



## Shareholder Update

**Wednesday, 25 November 2015:** Environmental Clean Technologies Limited (ASX: ESI) (ECT or Company) is pleased to provide the following update, covering areas of interest to shareholders:

- Tripartite collaboration agreement
- Appointment of Matmor Engineering Partner in India
- Coldry – Victorian market feasibility commences
- ECT joins DICEnet

### India Activity

In the Company's Annual Report, released on 23 October 2015, the current status of activities in India was outlined, with specific focus on the progress toward finalisation of the tripartite collaboration agreement with NLC and NMDC.

*"...clearances have taken several weeks to be processed through the ministries of both Coal and External Affairs. The agreement is now progressing through the Ministry of Steel, with the expectation we will soon gain the final clearance to sign."*

ECT has continued to work closely with NMDC, India's leading iron ore miner and one of the Company's collaborative development partners, to finalise the written confirmation from the Ministry of Steel needed to clear the way to the formal signing of the tripartite agreement.

At the time of writing, the Company understands that the Ministry of Steel has sought guidance from two Government departments with respect to confirming the statutory requirements and protocols for the signing of this type of agreement.

Of the two Departments, one has already provided their 'no objections' clearance and the Ministry of Steel is currently awaiting the other.

It is important to note that the sole focus of this recent deliberation within the Indian Government is on determining the appropriate regulatory authorities under which to provide clearance for NMDC to sign the tripartite agreement, rather than any consternation regarding the concept of the three companies coming together to develop and commercialise Coldry and Matmor technologies in India.

The tripartite collaboration agreement, with its inherent tie-up of two Public Sector undertakings with a foreign company, will be a first for the parties. Further, given its potentially substantial financial commitment through to commercial deployment and its binding status, ensuring the agreement is signed correctly under Indian law, is essential to giving it legal standing.

Managing Director Ashley Moore stated "India is a country with meticulous compliance processes and strictly defined communication channels, and navigating through these can be challenging for a foreign company new to this way of doing things.

"Thanks to the substantial support of our partners at NLC and NMDC, our advisers at YES Bank and the dedicated efforts from the staff at the Australian High Commission in New Delhi, we have been able to traverse these complexities.

"The next step following clearance from the Ministry of Steel will be a formal signing ceremony at NLC's headquarters. We're mindful of timing and will continue to work to finalise the agreement so we can progress to the core project activities that we're all keen to see advance."

## **Matmor Pilot Plant Development Program advances**

As previously announced (see shareholder update 08 July 2015), the Company has been formalising its Pilot Plant development program, with recent focus on the selection of an appropriate technical partner with specialist furnace engineering experience, a track record in process development and a vision for innovation that aligns to our own.

These capabilities are an essential part of the next phase in Matmor advancement, which requires an engineering partner to support the Test Plant upgrade works at our Matmor Test Plant north west of Melbourne, and the subsequent scale-up design works for the Pilot Plant in India, under the tripartite agreement with NMDC and NLC.

The company is pleased to announce that it has selected world-renowned furnace engineering firm M.N. Dastur and Company of India for this critical role.

ECT Managing Director stated that "ECT began its search for an engineering and development partner in India some 18 months ago. Of prime importance to us was to identify and harness a set of capabilities which would assist in our Pilot stage development of Matmor; from assistance with the data gathering efforts at Test Plant, through Conceptual and Detailed design stages for the Pilot plant, and appropriate assistance in operational aspects along the way. MN Dastur is clearly the stand-out organisation, and we are very pleased to be able to announce their appointment today."

Representatives from MN Dastur commented "We have many years of Corporate experience in supporting conventional and new technology development in the Iron and Steel sector. Dastur is keen to commence our work plans on supporting the Matmor technology development with ECT, starting with the upgrades needed on the existing Test Plant ahead of its detailed R&D program. From what we have seen so far, the Matmor technology's ability to replace coke as the main reductant in iron production, plus its utility in processing alternative ore sources such as fine powdered ores, often viewed as a waste or low value material, would make this a valuable contributor to iron and steel production globally. We look forward to the challenges associated with bringing Matmor technology to Pilot scale, and to working more closely with ECT and their staff."

## **Feasibility study for scale-up of BM pilot plant**

Since the closure of the Energy Brix brown coal briquette plant in Morwell Victoria last year, ECT has been approached by several companies seeking alternative sources of fuel to replace the rapidly dwindling supply of briquettes.

In addition, the Company has also received commentary from key Victoria based consumers and experts in the market indicating that alternative supplies of energy such as natural gas, LPG and black coal, are cost prohibitive due to their high capital and operational cost, compared to locally available de-watered brown coal, leading many end users to rethink their fuel-supply switching plans and presenting a potential opportunity for Coldry.

To this end, the Company has recently conducted live trials of its standard Coldry pellet in small-scale boiler systems, resulting in a level of success and end user acceptance, that justifies exploring the technical and financial feasibility of upgrading the Coldry Pilot Plant located at our R&D facility in JBD Industrial Park on the outskirts of Bacchus Marsh, northwest of Melbourne, to service that market.

The intent of any upgrade at our JBD Industrial Park facility would be to allow for the servicing of small but potentially commercial contracts for the supply of Coldry pellets as well as develop a higher throughput test facility to complement our growing product innovation initiatives as well as service test requirements to support potential global technology and equipment sales.

Managing Director, Ashley Moore noted “If we can underwrite the modest capital improvements of our Pilot Plant with small, yet viable supply contracts, we will have a world-class test facility able to deliver enhanced product innovation outcomes, assist with batch testing to support the sales of our Coldry and Matmor technology and equipment, as well as providing a bridge to larger scale future supply from locally based commercial plants.”

### **Membership of DICE Net**

DICE Net is the support group, based in Melbourne Australia, for the development and demonstration of the direct injection carbon engine (DICE) and associated fuel cycle for ultra-high efficiency power generation from carbon fuels derived from coal and biomass. The group, Chaired by Dr John White includes participants from Ignite Energy Resources, AGL, CSIRO, Energy Australia, GHD and Brown Coal Innovation Australia, among others.

DICE is a technology that promises a considerably more efficient, nimble and adaptable generation technology than is possible with pulverised coal-fired steam plants. It can achieve a step reduction in CO<sub>2</sub> intensity of around 20-25% for black coal and 30-50% for brown coal while being suitable for base-load, peak load and backup generation to support notoriously unpredictable renewable technologies such as wind and solar.

ECT’s role in DICE Net has become relevant given the recent work that the ECT team has been undertaking in product innovation and diversification. A recent stream of Coldry product research and development has created a pellet with significantly increased density and compressive strength without the need for briquetting or additives, and may provide a suitable raw material for a DICE fuel. As such, ECT is now working closely with the Leader of the DICE Development Program under a defined test regime and will continue to support the development of this technology as well as identifying where ECT’s technology and expertise can play a part in the future commercialisation of the DICE technology.

### **For further information, contact:**

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### **About M.N. Dastur:**

MN Dastur was founded in 1955 by Dr. Minu Nariman Dastur. It is today one of the foremost independent consulting engineering organisations in the world in the iron and steel sector.

Dastur has vast experience in India and internationally, across all facets of modern steel making; Blast Furnace, Direct Reduction, Iron ore sintering and pelletising, Coke oven plant and systems, Steel making, Ferro Alloys production, Standard and Thin slab casting plant, Hot and Cold Rolling mills, Forging Plant as well as Energy saving and Steel plant waste heat recovery systems.

Their services range from Feasibility studies, through Design & Engineering to Project management and Operational assistance.

For further information, please visit: <http://www.dastur.com/>

### **About DICE Net**

DICE Net was established in March 2013 to support the development of Generation 3 DICE fuel cycle via international pilot and demonstration projects, together with R&D into next generation technologies.

Establishing this new fuel cycle will require a holistic approach, involving stakeholders along the entire value chain; e.g. various carbon fuel processing technologies, fuel standards, engine and systems, transportation logistics, carbon capture and storage.

For further information, please visit: <http://www.dice-net.org/>

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**About ECT**

ECT is in the business of commercialising leading-edge coal and iron making 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 licencing and other commercial mechanisms.

**About Coldry**

When applied to lignite and some sub-bituminous coals, the relatively simple 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 MATMOR**

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

MATMOR is a simple, low cost, low emission, production technology, utilising the patented MATMOR retort, which enables the use of cheaper feedstocks to produce primary iron.

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