

BlackCycle Project : recycling end-of-life tires into new tires

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The BlackCycle project, coordinated by Michelin, the world's leading tire manufacturer, aims to establish a comprehensive and massive circular economy for used tires by designing one of the first ever manufacturing chains for making new tires from used tires. The project brings together seven industrial partners, five research and technology organisations (RTOs) and an innovation cluster in a European consortium across five countries.

Starting date of the project	May 2020		
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	The consortium is based in five European countries: France, Germany, Greece, Spain and Switzerland.		
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	The ambition of the BlackCycle project, expressed at the time of its launch, is to reduce the carbon footprint of the manufacturing of new tires. Indeed, the initial prognosis of the project is to allow a reduction of CO ₂ per unit mass of substituted material equal to 1 kg CO ₂ /kg.		
Detailed project description	<p>The BlackCycle project involves 13 organisations in a unique European public-private partnership that will demonstrate the technical, environmental, and economic viability of these circular processes.</p> <p>The consortium will develop specific solutions to produce sustainable tire feedstocks: collection of end-of-life tires and selection of the feedstock, optimisation of pyrolysis, refining and recovery of the oil, optimisation of the kiln processes and performance evaluation of the sustainable tires created.</p> <p>The project's medium-term goal is to ensure that nearly one out of two end-of-life tires in Europe will be incorporated into this virtuous circle. BlackCycle will build a circular economy for the tire industry on a European scale.</p> <p>Background : Every year, 1.6 billion new tires are sold worldwide, representing over 26 million tonnes. The same amount enters the end-of-life tire category each year, offering a great potential for material recovery, which is only partially exploited. The current processes for treating end-of-life tires produce only a limited amount of raw material that can be reused in the tire industry. Furthermore, in the absence of sufficient solutions for recovering the material from end-of-life tires in Europe, more than half of these are exported to other countries.</p>		
Main project's drivers for reducing the greenhouse gas emissions	Reduction levers	Details on the aspects of the project	
	<input type="checkbox"/> Energy and resource efficiency (including behaviour)		
	<input type="checkbox"/> Energy Decarbonisation		
	<input type="checkbox"/> Energy efficiency improvements		
	<input checked="" type="checkbox"/> Improving efficiency in non-energy resources	Creating a closed-loop circular economy model for the manufacturing of passenger and truck tires	
	<input type="checkbox"/> Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)		
	<input type="checkbox"/> Financing low-carbon producers or disinvestment from carbon assets		
Emission scope(s) on which the project has a significant impact and quantification of GHG	<input type="checkbox"/> Reduction of other greenhouse gases emission		
		Aspects of the project contributing to the reduction	Quantification of associated GHG emissions by emission category

emission reductions per emission scope		of emissions by emission category	Please follow the quantification methodology used in the Afep guidelines .
	Reduction of the company's carbon dependency		
	Scope 1 <i>Direct emissions generated by the company's activity.</i>		
	Scope 2 <i>Indirect emissions associated with the company's electricity and heat consumption.</i>		
	Scope 3 <i>Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.</i>	Raw materials with a lower CO ₂ emission factor	At its start in 2020, the project has estimated the CO ₂ gain generated by its innovations after deployment: France: *Initial emissions: 161,000 T CO ₂ /y *Final emissions: 112,000 T CO ₂ /y *CO ₂ savings: 49,000 T CO ₂ for an annual production of 195,000 T of tires During the course of the project, this initial estimate will be reviewed.
	Increase of carbon sinks		
	Emissions Absorption <i>Carbon sinks creation, (BECCS, CCU/S, ...)</i>		
	GHG emissions avoided by the company at third parties		
	Avoided Emissions <i>Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.</i>		
	Clarification on the calculation or other remarks: Annual production of Michelin tires in France taken into account is 195,000T/year. The production of 1T of carbon black for a tire via the traditional approach leads to the emission of 3.3 tCO ₂ , mainly due to the fossil fuel supply of the materials involved. The production of 1T of tire raw material from the new recycling channel leads to the emission of 2.3 tCO ₂ . The raw materials involved represent approximately 25% of a tire. For the given production volume, the gain could reach 49,000 tCO ₂ /year. During the course of the project, this initial estimate will be reviewed.		
Modality of verification of the quantification.	Calculation standard used (ADEME base, GHG protocol, etc.): Internal Consortium calculation at the inception phase, then ILCD Handbook and ISO140-14044 method during the project Verification of the calculation (internal or external): Verification by an internal partner of the Consortium: Quantis		
Other environmental and social benefits of the project	By offering an economically and environmentally viable alternative, BlackCycle will reduce the export of end-of-life tires. The relocation of scrap tire management and processing within the EU should lead to the creation of sustainable jobs in Europe.		
Project maturity level	<input checked="" type="checkbox"/> Prototype laboratory test (TRL 7) <input type="checkbox"/> Real life testing (TRL 7-8) <input type="checkbox"/> Pre-commercial prototype (TRL 9) <input type="checkbox"/> Small-scale implementation <input type="checkbox"/> Medium to large scale implementation Remarks: click here to enter the level of maturity of the project		
Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential	The technology solutions defined by the BlackCycle project are applicable worldwide with the same potential for climate impact.		
Amount of investment made (in €)	Research project worth €16M		
Economic profitability of the project (ROI)	<input type="checkbox"/> ST (0-3 years) <input type="checkbox"/> MT (4-10 years) <input checked="" type="checkbox"/> LT (> 10 years)		

	<p>Remarks: Profitability will be calculated on the industrial projects that will follow the BlackCycle Research project</p>
Engaged partnerships	<p>13 organisations involved in a European public-private partnership Seven industrial partners, 5 RTOs and one innovation cluster.</p>
Open comments from the project owner	/
Pour en savoir plus sur le projet	
Contact the company carrying the project	<p>Contact : Estelle PANIER – estelle.panier@michelin.com</p>
Project URL links	<p>https://blackcycle-project.eu/ https://cordis.europa.eu/project/id/869625</p>
Illustrations of the project	

