

## Australian Securities Exchange Announcement

17 October 2017

# Leaf enters \$5 billion Biodegradable packaging market leveraging Glycell™ strategy

- Leaf Resources has licensed a biodegradable barrier coating applicable for paper and cardboard
- The product enhances the economics of our Glycell™ process as it utilizes two of Leaf's core products, lignin and glycerol
- Coating is renewable, biodegradable and recyclable and potentially a solution to the disposable coffee cup problem
- Biodegradable packaging market is \$US5b and growing at 17% CAGR

Leaf Resources (ASX: LER) ("Leaf") has secured a license for an innovative biodegradable coating product for the packaging market. The product is based on lignin and also utilizes glycerol, two of the products that Leaf's Glycell™ process will produce. The technology was licensed from QUT bluebox, the commercial arm of the Queensland University of Technology (QUT) and was developed as a long term QUT project that included Dr. Les Edye, Head of Research and Development while an Adjunct Professor at QUT.

In packaging markets there is a strong and growing consumer preference towards biodegradable materials because of environmental concerns. There has therefore been a concentrated focus in recent years on developing new barrier coating technology that is either renewably sourced, readily recyclable, biodegradable or all three.

Literature and patent searches show that the biodegradable coating technology that Leaf has licensed, is the product closest to entering the market that fulfills these three requirements. Given this coating technique uses natural ingredients and produces a biodegradable product, it is not only suitable for the established corrugated board and mulching markets, but also a potential solution to the disposable coffee cup problem.

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### **Strategically ideal for Leaf Resources**

This biodegradable coating is strategically advantageous for Leaf Resources as:

- It complements and enhances the economics of our Glycell™ process as it utilizes two of Leaf's core products, lignin and glycerol
- With this license, Leaf will reposition lignin from the Glycell™ process as a high value bio-based, renewable lignin barrier coating, instead of burning it as fuel.
- The product will be sold as a coating into the paper market where Leaf has strong industry contacts
- Low cost entry to the market through the terms of the license agreement
- No capital required for initial production as coating can be toll manufactured
- Leaf personnel possess the technical knowledge and skill
- It could deliver short term cash flow to Leaf within the next 12 months
- Pre-market testing already completed by QUT

### **Low cost entry**

Initially Leaf's strategy will be to buy lignin and glycerol and sell the coating product to paper companies to coat paper and cardboard for the various market segments and supply the coating via toll manufacturing. Considerable work has been done on the availability of toll manufacturers in the USA in particular and they are readily available at competitive pricing.

This strategy for both manufacturing and marketing will keep capital requirements and operating costs to a minimum. Contracted sales of product to licensees could provide short-term cash flow to Leaf Resources.

In the medium term, development of the new product provides additional revenue for a commercial Glycell™ plant, providing valuable off take demand for lignin, which in previous modeling was simply burnt for power generation. Hence the development of this product improves the economics of a commercial Glycell™ plant.

### **The Biodegradable packaging market is large and growing.**

The global Biodegradable Packaging Market was \$4.7 billion in 2015, growing at a CAGR of 17.2% and should reach \$14.3 billion by 2022<sup>1</sup>. Leaf's coating strategy will look towards three segments of the market where the biodegradable coating has natural advantages.

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<sup>1</sup> <http://www.prnewswire.com/news-releases/biodegradable-packaging---global-market-outlook-2015-2022-300234619.html>

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- **Corrugated Board market** - The Biodegradable coating was developed to replace the traditional, petroleum based wax coatings and various plastic coatings used to waterproof the paper or cardboard.
- **Mulching Markets:** Testing shows that barrier coating can replace black polyethylene as a mulch with additional benefits that it biodegrades to put beneficial carbon back in the soil.
- **Food & Beverage Packaging** - As a biodegradable, recyclable and renewable sourced natural product it is a potential solution to the 487 billion cups a year disposed of worldwide each year<sup>2</sup> (second largest contributor to waste).

### License details

Leaf has signed an exclusive license contract with QUT bluebox for Malaysia, USA, Canada and Brazil.

### General

#### Leaf Managing Director Ken Richards said:

*"This is a wonderful opportunity for Leaf Resources to grow and to continue working with QUT. We are fortunate to secure an innovative technology that delivers a much-needed product to the market, complements our core strategy so well and can deliver shorter-term cash flows to Leaf Resources."*

#### QUT bluebox CEO Tim McLennan commented:

*"We are pleased to welcome Leaf Resources as a licensee for this tremendously promising product that showcases Queensland innovation. Leaf Resources has very strong contacts in their licensed territories and we look forward to their success in those areas."*

*QUT bluebox are pleased to support outstanding research from QUT, research that is commercially oriented and solves real world problems.*

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<sup>2</sup> <https://www.linkedin.com/pulse/paper-cups-tip-ice-berg-richard-fine/>



**LEAF**  
RESOURCES

SUSTAINABLE PRODUCTS FROM PLANT BIOMASS

### **Malaysian Update**

Leaf continues to progress work on the other elements of the Malaysian project and is making considerable positive progress towards agreements covering the site, biomass, glycerol, government incentives and advantageous, off balance sheet, financing options. Apart from the slower than expected timing the project continues to shape up positively. A full update will be provided at the Annual General Meeting on October 30<sup>th</sup>, 2017.

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### **About Leaf Resources Ltd (ASX: LER)**

Leaf Resources is one of the world's leading companies in converting plant biomass into fermentable sugars. Our proprietary process for converting biomass-to-functional industrial sugars enable a myriad of downstream technologies for the production of renewable chemicals that will substitute petrochemicals used in manufacturing today. With our project development and continued technical innovation we are building a robust global business centered on renewable carbon containing products to deliver environmental and economic benefits to our shareholders and our planet. More on [www.leafresources.com.au](http://www.leafresources.com.au)

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