

# LCA STUDY DEMONSTRATES POSITIVE CLIMATE AND ENVIRONMENTAL BENEFITS OF THE RECYCLING OF END-OF-LIFE TYRES FOR ARTIFICIAL TURF PITCHES

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## IF NOT RECYCLED, END-OF-LIFE TYRES POSE A SUBSTANTIAL CLIMATE AND ENVIRONMENTAL PROBLEM

- Each year and all over the world, the total amount of driving in motorised vehicles increases. Tyres are an essential element for the safety and mobility of cars. Considering the variety of materials used for the manufacture of tyres, proper treatment or disposal is all-important for the sound management of end-of-life (ELT) tyres.
- Globally, there are today three main ELT management routes, ranging from the lowest ranking on the waste hierarchy and upwards: landfill at waste deposits, incineration in e.g. cement works or material recycling into steel and rubber; – the latter e.g. to be used for artificial turf pitches.
- Landfill disposal is prohibited in the EU – yet still very common elsewhere on the planet. Where tyre piles constitute a fire hazard – and cause health problems, as puddles in these large tyre piles are perfect breeding grounds for malaria mosquitoes. Moreover, all the valuable raw materials of these tyres are simply wasted instead of being recycled.
- In the EU, incineration in cement works is one of the two major channels for the disposal of end-of-life tyres. More than 1 million tonnes of tyres (approx. 40% of ELT annually produced) are incinerated in the EU each year. The advantage is that the calorific value of these tyres is utilised in replacement of other fuels; but at the same time, raw materials are destructed, resulting in increased greenhouse gas emission as well as increased import of virgin rubber for the manufacture of new rubber products.
- The most efficient, climate and environmentally friendly route for the sound management of ELT, is recycling through mechanical processing to recover rubber, steel and textile.

## THE APPLICATION OF RUBBER GRANULATE IN ARTIFICIAL TURF PITCHES

- The main market for the application of rubber granulate from end-of-life tyres (ELT) is the use as infill material in artificial turf pitches – a technology thoroughly tested over the past 20 years and used at the large majority (approx. 75-80%) of European artificial turf pitches.
- It is estimated that approx. 1.7 million tonnes of ELT infill are currently laid out at more than 17,000 existing pitches in the EU.
- Basis and reason for this success are the properties of the rubber granules, ensuring perfect resistance and shock-absorption. The tyre industry has spent decades developing a durable and elastic material, and the ball thus rolls and bounces naturally.
- Approx. 300.000 tonnes of ELT infill are used in the EU each year. The lifetime of a pitch with ELT infill is estimated to be min. 10 years.
- When mechanically recycled, a tyre is processed into approx. 75% rubber, 15% steel and 10% textile. For an output of 300,000 tonnes of ELT infill, 400,000 tonnes of tyres must thus be processed. With an average weight of 10 kg/tyre on an intake mix of all types of tyres (passenger car tyres, lorry/truck tyres etc.), this thus corresponds to a total of approx. 40 million end-of-life tyres in the EU being recycled into infill for artificial turf.

## CLIMATE AND ENVIRONMENTAL BENEFITS OF MECHANICAL TYRE RECYCLING AS OPPOSED TO CO-INCINERATION

- In the EU, policy-makers may in fact only choose between recycling or incineration. Tyres which cannot be processed for recycling purposes, will instead be burnt. Currently, more than 1 million tonnes of tyres are incinerated in the EU each year.
- The tool most often used by decision-makers when assessing and comparing climate and environmental alternatives, is called LCA (Life Cycle Assessment).
- The most recent report<sup>1</sup> scientifically weighing the pros and cons of tyre recycling and incineration respectively, is from May 2020 and was prepared by the internationally well reputed institutes FORCE (Denmark) and IFEU (Germany).
- The report has subsequently been peer-reviewed by three independent researchers.
- The report has been prepared in compliance with international standards ISO 14040 and ISO 14044 – and is based on the EU methodology from the ILCD programme relating to LCA analyses.

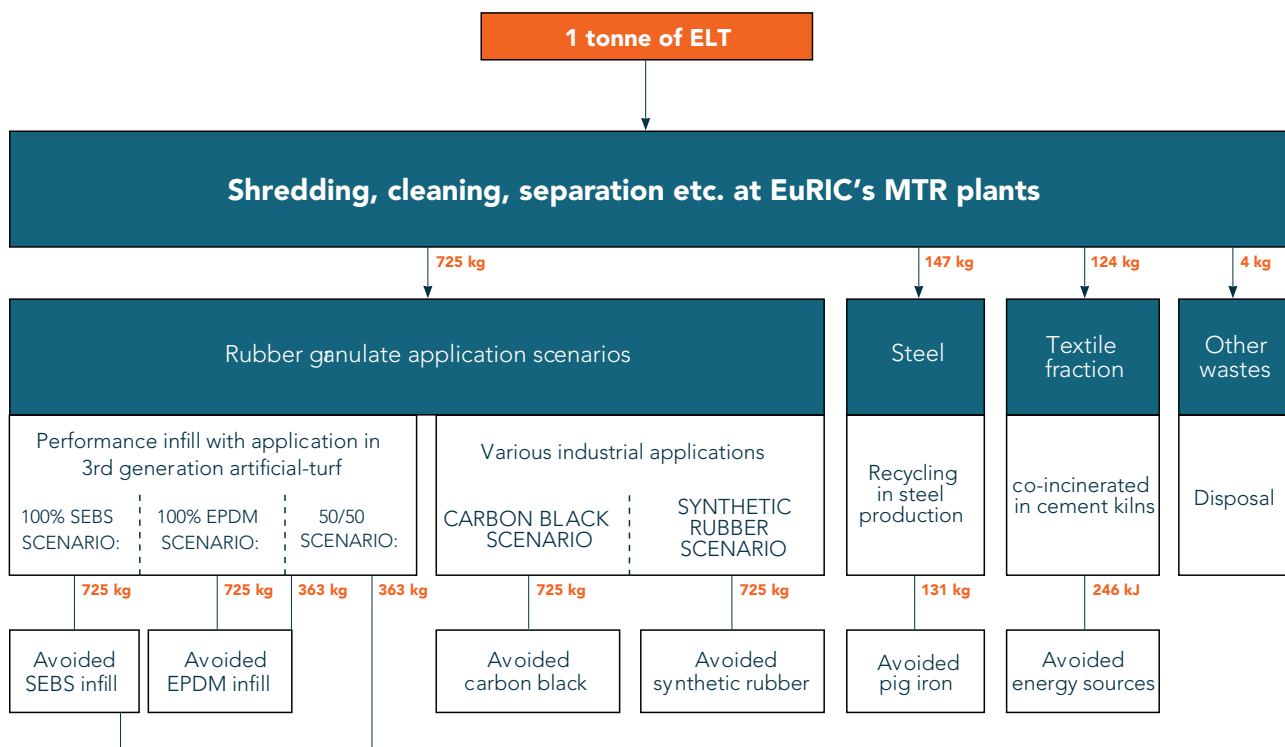


Figure 1.a: System boundaries for material recycling methods. All infills are incinerated after dismantling of artificial turfs. (SEBS is styrene ethene butene styrene copolymer, EPDM is ethylene propylene diene monomer)



<sup>1</sup> Commissioned by GENAN, a leading ELT recycling company, who has been working with LCA for more than 10 years

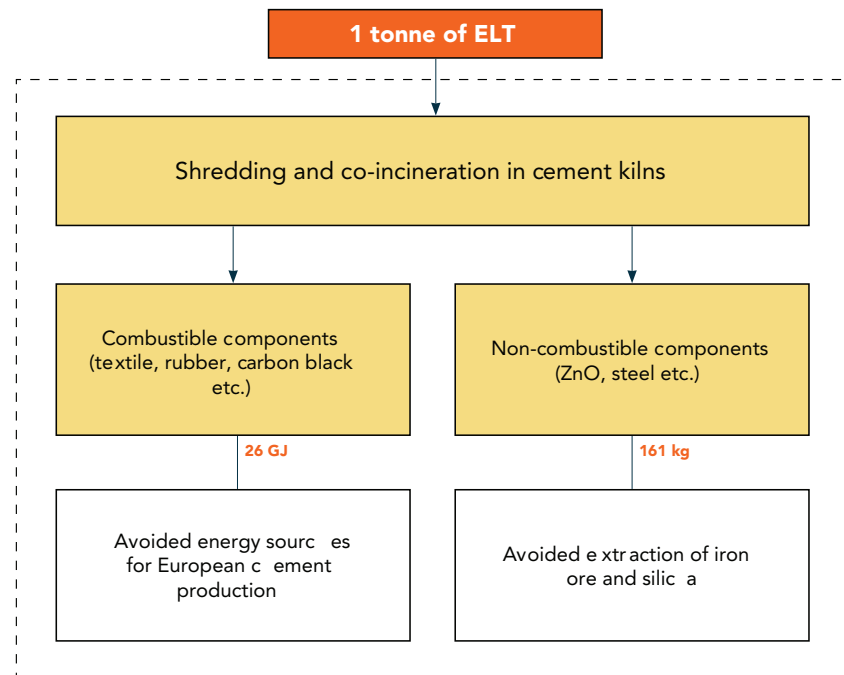
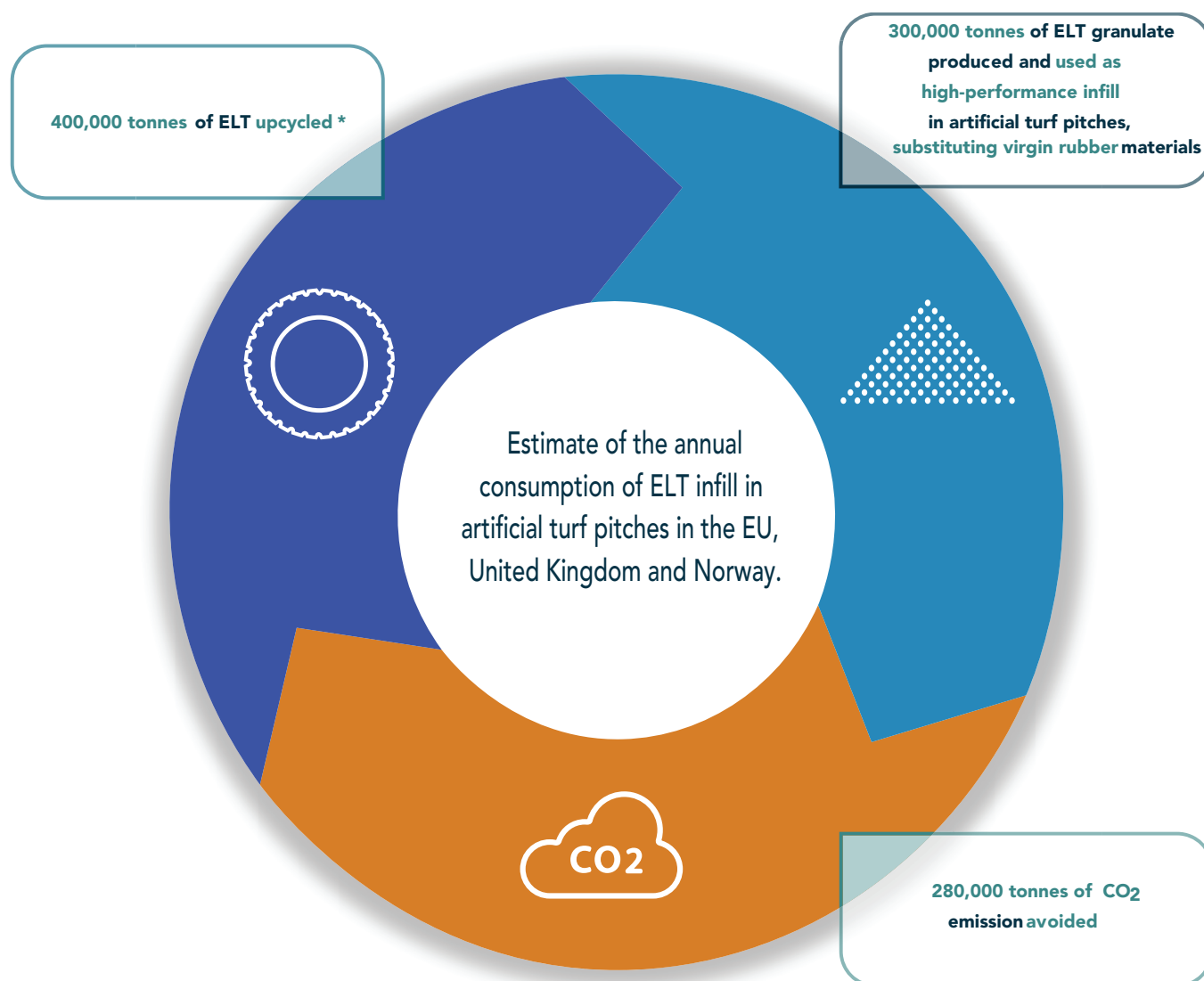


Figure 1.b: System boundaries for co-incineration method

- The assumptions (scope) of an LCA analysis are most important – and are illustrated in the above figures. In focus is the use of recycled rubber granulate as infill in football pitches, where virgin rubber: EPDM or TPE (SEBS) is substituted – both infill types with comparable impact on play, and which are indeed used in the market.
- The LCA analysis shows that for each tonne of end-of-life tyres processed into ELT rubber and used as infill in artificial turf pitches, the climate is spared 700 kg of CO<sub>2</sub> equivalents.
- Looking at the current, total volume of tyres processed in the EU for the application as infill in artificial turf pitches, i.e. 400,000 tonnes annually, this corresponds to annual savings of 280,000 tonnes of CO<sub>2</sub> emission within the EU.
- The report furthermore shows that compared to the incineration of tyres, recycling also reaps substantial benefits in a number of other environmental categories. These include e.g. acidification (terrestrial and freshwater) and respiratory inorganics.



\* Corresponding to approx. 40 million end-of-life tyres each weighing approx. 10kg

### WHAT IS THE ALTERNATIVE FOR THESE 40 MILLION TYRES, IF IN FUTURE THEY CANNOT BE USED IN ARTIFICIAL TURF PITCHES?

- Rubber from end-of-life tyres is today used for other purposes than as infill in artificial turf; yet, the infill market is by far the largest and cannot be substituted, as there are no mature market alternatives.
- Other markets for rubber granulate cannot absorb the production currently supplied to artificial turf pitches. If such unsaturated markets existed, then the more than 1 million tonnes of tyres, which are today incinerated in cement works, could instead be recycled.
- If the ELT infill market is eliminated, implications will thus be that the volume of tyres incinerated in the EU will increase from approx. 1 million tonnes to 1.4 million tonnes a year – resulting in increased CO<sub>2</sub> emission and other environmental problems.

**References:** Life cycle assessment of waste tyre treatments: Material recycling vs. co-incineration in cement kilns, May 2020, FORCE Technology – Charlotte B. Merlin & IFEU – Regine Vogt & ETRMA press release: Europe – 92% of all End of Life Tyres collected and treated in 2017, 2019, ETRMA.