

Pyrolyx

www.pyrolyx.com

8th Scrap Tire Recycling Conference

December 2019

pyrolyx
sustainable. efficient. progressive.

rCB Sustainability and Impact Investing

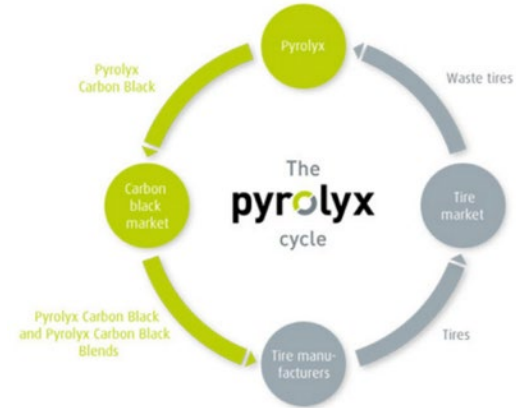
✓	Reduction of CO₂ & other environmental benefits	<ul style="list-style-type: none">▪ Every ton of rCB saves 2.7+ tons of CO₂ compared to production of one ton of Carbon Black▪ Saves consumption of ~2 tons of oil and enables tires to be used as recycled inputs▪ Every plant uses 4 million scrap tires annually, otherwise destined for landfills, TDF, or low value recycling
✓	Regulatory drivers – recycling requirements	<ul style="list-style-type: none">▪ Due to regulatory activity and sustainability efforts, major retailers, auto companies, tire manufacturers and masterbatch producers are increasingly seeking to utilize recycled inputs in their products<ul style="list-style-type: none">➢ In the EU, Directive 2000/53/EC sets a target of recycling 95%¹ of all car components
✓	“Green” marketing	<ul style="list-style-type: none">▪ Environmental concerns are increasingly important to the consumer – rCB is an environmentally sustainable product and can be marketed as such<ul style="list-style-type: none">➢ Major retailers, auto companies and tire manufacturers market to public their sustainability of tire disposal
✓	Cost competitive	<ul style="list-style-type: none">▪ rCB currently priced at a discount to virgin Carbon Black▪ Inputs for rCB (scrap tires) are abundant and, typically, either free or negative cost<ul style="list-style-type: none">➢ Pyrolyx is generally paid to accept scrap tires
✓	High quality product	<ul style="list-style-type: none">▪ rCB produced by Pyrolyx exhibits high quality and consistency▪ In certain applications, Pyrolyx rCB has been shown to have superior qualities to virgin Carbon Black (for example, better heat resistance leading to longer tire life)

Note: 1. By average weight per vehicle and year.

Pyrolyx Company History

- Pyrolyx AG (“**Pyrolyx**”) is a global leader in end-of-life tire to recovered Carbon Black (“**rCB**”) technology
 - Pyrolyx’s patented technology recovers Carbon Black from Scrap Tires
 - Carbon Black is the primary input in the production of new tires and a key input to the rubber and masterbatch (additive for plastic) industries
- Pyrolyx provides a solution to the serious and growing global problem of disposing of scrap tires

Solving the problem of end-of-life tires



2009

2011

2012

2015

2016

2017

2019

Pyrolyx founded in 2009 as one of the industry’s earliest producers of rCB

Pyrolyx establishes pilot commercial scale rCB plant in Drunen, Holland

Carbon Clean Tech (“CCT”) commences operation of commercial rCB plant in Stegelitz, Central Germany

Pyrolyx acquires CCT, merging the industry’s two leading companies to create a global leader in rCB

Pyrolyx enters into a joint venture with US-based Reclaim, Inc. to produce and market rCB in North America

Began construction of facility in Terre Haute, Indiana, USA

Start up of 1st facility in Indiana, USA
 Began construction of 2nd facility in Indiana, USA
 Purchase of ELT supplier
 Signed Supply Agreement with Global Tire Manufacturer

Pyrolyx has emerged as the dominant technology leader in rCB

What is Carbon Black?

Carbon Black is the primary input in the production of new tires and a key input to the rubber and masterbatch (additive for plastic) industries

What is Carbon Black?

- Virtually pure elemental carbon in the form of colloidal particles¹
- Produced by thermal decomposition of gaseous or liquid hydrocarbons under highly controlled conditions
- Used in tires, other rubber and plastic products, printing inks, coatings to provide the colour black and various other applications e.g. batteries

**>36 million tonnes
CO₂ p.a. globally**



What is recovered Carbon Black (rCB)?

- rCB is derived from post-consumer rubber
- Thermal depolymerisation² is used to extract the fillers from the rubber material
- After processing, the resulting rCB can be used to substitute virgin Carbon Black



Note:

1. The primary structure of Carbon Black is formed by several layers. 3-6 of these layers accumulate to solid, spherical colloid particles.
2. Depolymerization is a process in which a high-polymer substance decomposes into smaller fragments by mechanical or thermal action.

Page 4

pyrolyx

sustainable. efficient. progressive.

Markets for Carbon Black



Plastic Master Batch



Mechanical Rubber



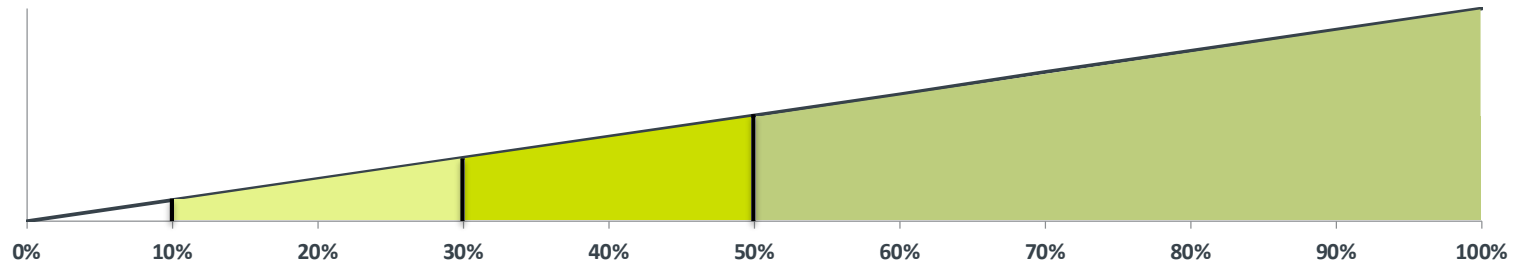
Automotive Rubber



Tires

Substitution of rCB by Application

rCB can substitute for virgin Carbon Black at rates from 10% up to 100%



10% - 30% rCB

- Passenger car/light truck tire tread
- Heavy duty conveyor belts (mining, etc.)
- High pressure hoses
- Transmission belts

30% - 50% rCB

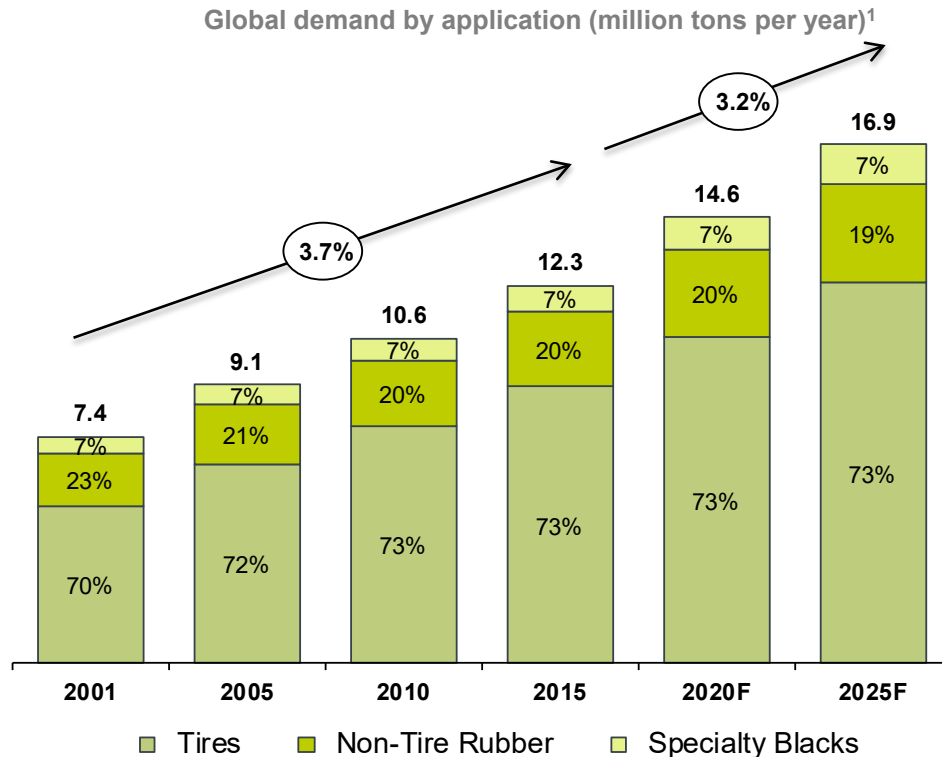
- Passenger car/light truck tire sidewall
- Passenger car/light truck tire undertread
- Passenger car/light truck body and belt plies
- Industrial/agricultural tire tread and carcass
- Light/moderate duty conveyor belts
- Rubber sheeting/geomembranes
- Wire/cable jacketing
- Gaskets & seals
- Rubber roofing

50% - 100% rCB

- Passenger car/light truck tire innerliner
- Passenger car/light truck tire bead/apex
- Plastic masterbatch (for general plastic compounds)
- Polyolefin films (trash bags, agricultural film)
- Plastic pipe
- Newspaper inks

Carbon Black and rCB Market & Demand

The global market for Carbon Black is extensive and forecast to continue expanding

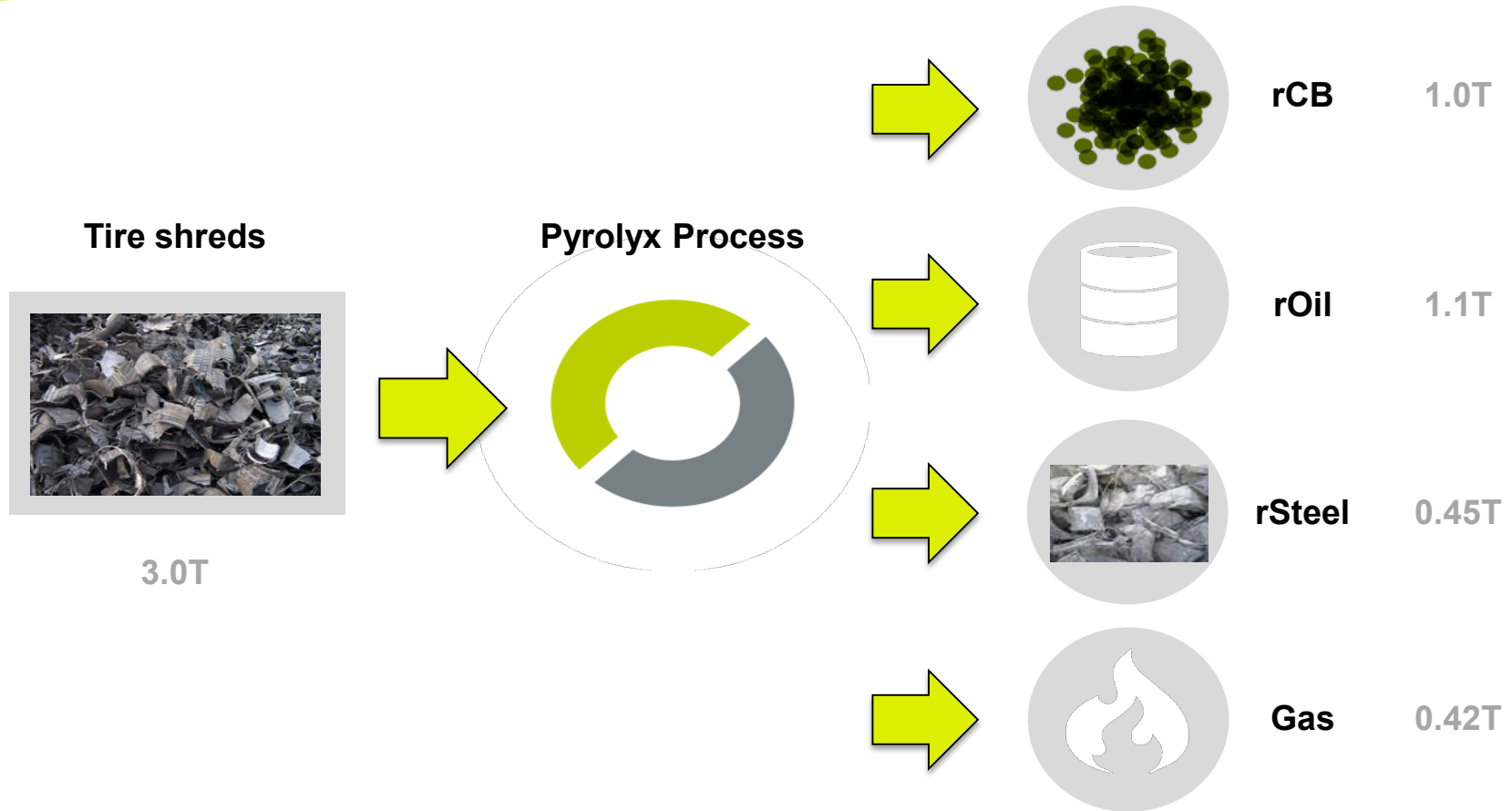


Trends / drivers of global Carbon Black industry

- Macro-economic trends¹
 - Large (12 million tons per year)
 - Growing (>3% per year)
 - Consolidated (top 5 suppliers >45% market share)
 - Upcoming supply shortage in some regions
- Sustainability / environment
 - Increasing environmental regulation increasing the cost of virgin Carbon Black
 - 3 tons CO₂ emissions per tons Carbon Black produced² ie >36 million tons CO₂ globally for the industry

Note: 1. Notch Consulting World Book 2016, Notch Consulting, Jan 2017.
2. Eco Test report: CO₂ footprint of the Pyrolyx process.

The Pyrolyx process



Terre Haute Plant #1 Exterior



Terre Haute Plant #1 Interior





Thank you