



Progetto cofinanziato dall'Unione
Europea nell'ambito del
programma LIFE+
LIFE10ENV/IT/000390



TYREC4LIFE: New market demand for tyres from End of Life Vehicles

Final conference of the European project TyRec4Life

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Turin, 18 September 2015

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Con il contributo di:





www.tyrec4life.eu

**DEVELOPMENT AND IMPLEMENTATION OF INNOVATIVE AND
SUSTAINABLE TECHNOLOGIES FOR THE USE OF SCRAP TYRE
RUBBER IN ROAD PAVEMENT
LIFE10 ENV IT 000390 « TyRec4Life »**

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European Directive 2000/53/EC on End of Life Vehicles

ECONOMIC OPERATORS goals

01/01/2006

Recovery of ELVs: 85% by weight
Reuse/Recycling of ELVs: 80% by weight

01/01/2015

Recovery of ELVs: 95% by weight
Reuse/Recycling of ELVs: 85% by weight

2006

2007

...

2014

2015

2016

2017

2018

2019

...

CARMAKER BONDS

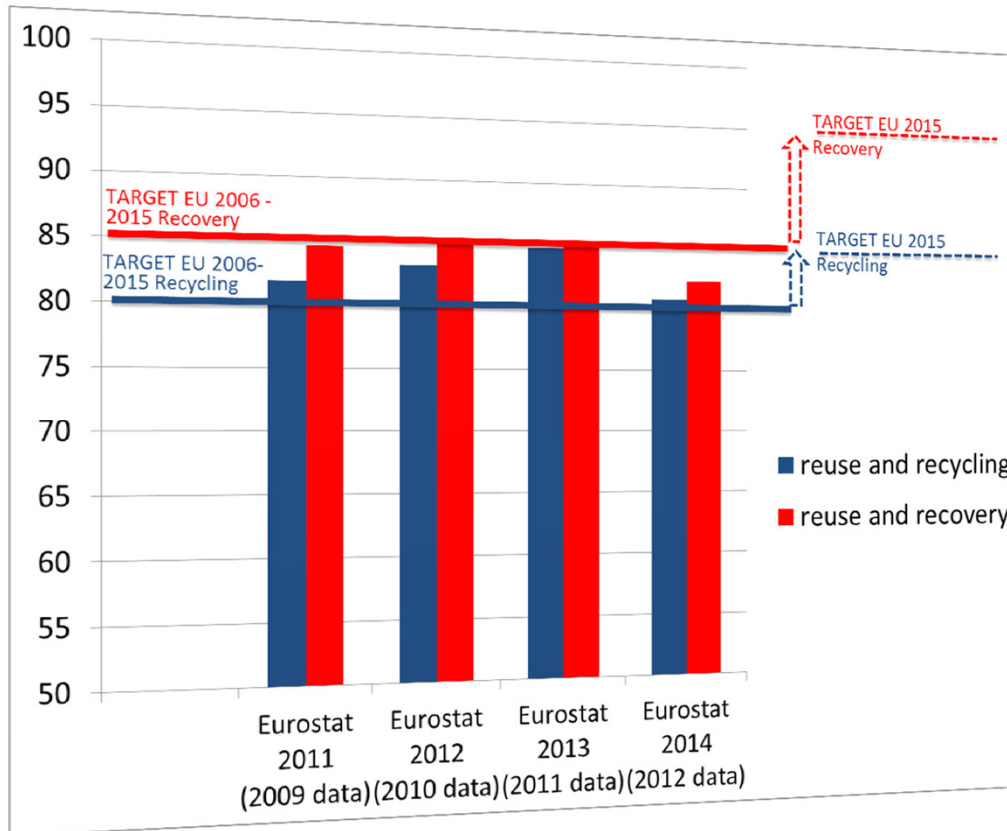
- Free takeback for the last owner for the whole fleet
- Heavy metals ban (Cd, Cr6, Hg, Pb)
- Vehicles dismantling information: IDIS manuals for each vehicle
- Homologation bond: vehicle recoverability to 95% by weight (of which 10% maximum energy recovery)



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Italian ELV quotas

EUROPE

- Vehicles: **260 million** of vehicles (M1/N1)

ITALY

- Vehicles: **40 million** of vehicles (M1/N1)
- Dismantlers on the territory: about 1.800

FCA is dealing of the ELV management:

- to improve the quality of the ELV chain
- to find out solutions to achieve the European targets
- to hinder the export of ELVs
- ..



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Main FCA activities to achieve the European targets

REUSE

The current **network** consists of 300 dismantling companies working on the following Brands:



The network has been built through specific contracts with each company.

RECYCLING



bumpers



windows



tyres



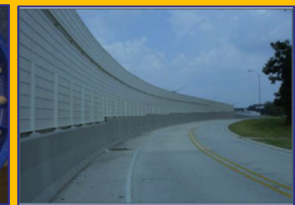
RECOVERY (material and energy)



post-shredding and energy recovery plants



lightweight concrete





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CAR-MAKERS

DEALERS

DISMANTLERS

CRUSHERS

SHREDDERS



Directive 2000/53/EC

European ELV targets (2015):

- REUSE AND RECYCLING **85%** by weight
- REUSE AND RECOVERY **95%** by weight



FCA is interested in developing new **market demands** for materials recycled from ELT

TyRec4Life project





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Goal of the TyRec4Life project

Development and implementation of innovative technologies allowing to **increase the use of powder coming from End of Life Tyres (ELTs) for rubber asphalts** which improve so the properties and performances of asphalts themselves in terms of:

- Safety
- Comfort
- Resistance
- Environmental impact
- Noise



FCA/CRF involvement

Development of an important **market demand** (rubber asphalts) for the powder from end of life tyres boosting so the sustainable use of natural resources considering a life-cycle thinking, including the environmental, economic and social aspects.

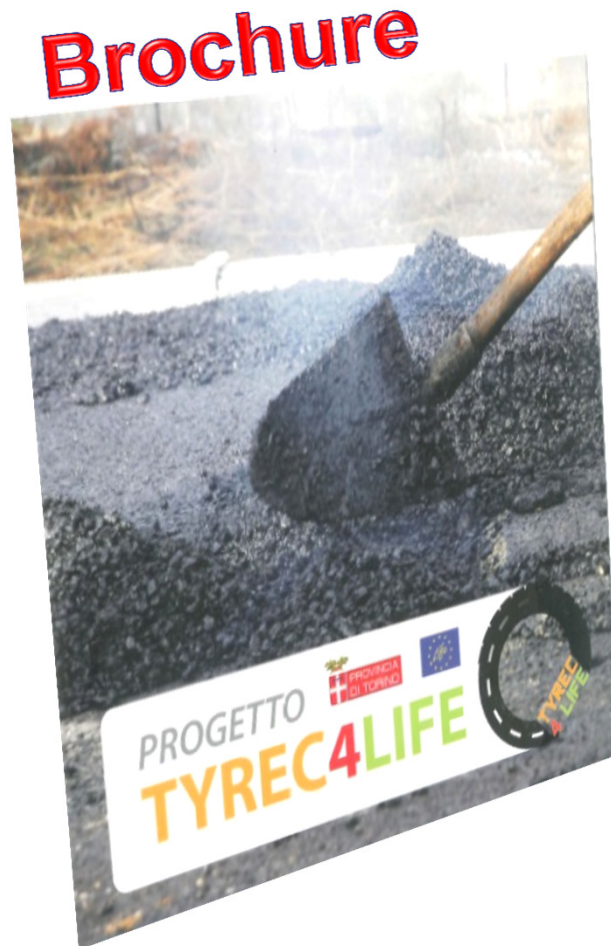


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CRF has checked through Life Cycle Assessment studies the **environmental advantages** of the use of scrap tyre rubber in road pavement



2.1 EVALUATION CURRENT STATUS OF THE RECYCLING/ENERGY RECOVERY OF ELT

2.2 LCA OF RECYCLING TECHNOLOGIES OF RUBBER POWDER AND GRANULES FROM ELT COMPARED WITH LANDFILL DISPOSAL AND ENERGY RECOVERY

2.3 ENVIRONMENTAL EVALUATION (LCA) OF INNOVATIVE ASPHALTS WITH RECYCLED POWDER COMPARED TO THE TRADITIONAL ASPHALTS

PROGETTO TYREC4LIFE

Goal: environmental impact assessment of innovative bituminous conglomerate with rubber powder recycled from ELTs in comparison with the standard one.

Functional Unit: quantity of bituminous conglomerate to pave the wearing course of a road long 1 km, wide 5 m and with a variable thickness on the basis of the technology.

Technology	Thickness [cm]	Volume [m ³]	Aggregates [kg]	Rubber powder [kg]	Bitumen [kg]
STD	4	200	445455	0	25840
WET	4	200	437107	4371	26049
WET (open-graded)	3,3	165	333313	4750	20913
WET (gap-graded)	3,9	195	366938	5838	25725

The LCA study evaluates the environmental impact categories with the CML2001 method. Focusing the attention on the Global Warming Potential (GWP), the DRY and WET (open-graded) solutions show results comparable with the standard one, while the WET (gap-graded) improves the GWP of about 12.41%.

LCA

GWP (kg CO₂ eq.)

- STD
- DRY
- WET (open-graded)
- WET (gap-graded)

Legend: Natural gas, Diesel, Electricity, Aggregates, Bitumen, Rubber Powder

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PROGETTO TYREC4LIFE

recycling solutions in LT landfill

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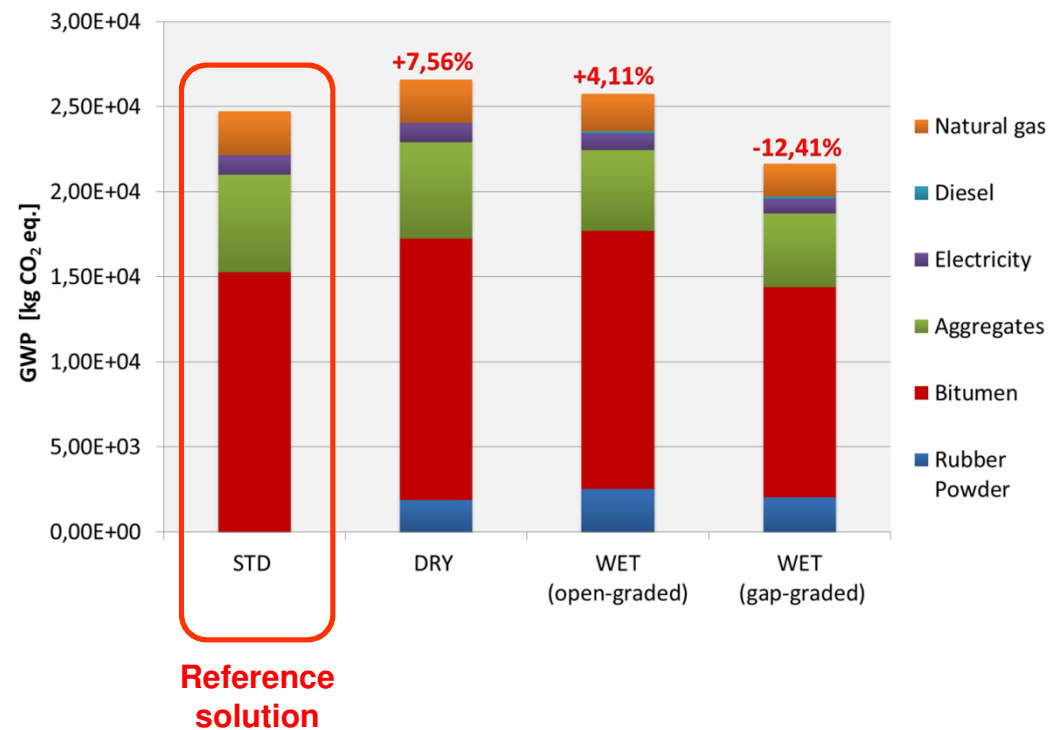
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Main results

- ❑ The main environmental indicator, Global Warming Potential (GWP), shows results slightly higher, but comparable, for the dry (+7,56%) and open-graded wet (+4,11%) technologies in respect to the standard solutions;
- ❑ the gap-graded wet technology, which allows to reduce the thickness and so material quantity, shows an improvement of 12,41%. Comparing materials, bitumen is the main contribution affecting the GWP;
- ❑ since the asphalt rubber solutions assure a major durability, it would expected further improvements in terms of environmental impacts if the analysis included the ordinary maintenance of the road as well.



The use of scrap tyre rubber in road pavement is the **most sustainable solution from the technical, environmental and economic point of view**



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Communication: FCA website on CAR RECYCLING

A specific FCA website on CAR RECYCLING has become a real reference point for the industry and different operators involved in the recycling sector.

www.carecycling.fiat.com

FCA
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carecycling

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Area Riservata

NEWS :

AZIE CON CLIC RICE NOR ARE

Demolizione Concessionarie Clienti Finali Ricerca Normative Worldwide

Benvenuti nel sito di Fiat Chrysler Automobiles dedicato al riciclaggio dei veicoli a fine vita.

L'impegno di Fiat Chrysler Automobiles sul tema del veicolo fine vita, che impatta a livello ambientale come rifiuto solido, si concretizza da anni in una serie di attività riguardanti sia la progettazione, mirata a favorire al massimo il riciclaggio dei materiali, sia la gestione del rifiuto solido stesso.



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Communication: <http://2014sustainabilityreport.fcagroup.com>



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2014 SUSTAINABILITY REPORT

FCA continues to participate in the **TyRec4Life project**, funded under the European Union's LIFE+ project. The aim of this project is to develop innovative technologies to incentivize the use of rubber from end-of-life tires in road paving and improve the characteristics and performance of asphalt in terms of safety, comfort, resistance, environmental impact and noise. Life Cycle Risk Assessment (LCRA) and Life Cycle Assessment (LCA) studies have been conducted to evaluate safety and sustainability of the product and process, as well as ensure security and eco-sustainability.



FIAT CHRYSLER AUTOMOBILES





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Communication of activities and results in the tyres end of life management

- ❑ The activity of tires end of life is regulated by the Ministerial Decree n. 82/2011, published in the Official Gazette on 8 June 2011

- ❑ The management of ELTs belongs to the responsibility of a dedicated Committee under the coordination of ACI. FCA actively participates in this Committee. <http://www.pneumaticifuoriuso.it/>

- ❑ March 25th: Presentation of the 1st activity report by the Committee for the ELT management with the attendance of the Italian Environmental Ministry
 - TyRec4Life project was cited as an excellent example of ELT management
 - [Video](#) to explain ELT management network



GAZZETTA UFFICIALE DELLA REPUBBLICA ITALIANA

MINISTERO DELL'AMBIENTE E DELLA
TUTELA DEL TERRITORIO E DEL MARE

DECRETO 11 aprile 2011, n. 82.

Regolamento per la gestione degli pneumatici fuori uso (PFU), ai sensi dell'articolo 228 del decreto legislativo 3 aprile 2006, n. 152 e successive modificazioni e integrazioni, recante disposizioni in materia ambientale.



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Conclusions and next steps

- Tyrec4LIFE was a remarkable example of Team working between Institutions, University, SME and big company;
- the asphalt rubber is a sustainable solution from the technical, environmental and economic point of view;
- The results are available for others institutions in order to boost the use of asphalt rubber in several application reducing so the waste production and increasing the recycling of tyres.