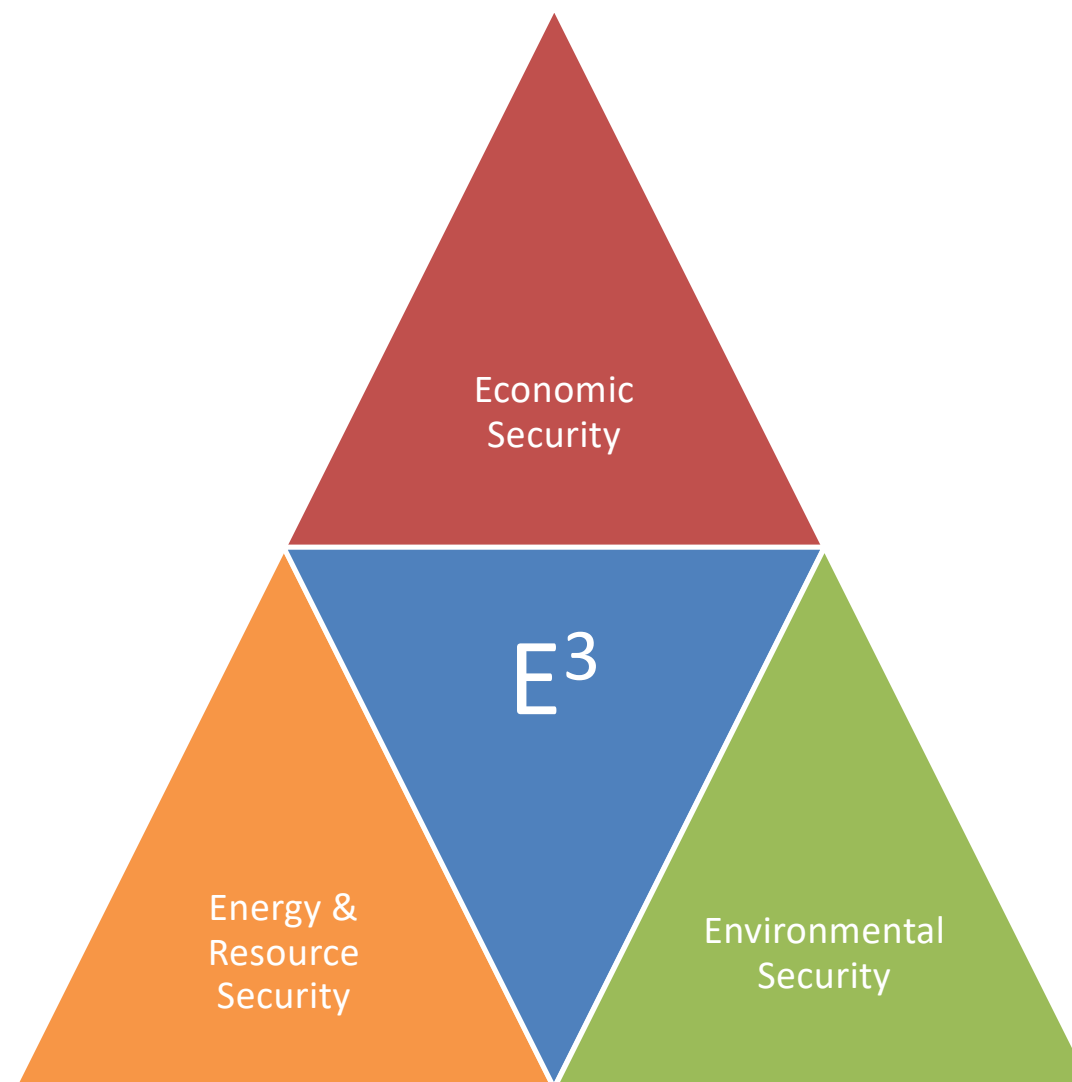
This transition creates great tension between the old and the new, with the principles of the debate often overshadowing practical solutions.

CO₂ emissions are progressively being priced and access to valuable inputs is becoming a strategic, commercial and political imperative.

Utilisation of lower cost resources and the mitigation of CO₂ intensive processes represent an abundance of opportunity.

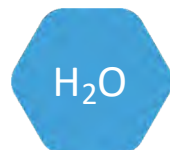
Economic security is the primary policy objective of nations.

Energy and resource security underpins economic security allowing nations to afford the cost of environmentally cleaner pathways.



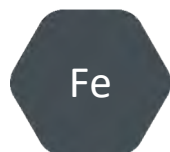
Innovative resource upgrading and conversion technologies

Minerals processing technologies focused on transforming low-value and waste resource streams into higher grade, valuable products delivering positive economic, energy, resource and environmental security outcomes.



Unique low rank coal drying technology - Coldry

- > IP owned 100% by ECT and key aspects of the IP are patent protected in all major markets
- > World's most efficient pre-drying process for high moisture content coals
- > Enables low-rank coal use in downstream conversion process for high value products and applications
- > Outstanding environmental credentials including a zero net CO₂ footprint from the process
- > Construction-ready designs for first commercial scale plant completed



Primary iron processing technology – HydroMOR

- > Intellectual property owned 100% by ECT
- > Integrates with Coldry which acts as the feedstock preparation stage
- > Reduces manufacturing costs by ~65% through use of low cost, abundant raw materials
- > Reduces energy costs through innovative thermo-chemical pathway (impact embedded in manufacturing costs above)
- > CO₂ emissions reduction helps deliver lower emissions intensity

“Frugality drives innovation, just like other constraints do. One of the only ways to get out of a tight box is to invent your way out.”

Jeff Bezos.

ECT’s pursuit of the “why” and “how” of our core technology has led the company to make new discoveries which promise to open up new markets and turn waste into value.



Hydrogen – COHgen technology

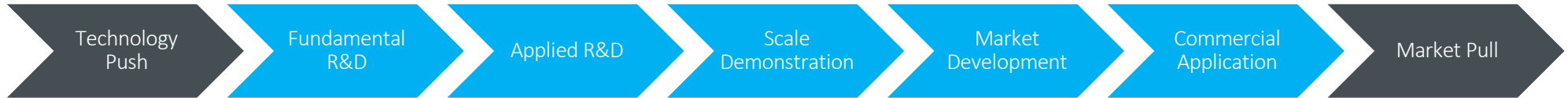
- > ECT is developing world leading know-how of hydrogen chemistry in low grade coals
- > Targeting the lowest cost means of extracting hydrogen from low rank coals, while retaining the bulk of carbon in the solid form as a valuable, usable byproduct
- > Potential applications of this know-how include purpose-built hydrogen production



Diesel – CDP Waste-to-Energy (WTE)

- > ECT recently acquired the CDP-WTE technology
 - > Waste hydrocarbons to diesel
 - > Potential downstream application for Coldry; lignite-to-diesel
 - > Low temperature, low emissions

Commercialisation Pathway



ECT's commercialisation strategy is a core part of its business model. Revenue is the goal.

- > Commercialisation is the process that converts ideas, research, or prototypes into viable products and production systems.
- > Commercialisation relies on the creation of effective manufacturing, supply chain and implementation strategies.
- > Research, development and commercialisation require significant investment before revenue is realised.
- > Our commercialisation strategy also includes marketing and sales systems, which will seek to drive the transition from research investment to revenue generation.

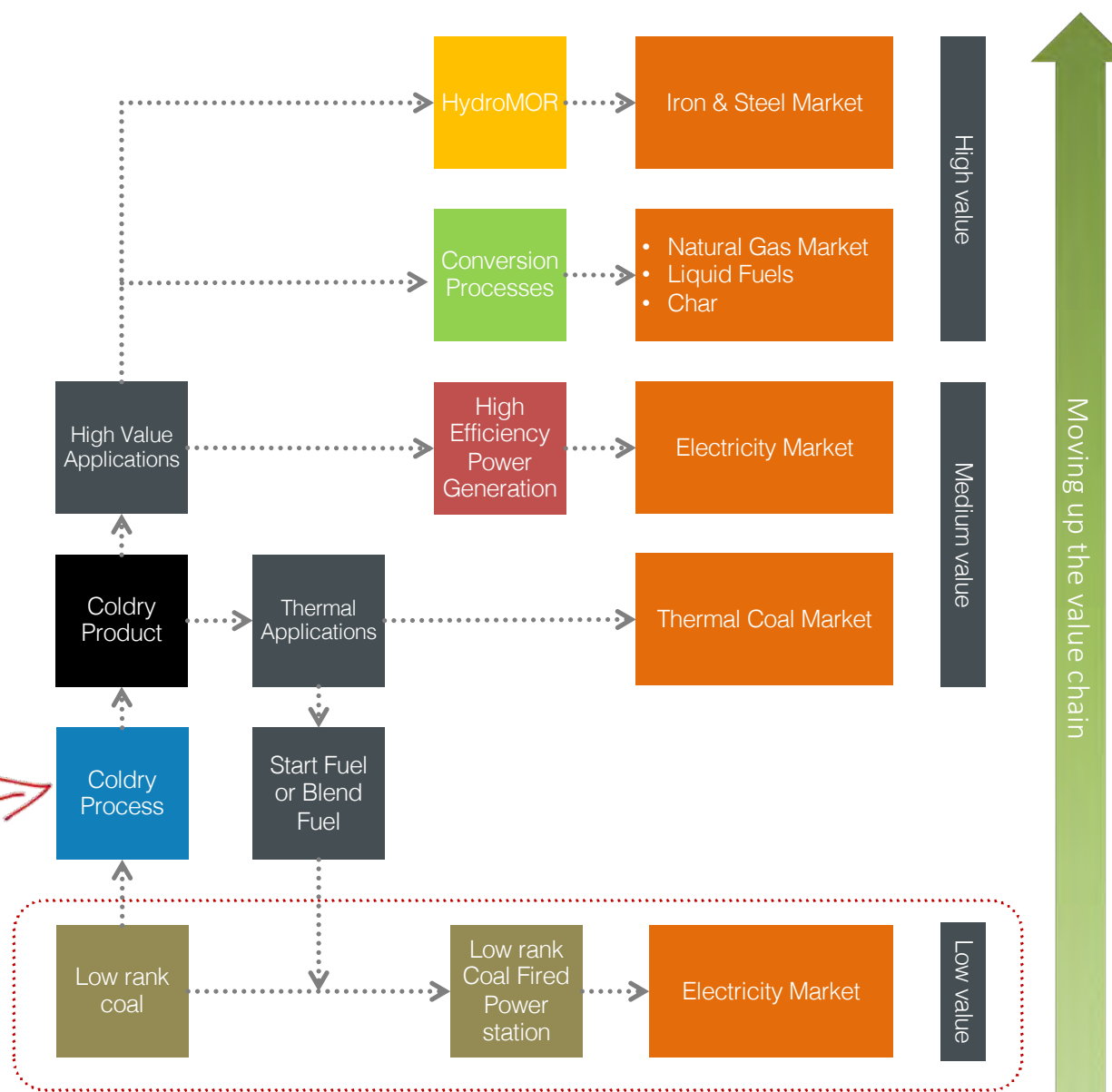


Coldry Value Proposition

- > Opens new markets
- > Establishes new revenue streams
- > Diversifies energy and resource options
- > Upward revaluation of stranded or low value low rank coal assets
- > Enhanced efficiencies
- > Mitigate CO₂ emissions

Cost effective low rank coal drying is the 'gateway' enabler.

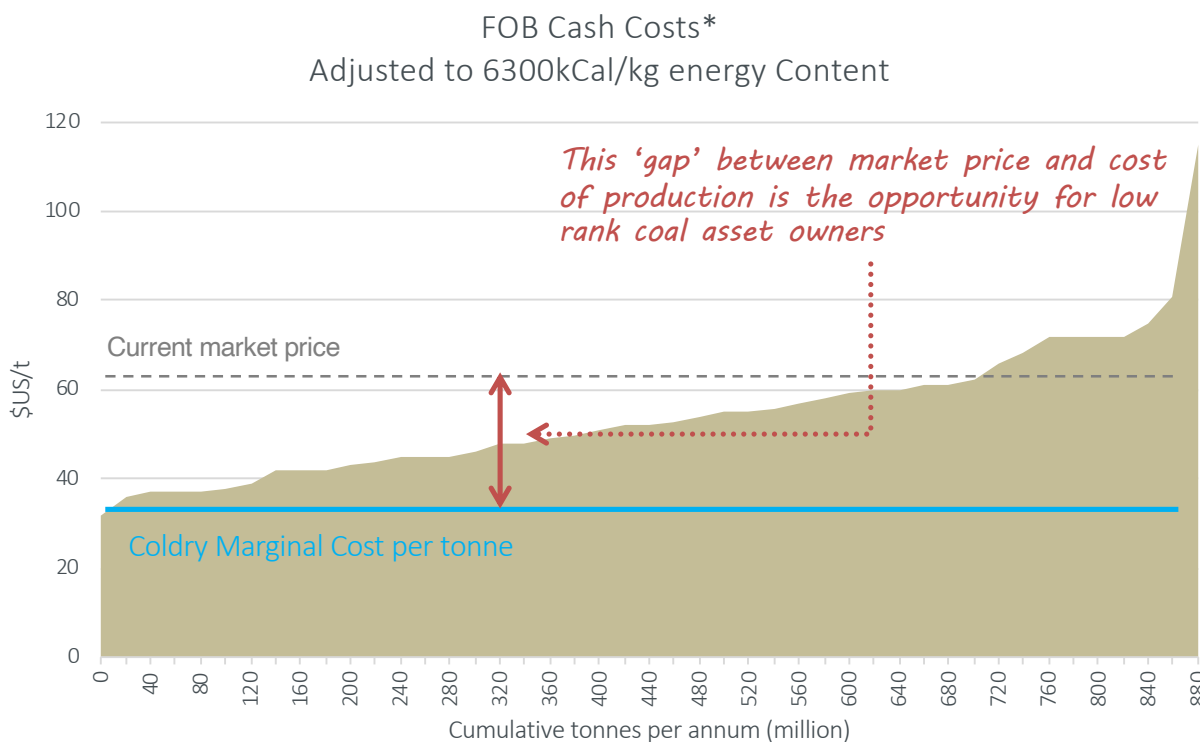
Traditional utilisation pathway is 'low value'.



Coldry Value Proposition:

Spotlight on the thermal coal market

- > Incremental income from sales of upgraded product enabled by low marginal upgrade cost
- > Competition – Seaborne Thermal coal trade
- > To gain competitive space, you must be able to displace others on the supply curve
- > With current pricing, less than half of supply generates profitable sales for traditional suppliers (horizontal dashed line). Via Coldry (blue line), ample margin is available even at lower pricing levels.



Market supply curves represent the relative competitiveness of a range of suppliers serving the seaborne coal trade. Those holding cost positions below the prevailing market price could profitably supply, whereas those whose cost positions are above the prevailing market price typically supply at a loss, and then consider the differential between an operating loss versus the costs associated with mine closure.

Market Opportunity

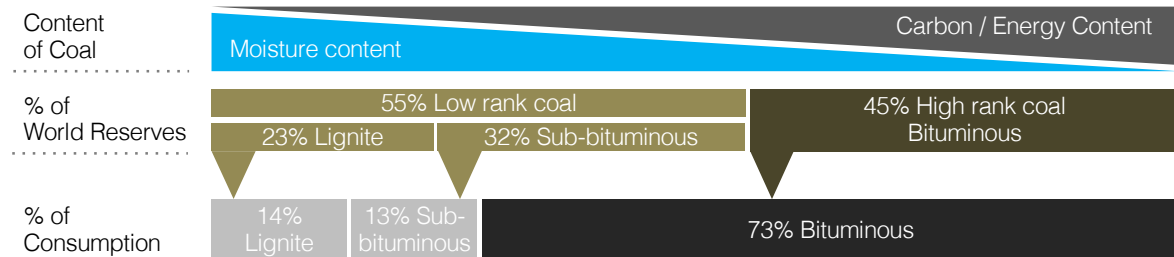
Coldry enables enhanced utilisation of low-rank coal resources by allowing them to service higher-rank coal applications

The market for coal currently exceeds 7 billion tonnes per year, with the majority of consumption for energy generation and steel production.

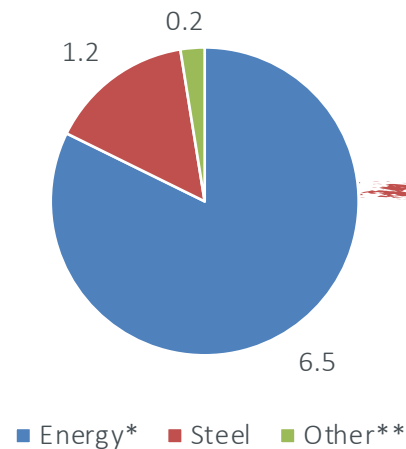
Electricity generation is dominated by high rank coal. Upgrading via the Coldry process allows low rank coal to access this market.

*Energy; electricity, steam and conversion to gas and liquid fuels
**Including cement manufacture, fertiliser
Source: World Energy Energy Council

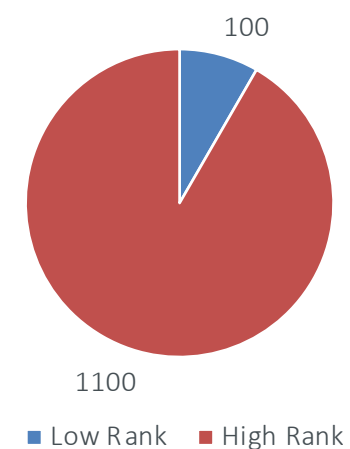
World Recoverable Coal Reserves & consumption



Coal Use (bn tonnes per year)



Electricity Generation (GW)



0.1 Bn tonnes market penetration = 330 Modules of capacity similar to proposed Coldry commercial scale plant

Market Opportunity - Global Application

Major low rank coal reserves

Australia

China

Indonesia

India & Pakistan

Turkey

Thailand

Germany

Czech / Serbia / Poland ...

North America



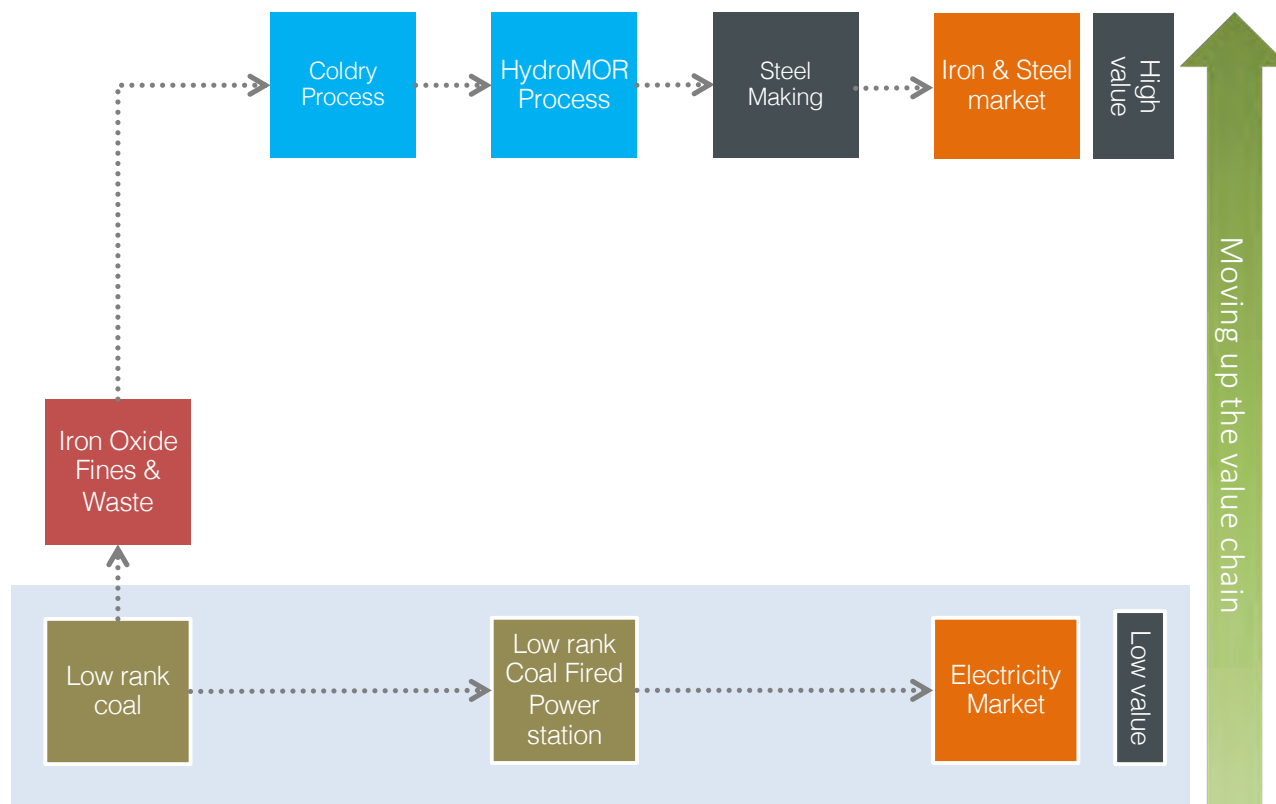
Fast Fact – Capacity represents significantly more than 500 years of consumption at current rates, i.e. ample space for growth if achieved with improved sustainability.

Value Propositions	Revenue Streams	Customer Segments
<ul style="list-style-type: none"> > Cost effective low rank coal drying > Open new markets > Establish new revenue streams > Diversify energy and resource options > Revalue assets > Enhance efficiency > Mitigate CO₂ emissions 	<ul style="list-style-type: none"> > Direct Product Sales from owned and operated capacity – Coldry and high Value products (Char, Syngas) > Technology IP - Royalty fees from plant capacity deployed > Detailed Design and OEM – vending of third party services > Project Management fees – plant design through to commissioning > EPC – Commission on contract value managed > Maintenance and servicing – Commission on contract value managed > Direct plant ownership / operation 	<ul style="list-style-type: none"> > Direct Commercial users > Process integration > Mine & power station owners > Conversion process owners: <ul style="list-style-type: none"> > Product consumption > Power stations > Conversion processes > HydroMOR > COHgen > CDP-WTE

HydroMOR Value Proposition

- > Lower cost raw materials
- > Lower capital cost plant
- > Lower emissions
- > Higher value products
- > Resource diversity & security
- > Waste remediation solution
- > Coldry provides essential feed preparation step

Business-as-usual use of lignite is relatively low value.
HydroMOR allows lignite to be used to produce high value metal products.



Value Propositions	Revenue Streams	Customer Segments
<ul style="list-style-type: none"> > Lower Capital and Operating cost primary iron production > Waste remediation solution > Open new markets > Establish new revenue streams > Diversify energy and resource options > Revalue assets > Enhance efficiency > Mitigate CO₂ emissions 	<ul style="list-style-type: none"> > Direct Product Sales through contracted off-take to 3rd party Projects > Technology IP - Royalty fees from plant capacity deployed > Detailed Design and OEM – vending of third party services > Project Management fees – plant design through to commissioning > EPC – Commission on contract value managed > Maintenance and servicing – Commission on contract value managed > Direct plant ownership / operation 	<p>Process integration</p> <ul style="list-style-type: none"> > Integrated steel plants > Stand alone plant <p>Product consumption</p> <ul style="list-style-type: none"> > Integrated steel plants > Electric Arc Furnace > Induction Furnace

Commercialisation Next Steps

- To date, the Company has relied on equity and debt capital raisings, together with Government R&D rebate funding to advance development activities.
- While ECT continues to pursue project opportunities in India with NLC India Limited (NLCIL) and other strategic partners, timelines for the development of its technology suite have stretched, necessitating a change in strategy to ensure near term cashflows.
- Over the past 8 months, ECT has been advancing a strategy aimed at developing near-term operational cash-flows in parallel to proposed projects in India, the Latrobe Valley and other regions. As a result of previously announced India project delays, the Company has accelerated these plans.
- To deliver positive cashflows sufficient to continue the broader research, development and commercialisation objectives over and above basic operating expenses, the Company is adopting the following three-tiered approach.

Tier	Description	Targeted Outcome	Targeted Benefit	Timeframe
Organic Growth	Bacchus Marsh plant; char, syngas and steam fuel production	\$3M EBITDA	Finance basic operational costs	<12 mths
Acquisition	Proposed acquisition targets where ECT technology can be leveraged for better value	\$3M+ EBITDA	Finance ongoing project and technology development	12 mths +
Structural	Corporate restructuring to improve market rating	>20x earnings multiples	Drive return to shareholders	Ongoing

Commercialisation Next Steps

- First tier of the strategy aims to leverage the Company's existing Coldry High Volume Test Facility northwest of Melbourne to build upon the demand in the local market for solid fuel and char products
- Following the successful signing last year (9 August 2018) of a 5-year deal for the provision of fuel and steam services to a Victorian customer, the Company subsequently announced (12 April 2019) the launch of its steam and boiler package division
- This division offers turnkey solutions to industrial-scale steam and hot water users, encompassing the upgrade of existing equipment, installation of new equipment, new equipment financing, operations, maintenance and fuel supply with the unique proposition of offering significant savings to customers on their total cost of ownership
- The launch of this new business initiative was made following upgrades to the Company's Coldry HVTF which increased the testing capacity of the plant, making higher volumes of Coldry solid fuel available for sale
- In parallel, ECT has been assessing other markets for potential Coldry sales. This has led to consideration of the char market. Char serves two key markets; as a smokeless fuel (e.g. BBQ fuel) and as a carburiser, used in specialty metallurgical applications
- The next phase of development at the HVTF aims to increase capacity to 25,000 tonnes per annum, with the following sales and revenue targets:

Market	Description	Volume (tonnes per annum)	Revenue Target (\$)
Steam & boiler systems	Support existing marketing & operations	~5,000	1,000,000
Char products	Vertical integration with the char process	~10,000 char	5,000,000-6,000,000
Syngas	Derived from the char process	~10,000 (equivalent)	TBC
Total		~25,000	~6,000,000+

Fire event & insurance update

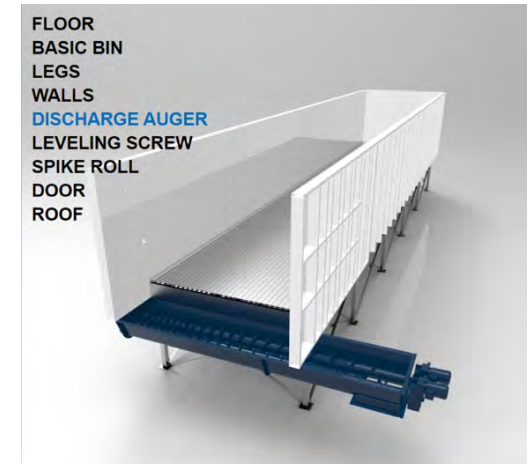
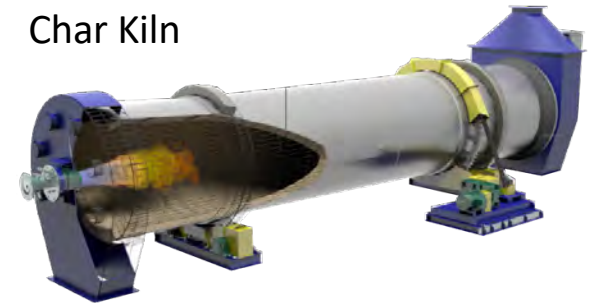
- Initial insurance claim payment of \$200,000 received
- Site clean-up proceeding, estimated to take another 4 weeks
- Proposed plant upgrade preparations & timeline (page 23) updated to include remediation works
- Current estimate of the overall claim increased from initial estimate of \$2.0 - \$2.5 million.
- Further claim payments to be received over several tranches as remediation works proceed
- The rapid and supportive response of ECT's insurer to the fire incident has allowed the Company to drive the recovery and remediation process and continue to advance its proposed upgrade program, while minimising delays to the original timeline
- Anticipated impact to our original upgrade timeline to shift completion from August 2020 to November 2020

High Volume Test Facility (HVTF) – Upgrade program

Char Project and Coldry Capacity Improvements

- Earnings target: \$2-3 million p.a. EBITDA
- Cashflow target timeframe: 12 months
- Consistent with tier-1 of the corporate strategy, the Company recently announced (9 October 2019) the proposed upgrades to its Coldry HVTF targeted at:
 1. Generating earnings of up to AU\$2-3M pa from the facility
 2. Underpinning the market feasibility of a larger, more efficient and economical Coldry plant
 3. Further developing commercial aspects of the facility
- The Prospectus seeks to raise funds for the implementation of the upgrades, estimated at AU\$3M.

Char Kiln

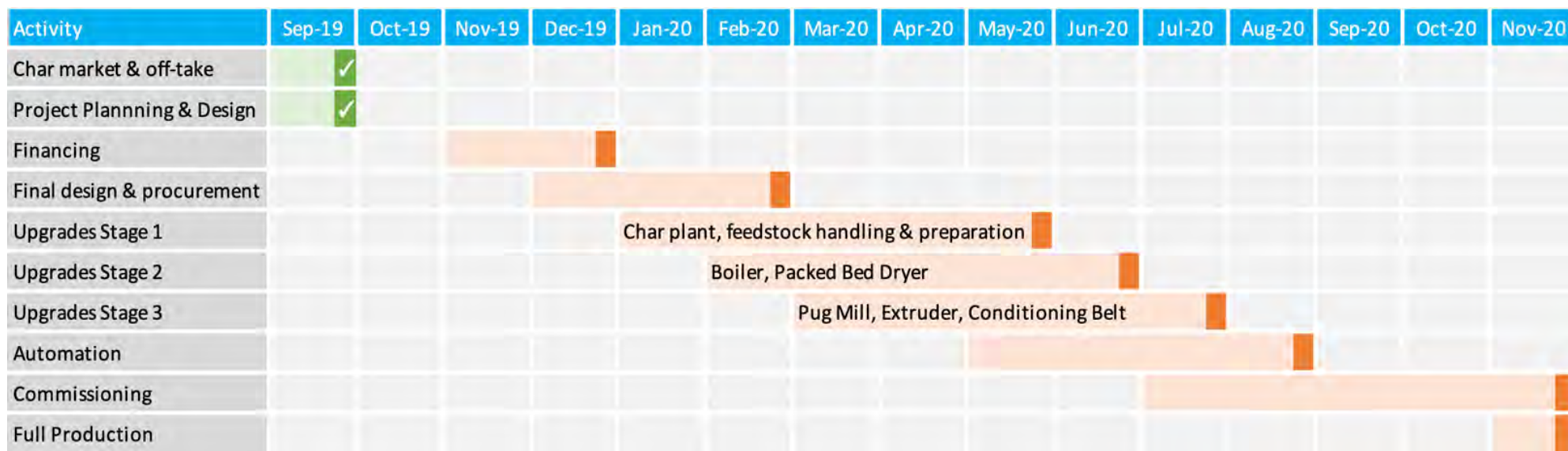


High Volume Test Facility (HVTF) – Upgrade Program

ECT will initially focus off-take marketing efforts on the BBQ briquette market and is in active discussion with off-take parties.

The upgrade works aim to deliver the following commercial capability:

- Char and syngas production, utilising Coldry pellets via vertical integration with upgrading plant
- Cost reduction via surplus energy utilisation and improved process assembly
- Scalability via the upgrade of site infrastructure and utilities providing scope for future commercial activities.
- The target timeline to reach full production, subject to funding outcomes, is November 2020
- The upgrade program will also establish the final plant capacity which may exceed 25,000 tonnes per annum, thus giving potential upside to the economics of this plant as described above



Plant Upgrade Outcomes

Install new equipment and upgrade existing plant & equipment at HVTF site to:

- Increase Coldry Production capacity to 25kmt/yr
- 20kmt for Char, 5kmt for boiler fuel
- 55kmt raw lignite required

Coldry Revenue Target – Direct Sales

- 5,000t delivering ~\$1M rev pa & ~\$250k EBITDA pa

Produce char from Coldry pellets for BBQ briquette, carburiser and agriculture char markets:

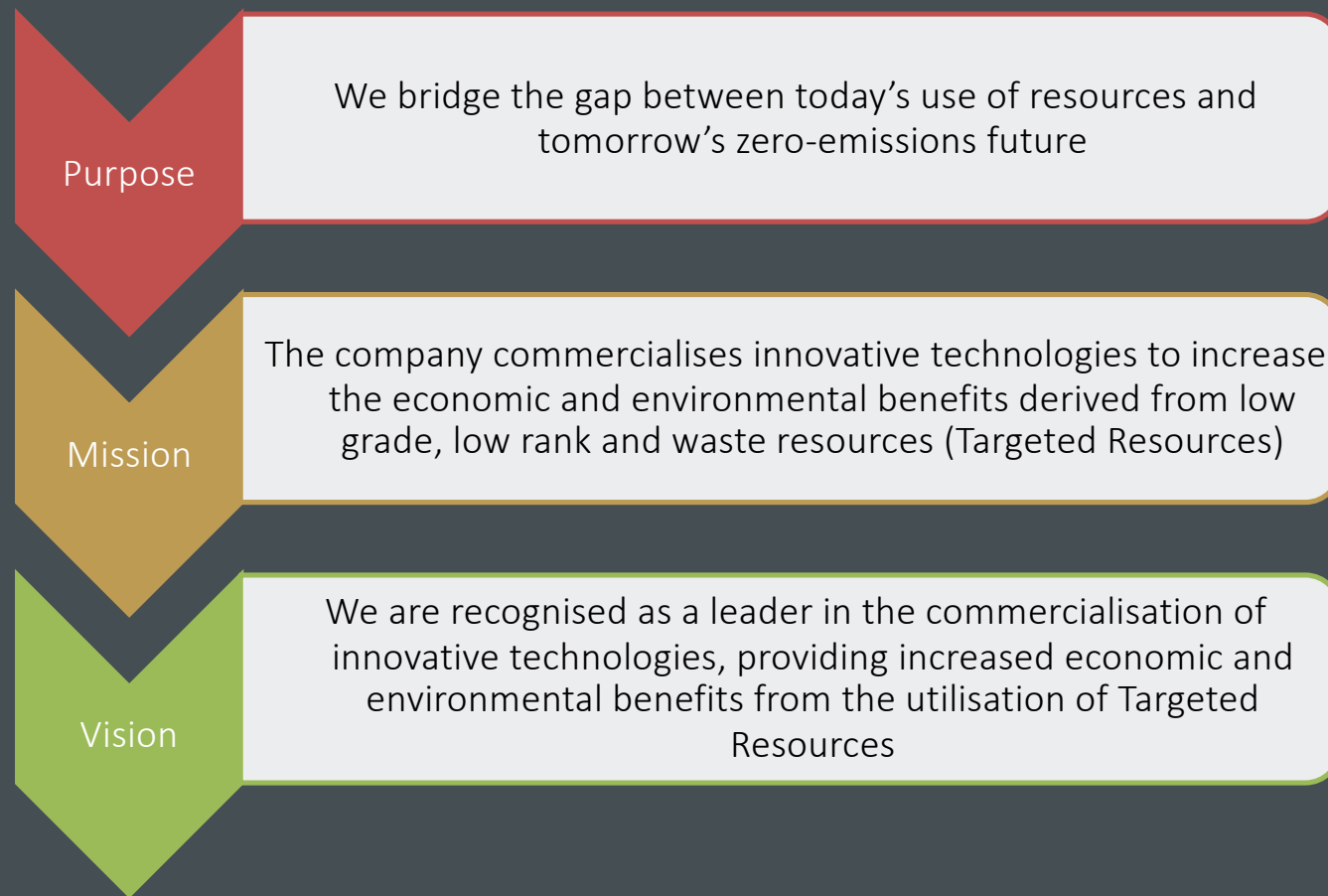
- 10kmt/yr, requiring ~20kmt/yr Coldry

Char Revenue Target – Direct Sales

- 10,000t delivering ~\$4.5M revenue pa & ~\$2m-\$3M EBITDA pa



- Purpose Mission Vision
- Corporate Values
- Business Model
- Our Partners
- Coldry
 - Technology introduction
 - The low-rank coal challenge
 - The drying challenge
 - The Coldry process
 - Value Transformation
- HydroMOR
 - Technology introduction
 - The 'alternative raw material' opportunity
 - The 'steel intensity' challenge
 - HydroMOR process
 - Inputs
 - Commercialisation Pathway
 - HydroMOR vs Blast Furnace
 - Benefits vs other methods
- High Volume Test Facility
 - Lignite handling systems
 - Extrusion systems
 - Conditioning belt system
 - Char system
 - Boiler system with co-generation
 - Upgrades of existing plant & equipment
 - Proposed site layout
 - Operational future of ECT at HVTF site



Corporate Values

ECT has developed a set of corporate values which are as important as the technologies to our company.

These values are at the heart of how we conduct our business.



Bridging the Gap:

We are focused on technology as an enabler to a zero-emissions future



Frugal Innovation:

We strive to deliver innovative outcomes, through reducing complexity, cost conscious execution and fit-for-purpose engineering



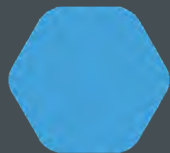
Collaboration:

We work collaboratively to yield the best possible outcomes



Integrity:

When we say we will do something, we do it – and we do it responsibly



Sustainability:

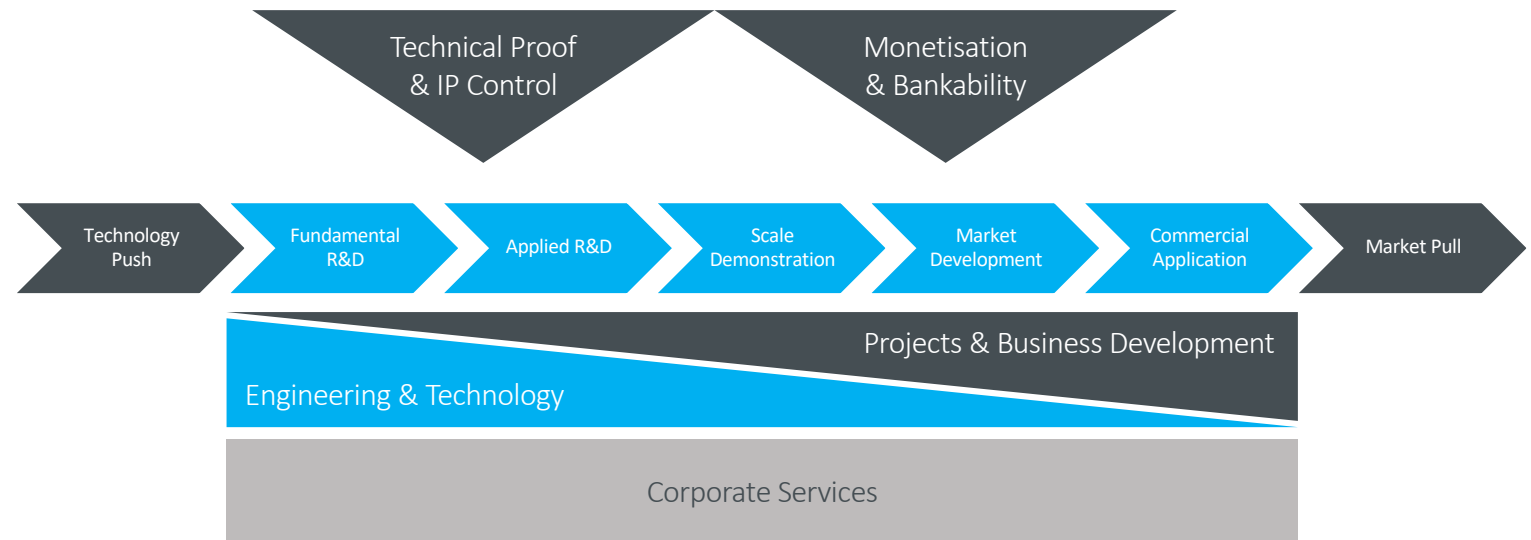
We consider the safety, quality and environmental outcomes of our decisions

Business Model

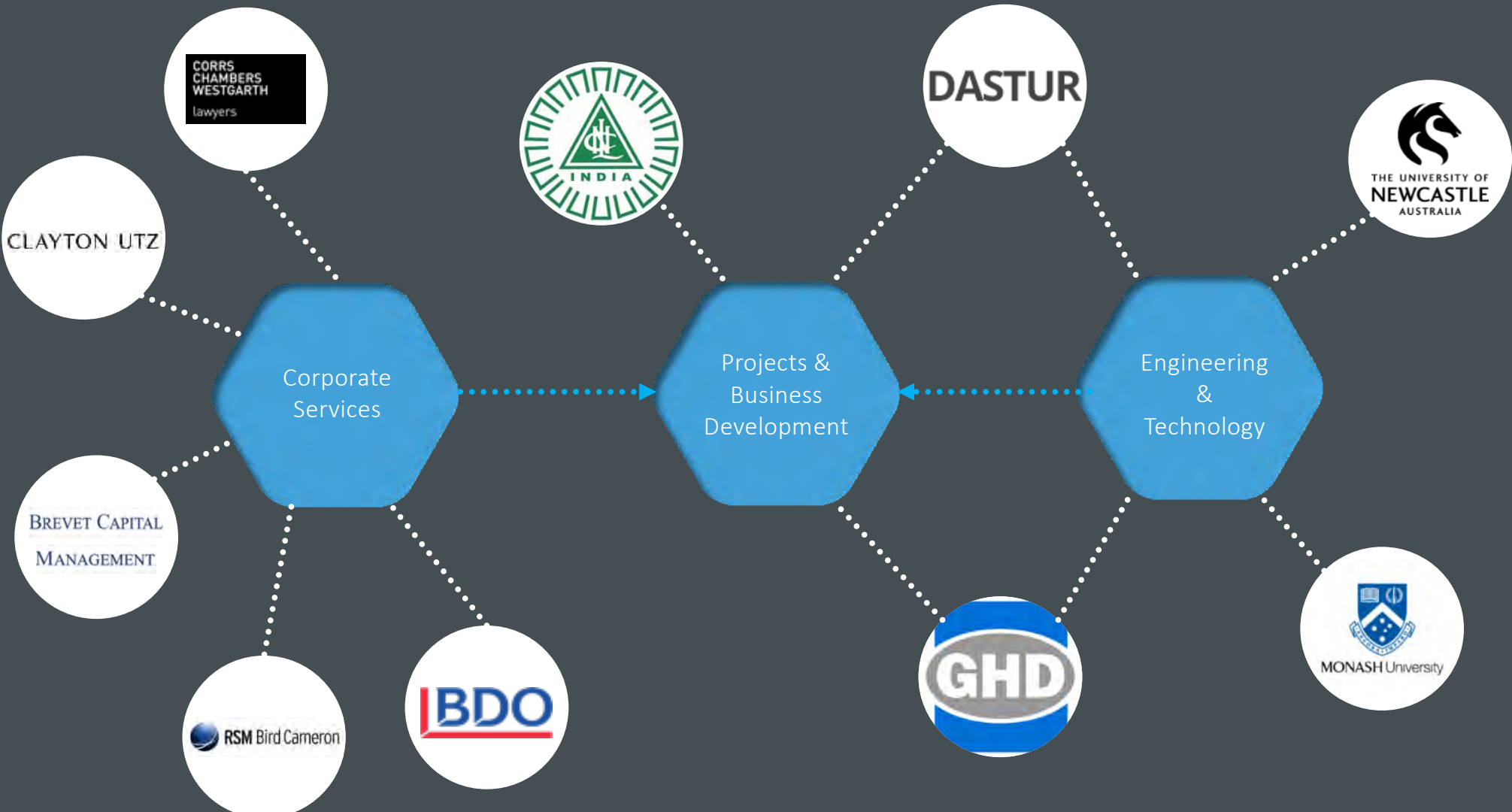
ECT takes technologies, consistent with our Purpose, through the entire commercialisation process and into industrialisation.

Each stage is supported by our three departments which specialise across the commercialisation chain:

- > Engineering & Technology
- > Projects and Business Development
- > Corporate Services



Our Partners



Coldry technology introduction

Low-rank coal drying

- > Enhanced efficiency
- > Greater energy security
- > High value applications
- > Low emissions

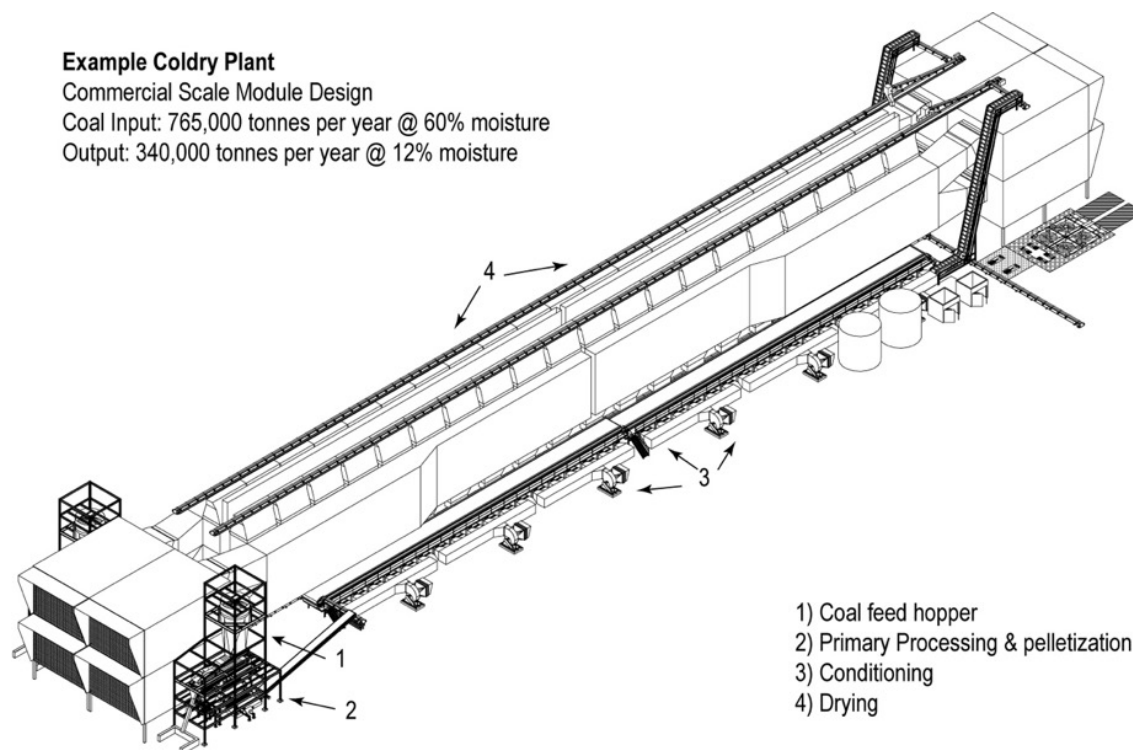
Process Features	Benefits
Low temperature, low pressure	Lower opex cost per tonne
Simple, mechanical design	Lower capital intensity, robust, reliable, lower operating & maintenance cost
Unique 'Densification' & waste heat utilisation approach	Enables low temperature, low pressure removal of moisture resulting in net energy uplift, low opex and zero CO ₂
Modular	Scalable, cost effective

Example Coldry Plant

Commercial Scale Module Design

Coal Input: 765,000 tonnes per year @ 60% moisture

Output: 340,000 tonnes per year @ 12% moisture



- 1) Coal feed hopper
- 2) Primary Processing & pelletization
- 3) Conditioning
- 4) Drying

Coldry technology introduction



Gateway



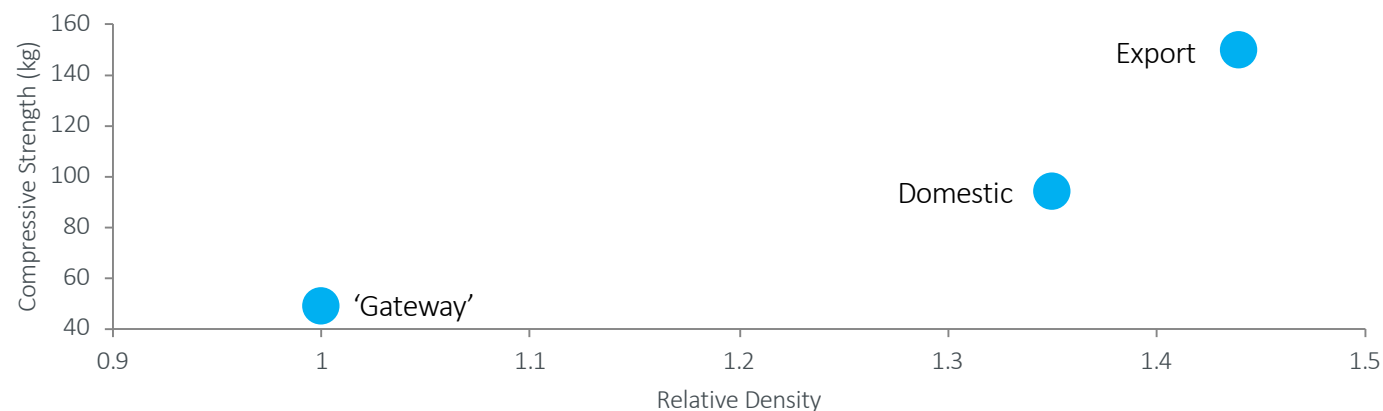
Domestic



Export

Product Features	Benefits
Low moisture, high energy value	Higher price, broader market applications
Stable	Won't permanently reabsorb moisture, low spontaneous combusting risk, storable, transportable
Retained volatile matter	Ideal for coal conversion technologies, yielding more gas and oil than black coal
Variable product output (pictured left)	Fit for purpose product format tailors hardness to customer needs: <ul style="list-style-type: none"> > 'Gateway' is ECT's 'fast dry' product, producing a lower cost but more friable product, ideal as a cost-effective front end feedstock for conversion processes. > 'Domestic' grade is the 'standard' Coldry product, robust enough to withstand handling and transport in local markets with minimal fines generation. > 'Export' grade is designed to withstand the rigours of multiple bulk handing points over long distances with minimal fines generation.

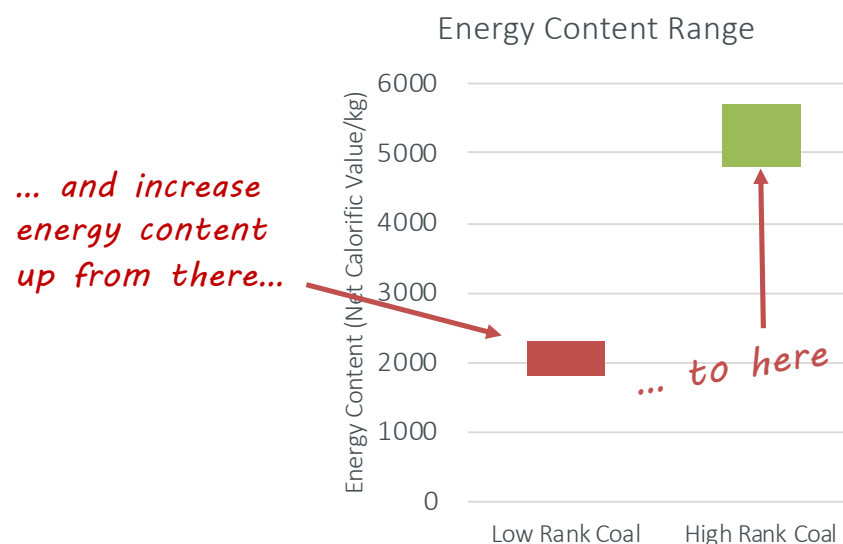
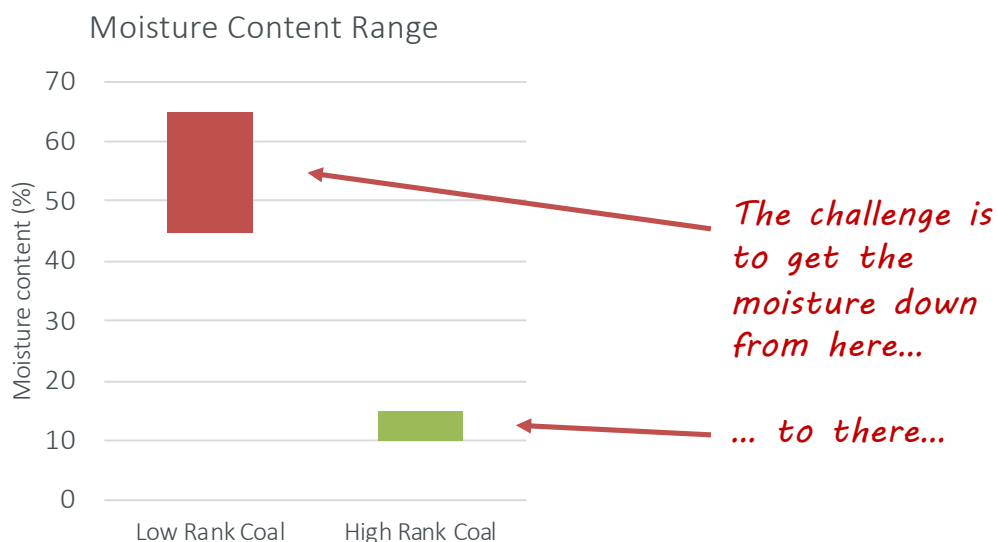
Coldry Product 'Toughness' Indicators



The low rank coal challenge

To enable low rank coal use in higher value applications, it needs to be dried.

- > High moisture content
 - > Low energy content
 - > Not suitable for use in black coal applications or further upgrading
 - > CO₂ intensive power generation
- > Significant risk of spontaneous combustion compared to bituminous coal
 - > Limits storage volume and duration
 - > Increased transport cost
- > Inefficient transportation cost due to carting mostly water



The Drying Challenge

Drying is easy.

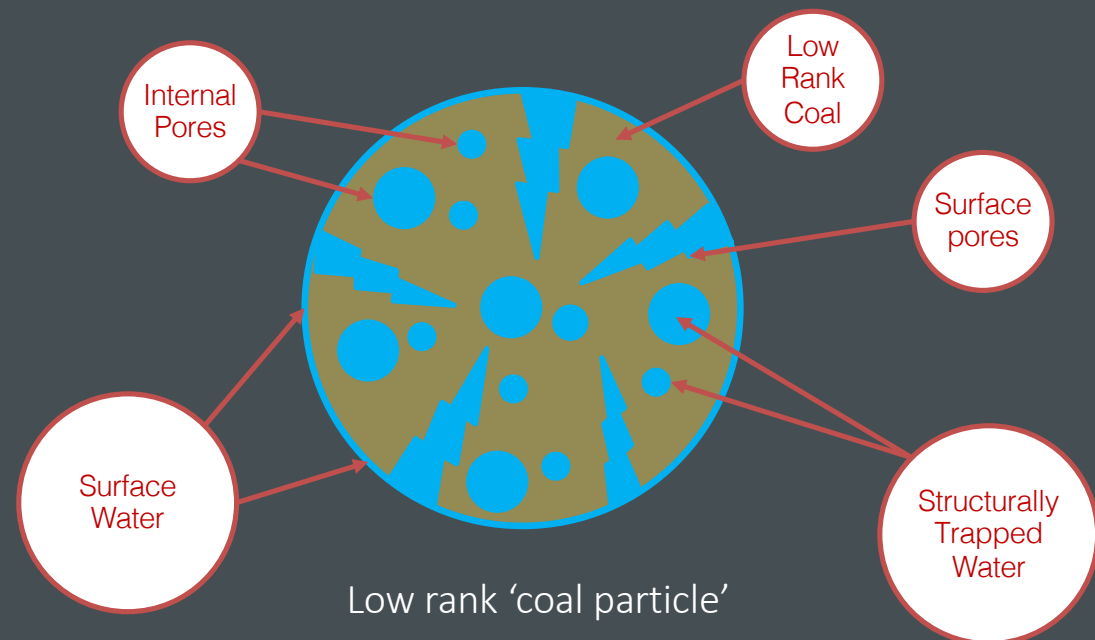
Drying **efficiently** and **cost-effectively** is the challenge.

Coldry meets the challenge.

Achieving a net energy uplift and zero CO₂ emissions at the lowest possible marginal cost, is the goal.

“It is difficult to dry low rank coal with high efficiency. For hard coals, the majority of the moisture is present on the surface of coal particles. Energy required to remove free moisture is simply the latent heat of evaporation ($\sim 2.27\text{MJ/kg}$). In contrast a considerable portion of the moisture is held by hydrogen bonds in the capillary pores or interstices of low rank coal particles. Hydrogen bonding increases the strength of moisture holding and more energy is needed to remove a certain amount of moisture from low rank coal. Another severe problem with drying low rank coal is the ease of reabsorption of moisture. To achieve deep drying of low rank coal, the number of hydrogen bonds has to be reduced by destroying them either using thermal or mechanical methods, which is the key to any effective drying process.”

Dr Nigel S Dong, IEA Clean Coal Centre

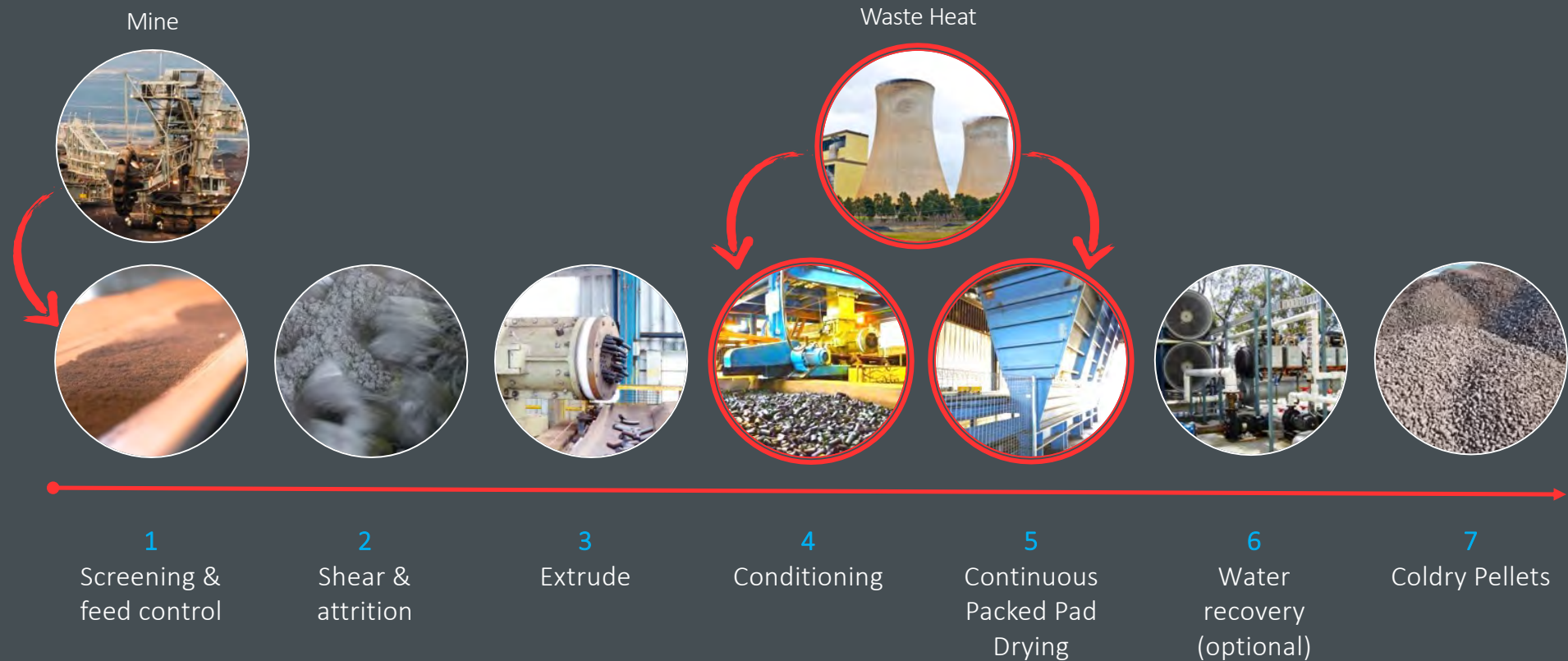


Coldry Process

“One distinct advantage of Coldry is the relative low heat requirements in the drying process, allowing for the opportunity to make use of waste heat from an industrial facility or power plant.”

Dr Victor Der

Former Assistant Secretary for Fossil Energy, US Dept. of Energy
General Manager, North America, Global CCS Institute

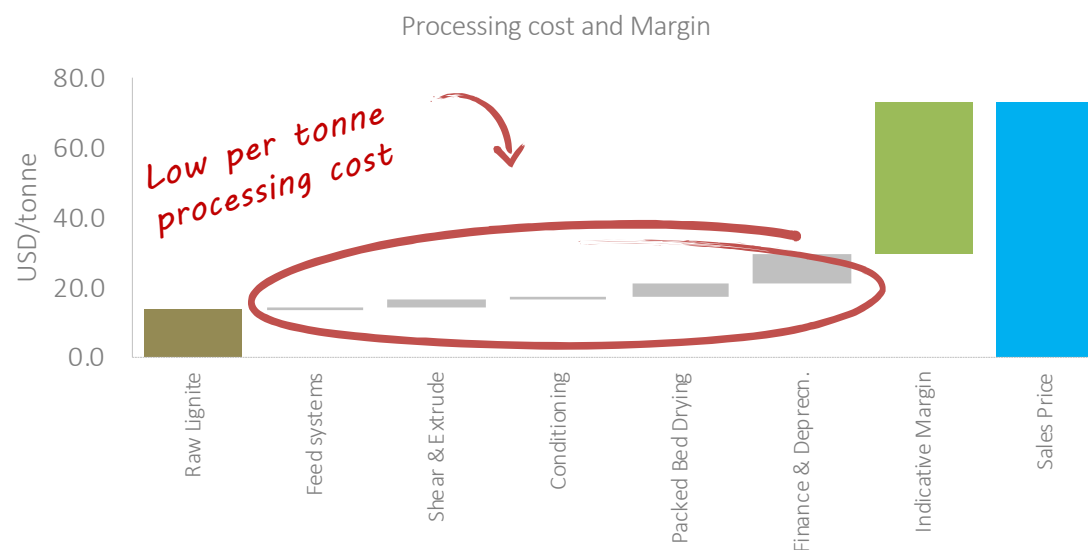
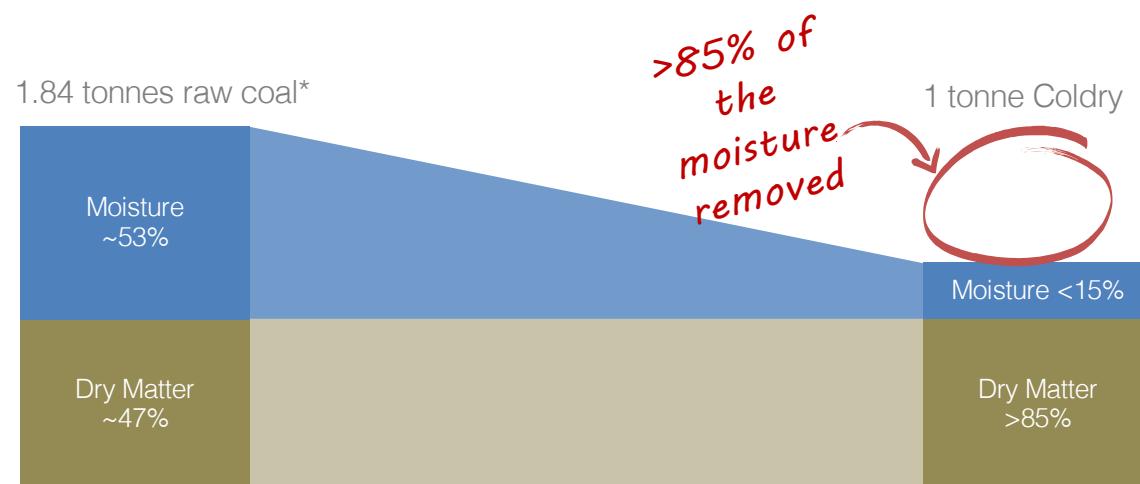


Coldry Value Transformation

“Given India’s large demand-supply mismatch of thermal coal, the Coldry technology offers an efficient and cost-effective solution to utilize the 43 BT (est.) lignite reserves of India efficiently to bolster the energy security of the country while mitigating any adverse impact on the climate.”

YES Bank Ltd, India

The marginal upgrading cost supports substantial value add through allowing low-rank coal to service higher value coal markets, with significant margin.

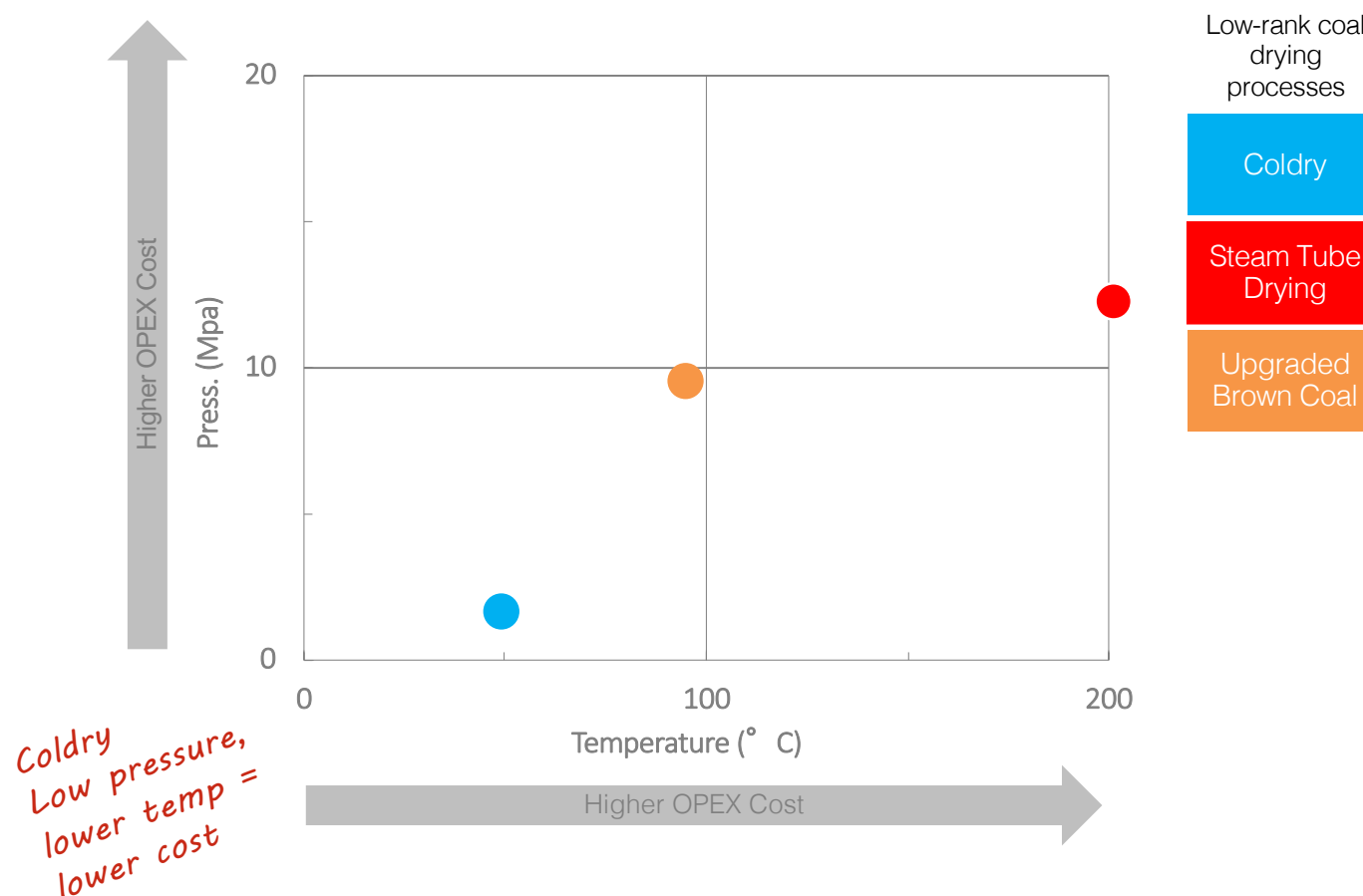


* 55% moisture content lignite via ‘gateway’ product used as an example

Coldry Competitors

- > This graph is a proxy for process energy efficiency.
- > High temperature and pressure requires energy input.
- > Energy needs to be generated, either from gas or coal, adding cost to a process.
- > ECT have 'cracked the code' of efficient low rank coal drying.

Coldry is the world's first low temperature, low pressure drying method capable of producing a black coal equivalent product via a low cost, zero CO₂ process.

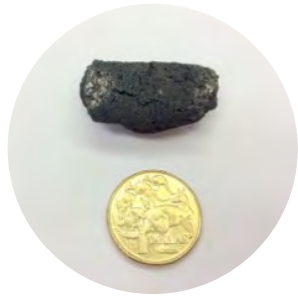


HydroMOR technology introduction



Process Features	Benefits
Uses low-rank coal and alternative iron ore materials	<ul style="list-style-type: none">> Low rank coal replaces coking coal> Wide range of iron oxide sources> Ability to use lower grades of iron ore> Lower raw material cost> Diversified supply chain> Decoupling from coking coal and high grade iron ore improves energy and resource security> Waste remediation solution improves environmental outcomes> Economic advantages: Import replacement, monetise waste streams and add value to lower grade coal and iron oxide resources
Lower operating temperature, <1,000°C	<ul style="list-style-type: none">> Lower capital cost plant> High quality metal product> Increased energy efficiency
Uses Coldry as the feed preparation process	<ul style="list-style-type: none">> Low cost, net zero CO₂ drying and pelletising> Eliminates coking ovens and sinter plants
High Fe yield	<ul style="list-style-type: none">> High level of Fe extracted from low value resources> Suitable for existing steelmaking processes

HydroMOR technology introduction



DRI pellet

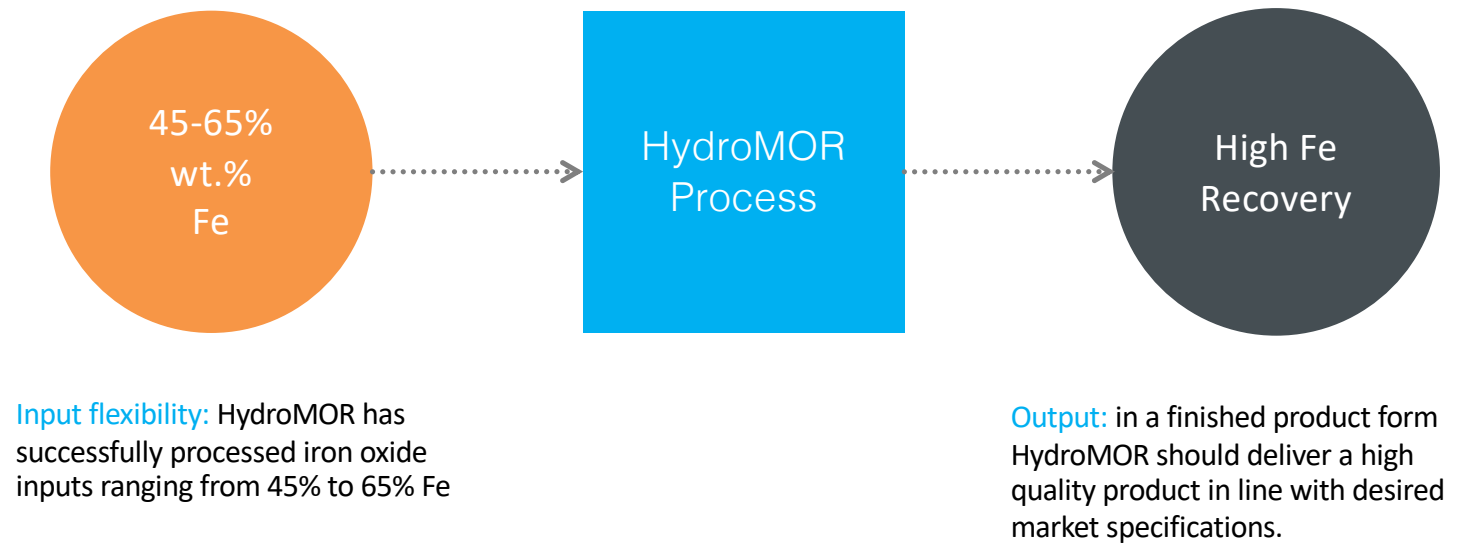


Hot liquid
metal



Solid iron

Product Features	Benefits
High Fe content	<ul style="list-style-type: none"> > Quality primary iron product suitable for existing steel making processes > Low impurities resulting in high quality primary iron
Flexible output: <ul style="list-style-type: none"> > DRI pellet > Hot Liquid metal > Solid Iron 	<ul style="list-style-type: none"> > Flexible applications > Integrate seamlessly with existing steelmaking operations > Feed Induction or Electric Arc furnaces > Export



The 'alternative raw material' opportunity

There exists a vast, 'above ground ore body' in the form of iron ore mine fines and slimes, and industrial wastes such as millscale and nickel refinery tailings.

Current processes can't utilise fines and wastes without expensive pre-processing.

HydroMOR liberates this resource in an efficient, cost-effective manner.

HydroMOR enables a lower cost primary iron production pathway by leveraging two unique features:

1 Decoupling iron making from coking coal

By utilising the rich organic chemistry within low rank coal, the HydroMOR process utilises a different chemical pathway to deliver a high quality product without the need for high quality coking coal, resulting in decreased raw material cost and diversified supply options.

2 Exploiting the 'above ground ore body'

By harnessing the vast 'above ground ore body' that exists as mine tailings, fines and slimes and from industrial wastes such as millscale and nickel refinery tailings, HydroMOR is able to leverage sunk mining and processing costs by providing a waste remediation solution that turns a contingent liability into a revenue stream.

Tailings storage locks up significant swathes of valuable land. HydroMOR minimises waste, releasing land for productive use.

The 'steel intensity' challenge

India is positioned to substantially increase its steel demand, yet is heavily reliant on imports of coking coal and iron ore.

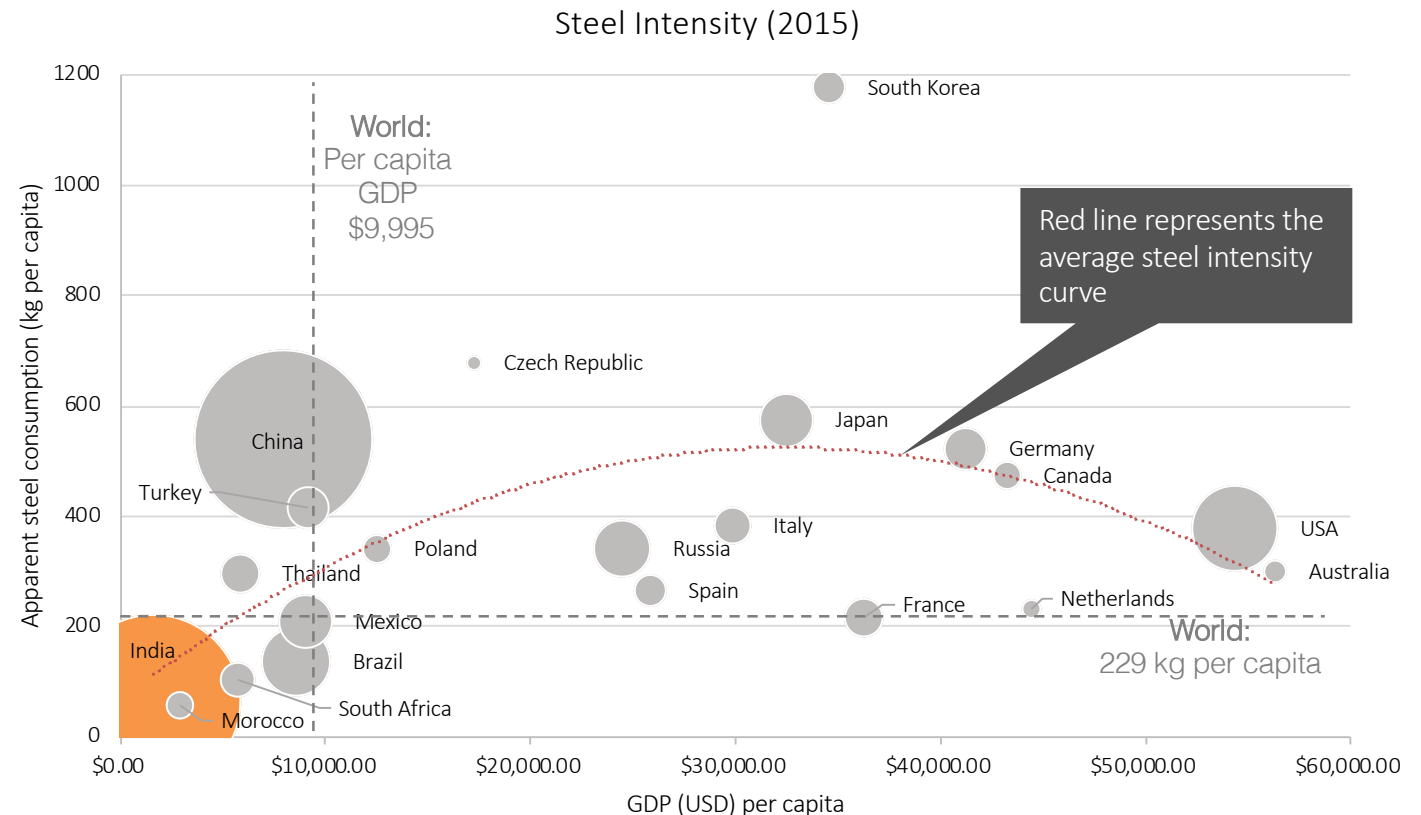
India has signaled its intent to double steel intensity from 64kg to 120kg per capita per year.

HydroMOR opens up new domestic raw material supply options in support of growth in emerging nations.

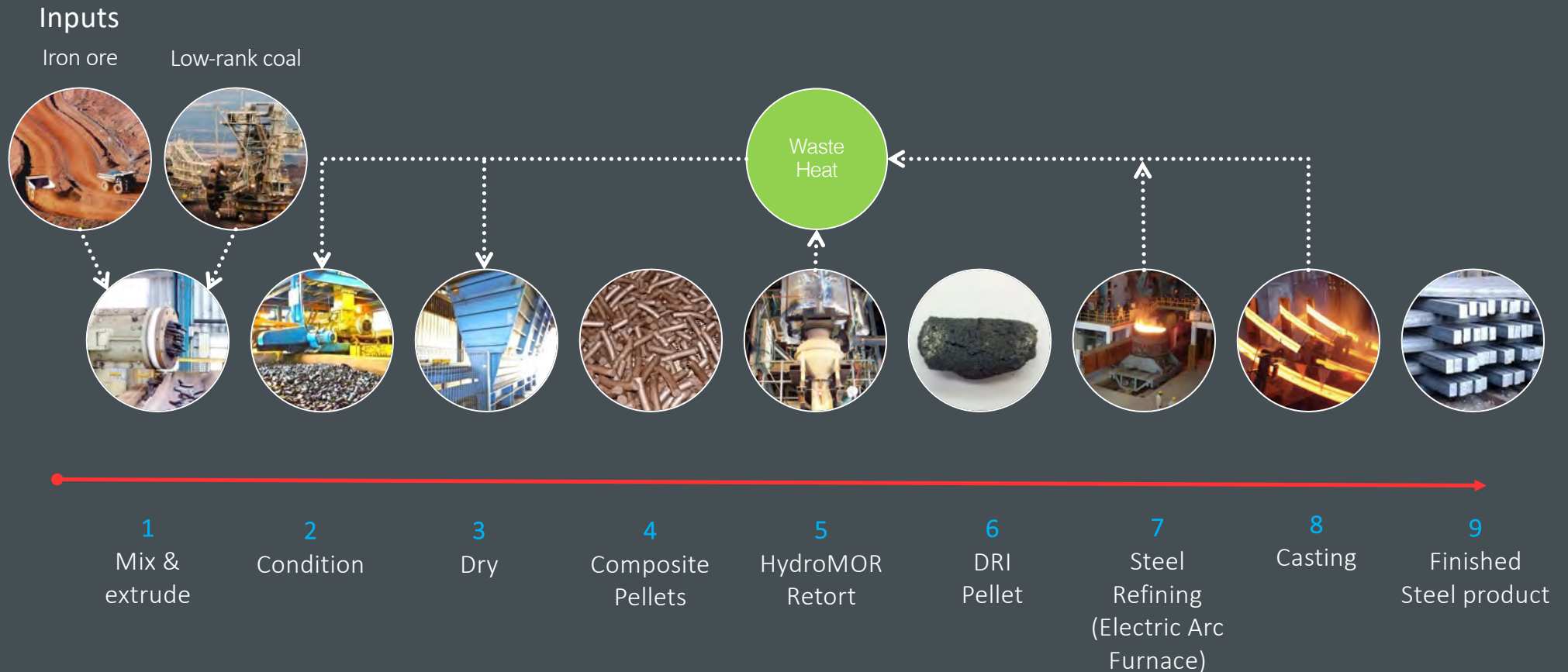
In countries with mature steel intensity curves, HydroMOR is an ideal waste remediation solution.

Data: World Steel Association, World Bank
Bubble size represents population

The most powerful forces driving steel demand are aligned. As economies develop and modernise, steel consumption per capita grows, reflecting a wide range of growing applications – basic infrastructure, water treatment plants, food processing distribution centres, roads, bridges – and, as the middle class emerges, durable goods such as appliances and cars.



HydroMOR Process



HydroMOR employs a different chemical pathway, making it the world's first and only low temperature, low rank coal-based iron making process.

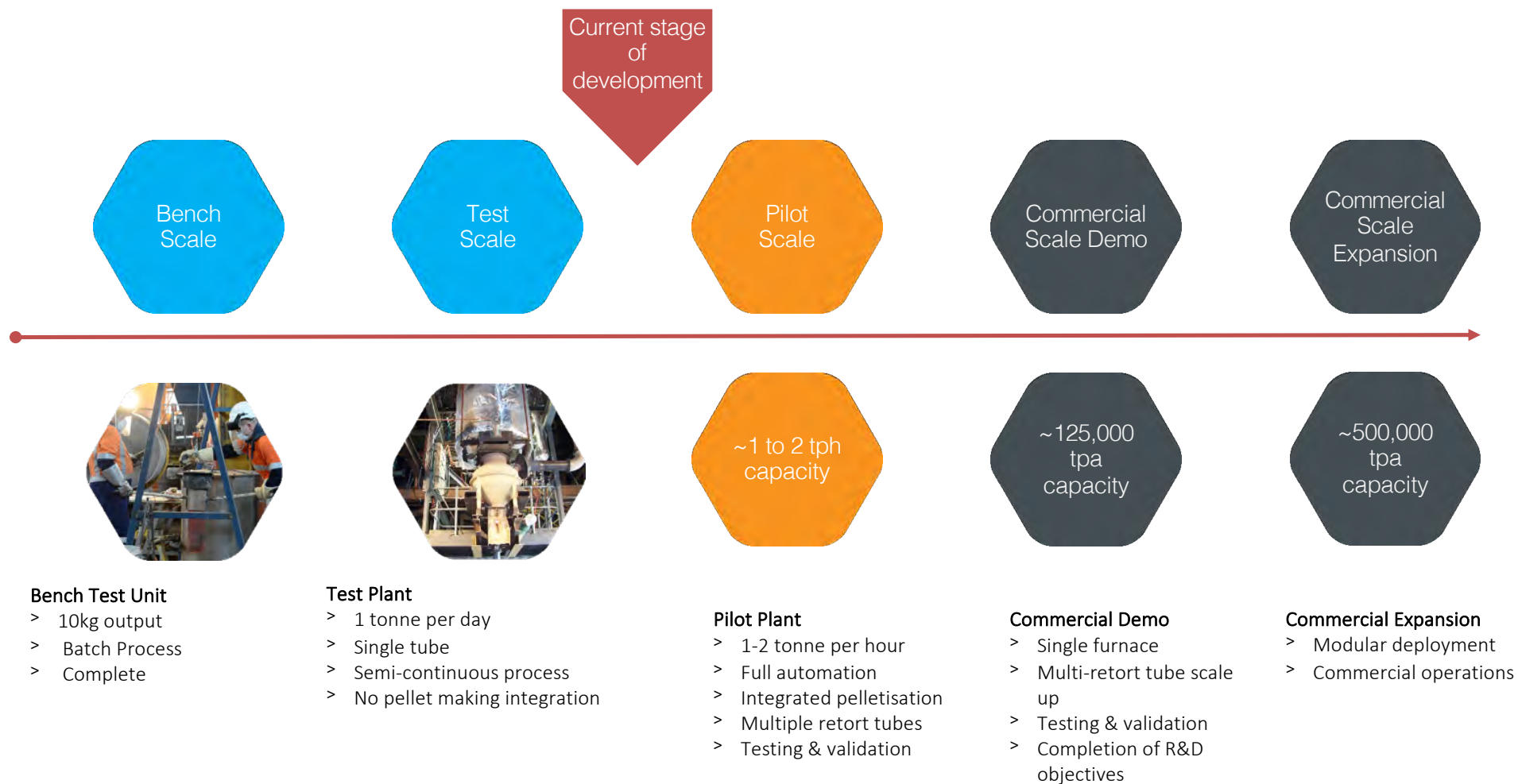
Creating higher value product opportunities



- > The HydroMOR process combines metal oxide bearing media, low rank coal and a flux via the Coldry process to produce a composite pellet
- > Feedstock flexibility: HydroMOR can reduce the following metal oxides to metal:
 - > Iron Ore:
 - > Hematite: Fe_2O_3 (Lump, fines and slimes)
 - > Magnetite: Fe_3O_4 – without the need for sintering
 - > Waste streams:
 - > Mill scale
 - > Blue Dust
 - > Fe within Nickel ores (Limonite) and Nickel refinery tailings:
 - > Also recovers Ni within the alloy
 - > Has also recovered Cr content within these same materials
 - > Positive test results on both Ilmenite (Ti source) & Mn ores with further development required

3	4	5	6	7	8	9	10	11	12
IB	IVB	VB	VIB	VIIIB	VIII		10	IB	IIB
8	4B	5B	6B	7B	8			1B	2B
Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38
Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414
71	72	73	74	75	76	77			

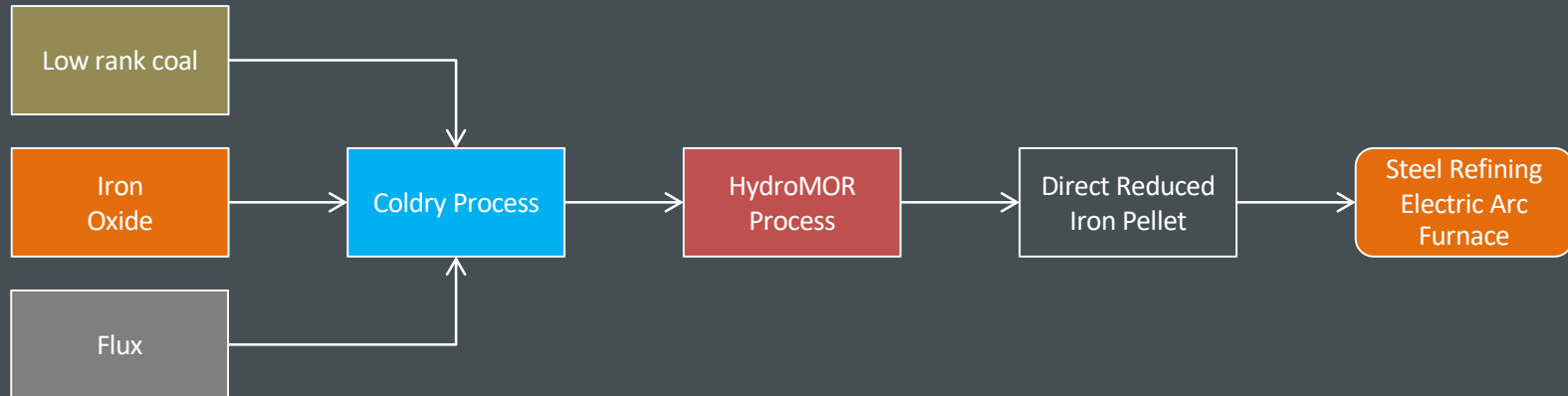
HydroMOR Commercialisation Pathway



HydroMOR Process vs. Blast Furnace

HydroMOR Process

- > Lower Cost
- > Simpler
- > More flexible
- > Less CO₂



- > **Lower cost** inputs
- > Utilise domestic raw materials
- > Utilise waste grade ore

Environmental Improvement
Eliminates:

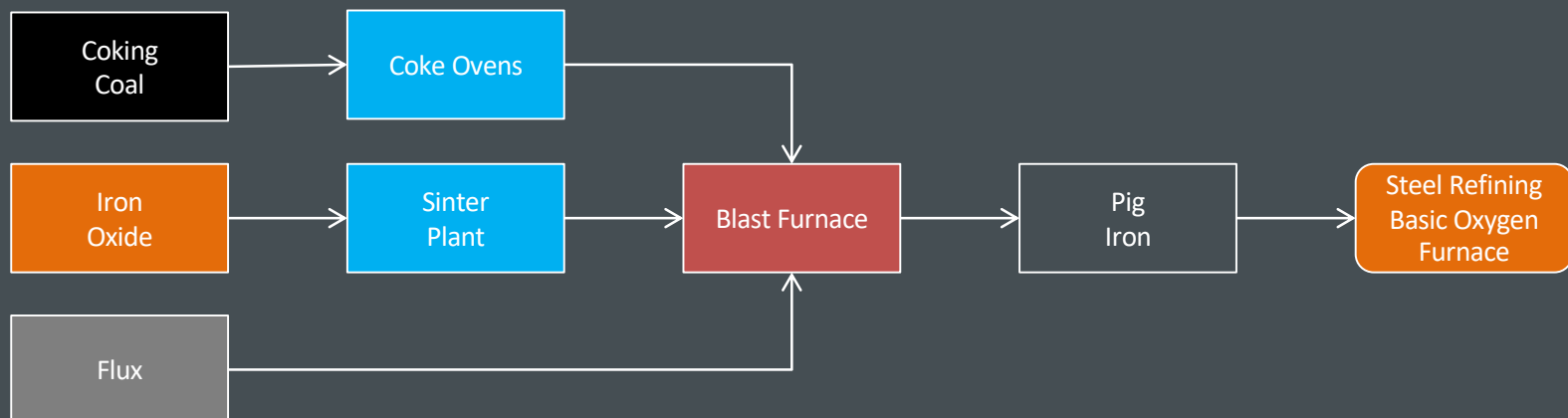
- > Sinter plant
- > Coke ovens
- > Associated CO₂ emissions

Efficient
Lower temperature than Blast Furnace:

- > **Lower** capex
- > **Lower** maintenance cost
- > Economic at smaller scale

Product:
Tailored to the same specification as traditional processes delivering the desired grades of iron and steel for various applications.

Blast Furnace



Benefits vs Blast Furnace

Decoupling from traditional raw materials strengthens a business' resistance to inherent price volatility

- > Critical Raw material prices have moved between early and late 2016; mainly Coking coal
- > Compared below is F2015/16 average (left) vs. mid October 2018 Spot (right)
- > Based on 500,000tpa finished steel Plant size or equivalent

	Traditional	ECT
	BF - BOF	C/M - EAF
	Blast Furnace - Basic Oxygen Furnace	Coldry / HydroMOR - EAF + Power Generation
Case / Scenario	Base Case	Mid Case
CAPEX (\$AUD million)	516.2	328.9
OPEX (\$AUD million)	198.3	205.1
SALES (\$AUD million)	258.7	267.5
Gross Profit	60.4	62.4
IRR (ungeared)	9.1%	17.2%
IRR (geared 30%)	7.7%	18.4%

Inherent strength – Lower Capex, plus ability to use lower cost raw materials

- > Coking coal (above \$US 85 FOB)
- > Fe Ore fines

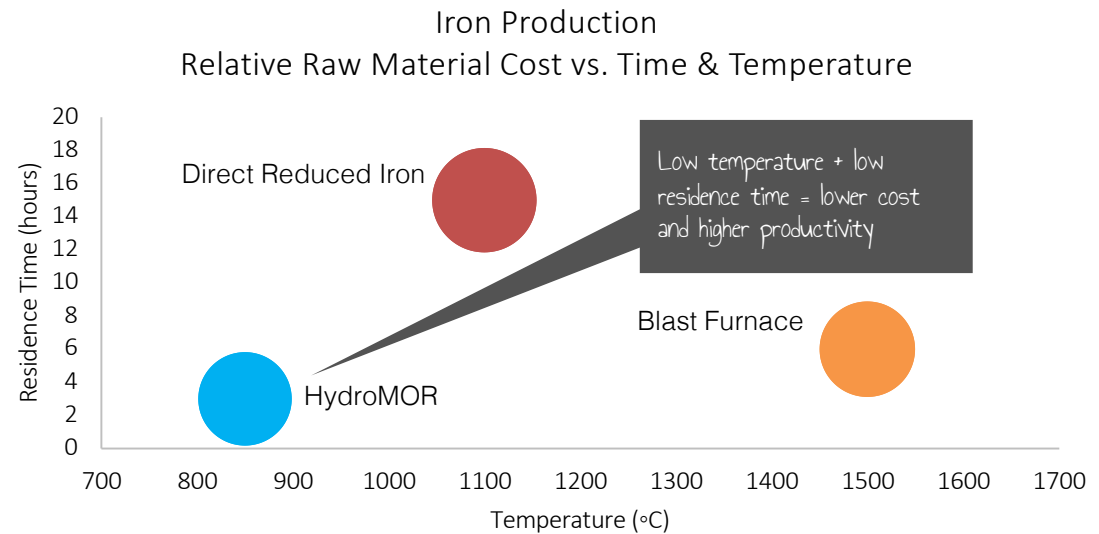
	Traditional	ECT
	BF - BOF	C/M - EAF
	Blast Furnace - Basic Oxygen Furnace	Coldry / HydroMOR - EAF + Power Generation
Case / Scenario	Base Case	Mid Case
CAPEX (\$AUD million)	516.2	328.9
OPEX (\$AUD million)	304.0	209.2
SALES (\$AUD million)	272.2	281.7
Gross Profit	-31.7	72.5
IRR (ungeared)	negative	20.0%
IRR (geared 30%)	negative	22.1%

2016 mid October spot price:

- > Coking coal - \$US 245 FOB
- > Also, escalation of Ore & Steel (less significant)

Benefits vs other methods

- > Lower Temperature
- > Lower residence time, higher productivity
- > Lower Cost



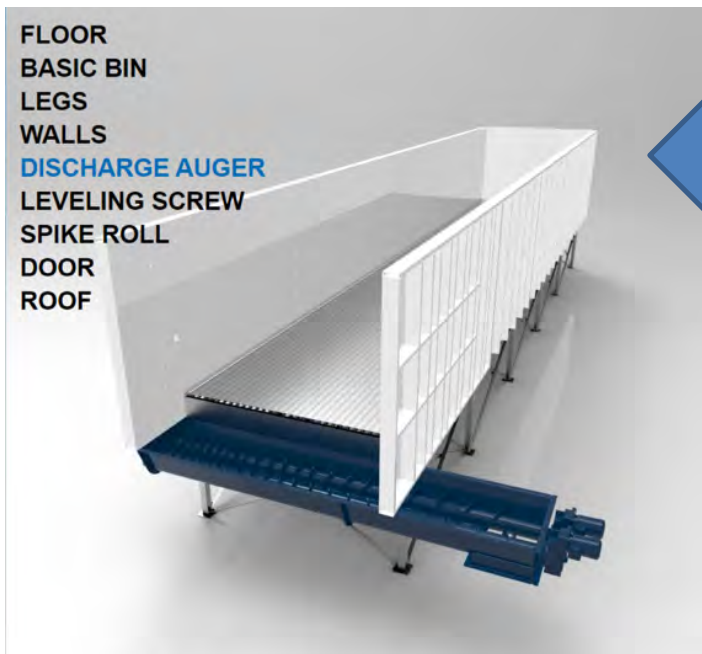
- Residence time is a proxy for asset productivity
- Temperature is a proxy for asset capital intensity
- Bubble size represents 'Relative Raw Material Cost'

Primary Iron Making Process			
	Blast Furnace	DRI	HydroMOR
Temperature (degrees C)	1300-1500	1000-1100	800-900
Residence Time (hours)	6	12-18	1.5-3

Planned Upgrade to Plant & Equipment*

- 1) NEW lignite handling systems
- 2) NEW pug mill & extrusion system
- 3) NEW Conditioning systems
- 4) NEW Char kiln
- 5) NEW boiler system and co-generation
- 6) NEW lab, workshop, briquette press
- 7) Upgrade – Packed Bed Dryer
- 8) Upgrade – Conveyors
- 9) Upgrade – Electrical, SCADA
- 10) Upgrade – building improvements, concrete padding, site safety and security

- Cover raw lignite stockpile
- Walking Floor conveyor for feed
- Hammer mill size reduction for fibrous content



- Retractable canopy roof
- Feed to belt conveyor then into mill
- Floor speed controlled by pit level sensor

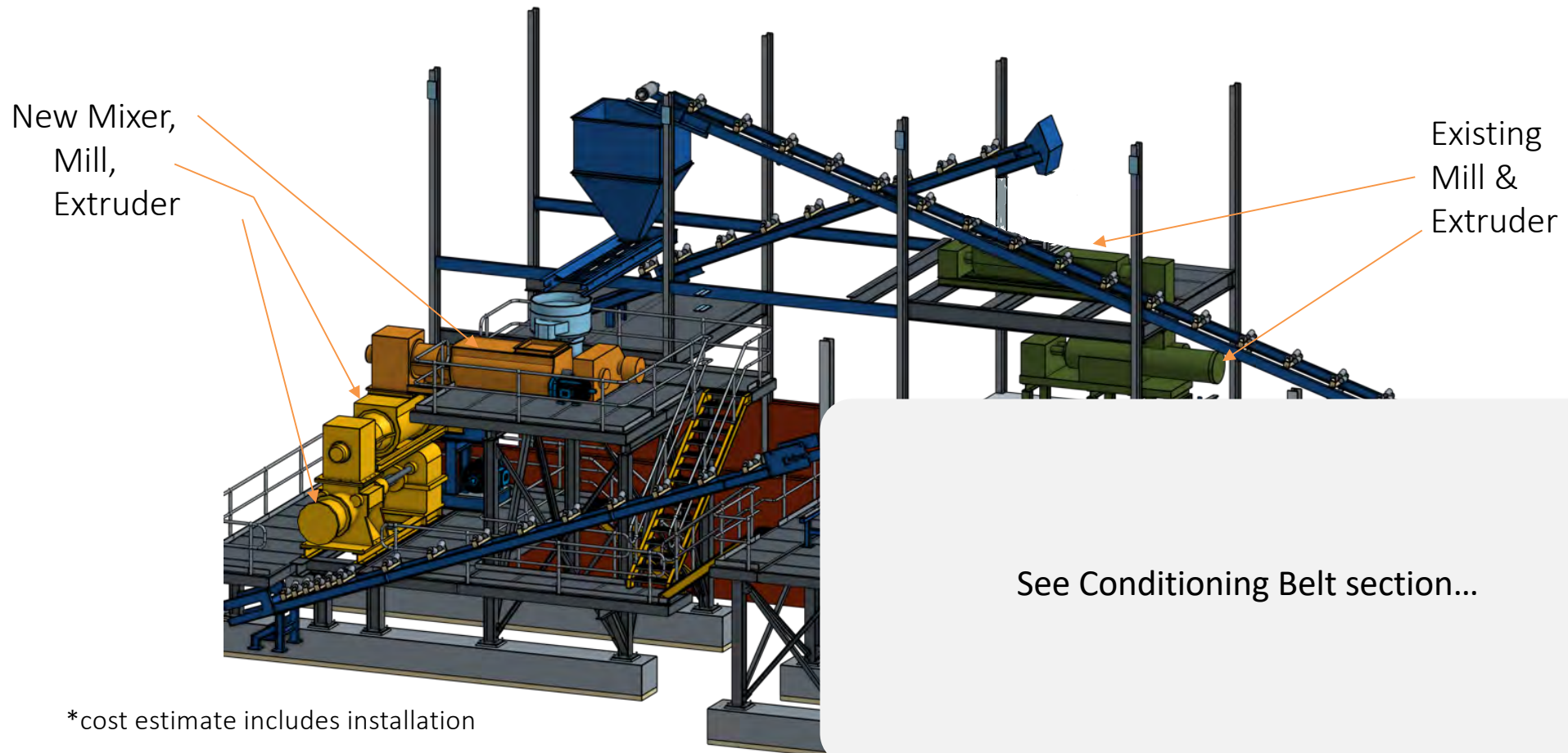
- High capacity hammer mill
- Mill fibrous components to -2mm
- ON/OFF operation



*cost estimate includes installation

Extrusion Systems

- Install larger capacity extruder system
- Retain existing extruder system



*cost estimate includes installation

Conditioning Belt System

- Multi-deck drying belt
- Extended residence time for stronger pellets

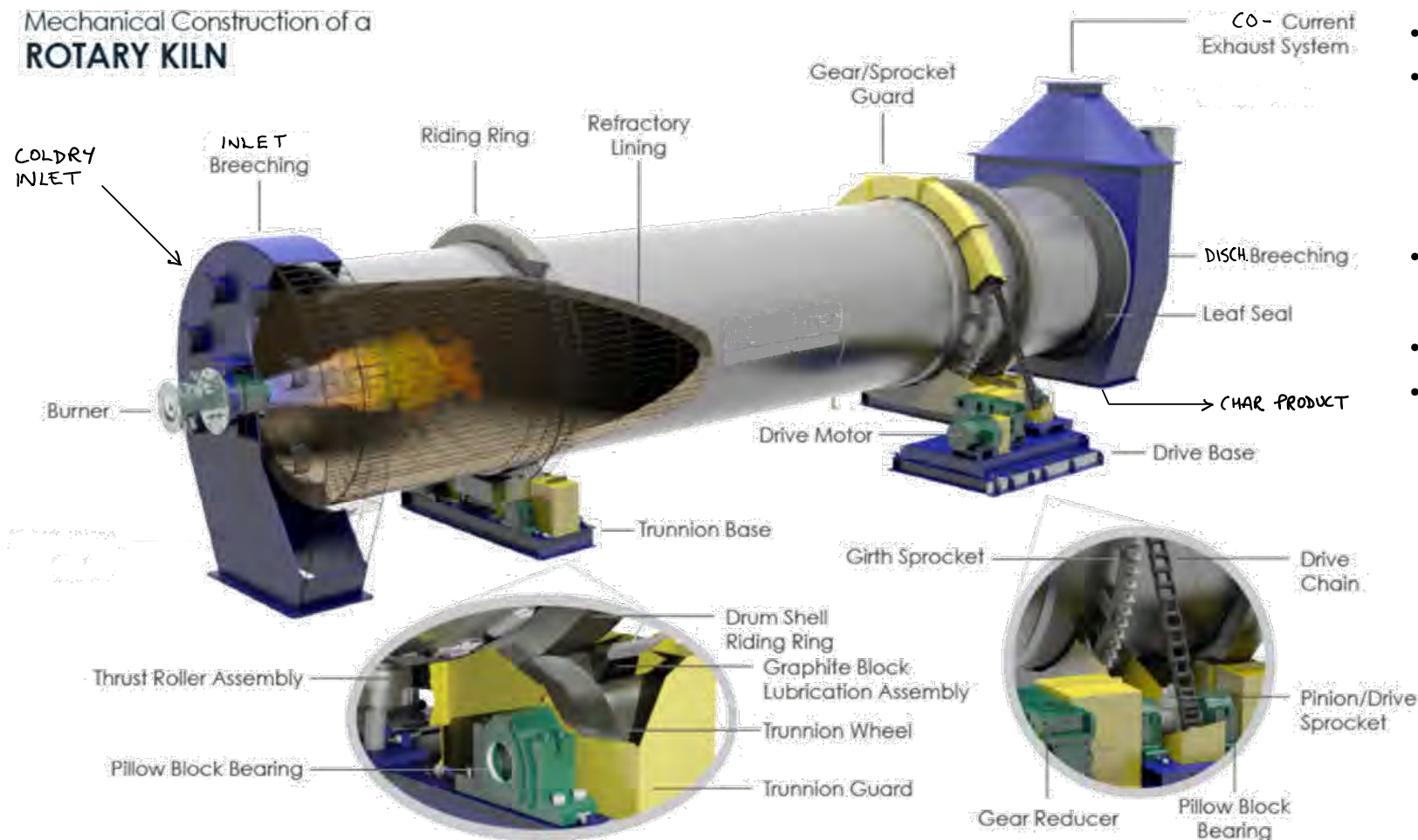


- ~2m wide, 13m long, 5 decks
- Will achieve over 60min residence time at max rates
- Bed turnover at each deck aids in even drying / curing
- A range of vendors currently under review

Char System

- New Char kiln & systems

Mechanical Construction of a
ROTARY KILN



- Co-current kiln
- Refractory lined
- Intermittent burner operation (Lignite is the main energy source)
- Energy value in the off gas is significant
- Product rotary cooler
- Refurbished tank for storage & packing

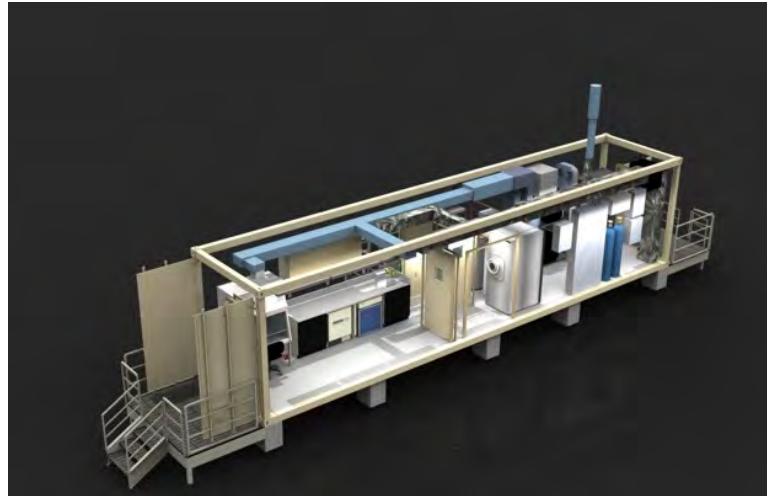
Boiler System with Co-gen

- New Combustor for Kiln off-gas
- 8-10MW JT gas boiler
- Screw expander for electricity co-gen



Lab, Workshop, Briquette Press

- Laboratory
- Workshop
- Briquette Press

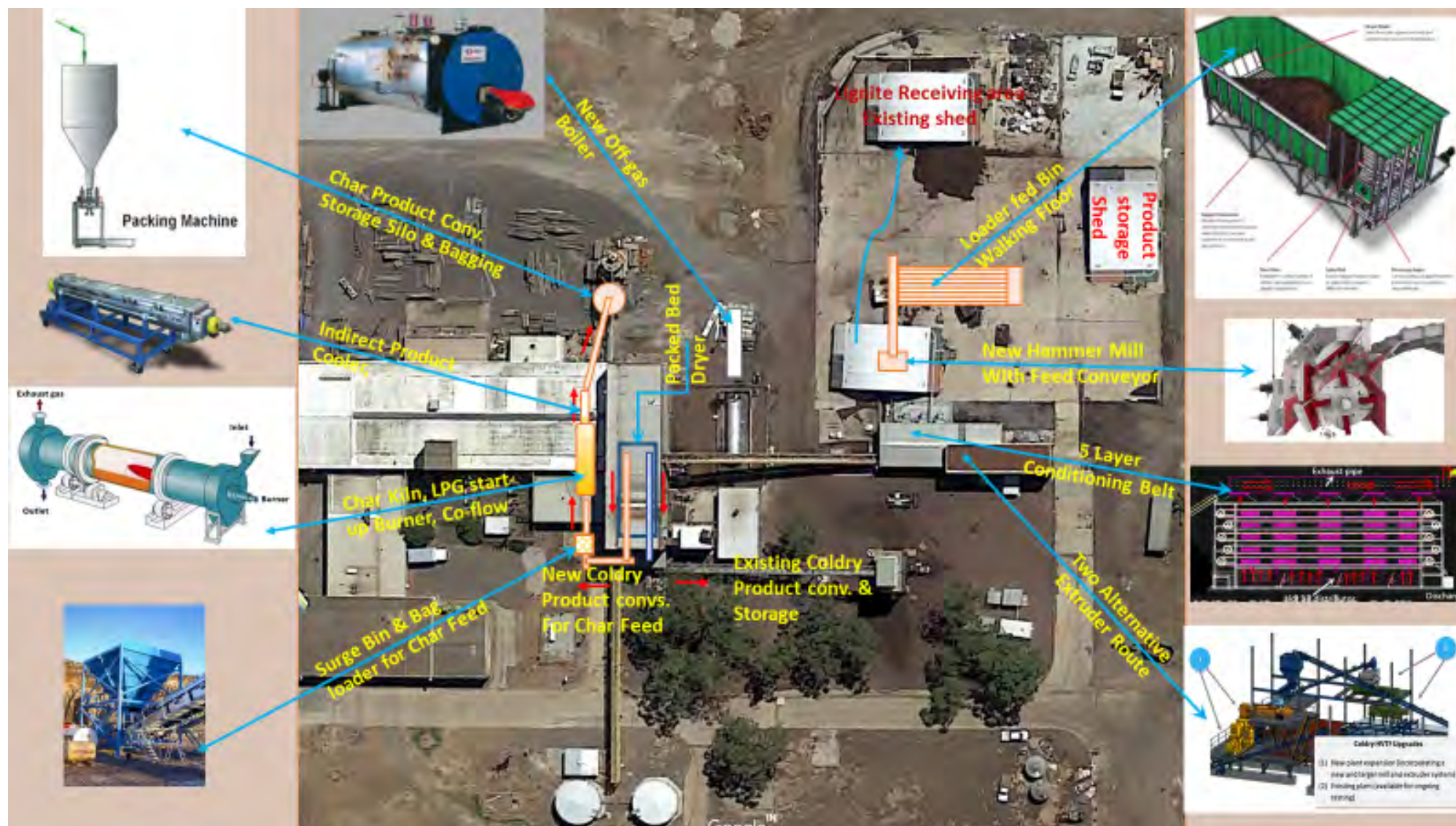


Packed Bed Drying System

- New internal packed bed dryer (PBD) vessel design to improve air flow
- Modified discharge mechanism to allow product evacuation flexibility:
 - Coldry to storage, or
 - Pellets to Char, or
 - Both



Proposed Site Layout



- ECT aims to operate the Coldry and charring plant targeting \$2m-\$3m EBITDA pa selling to BBQ briquettes and carburiser markets
- “Steam factory” used to attract other businesses seeking steam
- Electricity cogeneration to off-set ECT production costs support integration with other projects at the Bacchus Marsh site.
- Parallel development of the proposed Latrobe Valley facility and transition of char for smokeless fuel market and carburiser from Bacchus Marsh to LV
- Establish the Bacchus Marsh site as dedicated char processor for the agricultural markets (utilising suitable lignite from the adjacent Maddingley coal mine)
- Bacchus Marsh site becomes potential location for ECT’s expansion plans including:
 - Waste to diesel plant
 - Agricultural char
 - Waste processing (drying)



ENVIRONMENTAL CLEAN
TECHNOLOGIES LIMITED

Thank you.

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