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Media Release

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Positive findings from the ABIR Program – Bio-Chemicals to Drive Commercialisation

- **Licella is nearing completion of an $8.2m ABIR feasibility project with the assistance of a $5.4m grant**
- **The ABIR feasibility project is for a commercial-size Cat-HTR module producing Bio-Chemicals and Bio-Crude**
- **Focus going forward will be on high-value Bio-Chemicals and using Bio-Crude oil as a refinery blend stock**
- **The Bio-Crude fraction has been shown capable of blending and upgrading to drop-in fuels in a conventional refinery, which could potentially help Australia reduce its reliance on imported finished fuels**
- **Licella has identified an optimum site for a commercial plant in the "Green Triangle" of South Australia**

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About Licella

Licella is a world-leading advanced bio-chemicals and bio-fuels company whose Catalytic Hydrothermal Reactor ('Cat-HTR') process rapidly converts wet biomass (plant material) into high-value 'Bio-Chemicals' and 'Bio-Crude.' Licella's Bio-Crude is a renewable equivalent of petroleum crude oil and Licella's Bio-Chemicals can be used as substitutes for analogues derived from conventional crude.

Corporate Details

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Licella's ABIR Project

Background – ABIR Grant

In February 2013 Licella won a $5.4m Advanced Biofuels Investment Readiness (ABIR) grant from the Australian Government, through ARENA, as part funding towards an $8.2m project to produce the investment case for the construction of Licella's first commercial scale Cat-HTR module, pre-commercial plant, ("the Project"). The Project consists of a commercial-scale module that is designed to process 50,000 oven dry tonnes (ODT) of biomass p.a. to produce ~125,000 barrels of combined Bio-chemicals and Bio-Crude oil p.a.

Project Activities

Licella's ABIR project involves a comprehensive range of activities to address the entire value chain from receiving biomass into the plant to product sale. These activities included:

- Selection of a site in Australia for construction of the commercial-scale Cat-HTR module. The site will support the expansion to a commercial plant processing 200,000 ODT of biomass and producing ~500,000 barrels of BioCrude p.a.;
- The successful negotiation of a feedstock supply and BioCrude off-take agreements, as well as the identification of markets for Bio-Crude and Bio-Chemicals;
- Development of the refining pathways to convert Bio-Crude into 'drop-in' transport fuels and Bio-Chemicals;
- Completion of the Cat-HTR technology front end engineering design (FEED) and costing for the Cat-HTR module; and
- Completion of the feasibility study and preparation of the investment case for the construction of the Cat-HTR module (this is the final activity, with all others submitted to ARENA).

Image: Licella's BioCrude

For More Information

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Cat-HTR Reactor Development Pathway

Reactor	Plant Scale	Construct	Scale-up
Lab	-	2007	-
Gen 1	Small Pilot	2009	-
Gen 2	Large Pilot	2011	2x
Gen 3	Large Pilot[1]	2012	3x
Gen 4	Commercial[2]	2015E	2.2x

Notes to table:
1. Large Pilot Plant – Large Diameter Reactors
2. Commercial-scale reactor

ABIR Project Results

Site Selection – South Australia

The Project showed that whilst there are sufficient biomass residues available in each state in Australia to support the initial 50,000 ODT commercial-scale module and subsequent expansion, South Australia is the best location for a first plant in terms of available sustainable biomass residues.

Licella's Commercial Director Sami Aoude said that "whilst biomass residues are available in significant quantities across Australia, it is important that these residues come from sustainable sources". The "Green Triangle" in south-eastern South Australia has commercial plantations that could provide sufficient residues for not only the commercial-scale module but also for subsequent commercial-scale plants (+200,000 ODT) that could share centralised infrastructure, including Bio-Crude upgrading facilities.

Cat-HTR Process Flexibility

The Project also demonstrated the flexibility of the Licella process and how this can be used to optimise the economics. Licella's Executive Chairman Dr Len Humphreys said "Licella's Cat-HTR Process is flexible enough to be able to cope with a variety of different wet feedstocks, allowing us to use those with the lowest cost."

"The Cat-HTR also allows us to tilt production towards those products with the highest value, such as renewable chemicals and boutique fuels", Dr Humphreys explained. "Licella's Bio-Crude contains a variety of renewable chemicals, including aromatics such as phenols and catechols, as well as resin acids which are of a lot of interest to the chemicals industry who are seeking renewable alternatives".

Kerosene and Diesel Production

During the study the world renowned ITQ laboratory in Valencia, Spain demonstrated the ability in the upgrading process to easily tilt production yield towards kerosene or diesel. Mr Aoude explained that Licella's "ability to tilt production towards kerosene opens the opportunity for us to produce boutique fuels such as military marine aviation fuels. These fuels have a high flash point requirement and have to be specially manufactured at refineries with associated higher prices."

Image: “Gen 3” Reactors from the Large Pilot Plant located at Somersby on the Central Coast of NSW, Australia

Front End Engineering Design (FEED)

The study also enabled detailed engineering design to be undertaken. The FEED addressed the entire process - receipt and processing of biomass, converting to bio-crude, distillation and despatch of the products as well as treatment of the water stream.

National Implications

Mr Aoude explained “Australia has an annual liquid fuel requirement of around 50 billion litres; one of Licella’s 200,000 ODT plants could produce approximately 45 million litres. With the announcement of closure of 4 of our 7 refineries in the past 2 years we are rapidly moving to a situation where the bulk of our liquid fuel requirements will come from imported finished fuels.”

This has resulted in concerns for Australia’s energy security as highlighted recently by the NRMA. So whilst this is just the beginning, the construction of Licella plants, whilst initially focused on production of renewable chemicals and boutique fuels, could be the start of Australia’s return to liquid fuel independence.

On behalf of IER’s Board. For more information, please contact us.

Kind regards,

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