

Ecopneus in the Green Economy

Sustainability Report **2015**





Ecopneus in the Green Economy. 2015 Sustainability Report
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Edition I, June 2016

Edition I printed in June 2016

Printed in Italy by TMB Stampa - Roma

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Letter to the stakeholders

2015 was a year marked by significant progress for Ecopneus and for the entire end-of-life tyre management system in Italy. The consolidation of the collection and industrial processing system was accompanied, I believe for the first time since the beginning of activities in 2011, by a marked increase in the demand for rubber granules and powder from ELT recycling. This increase was well above the country's rate of economic recovery and, therefore, is primarily to be read as a result of the investments made in previous years in the improvement of quality and compliance with product standards, in applied research, and in the promotion of projects on the end markets (mostly asphalt, sports facilities, construction and compounds). It is a significant signal that benefits the entire sector and a concrete implementation of the circular economy principles of which Ecopneus strives to be an interpreter and actuator.

In order to clearly support the development of ELT rubber applications, Ecopneus has also decided to engage directly in time-consuming and innovative research to confirm the absence of the risk of migration of harmful substances from ELT recycling materials to the environment and to people. This research project was conducted with the help of leading Italian and international scientific institutes and laboratories, with a sampling base never before implemented and a level of accuracy in the methodology that makes us confident in the quality of the results. In this period that we are getting ready to publish this document, our fifth Sustainability Report, we have recently received the first evidence of these results, based on an effort that began in early 2015 and lasted several months. These findings seem to prove once again that there is no risk of damaging the health of the people who use materials and applications made of ELT rubber in various ways (for work or for pleasure) resulting from the migration of substances from these materials, and the same can be said with regard to disposal into the environment.

This is a big step towards a recycling economy that allows the consolidation of the efforts of hundreds of companies that have invested in the green economy, confirming the value of the vision that has accompanied us over the years. Also in this case Ecopneus wants to put the knowledge that it has acquired at the disposal of the entire system: institutions, political and scientific authorities, companies from different sectors and the entire community.

The industrial sector is growing; shredding companies are specializing, expanding, and also integrating downstream, with a positive boost in investments that is indicative of a signal of optimism by entrepreneurs in the potential of the green economy, as well as the endurance of the Italian economic system.

Ecopneus' 2015 management performance indicators clearly give this signal: also thanks to a refinement of the calculation methodology developed in collaboration with the Sustainable Development Foundation, this year it was possible to demonstrate that the recovery of material has overcome the recovery of energy. This ratio, historically in favour of the latter, has now reversed: we can calculate a higher amount of material recovered in physical form (considering rubber, steel and solid residues from combustion) with respect to that recovered in the form of energy. These positive notes are contrasted by some problems still encountered in the field, which have actually been exacerbated this year, most notably the phenomenon of "extra-target" amounts resulting from illegal flows of tyres, which obviously impact ELTs. This phenomenon, which Ecopneus had compensated for with greater amounts of additional collection beyond the legal target, had already been seen in previous years. The data have shown an unequivocal increase in these "extra" quantities at the end of 2015, highlighting the economic difficulty that Ecopneus, like other subjects, has in taking responsibility for them, due to a lack of funding resulting from the non-application of the environmental contribution for those tyres sold without tax documentation.

The problem will be even more serious in 2016, both due to a probable overall increase of these illegal flows, and as a result of the progressive build-up of material for which pick-up cannot be guaranteed, preparing the way for a dreaded resumption of abandonments into the environment by both "tyre fitters" and by individual citizens who need to dispose of ELTs following a "black market" purchase/change. The damage to the country resulting from the lack of tax revenue due to evasion must also be considered.

For several years Ecopneus has been conducting an awareness campaign regarding the need for ethical and law-abiding purchasing behaviour. Begun in the "Terra dei Fuochi" (Land of Fires, i.e. provinces of Naples and Caserta) area as part of the activities tied to the memorandum of understanding with the Ministry of Environment, the prefect delegated by the Ministry of the Interior, and the mayors and prefectures of Naples and Caserta, the educational efforts against black market purchases are gradually becoming necessary also in other areas of Italy. A precise overview of the phenomenon and the activation of a monitoring campaign by the relevant authorities is also urgent; corrective actions to the regulatory framework to effectively close the holes left in the ELT management system, ensuring the maximum transparency of the responsible subjects and guaranteeing that all of the operations are performed in the public interest.

The principles of ethics and transparency must characterize all of the entities that manage public resources with the ultimate goal of protecting the environment. The specialization of the supply chain, the genuine application of the principle of Extended Producer Responsibility desired by the European legislature, the absence of declared or hidden profit aims, and an equal sharing of responsibilities among the different subjects in each chain must become the foundations on which to impose that reform of the consortium system that the institutions have been questioning for a long time, also in light of the European guidelines on waste.

We hope with this work to be able to make our contribution to the discussion, presenting the effectiveness of an "Ecopneus model", which seems to be one of Italy's best practices at the international level, and also honestly highlighting the critical issues still to be overcome. Many people and organizations that contribute in different ways to the various areas of activity are to be thanked for this collaborative work, but most of all those who work inside Ecopneus on a daily basis with seriousness and devotion to our mission. Happy reading.

Giovanni Corbetta

Jurun horbette



Guide to reading

In continuity with the strategic choice of a transparent and comprehensive reporting of its activities, Ecopneus offers its stakeholders again this year a key to reading the Green Economy report prepared according to the methodological approach developed by the Sustainable Development Foundation. It is an innovative approach that extends the scope of an organization's reporting to the entire value chain, allowing an evaluation of the contribution to the green economy that includes the effects that the goods and services produced by the organization have on the environment, on the economy and on society as part of a life cycle approach. But there's more. Along with reporting the performance of the Ecopneus system's green economy, in fact, the 2015 Ecopneus Green Economy report addresses a topic of particular relevance in the context of the consolidation of a circular economy of the sector: the verification of whether an efficient and careful management of this waste stream, such as the one that guides the consortium system in its strategy to transform end-of-life tyres from waste into resources, is in line with the latest proposals for the termination of the status of waste, or end-of-waste, for the rubber polymer granules and powder derived from the recycling of ELTs.

To achieve this objective, the information collected and calculations made for reporting the operating performance and positive effects for the environment, economy and society of the end-of-life tyre management system organized by Ecopneus have been compared, where relevant, with the European Commission's reference guidelines for the definition of end-of-waste criteria. We have thus verified, for example, that the organization of ELT collection in the Ecopneus system, which provides for the timely tracking of loads of end-of-life tyres from their origin to the final recovery destination, responds to a specific requirement to define whether a material or a substance derived from a waste stream can be defined as end-of-waste. The same applies to the ELT processing technologies aimed at widespread recycling in the chain's companies, which ensure the integrity, dimensional quality and purity of the granules and powders produced, or to the fact that these recycled materials have a market value and a recognized price, and are used as secondary raw material for the production of new goods in many industrial sectors. Or again, that the environmental benefits of recycling far outweigh the negative impacts generated by the industrial management of ELTs in the chain.

To enable the use of these two levels of information – the reporting of the performance of Ecopneus' green economy and the compliance of the organizational model and product characteristics with the end-of-waste status requirements – we have highlighted the key criteria identified by the European end-of-waste guidelines through different coloured flags, which are shown next to the relevant passages of text. In this context, the 2015 edition of the Ecopneus Green Economy Report is intended to be like a multimedia text, where a coloured flag, the meaning of which is encoded in the report's first chapter, indicates that the topics addressed in that part of the document demonstrate how materials recycled from ELTs respond to the end-of-waste characteristics.

for products and

applications

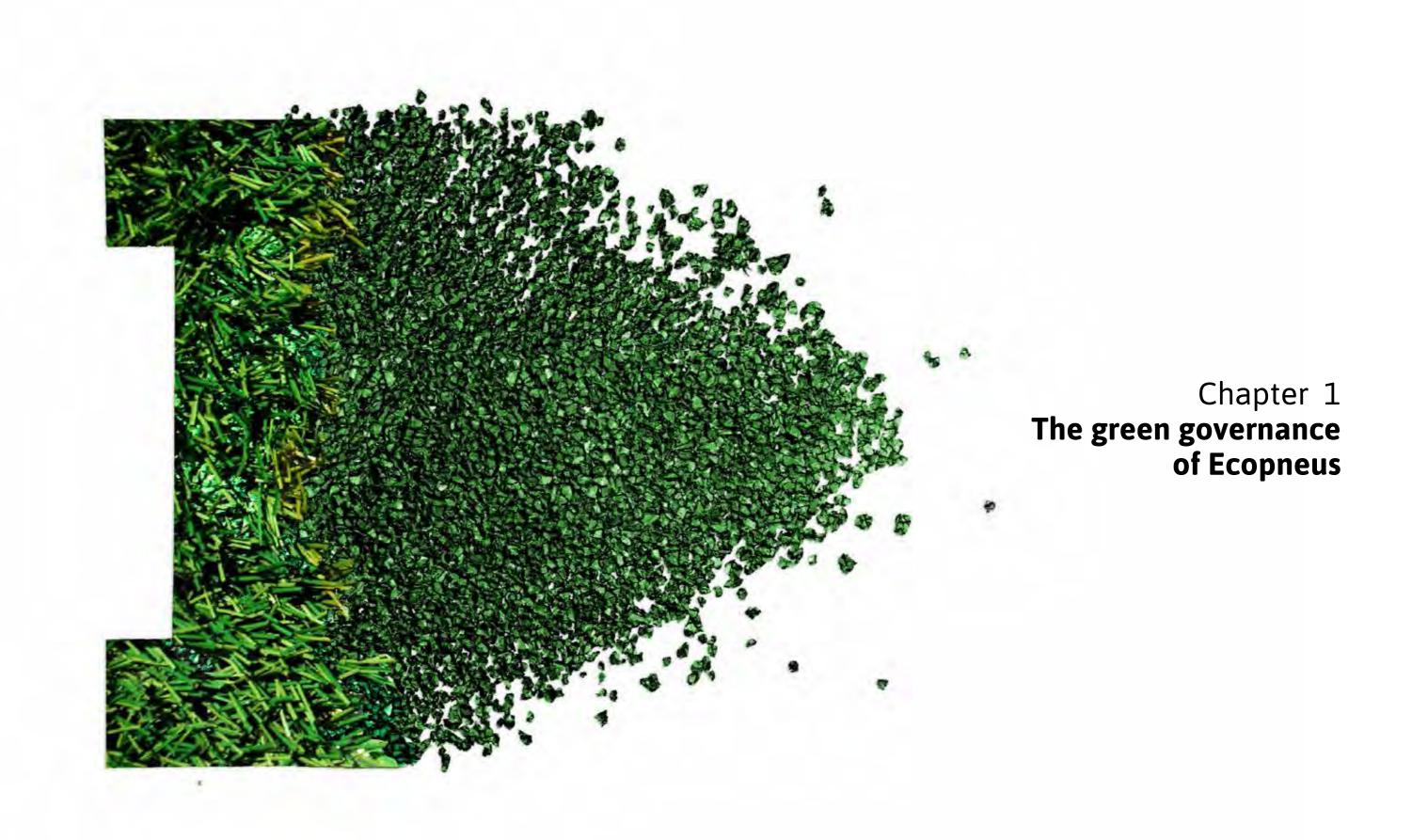
119 milion euros of raw material imports avoided

363,000 tonnellate

of CO₂ equivalent e missions avoided

1.7 milioni di m³ of water not consumed 342 tonnellate of resources saved





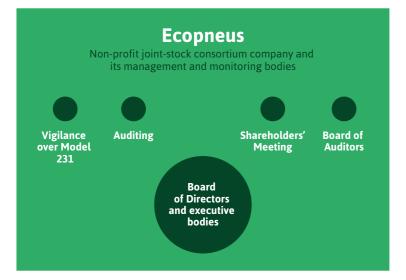
Ministry of the Environment

Ecopneus Scpa is a non-profit joint-stock consortium company whose purpose is to manage a quantity of end-of-life tyres (ELTs) in Italy equal to those released into the national replacement market by its shareholders in the previous year. Founded by the leading tyre manufacturers worldwide (Bridgestone, Continental, Goodyear Dunlop, Marangoni, Michelin, and Pirelli), other members have joined over time for a current total of 61 shareholding companies.

Ecopneus' activities are financed by the environmental contribution paid by consumers when they purchase new and imported used tyres; the amount is calculated on the basis of the costs necessary to ensure the management of the number of ELTs equal to the quantity of tyres placed into the replacement market by its shareholders in the previous year, taking into account both the costs directly connected to their collection and recovery, other costs of an administrative nature (monitoring, reporting, management and organization of the supply chain), and those for research and development, training, and communication activities.

Ministry of the Environment

Authority responsible for direction and monitoring for the purpose of environmental protection and the efficiency, effectiveness and economy of the connected systems



Market of companies

in free competition with each other

In this context, and within the constraints of the current legislation, the founding Ecopneus tyre manufacturers have formed a joint-stock consortium company with a corporate governance system that emphasizes control and transparency in the management of the activities performed for the protection of the interests of all stakeholders. As regards the shareholders, this consists of adopting decision-making and monitoring mechanisms aimed at preventing the creation of conflicts of interest between them. As regards the companies of the recovery chain participating in the system, as well as all consumers and citizens, the procedures and provisions of Model 231 on the criminal liability of legal persons have been chosen as a reference for the organization, management and operational control. Furthermore, as an additional protection of legality in relations with stakeholders, Ecopneus flanks Model 231 with a Code of Ethics that contains the principles of corporate conduct designed to guide the actions and behaviour of all those who, directly and indirectly, are involved in the activities. The ISO 9001 quality certification and ISO 14001 environmental certification obtained in 2015 represent a further reinforcement of the management model adopted by Ecopneus.

This approach has resulted in a management model aimed at optimizing performance and operating costs, as well as avoiding potential conflicts of interest between the controller (role assigned by law) and controlled. In fact, Ecopneus' governance model provides for the management of collection and recovery activities totally assigned through outsourcing to market companies, operating in free competition and specialized in the various processing of ELTs, maintaining planning and monitoring within the management structure.

In this approach, the model chosen for the selection of the chain's companies assumes a central role, and occurs by means of competitions open to all those companies that possess the necessary authorizations, with reward criteria.

Focus Q

Opportunities for a greater efficiency of the ELT system in Italy

The new proposal for reform of the Waste Framework Directive, inserted by the European Commission in the Closing the Loop package for the circular economy, identifies the criteria for defining waste management systems operating under the Extended Producer Responsibility regime. Specifically, the proposal requires the following from the Member States:

- the introduction of a clear distinction of roles between producers, consortium management companies and collection, transport and recovery companies in order to avoid conflicts of interest;
- the definition of a legal framework marked by the reinforcement of the governance and control systems with the introduction of binding recovery objectives;
- transparency of information to citizens with the obligation to publish corporate and financial information;
- effectiveness in the management of the operational activities with regard to the territorial coverage of the service, the allocation of resources to the companies involved, and flow monitoring capabilities;
- efficiency in the economic and administrative management aimed at optimizing costs and minimizing the burden to citizens deriving from the environmental contribution.

Over 60 companies authorized under Ministerial Decree 82/2011 work in the ELT sector in Italy, including six national consortia and 54 individual subjects. Such an articulated framework would require a regulation in line with the European Commission's new proposals, to improve the system's efficiency and not give space to opportunistic behaviour.

In this regard, for example, it should be avoided that the subjects involved only perform the more convenient and less costly collections, operating in a range of action limited to easily accessible areas where the greatest amount of ELTs are concentrated, or only performing pick-ups from large tyre fitters through bins, or collecting only the most requested car and truck ELTs, placing at a disadvantage those who collect throughout the country, including mountain areas, poor regions with low amounts, or on the smaller islands, without any discrimination. In fact, those who perform easier and more low-cost collections can apply a lower environmental contribution to the purchase of a new tyre, therefore encouraging the sale of the brands of tyres of their associates. Conversely, by having to apply higher environmental contributions, a tyre producer associated with a system that performs collection throughout the country, with consequent higher costs, risks reducing its market share, losing customers at tyre fitters (even though it is more virtuous from the environmental protection point of view).

In this framework, and without the introduction of corrective measures in line with the new European guidelines, all operators, for competitive reasons, may tend to achieve their goals by focusing on the collections with the lowest cost for their members, avoiding, or reducing to a minimum, the most expensive ones, leaving some areas of the country completely uncovered.

The cost of black market sales of tyres to the ELT management system

An extremely relevant aspect with a direct repercussion on the efficiency of ELT management in Italy concerns the large quantities of tyres introduced onto the domestic replacement market without the regular payment of the environmental contribution that triggers the target count and is indispensable for the management of those ELTs that they are replacing. This regards a total quantity estimated by experts to be up to 60,000 tonnes each year, arising in large part from illegal import. In absolute numbers, considering an average weight of around 9 kg per car tyre, it comes to about 6 million end-of-life tyres that are sold without issuing a regular invoice, generating an equally conspicuous stream of

Illegal flows of tyres and ELTs:

of almost 80milion euros

Equal to 6 milion ELTs

not paid

(VAT evasion)

up to **60,000 t/year** (estimate)

12 milion euros of contributions

Estimate of a damage to the treasury

end-of-life tyres not covered by the environmental contribution. In economic terms, considering that the environmental contribution applied is 2 euros per tyre on average, this means that approximately 12 million euros of contributions are not paid to the management systems, to which can be

added (conside-

ring an average sales price of around 85 euros per tyre) a damage to the treasury of nearly 80 million euros of VAT evasion.

According to the current regulations, the collective and individual systems are required to collect a quantity of end-of-life tyres corresponding to the quantity of new tyres sold in the replacement market by their members in the previous year, using the contributions that they receive on a monthly basis from sales of tyres by the member manufacturers and importers. The 60,000 tonnes

released on the market and for which no environmental contribution is paid, therefore, are an additional quantity for which the consortia cannot be responsible that clogs the stocks of tyre fitters, generating a potential environmental risk in the event of abandonment or fire. Over the years, to prevent tyre fitters, mechanics and other generation points from not sending the quantities of end-of-life tyres generated off for correct processing, Ecopneus has contributed to the collection of 80,000 tonnes of extra-target ELTs for a total cost of about 16 million euros of extra expense compared to ordinary operations. Ecopneus made this decision in a perspective of responsibility and to avoid the risks of the illegal management of surpluses by tyre fitters.

Year	Extra quantity (t)	% beyond the target
2011	6,015	10%
2012	12,462	6%
2013	19,982	9%
2014	32,864	13%
2015	18,371	8%

However, after the peak of extra-collection in 2014, with more than 32,000 tonnes collected beyond the legal target, already starting in 2015 Ecopneus has been constrained, for budgetary reasons, to limit its availability to collect quantities of ELTs beyond the target.

In this context, having noted a difficult situation at many tyre fitters already at the end of 2015, which is expected to be repeated even in 2016, it is necessary that the responsible authorities take steps to quickly find a solution to address the problem of irregular tyre sales (without invoice or receipt).

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End-of-waste of ELTs: the end of a waste, the beginning of a resource

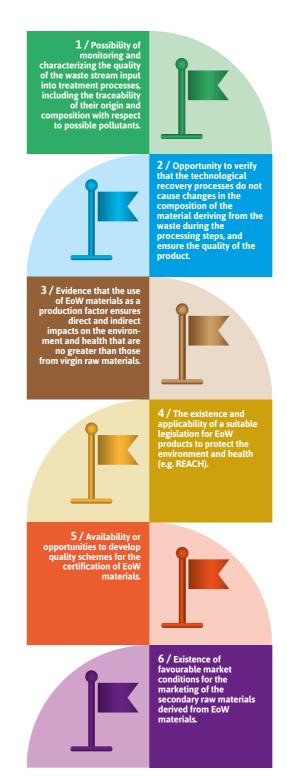


Starting from the conditions dictated by the Waste Framework Directive, in 2009 the Joint Research Centre, the technical body that supports the European Commission in EU policy development, published the "End-of-Waste Criteria" report. This report dictates the guidelines for the development of specific criteria and requirements to define when a material derived from the processing of a waste flow ceases to be waste and assumes the status of secondary raw material.

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Further on in this report the compliance of some aspects that characterize the recovery of rubber polymer granules from ELTs in the Ecopneus chain with the main end-of-waste guidelines prepared by the JRC are highlighted. The focus points will be marked with coloured flags.

Guideline of the Joint Research Centre for end-of-waste and corresponding characteristics that can be found in the products of the Ecopneus chain



To make the transition towards a circular economy more effective, one of the priority reform areas identified by the Closing the Loop Action Plan prepared by the European Commission regards the secondary raw materials deriving from the recycling of waste and the opportunity that they can be "exchanged and transported in the same way as primary materials" by removing barriers to their use by the market's operators, in particular with regard to "the relative uncertainty as to their quality". Among the opportunities for regulatory intervention to facilitate the achievement of these objectives, the plan refers to "improving the provisions for end-of-waste" introduced in the Waste Framework Directive 2008/98/EC reform. This reform – unlike the current approach – makes Member States responsible for ensuring that the wastes subjected to recovery operations (operations that meet specific common conditions and criteria in accordance with the European guidelines) can no longer be considered waste, and instead assume the status of secondary raw material, or end-of-waste.

In Italy this is a great potential opportunity for the companies of the waste sector's green economy. The regulatory framework of the authorization procedures for waste treatment aimed at the recovery of materials could be rationalized, for example, by updating Ministerial Decree 5 February 1998 for non-hazardous waste subject to simplified recovery procedures; or by intervening, for the types of waste managed in large quantities that require consent for regular recovery pursuant to Legislative Decree 152 of 2006, to allow operators to avoid the risk that materials classified as secondary raw material for recovery operations authorized by one province may not be recognized as such in other provinces.

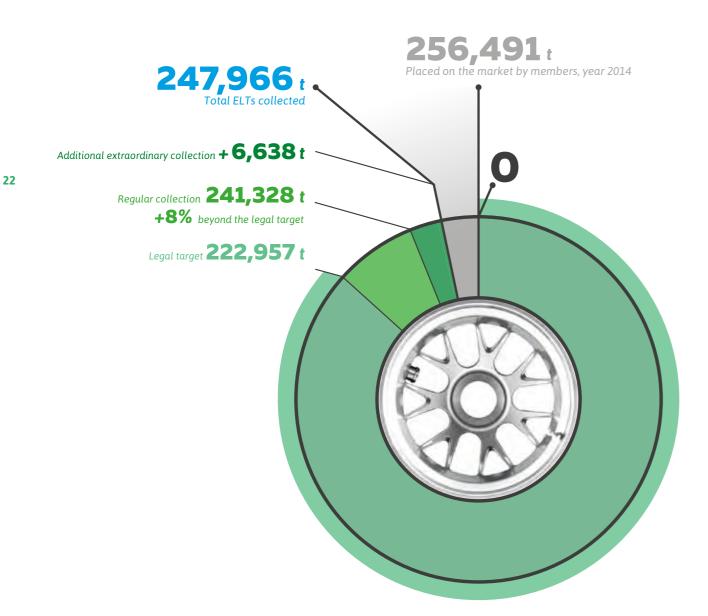
A regulatory framework consistent with end-of-waste, in addition to allowing the equivalence of the competition conditions for all recycling operators, would contribute to the certainty of the investment, remove the reservations that can be advanced by users of recovered or recycled material, re-launch and support the recovery and recycling market, decrease the uncertainty in the supply of materials, and reduce the waste of resources and, consequently, their removal from nature, pursuing the environmental sustainability objectives.



Chapter 2
Management
performance

Collection of ELTs

Allocation of the collection in 2015



25,000 tyre fitters served throughout the country

In 2015, a result beyond the legal expectations: + 18,371 t with respect to the target (+8%)

Protocol for the "Terra dei Fuochi" (Land of Fires, i.e. provinces
of Naples and Caserta): about
800 t of ELTs recovered,
equal to approximately 80,000
abandoned tyres

The Italian legislation regarding the end-of-life tyres generated in the replacement market provides, for authorized collective or individual systems, for an end-of-life tyre collection target equal to 100% of the new and imported used tyres placed on the replacement market in the preceding year by the members. By law, the collection target is calculated net of tread wear (-10% of the total weight of new tyres) and the portion of used tyres exported. In 2014, the Ecopneus member companies placed over 23 million tyres on the national replacement market for a total of 256,491 tonnes, accounting for nearly 70% of the domestic market. With respect to this amount, the consortium's management target for 2015 amounted to 222,957 tonnes.

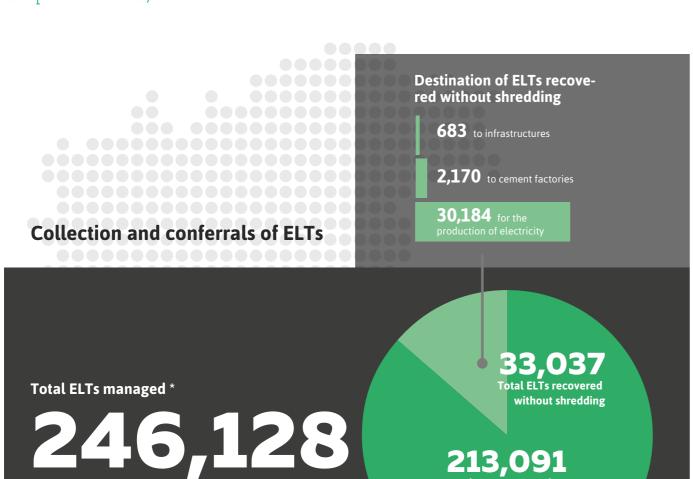
As results from Ecopneus' electronic supply chain monitoring system — an instrument that allows the timely tracking of the quantities of ELTs taken from each individual waste generation point, old stock or other authorized site — the total ELTs collected by Ecopneus in 2015 amount to 247,966 tonnes.

Of these, 241,238 regard the regular collection, over 99% of which (239,630 tonnes) was performed at over 25,000 "tyre fitters" scattered throughout the country, with the remainder from other historical stocks that Ecopneus was authorized to collect from. This result, also in 2015, goes beyond the legal expectations by a total of 18,371 tonnes of ELTs collected beyond the target (+8%).

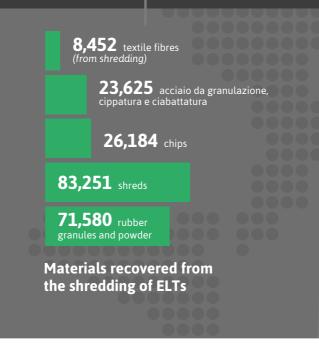
Another 6,638 tonnes of ELTs are added to these amounts. Of these, 6,241 tonnes were collected as part of the commitment provided for by Ministerial Decree 82 of 2011 (Article 3, paragraph 5) for emptying the historical stocks of ELTs throughout the nation, which was financed with 30% of the operating surplus of the previous financial year. In 2015, there was no operating surplus from 2014 due to the unprofitable closure of the financial statements that year (due in large part to the more than 32,000 tonnes of ELTs collected beyond the legal target in 2014 (for more information see the box on page 17), but some budget from 2013's operating surplus had not yet been spent.

An additional 397 tonnes were collected under the Memorandum of Understanding signed with the Ministry of Environment, the prefectures and the cities of Naples and Caserta, and the representative of the Ministry of the Interior for recovering the ELTs abandoned throughout the provinces of Naples and Caserta. For this project, launched in 2013, Ecopneus is using initial financial resources equal to 3.8 million euros deriving from inventories exceptionally generated by some of its members at the start-up of the system in 2011; this funding is used for both the collection and recovery of ELTs, and in communication and public awareness activities in order to stop the chain of illegality that connects the black market purchase of new or imported used tyres to the risk of potential abandonment of the ELTs generated in the environment.

From the beginning of the project to date, Ecopneus has contributed to the recovery of nearly 800 tonnes of ELTs abandoned on public land, the equivalent of about 80,000 car tyres, for a total expenditure of 518,000 euros (of which about 91,000 euros in 2015). The project, which is monitored by the Supervisory Committee set up by the Ministry of Environment, will continue until the funds are exhausted.



* The flow analysis only regards the ELTs managed for recovery up to 31/12/2015. This does not consider the stocks of ELTs delivered to plants but not yet processed for recovery.



213,091 Total ELTs recovered

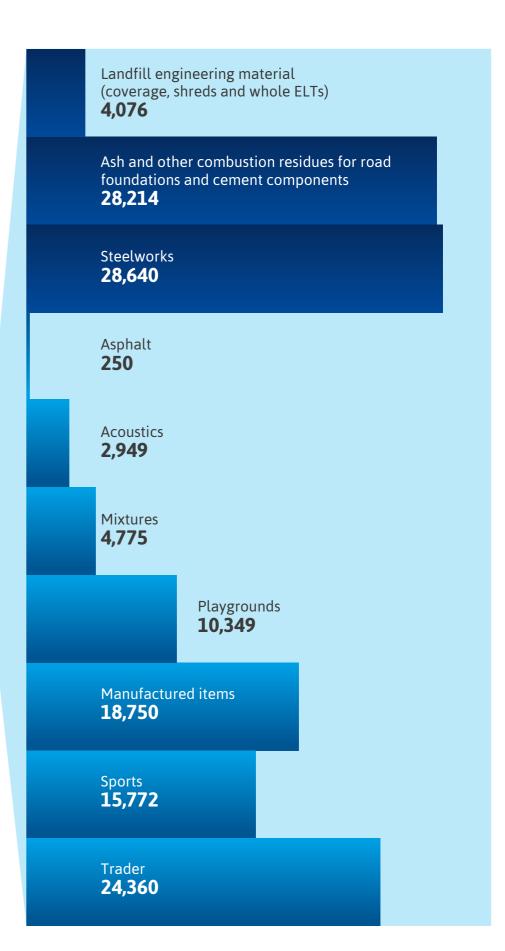
through shredding

Effective recovery performance

Energy recovery 113,618 (46%)

Material recovery 132,510

> Recovery of ELTs collected the previous year (rubber granules and powder) 5,625



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In 2015, the ELTs delivered to the processing and recovery facilities of the Ecopneus chain amounted to 251,000 tonnes, or approximately 3,000 tonnes more than the amount collected in 2015; the difference in weight

is due to the remainders of the 2014 collection stocked as of December 31 at the Ecopneus system's authorized storage centres. Of the 251,000 tonnes conferred, 33,000 tonnes were managed for energy recovery as whole ELTs and 218,000 tonnes were sent to facilities

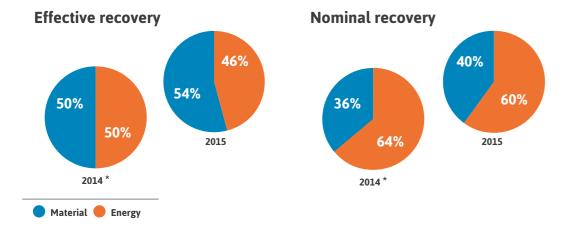
54% of the ELTs are recovered as material

and 46% as energy

for recycling and preparation for energy recovery, which processed a total of 213,000 tonnes during the year. Net of the 5,000 tonnes of ELTs conferred to the supply chain's plants (stocks) that will be processed in 2016, 246,128 ELTs total were managed for recovery in the Ecopneus system; of these, 54% (equal to 132,510 tonnes) were recovered as material and 46% (113,618 tonnes) as energy.

These are the data that emerge considering the "effective recovery" of ELTs according to the calculation method developed by Ecopneus in collaboration with the Sustainable Development Foundation (see sidebar "The calculation method" on page 28), which, from the environmental accounting point of view, considers recovered materials as all those that become available as such downstream of processing, also including steel and the incineration ash residue from processes primarily oriented to energy recovery. The ELT steel and ash delivered to plants for electricity production are separated and sent to the respective recycling chains;

Comparison of the distribution of the "nominal recovery" and "effective recovery" for the ELTs managed in the recycling and energy recovery plants of the Ecopneus system



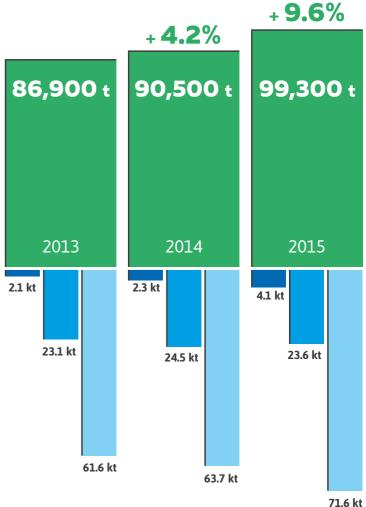
^{*} Note. The effective recovery performance for 2014 has been recalculated applying the new methodology

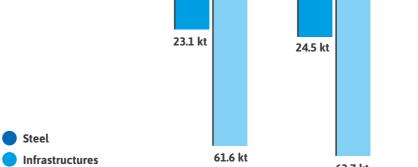
in the case of deliveries to cement factories, the steel and residual ash from the combustion of ELTs in clinker kilns are incorporated into the finished product, allowing the use of equivalent quantities of virgin raw material to be avoided.

According instead to the traditional accounting, i.e. that which considers the "nominal recovery" (traditionally defined as "at the gate") of waste in relation to it being sent to recycling or energy recovery plants, the data show 60% (146,867 tonnes) of ELTs sent for energy recovery and the remaining 40% (99,281 tonnes) to material recovery. Even though the indicator of "effective recovery" provides a reading of the ELT management performance that is coherent from the environmental protection point of view, the traditional "nominal recovery" accounting remains useful for measuring the performance of high value-added materials, in particular rubber granules and powder as well as steel. The nominal recycling of these materials from ELTs registered a steady increase in the Ecopneus system in the 2013-2015 period.

The recycling of materials from ELTs in the Ecopneus system in the three-year period 2013-2015

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Granules/powder

The method for calculating the effective recovery of ELTs in the Ecopneus system

An end-of-life tyre consists of an organic matrix and an inorganic one. The organic matrix contains a mixture of natural and synthetic rubber, carbon black and textile fibres, while the inorganic matrix contains steel, sulphur and other oxides (primarily zinc oxides). By virtue of this composition, during the aerobic combustion of an ELT, the organic matrix is transformed into energy, carbon dioxide and inert ash, while the inorganic matrix remains substantially unchanged. For ELTs sent to energy recovery, the amounts of these residues can be calculated and counted in the definition of the environmental management performances of ELT management systems.

In energy production facilities, the residues of the ELTs burned in power plants are recovered as they exit from the boilers and are sent for recycling to their respective chains: the ashes and oxides are used in the road infrastructure chain as inert materials, while steel is recycled as scrap iron in steelworks. In cement factories, the residues of ELTs used as fuel in the clinker kiln become part of the final mixture. In a mass balance, the ashes and oxides are recycled as substitute materials for other inert materials from mining, which are in any case required by the production recipe. Similarly, the steel replaces iron ore, which is another essential component of cement.

For end-of-life tyre management systems the two cases illustrated are the management solutions typically adopted for the energy recovery of ELTs as an alternative to recycling them into rubber polymer granules and steel.

The calculation method developed by Ecopneus in collaboration with the Sustainable Development Foundation to quantify the residues of ELT combustion

in the two different cases presented above is based on a set of "recovery coefficients" for different sizes of ELTs. For ELTs sent whole and shredded to cement factories, the recovery coefficient was derived from the results of several specific trials conducted by the major collection systems in France, Greece, Portugal and Spain (in the latter case, in collaboration with the Polytechnic University of Madrid). Differently, the recovery coefficient of chipped ELTs was derived by considering both the results of an analysis and classification campaign of the materials transferred to Cementi Rossi, and the mass balance of the manufacture of the chips themselves, where much of the steel is separated. For ELTs sent whole or shredded to plants for the production of energy, the recovery coefficient is determined starting from the actual quantities of the separated residues outgoing from the plant boilers net of the water content. The estimated weight of the residues of ELTs recycled in energy recovery processes is obtained by applying the respective coefficients to the quantities of ELTs sent in different sizes to the plants. The share of combustion residues of textile fibres alone sent to energy recovery was not considered in the study as it is regarded to be marginal.

The effective material recovery of an ELT management system is obtained by summing the weight of the directly recycled materials (rubber granules and powder, steel, whole ELTs and shredded to infrastructures) with the quantities of the combustion residues of the ELTs sent to the different energy recovery cases. Similarly, the effective recovery of energy is obtained by subtracting the weight of these residues from the total material sent to the energy recovery facilities (see infographic on the following page).

Compared to an evaluation of the ELT management performance based on a traditional accounting that considers the "nominal recovery" of ELTs, i.e. observing the routing of the ELTs towards the types of facility (and therefore without considering what happens to the steel, combustion residues and textiles), "effective recovery" offers a more faithful picture of the environmental performance of ELT management systems.



The ELT recycling market

The granules and powder derived from the processing of ELTs inherit the characteristics of elasticity as well as resistance to wear, heat and the action of oxidizing agents of the vulcanized rubber compounds used in tyre production. This peculiarity makes them suitable for recycling as a secondary raw material in the place of polymeric materials otherwise derived from virgin raw materials in hundreds of high added value products and applications, offering an important contribution to saving resources and efficiency as part of a circular economy in many industrial sectors. A share is also reabsorbed by the rubber industry for use (in small percentages) in compounds for several lines of production, including coatings for electrical cables, pipes, and conveyor belts. The latter market is still very limited but has a huge growth potential in relation to the development of new devulcanization technologies that can allow ELT rubber to be recycled in the formulation of compounds for the production of new tyres. In Europe this sector absorbs more than 70% of imports of natural rubber on its own: a strategic raw material for the industrial future of the Union that was defined as being at risk of adequate supply by the European Commission in 2014.

In this framework, the companies of the Ecopneus system placed a total of 77,205 tonnes of ELT rubber polymer granules and powder on the market in 2015. This is an increase of 33% with respect to the quantities sold in 2014, which was covered in part by the quantities produced in 2015 (71,580 tonnes), with the remainder (5,625 tonnes) from the warehouse stocks of the processing of previous years. 31% of the quantities sold were marketed through intermediaries (traders), while for the remainder, the commercial proposal to the companies that use rubber granules and powders as a secondary raw material was managed directly by the processing companies of the Ecopneus chain, with the advantage of a greater control over sales prices.

The primary recycling field involved the production of manufactured goods (24.3% of the total), with a strong increase in the quantities sold compared to 2014 (+53%) both in Italy and abroad. Use in sports applications, especially performance infills for artificial turf playing fields, counted for 20.4% of sales, down compared to 2014 (-7%) due to a fall in exports, but with a sharp growth of the national quota, which in absolute terms increased by about 2,300 tonnes overall. The demand for recycled rubber for the production of playgrounds regarded 13.4% of the total commercialized, up 32% compared to 2014 mainly due to the increase in the export quota. Sales for rubber mixture productions, while still representing a modest 6.2% of the total, registered the greatest increase compared to 2014 (+110%), with the domestic market more than doubling its share. Acoustic insulation materials for construction cover 3.8% of total sales, down slightly (-2%) with respect to the previous year. The quantities recycled in the production of modified asphalt for the construction of road pavements are only 0.3% of the total, a sharp decrease compared to 2014 (-50%), despite the potential and recognized advantages of this technology applied to the road maintenance sector.

Construction

Granules and powder are used for the production of panels, sound-dampening mats and other products used as elements for soundproofing environments.

Sports

Recycled rubber has many applications in the sports sector, from the use of performance infills in artificial turf football fields to the installation of anti-shock flooring, athletics tracks, basketball and tennis courts, etc.

Manufacturing

Granules and powder are used in the manufacturing industry for a wide range of products, including urban furniture elements such as benches, curbs, speed bumps, and jersey barriers, as well as other useful objects.

Rail transport

In rail and tramway transport infrastructures, rubber from ELT recycling lends itself to the production of shaped inserts to be installed on tracks to reduce the transmission of vibrations from the passage of trains, or to the production of sleepers.

Road infrastructure

In the construction of roads, the polymeric materials derived from the recycling of ELTs can be used for the formulation of modified bitumens for laying rubberized asphalts.

77,205 tonnellate

of granules and powder were placed on the market in 2015 (+33% with respect to 2014)

Breakdown of the rubber polymer granule and powder market

(values expressed in tonnes)

	2015	% of the 2015 total	2014	2015-2014 variation
Asphalts	250	0.3%	502	-50%
extra-EU	23		1	
Italy	108		501	
EU	118		0	
Acoustics	2,949	3.8%	2,994	-2%
extra-EU	216		2	
Italy	2,732		2,992	
EU	0		0	
Mixtures	4.775	6.2%	2,276	+110%
extra-EU	3		0	
Italy	3,718		1,734	
EU	1,054		542	
Playgrounds	10,349	13.4%	7,845	+32%
extra-EU	6,338		3,736	
Italy	2,892		2,732	
EU	1,118		1,377	
Manufacturing	18,750	24.3%	12,291	+53%
extra-EU	7,223		4,178	
Italy	9,637		6,793	
EU	1,891		1,320	
Sports	15,772	20.4%	16,940	-7%
extra-EU	1,897		2,894	
Italy	11,171		8,871	
EU	2,704		5,175	
Traders	24,360	31.6%	15,342	+59%
extra-EU	7,706		5,104	
Italy	13,810		9,244	
EU	2,845		994	
Total	77,205		58,190	+33%

The growth in the demand for recycled rubber recorded in 2015 is certainly an important result to which many components have contributed, not least of which Ecopneus' commitment to conveying confidence to the market on the chain's quality with regard to both the production processes and the products. This concrete commitment focused on several fronts again in 2015, including in particular corporate management, with the support offered to the system's companies for the development of expertise on quality and to the market, with both the consolidation of the Ecopneus Quality Mark (developed to guarantee the technical characteristics of the granules and powders produced in the chain, which can also be extended to the finished products that use them) and through active participation in the working groups of the Italian National Unification Association to define technical standards for the secondary raw materials derived from ELTs.



Environmental product certification

The competitiveness of companies on the domestic and international markets increasingly depends on a capacity to innovate products and production processes through the valorisation of natural, economic and social capital in a perspective of sustainable development and the green economy. In this context of the development of new production and consumption models, companies are increasingly adopting the analysis and voluntary certification of the environmental performance of the products placed on the market.

At the European level, the policy framework is that of the Integrated Product Policy (IPP) of 2003, and of the Sustainable Production and Consumption Action Plan of 2008, which along with the introduction of mechanisms for stimulating market demand for sustainable products (especially with Green Public Procurement) have stimulated the market for supplying voluntary instruments for the environmental labelling of products. These instruments focus attention on a product's life cycle (from production to use, to management of the end-of-life), allowing companies, those who manage them, and consumers to consider environmental protection, a saving of resources and climate change as determinants in consumer decisions. The set of requirements to be met for the construction of environmental labels and declarations is defined by specific ISO standards, which are also intended

to ensure that the information being provided to companies and consumers is accurate, verifiable and non-misleading in relation to the direct and indirect environmental aspects of the goods and services they regard.

There are three types of environmental labels/ declarations. Type III environmental labels, or Environmental Product Declarations (EPD), are aimed primarily at communications between producers (Business to Business) and between distributors and consumers (Business to Consumer), providing guidance on the potential environmental impacts of the products and/or services related to the entire life cycle according to the Life Cycle Assessment methodological approach. They report information related to a product on the basis of predetermined parameters with the ISO 14025 reference standard.

Type II environmental labels are environmental self-declarations by product manufacturers, importers, and distributors without any intervention by an independent certification body. This type of declaration is generally related to a product's individual environmental aspects and is regulated by ISO 14021, which also defines the specific criteria to be met to avoid the possibility of green-washing communications.

Type I environmental labels are voluntary ecological labels that are based on a multi-criterion investigative approach to a product's life cycle. They are regulated by ISO 14024, which sets minimum thresholds to be met for the release of the brand, and must be subjected to third party certification. At a European community level, the best known example for Type I labels



is the Ecolabel, which is granted pursuant to regulation no. 882/92 for specific categories of products with reduced environmental impact according to evaluation criteria that are subject to continuous review. Other examples of Type I labels regard the eco-label Nordic White Swan, which is issued to individual national bodies for all categories of non-food products with respect to criteria for production, recycling, packaging, emissions, delivery and disposal, and a declaration of conformity of the product. There are various examples at the level of individual member states, including the labels Blau Engel (D), Umweltzeichen Baume (A), Stichting Milieukeur (NL), NF Environment (F), and AENOR (ES).



The Italian example is the ReMade in Italy environmental label, which lies transversely with respect to the categories of labels described above and is recognized as a conclusive requirement in the rules governing green purchasing by the public administration, the so-called Green Public Procurement (GPP). It is a product certification scheme based on an ACCREDIA1 accredited technical regulation, which certifies the use of recycled components in materials and semi-finished and finished products. The certification is issued as an alternative to an audit process carried out by a recognized third party organization. To date, the bodies accredited by ACCREDIA for the release of the ReMade in Italy certification are: CERTIQUALITY, BUREAU VERITAS, ICQM and ICIM. The certification process for obtaining the brand is based on the quantity and type of recycled material, and considers the traceability of the materials used and correspondence with the production's Made in Italy characteristics as evaluation criteria. Like power consumption labels, ReMade in Italy distinguishes products into different classes as a function of the percentage of recycled material contained (A+, greater than 90%; A, between 60% and 90%; B, between 30% and 60%; C, between 10% and 30%). The label may also contain additional information not certified by ReMade in Italy but still subject to the verification of its truthfulness and consistency by the auditing certification body. This regards, for example, information related to savings of energy and greenhouse gas emissions thanks to the use of the product, as well as other references to quality labels adopted for the product itself, including, for example, the Ecopneus Quality Mark for rubber granules and powder produced in the chain.

Single national accreditation body designated by the Italian government, i.e. the only body recognized in Italy to attest that certification and inspection bodies as well as testing laboratories (also for food safety and calibration) have the expertise to assess the conformity of products, processes and systems to the reference standard. ACCREDIA operates under the supervision of the Ministry of Economic Development and performs a public authority service, since accreditation is carried out in the public interest, and is an effective qualification instrument of the products and services circulating on all markets (www.accredia.it).

The use of ELT granules as performance infills in artificial turf football fields: the initial results of a survey on health risks sponsored by Ecopneus

With the spread of third-generation artificial turf sports facilities, rubber recycled from endof-life tyres, also called SBR (styrene-butadiene rubber), has gradually imposed itself on the market - thanks to its performance - as an infill material that replaces other materials of both a synthetic origin (different polymers including EPDM, TPO, and TPE) and a natural one (sand or mixtures of plant fibres and cork granules). The rapid spread of this technology and the increasing demand for quantities of rubber granules were accompanied, in the early 2000s, by some "incidents along the way" in relation to a lack of attention to proper playing field maintenance by managers as well as supplies of poor-quality granules of dubious origin, which fuelled some controversies about the possible health risks of athletes in relation to the potential toxicity of these materials used as infill. In particular, the controversies associated the problem with infills derived from end-of-life tyres with regard to the content of polycyclic aromatic hydrocarbons (PAHs) present as contaminants in some raw materials (carbon black and plasticizer oils in particular) in vulcanized rubber compounds, even though there was no evidence of the origin of these materials for the cases under consideration.

A study of numerous scientific publications that have addressed the problem over the years revealed a substantial convergence of results in assessing the risks to human health from exposure to these materials below the threshold limits considered acceptable by the international scientific community. However, the variability observed in the study methods used, especially with regard to the identification of the actual source of the materials subjected to verification, led Ecopneus to **develop a dedicated research project** as a contribution to the

development of further knowledge.

The project involved several agencies, laboratories and specialized research centres selected according to the different investigation requirements. In particular, Bureau Veritas, an accredited certification body, was involved in defining the project procedures as well as during verification and testifying to the methodological compliance of the activities performed by the partners involved.

Having verified the high degree of uncertainty with respect to the characterization of the origin and quality of the infill materials analysed in the literature, the project was designed to start with the development of a methodology for classifying the samples of ELT recycled rubber granules to be investigated that considered the geographical origin of production and the age of the tyres used in the recycling processes. In this way, the subsequent product and chemical composition characterization

of the samples allowed the "fingerprint" of the rubber granules produced from end-of-life tyres managed in the Ecopneus chain to be defined in relation to the PAH content.

The first research project ever carried out on a large scale:

3.885 ELTs sampled and classified, equal to over

63.800 Kg of material examined

The selective sampling, which

involved several companies in the Ecopneus chain specialized in the processing of ELTs for recycling, regarded 3,885 ELTs in total, corresponding to over 63,800 kg, which were converted into 65 samples of recycled rubber granules of known age and origin.

The rubber samples were characterized using three specialized laboratories, selected in relation to the availability of the proper instrumentation needed to carry out the appropriate chemical and physical analyses: CERISIE (Italy) was tasked with verifying the product characterization and composition of the samples used in the investigation, the Tun Abdul Razak Research Centre (UK) was entrusted with verifying the concentration of PAHs in selected rubber samples with regard to the content of plasticizing oils used in ELT rubber compounds, and the Biochemical Institute for Environmental Carcinogens (Dr. Grimmer Foundation - Germany) was charged with verifying the total PAHs present in the rubber samples, thus including those coming from the carbon black used in tyre rubber mixtures. The quantification of the total PAHs present in the rubber samples was also subsequently repeated by the Mario Negri Institute with a test method developed ad hoc.

Compared to the REACH restriction on the content of aromatic oil compounds in tyre mixtures in force since 2010 (see box on next

The research partners

CERISIE

Tun Abdul Razak Research Center Biochemical Institute for Environmental Carcirogens Mario Negri Institute WasteAndChemicals

page), the results of the analyses show a substantial conformity for end-of-life tyres sent for recovery between October 2014 and January 2015. In connection with the recent enlargement of the RE-**ACH** restrictions relating to PAH concentration limit values in

some consumer products, the results of the analyses reveal that only two compounds (benzo[a]pyrene and benzo[e]pyrene) exceed the limits

The validity of these results was checked through comparison with the major scientific studies available in the literature, as well as with the results of investigations that Genan, one of the largest ELT recycling companies in the world, conducted on its products.

To further support the development of knowledge, as also indicated in the position expressed by the Ministry of Health in the interpretation of the new REACH regulation, Ecopneus has set up the second phase of the project in order to verify whether there are health risks arising from prolonged exposure to the ELT rubber granules used in football field infills. The investigation has focused on the migration capacity of PAHs in two specific biological fluids: sweat and so-called pulmonary surfactant (from the

English acronym SURFace ACTive AgeNT), i.e. the physiological liquid present in the pulmonary alveoli. In both cases, the analyses were conducted by the Mario Negri Institute in Milan. For a comprehensive assessment of the health risks resulting from exposure to rubber recycled from ELTs, the project has also performed, in partnership with WasteAndChemicals, a series of prolonged monitoring conducted in the field in order to quantify the actual dermal and inhalation exposure to PAHs resulting from the use of ELT recycled rubber as performance infill. The monitoring has involved both workers involved in laying artificial turf football fields with performance infill made of ELT recycled rubber and athletes during training and football

The results obtained from the monitoring show that the concentration of PAHs in the air breathed, as well as the content of inhalable dust deposited on the skin of the workers and players placed under observation, are comparable to the "background" concentrations found in areas adjacent to the playing fields.

In light of the data collected, in line with the guidelines of the European Chemical Agency (ECHA) for the assessment of risk to human health, especially with regard to the carcinogenic risk associated with the presence of PAHs, the project has identified an incremental risk for the workers and players exposed to rubber recycled from ELTs less than the de minimis value 1x10-6 that is considered acceptable by the international scientific community.

In-depth: restriction no. 50 of the REACH Regulation

Point no. 50 of Annex XVII of REACH, the regulation adopted by the European Union to improve the protection of human health and the environment from the risks of chemicals, prohibits the use, for the production of tyres, of plasticizing oils containing more than 1 mg/ kg of benzo[a]pyrene or more than 10 mg/kg total of 8 listed PAHs. From January 2010 it was prohibited to market tyres or tread bands for reconstruction that contained these "aromatic" oils at concentrations higher than those mentioned above. The conformity of the tyres relative to the concentration of polycyclic aromatic compounds, which is determined using a standardized analysis method according to ISO 21461, is guaranteed by an HBay percentage value (a specific unit of measure used for nuclear magnetic resonance spectroscopy analysis provided for by the regulation) that does not exceed 0.35%; re-treaded tyres enjoy an exception to the 0.35% limit if the tread band is still compliant with the aromaticity limit (i.e. the carcass can be non-compliant as long as the tread band used for reconstruction is compliant with the restriction).

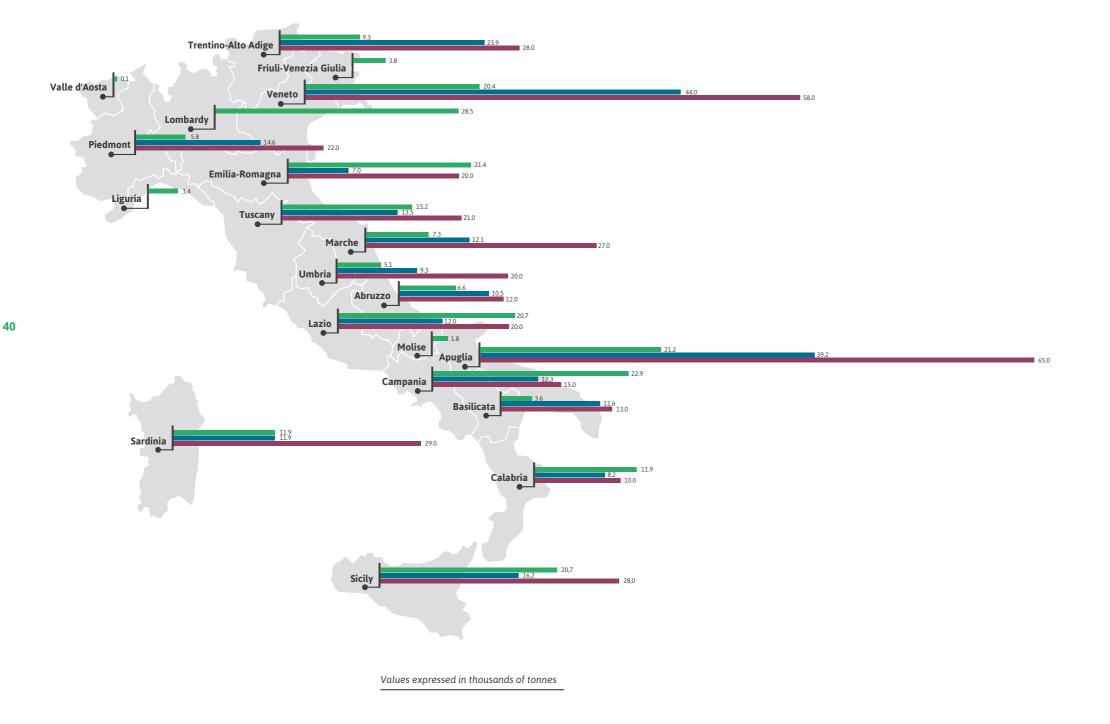
With Regulation (EU) 1272/2013, restriction 50 was extended by introducing a ban on using plastics and rubbers containing more than 1 mg/kg of each of the 8 listed PAHs (0.5 mg/kg in the case of children's toys) for products intended for frequent or prolonged skin contact. The new restriction is therefore no longer confined to plasticizing oils only but also significantly impacts the use of the carbon black utilized as filler in the manufacture of new tyres. With respect to this new restriction, which came into force on 27 December 2015, the Italian Ministry of Health notified the European Commission of its interpretive stance, stressing that those products not specifically covered by the restriction, including anti-shock flooring and artificial turf sports facilities, will be subject to additional specific assessments.



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Chapter 3 **The chain**



Collection of ELTs

ELTs delivered

Annual processing capacity available in facilities with an Ecopneus contract

A cross-check of the regional collection data with the amounts of whole ELTs delivered to the chain's processing and recovery facilities shows that a consistent flow of ELTs (about 86 thousand tonnes) are not managed for recovery directly in the regions in which they are collected, but come from other regions. In this situation, due to the availability of production facilities throughout Italy that Ecopneus deems suitable for participation in the system, the interregional flows of ELTs are regulated favouring the minimum distances from the collection centres. Thus, for example, ELTs collected in Lombardy, Friuli, Liguria and Valle d'Aosta flow mainly into Veneto, Trentino and Piedmont, ELTs coming primarily from Tuscany and Lazio are managed in Marche and Umbria, and ELTs arising mainly from other southern regions are managed in Apulia, Basilicata and Abruzzo.

In this framework, according to the outcome of the 2014 tender to select the companies that would work with Ecopneus in the three-year period 2015-2017, collection and storage is carried out by 16 main contractor companies, which in turn serve 52 subcontractors (previously approved by Ecopneus), while 36 transport companies sort the ELTs from the collection and storage centres to recovery centres. The recovery of materials and the shredding preparatory for ELT energy recovery are carried out at 29 facilities. For energy recovery, Ecopneus has entered into transfer agreements with 20 authorized facilities in Italy and abroad, of which 14 were actually used in 2015. Finally, Ecopneus works with three companies authorized for the recovery of ELTs as materials for engineering works (in particular the coverage of landfills).

Logistics

The first link in the Ecopneus system's value chain is collection, which is necessary to be able to intervene in a capillary way at tens of thousands of ELT generation points (ELTGP) distributed throughout the country.

Collection logistics in the Ecopneus system

No. of ELTGP served	25,369
No. of missions performed	73,116
No. of km travelled	8,929,139
Average weight of manual loads (t)	1.86
Average weight of crate loads (t)	4.43

ELT generation points served and collection details by region and province

No. ELTGP*	Region	Provincia	Tonnes collected
		L'Aquila	1,528
050	A1.	Pescara	1,288
850	Abruzzo	Teramo	1,482
		Chieti	2,307
400	Dilit-	Matera	1,312
408	Basilicata	Potenza	2,239
		Catanzaro	1,902
		Cosenza	4,415
1,162	Calabria	Crotone	1,136
1,102	Cutubila	Reggio di Calabria	3,574
		Vibo Valentia	827
		Naples	9,812
		Avellino	1,842
1,780	Campania	Benevento	1,461
		Caserta	3,387
		Salerno	6,385
		Bologna	3,532
	Emilia Romagna	Ferrara	1,490
		Forli-Cesena	1,316
		Modena	4,277
2,059		Parma	3,152
2,037		Ravenna	1,282
		Reggio nell'Emilia	3,198
		Rimini	1,248
		Piacenza	1,911
	- · · ·	Gorizia	502
77	Friuli Venezia	Pordenone	600
77	venezia Giulia	Trieste	771
	Giulia	Udine	1,894
		Frosinone	3,628
		Latina	2,707
2,235	Lazio	Rieti	732
		Roma	12,640
		Viterbo	996
		Genoa	1,703
577	Liguria	Imperia	260
577	Liguria	La Spezia	1,178
		Savona	273

No. ELTGP*	Region	Provincia	Tonnes collected
		Bergamo	3,285
		Brescia	3,749
		Como	1,247
		Cremona	1,060
		Lecco	1,030
		Lodi	764
3,580	Lombardy	Mantova	918
		Milan	6,877
		Monza e della Brianza	2,089
		Pavia	1,368
		Sondrio	861
		Varese	3,601
		Ancona	1,866
		Ascoli Piceno	1,147
873	Marche	Fermo	1,073
		Macerata	1,496
		Pesaro and Urbino	1,701
271	Molise	Campobasso	1,262
2/1	Monse	Isernia	521
		Alessandria	1,163
		Asti	348
		Biella	56
055	B's Losson	Cuneo	1,081
855	Piedmont	Novara	940
		Turin	1,625
		Verbano-Cu- sio-Ossola	537
		Vercelli	88
		Bari	7,452
		Barletta-An- dria-Trani	1,998
1,348	Apulia	Brindisi	1,827
		Foggia	4,295
		Lecce	3,077
		Taranto	2,503
		Cagliari	4,097
		Carbonia-Igle- sias	648
		Medio Campi- dano	967
791	Sardinia	Nuoro	1,538
		Ogliastra	616
		Olbia-Tempio	1,494
		Oristano	1,071
		Sassari	1,462

		Bologna	3,532				Pesaro and Urbino	1,701
		Ferrara	1,490					12/2
		Forli-Cesena	1,316		271	Molise	Campobasso 	1,262
		Modena	4,277				Isernia	521
050	Emilia	Parma	3,152				Alessandria	1,163
,059	Romagna	Ravenna	1,282				Asti	348
		Reggio nell'Emilia	3,198				Biella Cuneo	56 1,081
		Rimini	1,248		855	Piedmont	Novara	940
		Piacenza	1,911				Turin	1,625
	Friuli	Gorizia	502				Verbano-Cu- sio-Ossola	537
77	Venezia	Pordenone	600				Vercelli	88
′′	Giulia	Trieste	771		1,348		Bari	7,452
	Giulia	Udine	1,894				Barletta-An-	
		Frosinone	3,628				dria-Trani	1,998
		Latina	2,707			Apulia	Brindisi	1,827
,235	35 Lazio	Rieti	732				Foggia	4,295
		Roma	12,640				Lecce	3,077
		Viterbo	996				Taranto	2,503
		Genoa	1,703				Cagliari	4,097
577	Liguria	Imperia	260				Carbonia-Igle- sias	648
	8	La Spezia	1,178				Medio Campi-	967
		Savona	273		701		dano	1.500
					791	Sardinia	Nuoro	1,538
							Ogliastra	616
							Olbia-Tempio	1,494
C-1							Oristano	1,071
o. of EL	Γ generation p	ooints					Sassari	1,462

No. ELTGP*	Region	Provincia	Tonnes collected	
		Agrigento	1,757	
		Caltanissetta	1,202	
		Catania	5,194	
		Enna	803	
1,873	Sicily	Messina	3,306	
		Palermo	3,602	
		Ragusa	1,575	
		Syracuse	1,486	
		Trapani	1,740	
		Arezzo	1,272	
		Florence	3,920	
		Grosseto	1,640	
		Livorno	1,249	
2,494	Tuscany	Lucca	1,154	
2,474	luscally	Massa-Carrara	1,040	
		Pisa	916	
		Pistoia	1,440	
		Prato	1,013	
		Siena	1,540	
289	Trentino	Bolzano/Bozen	2,772	
	Alto Adige	Trento	6,483	
219	Umbria	Perugia	4,111	
219	Ollibila	Terni	1,022	
18	Valle d'Aosta	Valle d'Aosta	56	
		Padua	3,358	
		Belluno	786	
		Rovigo	1,028	
3,610	Veneto	Treviso	3,447	
		Venice	3,065	
		Verona	4,778	
			3,891	
Р	ick-up fro	m historica	l sites	
	Castelletto di Branduzzo (PV) site			
Total ro	Total routine collection			

Month	Tonnes collected (including Castelletto)
January	21,731
February	18,710
March	18,703
April	19,124
Мау	22,306
June	21,828
July	22,264
August	13,566
September	22,830
October	23,926
November	23,428
December	12,912
Total	241,328

Use of 30% operating surplus	Tonnes collected
Castelletto	768
Battipaglia	996
Eboli	2,806
Rapolano Terme	1,670
Total	6,241
Terra dei fuochi	397

^{*} No. (

In 2015 the ELT pick-up service guaranteed by the Ecopneus system's collection companies covered 25,369 generation points such as tyre fitters and repair shops (mostly), but also gas stations, body shops and vehicle dealer shops, corporate fleets, government agencies, and farms for a total of 73,116 missions performed (290 per day on average) and an estimated almost 9 million km travelled. Of the total number of ELTs collected in the system, 42% came from the southern regions and islands, 38% from the north of the peninsula and 20% from the centre.

Ecopneus plans and monitors the collection in order to guarantee the complete traceability of the waste. The ELTGP send pick-up requests to Ecopneus' collection companies that are managed in real time through a dedicated online platform. Once the service has been performed, the collection companies communicate the amount picked up and the loading means used. On average, 1.86 tonnes of ELTs were picked up manually and 4.43 tonnes were loaded from crates provided to those generation points that produce the most ELTs.



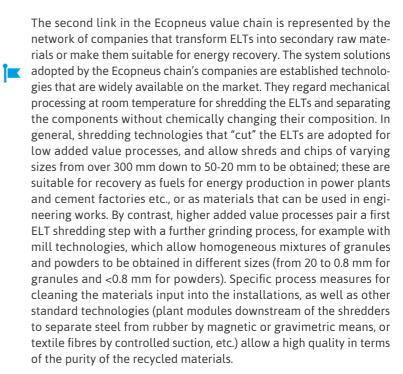
The 36 transport companies subsequently travelled over 2.6 million kilometres for sorting the ELTs to recycling and recovery plants, performing 15,449 missions, 2,111 of which for sending whole ELTs from collection centres directly to energy recovery facilities, 10,670 for sending whole ELTs from collection centres to shredding plants, and 2,578 for delivering shreds and chips from shredding centres to energy recovery facilities. Also in this case, the sorting of ELTs to the processing facilities is coordinated by Ecopneus through a computerized management system. As a strategic objective, the sorting of ELTs to the facilities is performed with a priority given to delivery to companies that perform material recovery over those that perform the preparatory treatments for energy recovery.

Logistics of ELT transports in the Ecopneus system

	Number of missions	km travelled
Transport of whole ELTs to energy recovery	2,111	365,337
Transport of whole ELTs to shredding centres for processing	10,760	1,791,633
Transport of processing products to energy recovery	2,578	504,400
Total	15,449	2,661,370*

* of which: Transport by road 98.96% Transport by sea 1.04%

Processing



The shredding of the ELTs managed in the Ecopneus system was carried out by 29 companies. In confirmation of the chain's vocation for recycling, 18 companies processed ELTs for the exclusive production of rubber polymer granules and powder (two in the north, six central, eight in the south and islands, and two abroad in Austria and Germany), five exclusively produced shreds and chips (one in the north, one central, three in the south and islands), and six performed mix operations (three in the north, one central, and two in the south and islands).

Processing of ELTs in the facilities of the Ecopneus chain

Product					f process acility	sing	
	Granules and powder (t)	Shreds and chips (t)	Steel (t)	Textile fibres (t)	Granules and powder	Shreds and chips	Mixed
Production total	71,580	109,435	23,625	8,452	18	5	6
North	18%	40%			2	1	3
Central	37%	4%			6	1	1
South and islands	42%	56%			8	3	2
Foreign	3%	-			2	-	-

Of the amount of rubber polymer granules and powder produced and destined for the recycling market, 42% was produced in the southern regions and islands, 37% was produced in the central regions of the peninsula and 18% was produced in the north; the remaining 3% was produced in two foreign plants. The southern regions and islands produced the largest quantities of shreds and chips (56% of the total), while the northern regions produced 40% and the central ones produced 4%. All the steel recovered in the processing facilities was sold to steel mills and foundries.

Energy recovery

In 2015, the recovery of ELTs as fuel for energy production was carried out in 14 plants – 11 cement factories and three power plants for electricity production.

Energy recovery of ELTs in the plants of the Ecopneus system

		Power station	Cement factories
Total ELTs to the energy recovery plants by macro area	150,241 t	3	11
North	50%	1	2
Central	7%	1	
South and islands	9%	1	1
Foreign	34%		8

66% of the ELTs recovered (which includes whole ELTs and ELTs shredded into shreds and chips) were recovered in six plants for the production of cement and electricity in Italy, primarily in the north. The remaining 34% (which includes the textile fibres separated from the shredding of ELTs for the production of granules and powders) were sent to foreign cement factories in Morocco, Turkey, Romania, Austria and Germany. Also in this case, the management of the transfers is coordinated by Ecopneus, which strategically directs the flows of materials, favouring a contribution to national recovery plants.

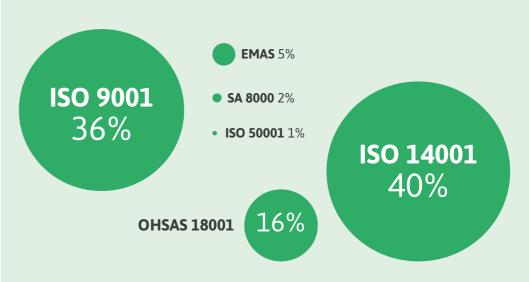
Certifications in the Ecopneus system

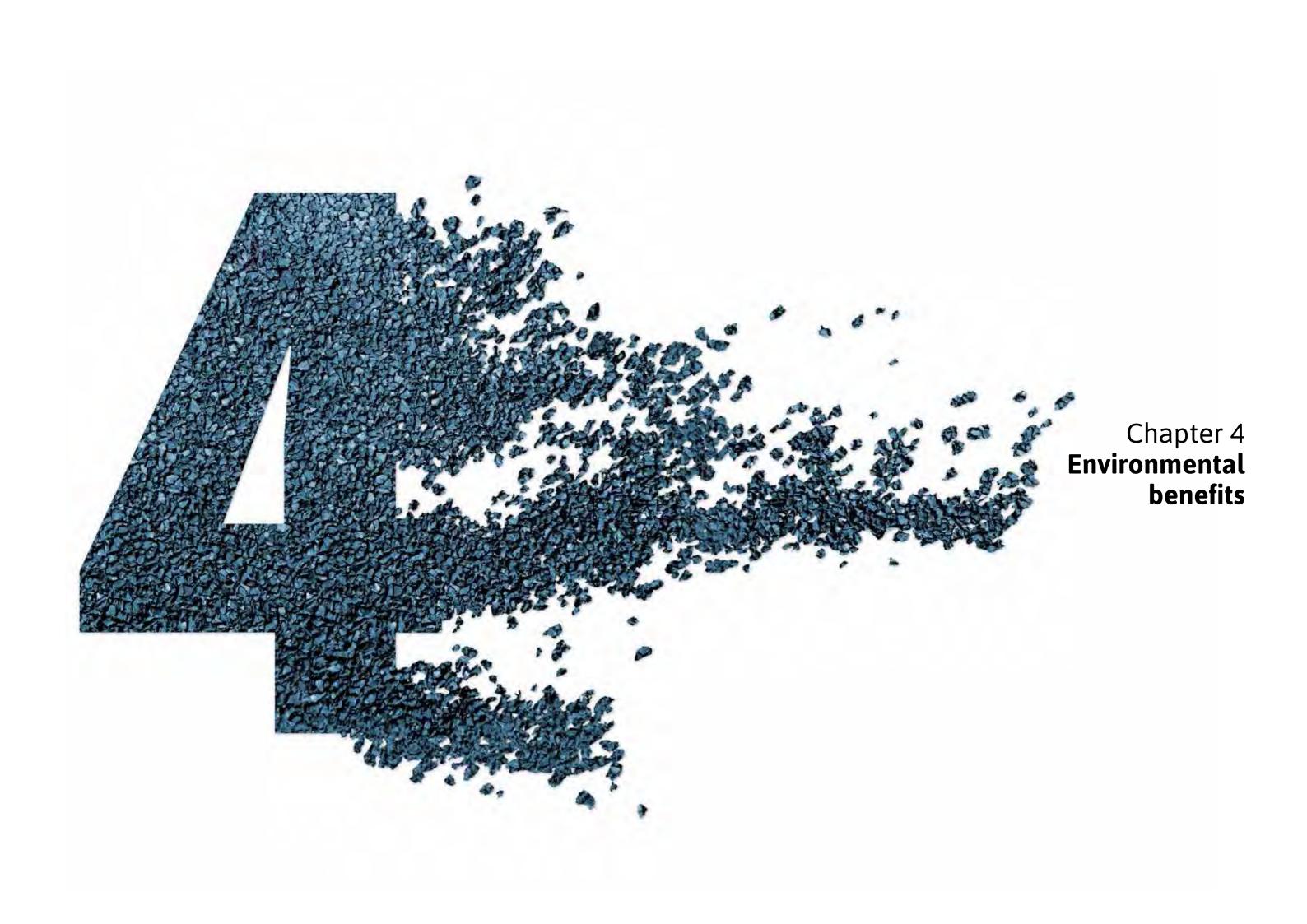
In 2015 Ecopneus concluded the processes for the ISO 9001 quality certification and ISO 14001 environmental certification, both issued by Bureau Veritas, and renewed the chain's auditing scheme in collaboration with TUV-Italy, which performs compliance checks among companies (including subcontractors). The checks consist of document examinations, for example to assess the completeness of regulatory approvals, and especially of site visits to facilities to verify their compliance with legal requirements as well as specific requirements for environmental protection, safety at work, and process and product quality, many of which are related to ISO standards and EMAS. The new Ecopneus regulation consists of a checklist of over 140 points, including many related to issues such as the adequacy of environmental emergency management systems, pollution (air, water, and soil) monitoring and protection systems, the management of process waste, the level of noise emissions, the healthiness of the work environment, fire prevention, plant and machinery safety, energy efficiency, and product quality.



The audits carried out in 2015 involved 45 collection companies and processing plants for over 6000 aspects checked: a total of 11 non-compliances were found and there were 70 observations, 192 comments and 45 positive aspects, all of which were promptly evaluated by Ecopneus' managers to encourage companies to carry out the actions necessary for improvement. In any case, compared to previous years, the audits performed showed a marked improvement and ascertained the compliance of the companies' work with the requirements contained in AIA or ordinary authorizations. Furthermore, all of the collection companies and 66% of the processing companies for recovery and recycling have adopted one or more of the standard environmental, quality, protection and occupational safety certification schemes.

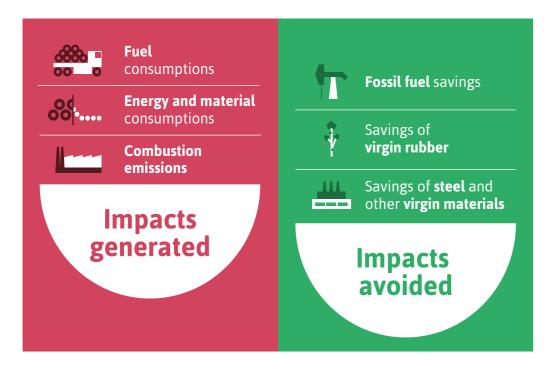
Spread of certification standards in the Ecopneus chain





The scope of environmental reporting

The scope of reporting of the Ecopneus environmental balance



Unlike the indicators used in traditional sustainability reports, which only measure the direct impacts generated by a production activity, at most extending the accounting to the so-called "value chain", the environmental footprints approach adopted in a green economy report widens the scope of analysis to include the indirect or life cycle impacts of the process and the environmental effects of the product put into circulation.

The process life cycle impacts are connected, for example, to all the consumables that feed the production process (but also to all the infrastructures and equipment that make them possible). Thus, for example, in quantifying the carbon footprint, the consumption of a certain amount of diesel fuel used to power a certain production process not only produces emissions, which we call direct, that are connected to the combustion of the diesel, but also emissions that are connected to the entire life cycle of the fuel, i.e. those generated during the production and marketing of the fuel itself: from the extraction of the oil from reserves to transport to refineries, refining, storage, and distribution.

The green economy report also assesses the environmental impacts produced by placing the output of the production process – the product – on the market. In the case of a product resulting from the ELT recovery process, for example, the emissions saved with respect to another product that is equivalent in terms of performance and type of use, but produced from virgin raw material, will be accounted for. In this way, by extending the analysis of the impacts to the entire life cycle of the production process (but also of the product, up to the end-of-life) and including a differential analysis of the impacts associated with a product as opposed to its traditional equivalent, a much broader

assessment of the activity is obtained that is closer to what we consider a "green economy assessment".

Quantification of the negative environmental impacts

The in-depth look at the processes considered to assess the negative life cycle impacts in the scope of reporting of the Ecopneus system includes:

- all the transport phases of the ELTs and their derivatives;
- the processing operations;
- the recovery of ELTs as fuel for energy production.

For the processes necessary for recovery, the specific impacts of shredding are considered, in a differentiated manner, for the different sizes produced: shreds, chips and granulates. For ELTs (whole or shredded) sent to energy recovery, the impacts of the combustion of the ELT organic matrix (rubber compound and textile fibres) are considered, regarding the portion of emissions of the natural rubber component in the tyre to be carbon neutral.

Quantification of the environmental benefits

The environmental benefits of the life cycle resulting from the recycling and energy recovery of ELTs in the scope of reporting of the Ecopneus system are assessed with the replaced product methodological approach, calculating the impacts avoided from the production and consumption of equivalent materials. In particular:

- for ELTs sent to energy recovery in cement factories, the avoided impacts regard both the replacement of coal and petroleum coke for the amount of thermal energy avoided thanks to the use of ELT as fuels, and the replacement of iron oxides and other binders thanks to the steel and combustion ashes that remain embedded in the concrete;
- for ELTs sent to energy recovery in power plants, the impacts avoided regard the production of the same amount of electricity with the national energy mix;
- for steel separated during the shredding stages and downstream of combustion in power stations, the avoided impacts regard recycling as scrap iron in steel mills;
- for ashes separated downstream of combustion in power stations, the avoided impacts regard recycling as a binder for the production of cement or as a material for road infrastructures;
- for rubber polymer recycled into granules and powder, the impacts avoided concern the production of the component materials of a tyre's rubber compound (natural and synthetic rubber, carbon black, zinc oxide, and other additives) from virgin raw material.

50

Balance of the avoided emissions

-362,794

tonnes of CO, equivalent

Avoided emissions

31.2%

Recycling of ELT granules and powder Recycling of steel and other materials

8.4%

3.7%

Electricity avoided vs. national mix from ELTs to energy recovery

56.8%

Thermal energy avoided vs. pet coke from ELTs to energy recovery in cement factories

Total avoided emissions

-571,246

thousand tonnes of tCO, equivalent

Generated emissions

9.8%

11.0%

Logistics

11.6%

electrical plants

67.6%

cement factories

Total generated emissions

208,452

thousand tonnes of tCO, equivalent

What the carbon footprint is

The carbon footprint is measured in kilograms of CO₂ equivalent and represents the total amount of greenhouse gases emitted directly and indirectly in a product's life cycle, from the extraction of raw materials to transformation into semi-finished and finished products, up to the related waste management. It is the reference indicator used by the international community for climate impact assessments of products, including the Product Environmental Footprint (PEF) [EU Commission, 2012]. A negative value of this indicator indicates the life cycle emissions avoided through the recovery of materials or energy from a product, avoiding the use of new productions from virgin raw materials. The methodological reference adopted for calculating the carbon footprint of the Ecopneus system is the 2013 International Panel on Climate Change (IPCC).

The balance of the greenhouse gas emissions saved in 2015 from the ELT recycling and recovery management activity in the Ecopneus system amounts to a total of nearly 363 thousand tonnes of CO₂ equivalent (tCO₂eq), a value equivalent to the emissions of about 80,000 cars that travel an average of 30,000 kilometres in one year.

the emission of **363 thousand tonnes** of CO₂ equivalent saved, equal to 80,000 cars that travel **30,000** kilometres in one year

Of the total emissions generated, the main contribution is due to the recovery of ELTs as fuel in cement factories, which amounts to 141 thousand tCO₂eq (67.6% of the total). In the carbon footprint balance, these emissions are offset by 324.2 thousand tonnes of emissions saved thanks to the

fact that the ELTs used in cement factories can be replaced by other fossil fuels, in particular coal and petroleum coke, whose life cycle impacts for the production of a quantity of thermal energy equivalent to that recovered from the ELTs are very high (56.8% of the emissions avoided). In contrast, the emissions generated from the recovery of ELTs as fuel for energy production in power plants, which account for 24.2 thousand tCO₂eq of the total generated (11.6%), are not offset by the benefits resulting from the avoided production of an equivalent amount of electricity in the national electricity mix, which is equal to 20.9 thousand tCO₂eg saved (3.7% of the total emissions avoided). This is also due to the particular efficiency of the Italian electric production mix, both in terms of the contribution of renewable sources, and due to the installed capacity of energy production from combined cycle gas power plants. The balance for this recovery option, however, is again favourable for a total of 8.1 thousand tCO₂eq if we consider the impacts avoided by separating the steel and ash downstream of the ELT combustion process, which are sent for recycling in their respective chains.

Emission balance for the production of electricity with ELTs in the Ecopneus system, 2015

	tCO₂eq
Combustion and ELTs for the production of electricity	24,193
Electricity avoided in the national energy mix	-20,859
Recycling of steel and other combustion residues	-11,405
Balance of the emissions avoided	-8,070

Overall, considering all the emissions generated in the management of ELTs for energy recovery (including processes for the production of materials suitable for recycling as fuel and combustion emissions) and the benefits of avoided emissions (including the different options for recovery of materials from combustion residues), the balance of the ELT energy recovery totalled 185.4 thousand tonnes of CO₂ equivalent.

By contrast, the emissions balance of the management of ELTs for recycling into rubber polymer granules and powder amounted to 190.6 thousand tonnes of CO_2 equivalent avoided. In detail, this regards 16.7 thousand tCO_2 eq of emissions generated in the processing stages, which are compensated by 207.3 thousand tCO_2 eq of emissions avoided thanks to the recycling of the constituent materials, preventing their primary production. The largest share of emissions saved derives from the avoided production of the main components of tyres, and in particular rubber (natural and synthetic), carbon black, and steel, whose production from virgin raw materials has a high impact in the life cycle.

Comparison of the emissions balance of ELT management for energy recovery and recycling into rubber polymer granules and powder in the Ecopneus system, 2015

54

Energy recovery	tCO₂ eq
Emissions generated by the processes and by the combustion of ELTs	171,174
Emissions avoided through the replacement of other fuels and materials	-356,618
of which Replacement of other fossil fuels Recycling of steel and combustion residues	-345,044 -11,574
Balance of the emissions	-185,444
Recycling	tCO ₂ eq
Emissions generated for the production of ELT granules and powder	16,717
Emissions avoided from the recycling of the component materials	-207,294
Carbonaceous additives	-4,156
Zinc oxides	-5,669
Steel	-28,866
Natural rubber Carbon black	-46,781 -51,213
Synthetic rubber (SBR)	-70,609
Balance of the emissions	-190,577

The difference of 5.1 thousand tonnes of CO₂ equivalent in favour of ELT recycling confirms the advantage of this management option compared to energy recovery.



Recycling and energy recovery of ELTs in cement factories in the Ecopneus system

The use of ELTs as a fuel for the production of thermal energy in cement factories generates a very significant overall benefit in the Ecopneus chain in absolute terms, both because of the large quantities that are sent to this recovery process, and because the fossil fuels replaced in plants, coal and petroleum coke, have very

high life cycle emissions (due to the high specific emission coefficient of combustion, as well as to the extraction and production process).

However, taking one tonne of ELTs managed in the Ecopneus system as a reference, the benefit of the recovery of ELTs as fuels in cement production facilities is about 40% lower than that resulting from material recycling and recovery: a fact that confirms the validity of the strategy pursued by Ecopneus, which privileges material recovery and only sends the surplus that cannot be absorbed by the recycling market off for energy recovery. In any case, considering the limited size of the domestic ELT recycling market, the possibility of energy recovery from ELTs in cement factories represents a valid option from the environmental point of view.

Comparison of the balance of greenhouse gas emissions avoided for different recovery options of 1 tonne of ELTs managed in the Ecopneus system, 2015

Recovery/recycling option	tCO ₂ eq/1 t ELTs
Shredded ELTs sent to recovery in cement factories	-1.32
Whole ELTs sent to recovery in cement factories	-1.40
ELTs sent to recycling for material recovery	-2.11



Material Footprint



Balance of the saved resources

-354,960

tonnes of material

Saved resources

28.0%

Recycling of steel and

30.0%

Thermal energy avoided

vs. pet coke from ELTs

to energy recovery in cement factories

other materials

39.8%

Recycling of ELT granules and powder

2.3%

Electricity avoided vs. national mix from ELTs to energy recovery

Consumed resources

53.8%

Logistics

19.2%

4.0%

electrical plants

23.1%

cement factories

Total avoided emissions

-407,578

Total generated emissions

52,618

What the material footprint is

The material footprint is expressed in kilograms of materials and represents the total flow of mineral and fossil resources that have been extracted for the production of a particular good or service during its life cycle: from the extraction of raw materials, to processing into semi-finished and finished products, up to the management of the related waste. It is the reference indicator used by the international community for impact assessments on product resources, including the Environmental Product Declaration - International EPD System and the European Union's Beyond GDP initiative. A negative value of this indicator expresses the resources that have not been extracted and consumed thanks to the recovery of materials or energy along a product's life cycle, which allows the use of new productions from virgin raw materials to be avoided. The methodological reference adopted for the calculation of the material footprint is the inventory of the substances used in the life cycle, the Life Cycle Assessment Inventory with reference to the Ecoinvent 2014 database.

The balance of the savings of resources taken from the environment in 2015 through the ELT management activity amounts to a total of 355 thousand tonnes of materials, an amount equal to about 1,000 times the weight of an Airbus 380.

In detail, the balance includes the negative environmental impacts of the logistics, processing and energy recovery activities of the ELTs (for almost 53 thousand tonnes of resources consumed)

335 mila t thousand tonnes of resources saved. about 1000 times the

weight of an Airbus 380

and the benefits in terms of resources saved (equal to 407.6 thousand tonnes) thanks to the reuse of ELTs in recovery processes that have avoided the consumption of virgin resources for the production of the replaced products.

Unlike the carbon footprint indicator, and confirming

the utility of an overview, in this case the principal weight of the negative impacts is that of the ELT collection and transport phases, which together account for 53.8% of the consumed resources, for a total of 28.3 thousand tonnes of materials. These are mainly fossil resources consumed for the production of the fuels used by the logistics fleet: hundreds of vehicles and dozens of ships that transported the ELTs millions of kilometres during the year.

Details of the impacts of logistics in the Ecopneus system, 2015

	Tonnes of resources
Collection logistics	4,592
Ordinary target collection	92.4%
30% operating surplus collection	7.3%
"Terra dei Fuochi" extraordinary collection	0.3%
Transport logistics	23,711
Transport by road	72.8%
Transport by sea	27.2%
Total	28,303

57

Analysing the material footprint balance in detail, limited to the option of recovering the ELTs for energy production in cement factories and power stations, we can see an overall savings of resources amounting to 146 thousand tonnes. The negative impacts of processing and combustion, equal to 16.8 thousand tonnes of resources consumed, are offset by 118.2 thousand tonnes of resources saved thanks to the avoided consumption of fossil fuels for the production of an equivalent amount of energy, plus an additional 44.7 thousand tonnes of resources not consumed deriving from the portion of steel and ash recovered downstream of the combustion and sent for recycling to the respective chains, as well as the combustion residues that remain incorporated in cement as binders in place of other materials.

On the other hand, the analysis of the material footprint balance for the recycling of ELTs into rubber polymer granules and powders shows that

Comparison of the resource consumption balance between energy recovery and recycling of rubber polymer in the Ecopneus system, 2015

Energy recovery	Tonnes of resources
Impacts of preparatory processes for recovery and combustion	16,870
Benefits of energy recovery of which Replacement of other fossil fuels Recycling of steel and combustion residues	-162,882 -118,195 -44,687
Balance of the energy recovery	-146,012
Recycling	Tonnes of resources
Impacts of processes for recycling	7,361
Benefits of recycling of which	-214,114
Carbonaceous additives	-7,800
Zinc oxides	-2,486
Steel separated from the processing phases Natural rubber	-52,052 -33,156
Carbon black	-47,266
Synthetic rubber (SBR)	-71,355
Balance of the emissions avoided	-206,753

the consumption of 7.3 thousand tonnes of resources associated with the granulation processes is compensated by 214.3 thousand tonnes of resources saved thanks to the avoided production of the ELT component materials: rubber (natural and synthetic), carbon black and steel, as well as other materials present in the ELT mixtures. In this case, the overall balance is equal to 206.8 thousand tonnes of resources saved, which is approximately 44 thousand tonnes more than the recovery of ELTs for the production of energy: a further confirmation of the major advantages of recycling ELTs compared to using them as fuels.

Focus Q

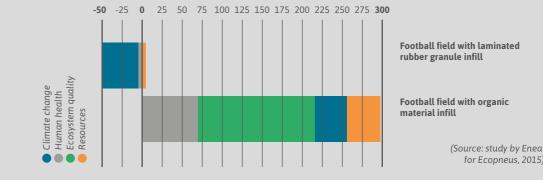
The environmental advantages of the recycling of granules as infill in football fields with artificial turf

A large portion of the ELT rubber polymer granules produced in Europe are used as performance infill in the laying of artificial turf football fields as a substitute for other materials of organic origin. In order to consolidate its strategy in support of the recycling options that offer an effective contribution to reducing pressure on the environment, in 2015 Ecopneus commissioned a study from Enea to test the advantages of recycling ELT rubber polymer granules from a life cycle point of view. In detail, the study considered the life cycle of an artificial turf football field with a surface of

7,768 m2 made using ELT rubber polymer granules produced in the Ecopneus chain as infill, in comparison with an equivalent facility in which the infill is made with materials of organic origin produced from virgin raw material (in particular imported coconut fibres and cork granules). With reference to the UNI EN 14040 standard and the LCA Impact 2002+ method of analysis, in both cases the study adopts a "cradle to grave" life cycle approach, i.e. considers all the infill production phases (starting with the virgin raw materials needed for the production of its components) to disposal, with energy recovery of the infills themselves once they have reached the end of their useful life.

The results of the comparison show that the use of virgin organic materials as infills causes an overall environmental impact of 300 ecopoints, i.e., with reference to the IMPACT 2002+ method adopted, the impact generated annually by the average consumption of 300 Europeans. By contrast, the use of infills with laminated ELT granules produced in the Ecopneus system allows the environmental impact generated annually by 50 European citizens to be avoided.

Comparison of the life cycle impacts by category of damage for performance infills of artificial turf football fields derived from ELT granules and made of an organic matrix



Water Footprint

Balance of the water not consumed

-1,776,894

Saved water

44.3%

Recycling of ELT granules and powder Recycling of steel and other materials

25.3%

4.7%

Electricity avoided vs. national mix from ELTs to energy recovery

25.8%

Thermal energy avoided vs. pet coke from ELTs to energy recovery in cement factories

Total saved water

-2,263,853

Consumed water

23.5%

23.5%

Logistics

7.7%

electrical plants

45.1%

cement factories

Total consumed water

492,959

What the water footprint is

The water footprint is measured in m3 of water and evaluates the scarcity of water due to net withdrawals of water resources and their pollution (degradation, eutrophication, toxicity and acidification) caused by the production of a particular good or service along its life cycle: from the extraction of raw materials, to transformation into semi-finished and finished products, up to the related waste management. As an impact indicator, it will be included as a reference indicator in the next update of the Product Environmental Footprint (PEF) regulation [EU Commission 2012]. A negative value of this indicator expresses the amount of water not consumed and not contaminated thanks to the recovery of material or energy along the life cycle of a good, avoiding the use of new productions from virgin raw materials. The methodological reference adopted for calculating the water footprint was developed by Hoekstra et al. (University of Twente, The Netherlands) and is called "water scarcity".

In 2015, the management of ELTs in the Ecopneus system made it possible to avoid the consumption of about 1.78 million m3 of water, a volume equivalent to 710 Olympic swimming pools.

1.78 million cubic meters of water not consumed. equivalent to 710 Olympic swimming pools

The impacts regard 493 thousand m3 of water consumed. of which 261 thousand m3 (52.9% of the total) are due to the recovery of ELTs as fuels in plants for the production of thermal energy and electricity. The impacts of the collection and transport logistics account

for 115.8 thousand m3 (23.5%), while processes in preparation of ELT recycling and recovery in the chain regard 23.6% of the overall impacts for a total of 116.4 thousand m3.

To offset the impacts, the overall benefits of ELT recycling and recovery in the Ecopneus system regard just under 2.3 million m3 of water not consumed, of which the main contribution, once again, comes from the recycling of ELTs for the production of rubber polymer granules and powders (44.3%) for a total of about 1 million m3 of water not consumed, against 691 thousand m3 of water saved through the energy recovery of ELTs in cement factories (25.8%) and power plants for electricity production (4.7%). The recovery of steel and other materials, finally, accounts for 25.3% of the savings, for a total of about 573 thousand m3 of water not consumed.

As already seen for the carbon and material footprint indicators, also in this case the details of the balance of the two main ELT management options in the Ecopneus system show how recycling for the production of rubber polymer granules and powder generates a net life cycle benefit with respect to energy recovery, quantified at 702 thousand m3 of water not consumed or contaminated.

Comparison of the balance of water consumption between energy recovery and the recycling of rubber polymer in the Ecopneus system, 2015

62

Energy recovery	m³ of water
Impact of the preparatory processes for recovery and combustion	291,222
Benefits of energy recovery	-840,112
of which Replacement of other fossil fuels Recycling of steel and combustion residue ash	-691,211 -148,901
Balance	-548,890
Recycling	m³ of water
Impact of recycling processes	85,898
Benefits of recycling	-1,337,403
of which Carbonaceous additives Zinc oxides Steel separated from the processing phases Natural rubber Carbon black Synthetic rubber (SBR)	-44,101 -8,314 -332,111 -195,265 -271,873 -485,739
Balance	-1,251,505



The environmental benefit of the recovery of ELT rubber polymer powder in the production of modified asphalt

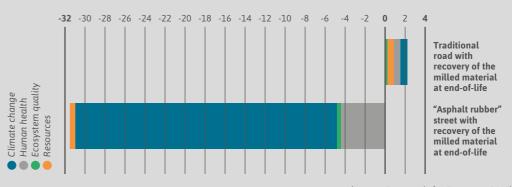
One of the applications with the greatest potential for the recycling of ELT-derived rubber polymer powder regards its use as an additive in bituminous conglomerates for the production of rubberized asphalt: a technology that allows thicknesses to be reduced and an increase in the useful life of road surfaces with a positive effect for the environment and the economy. In this framework, in 2015 Ecopneus charged Enea with quantifying the environmental benefit of road surfaces made of rubberized asphalt compared with those made of traditional asphalt.

The life cycle study elaborated by Enea considers a stretch of road pavement with a surface equal

to 2,650 m2 (corresponding to a section of road 2.65 meters wide and 1 km long) made with a traditional asphalt, composed of bitumen and inert materials, compared to an equivalent tract of pavement made using the rubber asphalt technology, in which a portion of inert materials mixed with the bitumen is replaced by rubber polymer powder recycled from ELTs. With reference to the UNI EN 14040 series standard and the LCA Impact 2002+ method of analysis, in both cases the study adopts a "cradle to grave" life cycle approach, i.e. considers all the production phases of the road surface (starting with the virgin raw materials necessary for the production of its components), as well as the recycling of the pavement for the production of new bituminous conglomerates once the end of useful life has been reached.

The results of the comparison show that the pavement made with traditional asphalt causes an environmental impact equal to about 2 ecopoints, i.e., with reference to the IMPACT 2002+ method, equivalent to that generated annually by the consumptions of two European citizens. By contrast, an equivalent stretch of road pavement made using asphalts modified with ELT rubber polymer powder produced in the Ecopneus chain allows an environmental impact equal to that generated each year by the consumptions of 31 European citizens to be avoided.

Comparison of the life cycle impacts by damage category of a road pavement made with rubberized and traditional asphalt



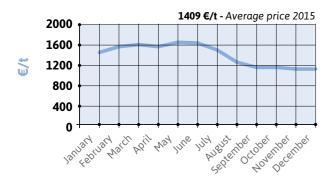
(Source: Enea study for Ecopneus, 2015)



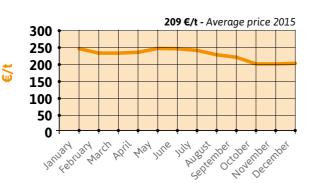
Economic benefits for the country

In addition to environmental benefits, end-of-life tyre recovery activities also have positive effects for the nation's economy, starting with a reduction of dependence on foreign countries for the supply of raw materials, with a net positive advantage to the trade balance. Recycling of ELT rubber polymer as a secondary raw material for the production of goods, for example, allows the import of virgin rubber (natural and synthetic), whose average value on the commodities market in 2015 was higher than €1,400/t, to be avoided. The same holds true for the recycling of steel, whose value as scrap iron was on average above €200/t.

Natural rubber (Source: World Bank)

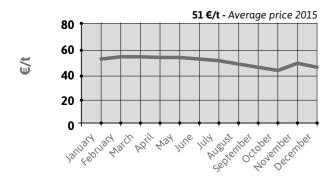


Scrap iron (Source: Eurofer)

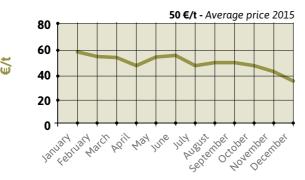


The recovery of ELTs for energy production is also a beneficial way to replace imported energy commodities, even if with a much lower economic benefit than recovery as materials. The use of ELTs as fuel in cement factories or in power plant boilers for the production of energy, in fact, allows the replacement of other fossil fuels, including coal, whose average market value in 2015 was equal to €51/t (about 30 times less than virgin rubber). Furthermore, the recovery of ELT steel as a binder in concrete allows the replacement of iron ore in the production process, the 2015 market value of which stood on average at about €50/t (about 4 times less than scrap iron).

Coal/coke (Source: World Bank)

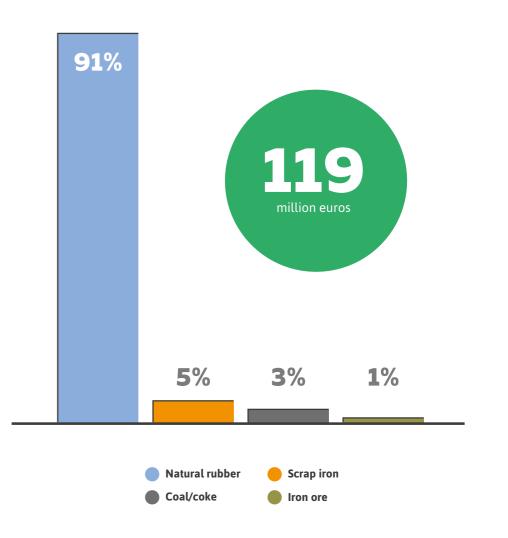


Iron ore (Source: World Bank)



Expressed in monetary terms with respect to the market value of these raw materials, in 2015 the savings on imports generated for the country by the management of ELTs in the Ecopneus system amounted to an estimated total of about 119 million euros, of which 91% can be attributed to the recycling of rubber polymer into granules and powders, confirming how the recycling of ELT rubber provides greater added value than recovery as fuel in both economic and environmental terms. This is a significant value, obtained above all in a negative situation for the green economy and for the recycling sector, with falling prices of key raw materials.

Savings for the country on imports of raw materials generated by the recovery of ELTs in the Ecopneus chain in 2015



Ecopneus financial statement

	2015	2014	2013
Economic value generated	62.358.374	65.643.130	73.932.878
Revenues from environmental contributions	62.257.448	65.565.382	73.823.842
Other revenues	100.926	77.748	109.036
Economic value distributed	64.172.812	66.687.066	68.379.805
Total cost to suppliers (goods and services)	62.649.491	65.271.518	64.827.841
suppliers of the operations chain	56.562.096	59.266.215	58.991.901
other suppliers	6.087.395	6.005.303	5.835.940
to personnel	1.151.119	1.127.513	1.090.541
to the corporate bodies (Board of Directors)	0	0	0
to the public administration	181.792	219.769	2.143.966
to capital providers	190.409	68.266	317.457
Economic value withheld	0	0	3.248.338
provisions for the year	914.181	1.493.115	2.198.182
depreciation and amortization	135.257	179.063	912.590
Operating surplus (profit/loss for the year)	-2.863.876	-2.651.023	4.640.483
30% operating surplus for interventions on historical stocks (Art. 3, paragraph 5, Ministerial Decree 82/2011)	0	0	1.392.145

Reclassified financial statement according to the scheme of the Global Reporting Initiative (GRI-G4) international standard from the data of the Ecopneus financial statements - amounts in euros

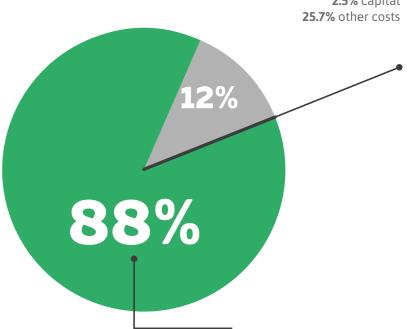
The benefits to society of the activities carried out by the Ecopneus consortium system are the result of the efficient use of the **economic value generated** by the environmental contributions paid by consumers when buying a new tyre, amounting to over 62 million euros in 2015. By contrast, the **economic value distributed**, defined as the sum of the costs incurred in support of the direct management activities, net of the provisions and depreciation for the period, amounted to 64.173 million euros, of which 88% was used to remunerate the chain's companies for the activities performed (collection, transport, processing,

energy recovery and recycling of ELTs). The remaining 12% was used to cover the costs of personnel, communication and projects (which impact the total general costs by over 50%), taxes and other general operating costs.

Breakdown of the economic value distributed in the Ecopneus system in 2015

General costs

54.4% development projects and communication
15% personnel
2.4% taxes
2.5% capital



Chain costs

46% collection

12% transports

18% shredding for granules and powder

16% shredding/chipping

6% energy recovery

0.1% infrastructure recovery

1.8% other costs not distributed (30% operating surplus)

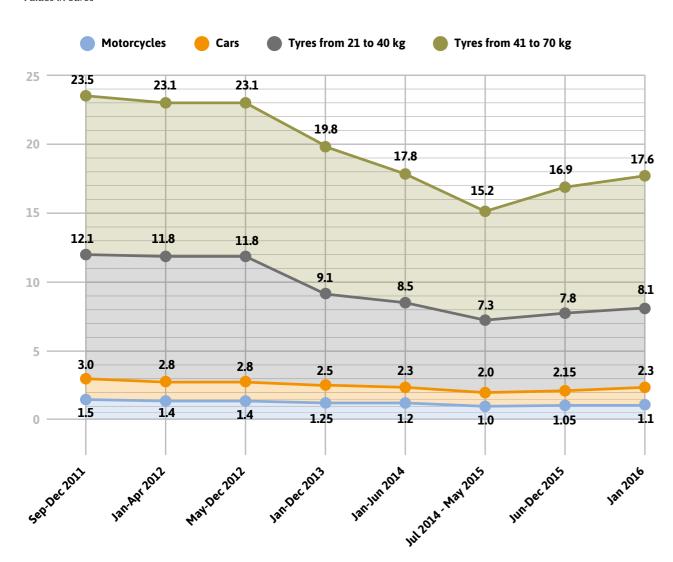
As in 2014, also in 2015 the **negative balance** between the year's income and expenditures has been covered by drawing on the reserves composed of the surpluses of prior years, resulting in a further reduction of the consortium's net assets. The need to take action to compensate for the losses of the last two years, aimed at bringing the balance sheet to an equilibrium compatible with the prerogative of the consortium's sound economic and financial management, has led the Ecopneus Board of Directors to approve an increase in the environmental contributions applied to the sale of tyres placed on the replacement market, after years of continuous decline.

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	Motorcycles	Cars	Tyres from 21 to 40 kg	Tyres from 41 to 70 kg
Sep-Dec 2011	1.5	3	12.1	23.5
Jan-Apr 2012	1.4	2.8	11.8	23.1
May-Dec 2012	1.4	2.8	11.8	23.1
Jan-Dec 2013	1.25	2.5	9.1	19.8
Jan-Jun 2014	1.2	2.3	8.5	17.8
Jul 2014 – May 2015	1	2	7.3	15.2
Jun-Dec 2015	1.05	2.15	7.8	16.9
Jan 2016	1.1	2.3	8.1	17.6

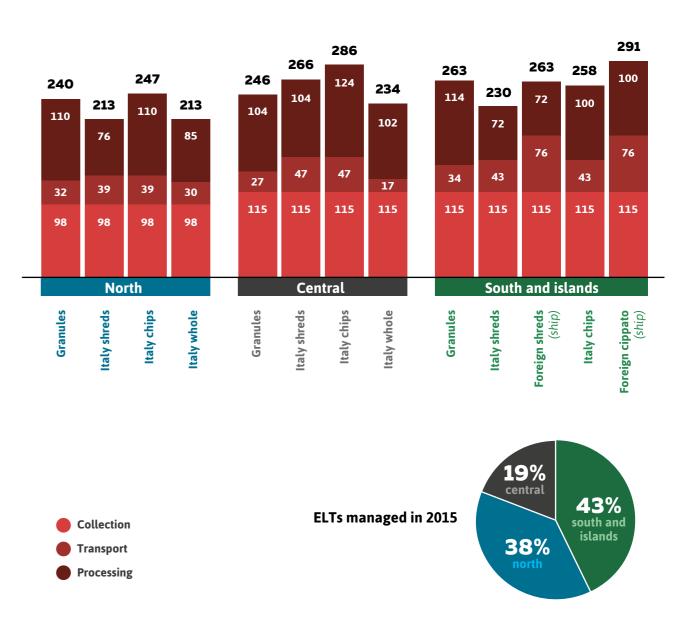
Values in euros

70



The deficit in the consortium system's 2015 balance sheet is due to a number of causes, some of which have already been discussed, and not least of which the lower flow of environmental contributions due to a decrease, as compared to the budget forecasts, in the sale of new tyres by the Ecopneus partners. With regard to the increase in operating costs, the highest impact is due to the quantities of ELTs collected, which as in previous years went beyond the legal target and for which Ecopneus receives no contribution. Secondly, the increase in ELT recycling (as compared to energy recovery) for the production of rubber polymer granules and powder has also had an impact. This has been concentrated mainly in the central and southern regions, where business costs for both collection and shredding are higher than in other parts of the country due to the different orography of the region, population density, and the competitive structure of the system of companies.

ELT management costs by type of recovery and geographic macro-area (values expressed in €/t)



Cross-checking an analysis of the financial data with information on operations, it can be seen that 62% of the ELTs were collected in the central regions (19%) and the south and islands (43%), with an average management cost for Ecopneus of \in 115/t. On the other hand, the collection carried out in the northern regions covered 38% of the total ELTs with an average cost of \in 98/t: an average difference of \in 17/t which, given the amounts needed to achieve the target and those of the extra collection in these regions, has had a decisive impact on the increase in total costs incurred by the consortium.

Albeit to a lesser extent than collection, another aspect that has contributed to the increase in Ecopneus' operating costs in 2015 is related to the increase in the market demand for ELT recycled rubber granules and powder that occurred during the year. This resulted in an increase in requests for ELTs for recycling materials from the system's companies, which was promptly sustained by Ecopneus, whose strategy includes prioritizing recycling for the recovery of ELTs. The largest increase in demand for ELTs for recycling was concentrated among businesses in the southern regions, which have shifted a significant amount of ELTs destined for the production of shreds, at an average operating cost for Ecopneus of €230/t, towards the production of rubber polymer granules and powder; Ecopneus' management cost for the latter is equal to €263/t.

As part of an economic comparison of the main ELT management options in the Ecopneus system, it is worth noting that the recycling of ELTs into rubber polymer granules and powders is always preferable to the energy recovery option when the ELTs are transformed into chips to be used as fuel in cement factories. The "free at destination" management costs of these products, in fact, are on average higher than the recycling of ELTs into granules and powder independently of the geographical area in which they are managed. Differently, the management of ELTs as whole tyres and shreds results in a price competition with the recycling of materials, albeit with significant differences between macro-areas of the country.

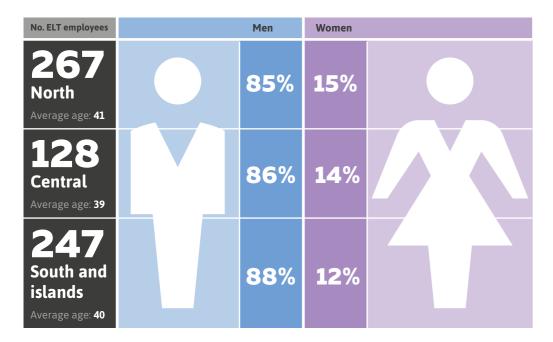
Employment in the Ecopneus system

The end-of-life tyre collection and recovery activities performed in the Ecopneus chain are based on the contribution of a total of 642 workers employed by the system's companies for the sole management of ELTs, predominantly men (87%), with an average age of about 40 years. With respect to the employment survey conducted in 2014 on the companies themselves, there was a slight reduction in the total number of employees dedicated to the Ecopneus ELT management activities (-8%). As also stated by the companies during Ecopneus' review of this information, this decline is not necessarily attributable to a reduction in employment, but rather to a reallocation of human resources employed in the various activities carried out, considering the fact that 70% of the companies involved in the Ecopneus system are also involved in other activities.

Macro area	Region	No. of ELT employees	Men	Women	Average age	Higher education
North	Emilia Romagna	41	85%	15%	44	44%
	Friuli Venezia Giulia	15	73%	27%	38	47%
	Liguria	9	89%	11%	37	22%
	Lombardy	85	87%	13%	42	39%
	Piedmont	27	85%	15%	42	48%
	Trentino	17	87%	13%	39	52%
	Veneto	73	89%	11%	43	27%
Central	Lazio	35	77%	23%	41	74%
	Marche	26	88%	12%	40	65%
	Tuscany	35	94%	6%	40	63%
	Umbria	32	86%	14%	35	40%
South and Islands	Abruzzo	9	78%	22%	39	44%
	Basilicata	34	88%	12%	37	26%
	Calabria	26	92%	8%	35	52%
	Campania	74	91%	9%	42	33%
	Apuglia	49	85%	15%	40	53%
	Sardinia	19	89%	11%	43	58%
	Sicily	36	94%	6%	46	47%
National total		642	87%	13%	40	46%

In addition to these employees, in 2015 for the first time Ecopneus also estimated the labour force employed by the system's transport companies involved in sorting ELTs from collection centres to recovery and processing facilities (46 equivalent units), as well as the employment generated by the micro-collection activities carried out by small local transport companies on behalf of the Ecopneus system's collection centres (93 equivalent units). These are an additional 139 workers, mostly drivers, who bring the total workforce permanently employed thanks to Ecopneus ELT management to a total of about 780 units.

Employment in the Ecopneus system



The employees of Ecopneus itself can be added to this photograph of the 2015 employment among the system's companies; without their daily work in the executive offices of Milan and throughout the country among companies, none of that which has been reported in this 2015 Green Economy Report, as a contribution to the country's green economy given by the ELT recovery sector, would have been possible.

Ecopneus employees

No. of employees	11	Level of	High school	
Average age	43	education	College or master's degree	
Gender	† 8	Seniority	3-5 years 5	
Genuer	‡ 3	Semonty	6-10 years 6	

The Social **Footprint** certification

The Social Footprint (SFP) certification is a tool that allows an organization to communicate the ethical and social value of its products, making it clear to the market "who" is behind a product, as well as the commitment to stimulating the continuous improvement of the ethical and social conditions along the production value chain. As reported in the certification regulation published on www. socialfootprint.it, in fact, a company that intends to certify a product according to the SFP scheme commits to providing a series of information on the organization of its production structure (for example in terms of the number, gender, and level of education of its employees, signed collective agreements, applied pay conditions, accidents at work, etc.), as well as on the supply chain in the case of suppliers that depend on the product in question for over 50% of their revenues. In addition, the SFP product certification requires the company to respect and to ensure respect in the supply chain of the OECD Guidelines for Multinational Enterprises, the principles set out in international conventions on human and labour rights (Universal Declaration of Human Rights, United Nations Convention on the Rights of the Child) and the laws of the country in which it operates, as long as these are not worse than the provisions of the ILO conventions. In addition, it agrees to enforce mandatory rights within the scope of the SFP itself.

In this framework of rules and opportunities, Ecopneus certified the ELTs managed in the system with the Social Footprint certification in 2015: a further contribution to qualifying the value of ELTs in the national green economy and on the market through the social identity of the chain companies that recover and recycle them.











Ecopneus - www.ecopneus.it

SFP-P2386 Certified by: Certiquality



Organization: Medium company













National suppliers





International suppliers

2 Turkey

Suppliers with mainly turnover with the organization (>50%)











Suppliers monitored: 57%

Other information: Each year Ecopneus guarantees the recovery and recycling of 100% of the tyres sold on the market by its members, approximately 250,000 tonnes of end-of-life tyres, which are transformed into recycled rubber for applications in sports, asphalt, construction and more.

The company's commitment to the entire chain to respect child labour laws with reference to the ILO and national legislation of reference.

The commitment of the suppliers of the product chain to respect the SFP principles.

Further information is available at www.ecopneus.it





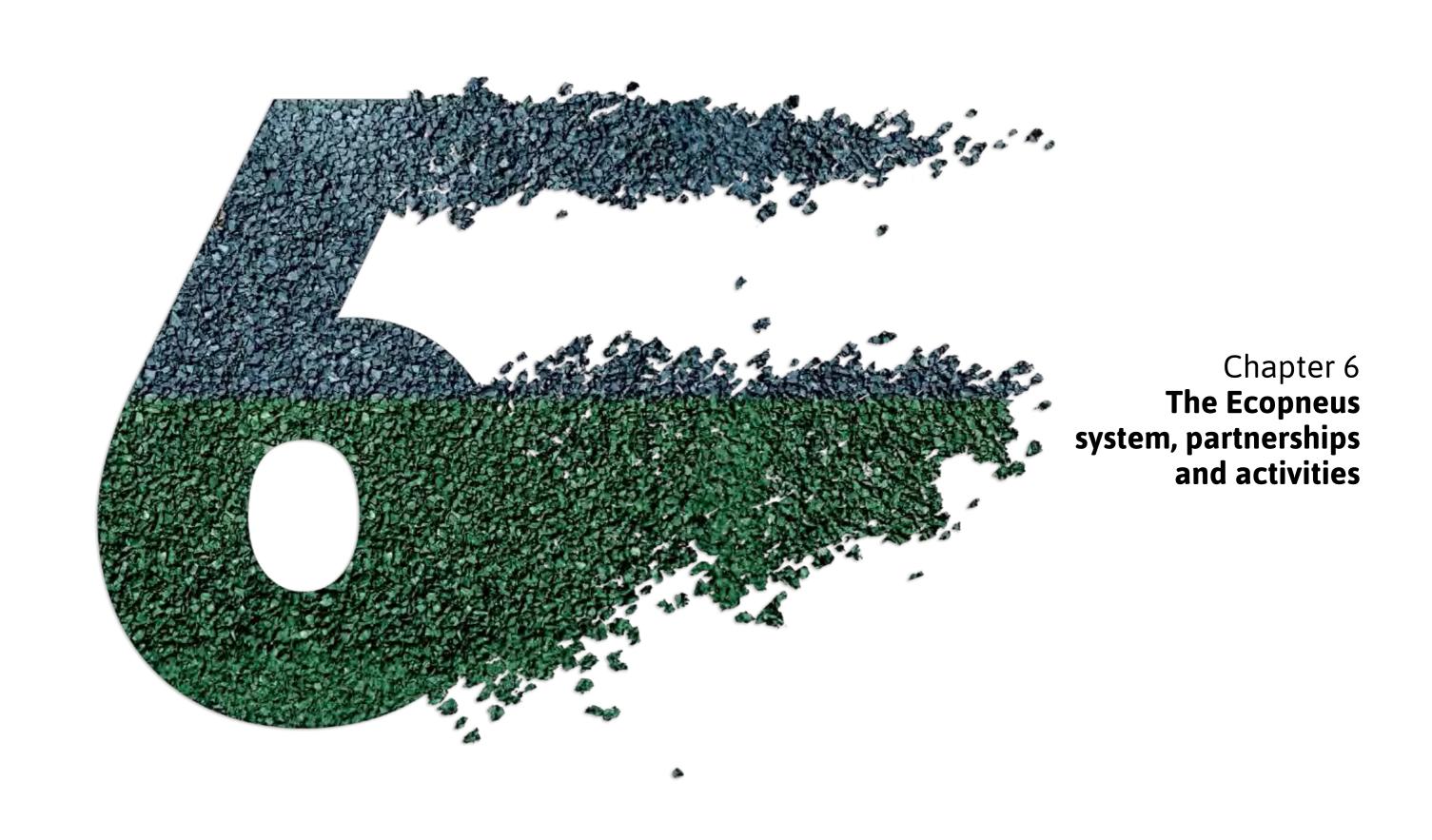












Who is Ecopneus

Ecopneus is the non-profit consortium founded by the six main tyre producers operating in Italy (Bridgestone, Continental, Goodyear Dunlop, Marangoni, Michelin and Pirelli), which have been joined by many other tyre manufacturing and import companies over time, in order to fulfil the obligations of the end-of-life tyre (ELT) Extended Producer Responsibility.

In accordance with the provisions of Art. 228 of Leg. Dec. 152/2006 and Ministerial Decree 82/2011, which govern the management of ELTs, Ecopneus is responsible – each year – for managing the tracking, collection, transport and recovery of a quantity of ELTs equal to the quantity of tyres placed on the market by the partners in the previous year: it amounts to almost 70% of the approximately 400,000 tonnes of tyres that on average reach the end of their life each year in Italy.

Despite a "light" corporate structure, with a staff of just 11 people, Ecopneus guarantees the correct recovery of approximately 250,000 tonnes of ELTs each year, equal in weight to about 30 million car tyres: placed side-by-side, they would form a line over 13,000 km long, twice the distance from Milan to New York.

Ecopneus' network of relationships and partnerships

The involvement of stakeholders is a priority and a qualifying element; in fact, Ecopneus qualifies itself as an inclusive system capable of activating a wide spectrum of collaborations with a wide range of subjects:

- environmental associations, such as Legambiente;
- supervisory authorities: the fire department, local police, state forestry, and other law enforcement for initiatives to promote legality in ELT management.

Institutions

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Ministry of Environment
Other ministries (Industry, Health, Transport)
Public administration
Regulatory authorities
Technical supervisory bodies
Law enforcement

Personnel

Direct employees
Collaborators
Consultants
Supplier employees and collaborators



Community

Environmental associations
Consumer associations
Academic and research world
Scientific community
Media

Citizens

Tyre purchasers

Beneficiaries of Ecopneus' work throughout the country

Partners

Ecopneus partner tyre manufacturing and/or import companies in Italy

ELT chain

Partner operators in the chain Processing companies Other operators in the national ELT management system

















- national research institutes such as ENEA, Waste and Chemicals, the Mario Negri Institute and the Cerisie laboratory to promote research and development of the most promising applications in the material recovery field;
- experts in the green economy and stakeholder engagement, such as for example the Symbola Foundation for Italian Qualities and the Sustainable Development Foundation, also through membership in the National Council of the Green Economy and participation in the activities of the States General of the Green Economy;
- nternational agencies such as: ETRMA, the European Tyre and Rubber Manufacturers Association, the mouthpiece at the European institutions of the interests also of the various subjects responsible for the management of ELTs in EU countries;
- the International Road Federation, a non-governmental organization that promotes the development and maintenance of a better, safer and sustainable road network, aiming at the highest economic and social returns of national and transnational road investments.

The results of the open dialogue with the consortium system's stakeholders, the suggestions arising therefrom, and the preparation of its strategies are effectively constructed in a participatory way and take the activated consultation system into practical account.

The chain



Points of generation where the ELTs are generated



Collection through authorized companies that collect ELTs from points of generation



Storage in specialized centres



Shredding facilities processing of waste

How ELT **SHREDS** are used



Electricity

Cement



factories



Large civil works

What is made with ELT GRANULES



Football fields

Sports flooring

Acoustic insulation

What is made with ELT **POWDER**



Asphalt

Sealants



Rubber articles

Ecopneus operates a network of companies throughout the country that guarantees the operations necessary for the proper recovery of ELTs:

- pick-up of ELTs at generation points (tyre fitters, garages, etc.) to the extent determined by the regulations;
- transport of the ELTs from storage sites to shredding plants;
- processing, recycling and recovery of the ELTs at selected plants.

The choice of partner companies follows a rigorous multi-stage process. The first step is the registration of the companies, a necessary and mandatory process for access to the following selection and online tender steps. The tenders are conducted with the help of an e-procurement web portal whose management is entrusted to a specialized independent body. The selection rewards companies according to the logic of the greatest added value; companies that are successful in the tender enter into a three-year contract with Ecopneus that is in any case bound to the quality of the service provided. Also thanks to Ecopneus' support, many companies in the chain have also begun certification and continuous improvement processes for the quality of the workmanship and products in order to revive the entire sector.

The managerial practice of timely payments to the chain, which are provided without any delay in 100% of cases, is also a contribution to the system's robustness. The system's companies know exactly the resources they can count on, and are favoured in financial and investment management and planning, and also enjoy easier access to credit.

The strength of the Ecopneus system lies in the efficiency of its management, the speed and capillary nature of the pick-up of the relevant amounts of ELTs in strict coordination with the demand flows, the saturation of the contracted plants, and the timely payments, but above all in the quality of service that is required of all the chain's operators.

Implementation of an industrial chain

Ecopneus annually organizes a chain convention with the aim of increasingly making the Ecopneus chain a qualified industrial sector with common strategies and development goals that can activate synergies that can generate positive impacts throughout the end-of-life tyre processing value chain. Some of the major companies using rubber granules and powder in various application sectors took part in the last two editions of the convention, as did all the ELT collection and processing companies that signed the three-year contract with Ecopneus.

A dialogue between the market "demand", the companies using the rubber, and the offer, i.e. the rubber recycling chain, is one of the central points of the convention and showcases the sector's strong points, any critical issues to be addressed and the prospects for future development.

The guidelines of the chain's development strategy in the short- to medium-term are also shared during the convention, and the main news for the sector is addressed under the regulatory, legal and economic points of view, also thanks to the contribution and testimonies of experts and representatives of the main bodies, research centres and companies. The objective is to increasingly make the Ecopneus ELT processing chain a solid, qualified and independent industry able to face and overcome the challenges posed by the market.



Social Footprint

Providing consumers with clear and transparent information that can help guide buying decisions towards socially and environmentally sustainable products: this is the objective of "Social Footprint - Product Social Identity", the first certification that evaluates the social footprint of a product and service, valorising the organization, people, manufacturing and chain. Ecopneus was the first company in Italy to obtain the AAA-level certification for its chain, the highest standard recognized. The result of the activity of a working group made up of three important certification bodies (Bureau Veritas, Certiquality and DNV GL), Ecopneus commits itself through the certification to, on one hand, stimulate the improvement of the ethical-social conditions of the various rings of its chain and, on the other, to make the chain of the service subject to certification transparent to the market.

Chi sono i Punti di Generazione dei Pneumatici Fuori Uso?

All the professional settings where a regular and authorized tyre change occurs, also attested to by the presence of tyre disassembly-assembly and calibration equipment, are called end-of-life tyre generation points. The following fall into this category:

- Public authority garages
- (army, law enforcement, ministries, public administration, etc.)
- Farms
- Body shops
- Automotive electricians
- Corporate fleets
- Tyre fitters
- Machine shops
- Tyre retreaders
- · Workshops at vehicle dealers
- Service stations





The collection of ELTs

The centralized coordination of the logistics network for collection from generation points is able to guarantee all "end-of-life tyre generation points" registered and scattered throughout the country - including the smaller islands - the timely pick-up of the ELTs in their possession.

The registered generation points can request the pick-up by Ecopneus partner companies through the web portal, and make use of a timely, but above all free, withdrawal service. The computerized flow tracking system developed by Ecopneus allows the full traceability of each individual end-of-life tyre from the time it is given by the tyre fitter until its effective recovery.

In addition to the "ordinary" collection from generation points throughout Italy, Ecopneus also intervened in the so-called "historical stocks", large accumulations of ELTs formed before 2011 often following events at the borders of legality. Thanks to this commitment, so far it has been possible **to remove over 65,000 tonnes of ELTs**, equal in weight to about 7 million individual car tyres: a quantity that can fill more than 80 Olympic swimming pools.

Decree 82 frames the historical stocks as "any storage of ELTs pre-existing the date of entry into force of the Decree" and also offers a remedy: those responsible for the management of ELTs are obliged to allocate, when present, a share not less than **30% of the budget surplus** at year-end to the management of existing historic stocks.

Thanks to the work of Ecopneus, in just four years the large historical stocks in Italy were substantially all emptied. The withdrawal in Castelletto di Branduzzo (Pavia) in the ex-Ecogomma area, the largest accumulation of ELTs in Europe, is still underway. Over 60,000 tonnes of ELTs lay abandoned there alone: visible even by satellite, lined up next to each other they could cover twice the distance between Milan and Palermo.

The activities in the "Terra dei Fuochi"

Ecopneus' approach to its activities, which are based on the principles of ethics and responsibility, can also be found in the extraordinary withdrawal of end-of-life tyres abandoned in the provinces of Naples and Caserta that continues thanks to a protocol signed in 2013 by the Ministry of Environment, the government's representative for the burning of waste in Campania, the prefectures and municipalities of Naples and Caserta, and Ecopneus.

Municipalities, through the collection companies that already serve them, perform the collection on public land to then concentrate the ELTs in areas suitable for their storage and allow free withdrawal by Ecopneus, which sends the material off for recovery, taking upon the related costs. The protocol is flanked by the information campaign "I choose the right path," which launches an appeal against the black market purchase of tyres, a phenomenon that gives rise to a flow of abandonments that reappear in fields or along roads and become a spark for the fires that sadly identify this area. The choice to accompany the withdrawal activities with an effort to provide information and raise awareness is linked to the objective of intervening with an immediate



recovery, but also to building long-lasting results that help the younger generations mature responsible decisions of legality for their future.

The processing of ELTs

Thanks to a calorific value equal to that of coal, ELTs are a source of energy widely used all over the world to meet the demands of highly "energy-intensive" industries, mainly cement factories, that use them in various formats (whole, shreds, chips). The lower CO₂ emissions for the same calorific value also allow an improvement in the overall emission scenario.

For **material recovery**, instead, the ELTs are sent to special facilities to a mechanical shredding process at room temperature that reduces the ELTs into ever smaller fragments in different phases, until reaching dimensions even less than a millimetre. The process ends with the separation of the rubber granules and powder according to their size as well as the metallic and textile residues normally contained in tyres. di energia, quest'ultimo più semplice e meno costoso e quindi naturalmente più attraente.







Rubber granulate



Rubber powder



Ecopneus made an important strategic decision to engage strongly in the development of the applications and markets of recycled rubber, considering this as the real challenge for increasing material recovery at the expense of energy recovery, with the latter easier and cheaper and therefore naturally more attractive.

It is in this scenario that Ecopneus' activities for the qualification of the chain and to increase the quality of the output of the recycling process assume particular strategic relevance.





Ecopneus quality mark

Ecopneus, in partnership with Certiquality and ReMade in Italy, has established a quality certification for the rubber granules and powder obtained from the Ecopneus chain.

The "Ecopneus certified product" Quality Mark guarantees the quality and high characteristics of the secondary raw material resulting from the recovery of ELTs and is a tool for companies to face an internal path of managerial growth. Certification can also be extended to finished products manufactured with ELT rubber. **Ecopneus** wants to highlight the excellence of the work carried out by its chain's operators with the establishment of this mark and promote the use of materials deriving from ELT recycling.

Standardization of secondary raw materials from endof-life tyres

The limited availability of information on the quality of the materials derived from ELTs is one of the elements that can cause "mistrust" in the market and discourage their spread. To overcome these obstacles, Ecopneus is an active part in the working groups of UNI, the Italian Organization for Standardization, a multi-stakeholder platform that defines the unique standards of different categories of products and services, ensuring reliable performance, safety and respect for the environment. The body represents Italy at the European (CEN) and international (ISO) standardization organizations. Within UNI, Ecopneus is a member of working group number 14 "Materials from the recovery of end-of-life tyres" and is a convenor of the respective European Mirror Group of Technical Committee CEN/TC366 "Materials obtained from end-of-life tyres". Also as part of UNI, Ecopneus participates in the work of the "Sports flooring" group within the "Sports and recreational facilities and equipment" commission.

Green Public Procurement

The green public procurement (GPP) policy obliges public administrations to introduce "ecological criteria" in procurement procedures to reduce energy consumption, CO₂ emissions, waste production and the use of dangerous substances linked to the supply of goods, services and works.

The European Union aims to introduce ecological criteria in at least 50% of contracts, obliging all European countries to adopt a National GPP Action Plan that favours the spread of "green purchasing".



MATREC and the catalogue of ELT rubber products

Injury prevention flooring, equipment and surfaces for children's playgrounds, curbs, traffic islands, speed bumps and lane delimiters are just some of the products made of ELT recycled rubber that can be found in the "Catalogue of ELT rubber products" on the Ecopneus website. The catalogue stems from a project in collaboration with MATREC (Eco Material database), the first Made in Italy international ecodesign database, which has carried out a study on the recycled rubber products and items marketed in Italy and has included them in an online catalogue that aims to turn the spotlight on companies and products that contemplate production processes with low environmental impact, made with rubber from ELTs and intended for multiple uses.

Filters and keywords can be used to search the catalogue for an easy and quick consultation; users can get information about the recycled rubber products sector, satisfy simple curiosity or find the references of the companies that make them.

ELT rubber markets

The main applications of recycled rubber to date are road infrastructures, sports surfaces and materials for construction, which are flanked by experimental applications with a strong development potential.

From the street to the street: asphalt modified with rubber powder

The rubber of which tyres are made is a mixture of high-quality polymers; added to bitumen for asphalt, they change its physical properties, thereby improving the overall performance of the pavement itself and allowing:

- an appreciable reduction of the noise generated by the tire in its contact with the road and, in some types of asphalt, also of the vehicle in general;
- long life of the pavement and exceptional resistance to aging, with international experiences that attest to durations up to three times greater than traditional asphalt;
- greater resistance of the surface to the formation of fissures and cracks of all kinds, which leads to the containment of maintenance works, with a reduction of the inconveniences arising from road works and related costs:
- improved safety, thanks to the optimal adherence, water drainage (which dramatically reduces the splash and spray effect in rainy weather, improving visibility), and a reduced presence of potholes, which are often the cause of accidents for two-wheeled vehicles.

A recent study conducted by **Enea** also underlined a lower environmental impact of modified asphalts by comparing the analyses over the entire life cycle with those of other traditional pavements.

In Italy the use of this technology has been consolidated over time, also thanks to the on-going commitment of Ecopneus: on the one hand, with support for new interventions and monitoring campaigns, and on the other in raising awareness and disseminating technical information and scientific data.

In Italy today, Emilia Romagna, Tuscany, Piedmont and Trentino Alto Adige are the regions with the most significant experiences and where Ecopneus has intervened directly by promoting their realization, assisting installation companies in the adoption of the technology and in optimizing the preparation of bituminous mixtures, performing measurement and monitoring campaigns for field verification of the specific advantages provided, as well as taking care of the dissemination of the results.

Noise reduction: tests in the urban environment and the experience of Val Venosta

To test the effective lowering of noise emissions, in 2011 the Autonomous Province of Bolzano launched a campaign of interventions and measurements in Val Venosta. After 12 months from installation, the monitoring results showed a reduction in the noise caused by the rolling of tyres of up to 7 decibels. This also makes these asphalts a valid alter**native to the use of acoustic barriers** on roads with heavy traffic: they are not an obstacle to the crossing of the roadway, do not reduce the light of the surrounding housing, and allow space for the accumulation of snow in the winter months and escape routes in case of an accident.

Acoustic performance has also been studied in urban areas (where there is a greater presence of sensitive receptors) thanks to a specific project carried out together with Vie En.Ro.Se. Engineering and merged into a dossier entitled "Acoustic performance of low-noise asphalt in urban areas", which confirmed the expected acoustic benefits.

A useful life three times longer than that of traditional asphalt: the tests on the Variante Canali road

The increased durability of modified asphalts was also demonstrated by the tests conducted on the **Variante Canali road in Reggio Emilia**, an important junction of the regional road system made with bitumen modified with rubber powder. Six years following realization, the pavement is still in perfect condition and does not require any maintenance.

The health of construction workers

Another important project activated by Ecopneus regards the comparative monitoring of the exposure of workers to the fumes caused by asphalt laying operations. The study, conducted by the company Waste & Chemicals on workers with different jobs and under different conditions, showed no worsening of emissions and, in some cases, even a slight improvement in the quality of fumes; the dust, in fact, absorbing some of the bitumen, tends to retain volatiles thereby reducing the exposure of workers.

The modified asphalt information and promotion activities carried out by Ecopneus also include:

- the organization of the "Ecopneus asphalt workshops", thematic meetings aimed at technicians, designers, businesses and public administrations, which were attended by over 600 people;
- a strong communication and information activity through targeted publications in major trade journals;
- participation in the Asphaltica trade show and other industry meetings;
- the publication of three technical dossiers on modified asphalts and many informative videos.

The use of ELT rubber in construction

The characteristics of elasticity, sound absorption and resistance to loads make ELT rubber an excellent material for limiting the transmission of noise and vibrations inside buildings. Rubber granules and powder, bound with polyurethanes or other thermoplastic materials, are veritable high-performance "building blocks" for sound insulation and vibration dampening. Several products aimed at the construction market can be grouped into the following main categories:

- subflooring products for the acoustic insulation of floors: systems that
 are based on the interposition between the surface layer and the base
 structure (floor) of a layer of elastic material that interrupts the transmission of noise from footsteps from one floor of the building to another;
- interspace products for the sound insulation of walls: the interposition
 of a layer of rubber in the interspace of masonry walls is a particularly
 suitable solution for new construction that allows the attenuation of
 insulation losses caused by the interspace resonances;
- anti-vibration products for industrial machinery, hydraulic and mechanical systems and their components, and building foundations.

In order to spread awareness of the benefits and encourage the use of mate-



SITEB and the promotion of asphalt in Italy

SITEB is the association that represents the operators of the road and bitumen sector in Italy. It groups about 300 members including companies, public administrations and professionals involved in the design, construction, inspection and maintenance of the Italian road network. Ecopneus, represented by its Director General, was appointed Category Representative for "Producers of polymers and asphalt products" due to its constant and concrete commitment to the spread of modified asphalts in Italy, thus becoming a member of the association's board



Appointment as Asphalt Rubber Ambassador by the United States association RPA

Ecopneus has been named Asphalt Rubber Ambassador by the Rubber Pavements Association (RPA), a non-profit US organization that internationally promotes the widest possible spread of asphalt containing recycled rubber powder.

Every three years RPA promotes one of the major world conferences on modified asphalt, Rubberized Asphalt Rubber (RAR), during which the appointment of the Asphalt Rubber Ambassador is also made official. Ecopneus, having already received the prestigious recognition for the period 2012-2015, was also confirmed for the next three years during RAR 2015.

Case studies - the former church of Festambiente

Ecopneus, in collaboration with Legambiente and with the planning and coordination of Vie En.Ro.Se Engineering, has promoted the acoustic refurbishment of the former church situated within Festambiente, Legambiente's annual festival. The former church, now auditorium, had reverberation times three times longer than the optimal values, which led to confused sounds and a space that couldn't be used for conferences and events. Starting from rubber recycled from ELTs, also used in combination with other materials to obtain synergistic actions, eight curved panels were obtained, characterized by a completely sound-absorbing side and a reflective side, positioned on mobile structures on wheels. These panels can also be used to divide the environments of the church, allowing it to be used simultaneously for multiple meetings or gatherings. Thirty-six curved sound absorbing panels were instead placed on the ceiling, hanging from the rafters of the roof, and panels of Cladonia arbuscula, a plant species native to Scandinavia, were used as the finishing touch. The result was amazing, with a performance above all expectations that was confirmed by technical measurements but especially by the participants in the various meetings that have already taken place there.



UISP - Italian Union of Sport for All

In order to promote the use of rubber from ELTs in the sports sector as much as possible, in 2012 Ecopneus launched a partnership with UISP, the Italian Union of Sport for All, which counts over 1,310,000 members, 17,800 affiliated sports societies, and 1000 clubs throughout Italy and is present in the country with 164 councils and 28 alliances, coordination committees and areas of activity. The partnership aims to synergistically unite Ecopneus' commitment to the development of sports applications of recycled rubber with a policy initiated by UISP towards the sustainability of the facilities of the associated sports clubs.

rials derived from ELTs among designers and builders, Ecopneus constantly participates in technical workshops of the sector and has also, in collaboration with Vie En.Ro.Se. Engineering, published several manuals on the use of rubber from ELTs in construction aimed at the professionals of reference.

Allo scopo di diffondere la conoscenza delle prestazioni e promuovere l'impiego di materiali derivati da PFU presso i progettisti e costruttori edili, Ecopneus partecipa costantemente a workshop tecnici di settore e inoltre, con la collaborazione con Vie En.Ro.Se. Ingegneria ha pubblicato diversi manuali sull'utilizzo della gomma da PFU in edilizia rivolti alle figure professionali di riferimento.

Sports applications

Rubber granules and powder are widely used throughout the world for the realization of sports surfaces. Athletics tracks, for example, exploit the characteristics of ELT granules to acquire the roughness required for good adhesion, a reduction in muscle fatigue, the attenuation of micro-traumas and an overall improvement in sports performance. Added to this is the absence of joints and weak points since the rubber mantle is "cast in place" and therefore monolithic. Another recreational and sporting use is shockproof flooring for children's play areas or the protection of sharp edges, in order to avoid accidental injuries from falls. Multipurpose surfaces made of recycled rubber are another widely used application solution, also thanks to their versatility and the possibility of even temporary installations: precisely this factor prompted the Italian Basketball Federation to use a recycled rubber shock pad under the courts used for Streetball Tour 2012, 3-on-3 basketball tournaments that took place in six cities throughout Italy.



One of the main sports applications that Ecopneus strongly promotes, and that is finding more and more space in Italy, is artificial turf football fields.

Artificial turf football fields, in which ELT granules are used as an infill material between the blades of grass or as a sub-layer below the playing surface, offer better playing conditions than traditional ones and, in particular, show:

- •
- resistance to the most adverse weather conditions;
- possibility of installation without restrictions for the weather conditions necessary to care for a traditional turf;

- low maintenance costs and reduced water consumption;
- longer life and better playing hours/year ratio compared to traditional mantles;
- ability to use the playing field for other purposes without affecting the mantle (concerts, meetings, events);
- ability to play games in every season, even with particularly difficult climatic conditions, due to the absolute incorruptibility of the playing surface.





A football field for Atalanta's Primavera team

Among the projects promoted by Ecopneus in this sector, of particular importance is the realization of the first football field in Italy made of artificial turf with ELT rubber for a Series A football club, the Atalanta. Inaugurated on October 8, 2014 at the Sports Centre in Zingonia in the presence of the Secretary of State for Environment Barbara Degani and the DG of Atalanta Pier Paolo Marino, the new field hosts the training and matches of the Atalanta youth team Primavera.

The use of ELT rubber in the sub-carpets facilitates the levelling of foundations, giving elasticity to the surface and encouraging the return of energy to the athlete. In the infill, instead, the granules have a performance function necessary for the purposes of shock absorption and preventing the vertical deformation of the surface, keeping high the quality standards for the rolling and bouncing of the ball.

Another important application of recycled rubber is flooring for equestrian activities. In addition to helping solve many of the problems related to the horse's daily management, a rubber surface ensures a soft, comfortable support, insulates from wet, cold or hot floors, compensates for unevenness in the floor, greatly improves hygiene in the stable, and eliminates the risk of slipping. Furthermore, the use of this solution allows a significant reduction in, and in some cases eliminates, the costs for the bedding material normally used such as wood chips



The Secretary of State Barbara Degani inaugurates the Atalanta field

Recycled rubber goes to prison: a football field for the Siena inmates

A happy ending that combines social sports and environmental protection, that of a football field made of end-of-life tyres at the Santo Spirito Prison in Siena thanks to UISP, the Italian Union of Sport for All, and Ecopneus. Created inside the Siena Penitentiary Institute that currently houses about 70 detainees, the sports area was built also thanks to the tyres sent for recovery by Ecopneus with the withdrawal intervention from the historic stock of Rapolano, near Siena.



An environmentally friendly football field in Gragnano (NA)

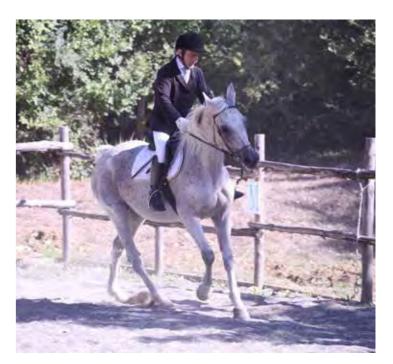
"Today is a day for all of us to remember," said the Secretary of State for Defence, the Member of Parliament G. Alfano. "Ecopneus has donated to the community of Gragnano a magnificent instrument for social gathering for our children and has demonstrated how companies can play a crucial role in the country's educational and social system. The 'mission' of modern entrepreneurship," added the Secretary, "must not be one-way but must also pay greater attention to the environmental, social and ethical impact, as Ecopneus is concretely doing."



What the ELTs of the Ecopneus chain can be transformed into

250,000 tonnes of ELTs, the average amount recovered annually by Ecopneus, could make:

- 20 km² of civil sound insulation
- 1.400 football fields
- 6,000 km/lane of roads
- 7,000 km of train/tram vibration dampers
- 60,000 t of steel
- 2,130,000 MWh (equal to the annual consumption of local public transport in Lombardy)



or straw. For external fields instead, the replacement of sand alone with a mixture of recycled rubber granules and sand helps to reduce the risk of onset of pathologies related to silicosis due to inhalation of sand micro-powders that are raised during activities in open fields. In collaboration with UISP, an equestrian centre in Todi has been upgraded with recycled rubber to concretely show the sector's workers the advantages of this application. These advantages are being studied by the Veterinary Department of the University of Perugia with a research project that aims to confirm the benefits for the health of the animal, both for the joints and for the respiratory system.

New scenarios for applications of recycled rubber

Greenrail™: recycled rubber sleepers

Traversine ecosostenibili realizzate in gomma riciclata da Pneumatici Fuori Uso. Un nuovo concept di traversina ferroviaria innovativa che rappresenta l'unica sostituta ecosostenibile delle traverse in calcestruzzo, standard attuale del mercato mondiale. Per ogni km di linea armata con traverse Greenrail™ si contribuisce infatti a recuperare 35 tonnellate di Pneumatici Fuori Uso e 35 ton di plastica da riciclo.

I vantaggi di questa tipologia di traversa sono duplici: a livello economico si riducono del 50% i costi di manutenzione delle linee ferroviarie e si aumenta la durata del prodotto (50 anni contro i 30/40 del calcestruzzo). Le traversine, inoltre, abbattono anche le vibrazioni e diminuiscono la rumorosità, problematiche che fino ad oggi costituiscono le principali fonti di inquinamento ambientale derivante dal traffico ferroviario.

Ballistic walls for shooting ranges

Shooting ranges are increasingly purchasing ballistic walls made of high density recycled rubber. One of the main characteristics is the capacity to retain bullets, thus impeding dangerous rebounds or ricochets, and therefore guaranteeing high safety standards. The use of recycled rubber also allows the total replacement of the virgin materials commonly used with recycled rubber.

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Training, education and communication

Ecopneus ELT Academy



Ecopneus has always paid great attention to the issue of training, both toward young people and students and for selected audiences on specific technical topics.

Take for example the **Ecopneus ELT Academy**, a series of workshops aimed at law enforcement and technical figures in the public administration, local authorities and supervisory bodies on the regulatory and legal implications related to the management of end-of-life tyres. The objective of the ELT Academy is to give technical instruments and specific information to those who are engaged daily in first person around the country: an instrument for networking and combatting flows of ELT abandonment with information.

Open Plants



The Open Plants initiative was begun in order to show institutions, the industrial world, supervisory bodies and citizens how the end-of-life tyre processing and recovery process is managed up close; the initiative involves visits to ELT shredding plants and collection centres to give concrete evidence of how it is possible to give this precious material a new life. Open Plants is therefore an important opportunity to show the work, commitment, seriousness and professionalism of

The 11 stops of the ELT Academy

- Castel Volturno (CE)
- Venezia Mestre
- Palermo
- Bari
- Rome
- LIVOTTI
- Udine
- Florence
- Perugia
- Naples
- Turin

The stops of Ecopneus Open Plants

- Corgom, Corato (BA)
- Steca, Fermo
- Tritogom, Cherasco (CN)
- Graneco, Possagno (TV)
- TRS, Balvano (PZ)
- TerniEnergia, Terni
- Centro Rottami, Cisterna di Latina (LT)
- Salvaguardia Ambientale, Crotone
- Valli Gestioni Ambientali, Gorlago (BG)

all the chain's actors and especially to raise awareness among the public and employees of the many applications of secondary raw materials from ELTs.

Activities in schools and the contest that gives a recycled rubber field

Schools also represent a central point of Ecopneus' training activities, with the conviction that the training of new generations is fundamental in order to construct a culture of sustainability, legality and respect for the environment. This is the objective of the various activities dedicated to the citizens of tomorrow – young people and students – through educational projects in the schools, theatrical performances and workshops.

Now in its fifth edition (after a first pilot year, children in Campania were involved, then those in Puglia, then Piedmont, and then again Campania students with a special project), the "For a correct use of tyres" project has already involved over 4,000 students throughout Italy who, thanks to classroom activities with the educators of Legambiente, have been able to see and in some cases even "touch" the ELT recovery process and the ways to ensure their proper management. The educational activities are flanked by a competition that calls the children to launch a positive message on the benefits of the correct management of ELTs through a video. A jury composed of representatives of the Ministry of Environment, Ministry of Education, Ecopneus and Legambiente selects the winning class, which receives a scholastic sports facility (gym or outdoor facility) made of recycled rubber from Ecopneus. There are also second and third prize winners, who receive internal and external furniture, also made of ELT recycled rubber.

The educational project focused for two years on the provinces of Naples and Caserta with the competition "From Terra dei Fuochi to Terra Felix" first and then "Land of fires, land of beauty", by virtue of the activities that Ecopneus performs in this area thanks to the protocol for the Terra dei Fuochi (Land of Fires). In this context it is even more important to give children messages of hope, legality, and the real possibility to change things, counteracting the abandonment of ELTs that, in addition to causing damage to the environment, damages the economy, the country and above all threatens the health of many citizens.

The educational part in class flanked with the creative project aims to show kids the concrete result of the correct management of the chain of a waste that is transformed into a good, again useful for everyone, from a potential danger to the environment and health.







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"NOW! The future is now": environment, legality and beauty come to the theatre



Ecopneus has also promoted a cycle of theatre performances aimed at high school children and conducted by Luca Pagliari, author and director, on the issues of environmental protection, legality and beauty. The performances have been constructed with the contribution of the children, who together with Pagliari created a "video-voyage" in the region in which they live; a dialogue begins with a testimony of love for their area and a path then leads them toward a hypothesis and hope for a new future for all of Italy. A future that must start being conceived of and chosen today by the young people that will be tomorrow's adults.

ELT recycling is a game! Ecopneus at Explora, the Children's Museum of Rome



At Explora – the Children's Museum of Rome, Ecopneus has overseen the creation of "The second life of ELTs". From a change of tyres and tyre fitters up to the uses of recycled material, children from 3 years and up have been guided, through play and in an interactive and participatory way, toward the discovery of the correct recovery of end-of-life tyres through gears, videos and a city to colour with constructive sports fields, bike paths and roads using recycled rubber bricks.



Little fans of Peppa Pig play on recycled rubber flooring at Leolandia



Ecopneus has also activated a collaboration with Leolandia, the amusement park in Capriate (BG), where it contributed to the realization of 400 m2 of anti-slip flooring in the thematic area dedicated to Peppa Pig, the popular cartoon. Some educational paths on the proper recycling of ELTs were promoted in parallel, and Ecopneus also participated in the "Let's clean up the miniworld" initiative, during which 300 children cleaned a "MinItaly" of wastes abandoned by a group of irresponsible adults, learning how to differentiate them to produce new goods useful for everyday life.

Ecopneus' communication instruments

Sustainability Report





Ripetta Residence, Roma 2014



The Sustainability Report, now in its fifth edition, offers a reading of Ecopneus' performance, making it accessible to all the consortium's stakeholders and particularly underlining the environmental, economic and social impacts of the ELT recovery and recycling activities.

The report is presented annually in institutional settings, in the presence of all the major stakeholders, primary exponents of institutions and key players in the Italian green economy. The first two editions prepared by the Sant'Anna University of Pisa were followed by an additional three editions of the report prepared by the Sustainable Development Foundation.

Trade shows and events

Ecopneus participates in many events, meetings and trade shows to reach specific audiences and targets that can help create a recycling culture for end-of-life tyres in the respective fields of activity.

Ecomondo





Ecomondo, the International Sustainability Fair that is held each year in Rimini, is the main event for Ecopneus, also in light of its role as part of the States General of the Green Economy. Here Ecopneus meets and communicates with all the operators in the sectors of interest, institutions, associations and industries that revolve around the Italian

During one of the editions of Ecomondo, Ecopneus also brought, in a first for the fair, a "sensory space" where, thanks to interactive multimedia technologies, sound showers and LCD screens, it was possible to "touch" the applications and advantages of recycled rubber in sports, asphalt and construction.

Autopromotec



The main Italian trade show dedicated to the world of the automotive aftermarket during which Ecopneus meets the wider audience of the

points of generation of end-of-life tyres and their associations; conferences and meetings dedicated to tyre fitters were organized during the various editions. A moment of dialogue with a fundamental part of the tyre chain in order to transparently engage with each other on the operation of the system, any critical issues and common prospects for development.

During Autopromotec 2013, Ecopneus also received the GIPA (Groupement InterProfessionnel de l'Automobile) Trophy of Excellence in the category "Respect for the Environment", having been recognized by Italian repairers and distributors as the company that has particularly distinguished itself for its contribution to the environment.

Festambiente









Ecopneus collaborates with Festambiente, Legambiente's International Sustainability Festival, which is held each year in Rispescia, Grossetto. The acoustic redevelopment work on the former church was carried out as part of this collaboration, but that's not all. Play areas and spaces for families to relax were also created with flooring and furniture, playgrounds, bike paths and walkways, all made of recycled rubber. Ecopneus plays an active role in the busy schedule of events that take place during the festival, which is attended by leading members of the political, institutional, environmental and association world linked to the themes of sustainability and the Italian green economy.

Networking for a recycling culture



Ecopneus also has many opportunities to participate in events organized by others: from the commitment to promoting the use of recycled rubber in different application centres, to the contribution to the creation of a recycling culture for ELTs, the objective is to make a concrete contribution to the definition of national strategies and objectives regarding sustainability and the circular economy.

The States General of the Green Economy takes place during Ecomondo, for example; it is an open and participatory strategic-programmatic process that involves key stakeholders in the Italian green economy to which Ecopneus is called to contribute regularly. The objective of the States General is to develop, through the innovative participatory process method, a platform for the development of a green economy in Italy through the analysis of the potential positives and obstacles, as well as the policies and measures necessary to improve the ecological

quality of the strategic sectors. The participatory process takes place throughout the year through the activity of the National Council of the Green Economy, of which Ecopneus is a member as part of the "Materials and Recycling" group.

Ecopneus also participates every year in the "Festival of the Soft Economy", promoted by Symbola, the "Foundation for Italian Quality" that aims to promote a new model of development that can combine competitiveness and valorisation of human capital, economic growth and respect for the environment. In this context, the circular economy is a driving force of development for the entire country and Ecopneus is called to share their commitment to the creation of a circular economy for recycled rubber.

On the path toward the creation of an ELT recycling culture, Ecopneus organized the photo exhibition "Material-Value-Immaterial", with shots by Daniele Tamagni, the Milanese photographer who won the World Press Photo in 2011 in the "arts and entertainment" category. Ecopneus wanted to create this "photographic journey" in rubber recycling to eliminate the sense of rejection linked to old tyres, replacing it with that of reuse, recovery, and recycling of the material, trying a new language to communicate environmental sustainability but also the social and economic implications of its activities.

To show how ethical, fair, transparent and impartial communication is essential for both conveying messages to its target, but also as a strategic tool for development and growth, Ecopneus' Director General is called to give lectures at the Laura Conti Environmental Journalism EuroMediterraneano Course promoted by Legambiente and Editoriale La Nuova Ecologia, and aimed at professional journalists and publicists who want to deepen their knowledge on the subject.

Social and web

The Ecopneus website is the hub of all the content created and conveyed by the consortium, be it of a technical, popular or generalist nature. All the technical manuals, press releases, consortium news, photos, documents, updates, service information and everything related to the world of Ecopneus is published here. Facebook is instead a more direct and immediate channel for dialogue with the different audiences of the consortium. All of the content published on the Ecopneus site is also provided on social media, giving more space to multimedia materials such as photos and videos; the latter are also available on the Ecopneus YouTube channel.

Press office, information campaigns and advertising

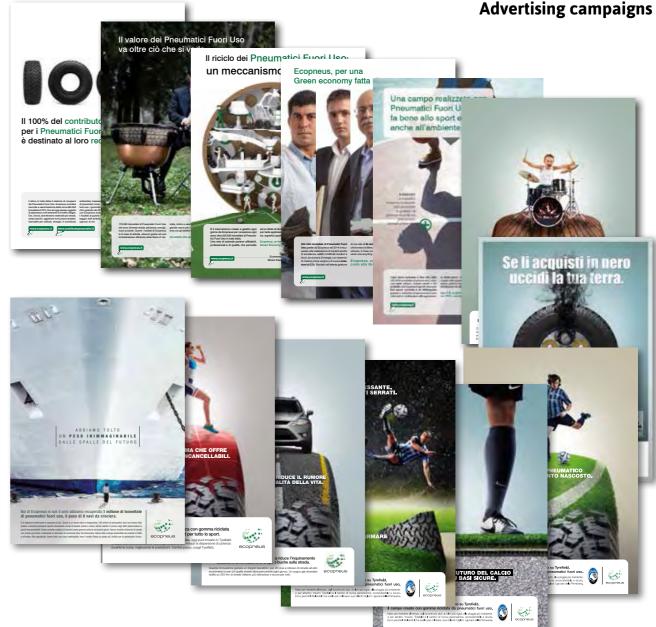
In order to promote the various application sectors and give specific projects a greater pervasiveness, Ecopneus has developed, with the support of the public relations agency H+K Strategies Rome, a series of advertising and information campaigns that have been published in the press, on the web and during the main trade fairs.

The press office's work is transversal and in support of all projects, and is the instrument Ecopneus uses to feed information, updates and opportunities for study towards a consolidated network of newspapers and journalists throughout Italy.









Sustainability reports



ANSA

Old tyres become a football field for the Siena inmates

Sports area realized in Santo Spirito by the Italian Union of Sport for All (UISP) and Ecopneus



End-of-life tyres: a million tonnes recovered One million tonnes of end-of-life tyres: the number recovered by Ecopneus since the activation of the national system in September 2011

Website and social media







Press office

Over **4.500** articles, TV broadcasts and radio services since 2011



That tyre is a gold mine. 14 million euros of investments in search of new applications

Materials for steel mills and foundries, but also to "silence" streets. The consortium that excels in collection bets on other uses and invests money in knowledge and innovation



Benefits of rubber for sports, play and roads

'Powder" ensures that constructions have more strength and elasticity, as well as greater noise absorption

IL MATTINO Ecopneus, anti-burning challenge in the "Land of Fires"

The special plan of the leading consortium for tyre collection



The initiative, 22,000 kg of tyres recycled to construct a playground

Ecopneus' initiative in the Leolandia amusement park





Recognitions

Ecopneus' approach to its activities, based on the principles of efficiency, accountability, ethics and transparency have earned it several national and international awards, evidence of the consortium's commitment to the creation in Italy of a solid recycling economy for end-of-life tyres.



2016-2018



Social Award



Premio Eco and the City®









Premio ambiente e legalità

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1 - Asphalt Rubber Ambassador 2016-2018

2 - Social Footprint certification level AAA

3 - Sodalitas Social Award 2014

4 - Aretè Award 2013 for responsible communication Categories: Public communication, Press Jury Prize, Grand Prize

5 - Eco and the City Award – Giovanni Spadolini 2013

6 - Asphalt Rubber Ambassador 2013-2015

7 - Sustainable Development Award

8 - GIPA 2013 Trophy of Excellence Category: "Respect for the Environment"

9 - Legambiente – Environment and Legality Award 2013

List of partners as of 31/12/2015

A.R. Pneumatici Marangoni Apollo Vredestein Italia Marangoni Tyre Mercedes Benz Italia Asperti Angelo Michelin Italia Autogomma Perego B. R. Pneumatici Natale Illario Bellotto

Nuova Pneus Vignola Outlet gomme Bersangomme BIS Parise Gomme Perla Pneumatici

Bridgestone Buymec Picone pneumatici e cicli Pirelli Tyre Catania Gomme

Pirelli Industrial Centro europeo ricambi Centro Gomme Pneus Area Commerciale Pneumatici Pneus Service Italia

Continental Pneus Sette Crespi Gomme Pneusmarket Romagna Devalle Gomme Pneusmarket

Di Pasquale Diego Pneuspergine DP Commercial Tyres Pneustore Snc Driver Italia Ponente Gomme Driver Servizi Retail R.G.S. Pneumatici DST Re-Ta Gomme

Fiat Group Automobiles River Rossi Lamberto Fintyre

Gexpo Satep Goodyear Dunlop Solideal Italia Gottardi Spiezia Pneumatici

Grassini Pneumatici Tecnogomme Top Ruote Grg Pneumatici Harley - Davidson Italia Trelleborg Wheel System Italia

Idio Ridolfi & Figli Volkswagen Group Italia Zuin

La Genovese Gomme

Mazzon Leonardo & C

