

## NATURAL RESOURCES LTD

# Plastic-free potential



### Ian Thomas

Managing Director  
Turquoise International

To talk to me about the issues raised in this article, feel free to contact me via email [IRT@Turquoise.eu](mailto:IRT@Turquoise.eu) or call me on 020 7248 7503

The past year has seen a groundswell of concern raised over the presence of plastic pollution in the environment, above all in the oceans. One of the companies in the Low Carbon Innovation Fund's (LCIF) portfolio is developing part of the solution: a process for high volume manufacturing of bottles made from paper pulp.

Through work with Britvic, Natural Resources Ltd has demonstrated that paper bottles have the potential to replace plastic. Originally funded through a significant European grant, the company has subsequently been supported by investment from business angels and, more recently, LCIF. In addition to the issue of plastic waste, Natural Resources Ltd's approach has the potential to lower the carbon intensity of packaging.

Businesses and society are adapting to new ways of manufacturing, consuming and recycling traditional products and their packaging. Natural Resources Ltd has an important contribution to make to this emerging circular economy.





## James Gardiner

Managing Director  
Natural Resources Ltd

**“ More people are talking about plastic in the ocean than ever before and governments are responding with new legislative initiatives designed to encourage alternatives to hard-to-recycle plastic packaging. ”**



*Plastic has become an important part of our everyday lives but, from coffee cups to food packaging, we now have too much plastic waste to ignore.*

**James Gardiner, Managing Director of Natural Resources Ltd, discusses how new technology can allow paper pulp to provide an alternative to plastic in the manufacture of bottles and other packaging. Social concerns and new regulatory drivers, such as the UK's plastic bag tax and bottle deposit return scheme consultation, are helping to promote a more energy-efficient and cost-effective manufacturing process and reduce the amount of plastic waste ending up in the environment.**

An estimated eight million tonnes of waste plastic enters the oceans every year, much of which is consumed by seabirds, fish and other ocean dwellers. For a turtle, it is difficult to tell the difference between a nutritious jellyfish and a harmful plastic bag. Studies have suggested that as much as 155 million tonnes of plastic could enter the oceans by 2025, and that every seabird will have plastic in its stomach by 2050.

As a result of high profile media coverage, such as the award-winning documentary series Blue Planet II, more people are talking about plastic in the ocean than ever before and governments are responding with new legislative initiatives designed to encourage alternatives to hard-to-recycle plastic packaging.

Producing an alternative to plastic is a challenge. Barrier coatings for drinks containers are difficult to replicate in a biodegradable form. Moreover, state-of-the-art processes for manufacturing plastic bottles are quick and low cost, which creates a high bar for alternative materials to reach.



### **Natural Resources Ltd aims to create a new and competitive alternative to single-use plastic containers.**

Our goal is to use a manufacturing process that is both energy-efficient and cost-effective, while producing a product that can be recycled readily but will also biodegrade safely and rapidly at the end of its life. This is particularly important if the material is discarded inappropriately outside a properly managed waste stream. The raw material was originally envisaged to be recycled paper; however, after further research and market feedback, we found that virgin pulp carried less contamination and, therefore, was more readily acceptable for food and beverage packaging.

There are three key aspects to developing commercially-viable containers from paper pulp:

- A manufacturing process that can deliver large volumes of product at a cost competitive with plastics
- A capping solution that effectively seals the container and does not compromise recyclability
- A barrier coating that preserves the contents while allowing for recycling and rapid, environmentally-safe biodegradation.

Natural Resources Ltd is furthest advanced with the development of our container moulding process, which we have been working on since 2012. To minimise production time and cost, we mould containers as a single shape rather than piecing two halves together. Based upon trial runs using our latest production machine, we believe that the Natural Resources Ltd process is capable of being scaled up to meet the requirements of large-scale bottling operations.

### **Proof-of-concept work with Britvic Soft Drinks demonstrated that Natural Resources Ltd's bottles could be finished and decorated to meet the requirements of major brand owners.**

Of course, paper pulp will always have a different look and feel to plastic. This behavioural change is part of the journey for consumers and FMCG companies as the world moves towards sustainable packaging.

We have undertaken development work on both plastic caps and closures moulded from fibre. Both are viable solutions, although there remain technical challenges around moulding fibre-based caps consistently at high volume, which means that using plastic caps may be a more pragmatic approach for initial market entry.

Natural Resources Ltd is currently undertaking an InnovateUK-funded project to identify alternative barrier coatings that can be used for wet and dry goods packaging without compromising recyclability or biodegradability, an area where the market is promoting much innovation. Given the variety of moulded shapes that Natural Resources Ltd can offer, these coatings are applied in solution directly to the bottle, unlike a carton-board container where a pre-extruded film is generally applied to a flat substrate. We are currently testing a waterproof barrier coating that has been demonstrated safe for lobsters to consume in the event that bottles were to enter the ocean - an example of a natural recycling process!

## Market entry



Natural Resources Ltd is keen to tackle dry goods packaging, such as household goods, cosmetics and health supplements, as an initial entry into the market. While we are seeking development partners and/or launch customers in those areas, the larger, wet goods market, such as drinks and lubricants, is a subsequent target. Having said that, we have already undertaken a substantial amount of work on bottles for soft and alcoholic drinks, including with Britvic and another major brand owner in this space.

**We anticipate that the shift away from plastics to alternative materials such as paper pulp will occur most rapidly in market segments where products are less heavily branded (horticulture, for example), or where niche brands offer environmental sustainability as a key element of their brand proposition.**

However, we also see that mainstream consumer goods are going to have to respond with increasing urgency to address the plastic waste issue.

Because such a move will require some significant changes to current production methods, as well as to the appearance of the product packaging, some brand owners may be reluctant to address opportunities quickly. Others will perceive a competitive advantage in moving early to meet the desire of an increasing number of consumers (and, ultimately, regulators) for genuinely sustainable solutions. Natural Resources Ltd is seeking to engage with these industry players to develop packaging that meets their needs.

## Repackaging



**Production of plastics has increased some twenty-fold over the last fifty years, yet today 95% of plastic packaging material value is lost after a short, first-use cycle.**

This cannot be economically, environmentally or ethically sustainable, as consumers, suppliers and governments are starting to recognise. There have been efforts to reduce environmental impact – light-weighting, bioplastics, new recycling processes and development of more sophisticated waste management systems – but there is also a need for single-use packaging to migrate to using new materials.

Fibre-based packaging combined with single layer degradable barrier coatings will offer a properly sustainable alternative to plastics. These products are functionally capable and versatile, compatible with current manufacturing systems and fit readily into existing paper recycling streams. Critically, they have attractive end-of-life characteristics such as rapid and harmless biodegradability if deposited in the environment. Natural Resources Ltd aims to be one of the leaders in this new area of technology.

For more information about Natural Resources Ltd:

visit : [www.sinfiltrate.co.uk](http://www.sinfiltrate.co.uk)  
 email : [info@sinfiltrate.co.uk](mailto:info@sinfiltrate.co.uk)  
 call : **01782 745 043**

Sinfiltrate, Frogmore Paper Mill, Fourdrinier Way, Apsley,  
 Hemel Hempstead, Hertfordshire, HP3 9RY, United Kingdom