

### Dutch Rubber Recycling: innovative with rubber.

#### Objective

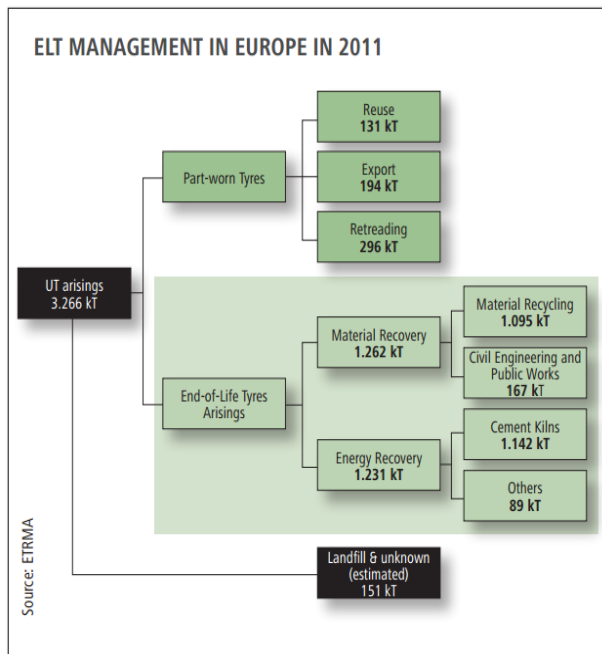
Contributes to solve one of the worlds biggest hidden waste problem: **waste tires**. Rubber is still a difficult product to recycle or to transfer in to raw materials for the rubber industry to make new rubber products. This is our ultimate goal **from recycling to reuse**, via a energy neutral, reproducible modular process. This approach fits with the solutions in behave of the circular economy. Due to re-use, less virgin rubber raw materials (likes rubber and carbon) are needed to extract from our planet.

#### The market

Europe has approx. 740 million inhabitants who drive 274 million cars and 4.6 million light trucks. The replacement market of waste tires is approx. 262 million tires per year.

The production of used tires is steady growing every year. Some numbers of used tire production for Europe:

- ± **3.5 million tons** of waste tires are produced every year
  - ± **1.1 million tons** are burned, to be used as fuel for the cement industry. The new regulations in Europe will not allow that anymore.
  - ± **1.1 million tons** are recycled, which mainly means the milling to granulate. This market is overloaded, therefore, the prices decrease.
  - ± **151.000 tons** are dumped on dumpsites or disappear.
- At this moment, there are still less used tires recycled, than new tires are produced.

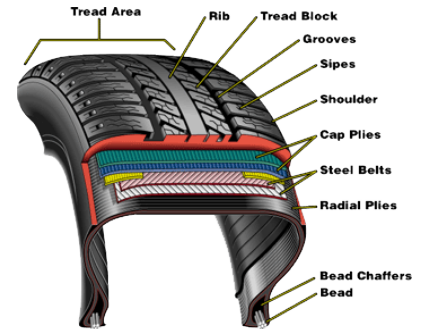


ELT = End of Life Tires  
UT = Used Tires

#### The solution

Our technology transfers the rubber of used tires into raw materials for the rubber industry. Therefore, for the rubber market the circular economy is a fact, and the rubber loop is

closed. This high-end final product, demands a 3 step approach of modular cascaded processing steps



**Step 1** is the pre-treatment. The tires are selected and chipped to 15 cm pieces, to get it ready for the next step. This treatment does not produce the common rubber granulate as used for artificial turf, pressed products like seats, poles or mats or in asphalt.

**Step 2** is a high-quality process called **Carbonisation**, with a higher efficiency, lower investment, a 10% higher yield of Carbon and a surplus of energy compared to Pyrolysis. This process disintegrates the rubber into Carbon, Oil and gas at a working temperature of ± 500 °C, in a oxygen free environment. The quality of the produced Carbon determines the degree of re-uses in the following process step. In a standard unit, some 12.000 ton's of car tires are processed.

**Step 3** is reworking the carbon and oil of step 2, to produce master batches and/or compound. These are common materials in the rubber industry. The material has unique properties and we can produce a product which is made for 100% out of recycled material. This can be used as raw material in the rubber industry to make rubber articles via vulcanisation. It can be used as a virgin rubber mixture. Due to this fact there will be less demands for virgin rubber and virgin carbon. This in a market under pressure with increasing raw material prices. The steel form the waste tires is processed at high temperatures to obtain a 100% clean steel, a high quality product for the steel industry. This innovative solution is developed in cooperation with one of the leading rubber laboratories in the world, ERT BV, in Deventer, The Netherlands.

#### The chain of solutions

For the demonstration plant, planned in Deventer, The Netherlands, ± 12.000 ton/year of shredded tires are delivered from Germany, this is 4% of all used tires in Germany. The "Deventer plant" processes the shreds into 4800 tons Carbon, 4080 tons oil, 1800 tons steel and electricity and warmth. The process steps 2 and 3 are performed in Deventer (The Netherlands), close to the rubber laboratory, important for testing, analysing and market approach. There is a contract signed with the rubber laboratory for this unique cooperation. On this rented location there is more than enough space for storage and processing step 2 and 3. The delivery of the final product is to a large Dutch company<sup>1</sup>. The produced energy is partly internally used and delivered to a joint energy net of neighbouring companies in the same industrial area.

<sup>1</sup> Names of these companies are made known after signing the NDA.

*Disclaimer: This document has been prepared solely for the purpose of assisting interested parties in deciding whether to proceed with their own independent, in-depth investigation and analysis of the company and does not purport to contain all the information that may or should be required to evaluate the proposed investment.*

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**A1**  
**BEDRIJVENPARK**  
**DEVENTER**  
*SMART choice.*

Cofely develops a sustainable industrial area A1 in Deventer, containing a joint energy and warmth network. Cofely has stated to be interested in our surplus of energy. Contract with cooperation partners are signed.

### Competitive advantage/uniqueness

Besides incineration in the cement industry, is milling to granulate, the most common technique used for processing waste tires. This however, results in a low-quality mass product. Competitors claim to revert to diesel and carbon black for tires. When technically feasible, it is either economical not viable or the market does not desire the product. Moreover, many competitors start projects because they have a technology. We don't have our own technology, but the concept. Therefore, we can use the best available technique(s)

### Vidras B.V.

The concept for Dutch Rubber Recycling is developed by the Vidras CTO, Mr. D.Broekhuis. Focussing on the best available innovative, but proven processes in technique and economy, keeps Vidras always on the forefront of developments in rubber recycling. Mr. Broekhuis has worked for more than 25 years in research of rubber processing and solids handling and has more than 7 years experience in waste tire recycling.

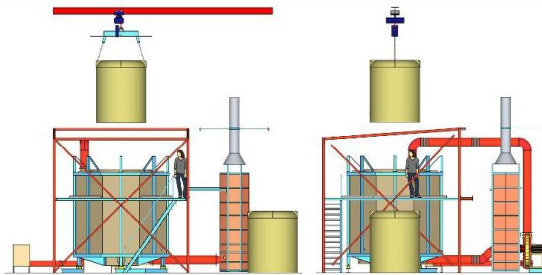


Figure: Schematic drawing of the Innovative Carbonisation process.

De Concept® is unique because it is always focuses primarily on producing high value raw materials for the rubber industry The plant concept is modular, so it can be easily unrolled worldwide. Discussion are already started with companies in the U.S.A., South America and Africa.

### The company

The company Dutch Rubber Recycling, to be erected by Vidras B.V., is a network of cooperation partners, each superb in their own field of technology. Experience in erecting new technology plants and specific waste tire knowledge is a result of working in a project from 2005 – 2012 with the end result, a 9000 ton/y waste tire recycling plant on Cyprus. This knowledge is the basis and further developed to this new solution (lower investment vs. higher output). The company will be operated by people with multi years experience in the rubber and chemical industry. A cooperative partnership with the rubber laboratory ERT in Deventer is the guarantee for producing the highest quality

products and a up to date knowledge of the market. The technology is provided by an experienced technology supplier.

### Business Case

The proposed plant in Deventer needs an investment of ± € 7.5 million, and after the research period, the realisation time is approx. 6 months. A location in Deventer is already selected. The 3 step process plant and the unique NFAR final product results in the following numbers over 3 years.

Investment option	
Object	Co investment in a rubber recycling plant with the latest technology
Sector	Waste recycling. Upcycling
Licenses	All permits are foreseen
Feasibility study	Performed on basis of long term experience
Organisation	Dutch rubber Recycling (DRR) is the company to invest in
IP rights	IP licenses are own by DRR
Total finance required	€ 5.6 mill. investment and €1.9 mill. working capital
Additional finance required	Approx. € 3 mill. including share in working capital, for 40% of shares
Co-investing	Commitment of Energie Fonds Overijssel and Cofely
Input	12.000 ton used tires from Germany
Production	10.000 ton NFAR for the rubber industry
Impact	..... Paid jobs

Financial forecast			
(EUR 1.000)	2015, 1 <sup>st</sup> year production	2016	2017
Turn over	6.930	7.069	7.210
EBITDA	2.607	4.019	2.975
EBT	500	1.927	2.866
ROI	5%	19%	29%

Business plan with 10 year financial prospective available.

### Co-investment

For the Deventer plant is, on basis of the possible energy savings a participation request filed at: het Energiefonds Overijssel. Who stated in discussions the willingness of participation in loan and equity). This participation is maximum 60% of the investment. The guarantee for sales of surplus energy and warmth to Cofely for the industrial area can result in a financial contribution. Therefore, the remaining financial requirement is ± € 3 million.

The investment option offers different ways of participation and involvement.

### Risk Management

Competition: long term delivery and sales contract are foreseen.  
People: Management organised in consultation with investors  
Safety: Safety plan is coordinated with local government.  
Adequate instruction and training of employees.

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### More info at Vidras Group

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