Ecopneus in the Green Economy

2014 Sustainability Report

ecopneus

the future of end-of-life tyres, today

Ecopneus in the Green Economy

2014 Sustainability Report

Ecopneus in the Green Economy. 2014 Sustainability Report.
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Edition I, June 2015

Edition I printed in June 2015

Printed in Italy
da TMB Stampa - Rome

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Introduction

The theme of the circular economy is currently at the centre of the debate on the sustainability of the economic development of the entire planet, especially Europe. Material recovery and recycling chains are a fundamental part of this debate, and in fact represent the hinge between the primary industry, the production of raw materials, and the secondary one, processing.

In a perfectly circular economy, the negative impact on the environment (and consequently, on society) of the production of goods should tend to zero. The energy used should derive as much as possible, if not totally, from recovery or from renewable sources; the CO_2 produced by the processes and transport should be minimized and the remaining part compensated for; raw materials should be produced according to sustainability criteria as much as possible, aiming to minimize the ecological footprint and, wherever possible, virgin raw materials should be replaced with material derived from recycling, likewise reducing the impact of the recycling processes themselves.

The activity of organizations such as Ecopneus is currently an indispensable factor for the sustainability of the economic system as a whole. Recycling itself should be performed by basing the chain (during the collection, transport, and processing phases) on maximum sustainability, and the materials resulting from the recycling process should be the preferred choice of private companies, businesses and the public administration.

Of course, the global economic and industrial system is only at the beginning of this path, and that's not all: we are actually taking the first steps on a rugged terrain that is full of obstacles and grey areas. We are sailing with a wind that sometimes seems to blow against us, often threatening to leave us stranded in the shallows of an economic and industrial system that is not resilient, anchored to old principles, and aimed more at safeguarding the existing than using this new economic vision as an opportunity for innovation, technology and the market.

Ecopneus is making a huge effort in Italy - an effort required in part by the legislature as a mission of consortia of this type, and in part the result of our particular strategic approach - to support the development of a circular economy culture and open new markets and new application solutions for products - granules and powders - resulting from the recycling of ELT. We are in parallel trying to steer the chain towards environmental and social sustainability, help the businesses in our network to monitor, optimize, and reduce consumption, improve the quality of products and the capacity to place them on the market, and represent a "healthy" chain also from the employment and social points of view.

We often fight against a slowness and resistance to change by the economic system, which still struggles to recognize recycled rubber articles as products in all respects: in the absence of a clear legislative recognition, recycled rubber is still

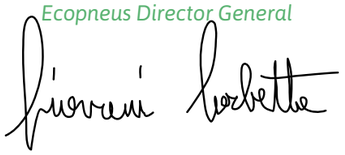
closer to placement/perception as waste or a waste derivative than a raw material or secondary raw material.

Certainly it is still necessary to more precisely define some aspects regarding safety in the use of recycled rubber for some specific applications; we are conducting surveys and specific research on this point. It is still necessary to improve the quality of the output of the crushing plants and further diversify the range of products for different application areas. It is necessary to improve the capacity of the recycling chain to act as a trading partner on the Italian and foreign markets and to be perceived not as a waste processing chain but as an industrial sector for the production of materials. It is necessary to inform and educate companies and professionals of the application sectors in the use of recycled materials instead of virgin material (which is scarce, such as natural rubber, or not sustainable, such as synthetic rubber, derived from petroleum) or as an alternative to other materials, especially in the case of a comparative ecobalance between one and the other that favours the first.

Among many difficulties, however, we see many positive and encouraging signals. 2014 was, from this point of view, a year of great results that marked a break from previous years and a definitive turn towards a new positioning of the ELT recycling chain in the general economic and industrial system. We are seeing a strong interest in recycled rubber from private companies, entire application sectors, public administrations and institutions. Our team is working hard and we are almost seeing a "change of clothes" with respect to the past. The certifications obtained in the months during which this evaluation was being prepared (such as the Social Footprint AAA, for example) encourage us to move forward in this direction. The results of the research we are conducting – in the spheres of the qualitative composition of products, the effects of their employment during processing and use, and the improvement of the semi-finished products that contain them – offer us insights and information that did not exist before and that are indispensable for progressing also in the creation of a "recycled rubber culture" and allow us to better target our future strategies.

The many open collaborations with research institutes, foundations, and organizations engaged in the circular economy in various ways help us to keep the tiller straight and continue on the ground that we have chosen, which is that of transparency, efficiency, and ethics. We are open to incorporating contributions that arrive externally in our strategies, to working together with everyone who would like to help maximize our results, and to making our know-how available to the institutions that want to use it. The ultimate goal goes beyond the solution of a problem, beyond the "processing" of tyre waste. The goal is to make this an industry that creates jobs, knowledge and sustainable products that contribute to the sustainability of the national economy.

Giovanni Corbetta
Ecopneus Director General



Reading guide

The new Ecopneus sustainability report illustrates the environmental, economic and social performance of the consortium. However, it has a greater ambition, that of systematizing the numerous initiatives that have been implemented, and framing them in what we have called the Ecopneus Green strategy. It is an original report from this point of view: it doesn't focus, as reporting instruments do, only on the evaluation of the past, but it also looks toward the future, trying to show the reader the logic behind the choices that are made each day to try to improve the ELT management system according to the Ecopneus model.

In line with the choice made in the previous edition, also this year the Ecopneus system was analyzed by adopting the approach of the Green economy Report prepared by the Sustainable Development Foundation. In addition to evaluating the operating performance for 2014, the coherence and effectiveness of the actions undertaken by the consortium to maximize the benefits of the recovery of end-of-life tyres for the environment and the community were evaluated.

This new report allows multiple reading levels, through which the reader can better understand the real potential and positive impact for the community of a Green economy strategy that extends along the entire value chain, from a product lifecycle point of view. It is the product that is placed at the centre of the Green economy Report, without neglecting the production process, with the knowledge that the product often weighs more on the environment, economy and society. This applies in a particular and positive way for those organizations that, like Ecopneus, are "green core" organizations, i.e. those that produce goods or services with a high environmental value.

In a structure organized by thematic chapters with a single narrative thread, the 2014 Green economy Report is enriched with in-depth thematic analyses which, even if they can be read independently, render the overall value of the strategic management path undertaken by Ecopneus.

0 / The Green strategy of Ecopneus

The benefits of Green governance

Ecopneus began its operations in September 2011, three months after the publication of Italian Ministerial Decree 82 that regulates the application of the European principle of extended producer responsibility (EPR) to the management of end-of-life tyres (ELTs) in Italy. It is the leading consortium for the management of ELTs in Italy, with the responsibility of managing more than 65% of the total generated in the country each year, calculated on the basis of the market share of tyres sold as replacement parts by its partners nationwide. In 2014 Ecopneus handled 255,000 tonnes of ELTs, equivalent in weight to more than 28 million car tyres, coming from over 27,000 tyre dealers and other players in the spare parts market that made use of the Ecopneus service, making about 500 pick-up requests per day. Overall, the quantities collected in 2014 and accountable under the national legislation for the achievement of the annual target amounted to 252,000 tonnes of ELTs, +13% with respect to the target (about 30,000 tonnes more). The collection "beyond the target", performed by emptying the historical stocks still present in the country and employing 30% of the 2013 operating surplus, is added to these amounts accounted for "at target". Finally, an additional 369 tonnes of ELTs were collected by Ecopneus in the "Terra dei fuochi" [English: "Land of Fires"] area in Italy. From the start of operations to 31 December 2014, the system has collected and recovered more than 800,000 tonnes of end-of-life tyres: in autumn of 2015, it will exceed one million tonnes recovered.

255,000 tonnes of ELTs collected in 2014

About 700 workers permanently employed

Consumption of 377,000 tonnes of virgin materials prevented

344,000 tonnes of CO_2 equivalent emissions prevented

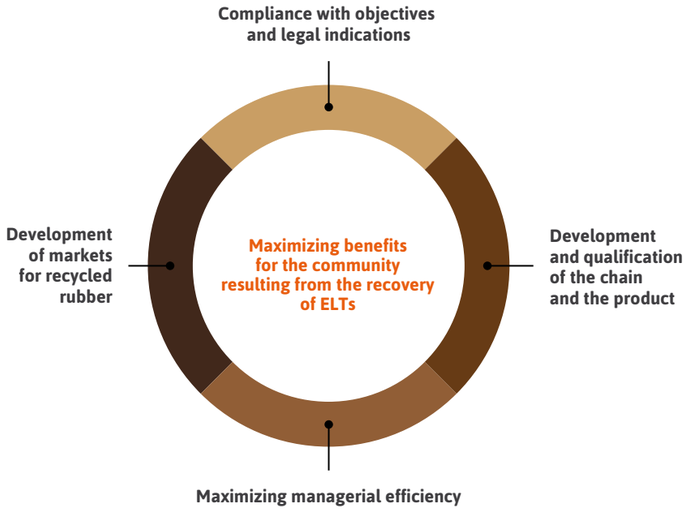
1.8 million cubic meters of water saved

Ecopneus manages its activities through service contracts with a network of partners throughout Italy; logistics and grinding operators selected through a call for tenders on an electronic platform (the last of which took place in 2014) and on the basis of advanced authorization, technical and management prerequisites aimed at continuous improvement. At the end of 2014 the system counted 103 companies – 17 involved in collection and storage, 41 in transport, 27 in processing, 15 in energy recovery and 3 for engineering use – with about 700 workers stably employed. The system implemented aims for maximum effectiveness, efficiency and quality and is 100% funded by the environmental contribution paid by consumers upon buying each new tyre, resources proportional to the maintenance of a non-profit system for which Ecopneus is responsible by law and by statute. Environmental sustainability is a strategic component of this drive toward quality, and is constantly integrated in every business decision; it is measured and monitored through three footprint indicators on the lifecycle of end-of-life tyres collected and recovered, which in 2014 had an overall positive balance: 344,000 tonnes of CO_2 equivalent prevented (carbon footprint), 377,000 tonnes of virgin raw materials prevented (material footprint), and 1.8 million cubic meters of water saved (water footprint). The management of the economic resources that support the system is another area in which Ecopneus works with the utmost rigor and transparency: the economic value distributed in 2014 amounted to 66.7 million euros, on a steady decline since 2011, with 90% distributed to the companies of the chain for their collection, transport and processing services for the recovery of ELTs. In addition, considering average prices in 2014, the system has generated, in terms of reducing the demand for virgin raw materials, a net economic benefit for the country of about 105 million euros, over 90% of which is associated with the recovery of rubber. An economic value that represents stability and a precious resource for businesses, and which is flanked by investments in the development of applications of ELT rubber; in the period 2013-2015, 14 million euros were invested in projects to support the market and companies for products and applications of ELT rubber: Ecopneus' Green strategy.

2014 economic value distributed equal to 66.7 million euros

14 million euros invested in projects to support businesses and the market in the period 2013-2015

La Green strategy of Ecopneus



Giving granules and powder greater economic value, first of all by qualifying the chain, to maximize the possible benefits of the system's activities for the country, working in an ethical way and with the utmost rigor and transparency towards the legal objectives.
This is the bet of Ecopneus' industrial strategy in the Green economy – a Green strategy that was developed by directly and continually involving the system's stakeholders in various areas (from institutions to companies of the chain and recycling sectors, associations, and research and development institutes), through a detailed analysis of the value chain's critical points.
On average, 64% of the ELTs collected by the Ecopneus system are recovered as fuel in the cement industry and for the production of electrical energy; the remaining 36% are sent for mechanical processing to separate the steel and reinforcement textile fibres present in the tyre and produce rubber granules and powder. From an environmental standpoint, the recovery of material generates net benefits greater than the energy recovery; intercepting the international market demand and developing the internal one are therefore critical success factors to reverse the dynamics of ELT recovery, a fundamental objective for the activities of Ecopneus.

Rubber from ELTs maintains the characteristics of the high performance polymer that characterizes the tyre from which it derives in post-recovery uses, and can be used to replace other virgin materials in many products and applications including flooring and sports fields, modified asphalts, sound insulation for the building industry, membranes for waterproofing, manufactured goods and much more. In Italy the mix of demand for rubber from ELTs sees a prevalence of sports applications and anti-slip flooring, but there are strong limits of absorption capacity and, above all, insufficient remuneration for producers of granules and powder – limitations and obstacles that Ecopneus has been working on for some time by focusing on the technical and scientific bases that give the right value, perception and visibility to these applications.

Meeting and going beyond the legal commitments

The first task of consortiums is to organize a collection and recovery model in full compliance with the constraints and objectives of the regulations in force. This requires first and foremost ensuring the collection and recovery of 100% of the ELTs corresponding to the tyres released for sale by the partners (binding target in existence since 2013). Furthermore, the law also requires that consortiums contribute to the recovery of thousands of tonnes of end-of-life tyres accumulated over the years in dozens of historical stocks throughout the country.
The collection targets were achieved immediately and it can now be said that the Ecopneus system is the only one that ensures the capillary pick-up of the ELTs generated throughout the country.
In the same way, Ecopneus has translated resources corresponding to 30% of the operating surplus accrued annually in actions to empty the historical stocks, which has allowed over 60,000 tonnes of stored (in some cases, for decades) ELTs to be picked up.
The "Terra dei fuochi" [English: "Land of Fires"] area in the provinces of Naples and Caserta is another case of a special Ecopneus action, here working to remove the ELTs abandoned in the environment and subtracting them from use as fuel for the burning of toxic waste. The protocol that regulates this special activity was promoted by the Ministry of Environment and the delegate of the Ministry of the Interior for the "Terra dei fuochi" area; the prefectures and municipalities of Naples and Caserta were also signatories. Extraordinary resources made available to the area's municipalities that have led, to date, to the removal of a quantity of ELTs equivalent to over 46,000 car tyres.

Managerial efficiency

In this frame, Ecopneus is constantly involved in programs for the continuous improvement of the operating performances of the chain's companies, with the aim of increasing the level of service and the efficiency of production.
The first instrument towards this goal is the continuous monitoring of the service through a computer system that handles the pick-up requests from tyre dealers, promptly verifies any reports of inefficiency with respect to the level of service promised, and monitors the level of inventory of ELTs at the processing companies to guarantee a continuity of supply but also to avoid excessive accumulations.
A continuous work of accompaniment of the chain's companies along their own path of improvement is included with these base operations.
Ecopneus performs periodic checks of environmental and workplace safety compliance on the basis of a specifically developed specification and implements support measures whenever non-compliances are encountered. Company personnel and contracted technical inspectors periodically visit the processing facilities, collecting suggestions and proposing solutions to improve the efficiency of the facilities themselves.
Another platform to support the efficiency and quality of the network of partner companies is the administrative management, which pays the invoices for the performance of service with utmost regularity, always paid punctually on time; a guarantee of economic stability that, for example, allows companies to plan investments in new technologies or maintenance programs.
But that's not enough. As mentioned, in order to increase the proportion of ELTs that are recycled it is necessary to intervene on the markets and on the levers that drive demand for granules and powder, working on their quality, on the development of end-use applications and on the information concerning their quality and safety characteristics.
The Ecopneus strategy returns additional added value in this context by supporting the chain in the production of high-quality recycled materials as well as the development of the demand for products and end-use applications in different sectors.
National and international market analyses orient the selection of the intervention areas, with further studies developed in collaboration with ENEA (the Italian National Agency for New Technologies, Energy and Sustainable Economic Development), with the aim of systematically assessing the environmental impacts and benefits of the different recycling and recovery options through a Life Cycle Assessment approach.

Qualification of the chain and the product

Stimulating the chain's companies in the direction of increasing qualification of the ELT material recovery activities: a goal towards which Ecopneus has also defined concrete operational tools.
The "Ecopneus Quality Mark" is a voluntary and proprietary Ecopneus certification plan, the first in Europe for rubber recycled from ELTs.
Developed on a specification drawn up ad hoc in collaboration with Certiquality, it aims to valorise the granules and powder of the companies belonging to the Ecopneus chain if they satisfy specific quality, ethical and environmental criteria:

- adoption of specific quality management plans;
- compliance with certain ethical and social criteria;
- guarantee of traceability and sustainability of products through the "Remade in Italy" certification.

The "Quality Manual for ELT grinding and granulation facilities" prepared by Ecopneus, on the other hand, is an instrument for the managerial growth of the companies: it schematically represents the internal procedures necessary for the construction of a Quality Management System, and defines the sampling plans and methods to characterize the materials derived from the mechanical processing of ELTs.
A tool inspired by the principal international standards, it is provided free of charge to the companies of the chain that want to start along a certification path, for example with respect to the ISO 9001 standards.

Development of the markets for products and applications

The development of the end-use markets for materials derived from ELTs plays a strategic role in ensuring compliance with the European powers for the management of waste and promoting a greater closure of the cycle as part of a circular economy. In fact, the limited demand for granules and powder weakens and sometimes undermines the efficiency of the chain upstream.
It is for these reasons that Ecopneus has promoted and activated numerous projects to consolidate and disseminate technical knowledge for the proper use of rubber from ELTs, even working to remove the barriers of scepticism and distrust that often prevent the acceptance of that which has already been broadly developed in other countries.

Rubberized asphalts, for example, are made by mixing traditional bitumen and conglomerates with ELT powder. Extremely durable and high-performance, they often encounter, unfortunately, a strong distrust by the sector's technicians – despite being used with excellent results in other countries – that can be overcome through the activation of trials at a local level.
The over 150 experimental tracts built in Italy since 2007 (corresponding to about 250 km/lane) testify to the interest of some decision-makers in rubberized asphalt, but also the fragmentation of knowledge at a regional level.
Ecopneus immediately committed itself to converting the local experiences into "shared knowledge", and it is with this objective that it has initiated numerous and extensive monitoring programs aimed at assessing the performances of the application, measuring in particular the reduction of noise by rolling, the durability of the materials and the consequent reduction of maintenance costs.

A monitoring activity that is accompanied by the production and dissemination of manuals and monographs, created with the involvement of universities and research centres, with the aim of providing increasingly complete information on these issues in the community of competent organizations and technical subjects. At the same time, the use of recycled rubber in building applications is promoted by Ecopneus through demonstration installations aimed at raising awareness in the specialized market of the potential of acoustic insulation, anti-vibration products and waterproofing membranes manufactured with rubber recycled from ELT. Also for this type of use, Ecopneus has overseen the creation of technical books dedicated to these applications that contain all the information relevant to designers and installers to use and make the most out of recycled rubber products.

Sports applications are the main sector of use of rubber recycled from ELTs in Italy. In most European countries the main sales market of granules regards their usage as a performance infill for the construction of football fields with synthetic grass. Ecopneus, in collaboration with UISP, the Italian Union of Sport for All, or directly in partnership with sports associations, supports and promotes the intelligent use of granules and powder for the creation of sports flooring (basketball, track-and-field, tennis, multi-purpose, etc.), also through the creation of demonstration installations with wide visibility that are often subjected to monitoring and technical assessments conducted by competent university centres.

The construction of the field of the Atalanta Primavera team is among the most important projects carried out in 2014 – a collaboration that has brought these facilities with excellent performance, strength and life to the pinnacle of the practice of football in Italy, opening the road to interesting growth prospects.

A revision of the legislative framework to encourage and develop the ELT granule use chain is also among the strategic issues to which Ecopneus is constantly committed. For this effort Ecopneus:

- participates in the working groups of the Ministry of Environment to develop the minimum environmental criteria to promote the use of recycled rubber products in public administration tenders;
- promotes proposals for the development of end-of-waste legislation for ELTs at both the European and national levels. To this end, it has activated a study project on environmental and health safety tied to the use of rubber powder and granules from ELTs;
- supports numerous information and communication initiatives aimed at raising public awareness and training public and private specialized personnel on the issue of the correct management of ELTs, in agreement with the mission entrusted to it by the legislature.

1 / The Green governance model

The Green governance model

The tyre: a hi-tech product

A modern tyre is a highly technological product with an approximately 40% composition of a mixture of natural and synthetic rubber, carbon black, plies, and steel, as well as additives, metallic oxides, and sulphur in lesser amounts. To obtain the final product that we know, the polymer mixture is vulcanized to a stable structure, with thermal and mechanical performances that ensure the safety of the mobility of billions of vehicles around the world. Even when the tyre becomes waste, the materials of which it is composed maintain their characteristics almost unchanged. If the end-of-life tyre is abandoned or treated improperly it can cause damage to the environment – it is not biodegradable and its decomposition time is indeterminate, and therefore with a low environmental risk, but if it accumulates in large amounts it can cause problems, especially in the case of uncontrolled burning, with heavy consequences for the environment and local communities.

1. "Tread", the portion of a tyre intended to come into contact with the ground;

2. "Tread grooves", the space between the adjacent ribs or blocks of the tread;

3. "Sidewall", the part of the tyre between the tread and the area to be covered by the rim flange;

4-5. "Layer", a layer of rubber-coated parallel cords. In the radial tyre, its purpose is to stabilize the tyre;

6. "Cord", the strands that form the fabric of the plies in a tyre;

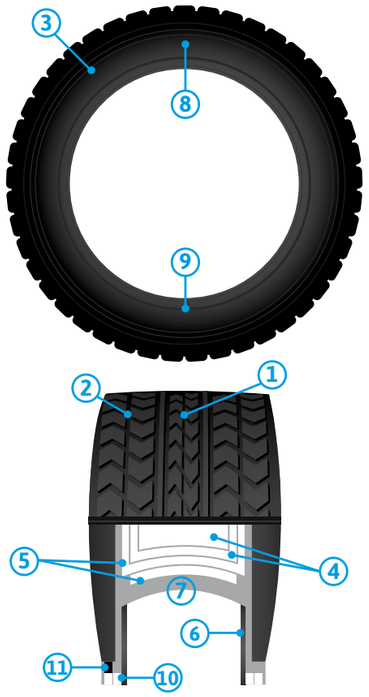
7. "Carcass", the structural part of the tyre, distinct from the tread and outermost rubber of the sidewalls, which, when inflated, supports the load;

8. "Section width", the linear distance between the outside of the sidewalls of an inflated tyre, mounted on the specified measuring rim, but excluding elevations due to labelling (marking), decoration or protective bands or ribs;

9. "Belt", refers to a radial ply or bias belted tyre and means a layer or layers of material or materials underneath the tread, laid substantially in the direction of the centre line of the tread to restrict the carcass in a circumferential direction;

10. "Bead", the part of the tyre that is shaped and structured so as to fit the rim and hold the tyre on it;

11. "Chafer", material in the bead area to protect the carcass against chafing or abrasion by the wheel rim.



What can be done with an end-of-life tyre

Tyres do not end their useful life when they are replaced at tyre shops. Ground into granules and powder to sizes that can be measured in tenths of a millimetre, they become a secondary raw material that can be used in a wide range of applications: modified asphalt, mats and panels for sound insulation and waterproofing of buildings, manufactured items for urban design, infrastructure elements for roads and tramways, playground flooring, tracks, football fields with artificial turf, equestrian flooring, and miscellaneous items. In addition, whole or broken into large pieces, they can be recovered in civil engineering works as retaining walls or for the rehabilitation of landfills, quarries and earthworks. In addition to rubber polymer, the recovery of material also regards the other components of the tyre structure and in particular steel.

Another possible option is the recovery of the tyre as an alternative fuel for the production of energy, a possibility that Ecopneus considers to be secondary with respect to the recovery of material, in line with the indications of the European Union regarding the processing of waste: the recovery of material from ELTs is, in fact, the most sustainable option from the environmental, economic and social points of view.

The circularity that, starting from the production of a tyre, goes on to its use on vehicles, and then to the collection of those that have arrived at the end of their life and, finally, to the reuse of the materials in re-products testifies to how what is commonly considered waste can instead have a prolonged usefulness and existence.

It is for these reasons that in recent years the European Commission has promoted policies in favour of a circular economy: to avoid losing valuable and scarce materials, and to create new jobs by developing new business models where eco-innovation and eco-design can lead to a "zero waste" society, reducing greenhouse gas emissions and the environmental impacts of disposal.

Along this path, on 2 July 2014 the European Commission presented a series of communications for the promotion of a circular economy whose objectives are: to raise levels of the recycling of municipal waste (bringing them to 70% by 2030), reduce their transfer to the landfill by 2025 (up to a maximum of 5%), and raise levels of recycling of packaging (bringing them to 80% by 2030).

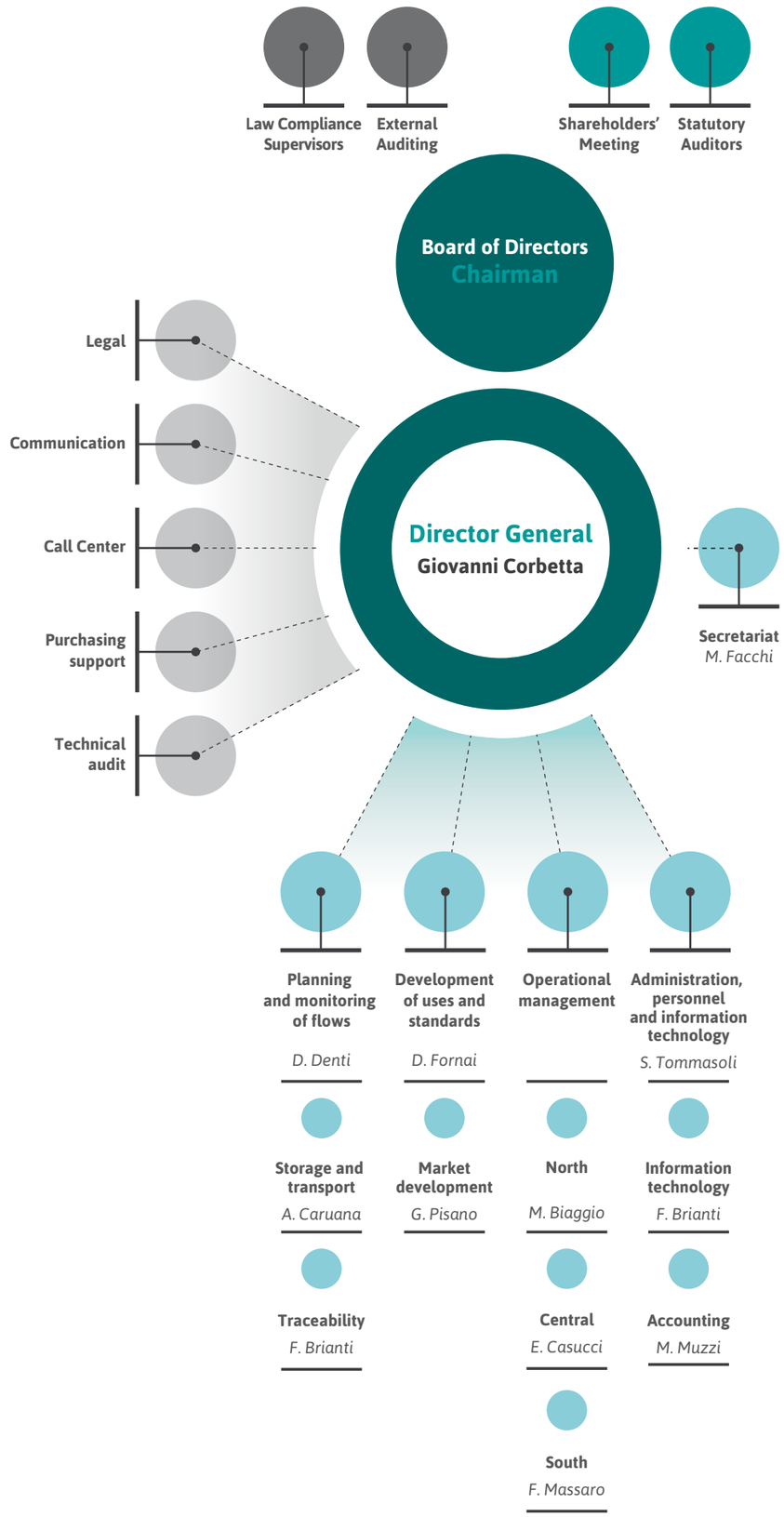
According to the Commission's projections, these policies would bring about a total savings of 600 billion euros, a reduction of greenhouse gas emissions by up to 4% and the creation of about 600,000 new jobs.

In this framework, Italy would be one of the countries that would benefit the most from the adoption of a directive on the circular economy. In fact, according to projections made by the Sustainable Development Foundation, stable employment would increase by 30,000 units and the country would also be rewarded with annual savings, in macroeconomic terms, of about 4 billion euros as well as lower environmental costs for another 3 billion euros.

In reality, the perfect closure of the lifecycle of the tyres will be obtained when it will be possible to recover rubber from ELTs that is suitable for a broad and stable use in the production process of new rubber products, including tyres, an objective that still requires a further development of knowledge with respect to the state of the art of the available processing and devulcanization technologies.

The Ecopneus governance system

Ecopneus scpa was founded by leading tyre manufacturers (Bridgestone, Continental, Goodyear Dunlop, Marangoni, Michelin, and Pirelli), who were then joined by another 57 partners (at the time of publication of this document) over time. The consortium system laid down by Italian Ministerial Decree 82/11 constitutes a model of management by private entities of an interest of a public nature – environmental protection – in application of the principle of extended producer responsibility.
As stated by the standard, Ecopneus is delegated by its members to fulfil the legal obligations related to the management of ELTs, even with the mandate to construct, around the collection and processing of ELTs, a high quality and sustainable industrial system for waste management.
A commitment to legality is one of the main elements of the work of Ecopneus, which, under that principle, has adopted Model 231 for the organization, management and supervision of its activities. Model 231 is an organizational scheme designed to promote transparency and to define the rights, duties and responsibilities of the organization in the exercise of its activities to prevent people involved in business management from adopting behaviours that conflict with the ethical principles and values that the company is based on.
To further protect legality in relations with stakeholders, Ecopneus has also adopted a Code of Ethics that represents a true Constitutional Charter for the organization, and always flanks the organization, management and internal supervision model.



Board of Directors: appointed by the six founding companies. The appointment of the Chairman of the Board is annual and involves rotations among the Directors.

Shareholders' Meeting: composed of the founding companies.

Statutory Auditors: composed of three members nominated by the Shareholders' Meeting in order to monitor and verify compliance with the legal previsions and those of the adopted Articles of Association, as well as the correctness of the business processes.

External auditing company: verifies the accuracy of the financial statements, accounting and tax compliance.

Law Compliance Supervisors: has the task of promoting the effective and correct implementation of Model 231, also through monitoring of the corporate conduct and activities.

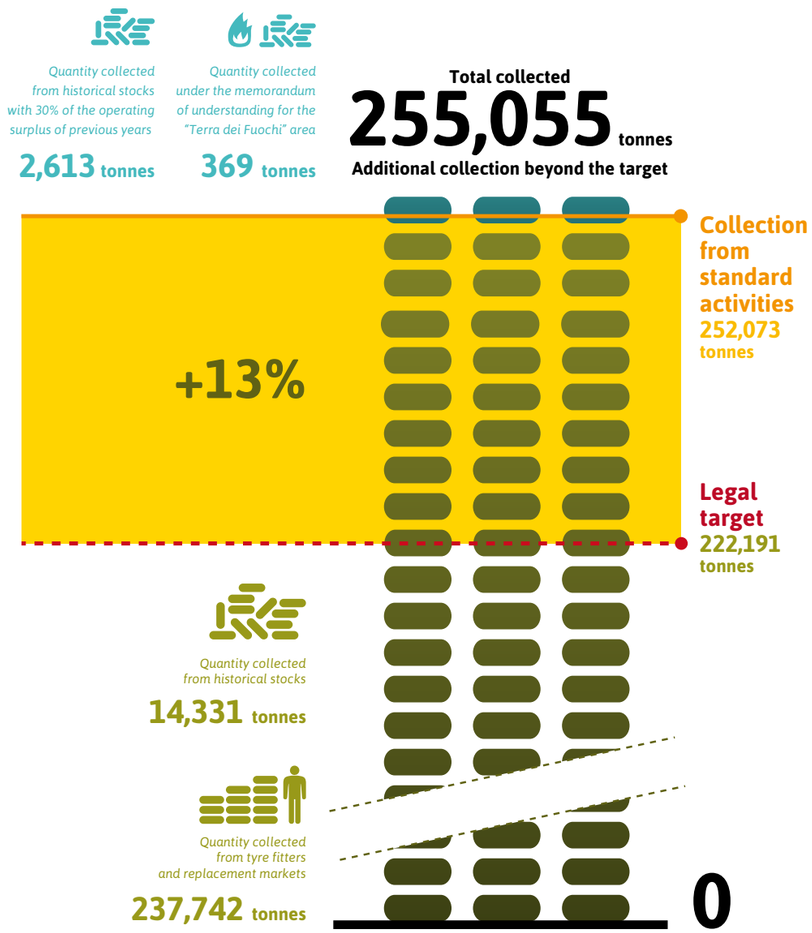
Beyond the legal objective

By law the annual collection target for ELT management systems operating in Italy is equal to the quantity of tyres sold by the respective partners in the preceding year, net of the loss of weight due to wear of the tread (by law fixed at 10% of the weight of the new tyre) and the share of export of used tyres to the re-use and reconstruction market. In 2014 Ecopneus' target totalled 222,191 tonnes, a figure that has been widely exceeded, with approximately 238,000 tonnes of ELT collected from tyre fitters and replacement markets, to which were added over 14,000 tonnes collected from the historical stock of Castelletto di Branduzzo in the province of Pavia, a historical accumulation of ELTs estimated at over 60,000 that is gradually being reduced thanks to the work of Ecopneus: from 2013 to today it has been reduced by half and the complete removal is expected to be completed in 2016. In total the amounts collected in 2014 and accountable according to national regulations to achieve the annual target amounted to 252,000 tonnes of ELT, +13% compared to the target, about 30,000 tonnes more. Collection "beyond the target", carried out by emptying the historical stocks still present throughout the country, can be added to the accounting of these "target" amounts. In fact, with 30% of the 2013 operating surplus, in 2014 Ecopneus launched the collection and recovery of a further 1,900 tonnes in Rapolano in the province of Siena, 3,370 tonnes in Battipaglia and 3,000 tonnes in Eboli, both locations in the province of Salerno (the operations will be completed in the first half of 2015). Finally, an additional 369 tonnes of ELTs were collected by Ecopneus in the "Terra dei fuochi" [English: "Land of Fires"], the area in the provinces of Naples and Caserta sadly characterized by the phenomenon of the burning of toxic waste, in which ELTs are often used to feed the fires.

A quantity equivalent in weight to about 43,000 car tyres, a relatively small number compared to the total managed by Ecopneus; however, it should be considered that in this case the end-of-life tyres are scattered throughout the country in small quantities and are taken in by Ecopneus only after being collected by authorized municipal workers. Furthermore, each individual tyre collected in this context is no longer available for the criminal use that has been wreaking havoc on an entire region and the populations that inhabit it for decades.

Overall these are another 3,000 tonnes of ELTs "beyond the target", which in 2014 lead to 255,000 tonnes of ELTs collected by Ecopneus, equivalent in weight to over 28 million car tyres, going far beyond, as mentioned, the legal objective.

The 2014 Ecopneus collection performance



Terra dei fuochi project

The "Terra dei fuochi" [English: "Land of Fires"] project arises from a memorandum of understanding authorizing Ecopneus to undertake extraordinary management interventions in a departure from the provisions of Italian Ministerial Decree 82/2011, which otherwise does not allow ELT management collection systems to pick up ELTs if not from the producers of the waste.

The Memorandum of Understanding was signed with the Ministry of Environment, the prefectures and municipalities of Naples and Caserta, and the delegate of the Minister of the Interior for "Terra dei fuochi". Upon signing, several Ecopneus partners made 3.8 million euros available from their reserves of environmental contributions collected during the start-up phase of the national system.

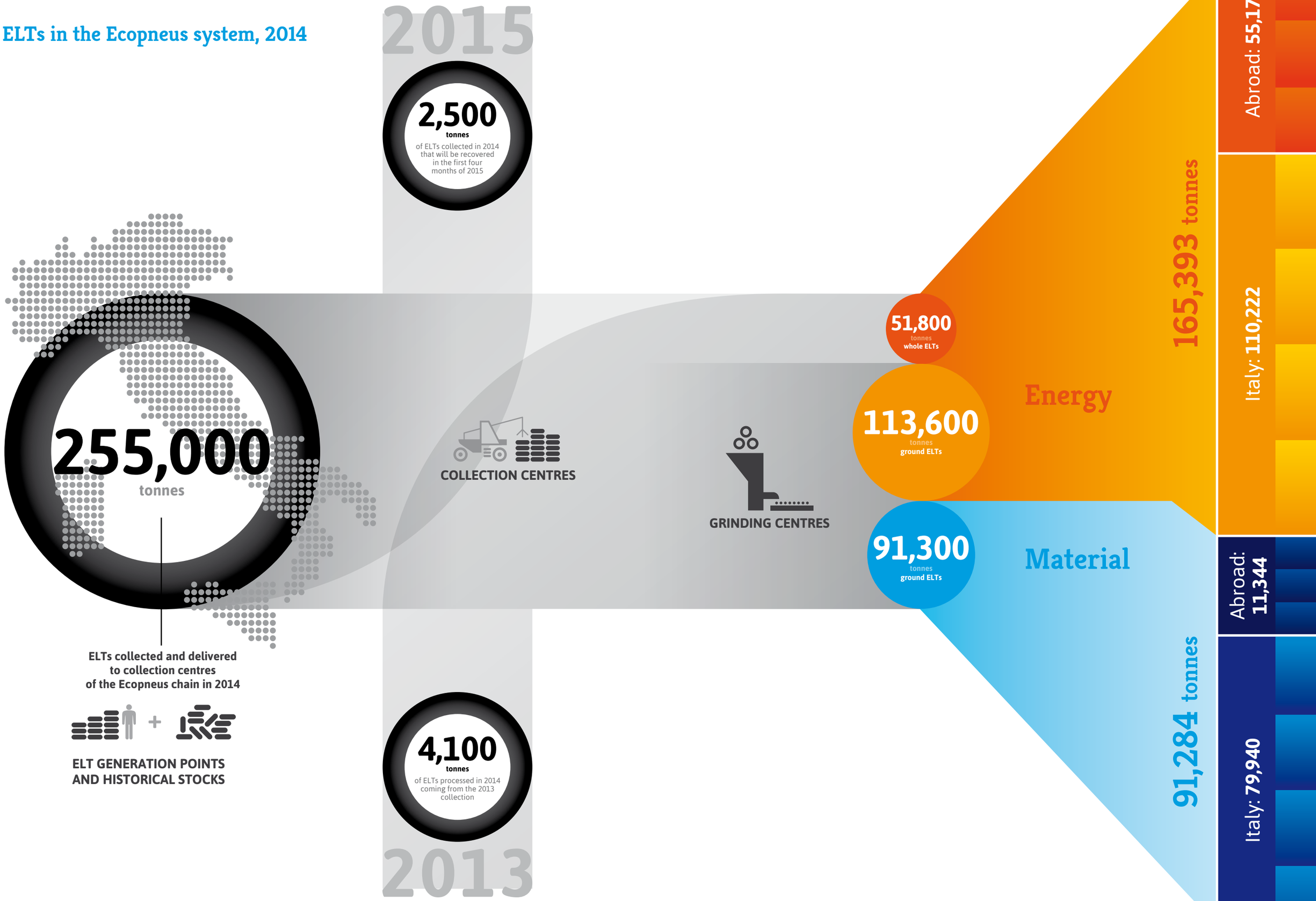
Collection activities began over the summer months of 2013 following the signature of the memorandum in June of that year. To date, these activities regard the free pick-up of ELTs at storage centres authorized and agreed upon with the municipalities involved, for subsequent transfer to recovery.

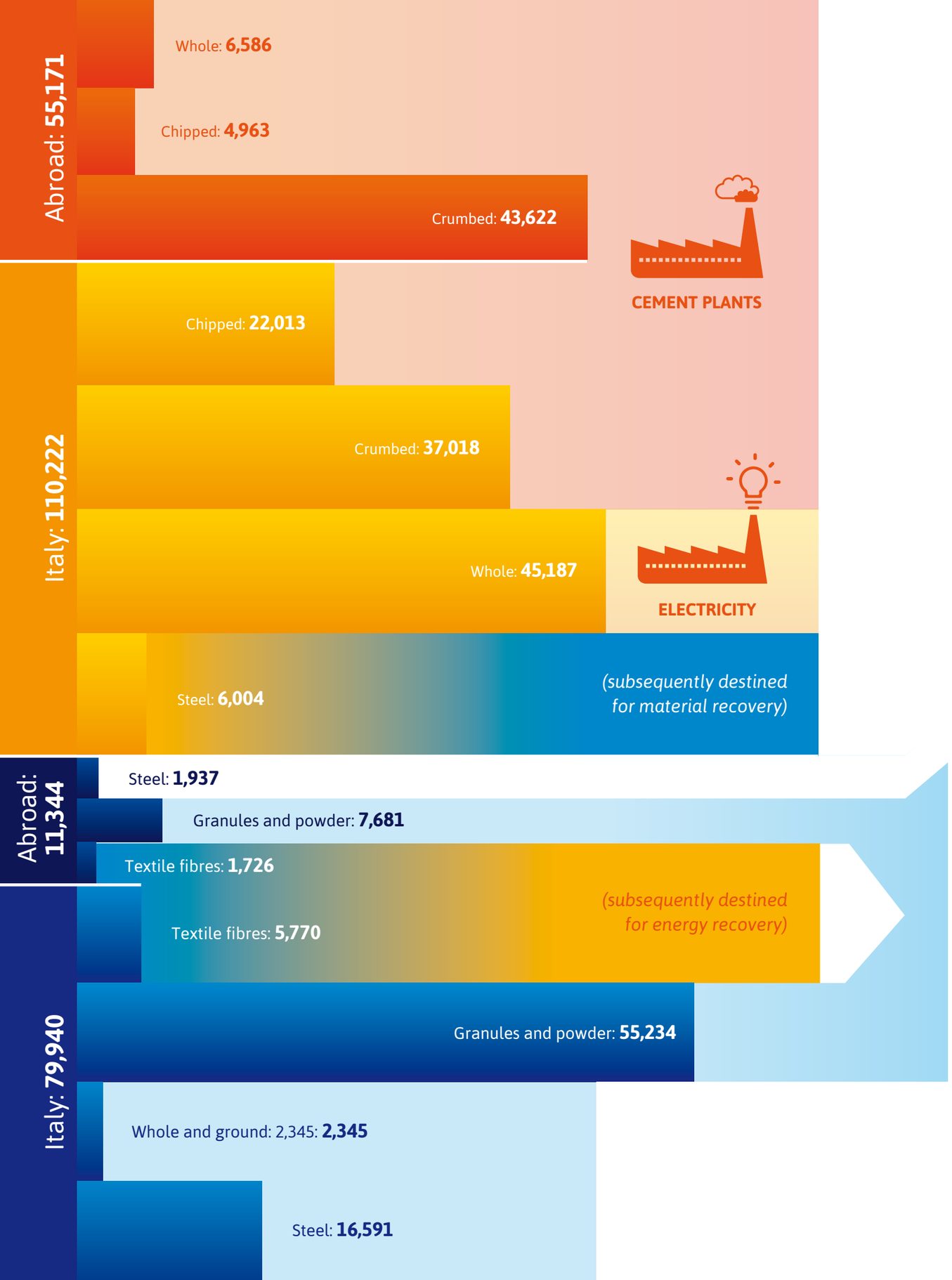
Alongside the collection activities, an information and awareness campaign against the purchase of tyres from the black market is also promoted, to help break the chain of illegality that connects tax evasion with the abandonment of ELTs in the environment.

Nearly 400,000 euros of funds have been used to date for the interventions and actions described, which have involved the major local collection and recovery companies of the Ecopneus network.

The project, constantly monitored by the Supervisory Committee established at the Ministry of the Environment, will continue until all available funds have been exhausted.

ELTs in the Ecopneus system, 2014



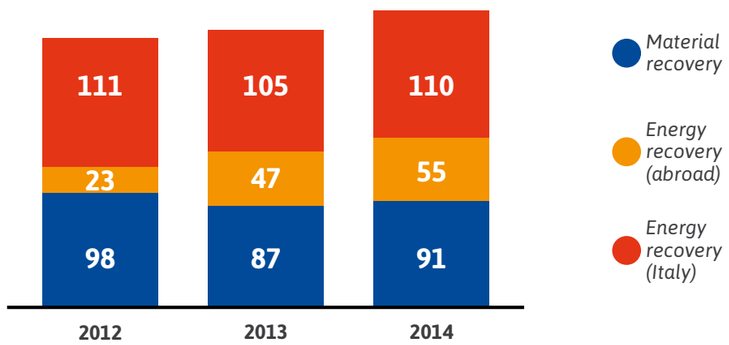


256,700 ELTs were processed by the facilities in 2014, a figure that differs slightly from the amount collected because of the quantities stocked in storage centres, with the balance given by the ELTs collected in 2014 but not yet processed that year, and those processed in 2014 but collected in previous years.

Of the total processed, just over 91,000 tonnes of ELTs (36%) were sent to facilities with the purpose of material recovery. These plants produced the following in 2014: 63,000 tonnes of rubber granules and powder sent for recycling, over 18,000 tonnes of steel, sent to steelworks, and just over 2,000 tonnes of ELTs, whole or ground/crumbed, recovered in infrastructure works (coverage and arrangement of landfills). These quantities are joined by about 7,500 tonnes of textile fibres which, despite their high added value (they are high-performance synthetic polymers) do not in this case supply the material recovery circuit due to technological proposals that are not yet sustainable: they are thus used as fuel in a foreign cement plant, and therefore destined for energy recovery, effectively exploiting their high calorific power. Almost 90% of the total ELTs destined for material recovery were processed in plants in Italy, in line with the model adopted by Ecopneus that favours transfer to Italian facilities until saturation of demand, with the aim of maximizing the economic benefit of the recovery for the national system.

Approximately 165,000 tonnes of ELTs were sent to facilities for energy recovery, two-thirds of which to national facilities. Almost half of the ELTs sent for energy recovery took the form of crumb, a good compromise between the process requirements related to combustion and the requirements for the reduction of the economic and environmental costs of the preparation and transformation phase. A non-negligible share, nearly 52,000 tonnes, 30% of the total, is composed of ELTs delivered whole, which are almost entirely sent to dedicated facilities for the production of electrical energy. The share of chips is more marginal, about 27,000 tonnes, produced primarily to meet the specific needs of several cement plants. 6,000 tonnes of steel recovered during grinding exit the energy recovery cycle and go on to supply the material one, with transfer to steelworks.

The ELTs recovered in the Ecopneus system (2012/2014)

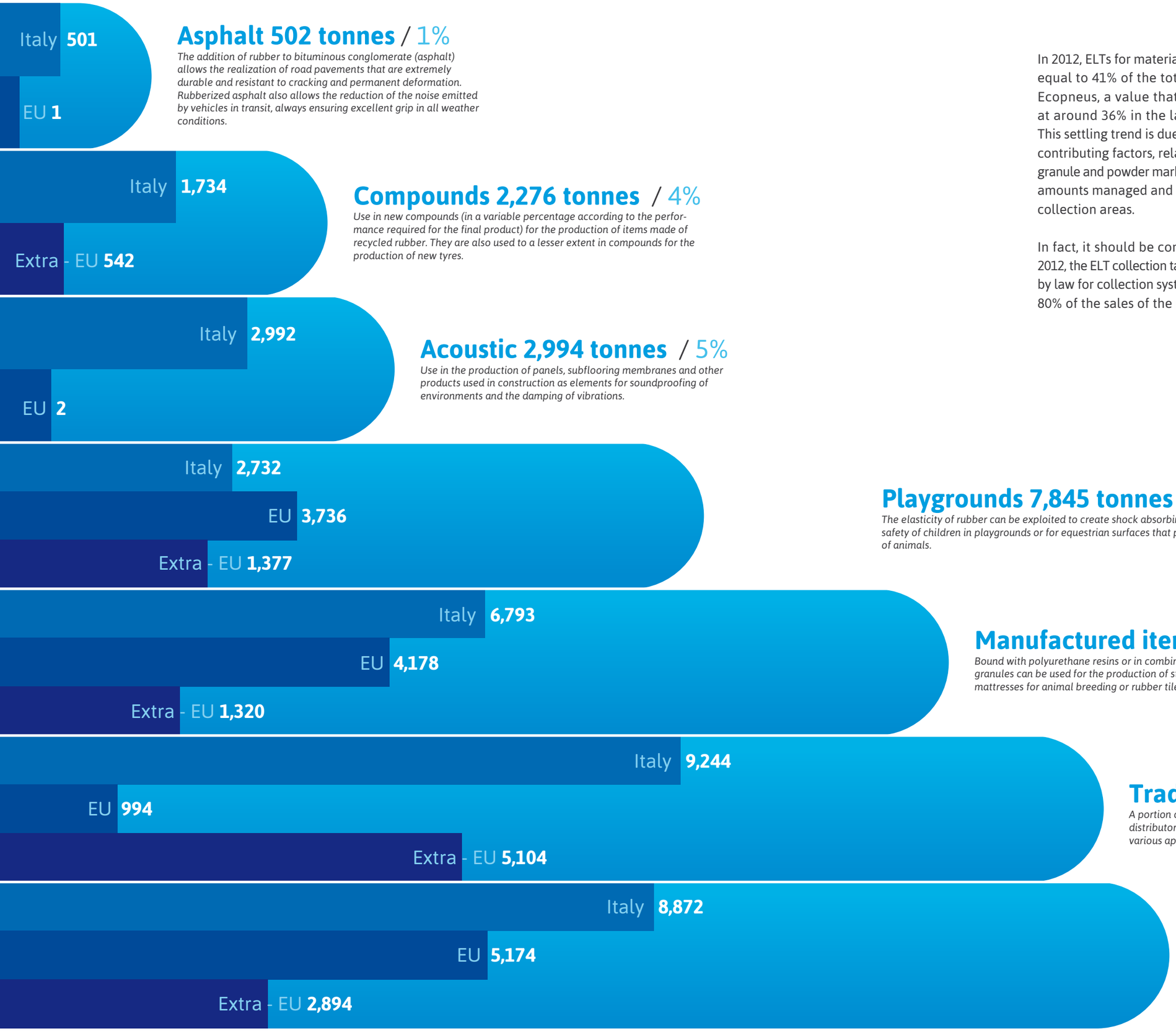


Amounts expressed in thousands of tonnes

In 2012, ELTs for material recovery were equal to 41% of the total collected by Ecopneus, a value that has stabilized at around 36% in the last three years. This settling trend is due to a number of contributing factors, related both to the granule and powder market, and the total amounts managed and their respective collection areas.

In fact, it should be considered that in 2012, the ELT collection target established by law for collection systems in Italy was 80% of the sales of the partners, so the overall availability of ELTs for material recovery was limited.

Ecopneus however, unlike other collection systems, collected a quantity of ELTs much higher than the target (+13%) that year, accounting for a high share of granules and powder. With the subsequent increase of the management target, which as of 2013 was 100% of tyres sold, the weight of the portion of ELTs sent to material recovery with subsequent placement on the market was reduced.



Asphalt 502 tonnes / 1%

The addition of rubber to bituminous conglomerate (asphalt) allows the realization of road pavements that are extremely durable and resistant to cracking and permanent deformation. Rubberized asphalt also allows the reduction of the noise emitted by vehicles in transit, always ensuring excellent grip in all weather conditions.

Compounds 2,276 tonnes / 4%

Use in new compounds (in a variable percentage according to the performance required for the final product) for the production of items made of recycled rubber. They are also used to a lesser extent in compounds for the production of new tyres.

Acoustic 2,994 tonnes / 5%

Use in the production of panels, subflooring membranes and other products used in construction as elements for soundproofing of environments and the damping of vibrations.

Playgrounds 7,845 tonnes / 13%

The elasticity of rubber can be exploited to create shock absorbing flooring for the safety of children in playgrounds or for equestrian surfaces that protect the joints of animals.

Manufactured items 12,290 tonnes / 21%

Bound with polyurethane resins or in combination with other thermoplastic polymers, ELT rubber granules can be used for the production of street furniture (speed bumps, traffic delimiters, curbs, etc.), mattresses for animal breeding or rubber tiles for different needs.

Traders 15,342 tonnes / 26%

A portion of the ELT granules produced in Italy is sold to traders and distributors that in turn send it for recovery (in Italy and abroad) in various applications.

Sports 16,940 tonnes / 30%

ELT rubber granules are used as infill in artificial turf football fields, or bound with resins and polymers to make basketball courts, tennis courts and multi-purpose areas, which are always characterized by high playability all year long.

The current scenario – which sees 36% of the ELTs collected sent for material recovery and the remaining 64% sent for energy recovery – does not reflect the real potential for exploitation of the value of the ELTs.

In fact, the recovery of the rubber polymer as a secondary raw material that can substitute virgin raw material generates the greatest benefits in terms of the recovery lifecycle: environmental benefits, in terms of reduced greenhouse gas emissions and reduced consumption of materials and water, as well as benefits of an economic and social nature, in terms of opportunities for new jobs that can be generated.

For these reasons, the Ecopneus Green strategy aims to reverse the current ratio between energy recovery and material recovery, doubling the proportion of the latter. In this context, Ecopneus' strategic action is developed with the activation of specific projects along two lines: one to support the growth of the market for applications and products from ELT rubber, and the other to support grinding companies for the consolidation of a production of granules and powders of high and verified quality.

The market for ELT rubber products

UAn analysis of the primary destinations of the rubber granules and powders produced in the Ecopneus system shows how the main one is sports applications (tracks, multipurpose fields, football fields), followed by play surfaces (playgrounds for children); together the two categories account for 42% of the total of the different types of final applications. 21% of the granules or powder produced is used for the realization of manufactured items, street furniture (speed bumps, curbs, etc.), rubber tiles and animal floorings.

Focus

From the road to the road

The rubber derived from the recovery of end-of-life tyres returns to the road through its use for the production of rubberized asphalt, one of the areas of market development for the use of rubber from ELTs with the greatest potential in terms of the circularity of their recovery. The use of powder as an additive to bituminous conglomerates, in fact, in addition to the environmental benefit of the recovery of the rubber, offers performance advantages in several respects, including:

- reduction of vehicular traffic noise on streets with the transit of vehicles with an average velocity greater than 50 km/h;
- longer life of the pavement with respect to conventional materials (up to three times longer) and a consequent reduction in maintenance costs for the public administration;
- possible reduction in pavement thickness with consequent lightening of the environmental loads (consumption of aggregates, transport of materials, milling of previous pavements);
- mitigation of the vibrations transmitted to the structures adjacent to the road.

Noise reduction is particularly important for promoting this solution for the use of rubber from ELTs, especially in view of the fact that prolonged exposure to the noise produced by vehicular traffic (composed of noise from rolling, engine noise and air friction) is one of the major causes of discomfort for the population and damage to health. A recent study published in the European Heart Journal (35/2014) demonstrated that exposure to noise levels over 10 decibels higher than the limits set by the World Health Organization increases the risk of stroke by 14% to 27%; this is joined by the effects of auditory and extra-auditory impairment, typical of areas where the acoustic climate is strongly influenced by the presence of roads with high traffic volumes.

"Rubberized asphalts", i.e. bituminous conglomerates modified with rubber powder from ELTs, have been around for over forty years and are widespread internationally. The experience of the United States, where 28 of the 50 states are already using this asphalt – and in particular of states such as California, Texas and Arizona, where there has been a constant monitoring of the pavements subjected to intense vehicular traffic for over 15 years – has allowed an assessment of how the construction of roads with rubberized asphalt is a more advantageous option than the construction of conventional ones. Spain is the European country that has invested the most in this constructive solution, with over 700 km of roads built in a few years. This result has also been achieved thanks to the action of the government, which has formally indicated this application as a priority for the recovery of ELTs in a national action plan. In Italy, the network of roads built with modified asphalt is about 235 km long, a very limited amount with respect to the application's potential: it would be possible to create pavements for nearly 19,000 km of roads every year from the ELT rubber collected annually in the country. The most significant experiences today regard Emilia Romagna, Tuscany, Piedmont and Trentino Alto Adige, where Ecopneus has contributed directly by promoting construction, assisting installation companies in the adoption of the technology and the optimization of the preparation of bituminous mixtures, and monitoring acoustic performance. One significant example is the construction in the municipality of Rome, in Via Prenestina and in Via Torpignattara, of two tracts of experimental pavement with "low-noise asphalt" modified with rubber powder from ELT.

The acoustic performances of the two experimental routes in Rome were evaluated by I-Pool (spin-off of the National Research Council (CNR) of Pisa) which found that the differential with respect to the pre-work pavement is about 6 dB at speeds of 40, 50 and 80 km/h; compared

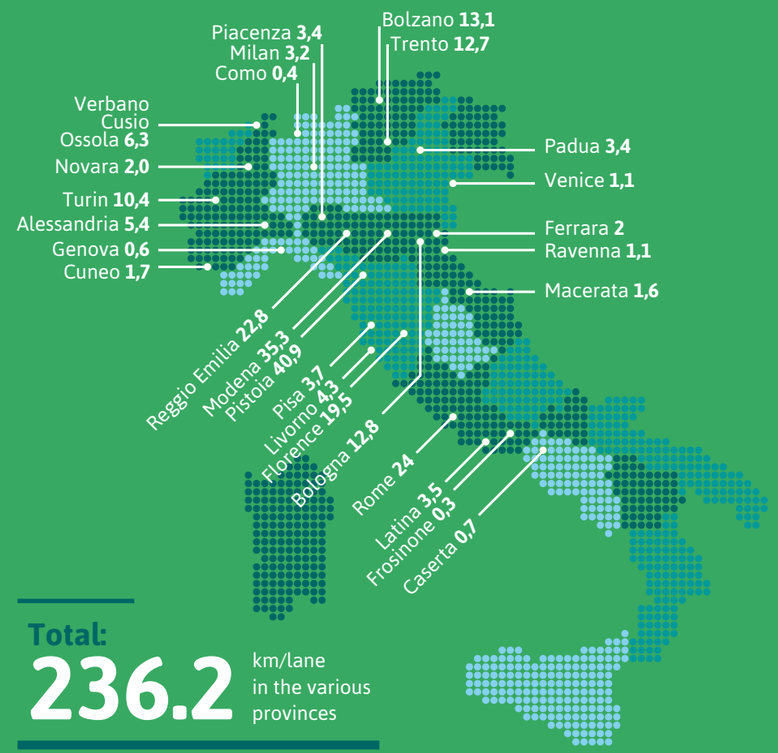
to a traditional pavement of the same age, the differential is 2.6 dB. As regards these results, it should be noted that 3 dB is equivalent to halving the measured sound power.

Also in relation to the acoustic performances, another noteworthy project was done in collaboration with the Autonomous Province of Bolzano on many stretches of road made of rubberized asphalt, where the acoustic monitoring carried out has verified a reduction of up to -5 dB of sound emission due to rolling with respect to the previous situation.

The acoustic performance of asphalt with added ELT rubber, with particular reference to the urban environment, has also been the subject of a specific project developed in collaboration with the engineering company Vie En.Ro.Se. and compiled in a dossier entitled "Acoustic performance of low noise asphalt in urban areas". The study shows how pavements made of low noise-emission asphalt are certainly the least invasive and most integrated solutions for mitigating noise and ensuring restoration after wear in urban and extra-urban environments.

Another important project activated by Ecopneus regards the comparative monitoring of worker exposure to asphalt fumes during installation operations. The study, conducted by the company Waste and Chemicals, was performed through multiple measurements on road works during the laying of rubberized and conventional asphalts.

The measurements demonstrated an improvement of the quality of the fumes following the introduction of rubber into the mixtures. Powder, in fact, by absorbing some of the bitumen, tends to retain volatile substances, thereby reducing worker exposure to them. The activities initiated in 2014 by Ecopneus in the promotion of asphalt modified with ELT rubber include:



Total:
236.2 km/lane in the various provinces

- the organization of 10 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 articles in important trade publications (Le strade [English: Roads], Rassegna del Bitume [English: Bitumen Review], Strade e autostrade [English: Roads and highways]);
- participation in the Asphaltica Fair in Verona and industry meetings; realization of the Acustica [English: Acoustics] dossier with accompanying video;
- publication of the "Guide for the production of bitumen with rubber powder from ELTs" (Italian translation of a study prepared by Signus Ecovalor, Ecopneus' counterpart in Spain), which provides useful information for the production of bitumen modified with rubber powder.

On the research and development side, Ecopneus recently activated several collaborations with universities and research centres on open source projects, the results of which are made freely available.
The University of Bologna is investigating the performance of adhesives and rubberized bituminous conglomerates produced at warm temperatures and in a dry way; innovative forms of valorising rubber materials for road applications are also the subject of research. A collaboration with the University of Pisa is also active for the preparation of a manual on the production of low-noise pavement with rubberized asphalt. Finally, in order to disseminate and make available to operators the vast amount of research and studies as well as the results of experimental projects in this application area, Ecopneus has created a dedicated newsletter, "Ecopneus Asfalti" [English: Ecopneus Asphalts] for updates on developments in the sector and the main news and events.

Use of rubber from ELTs in construction

The characteristics of elasticity, sound absorption and resistance to loads make rubber from ELTs an excellent material for limiting the transmission of noise and vibrations inside buildings.
Furthermore, products made of ELT rubber have a slowed bacterial growth, resist mildew, heat and moisture, and are not affected by exposure to sunlight and ultraviolet rays as well as chemicals, characteristics that make it an excellent construction material.
Even the high capacity of ELT rubber to maintain its performance unaltered over time is a definite added value in a sector such as construction, where the durability of products is an essential element. Rubber granules and powder, bound with polyurethane or other thermoplastic materials, are true high-performance "building blocks" for sound insulation and vibration damping. Various products aimed at the building market, grouped in the following categories, can be derived:

- subflooring products for 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 (normally between 2 and 20 mm thick) that interrupts the transmission of impact noise 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 solution particularly suited for new constructions that allows losses of insulation caused by the interspace resonances to be attenuated;
- anti-vibration products to dampen the vibration phenomena of industrial

machinery, hydraulic and mechanical systems and their components, and building foundations;

- under wall bearing strips: these products are usually sold in rolls of a width between 5 and 70 cm, and are used to separate the floor slab from partitions with a resilient layer. In this way, vibrations and noise are attenuated by the elastic layer. The damping effect of this technology also helps to prevent the propagation of sound between the two layers of which the double walls are composed;
- waterproofing membranes: bitumen-based solid sheets, reinforcing elements, fillers and polymers. The powder optimizes the elasticity and flexibility of the membranes at high and low temperatures. Made of rubber from ELTs, these products have an environmental impact considerably inferior to that of materials commonly used in construction for the same purposes and can therefore also play a leading role in the "green purchasing" of public administrations.

In order to spread awareness of the performances and encourage the use of materials derived from ELTs with designers and builders, Ecopneus continues the collaboration with Vie En.Ro.Se. Ingegneria for the production of manuals intended for professionals (architects, engineers, surveyors, and others). The publication of a Technical Paper entitled "The use of rubber from ELTs in construction" is planned for 2015.

Sports applications

The physical characteristics of rubber recovered from ELTs are particularly useful for the production of sports surfaces, play area flooring and, more in general, for all those surfaces on which sports or recreational activities that require protection from impacts and accidental trauma are performed. In order to promote a more widespread use of rubber from ELTs in sports, Ecopneus has partnered with UISP – the Italian Union of Sport for All – to spread knowledge and information among over 1,310,000 members, 17,800 affiliated sports societies and 1,000 clubs throughout the country.

There are multiple applications in the sports sector. Athletics tracks, for example, take advantage of the characteristics of ELT granules to obtain sufficient roughness for a good grip, a reduction of muscle fatigue, the mitigation of microtraumas and an overall improvement of sports performance. Furthermore, the rubber surface does not have any joints or weak points as it is "cast in place" and therefore monolithic. Another play/sports use is impact-absorbing flooring for children's play areas or the protection of edges in order to prevent accidental traumas from falls. Flooring for equestrian activities is also important; such materials are becoming more common in this area thanks to their capacity to reduce impacts, also when transporting horses, and to improve grip on wet ground as well as for protection from bacteria and dust. One of the main sports applications, which Ecopneus promoted in 2014 and is also finding an increased application space in Italy, regards artificial turf sports surfaces such as football fields. Ecopneus has conducted studies and produced technical files, in collaboration with Melete S.r.l. (university spin-off), analysing the extent of possible health risks resulting from contact with ELT rubber.

These studies show that exposure to ELT granules in artificial turf fields, in all the scenarios evaluated, is well below the derived threshold limits. Football fields made of artificial turf, in which the ELT granule is used as an infill material between the blades of grass or as a sub-layer below the playing surface, offer better playing conditions compared to traditional ones and, in particular, demonstrate:

- resistance to the most adverse weather conditions;
- possibility of installation without restrictions for the weather conditions necessary for the care of a traditional turf surface;
- low maintenance costs;
- lower water consumption;
- greater durability and better playing hours/year ratio compared to traditional surfaces, due to their drainage characteristics;
- ability to use the playing field for other purposes without jeopardizing the surface (concerts, meetings, events);
- ability to play games in every season, even with particularly difficult climates, due to the absolute incorruptibility of the playing surface.

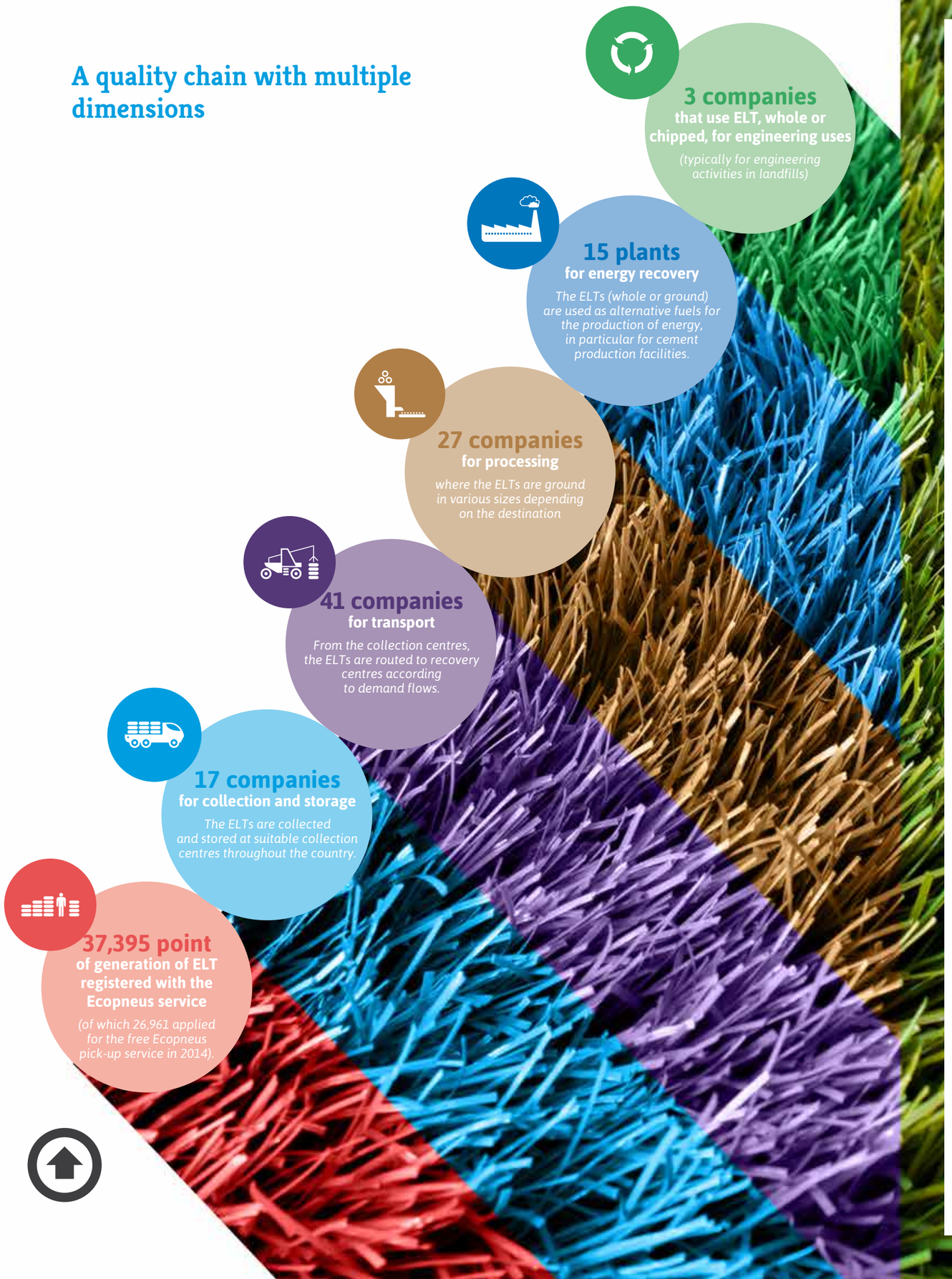
One project of particular note among those promoted by Ecopneus in this sector is the creation of the first artificial turf football field in Italy with the use of rubber from ELTs of the Serie A football club Atalanta.

Inaugurated on October 8, 2014 at the Sports Centre of Zingonia in the presence of the Undersecretary of State for the Environment Barbara Degani and the Director General of Atalanta Pier Paolo Marino, the new field made from rubber recovered from end-of-life tyres will host the matches of Atalanta's Primavera team. The use of rubber from ELTs in the underlays facilitates the levelling of the foundations, giving elasticity to the surface and encouraging the return of energy to the athlete. In the infill, instead, the granule has a performance function required for shock absorption and the prevention of the vertical deformation of the surface, maintaining high quality standards for the rolling and bouncing of the ball.

The use of materials derived from the recovery of ELTs in sports therefore allows a triple advantage.

First an environmental benefit, as it contributes to reducing the consumption of virgin raw materials. Secondly, it produces an economic advantage, since, for the same performance and yield, these materials cost about one tenth as much as the virgin materials commonly used and through their use contribute to the consolidation of a sustainable market for secondary raw materials from ELTs. Finally, ELT rubber allows a performance and overall yield of the sport that is in some cases even better than the commonly used materials.

A quality chain with multiple dimensions



The strength of the Ecopneus system lies in the efficiency of the management, in the speed and capillary nature of the pick-up, in the rigorous coordination of the demand flows, and in the punctuality of payments, but above all in the quality of the service that is required of all the chain's operators.

In fact, Ecopneus has drafted its Green strategy together with them, in the conviction that only an efficient industrial system can stabilize and expand the market for products recovered from ELTs, generating an effective environmental benefit and a positive impact on businesses and consumers. Only a proper management allows the environmental contribution to be reduced within the limits of a governance of the system that is in equilibrium with the recovery priorities provided for by law and with European waste management leadership for the minimal environmental impact.

The companies that work in the Ecopneus system are engaged in the sectors of logistics and the processing and recovery of ELTs and are selected through a rigorous process tied to the quality of service provided. Following the new bidding conducted in 2014, Ecopneus signed service contracts for the next three years.

An important three-year period, with the ambitious objective of substantially increasing the current share of material recovery from ELTs by reducing the quantities sent to energy recovery: Ecopneus addresses this challenge with a strategy of support for businesses to increase their capacity to produce quality granules and powder to penetrate the markets of today and tomorrow.

Requirements for the selection of the chain's partner companies

The choice of companies for the three-year period 2015-2017 followed, as usual, a rigorous process in several stages supported by an outsourced company that specializes in e-procurement, subsequently certified by a third party institution. In particular, the process involves:

- registration on the Ecopneus portal with a self-certification questionnaire;
- pre-selection made by Ecopneus on the basis of the verification of the requested minimum requirements;
- tender based on specific contract specifications;
- detailed check for the final selection of the companies, taking into account the possession of the indicated requirements and the most economically advantageous offer.

The requirements on which the evaluation of the companies is based are as follows:

- possession of the necessary authorizations to perform activities under the offer (companies with authorization under the ordinary procedure are preferred);
- coherence between the activities under the tender and the means/resources possessed by the company (facilities, weighing systems, storage areas, various structures);
- experience in the sector gained over the last three years;
- existence of contracts for the delivery of waste and/or sale of the materials obtained from the processing of the ELTs (for granulation companies);
- annual and instant storage ca-

pacity as required by Ecopneus and appropriate to carry out the required activities;

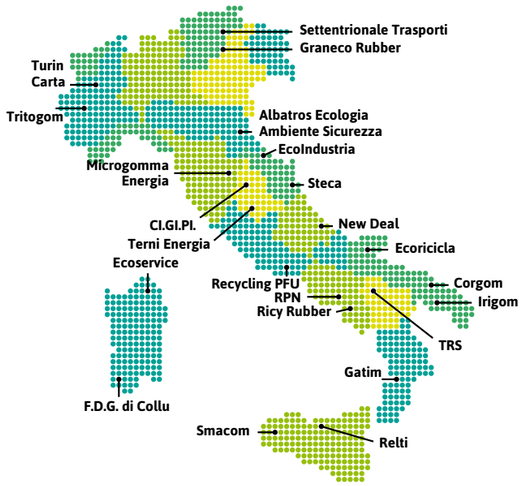
- ability to report the collection and storage flows, administrative transparency, possession of quality certifications (such as ISO or EMAS);
- registration of the company in the "white list" at the prefecture of the province of competence or document proving the registration request (subject to evaluation by Ecopneus of any critical issues and negative events in the company's history);
- solid and demonstrable financial robustness;
- most competitive financial offer in accordance with the conditions set out above.

In order to qualify its value chain from an environmental and social point of view, Ecopneus has been promoting a series of initiatives for many years aimed at improving not only the quality of its management system and sector research, but also the quality of the products offered by the chain's companies.

Only trained operators that are able to open themselves to the market can allow the development of an industrial system able to give a stable and enduring outlet to the wide range of innovative products and applications that come from the recovery of end-of-life tyres.

Ecopneus is continually engaged in efficiently and effectively performing all its business activities such as the timeliness

The collection and grinding companies of the Ecopneus system



Grinders

Collectors

of payments to suppliers, ensuring capacity utilization, consistency in audits of the quality and safety of the work of the processing plants and the commitment to ensuring an adequate level of service to tyre dealers. Added to this is the continuous investment in the capacity building of the operators through continuous assistance to the processing facilities by in-house experts, whether dealing with technology, regulatory issues or quality management. We analyse the initiatives implemented by Ecopneus for the qualification of its chain in greater detail.

Level of service, stability of transfers, economic stability, audit system

The centralized coordination of the collection logistics network at the points of generation can guarantee the timely pick-up of ELTs, which in 2014 occurred on average within 5.13 days from the pick-up request, from almost 30,000 tyre vendors served and scattered throughout the country.
The timely and capillary management of the collection is also a guarantee for the processing companies of continuous transfer flows, in support of a management of the production with adequate stocks of raw material to be processed. It is in this context that the Ecopneus management, after verification of the stock level, guarantees constant transfer flows to all the companies of the system, giving priority however to companies that perform material recovery.
The managerial practice of timely payments also goes in the direction of the financial strength of the system. In fact, Ecopneus issues payments at 60 days from the end of the invoice month without any delay in 100% of cases.
With exact knowledge of the resources they can count on, the system's companies are encouraged in financial and investment management and programming, as well as facilitated in access to credit.

The Ecopneus audit system and the performances of the chain's companies

Since starting its operations in 2011, Ecopneus requires by contract that the chain's companies are available to participate in a program of periodic verification of compliance with the legal requirements laid down in the Environmental Code and the Consolidated Law on health and safety based on a specification developed specifically by Ecopneus in collaboration with leading certification companies.
The audits consist of the examination of documents and visits to the collection and processing companies (and any subcontractors) and to some transporters, in order to assess the completeness of the permits necessary to operate in the ELT recovery sector, any environmental, quality and safety certifications, as well as the level of compliance with the legal requirements applicable to the production processes and facilities. In particular, the verifications regard a checklist of more than 140 issues regarding the environment and safety at work with reference to specific areas, including:

Environment

- operational and organizational systems for the management of environmental emergencies;
- monitoring and protection systems for emissions of pollutants in the air, water and soil;
- process waste management;

- level of noise emissions;
- health in the workplace with regard to powders;
- energy efficiency;
- management of hazardous substances;
- potential asbestos pollution.

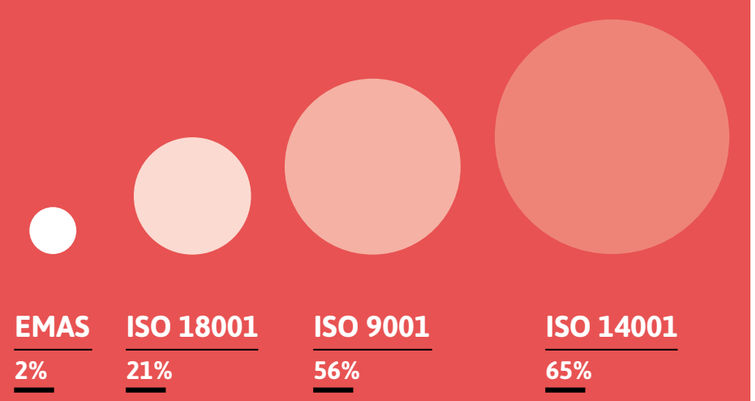
Health and safety at work

- organisational aspects (as per Legislative Decree 81/2008);
- risk assessment (Arts. 28 and 29 of Legislative Decree 81/2008 and similar);
- place of work;
- management and supervision of contractors;
- work equipment and prevention devices;
- fire-fighting measures;
- signage;
- manual handling and loads procedures;
- machine and facility safety;
- storage facility safety

Up to the end of 2014, the audits to monitor the program were carried out by Certiquality as a third party accredited certification body; satisfactory results were found with a level of compliance of 99% with respect to the check-list of aspects identified in the Ecopneus regulation, an increase of 2 percentage points from the audits carried out in 2013.
The audits performed also show that 75% of the system's companies possess one or more environmental (ISO 14001 or EMAS), quality (ISO 9001) or occupational safety (ISO 18001) certifications issued by major accredited institutions worldwide, including: Certiquality, TÜV, CSQ, DNV, SW, SGS, and RINA.

Starting in 2015, the Ecopneus audit program will be updated with the activation of a new service contract with TÜV Italy, the national branch of TÜV SUD, a leading global organization for certification in the fields of quality, energy, environment, safety and products.

Diffusion of certifications among the companies of the Ecopneus Network



Development of knowledge

Aware that a company must act on several managerial dimensions to obtain quality products, Ecopneus supports the capacity building of the system's operators, with resources dedicated to monitoring efficiency.

The Quality Manual developed specifically for the system's companies is certainly functional for this purpose, as is accompanying the environmental and workplace safety audits described by the service contracts for all the system's companies and performed by a third party certification institution, as well as the availability to provide specialized technical and legal assistance through its network of experts in the area.

Support in research and opening of markets

Ecopneus supports the companies of the chain in the development of managerial skills, with market research and on the path toward economic consolidation with initiatives aimed at opening up the market for the use of rubber granules and powder.
Among the activities carried out, Ecopneus has long been engaged in a collaboration with the Ministry of Environment for the definition of Minimum Environmental Criteria (MEC) for products made with rubber from ELTs and, in particular, in the definition of MEC for street furniture with participation in the working groups set up by the Ministry.
In this perspective, Ecopneus also promotes the certification of granules and powder produced by the chain through the Ecopneus Quality Mark: in order to provide additional certified guarantees on the characteristics and composition of the material produced from ELT rubber that could be useful – once the MECs of various rubber products for green purchasing by the public administration are defined – to give a concrete contribution to their increasing popularity and commercialization.

Certified product quality mark

In order to facilitate the penetration of the domestic and international markets for the ELT rubber granules and powder produced by the chain, Ecopneus has created its own Quality Mark: the first certification of quality of a secondary raw material in Europe.

Ecopneus makes this proprietary quality mark available to the companies of the chain that can certify the production with respect to certain characteristics concerning a specification, developed *ad hoc* for this type of product and in collaboration with Remade in Italy and Certiquality.

In particular, the certification process consists of two levels of verification:

- the first, binding, is relative to the product and, therefore, to the correspondence of the granules and powders manufactured by a company with respect to parameters of morphological and dimensional uniformity, as well as the presence of any process "impurities", i.e. steel and textile fibres that are separated during the processing of the ELTs. This step plans, among other things, for characterization analyses of the products on samples performed at selected laboratories;
- the second, optional, is related to the company and regards the possession of other certifications, including ISO 9001, ISO 14001, EMAS, etc. and respect for ethi-

cal and social principles inspired by international standards.

The Ecopneus Quality Mark can only be released following a certification audit carried out by accredited bodies: an additional cost for the companies that Ecopneus has decided to support with a project budget to cover the costs for specific activities, including those of product characterization by laboratory analysis.

Strategically, the affirmation of a quality mark for ELT rubber granules and powders is an opportunity not only for the companies of the Ecopneus chain, but also for companies that manufacture finished products, which can count on high quality secondary raw materials, improving in turn the potential for market penetration.

A multiplier effect that could also be supported by public demand, and by rapidly adopting suitable green public procurement criteria for products containing a proportion of recycled material.

There are still many discussions open as part of the actions to support the opening of the markets.

The one with the Ministry of Environment to explore the opportunity for eliminating the regulatory issues that may jeopardize the proper functioning of the ELT chain in Italy certainly remains among the most important; these regulatory issues include:

1. the lack of a homogeneous regulation governing processing authorizations for companies;

2. the issuing of an "End of Waste" decree.

Two important aspects that if addressed quickly can become a driving force of opportunities for the system of ELTs in Italy in the international context, multiplying the collective benefits:

- the actions described for the qualification of the chain guarantee economic and financial stability to the system's companies and offer the opportunity to plan investments to increase the recovery of material as part of the growth of the Green economy;

- a Green economy that the operators become a fully active part of only if they contribute with every effort to generating a real environmental and economic benefit for the community, reducing dependence on environmental contributions upon transfer and improving the capacity to remunerate capital through the market by offering quality green products.

The network of Ecopneus stakeholders

Stakeholder involvement

The involvement of stakeholders is a priority and a qualifying element for Ecopneus; in fact, various occasions have been dedicated to discussions with and among them over the years. It is in Ecopneus' nature to qualify itself as an inclusive system, capable of activating a wide spectrum of collaborations with a wide variety of subjects:

- environmental associations (such as Legambiente);
- supervisory authorities;
  - Fire Brigade;
  - Local Police;
  - Corpo Forestale dello Stato;
  - Carabinieri and Guardia di Finanza for initiatives to promote legality in the management of ELTs;
- national research bodies, such as the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), to promote research and development of the most promising applications in the field of material recovery;
- experts in the Green economy and stakeholder engagement such as the Sustainable Development Foundation, through membership in the National Council of the Green economy and participation in the activities of the States General of the Green economy.

Stakeholder engagement is part of Ecopneus' DNA and the results of this brainstorming, the suggestions that result from it, and the elaboration of the consortium's strategies are effectively constructed in a participatory way and take the consultation system activated into account in a practical way.

A careful mapping of key stakeholders has therefore been conducted, not limited to the narrow scope of the consortium, and many channels of contact and communication have been developed in order to refine and share strategic decisions.

2015 operators convention

The third Ecopneus Convention was held on January 30-31, 2015 and was convened, as in the past, during the contractual renewals defined with tenders in 2014 for a period of three years. The Convention brought together all the collection and processing companies that signed the three-year contract, including some foreign operators in both the granulation and energy recovery sectors. The event was held over two days and opened with a series of presentations aimed at framing the work on the relevant aspects for an increasing qualification of the chain and providing the participants with food for thought. During the afternoon of the first day, in fact, those present were divided into three working groups, broken down by geographic area, to discuss and debate the topics proposed during the morning.

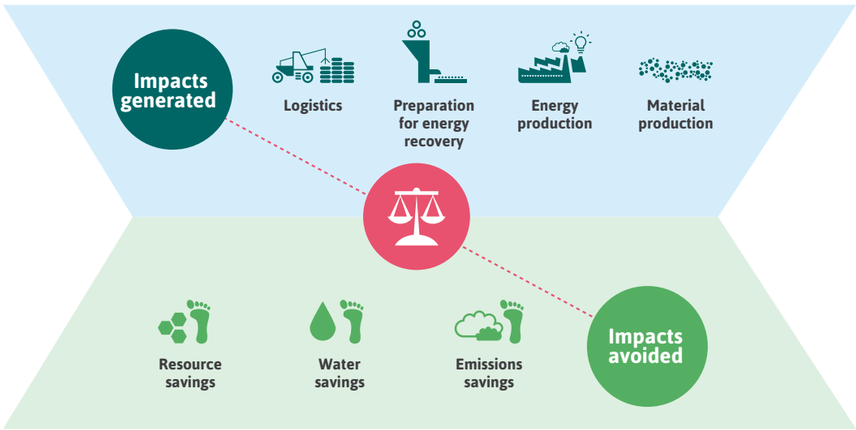
The main focus of the Convention was the increase in efficiency and productivity of the chain with the stated intention of stimulating a leap in quality aimed at increasing the recovery of materials, rather than sending the majority of ELTs for energy recovery, inverting the current ratio that sees 36% material recovery compared with 64% energy recovery. By involving the chain's stakeholders, the Convention allowed the priority areas in the coming years to be jointly defined:

- the importance of strengthening human capital (widespread know-how, motivation);
- management plans aimed at the quality of the product and production;
- investments for the renewal of dedicated facilities;
- development of product specifications to technically frame productions;
- with the involvement of the processing chain, promotion of eco-design practices to produce tyres that can be recycled more easily;
- reduction of production costs, also working on energy efficiency;
- product certification;
- development of buying groups to reduce production costs;
- development of managerial and marketing skills;
- development of shared/consortium commercial networks to aggregate demand and be more competitive in the commercial offer.

Finally, the possibility of organizing the convention every year and not just during contract renewals, also to provide an opportunity to follow up on the proposals, emerged from the discussion.

2 / Environmental benefits

Reporting boundary of the Ecopneus system environmental analysis



The reporting boundary adopted for the analysis of the Ecopneus system's lifecycle considers the effects of logistics, preparation for processing and the industrial recovery of ELTs.
These activities are associated with both negative environmental impacts, related to the consumption of resources necessary for the normal functioning of the chain, and benefits, arising from the environmental advantages related to the recovery of ELTs.

The quantification of negative environmental impacts

For logistics, the impacts of transportation related to the following were considered:

- ELT collection at the points of generation;
- any transfer to temporary storage centres;
- separation and subsequent transfer of whole ELTs to grinding companies or directly to the centres for energy recovery;
- transport of ground ELTs to cement factories or electric power stations for energy recovery.

The specific impacts of grinding for the different sizes produced (crumbs, chips and granules) have been considered in a differentiated way for the above processes, which are preparatory for the recovery.

The impacts of combustion were considered for the ELTs (whole or ground) sent to energy recovery, considering the components of non-fossil origin, starting with natural rubber, to be carbon neutral.

The quantification of the environmental benefits

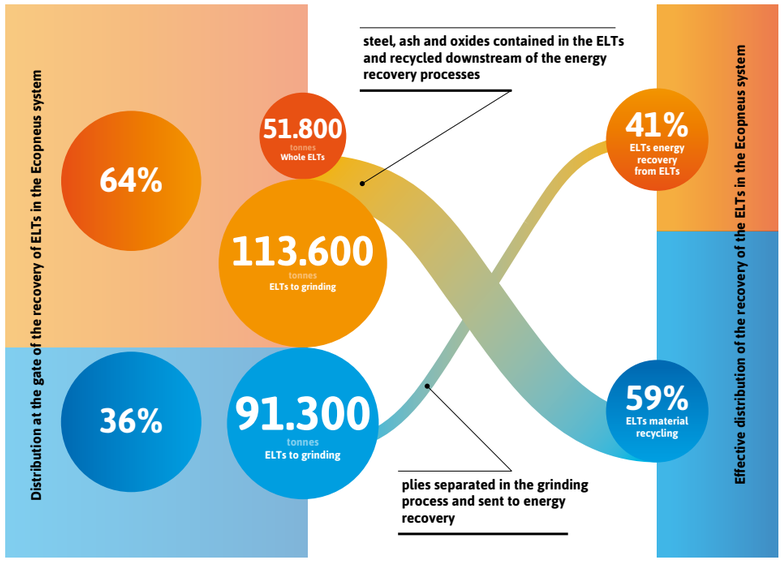
The main methodological approach used to evaluate the benefits of the recovery is that of the negative impacts avoided: each recovered material corresponds to the savings of the same amount of semi-finished product from virgin raw materials. In particular:

- for the ELTs sent for energy recovery in cement plants, in addition to the portion of thermal energy avoided thanks to the replacement of the traditional fuel, both the share of iron oxides replaced by the steel contained in the ELTs and the recovery of the incinerator ashes, both incorporated in the cement and replacing other binding compounds, were considered;
- for the ELTs sent for recovery for the production of electrical energy, the impact avoided for the production of the same amount of electricity with the national energy mix was calculated;
- for the steel, separated during the grinding phases and downstream of the combustion for energy recovery, the production of steel from scrap iron is considered as an avoided process;
- for rubber, natural rubber, synthetic rubber, carbon black and other additives present in the mixture of rubber of a tyre were considered as avoided products.

The recovery of material from ELTs in the environmental analysis

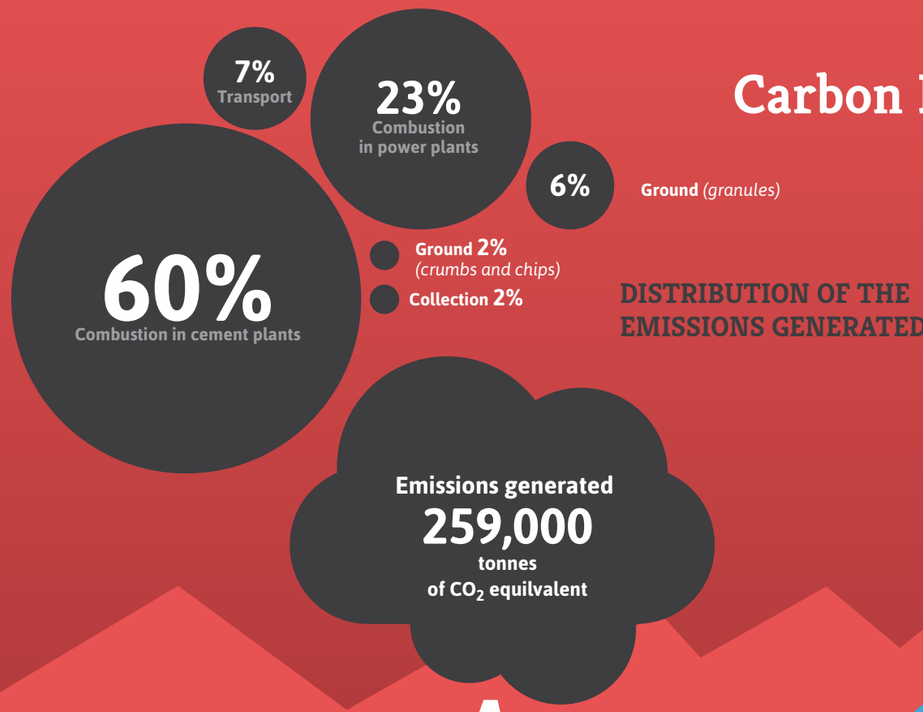
The method for reporting the flows of ELTs presented in the first chapter measures the percentage of material and energy recovery according to the quantities sent to cement factories and power plants, on the one hand, and to grinding and granulation facilities destined for recycling on the other. This method, adopted by Ecopneus and by the other ELT consortia in Italy and in many European countries, therefore measures the relationship between the two forms of recovery – energy or material – as a function of the ELTs delivered to the gate of the processing and valorisation plants. In doing this, however, there is an underestimation of the amount of material actually recycled at the end of the entire processing process. A non-negligible portion of material that is actually recycled is in fact obtained even from the ELTs sent to facilities for the production of energy: the steel that, recovered after combustion, is sent to the steelworks as scrap iron, or the steel incorporated in cement that replaces the iron oxides traditionally

From the ELTs sent "to the gate" to the effective recovery of materials and energy



used or even ashes, which replace other binders also in the cement production process. Adopting an accounting system based on the material actually recycled, as it replaces virgin raw material that would otherwise have been used in traditional production processes (i.e. without the use of ELTs), very different values are obtained and the proportion of recycled material in the Ecopneus system passes from 36% to 59%, as shown by the graphic. 36,000 tonnes of steel and 31,000 of ash and metal oxides are recovered starting from the ELTs delivered to the gate of the facilities (cement plants, energy production and grinding for energy recovery) and sent for energy recovery. These flows are only partly offset by the just over 7,000 tonnes of plies which, leaving the granulation plants for material recovery, are actually sent to energy recovery. This is a preliminary analysis and the results must be considered as guidelines only, but it is a significant first step towards a system of evaluation of the contribution of ELTs in terms of a circular economy.

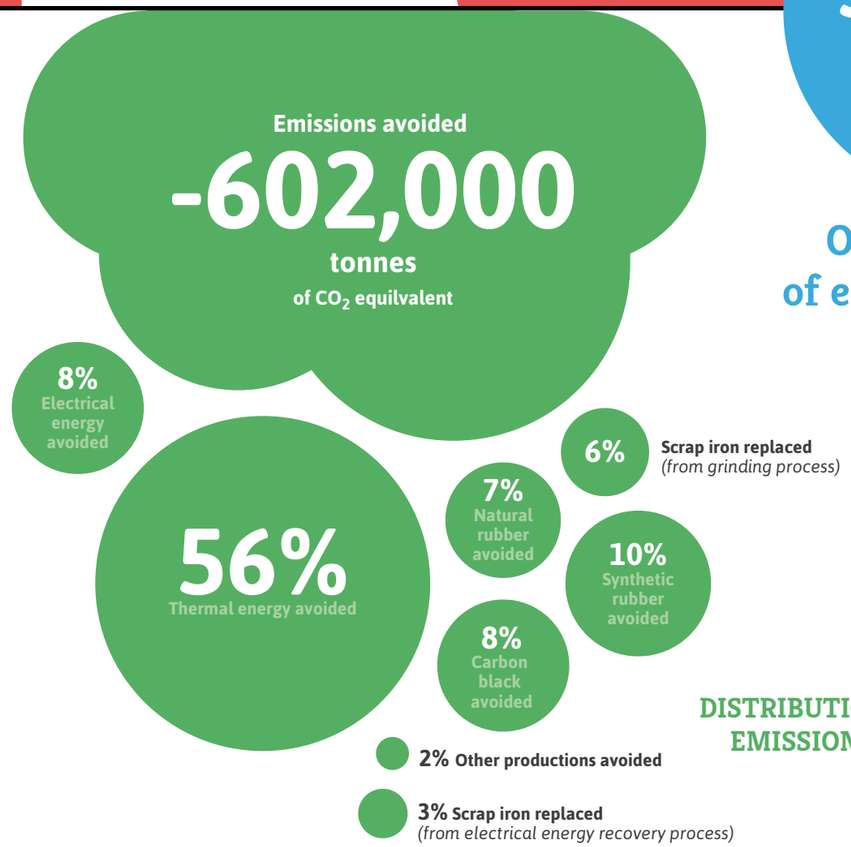
Carbon Footprint



DISTRIBUTION OF THE EMISSIONS GENERATED

-344,000
tonnes
of CO_2 equivalent

Overall balance of emissions avoided



DISTRIBUTION OF THE EMISSIONS AVOIDED

What is the carbon footprint?

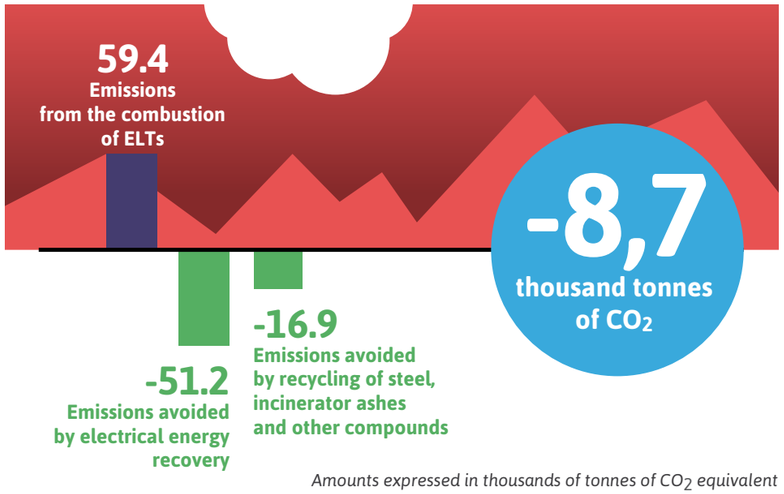
The carbon footprint is the total amount of greenhouse gases emitted directly and indirectly during the lifecycle of a product, from the extraction and processing of raw materials, to manufacturing, to the management of the relative waste for recovery or disposal.
It is the benchmark for assessments of the climate impact of products, and is used both internationally and at a European level, such as for example the PEF (Product Environmental Footprint) (European Commission, 2012).
The carbon footprint is expressed in kg of CO_2 equivalent and is calculated by summing the contributions of the emissions into the atmosphere of the different greenhouse gases - each with its own specific climate-altering factor – deriving from the processes relative to the entire lifecycle of the product considered.
In the specific case of Ecopneus, a negative value of this indicator indicates the emissions that are avoided thanks to the recovery of materials or energy along the lifecycle of the ELT.
The methodological reference adopted for the calculation of the carbon footprint for the Ecopneus system is that of the International Panel on Climate Change (IPCC).

Reduce CO_2 emissions to combat climate change

In the period from 2000 to 2010 alone, the global emissions of greenhouse gases into the atmosphere have increased by over 25%, exceeding 50 billion tonnes of CO_2 equivalent annually. In Paris in December 2015, state and government leaders from around the world will meet to define a new global climate agreement that can meet the challenge of climate change and reach, at least, the halving of global emissions by 2050. This is the commitment to which we are all called so that we can limit the rise in the Earth's average temperature of well over 2 degrees Celsius compared to the pre-industrial era. To achieve this aim we must focus on the development of renewable sources and energy efficiency, but we also need to promote a true revolution in the way we produce and consume, adopting new business models and more simple lifestyles, to do more and better with less consumption of resources.

In 2014 the recovery of ELTs in the Ecopneus system contributed to a reduction of greenhouse gas emissions by 344,000 tonnes of CO_2 equivalent. If we wanted to translate this value into one that can be more clearly understood, it would be equivalent to the emissions of about 75,000 cars travelling an average of 30,000 kilometres each in one year.
The overall balance is the result of the difference between the impacts generated in the different stages of ELT management and recovery – amounting to a total of 259,000 tonnes of CO_2 equivalent emitted – and the benefits – equal to 602,000 tonnes of CO_2 equivalent – related to the reuse of the materials recovered in substitution of raw materials in production processes.
The principal weight, in terms of negative impacts, is represented by the combustion of ELTs in cement plants and in facilities for the production of electricity, which together account for almost 83% of the total, for a value of 213,800 tonnes of CO_2eq emitted (of which 154,400 tonnes CO_2eq from cement plants and 59,400 tonnes from the production of electricity). However, these impacts are more than offset by the energy recovery guaranteed by the replacement with ELTs of the fossil fuel that it would have been necessary to employ to produce, in a traditional way, the same quantities of energy; a figure that corresponds to approximately 64% of the total benefits.
Some aspects that enrich the balance emerge from the analysis performed.
The first of these regards the use of ELTs in power plants for the production of electricity. The net emissions generated during the combustion of the ELTs (equal to 59,400 tonnes CO_2eq) are not immediately compensated by the emissions avoided for the equivalent electricity production replaced (equal to 51,200 tonnes of CO_2eq). If we confine ourselves only to energy production, the balance of the process under analysis would be negative, with a net emission into the atmosphere of 8.2 tonnes CO_2eq. If, however, the emissions resulting from the recovery of materials (the steel recovered as iron scrap, ashes recovered as a binder in the production of cement, and other minor materials such as calcium sulphate and zinc oxides) are included, the overall balance of this line of activity becomes

Emissions balance for the production of electricity with ELTs in the Ecopneus system for energy recovery of ELTs



Amounts expressed in thousands of tonnes of CO_2 equivalent

positive, with about 8,700 tonnes of CO_2eq avoided. It is important to note that the fact of operating in Italy, in reality, does not represent a favourable element from this point of view. Our country, in fact, is characterized by a good electrical mix in terms of specific emissions due, in particular, to renewable sources and gas-fired combined cycle plants. If the same analysis was conducted in another European country with a worse mix (for example with more coal and less renewable sources), the emissions avoided for electricity production would have been much higher, increasing the benefits of this form of recovery.

The use of ELTs as fuel for the production of thermal energy in cement factories generates an overall benefit in the Ecopneus chain that is significant in absolute terms, also thanks to the fact that the ELTs used in these systems replace fuel with very high emissions (carbon coke and coal), thus providing very important environmental benefits.

However, the significant positive contribution given by this technology in the Ecopneus chain also depends on the large quantities of ELTs sent for this form of energy recovery.

Taking one tonne of ELTs managed in the Ecopneus system as a reference, it is in reality observed that use in a cement factory generates a net benefit that, although positive and important, is lower than that produced by the recovery of materials (steel and rubber granules). This result – which is obtained even considering in the calculation the steel and incinerator ashes of the ELTs recovered as material incorporated into the cement (the steel replaces iron oxides and the ashes replace other binders otherwise used in the production process) - confirms the validity of the strategy pursued by Ecopneus, privileging the recovery of materials by sending only the surplus of ELTs that cannot be absorbed by the market to energy recovery.

It should not however be forgotten that, considering the limited size of the domestic market for materials recovered from ELTs, at least at present the possibility of transferring them to cement factories is a valid option from the environmental point of view.

Greenhouse gas emissions avoided in the Ecopneus system for different recovery options of 1 T of ELTs managed

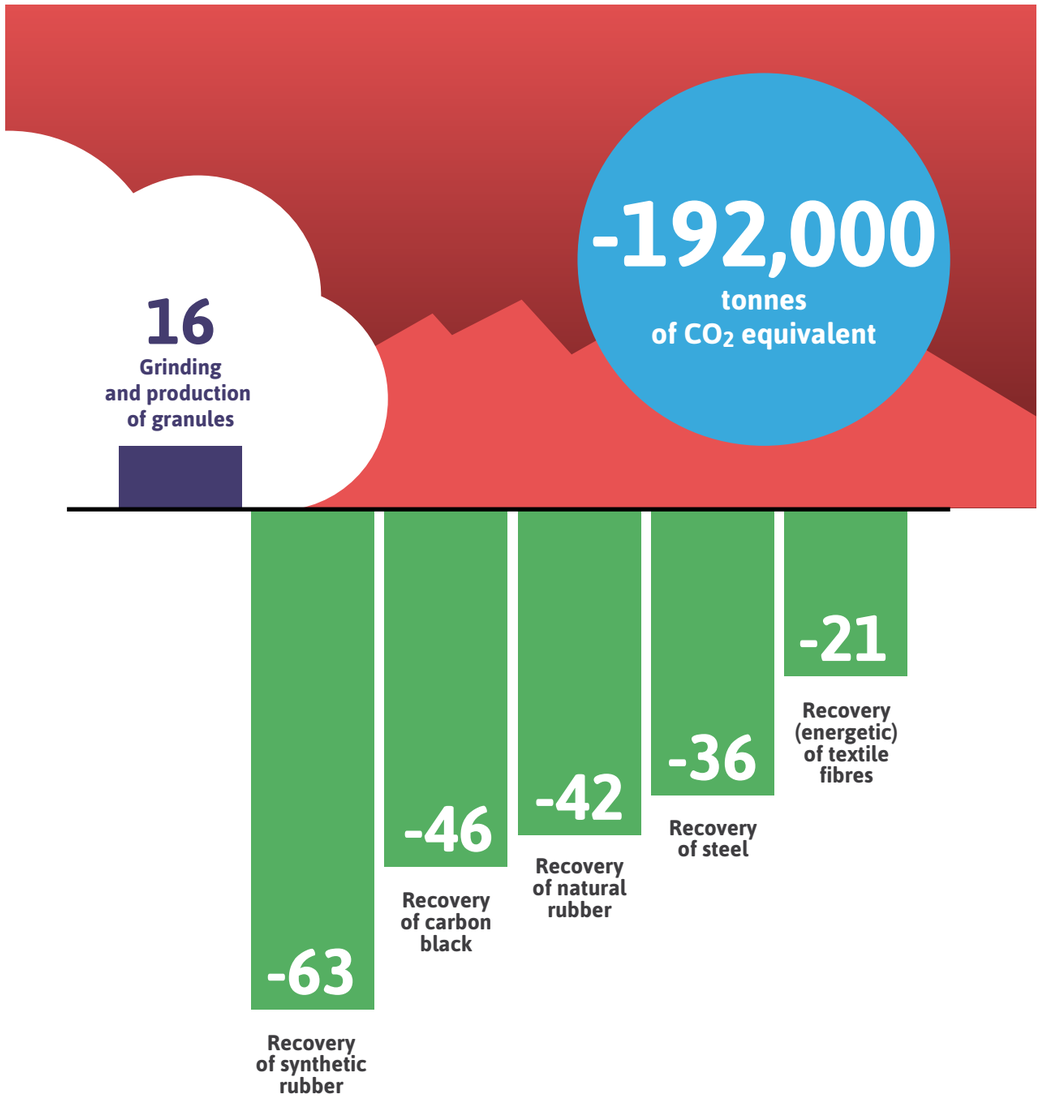
Values expressed in kg of CO_2 equivalent

Furthermore, it should be observed that the recovery of material, unlike combustion, does not involve the definitive destruction of the rubber polymer, thus lengthening the lifecycle. In theory, therefore, an ELT is transformed into a new product that, at the end of life, can in turn be sent for material recovery, while the ELTs sent for combustion, once used, can no longer re-enter the cycle.

This aspect is not considered in traditional lifecycle analyses and in the results presented here: if they were taken into account, the real benefits would be even greater.

These findings are also confirmed in the balance of the emissions generated by the processing for the production of granules, which are largely offset by the emissions avoided thanks to the recovery of the rubber polymer as such (analysed in its main components), of carbon black and of steel, to which the contribution of the plies sent for energy recovery is added. The overall balance is estimated at 200,000 tonnes CO_2eq of emissions avoided.

Balance of the greenhouse gas emissions from ELTs sent to material recovery in the Ecopneus system in 2014

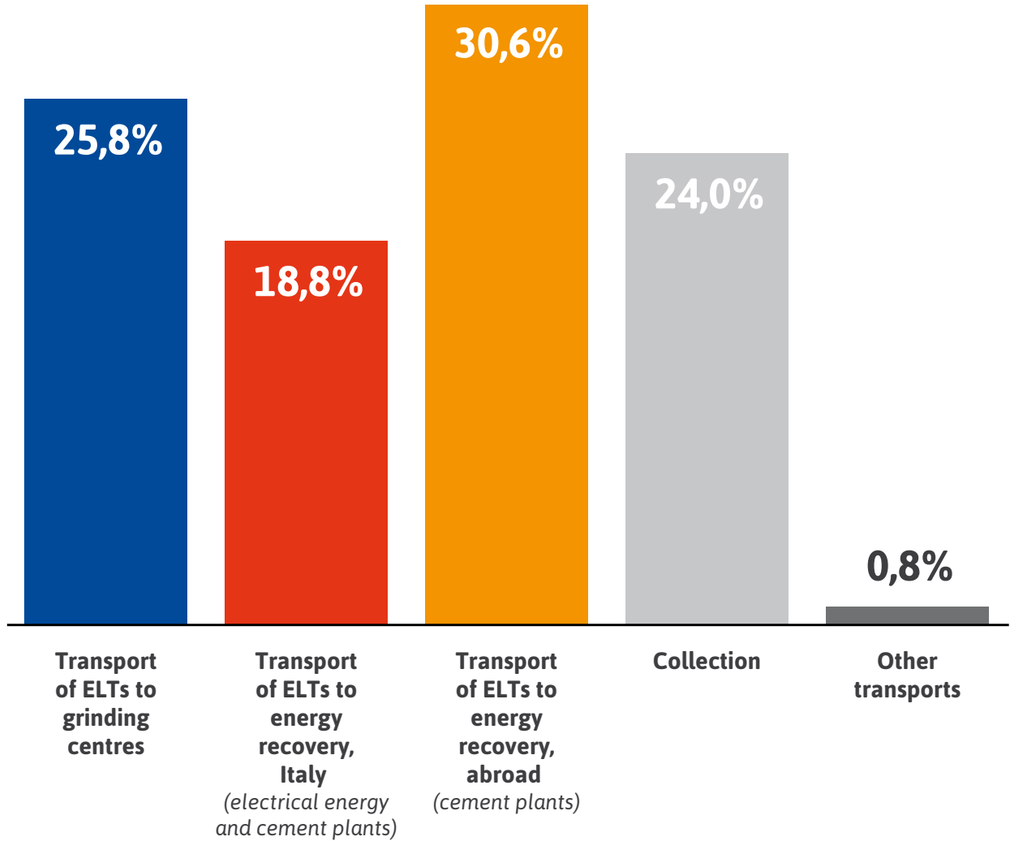


Amounts expressed in thousands of tonnes of CO_2 equivalent

Finally, the emissions of greenhouse gases produced by the logistics of the system as a whole were analysed. They appear relatively contained and equal to 8.6% of the total, for a total of 22,300 tonnes of CO_2eq emitted overall.

Compared to this figure, the logistics of collection accounts for 24%, while the remainder is due to the transports for sorting ELTs (whole or crushed) from the collection centres to the crushing and energy recovery facilities.
The export of ELTs to foreign cement factories and recovery facilities makes a significant contribution to this last category, and counts for over 30% of the total emissions alone.

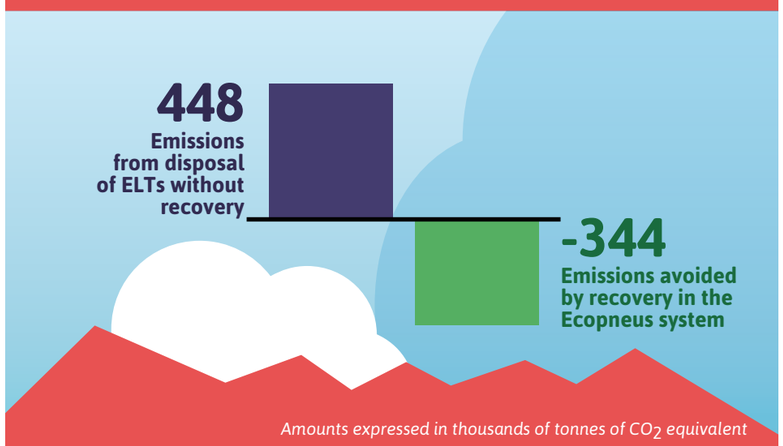
The saving for the country generated by Ecopneus in 2014 on imports of raw material



A comparison with a hypothetical scenario of management of the ELTs without recovery of materials and energy

The analysis presented thus far shows the benefits in absolute terms related to the recovery of materials and energy from ELTs in the Ecopneus chain.
It is however also possible to compare the existing scenario of the Ecopneus management with a hypothetical scenario in which the ELTs are disposed of without any type of recovery, with incineration of the carbonaceous part and disposal of the steel and combustion residues.
If all the ELTs collected by Ecopneus in 2014 had been treated in this way, instead of emissions avoided a net negative impact equivalent to the emission of 448,300 tonnes of CO_2eq would have been generated.

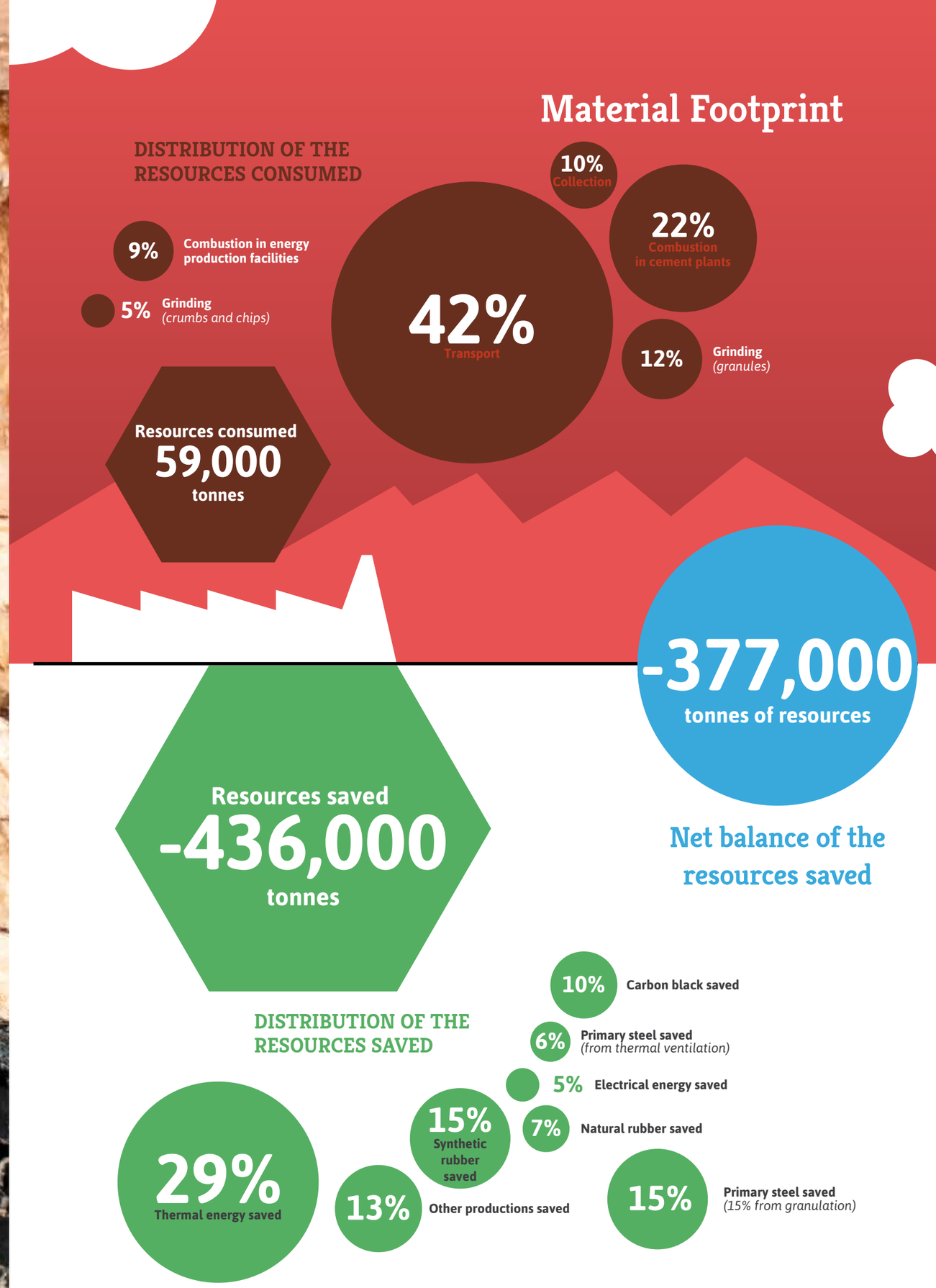
Comparison of the emissions generated in a hypothetical scenario of disposal of the ELTs without recovery compared to the emissions avoided by the Ecopneus management



Amounts expressed in thousands of tonnes of CO_2 equivalent

It can be deduced that in the absence of a recovery process, the management of the ELTs would result in a significant additional amount of net emissions of greenhouse gases.
By comparing this information with the direct benefits connected to the Ecopneus management, an overall balance even more favourable than that shown by the analysis of the carbon footprint is obtained, equal to 792,000 tonnes of CO_2eq avoided.

Material Footprint



What is the material footprint?

The material footprint measures the total flows of mineral and fossil resources that have been extracted during the entire production process of a certain good or service along its lifecycle: from the extraction of the raw materials to processing into semi-finished and finished products.

It is the benchmark for assessing the impact of products on resources and is commonly used by the international community, for example in the EPD - Environmental Product Declaration – and in the European Union's "Beyond GDP" initiative.

The material footprint is expressed in kg of resources consumed and is calculated by summing the contributions of the flows of materials extracted in all the lifecycle processes of a product.

A negative value of this indicator expresses the resources that have been saved thanks to the recovery of material or energy along the lifecycle of a product, allowing the use of virgin raw material to be avoided.

Like all footprint indicators, this indicator expresses the embedded amounts of resources extracted (or avoided) in products and allows an assessment of the global flows determined by their production and lifecycle management. The methodological reference adopted for the calculation of the material footprint is the Life Cycle Assessment Inventory with reference to the Ecoinvent 2014 database.

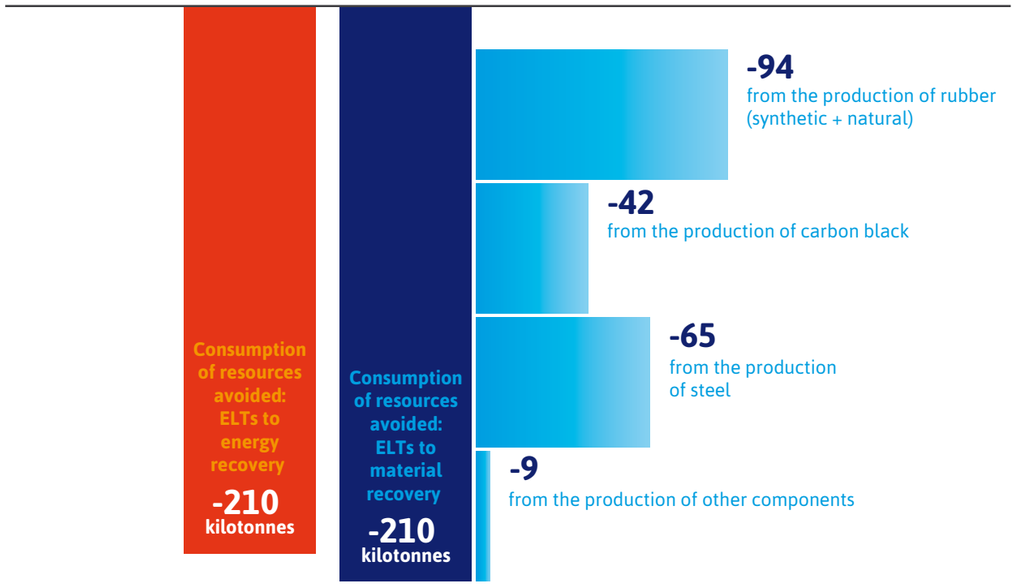
Resource consumption and the circular economy

Over 70 billion tonnes of raw materials are taken from the environment worldwide each year. Italy alone uses about 900 million tonnes, a demand met mainly with foreign imports. In addition to fuelling potential phenomena of scarcity and geopolitical tensions, this consumption produces enormous environmental damage, both during the collection, transportation and processing of raw materials, and at the end of the lifecycle of a product, when it becomes waste. An important part of the Green economy is the circular economy, which aims to construct a production system increasingly capable of an internal regeneration of the material flows, recycling and recovering waste products and transforming them into new raw materials, thus reducing our footprint on the environment.

The recovery of ELTs in the Ecopneus system in 2014 prevented the withdrawal of about 376,800 tonnes of resources from the environment, an amount equal to about one and a half times the weight (estimated) of the Empire State Building or about 40 Eiffel Towers. In detail, the balance includes the negative environmental impacts of ELT logistics and recovery activities (for a total of 58,800 tonnes of resources consumed) and benefits in terms of saved resources (equivalent to 435,700 tonnes) due to the reuse of ELTs in recovery processes that have prevented the consumption of virgin raw material, energy, rubber and steel. With respect to this indicator, the greatest impacts of the recovery of ELTs in the system are generated by the collection and transport logistics operations, which together determine 52% of the total of the impacts, for a value of resources consumed equal to 30,600 tonnes. These are mainly fossil fuels used for the production of the fuel consumed by the logistics fleet serving the system: thousands of trucks and dozens of ships which, in 2014, carried the ELTs for a distance of nearly 8 million km. The grinding of ELTs accounts for 16.8% of the total impact, with a greater contribution given by granulation; also in this case it is mainly the consumption of fossil resources necessary for the production of electrical energy for the operation of the facilities. Compared to the energy recovery of ELTs, the impacts on the resources resulting from the combustion of ELTs in cement factories and in systems for the production of electrical energy are offset by the consumption avoided of energy resources, mainly fossil ones, with a favourable net balance for a total of 131,400 tonnes of resources not consumed.

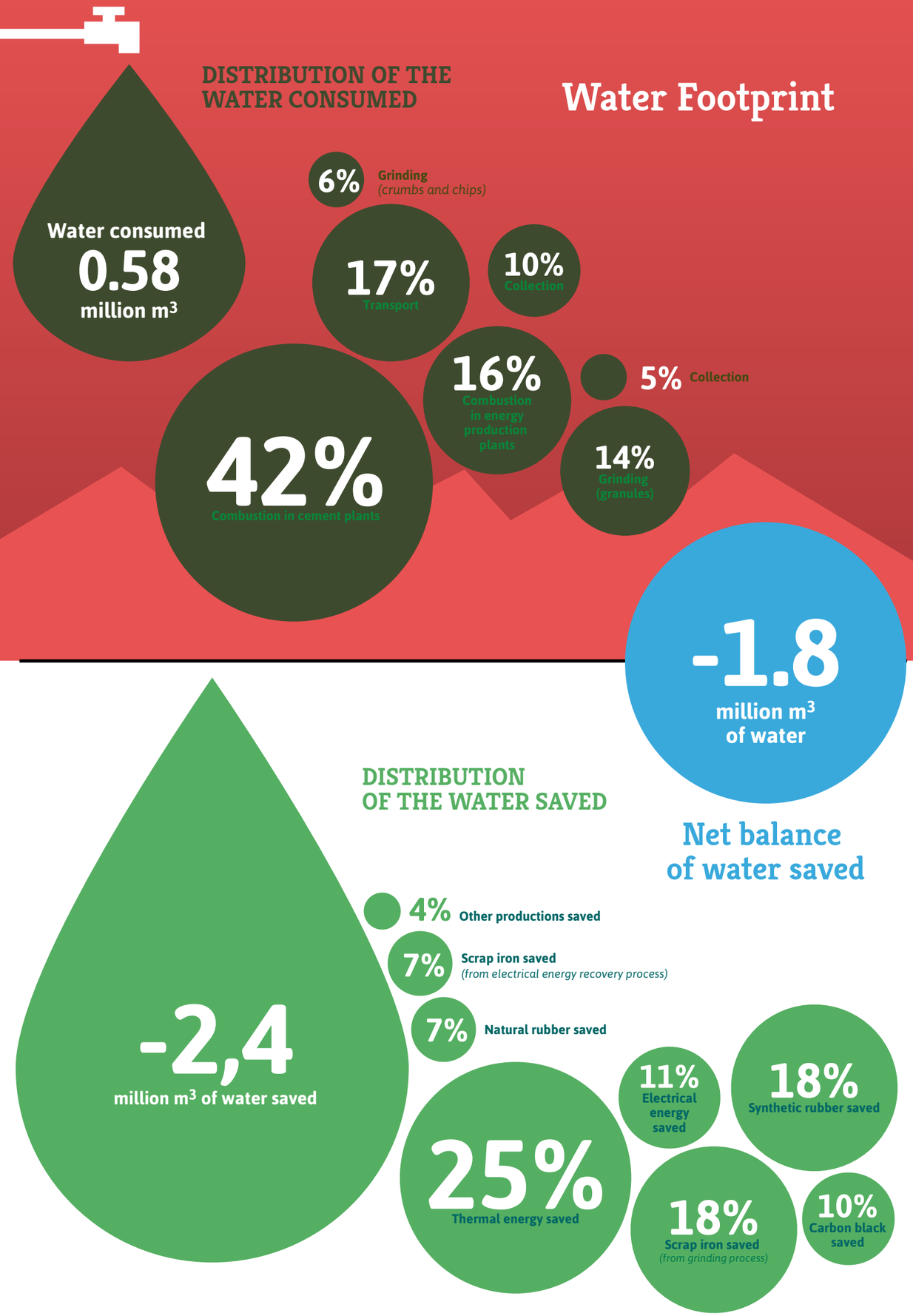
This benefit increases to 201,300 tonnes considering also the relative share of material recovered during the processes (steel as scrap iron, steel and incinerator ash incorporated in the cement). The comparison between the benefits of the energy recovery of ELTs with respect to the recovery of material confirms the advantage of the latter for the material footprint indicator as well. Thanks to the ELTs sent to material recovery, the overall net balance is equal to 210,300 tonnes of resource consumption avoided: 10,000 tonnes more spared, even though the total of ELTs sent to energy recovery is 1.8 times higher than that of ELTs sent to material recovery.

Balance of the savings of resources in the Ecopneus system in 2014: a comparison of different recovery options



Values expressed in thousands of tonnes

Water Footprint



What is the water footprint?

The water footprint assesses the impacts on water resources related to withdrawals and pollution (degradation of the resource, eutrophication, toxicity and acidification) associated with the production of a particular good or service along its lifecycle: from the extraction of raw materials to processing into semi-finished and finished products. Since it is an impact indicator, it is planned to be included as a benchmark for the next update of the Product Environmental Footprint (PEF) regulation of the European Commission.

The water footprint is measured in cubic meters of water and is calculated by summing the contributions arising from all the lifecycle processes of a product. A negative value of this indicator expresses the consumption or pollution of water avoided thanks to the recovery of material or energy along the lifecycle of a product, which allows avoiding the use of new productions from virgin raw material with a high impact on the water resource. The reference methodology adopted for the calculation of the water footprint is the one developed by Hoekstra and colleagues (University of Twente, The Netherlands) and called "Water Scarcity".

Water: the most at-risk resource worldwide

The increase in population and economic growth based on unsustainable production and consumption models are the main factors that cause the increase in the exploitation of water resources. Continuing at current rates, in the next decades many regions of the world will face a growing water scarcity. Water, in fact, is designated by the United Nations as the most at-risk resource, and is already generating conflicts, impoverishment and migration flows, and may generate them in the future.

The recovery of ELTs in the Ecopneus system has contributed, in 2014, to reducing pressure on water resources for a total of 1.83 million cubic meters of fresh water not consumed or preserved from pollution, a value five times the average daily flow of the Tiber river.

The impacts related to the system's collection, transport and recovery activities have determined water withdrawal and consumption of almost 580,000 cubic meters, mostly (58.4%) due to ELT combustion processes for energy recovery.

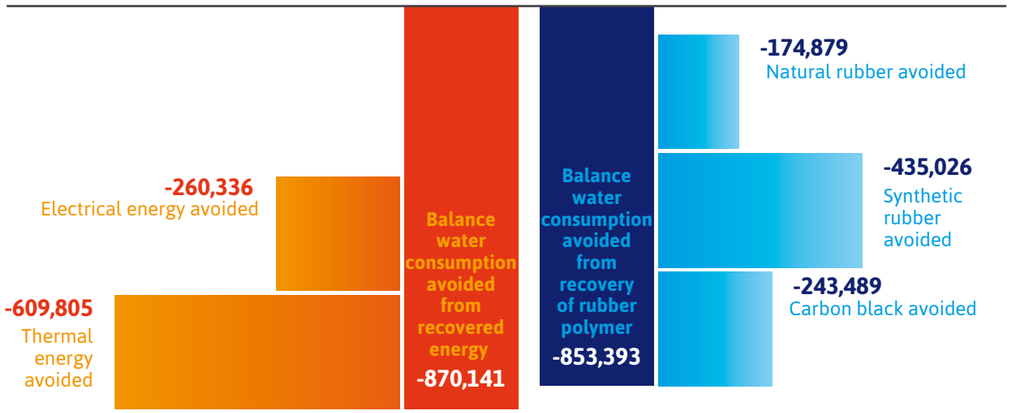
Collection and transport logistics have contributed less than 22% and industrial grinding processes for preparation for energy recovery (crumbs and chips) and the recovery of rubber polymer (granules) have induced water withdrawals and consumption for a little less than 20% of the total. This is essentially water withdrawn and consumed in the production of fuels and energy used in the individual processes.

In 2014 the savings of water resources generated by the recovery of energy and material from the ELTs managed amounted to a total of 2.41 million cubic meters of water.

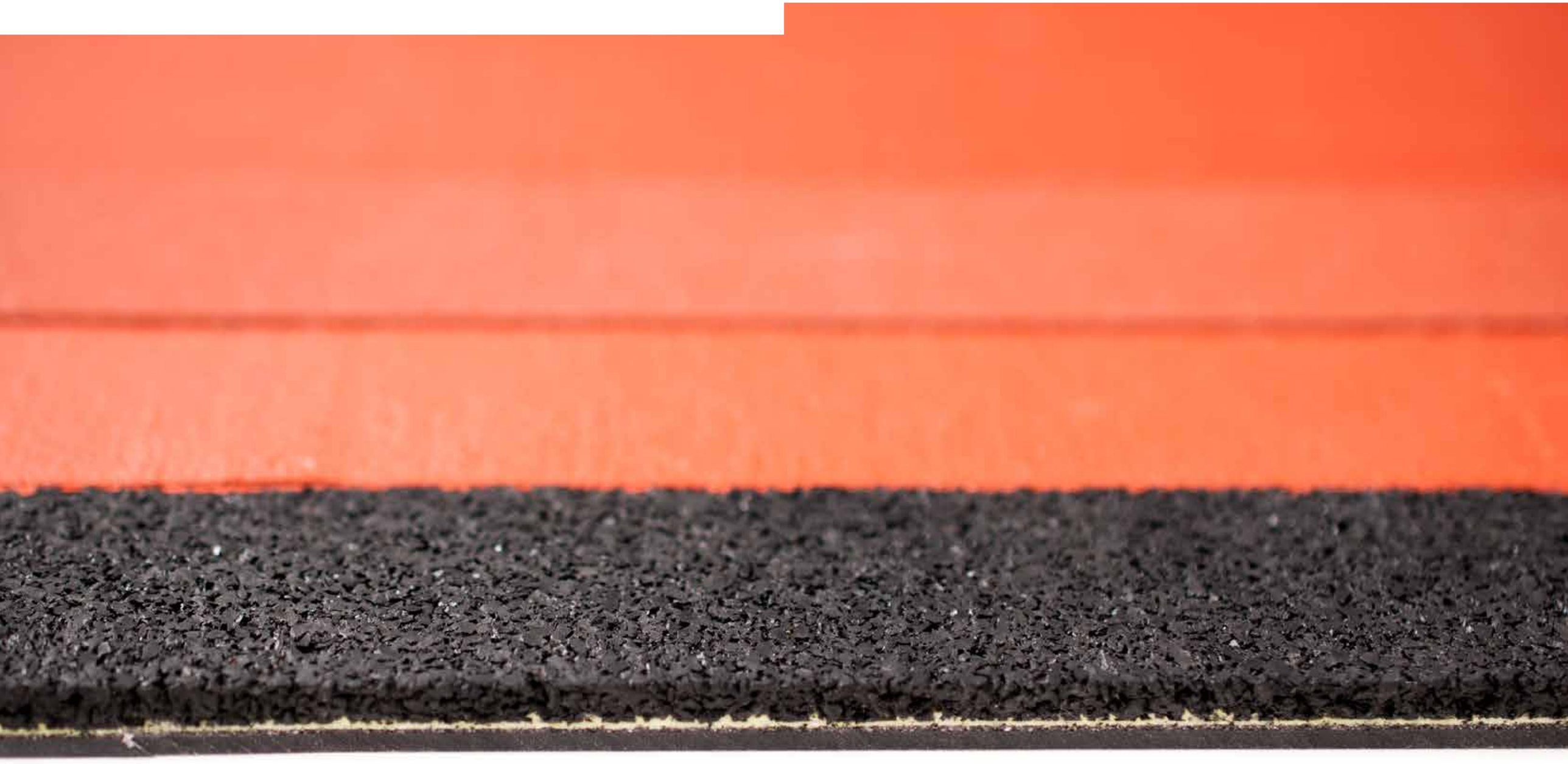
Compared to this considerable quantity of water saved, the energy recovery of the ELTs accounts for 36.1% of the total, which is comparable to that resulting from the recovery of rubber polymer in granules, which accounts for 35.4% (given by the sum of the water savings for the production avoided of the main components: synthetic rubber, natural rubber and carbon black).
However, if we consider that the ratio of the amount of ELTs sent to energy recovery to the amount processed for material recovery is 1.8:1, the comparison confirms that the material recovery option is the best one, also taking into account the water footprint. The recovery of steel from scrap iron coming both from the grinding of ELTs and post-combustion of ELTs in plants for the production of electrical energy accounts for 24.7% of the total water savings.

The comparative evaluation of the results of the impact assessment prepared for the Ecopneus system through the footprint indicators (which we recall are used as a reference by the main international standards for lifecycle processing) confirms that the environmental benefit resulting from the recovery of materials from ELTs is far superior than that resulting from their use as fuel for energy production. The slight but significant advantage evidenced by the carbon footprint indicator on greenhouse gas emissions, in fact, is combined and widely amplified when considering the impacts avoided also in terms of flows of resources (minerals and fossils), considered through the material footprint indicator, as well as the savings of withdrawals and consumption of water registered by the water footprint indicator.

Balance of water savings in the Ecopneus system: different recovery options compared

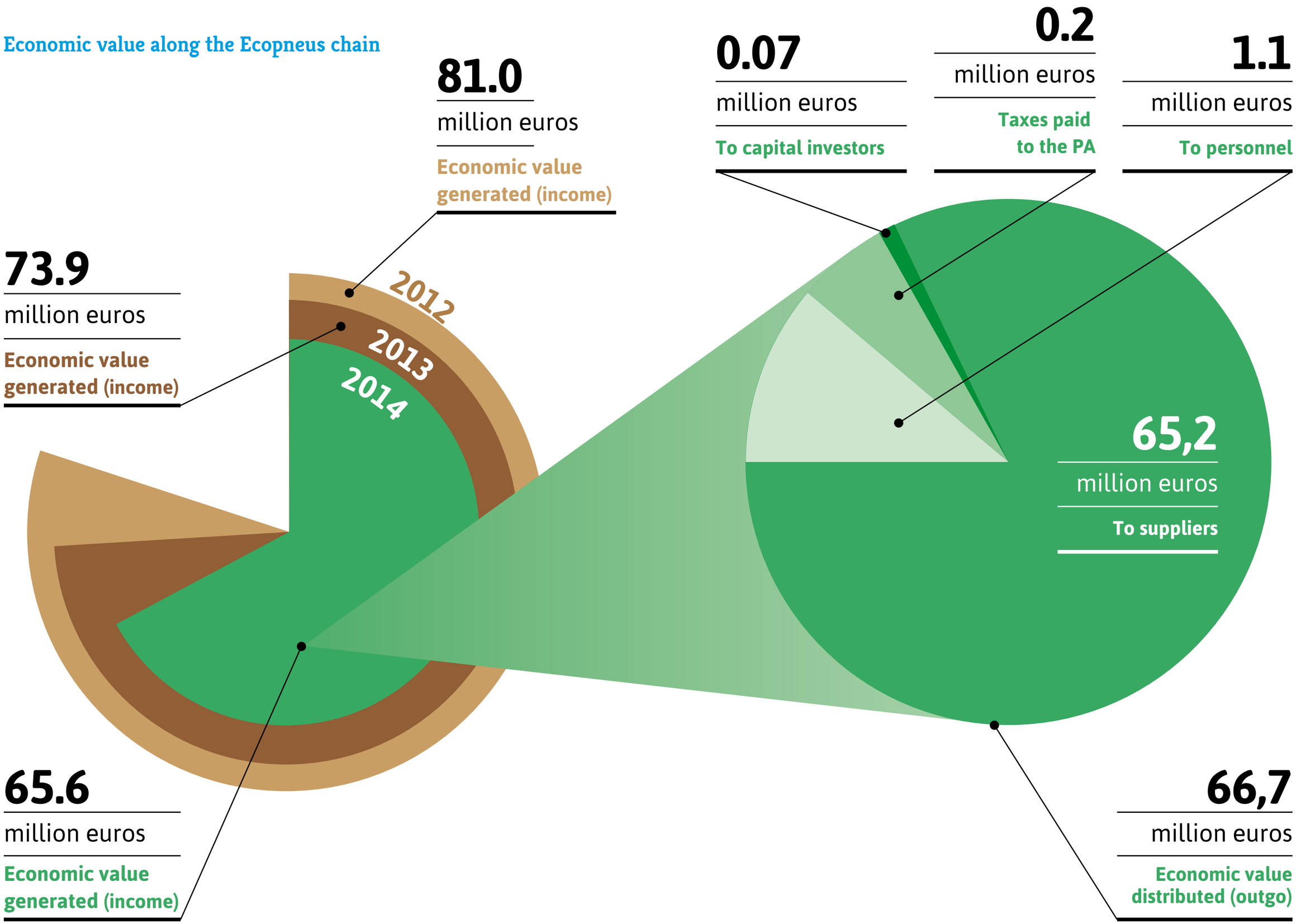


Values expressed in m^3 of water



3 / Benefits for the economy and society

Economic value along the Ecopneus chain



The economic benefit for the country

The recovery of end-of-life tyres, in addition to the undoubted environmental benefits, which are the main objective behind the European and national regulations that govern the sector, also have important economic benefits for the entire national economy that are not always properly valued.

The main advantage – which is particularly important for a country such as Italy that is lacking in raw materials and, therefore, heavily dependent on foreign imports – comes from the possibility of replacing virgin raw materials in the production process with secondary raw materials deriving from the recovery of materials and energy. The energy recovery of ELTs, for example, allows the replacement of the use of fossil fuels, which place a significant burden on the national energy bill.

Another important advantage derives from the fact that the recovery of ELT material into national production cycles allows the expenditure incurred for the purchase of materials to be maintained in Italy; in the absence of these secondary raw materials, it would end up abroad with the purchase of imported virgin raw materials. The activities of the Ecopneus network, instead, allow these valuable resources to be conserved in Italy, generating new income and jobs nationwide.

The possibility to give a second life to end-of-life tyres allows two important categories of materials to be reintroduced into the production system: rubber polymer and steel.

Currently, with regard to rubber – which constitutes the most significant component of a tyre (not less than 40% by weight) – the Italian manufacturing industry depends almost completely on foreign imports. The implications, of course, are not just economic in nature, but are also relevant in terms of national security in a geopolitical context such as the present one, which is increasingly unstable and characterized by strong tensions and uncertainties. Such a scenario, for example, has a strong influence on the natural rubber market, to the extent that the European Commission has inserted this material in the list of those considered critical in terms of availability and security of supply for European industry [see "Report of the ad hoc Working Group on defining critical raw materials", EU Commission, 2014].

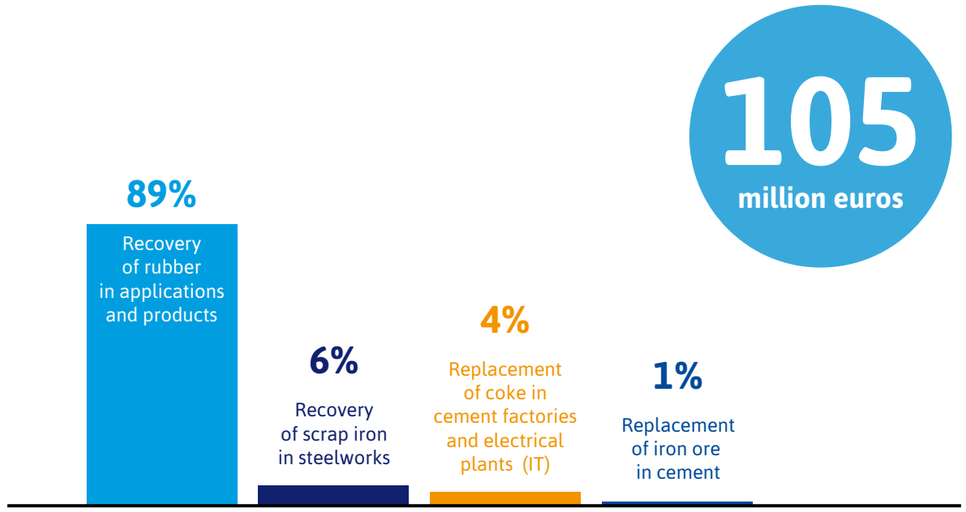
The other important material which, thanks to the activity of Ecopneus, is put back into circulation in the Italian economy is the steel contained in the tyres which, we recall, is the second most important component in terms of weight after rubber (up to a fifth of the weight of a tyre). The steel rings and fibres recovered from ELTs enter in part in the cement production process (for the ELTs sent to cement plants) and in part are fed into a strategic national sector: the production of steel, in which Italy is the second European producer after Germany. Unlike the latter, Italy has focused in particular on electric arc furnace technology, which allows even scrap metals, including steel coming from ELTs, to be used as input materials.

But, as mentioned, it is not only the production of secondary raw material that gives the national economy important economic benefits. The sending of ELTs to energy recovery is a useful and cost-effective way to replace the raw material coming from abroad, which is composed of, moreover, a mix of fossil fuels such as coal and petroleum coke used to fuel cement kilns. The replacement of these fuels with the ELTs sent to cement plants through the Ecopneus network in 2014 has allowed the generation of both an environmental benefit, in terms of the reduction of polluting emissions, and a cost savings, with a reduction of national imports of fossil fuels estimated at about 4 million euros.

As for the benefits produced by the material recovery activities, the data confirm the longsighted nature of Ecopneus' strategic approach, which is aimed at supporting the recovery of a greater quantity of rubber from ELTs in applications and products. In addition to being the recovery option that provides the greatest environmental benefits, it is also the option with the highest added value in terms of economic returns for the country by avoiding the importation of raw materials.

In 2014, in fact, the average value of the natural rubber registered on the international commodities market was approximately 1,460 euros/tonne (about

The saving for the country generated by Ecopneus in 2014 on imports of raw material



20 times higher than that of coal), while the market price for scrap iron was 256 euros/tonne (about 4 times higher than that of iron ore).

In overall terms, therefore, thanks to avoided raw material imports made possible by Ecopneus' activities, in 2014 Italy saved 105 million euros that would largely have been destined abroad and which instead remained in Italy, creating added value and employment.

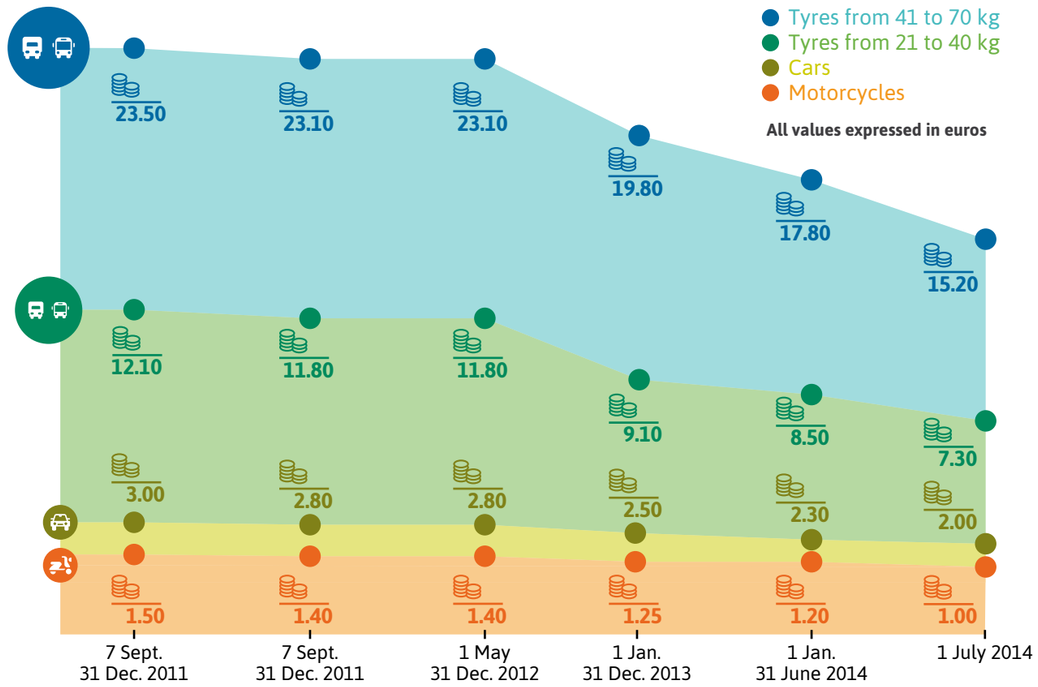
The economic balance of Ecopneus

The economic advantages generated for the benefit of the entire community from Ecopneus' activity are also the result of the efficient use of the environmental contribution paid by the citizen upon purchasing a new tyre. In 2014 the environmental contributions amounted to 65.6 million euros, which were redistributed to the entire recovery chain: compensation of the chain's operators, the promotion of advanced studies and research projects, and communication and awareness-raising about appropriate ELT management and in order to counteract illegal phenomena.
The decline in the generated economic value that can be observed in 2014 with respect to the previous year (-11%) is the result of the progressive reduction of the environmental contribution for all types of tyres collected by Ecopneus. From 2011 to 2014, in fact, the contributions for the replacement of car or motorcycle tyres were reduced by a third, while those for trucks and buses from 35 to 40%.
As a non-profit system, the extent of the environmental contribution paid by citizens is calibrated so as to economically cover and ensure the collection and recovery activities, with the consequent environmental benefits.
In this context, Ecopneus is continuously committed to maintaining the environmental contribution as low as possible, on one hand by optimizing the economic management of the activities and on the other by supporting recycling businesses, with the aim of making them more competitive on the secondary raw material market and therefore less dependent on contributions. Of course, the determination of the contribution can also be affected by external factors, such as the trend of raw material prices or, finally, the trend of the tyres introduced onto the market, to which the flow of resources is bound. The reduction of the environmental

	2014	2013	2012
Economic value generated	**65,643,130**	**73,932,878**	**81,013,015**
Revenues from environmental contributions	65,565,382	73,823,842	80,995,047
Other revenues	77,748	109,036	17,968
Economic value distributed	**66,687,066**	**68,379,805**	**77,520,312**
Total cost to suppliers (goods and services)	**65,271,518**	**64,827,841**	**74,913,622**
of which to suppliers of the operations chain	*59,266,215*	*58,991,901*	*70,748,821*
of which to other suppliers	*6,005,303*	*5,835,940*	*4,164,801*
to personnel	**1,127,513**	**1,090,541**	**936,720**
to corporate bodies *(Board of Directors)*	**0**	**0**	**0**
to Public Administration	**219,769**	**2,143,966**	**1,266,446**
to capital investors	**68,266**	**317,457**	**376,524**
Economic value retained	**0**	**3,248,338**	**1,857,027**
Operating surplus *(net income)*	**-2,651,023**	**4,640,483**	**2,652,896**
30% operating surplus for historical stock interventions *(Art. 3, paragraph 5, Italian Ministerial Decree 82/2011)*	0	1,392,145	795,869

Reclassified balance sheet according to the international standard format of the Global Reporting Initiative (GRI-G4) starting with data from the Ecopneus financial statements – values expressed in euros

Trend of Ecopneus environmental contributions (€/tyre purchased)

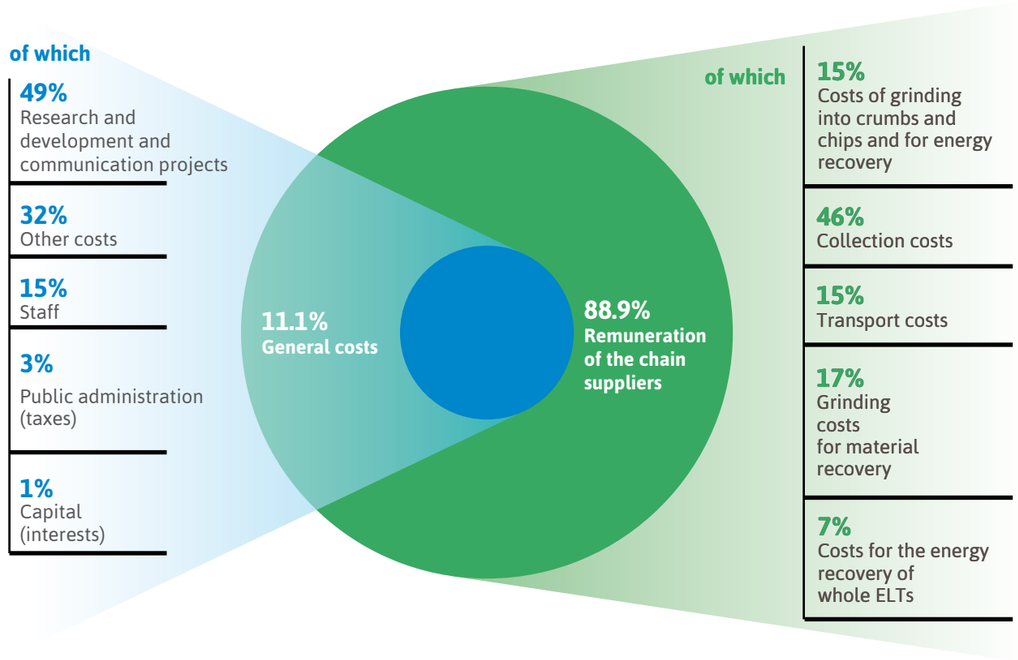


Values expressed in euros/tyre purchased

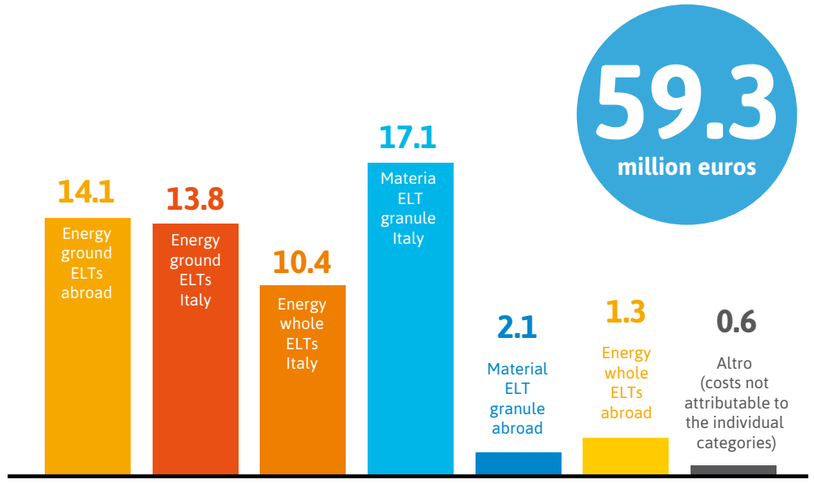
contribution in recent years has been ensured by simultaneously continuing the increase of the quantities of ELTs collected and processed; this figure reflects the continuous and progressive increase in the functionality and efficiency of the Ecopneus chain.
Overall, the total environmental contribution managed by Ecopneus passed from 81 million euros in 2012 to 65 million euros in 2014, with the quantities collected passing from 240 to 255 thousand tonnes. In other words, the gross cost to the citizen per tonne collected fell from 333 to 263 euros/tonne, a decrease of 21%.
In the detailed management information for 2014, the reduction of the environmental contribution per unit of ELT approved by the Board from July 1, 2014 on clashed with second semester sales numbers that were lower than budgeted. This resulted in lower than expected revenues and a net loss on the operating surplus equal to 2.651 million euros that was offset, as provided for by law, by drawing on the net assets accumulated with the operating surpluses of prior years.
About 89% of the economic value distributed by Ecopneus in 2014, equal to 59.3 million euros, went to the operator chain as payments for the collection and recovery activities.
Analysing costs alone for the remuneration of services provided by the recovery chain, we note that of the 59.3 million euros total, 46% went to companies that work in capillary collection throughout the country and 15% went to the transport companies for the sorting of ELTs from the collection centres to the processing and energy recovery centres. 15% went to activities related to the energy recovery of ground ELTs (as the sum of the production costs of crumbs and chips and valorisation costs paid to the facilities, primarily cement plants). 7% was paid to plants for the energy recovery of whole ELTs and, finally, 17% to granulation companies for recycling.
An analysis of the total costs by type of final destination of the ELTs managed from collection to final recovery allows the assessment of the proportion in which the environmental contributions are directed to the creation of value. It thus appears that about a third of the environmental contributions are used for the recovery of material, while the remaining part is divided among the different types of energy recovery. In particular, the largest share of this second slice, equal to approximately 24.2 million euros, goes to energy recovery in Italy (of both whole and crumbed ELTs), while over 15 million euros go to support energy recovery in foreign plants. Some interesting considerations derive from an analysis of the unit costs of the different forms of recovery. These are the average costs and, therefore, only partially representative of a very articulated reality , but still indicative for the purposes of an assessment of a more general nature such as the one reported above.

The average unit costs calculated for the va-

Segmentation of the economic value distributed in the Ecopneus system in 2014



Details of the costs for the remuneration of the recovery chain in 2014



Values expressed in millions of euros

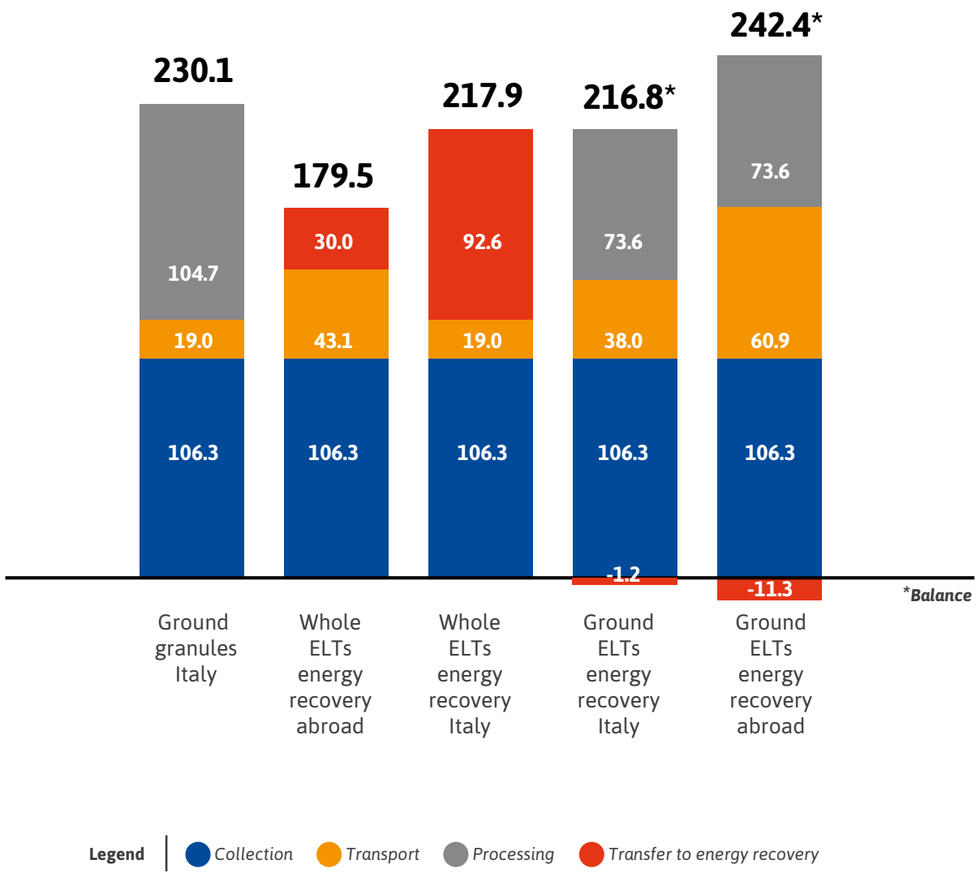
rious destinations range from €179.50/tonne for the whole ELTs sent abroad for energy recovery, to over €242/tonne for those ground and also sent for energy recovery abroad, mainly to overseas countries that can easily be reached by boat from Puglia and the islands and are able to absorb the quantities generated by the collection in these regions. The high cost paid for the foreign energy recovery of ground ELTs highlights the importance of strengthening, also from a purely economic point of view, the domestic demand for ELT-derived granules and powders.

With regard to the management performed in Italy, the recovery of material (€230/tonne) is confirmed as the most expensive option, about €12/tonne more than domestic energy recovery (both whole and ground). The cost differential for this recovery option, the best from the environmental point of view and therefore strongly pursued by Ecopneus, is certainly significant but has the potential to be reduced. In fact, the average selling price of granules on the market by the companies of the Ecopneus system varies from €80 to €120/tonne: values significantly lower than those recorded in some foreign countries, e.g. Germany, where the average sales prices of granules are up to two times higher than the Italian ones thanks to a better quality of the products and a business strategy that has evolved over the years, factors that together have allowed a more effective penetration of emerging markets (e.g. Arab countries).

Precisely because of this potential, Ecopneus has implemented the chain qualification actions that have been described in this report, investing to open the ELT granule and powder market and make it more profitable in Italy as well.

A sign of the increased recognition of the economic value of ELTs is given by the fact that in 2014 the Italian cement plants also paid a price for the delivery of ground ELTs to be used instead of fossil fuels in the production process (about €1.2/tonne): a value that, even if less than that paid by foreign cement plants (ca. €11.3/tonne) is a very positive signal. In the past, in fact, the cement plants required a financial contribution for the use of ELTs as fuel. This inversion of the trend, which reflects what is already happening in other European countries (e.g. France and Germany, where the price paid by the cement plants to use the ELTs as fuel is indexed to that of oil and pet coke and records variable values from €10 to €30/tonne) is largely due to the increased quality of the crumbs and chips produced by the grinding facility chain, as well as the increased competition that has developed among the possible destinations of final recovery (recovery of materials vs. energy recovery and recovery in Italian cement plants vs. recovery in foreign ones).

Unit costs of the recovery of ELTs in the Ecopneus system in 2014



Values expressed in euros/tonnes

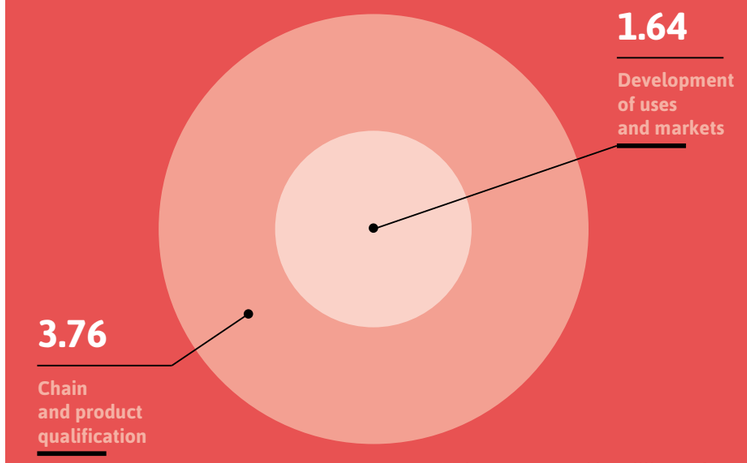
The Ecopneus investment in projects to support the chain and market

In order to realize its Green strategy, in 2014 Ecopneus increased its commitment to supporting the qualification of the chain for recycling ELTs into granules and powder and supporting the growth of the market demand for goods and applications that can be produced using ELT rubber.

The total investment grew by almost 30% with respect to the previous year to 5.4 million euros, divided as 30% to support the qualification of the granule and powder chain and 70% to support the development of the uses and market demand for products and applications.

An additional 4.2 million euros of investment in these activities has been budgeted to date, for a total investment in the three-year period of almost 14 million euros.

Qualification of the granule and powder chain (MPS)



Values expressed in millions of euros

- granule qualification project with Ecopneus Quality Mark;
- quality manual prepared for the chain's companies;
- audits to check performance and the development of expertise;
- technical support to the processing companies;
- legal support;
- marketing research;
- CEN certification of the granules;
- events (Ecomondo, trade fairs, conventions, etc.);
- support (technical-legal) for the development of an end-of-waste regulation

Development of uses and markets:

- web portal dedicated to rubber products and applications;
- leisure and sports applications (agreement with UISP for the promotion of sport and cooperation for building sports facilities, other partnerships for the construction of sports facilities, agreement with Atalanta for the construction of the junior team's football field, support of research to verify the performance of the sports flooring made from ELT rubber granules and powder;
- building applications (collaboration with the company Vie.En.Rose Ingegneria, study of soundproofing materials for building, publication and dissemination of technical books, targeted promotion of building materials);
- modified asphalts (support in installation on various stretches of road, development of research in collaboration with universities, publication of technical books and dissemination, spreading of knowledge among stakeholders through meetings, workshops, etc.);
- participation in technical meetings to define minimum environmental criteria for the green public procurement of street furniture.

Employment in the Ecopneus chain

	Men	Women	Average age
Emilia Romagna	29	5	41
Friuli Venezia Giulia	12	4	38
Liguria	3	0	41
Lombardy	24	1	37
Piedmont	22	3	43
Trentino Alto Adige	26	1	38
Veneto	90	14	38
Lazio	39	6	37
Marche	20	1	36
Tuscany	77	12	41
Umbria	27	3	30
Abruzzo	9	2	42
Basilicata	11	2	41
Calabria	33	1	36
Campania	74	11	39
Molise	4	0	42
Puglia	47	6	35
Sardinia	18	4	40
Sicily	45	3	36

Men Women Average age

The activities performed by Ecopneus are founded on the professional contributions of about 700 people, the number of full-time equivalent employees, i.e. full-time employees engaged throughout the country in the management of the chain's ELTs. The average age in the chain is 38 years, with a wide prevalence of men (89%) with respect to women (11%), reflecting a type of activity traditionally characterized by access to a predominantly male workforce. 53% of employees have a higher education or university degree. Of the total number of employees, more than half have a length of service between 3 and 10 years, 16% have more than 11 years, while 29% have less than 2 years.

Social Footprint certification

In order to promote adherence to several important ethical principles such as the company's commitment not to exploit black market labour or child labour, Ecopneus was the first organization to achieve the "Social Footprint – Product Social Identity" certification, which assesses the social footprint of a product and is the result of a working group made up of three major certification bodies: Bureau Veritas, Certiquality and DNV GL.
Through the AAA level Social Footprint certification, Ecopneus is committed, on one hand, to stimulating the improvement of the ethical-social conditions of the various links of its chain and, on the other, to making the chain of the service subject to the certification transparent to the market. Several special indicators, capable of verifying the social performances of the organization and verifying the effective adherence to them, were created for this purpose. The activity carried out by Ecopneus is the coordination and monitoring of the ELT recovery chain and, therefore, the "Tracing, collection, processing and recovery of end-of-life tyres" service has been subjected to certification. Ecopneus has initiated a process of "social" certification of its chain with the intention, in the future, of spreading this certification among the companies of its chain. In addition, starting in 2015, Ecopneus has also decided to launch a vendor rating activity in order to define a model that will allow the operators to be classified on the basis of objective criteria, to assess the levels of the services provided and to encourage them to continuously improve as well as prevent risks to the environment, health and safety. As part of the certification, Ecopneus has requested a series of basic data and other information from all 107 Ecopneus suppliers, of which 92% reside in Italy while 6% in European countries and 2% in non-European ones. For 83% of these, point investigations were carried out to check the data provided. 83% of the 107 suppliers were monitored as part of the Social Footprint certification. The social footprint also provides specific indications for those companies whose turnover comes at least 50% from ELT management activities for Ecopneus: 15 organizations, for a total of 175 employees working exclusively within the country with a predominantly male workforce (90% men, 10% women). Further restricting the scope and analysing the consortium on its own, Ecopneus stably employs 12 permanent employees, 8 men and 4 women, all with higher education or university degrees and an average age of 42 years.

The social commitment of Ecopneus

Ecopneus, to certify its service according to the SFP scheme, is committed to respecting and ensuring respect in its chain of the following:

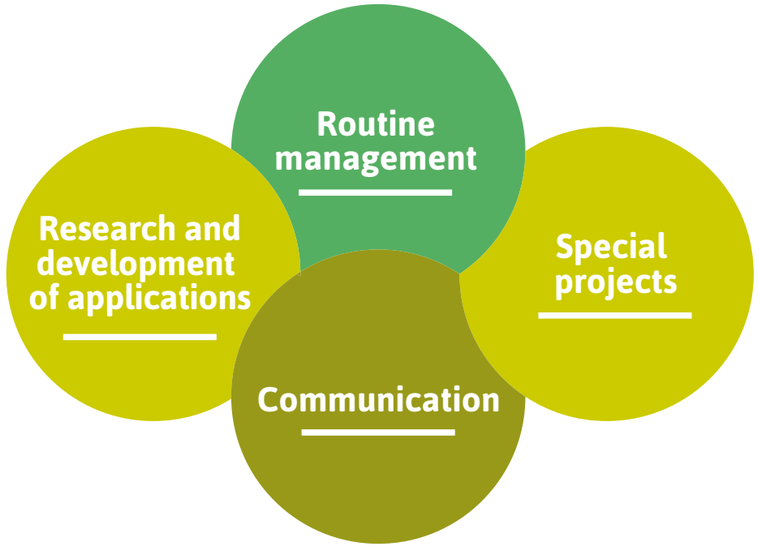
- OECD guidelines for multinational enterprises (www.oecd.org);
- the principles set out in international conventions on human and labour rights (Universal Declaration of Human Rights, the UN Convention on the Rights of the Child) (www.ohchr.org, www.unicef.it);
- the rules of law in the country/countries in which it operates (unless worse than what is provided for by international labour conventions - ILO: www.ilo.org);
- the statutory and regulatory requirements related to its service.

On the basis of the principles set out by the above statements, Ecopneus is proactive and vigilant:

- to ensure that the workers employed can enjoy, without distinction and without prior authorization, the right to establish organizations of their choice and join organizations, and have the right for these organizations to be recognized as representative for the purposes of collective bargaining;
- to abolish forced and compulsory labour in all its forms;
- to pursue policies designed to promote equality of opportunity and treatment in employment, in order to eliminate all forms of discrimination based on race, colour, gender, religion, political views, nationality or social background;
- to respect the minimum age for admission to employment or work, in order to ensure the effective abolition of child labour;
- to comply with the rules on safety and environment in the workplace.

4 / Communication

Constructing a culture

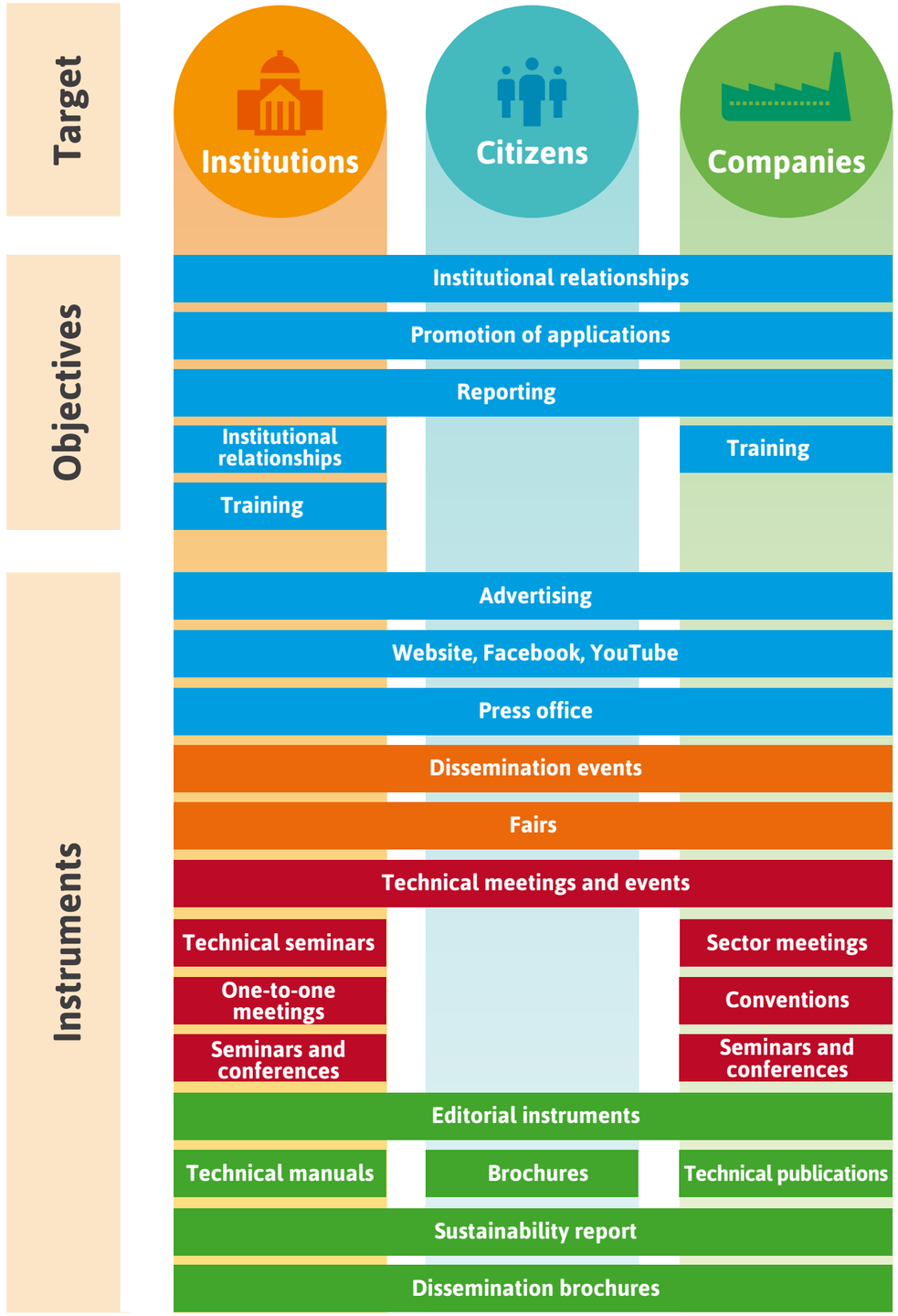


Ecopneus' commitment to communication, information and awareness-raising among all the stakeholders of reference is derived directly from the mission entrusted to it by the Legislature in Decree 82, which lists the activities of information and communication along with the other control, monitoring, accounting and reporting activities on the collection and recovery activities, as well as research and development projects.

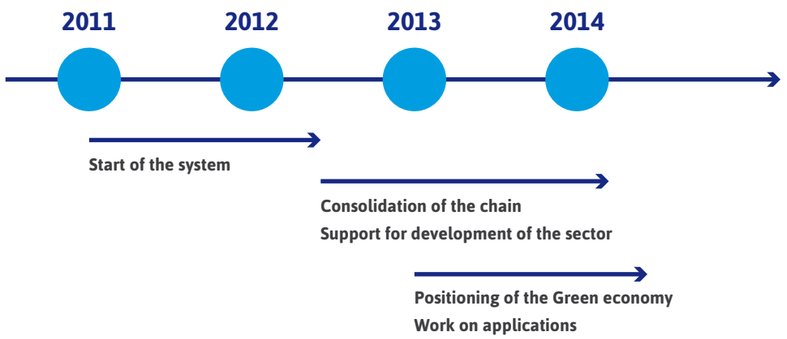
Many types of actions have been taken to support the construction of a circular economy culture in our country, always closely connected and strategically integrated with Ecopneus' activities. Objectives and working approaches that are consistent with the style of full transparency, efficiency and effectiveness adopted by the company in the management of all its activities.

Going far beyond a strict interpretation of the Legislature's mandate, Ecopneus assumes this responsibility by making transparency in communication a fundamental instrument to translate the ethical principles taken as guiding values into operational and managerial practices. An objective that can only be achieved through fully unambiguous, non-sensationalist communication, but one that is inspired and commensurate with the demand for information and feedback from all stakeholders, starting with the citizens, who provide the resources necessary for the function of the ELT recovery system. More specifically, the objectives, instruments and targets of the communication activities are summarized in the diagram on the page to the right.

The communication strategy and plan are developed with the support of the company Hill+Knowlton Strategies, where the team of professionals involved work in close and continuous contact with the Directorate General, but also with all the other internal offices, in relation to the



different types of projects developed. The commitment in communication has characterized Ecopneus' activities from the beginning, evolving over time to always adhere better to the needs of the moment and to the strategic goals.



Focus on recycled rubber

The main targets in the development of information and awareness initiatives are as follows:

- public opinion;
- national institutions;
- local governments;
- law enforcement;
- companies in the Ecopneus network.

2014

As shown in the diagram above, in 2014 the communication consolidated and focused even more on the commitment to supporting the development of the market of applications of recycled rubber, continuing, in parallel, the corporate communications activities (those on the functioning of the system, internal and external training, dissemination to the general public, and the consolidation of accurate information on the collection and recovery of ELTs). Each activity is conducted focusing on the maximum clarity, breadth and detail of information, basing all the information disseminated on a careful assessment and evaluation and, where necessary, using official accredited sources.
The focus is concentrated on sports facilities and modified asphalts as the sectors with the most promising growth prospects and those characterized by a degree of technological maturity sufficient for an adequate valorisation in terms of communication. The key projects realized are outlined below.

SPORT

- **Agreement with Atalanta B. C.**
- **Sensory space**
- **Sports facilities inauguration events**

ASPHALT

- **Sensory space**
- **Technical publications**
- **Technical seminars for public administration technicians**
- **Press on new projects**

As mentioned, in addition to these specific areas of action, the basic part of communication on Ecopneus' corporate issues related to monitoring and reporting on the activities conducted, training for technical figures linked to the sector, and the promotion of the proper management of ELTs by operators and citizens is carried out.

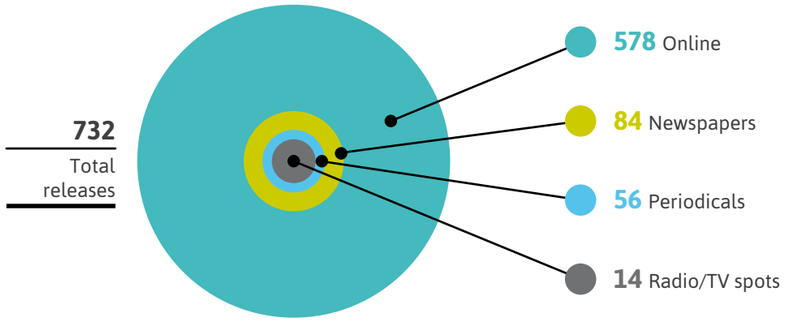
CORPORATE

- **Sustainability Report**
- **Ecomondo Fair – Sensory space**
- **ELT Academy**
- **Open facilities**
- **Press office**

The activity of the press office is transversal to all projects; Ecopneus uses it to feed information, updates and opportunities for study to a network of established newspapers and journalists. Parallel to the development of these projects, the achievement of the general objectives in relation to their different targets is monitored. In 2014 the work towards a network of press contacts of specialized and generalist publications, at the national and local level, in print and online, generated over 700 press releases.In summary, the goal of providing correct information on the ELT management system implemented by Ecopneus and the values of rigor, transparency and efficiency with which this is conducted on a daily basis appears to be achieved, but there is still a strong commitment to its monitoring and continuous supply, adapting tone and content over time.
The chart below details the current state of the main objectives taken on with regard to the target audience.

Target	Objective	Status
Institutional	**Positioning**	Ecopneus as a serious, reliable, competent, and transparent interlocutor, strongly oriented toward the best implementation of the expectations of the institutions and for the purposes for which it was founded.
Operators in the sector	**Perception**	Ecopneus is an important partner for efficient management and also for the development of strategies for future development; prepared and always close and available to seek proper solutions to business problems and to support companies.
Public opinion	**Correct information**	Ecopneus, through the website and other direct contact channels, is also an informational reference for citizens; every opportunity for direct contact confirms the positive reception of the new national system in which Ecopneus works.
All	**Applications of recycled rubber**	The dissemination and information work has produced a significant increase in the knowledge and positive perception of these applications. These phenomena are detected through contacts via social networks, public meetings, institutional meetings, and technical meetings.

Press office 2014



The social media presence, through which an increasing and strategic portion of the communication passes, is concretized in the management of a Facebook profile, a dedicated channel on YouTube and the website www.Ecopneus.it.
The Ecopneus website now configures itself as a real portal, where, next to the activities of the system, there are information and tools for the study of all the issues related to the management of ELTs in Italy and abroad – from the regulatory aspects to the market for products made of recycled rubber; thousands of articles monitored and updated daily, serving professionals as well as individual citizens, reporting the official and most internationally accredited sources. A complex organization that over time has developed, next to the main site, some sub-sites dedicated to the "Open plants" initiative, the recycled rubber product catalogue, and the ELT Academy training project.
The Facebook page is also a strategic tool for monitoring the uptake of the messages spread by Ecopneus, detecting potential problems and keeping an open channel of two-way communication that is direct and immediate. The videos on the YouTube channel allow web surfers to be brought directly "inside" the Ecopneus reality and the network of partner facilities that collect and process the ELTs, as well as onto an artificial football field made of recycled rubber or, finally, on a tour Italy's emptied historic stocks.

www.ecopneus.it	Over **145,000** visits and **403,369** content views In November 2014, the "See, touch, hear" page created as a landing page for the web campaign linked to Ecomondo 2014 recorded about 10,000 visits in just two weeks.
facebook	**884** like **155,000** content views **61,000** viral displays
YouTube	**5,397** video views for **6,782** minutes total The most watched video, **1,256** times, is "How is a synthetic turf field made?"
	**9,509** visits to the rubber products catalogue page **271** requests for information and estimates received through the site (the figure does not include any direct contacts with the companies).

Selection of projects from the 2014 communication plan

Sensory space at Ecomondo 2014

"See, touch, and listen to recycled rubber"
A sensory space at Ecomondo 2014 for a concrete experience of the advantages of rubber from ELTs.

Objective: to bring visitors in touch with the applications, overcoming the distance of knowledge and correct perception that still characterizes these products.

Approach: three modules with three spaces that reproduced, through audio, video and physical installations, situations designed to: try the experience of driving on roads with asphalt modified with rubber powder and appreciate the reduction of road traffic noise associated with it, feel the comfort resulting from the reduction of noise in an apartment with ELT rubber soundproofing, and see the performance of sports surfaces create with recycled rubber.

Instruments: video projections, animated graphics, 3D effects, LCD screens, audio playback via "sound showers".

The numbers: over 400 visitors in the five days of the fair in Rimini and more than 10,000 hits on the web page of the site dedicated to the project in the two weeks before and during the fair (October/November 2014).

Partnership with Atalanta

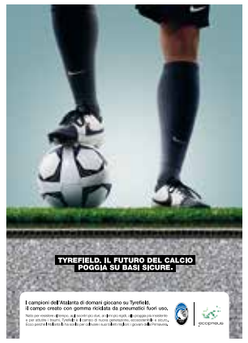
An artificial turf field with rubber from ELTs for Serie A football. Excellent performance and a three-year collaboration agreement to experience and communicate football on rubber from ELTs.

Objective: to bring the installation with rubber from ELTs to the top of national football and draw performance - and quality - related communicative elements from it.

Approach: a three-year agreement in which to realize various joint activities.

Instruments: construction of a field made of ELT rubber, press conference at the Sports Centre of Zingonia (BG), with the participation of the Undersecretary of the Ministry of Environment Barbara Degani, two advertisements with dissemination during the Serie A championship competitions, an advertising campaign in the main national sports newspapers, and press office activities (in 2014).

The numbers: 25,000 spectators each Sunday in the Bergamo stadium, 45 official press releases, and an advertising campaign in the main national sports newspapers and beyond.



The ELT Academy

Technical training, debate, and discussion seminars with public administration officials, law enforcement and control bodies.

Objective: to provide information to the specific target of those responsible for the prevention, monitoring and suppression of crime and irregularities in the management of ELTs throughout the country. A tool for networking and using information to combat the ELT abandonment flows that still persist and are linked to the black market purchase/sale of tyres.

Approach: workshops with a regional slant, with the contribution of national speakers (Paola Ficco, environmental lawyer, Enrico Fontana, journalist, Stefano Ciafani, Vice-President of Legambiente), the support of local authorities (ARPA Sicilia, the Province of Bari, the Livorno Port Authority, ARPA Lazio, and the Environment and Legality Observatory of Legambiente Veneto).

The events are organized in collaboration with Legambiente and have also seen the contribution of prominent members of the judiciary: Luca Ramacci, Court of Cassation Counsellor and curator of Lexambiente.it, Claudia Ferrari, Deputy Public

Prosecutor at the Court of Palermo, Luigi Scimè, Deputy Prosecutor at the Public Prosecutor's Office of Trani, Donato Ceglie, Deputy Prosecutor General of Bari, and Federico Bisceglia, former Deputy Prosecutor at the Public Prosecutor's Office of Naples.

Instruments: half a day of classroom work, with technical and legal analysis of existing legislation and analysis of the most recurrent cases on the subject in the daily work of law enforcement agencies (the State Forestry Department, Guardia di Finanza, Carabinieri - Protection of the Environment, Local Police) and area administrators. Distribution of regulatory reference texts.

The numbers: over 400 participants in the five events in 2014 (Mestre-Venice, Palermo, Bari, Livorno, Rome).

Material – Value – Immaterial

A photographic exhibition in Milan reinterprets the recycling of rubber.

Objective: an environmental communication project that uses the language of visual arts to bring attention, a new perspective and a new form of narration to the world of ELT recovery. A photographic journey that also speaks to the positive aspects tied to the management of ELTs in Italy, which creates economic, environmental and social value for the country.

Approach: an exhibition that began its journey in Milan in December 2014, at the "Spazio Solferino 40", and is continuing in 2015 with stops in other Italian cities.

Instruments: a series of photos taken throughout Italy by Daniele Tamagni, the World Press Photo Award 2011 winner in the "Arts and Entertainment" category.

The numbers: 40 shots in the exhibition, which was inaugurated with an evening event attended by about 200 people. Over 30 press releases.

Happier times for the "Terra dei fuochi" area

An educational path and a competition that promote a culture of legality and active participation by middle school and high school children, giving the winning school a sports facility with ELT rubber flooring.

Objective: to work on the construction of a culture of legality from a young age, against the economic and environmental damage to the country that comes from the abandonment that follows the black market purchase of tyres.

Approach: we began in the "Terra dei fuochi" area (in the provinces of Naples and Caserta), where this theme has emerged in an urgent and dramatic fashion with the phenomenon of toxic fires; the initiative will focus on other regions in the coming years, and was realized in collaboration with Legambiente Campania. The 2014 winner was the "Settembrini-Ciaramella" high school in Afragola (NA), currently known as the "Rita Levi Montalcini" Institute, at whose structure a multipurpose sports facility containing ELT rubber was created. Awards were also given to the 2nd and 3rd place institutions, with the realization of an anti-slip flooring made of recycled rubber furnished with playground equipment ("Europa Unita" Institute in Afragola, in the province

of Naples) and the donation of a computer terminal ("G. Caporale" Institute in Acerra, in the province of Naples).

Instruments: classroom instruction, a visit to an ELT processing plant and a competition to create a video on the correct management of ELTs as a symbol of the struggle for legality.

The numbers: over 1,200 participating students from 52 middle school and high school classes in the "Terra dei fuochi" area. Over 40 press releases.

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