



Shareholder Update – Proposed Bacchus Marsh Upgrades Char Project and Coldry Capacity Improvements - Status Update

Wednesday 9 October 2019: Environmental Clean Technologies Limited (ASX: ECT) (ECT or Company) is pleased to provide the following update on the proposed upgrades to its Coldry High Volume Test Facility (HVTF) targeted at achieving positive cashflow within the next 12 months.

Key Points:

- ECT targeting '12 months to cashflow positive' under a 3-tiered approach involving organic growth, acquisitions and corporate restructure
- Tier 1 is focused on upgrades to the Coldry HVTF, supporting expansion of solid fuel sales to the utility heat market and entry into the char market
- Update of key tier 1 activities including project design and implementation plan, off-take partners, refined revenue targets and project financing.
- Char project progress update with project awaiting finance decision.

On 4 September 2019 the Company released its updated Corporate Strategy, outlining efforts over the past 8 months aimed at developing near-term operational cash-flows in parallel to proposed large-scale projects in India, the Latrobe Valley and other regions.

To deliver positive cashflows sufficient to continue the broader research, development and commercialisation objectives over and above basic operating expenses, the Company outlined the adoption of a three-tiered approach of organic growth, acquisitions and corporate restructure.

The first tier of the strategy aims to leverage the Company's existing Coldry HVTF northwest of Melbourne to build upon the demand in the local market for solid fuel and char products.

With over \$10M invested to date, the Coldry HVTF has been focused on supporting the research and development (R&D) of the Company's growing technology suite.

The next 12 months will involve key upgrades to transition the Coldry HVTF from an R&D-focused facility to a commercial facility with three main goals:

- 1) Generate earnings of up to \$3M pa from the facility
- 2) Underpin the market feasibility of a larger, more efficient and economical Coldry plant
- 3) Further develop commercial aspects of the facility

Steam and solid fuel boiler market

- ECT is operating in the utility heat and steam market, with specific focus on the supply, financing, installation, servicing and operation of multi-feedstock systems up to 20Mwh
- This market consists of a broad range of businesses including abattoirs, milk processors, food manufacturers and timber processors that require heat or steam for their operations
- Current revenues of ~\$300,000 pa from this market with an objective to grow towards \$1,000,000 pa over the coming 12 months

Char market

ECT has been assessing a range of markets for potential Coldry sales, with the char market emerging as the most attractive due to a diversity of applications including:

- 1) Char feedstock to BBQ briquettes
- 2) Carburiser for the steel industry
- 3) Soil conditioner for the agricultural sector

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

The Australian BBQ briquette market is predominantly supplied by two companies under several established brands.

Given the value of the Australian dollar, there is also growing interest in overseas brands establishing a manufacturing presence where a reliable and cost-effective source of char can be established.

ECT estimates that demand for char feedstock for both the BBQ briquette and carburiser markets exceeds 50,000 tonnes per annum (tpa), with ~20,000 tpa of char being produced currently in Victoria.

Additionally, the worldwide supply of high-quality char is falling whilst demand is still growing, and the cost savings achieved via ECT's proposed Latrobe Valley Coldry plant would allow competitive access to the export markets with expected demand to be in excess of 100,000 tonnes per annum.

Chairman, Glenn Fozard commented, "ECT is working closely with off-takers to develop tailored char products. We would like these parties to be closely involved with the proposed upgrades, through to the commissioning of the plant, including support for a parallel R&D program for char product refinement. The BBQ briquette market is a retail market where the consumer demands high quality, so the importance of continually refining product to best suit the buyer, cannot be understated."

Coldry HVTF expansion works

The Coldry HVTF has been well established at the Company's Bacchus Marsh facility with incremental capital works spanning several years.

These past upgrades provide a valuable source of process data, informing ongoing research and development and the 'basis for design' of current Coldry plant and equipment.

However, the addition of new and repurposed equipment under R&D conditions over the years, inside the constraints of legacy infrastructure, led to a process train that met flexibility criteria for R&D activities, but was not commercially optimised.

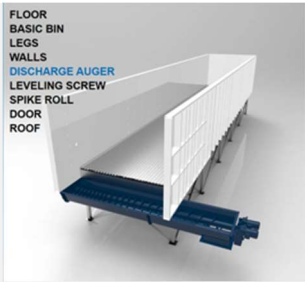


The upgrade works aim to deliver the following:

- 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.

This next phase of development at the Coldry 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 char process	~10,000 char	5,000,000-6,000,000
Syngas	Derived from the char process	~10,000 (equivalent)	~\$500,000+
Total		~25,000	~6,000,000+

To deliver the above sales objective, the Company aims to execute the following key capital works:

#	Upgrade	Description	
1	Raw lignite handling	<ul style="list-style-type: none"> • Further upgrade of terminals 15 & 16 at Yallourn coal mine to underpin lignite supply • Cover raw lignite stockpile • Walking Floor conveyor for feed: <ul style="list-style-type: none"> ○ Retractable canopy roof ○ Feed to belt conveyor then into mill ○ Floor speed controlled by pit level sensor 	
2	Feedstock preparation	Installation of milling & screening equipment to provide increased volume capacity: <ul style="list-style-type: none"> • High capacity hammer mill • Mill fibrous components to -2mm • Automatic operation 	
3	Primary processing	Installation of larger mixing, milling & extruding equipment with 25,000 tpa capacity: <ul style="list-style-type: none"> • Install larger capacity extruder system • Retain existing extruder system 	
4	Drying	Conditioning <ul style="list-style-type: none"> • Multi-deck drying belt • Extended residence time for improved control over pellet strength • Increasing capacity throughput to match packed bed dryer capacity • Pellet bed turnover at each deck for improved control over drying/curing parameters • A range of vendors currently under review 	

#	Upgrade	Description	
4	Drying	<p>Drying – Packed Bed Dryer</p> <ul style="list-style-type: none"> • New internal configurations for improved air flow & reduced fan energy consumption • Modified discharge mechanism to allow product output flexibility to storage or char production 	
5	Char	<p>Installation of rotary char kiln</p> <ul style="list-style-type: none"> • New Char kiln & systems • Refractory lined • Warmup burner operation (lignite is the main energy source) • Energy value in the off-gas is significant • Product cooler • Refurbished tank for storage & packing 	
6	Energy	<p>Installation of syngas harvester for process heat requirements and other economic uses (e.g. co-generation of electricity)</p> <ul style="list-style-type: none"> • New combustor for kiln off-gas • Up to 10MW heat recovery boiler • Screw expander for electricity co-generation 	
	Other Utilities and Site Upgrades	<ul style="list-style-type: none"> • Additional conveyer systems • Site electrical upgrades • Process control system • Buildings improvements • Upgraded concrete padding • Removal of asbestos sheeting • Increased security and safety measures • Laboratory • Workshop • Briquette Press 	



The updated draft timeline to deliver the upgrades and revenue is as follows:

Activity	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20
Char market & off-take		█										
Project Planning & Design	█	█										
Financing			█									
Final design & procurement				█								
Upgrades Stage 1	Char plant, feedstock handling & preparation						█					
Upgrades Stage 2			Boiler, Packed Bed Dryer				█					
Upgrades Stage 3				Pug Mill, Extruder, Conditioning Belt				█				
Automation										█		
Commissioning												█
Full Production												█

Whilst the timeline to reach full production has extended to August 2020, discussions with finance providers are well progressed, with final design and procurement expected to proceed quickly thereafter.

The upgrade program will also establish the final plant capacity which may exceed 35,000 tonnes per annum, thus giving potential upside to the economics of this plant as described above.

The Company looks forward to providing regular updates on the progress of the Bacchus Marsh upgrade project.

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	India Project	Aust. Projects	R&D	HVTF	Business Develop	Sales
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