This article introduces innovations to package food with a full recovery of all poly-ethylene and aluminum as one of the 100 innovations that shape “The Blue Economy”. This article is part of a broad effort to stimulate entrepreneurship, competitiveness and employment.

The Market
In 2008, global consumption of liquid dairy products reached a record high of 258 billion liters, a growth of 2.2% over the previous year, good for an additional four billion liters of milk. The world market for aseptically packed drinks amounted to 86 billion liters in 187 billion packs. Sales have grown by plus six percent a year since 2003, with Asia achieving the fastest rise with more than 13 percent per year. Milk accounts for more than 45 percent of all aseptically packed products.

Aseptic packaging permits food, drinks and its package to be sterilized separately, subsequently combined and sealed under sterile conditions. This niche application for drinks is a growing market in a broader packaging development that increasingly adopts multilayered materials for cartons, pouches and bottles. By 2013 the world market will reach 113 billion liters using 265 billion packs driven by an 11 percent growth in Asia where consumption is growing faster than anywhere else in the world.

Tetra Pak controls 80 percent of the world market, good for a $10 billion annual turnover, following by SIG, the world's second biggest maker of drink cartons with a 15 percent share of the market, representing $1.5 in sales. Both companies are headquartered in Switzerland. However Tetra Pak is originally from Sweden and SIG is controlled by the Rand Group from New Zealand. The German Bosch group is a strong contender in multilayered packaging market which has penetrated all consumer goods, from drinks, to cosmetics, coffee, tea, snacks and bakery products.

The Innovation
Food companies are looking out for technologies to improve shelf-life and traceability of their products. The demand for longer shelf life combined with improved sustainability pushes the industry to rethink the packaging techniques towards biodegradable films replacing petroleum-derived plastics (poly-ethylene) and thin film aluminum. Food grade quality poly-ethylene (PE) may one day be recycled with a biodegradable polymer, like the ones produced by Novamont (Italy) or Braskem (Brazil).
On the other side of the coin, aseptic packaging and diapers are two major contributors to the growth of solid municipal waste. The market leaders and patent holders of multilayered packaging have the design and engineering capacity to put complex packaging together, no one seems to know how to take them apart. While efforts are made to recover the fibers, consuming large amounts of water, the sandwich of plastics and aluminum, in either sheet or dust form from poses a major challenge. Aluminum represents an unacceptable waste stream that the industry has been incapable of resolving. While this layer of pure non-ferrous is indispensable to provide the barrier for air, the uncontrolled release implies that each year a staggering 380-420,000 tons of aluminum ends up in landfills making them the largest depository of this pure metal (based on an average of 1.5 grams of Al per pack).

Mrs. Gloria Niño López obtained her degree in biology in her home country Colombia and then specialized in food science in Mexico. She studied how lichens penetrate rocks with great ease and called them the miners of the world. Their hyphae are only two cells thick, permitting to penetrate rock at an amazing speed. When aseptic packaging entered the market of Bogotá, she noted in the laboratory’s kitchen how sour milk from opened cartons spilled on a compact disk (CD). She realized that the fermented milk dissolved the aluminium layer on the disk in a matter of minutes, leaving a clean polycarbonate plastic. Closer observations confirmed that even the milk carton would start separating where the pack had been cut open. As a trained micro-biologist she quickly identified the species responsible for the separation process and prepared a cocktail of micro-organisms that are naturally attracted to decomposing drinks or food, which are available anywhere in the world. This offered a standard solution for the separation of the multilayers, an open source technology.

Anders Byström came to comparable conclusions when operating the Bedminster waste recycling plant in Stora Vika, close to Stockholm. After a three days retention in the rotary kiln, aseptic packaging, food wraps, coffee bags and CDs left completely separated aluminum foils and dust. Even as the proof of efficiency was demonstrated in Japan (in cooperation with Tetra Pak Japan), Brazil, Colombia, USA and Sweden, the industry remained reluctant to actively engage in the development of a decentralized process.

**The First Cash Flow**

It was the Mayor of Curitiba, Casio Taniguchi, who decided in 2000 to set up a social enterprise collecting aseptic packaging and separating it into the three major components (paper, PE and Al). Unfortunately, due to the lack of support from the suppliers who refused to even make their industrial waste available for recycling, the project faced an uphill battle. However, the experiences both in Curitiba, Tokyo and Bogotá permitted to finetune the process and prove above all that the biological cocktail could be locally produced. This opens the avenue for decentralized and social projects that relieve waste dumps and incinerators from a major and growing component: multilayered packaging. The Politecnico di Torino, under the leadership of Prof. Luigi Bistagnino elaborated a detailed technical and economic plan that confirmed the business case.
The Opportunity

Aluminum represents only a minute part of aseptic packaging, food wraps, pharmaceutical containers, or CDs and DVDs. The opportunity to set up small operations combined with social benefits - like the payment with bus tickets to marginalized communities as applied in Curitibá, which secure a perfect separation of the packs from the dump - offers a platform for entrepreneurial initiatives where ever there is a landfill. These projects offer the opportunity to generate multiple cash flows, overcoming the traditional problem of the core business. Indeed, if one solely focusses on aseptic packaging the volume may be too low, However if all multilayers are considered then the characteristics of the Blue Economy become evident: go beyond reducing costs, secure the generation of multiple revenues.

First one gets paid to take the waste. Second one gets paid to secure a longer commercial life for the dump, by diverting waste to revenue. Third one sells the three recycled material to manufacturers in sheet or dust form, and thanks to the fact that the ingredients used are of high quality, prices are assured. Fourth, the core ingredient needed to separate aluminum, is produced by the fermenting left-overs delivered with the waste packaging, creating a low cost and self-sustaining input. Finally, this business model offers a window to engage in waste branding, where companies have an interest to make the public aware that the waste they create at the end of life of their package is actually providing new life, and generates jobs, while converting waste into a food. While cities are not known as entrepreneurs, entrepreneurs could contact the city and get a consortium going as now is shaping up in different parts of the world. The Politecnico di Torino is prepared to show the way.

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The Blue Economy

…… Further information on the 100 innovations at www.theblueeconomy.org

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