

# Innovative pyrolysis

for recycling of plastic-containing rejects



# The challenge:

## Full recycling of plastic rejects and laminates

Both consumers and industry worldwide generate ever increasing amounts of waste containing plastic, which is still mostly dumped or burned, instead of being recycled. ANDRITZ has combined its fiber and reject treatment know-how from pulp and paper applications with innovative pyrolysis technology, with the aim of closing the recycling loops.



### Full recycling

Few people around the world will not be familiar with the square beverage cartons that are typically used for juices, milk or other liquids, hundreds of billions of which are disposed of each year.

In a drive to recycle used beverage cartons (UBC), more and more initiatives in recent years have started to collect the empty cartons separately, so that paper mills can recycle their paper layers into new paper products. However, the plastic and aluminum layers in the laminates have so far been useless and could not be recycled.

Alucha, a company specialized in solutions for complex waste streams, has developed an innovative technology that makes it possible to fully recycle such waste as UBC or other waste products that contain plastic.

### Eco-friendly technology

The basic technical principle is a chemical process called pyrolysis, a technology for high-temperature heating of organic material in the absence of oxygen.

When treating UBC, for example, the paper fiber is first separated from the aluminum and polyethylene plastic. This is basically achieved in the pulping section of a recycled fiber line. The paper layer accounts for 75% of a beverage carton. When the remaining 25% of the UBC material is subjected to pyrolysis, this is what happens:

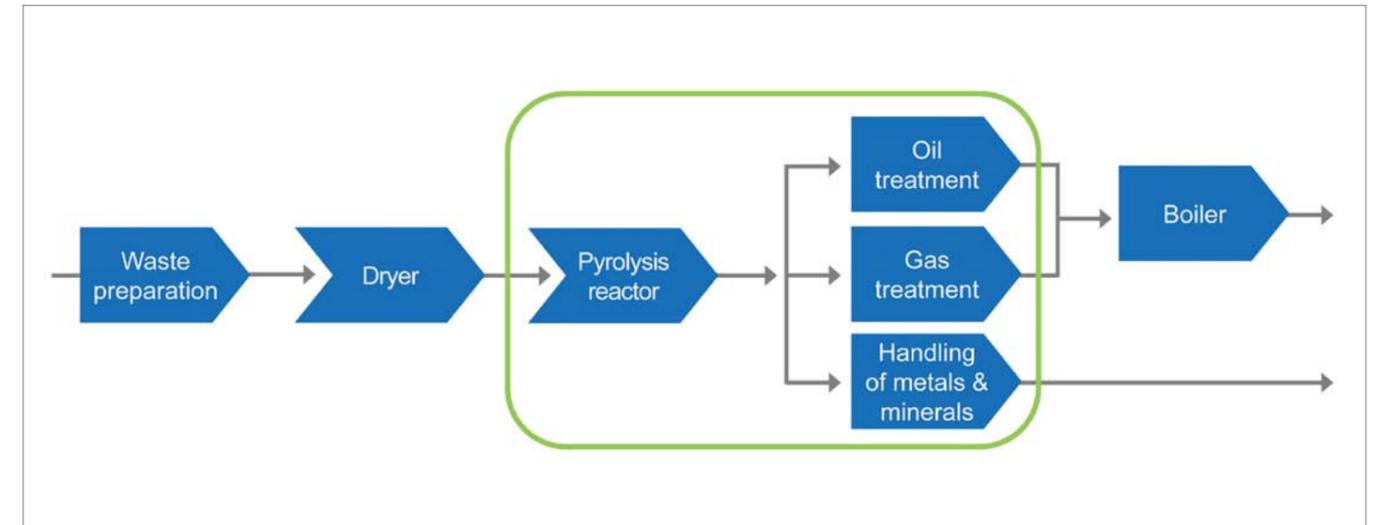
- The plastic turns into a hot gas that is later cooled down, resulting in pyrolysis gas and oil.
- The aluminum, however, can withstand the high temperatures and remains in metal form. The aluminum flakes are then pressed into briquettes, ready for recycling in the metal industry.

The pyrolysis gas and oil obtained are typically used to generate steam for the paper mill, but they can also be used to produce heat, electricity or steam for various other purposes.

With this pyrolysis process, complex waste products can be converted back into resources, thus making substantial contributions towards protecting the environment.

# The solution:

## Innovative pyrolysis technology



### Benefits

- Closing the recycling loops
- Separation of fibers and recovery of precious metals
- Reduction of a mill's operating costs by substitution of pyrolysis products for primary energy
- Substantial contribution towards environmental protection

### Cooperation

ANDRITZ has signed a cooperation agreement with Alucha, one of the leading developers worldwide of innovative pyrolysis processes for industrial applications. The aim is to supply new technologies and equipment for pyrolysis of rejects generated in the processing of used beverage cartons (UBC) or liquid packaging board (LBP), as well as other rejects

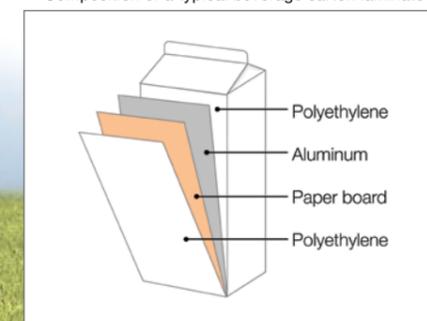
containing plastic occurring in pulp and paper applications. Pyrolysis of the rejects helps reduce operating costs and conserve natural resources.

Based on its extensive know-how in the field of recycled fiber processing and in the rejects treatment sector, ANDRITZ acts as a supplier as well as a sales and license partner under this cooperation agreement.

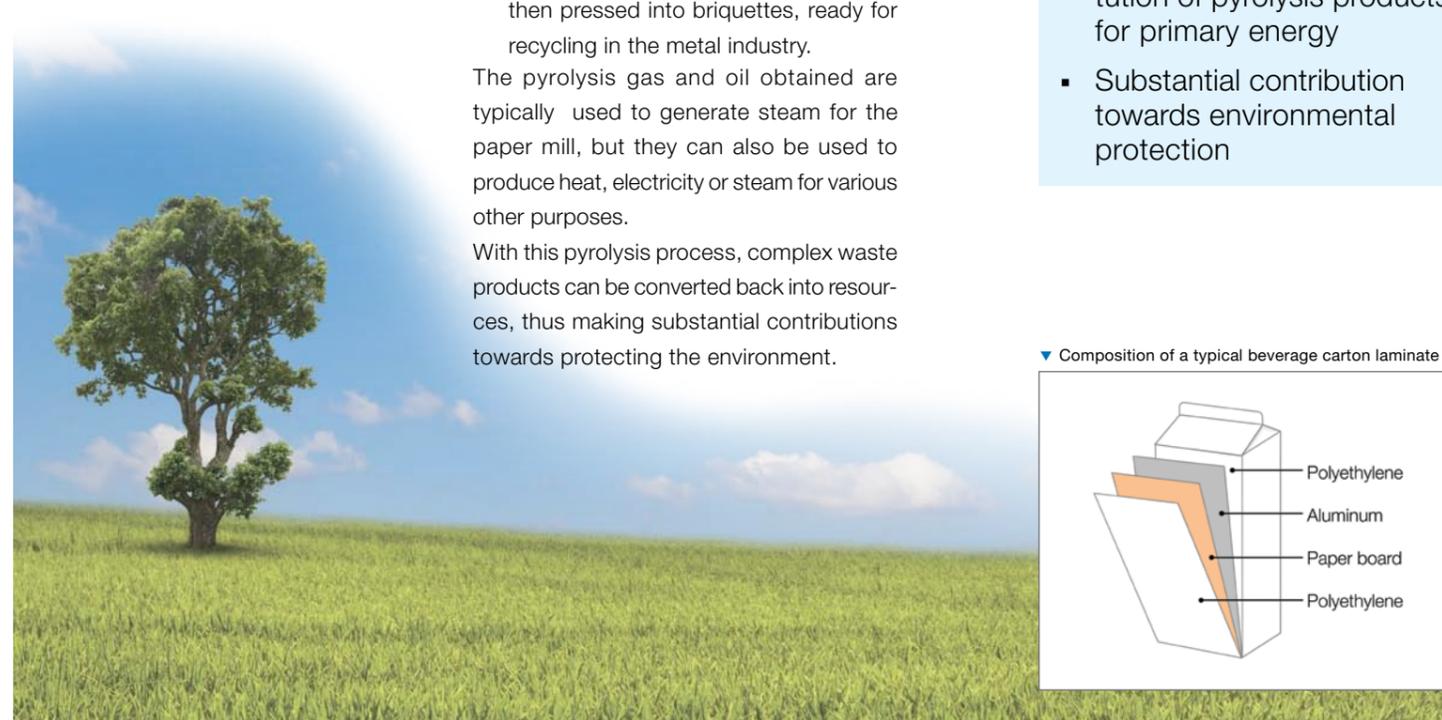
▼ Pyrolysis reactor: plastics are turned into gas, metals are separated.



▼ Composition of a typical beverage carton laminate



▲ Typical input materials: used beverage cartons (being fed into an ANDRITZ FibreFlow drum pulper), mixed plastic rejects from MOW/OCC, paper sludge.



## Innovative pyrolysis of plastic-aluminum rejects

The first facility that can fully recycle used beverage cartons was developed and built in a paper mill in Barcelona, Spain. It was officially opened in 2011 and processes more than 30,000 t/a of beverage cartons (plastic-aluminum laminates). Pyrolysis takes place in one reactor that feeds a condensation system for the generation of pyrolysis gas and oil; a subsequent boiler produces steam for the paper production line.

The system generates a total thermal energy of 7 MW (steam), more than 1,000 t/a of aluminum can be recycled and sold. Thanks to this innovative process, each and every one of the materials in a beverage carton can be recovered – for the benefit of the environment.



**ANDRITZ AG**  
Vienna, Austria  
Phone: +43 50805 0

**ANDRITZ Oy**  
Kotka, Finland  
Phone: +358 (020 450 5555)

**ANDRITZ (China) Ltd.**  
Foshan, Guangdong, China  
Phone: +86 (757) 8202 7602

**ANDRITZ K.K.**  
Tokyo, Japan  
Phone: +81 (3) 3536 9700

**ANDRITZ Ltd.**  
Lachine, QC, Canada  
Phone: +1 (514) 631 7700

**ANDRITZ Brasil Ltda.**  
Curitiba, Brazil  
Phone: +55 (41) 2103 7601

**ANDRITZ AG**  
Stattegger Strasse 18  
8045 Graz, Austria  
Phone: +43 316 6902 0  
pyrolysis.plastics@andritz.com  
www.andritz.com