A man with dark, curly hair and a light complexion is wearing a white lab coat over a blue and white striped shirt. He is holding two clear plastic bags, one in each hand. The bag in his right hand contains a blue granular material, and the bag in his left hand contains a dark, possibly black, granular material. He is looking directly at the camera with a neutral expression. In the background, there is a white wall.

Ecopneus in the **Green economy** **Sustainability** **Report** **2013**



ecopneus

il futuro dei pneumatici fuori uso, oggi

Ecopneus in the Green economy

Sustainability Report 2013



Ecopneus in the Green economy Sustainability Report 2013
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Foreword

Our third sustainability report has been prepared with the support of the Sustainable Development Foundation, with whom Ecopneus collaborates as a member of the National Council of Green economy.

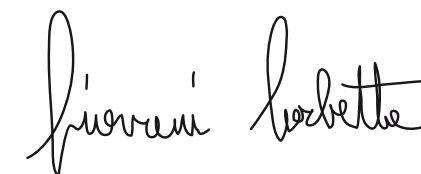
In this report we tried to quantify and qualify our activities in terms of contribution to the national Green economy and to analyse our ELT collection and recovery results in terms of environmental and social benefits for the Country.

Such choice is in line with our ethical and transparent approach, confirming the will of reporting the results of our activities in a new way, giving interpretations that go beyond the mere respect of law targets, which we have already overtaken.

The process involved representatives of our stakeholder categories in listening and discussion meetings, the outcome of which significantly contributed to the analysis of management results and to the consideration of the industrial strategy.

We invite all our interlocutors to inform us about their considerations regarding the contents of this document: we will surely examine them and keep them into consideration for our future journey.

Giovanni Corbetta
Ecopneus General Director



Reading guidelines to Ecopneus Green economy Report 2013

Note 1 - Ecopneus is a Member of the National Council of Green economy in Italy and shares the programme platform of Green economy General States.

The 2013 Ecopneus sustainability Report is a special edition. In fact, for its drafting, reference was made to the approach of Green economy Report® developed by the Sustainable Development Foundation, that updates the research approach in the light of the challenge opened by the Green economy, though following auditing international standards. Starting from the consolidated performance measures of a company's impact usually referred to accounting and process indicators, the Green economy Foundation reporting widens the research horizon and it includes in the analysis also the effects on environment and society derived from goods or services produced by an organisation, in a perspective of transition towards a green economy.



Note 2 - Through the Single Market for Green Products Initiative, the evaluation of the environmental footprint of goods or services and of organisations, is made by PEF (Product Environmental Footprint) and OEF (Organization Environmental Footprint) methodologies, elaborated with reference to life cycle analyses of the main international standards among which are: Life Cycle Reference Database Handbook, ISO 14040-44. Such methods evaluate the environmental impacts deriving from all life cycle passages: from the extraction of raw materials to transportation, from transformation to use and end of life.

Indicators for measuring the performance of an organisation used in the Green economy Report® refer to an approach of life cycle analysis of products and services, with the aim of supplying useful information to improve processes and products design, in a perspective of production chains eco-design. The goal is to identify and measure the impact origins along all the manufacturing process as well as during the product use, so as to plan management interventions focused on the optimisation of environmental, economic and social performances. In synthesis, the methodologies used to analyse the environmental impact of a Green economy Report® refer to the standards adopted by the European Community inside the *Single Market for the Green Products Initiative*: an initiative aiming at favouring the market penetration of environmentally sustainable goods and services,

reducing the risks deriving from activities such as green washing by some organisations.

The **Ecopneus Green economy Report 2013** assesses the sustainability performances of the consortium system along the whole value chain: it takes into consideration the activities of collection, transportation, treatment and recovery with their possible options, and verifies, in terms of total balance between positive and negative impacts, which of those options offer the highest benefits for environment and community, so as to better address the future choices of the Consortium. The results shown are the outcome of a preliminary study to be improved over time - either deepening the most critical aspects or integrating new aspects and indicators - leaving further deepening to the next Report editions.

The **Ecopneus Green economy Report 2013** is organised into thematic chapters that allow an independent reading of one from the other, though following a unique narrative trend referred to the system performance in the year 2013.

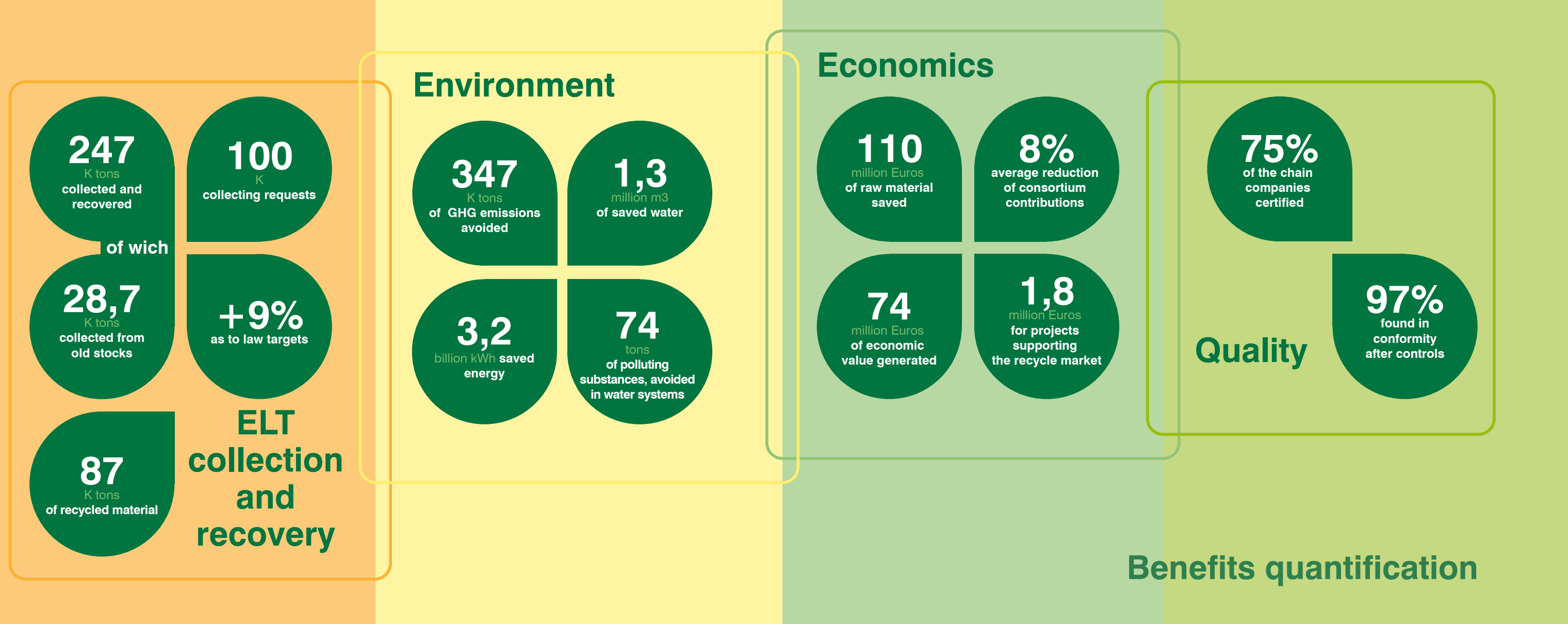
The **first chapter** examines Ecopneus's role inside Green economy from a management standpoint with reference to the operative performances of the ELT recovery chain. The **second chapter** enters the core of the balance assessments of the environmental impacts of the Ecopneus system, highlighting the benefits for climate, resources and biodiversity offered by the various recovery options. The **third chapter** focuses on the economic, employment and legality benefits generated for the Country by Ecopneus's ELT management. The **fourth chapter** analyses in detail the Consortium Company governance in relation to law and management models, adopted in a perspective of the utmost transparency, as well as Ecopneus's strategic vision and mission and the leverages used to reach a sustainability balance of the system. **Chapter five** reports the communication contribution to support strategy for all carried out activities. The **last chapter** puts together information collected and elaborated in the Foundation Green economy Report® with what is required by the international standard for the sustainability accounting GRI-G4.

Note 3 - Ecopneus adopted an annual reporting cycle. The Sustainability Report 2013 covers the activity period carried out by Ecopneus from 1/1/2013 to 31/12/2013. Previous versions of Ecopneus's report refer to the years 2012 and 2011, when the activity of the Consortium started.

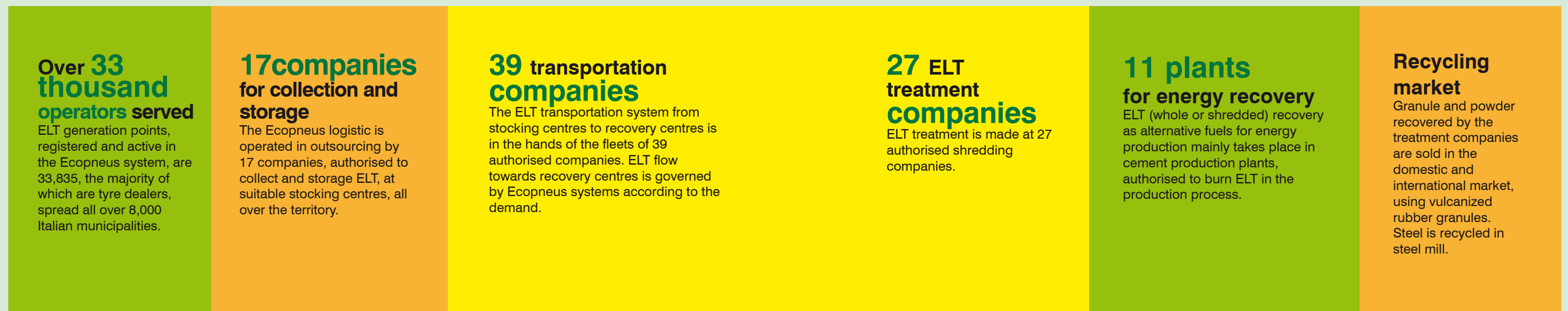


**Ecopneus in the
Green economy**

Ecopneus
in the
Green
economy



Value chain



Ecopneus in the Green economy

They have lost their usual value, but they can find a new one. They leave the domain of those who bought them but, instead of returning to daily life as a potential environmental, social, health problem, they are transformed into a resource able to increase economy and occupation. End of Life Tyres' (ELT) second life is an industrial project – moreover than environmental – supported by an accounting system able to precisely determine the advantages deriving from a correct use of such resource, wasted up to now, and the disadvantages deriving from an illegal use.

The system's value added increases through material recycling

The recovery value of an End of Life Tyre can be in fact measured in terms of energy, material, water and soil, thanks to the resources directly or indirectly used in the production of a new tyre. A huge value, which reflects also on the impacts determined by its life cycle, and which makes it an important resource once it has become waste.

However, differently from most of other waste, ELT cannot be recycled in the original production cycle: their management requires the organisation of an *ad hoc* industrial chain, able to seize market opportunities for transforming the single components (rubber, steel, textiles) into new products or to enhance their energetic power.

The organisation and management of a virtuous chain for ELT recovery and recycle in Italy represent Ecopneus's role in the Green economy. Results are directly measurable in terms of an effective waste management in itself and indirectly in terms of added value, generated during the ELT production, use and recovery phases for environmental, economic and social sustainability.

Ecopneus outsourced all services necessary to achieve ELT collection and recovery targets. The consortium economic system foresees that all activities directly linked to ELT management, as long as they remain a waste, are remunerated by the environmental fees paid by consumers when they buy a new tyre. The effective use of the environmental fees and their reduction over time depend on the chain's efficiency and quality, representing one of Ecopneus's priority target

From 2011 up to today, Ecopneus environmental fees have been reduced on average by 23%

and influencing decisions of industrial strategy and of sustainability of the whole system.

A network of quality companies for End of Life Tyres collection and recovery

Companies operating in the Ecopneus system are engaged in handling and ELT treatment and recovery sectors and are chosen through a very rigorous mechanism. The selection process of such companies includes: a first phase of **registration** on Ecopneus's portal, where self-certificated information are provided; a second phase of **pre-selection** made by Ecopneus after verification of the minimal requirements requested at the time of registration; a third phase of **bidding** made on specific service specifications; a fourth phase of detailed analysis for final **selection** of companies with which to stipulate contracts, taking into consideration the indicated requisites and the more advantageous economic offer. The tender for **operators' selection is made through a telematic process supported by a primary company specialised in e-procurement, and then certified by a third party.**

The main requirements evaluated by Ecopneus in the selection of the chain's companies

- Possession of the necessary authorisations to carry out the activities included in the offer (companies holding an "ordinary" authorisation are preferred);
- Coherence between the activities included in the tender and the company means/resources (plants, weighting systems, storage areas, various structures);
- Experience gained in the last three years;
- Valid contract regarding waste delivery and/or sale of materials obtained by recycled ELT;
- Annual and instantaneous storage authorized capacities as required by Ecopneus;
- Accounting capability of collection and storage flows, reporting transparency, possession of quality certifications (such as ISO or EMAS);
- Company's registration in the "white list" at the competent Province Prefecture or document proving registration request (with evaluation right of Ecopneus to take in consideration possible criticalities and negative events in the Company history);
- Financial "robustness" sound and provable;
- The most competitive economic offer respecting the conditions indicated in previous points.

Note 4 - A modern tyre is a high-technology product, 60% of which is made of carbon based material – mainly natural and synthetic rubber, polymeric fibres, organic additives and solvents, and for the remaining part by high performance steel, other metallic oxides and sulphur. In a tyre manufacturing process, rubber compound is vulcanised to obtain the robustness and elasticity characteristics necessary to their use. Such process essentially "fixes" tyres' rubber giving it particular chemical-physic characteristics that prevent a true end of life recycling for the production of new tyres: today known de-vulcanising technologies do not allow the production of recycled tyres of suitable quality. Weight is the only aspect reduced in an End of Life Tyre with respect to a new one, maintaining unchanged the characteristics of high quality and technology: the law considers a weight reduction of 10% with respect to a new one, due to tread pattern consumption, and on such prerequisite recovery targets are defined.

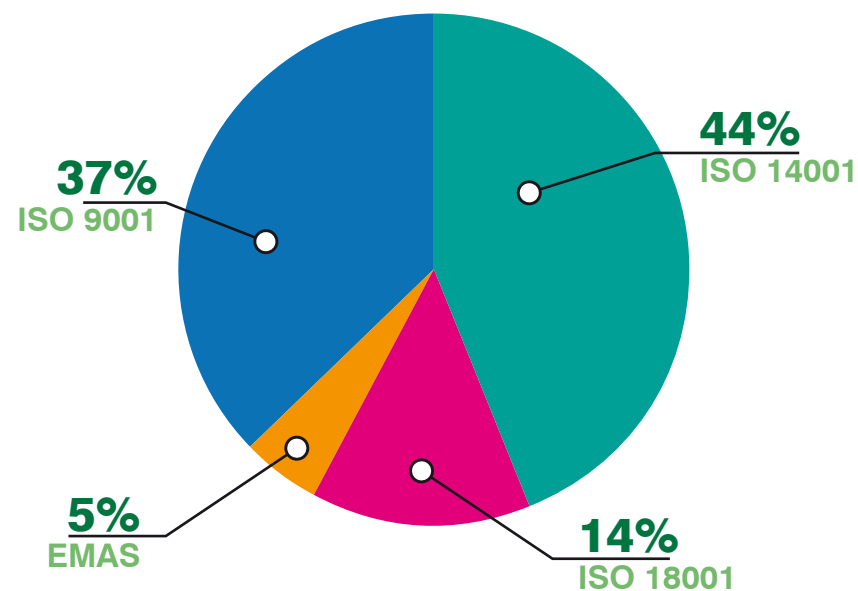


Figure 1 - Companies' certifications of Ecopneus system.

The essential requirement for participating to the tenders and in the assignment of service contracts is that the company should have all authorisations necessary to operate in the specific sector. As a further guarantee of service efficiency and quality, the companies are assessed also for their reputation and experience in the sector, for their company organisation and for the efficiency of management models and financial solidity.

In order to safeguard a situation of total legality and utmost transparency, companies belonging to the system are required to formally conform to the principles of the Code of Ethics adopted by Ecopneus, as well as to participate in a programme of periodical verification of conformities to law prescriptions, defined by the environment Code and by the Consolidated Act regarding job health and safety. The programme, elaborated in collaboration with Certiquality as external certifying body, includes periodical audits of each single firm in the network, according to a checklist of over 60 ad hoc selected aspects. In case a non-conformity is observed, the certifying body orders the company a series of recommendations for becoming compliant with the rules by the time indicated for the next verification.

Such system has already produced satisfactory results. **In 2013, 75% of active companies in the system have shown to possess one or more certifications on environmental safeguard, quality or job safety; the conformity rate to laws, concerning Ecopneus programme verified by Certiquality, is 97%.** The reaction capability to adapt to standards in case of non-conformity, is in line with times and ways required by the recommendations.

Over 33 thousands ELT generation points served throughout Italy

ELT collection at over 33 thousands generation points registered in the Ecopneus system (operators in the Italian replacement market) represents the key element of the consortium scheme, as it directs a huge ELT quantity to the right treatment path and guarantees a constant flow of tyres to treatment and recovery companies, feeding the entire value chain.

For that reason, from an operative standpoint, the **17 companies of Ecopneus network for collection and storage** are required to show a high service level in managing collections at ELT generators in the replacement market, all over the national territory. The same is valid also for the **39 transportation companies involved in ELT transfer from storage centres to national and international shredding centres**; they are required to have a fleet with high efficiency standard so as to reduce transportation costs and impacts. The remuneration guaranteed to logistics companies by Ecopneus

is determined by the weight of moved ELT. Another aspect Ecopneus pays great attention to, is the kind of treatment. It represents a key element in the ELT value chain, because it determines the main share of value added to support the chain:

- in economic and social terms for the market value of recovered materials and of generated employment;
- in environmental terms with respect to raw material savings guaranteed by recovery.

The higher is the share of ELT recycled in secondary raw materials, the higher is the value chain.

Out of the **27 ELT shredding companies** belonging to Ecopneus network, to those producing granule and powder it is required to have a commercial capability, besides efficiency in manufacturing processes, suitable to maximise the penetration in products applications market, using ELT rubber granules and powders as a substitute for virgin rubber. The remuneration guaranteed to shredding companies by Ecopneus depends on the quantities of processed ELT and on the kind of process and derives anyway from a comparison of market values, assessed through the tender

The request for ELT recycled rubber products and materials is however much lower than the offer, therefore a significant share of End of Life Tyres collected by the Ecopneus system is treated in preparation to their energy recovery: they have a high calorific power, comparable to that of pet-coke. **Among various options for ELT energy recovery, the use as fuel for cement production is preferred versus other forms of energy recovery**, also thanks to the effectiveness shown by co-burning and by connected material recovery (combustion ashes, steel and other metal oxides) within the produced cement.

For this kind of energy recovery, **Ecopneus privileges the domestic market, with supplies to Italian authorised cement plants.** As far as exported ELT share is concerned, plants are chosen based on criteria of proximity and of guarantee of respecting of law environmental criteria in each Country, assured by corporate governance of mother companies. **Plants belonging to Italian multinational Groups or to other organizations with a sound international reputation are preferred.** ELT energy recovery requires, in some cases, the payment of a contribution to those plants using them, in other cases a small economic saving has been built up, net of transportation and treatment costs. That represents a signal of ELT being considered more and more as a precious resource.

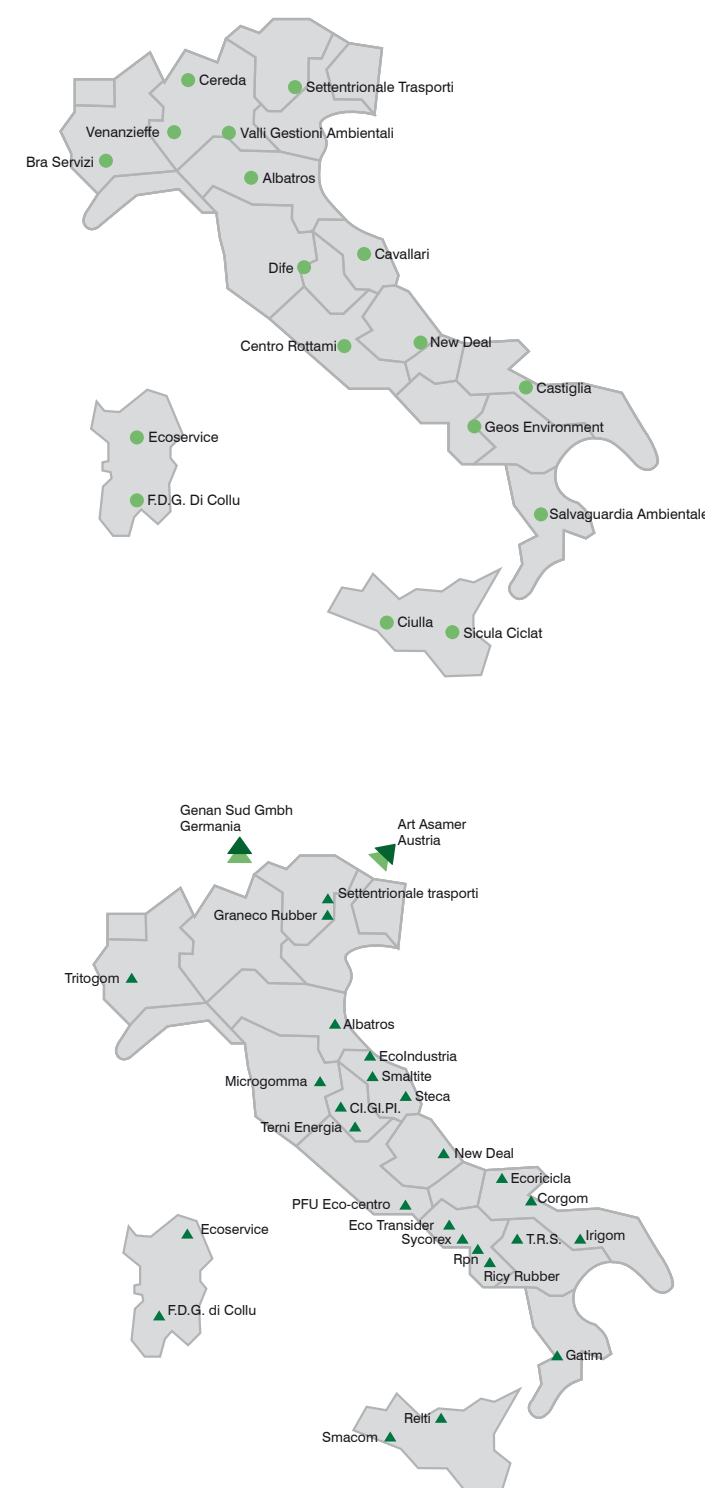
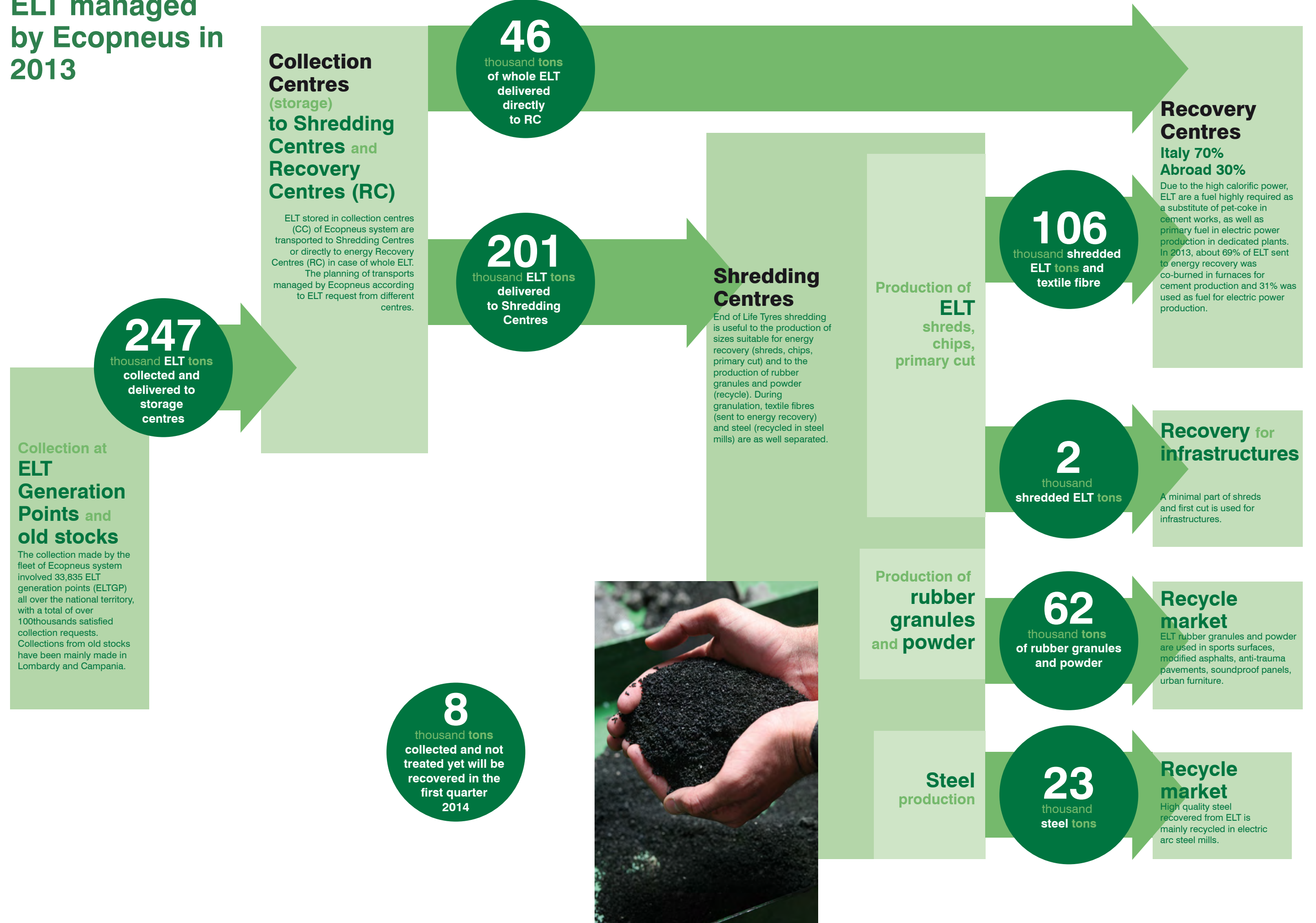


Figure 2 - Companies network in Ecopneus system in 2013. Figures show the geographical position in Italy respectively, collectors above, and ELT shredders below.

ELT managed by Ecopneus in 2013



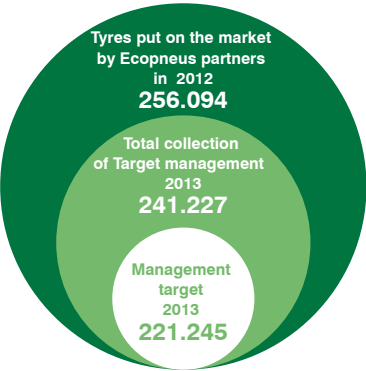


Figure 3 - ELT collection target is defined by law, starting from tyres quantities put in the market by the consortium shareholders in the previous year (calculation is made at net of tread pattern wearing due to usage and net of exported part-worn tyres). The ordinary management target must be mainly reached through ELT collection at generation points in the replacement market, and eventually at old stocks present on the national territory. Furthermore, the regulation envisages an extra-target management finalised to ELT collection from old stocks financed by 30% of the profit of the Consortium, in order to reduce them.

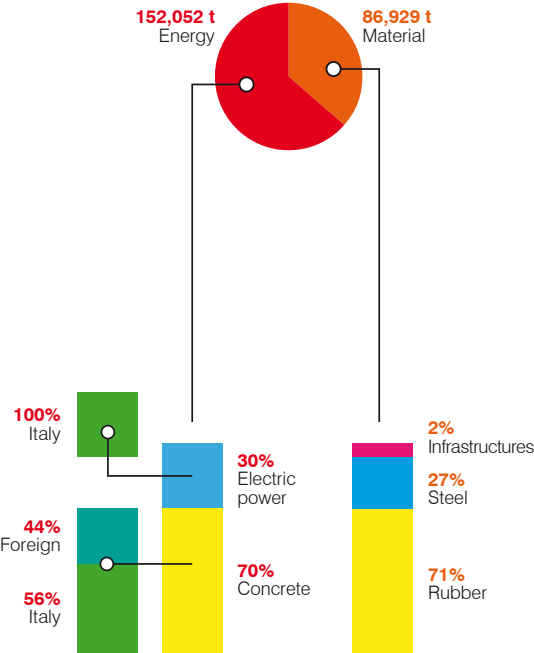


Figure 4 - Division by type of ELT recovery, managed by Ecopneus system in 2013.

247 thousand tons of collected ELT

As far as the **annual target management is concerned, over 2013 Ecopneus collected 241,227 ELT tons, 20 thousand tons exceeding law target (+9%).**

The achievement of such an important result was made possible thanks to the efficiency of the collection network of the Ecopneus system, able to satisfy over **100 thousand collection requests** made by over 33 thousand ELT generation points, throughout the domestic territory, registered to the Ecopneus system (mainly operators in the replacement market). In this way, 218 thousand tons were collected, plus 23,040 tons collected from old stocks for achieving the yearly management target. In order to have a whole picture of the collection performance of the Ecopneus system, **about 6 thousand tons collected from old stocks** as extraordinary management must be added to the previous quantities. Thus, **the total amount of collected ELT in 2013 is 246,953 tons.**

In 2013, the Ecopneus system treated 238,981 ELT tons, net of production scraps and of collected quantities not yet delivered to treatment plants. 64% of that quantity was sent to energy recovery and 36% was recycled in secondary raw material, essentially confirming the distribution in previous years.

70% of the 152 thousand ELT tons sent to energy recovery were used in the cement industry with a majority share (56%) absorbed by plants on the national territory. The crisis of the building sector has however limited the demand of ELT shreds in Italy, with the need to export an ELT shreds share to foreign cement plants. The remaining 30% was used for electric power production in authorised plants in Italy: after combustion, these plants recover and send to recycling, besides steel, residual ashes (used as substitutive binder of lime-pozzolana in cement production) and sulphur, which is transformed into sodium sulphate through the abatement of combustion smokes (Table 1). Out of the 87 thousand tons of recovered material from ELT by Ecopneus system in 2013, over 23 thousand tons of steel were recycled in steel mills with electric furnace and about 62 thousand tons of rubber were treated to become granules and powders suitable to be used in different products and applications as substitute of the virgin rubber. A residual share of shreds and primary cut were recycled in infrastructures and particularly as engineering material in landfill bottoms and covers, an application that allows the absorption of heavy metals and hydrocarbon leachate.

ELT rubber recycling

The destinations in products and applications of granules and powder, derived from recycled rubber of the ELT collected in 2013, has been basically in line with 2012, with the novelty of an increase in the use of **modified asphalts**. Such asphalts offer a benefit with respect to the traditional ones, in terms of longer durability and better resistance to bad weather conditions. They offer also a reduction of traffic noise, as highlighted in the **technical dossier “Acoustic performances of low noise asphalts in urban scenarios”** made by Ecopneus in collaboration with Vie En.Ro.Se. Ingegneria and presented during

a seminary held in Florence dedicated to Public Administrations. A wider diffusion of such application is strongly supported by Ecopneus through experimentations and projects promoted at local Public Administrations in different Italian provinces

among which are Ferrara, Torino, Roma and Trento. In November 2013 Ecopneus was awarded the prestigious Prize Eco and the City - Giovanni Spadolini for innovation, thanks to the project “Silent Asphalts in Trentino”, aimed at spreading the widest possible knowledge and diffusion of the advantages of asphalts modified with ELT recycled rubber.

Another interesting area for ELT recycled rubber is sports and antitrauma pavements (athletic tracks, children playgrounds, etc.) as well as the installation of artificial turf fields.

Those applications are actively promoted by Ecopneus, in partnership with UISP (Sports for All Italian Association), through high social value projects, such as the one for the Multisports Centre in Medolla, in the Modena area hit by the earthquake, or

174 road km in 8 regions in Italy are paved with bitumen modified with ELT powder

		Energy recovery: type of sizes/destinations					Total
Destinations	Industry	Shreds	Chips	Whole ELT	Primary cut	Textile fibres	
Italy	Cement	37.955	21.063				59.018
Foreign	Cement	29.816	7.195	3.095	97	6.610	46.814
Italy	Power energy recovery	2.243		43.977			46.220
Total		70.014	28.259	47.072	97	6.610	152.052

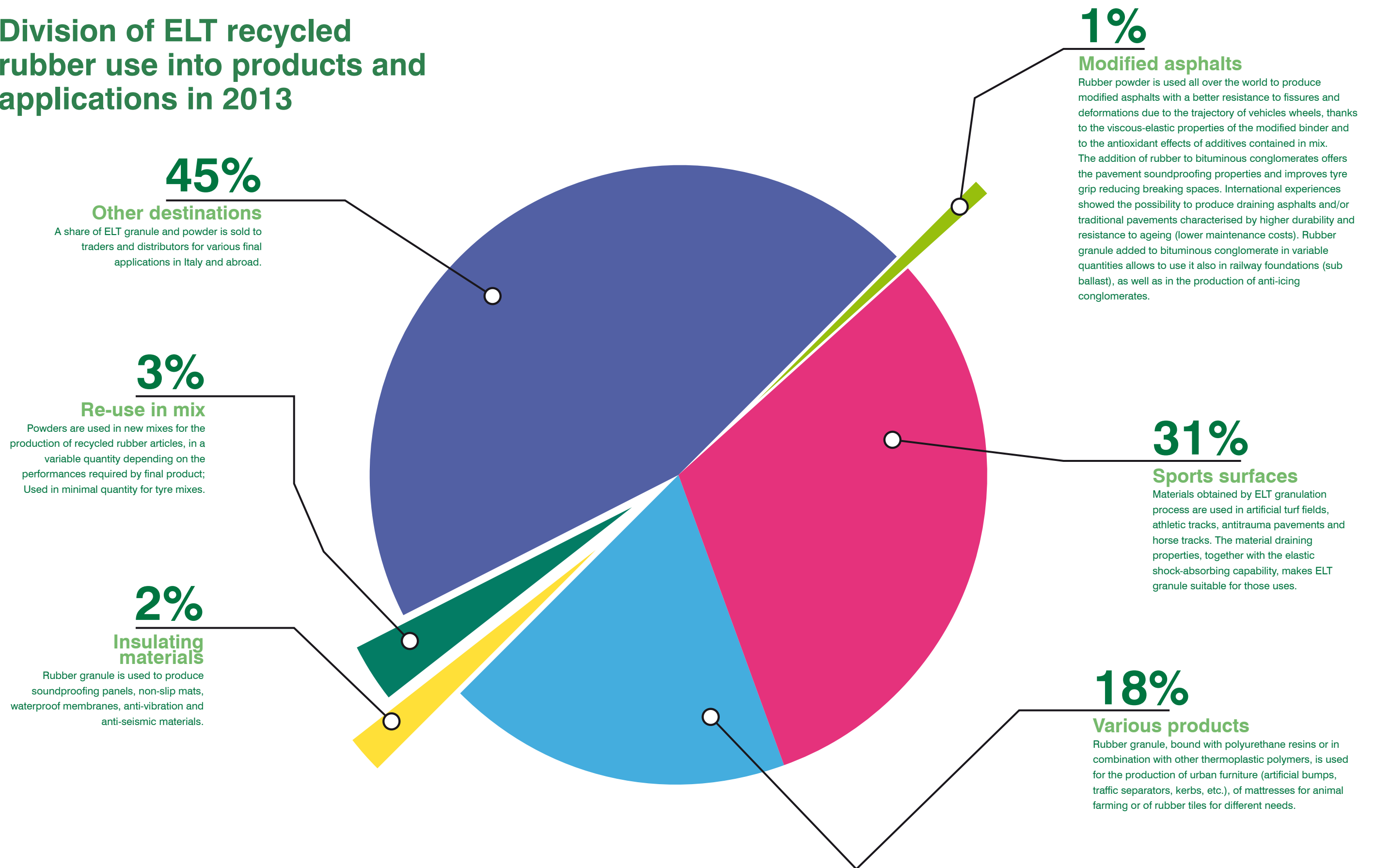
Table 1 - Total products sent to Energy recovery.

	Material recovery: type of sizes/destinations			
Steel production	Steel	Rubber granule and powder	Chips and primary cut for infrastructures	Total
Italy	21.529	55.080	2.105	78.714
Foreign	1.598	6.617		8.215
Total	23.127	61.697	2.105	86.929

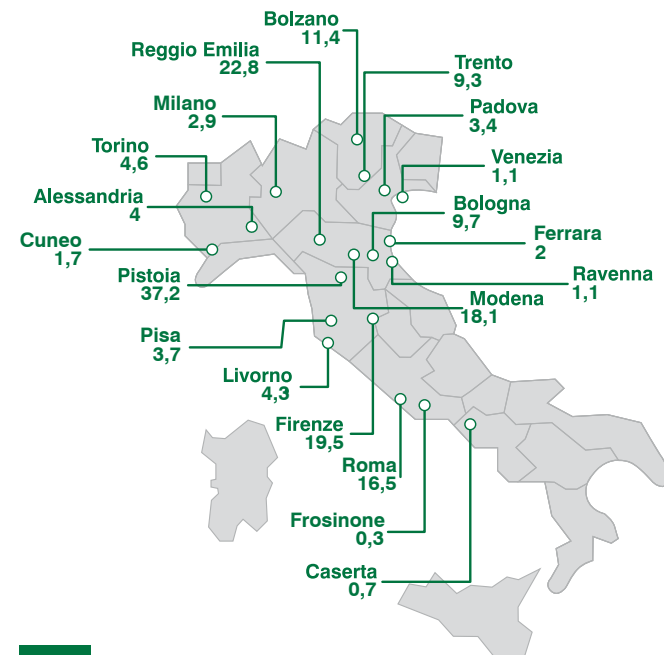
Table 2 - Total products sent to material recycle.

such as the one for a multi-purpose field in the Naples Quartieri Spagnoli, inaugurated during the information campaign made by the Ministry of the Environment against ELT abandonment in the Caserta and Napoli Provinces.

Division of ELT recycled rubber use into products and applications in 2013



Rubber Modified Asphalts in Italy



Realisation from 2007 to March 31st 2014, by Provinces.

Measures are indicated in Km/lane

In Italy, the use of rubber powder modified asphalts has consolidated over time, with more than 170 Km/standard lanes made (a standard lane measures 3.5 metres width), the main ones shown in figure. So far, Emilia Romagna, Toscana, Piemonte, Trentino Alto Adige are the regions where the most important experiences have been made.

Ecopneus actively collaborated in different projects, together with interested local institutions. It's to be remarked that the use of low noise road surfaces is one of the solutions set in the **Municipality Plan for Acoustic Improvement** and in the Strategic Action Plan foreseen by the L.D. 194/05: they compel relevant authorities to make "noise" mapping in areas close to the various infrastructures by 2013, identifying the most sensitive areas and so implementing action plans for their acoustic improvement.

Ecopneus in Ferrara

On the occasion of the maintenance of the municipality road at one of the main city entries - via Pomposa - it was decided to make the new surface using recycled

rubber modified asphalts. **The remake works of such strategic road for the city affected about 10 km of road**, part of which was paved with modified bitumen. However the Municipality Administration has the intention to further invest in this application if the results in terms of performance and durability will be in line with the forecast of scientific literature, already well confirmed. The intervention was linked with the GPP policies promoted by the Municipality and with the implementation of the project "LOWaste", co-financed by the European Union within the programme Life+ and promoted by the Ferrara Municipality, together with Hera, La Città Verde, Impronta Etica and RREUSE, to reduce the local waste production through the market development of recycled products, such as ELT rubber. The works acquired a special symbolic value because in 2012 Ecopneus carried out the emptying of the abandoned ELT site in Via Ca' Rosa, in the industrial area of Ferrara: 8,000 tons abandoned for years, due

to the bankruptcy of the company that should have recycled them.

The Florence experience

The Florence Municipality, already in 2008, approved the acoustic mapping of its territory and since then has operated in order to define an intervention plan in critical areas.

Part of that plan is the realisation of a road section about **250 metres long, two wide lanes of Via Pistoiese** (at the crossing with via Golubovich), using bitumen modified with the addition of **End of Life Tyres recycled rubber**, so to improve road performances in terms of adherence, durability and **reduction of traffic noise**. This road section was also involved in the on road Cycling World Championship held in Florence in September 2013. That is a demo installation with a strong message of **environmental improvement and health safeguard** in urban contest, and it was connected with a meeting organised by Ecopneus with the sponsorship of the Florence Municipality, Arpa Tuscany, the Italian Acoustic Association, and with the contribution of Asphalt Rubber Italia and Vie En.Ro.Se. Ingegneria.

During the meeting, held in October, the main topic covered was that of the performances of low noise pavements in urban scenarios, based on the experiences of study and measurement carried out in Italy in the past years by various expert groups.

The acoustics dossier: data and technical evidence

The document, made with the technical contribution of Vie En.Ro.Se. Ingegneria S.r.l. – a designing and consulting company specialised in environmental engineering and safety – collects and presents studies and measuring experiences carried out in Italy over the past years, by various expert groups, on the topic of acoustic pollution and of the use of asphalts modified with recycled rubber in urban contest. It represents an organic collection of relevant data and information to better understand the characteristic of low noise pavements of the kind Asphalt Rubber Open-graded and Gap-graded, offering their use indications in different scenarios. In order to verify the efficacy of the use of Asphalt Rubber pavements as a solution to lower road noise in acoustic improvement plans, a series of pre/post measures were taken, linked to the acoustic test of the improvement or reduction interventions set by the plans. In particular, continuous phonometric measures of the scenario pre-intervention and post-intervention were carried out, related to the same measurement post in front of the receiving device, in order to remove, as far as possible, changes in the scenario conditions. The global **results show noise reduction** of Asphalt Rubber pavements on average higher than **3 dBA with respect to traditional pavement**, data which correspond to half the noise recognised by human ear. In many cases, the reduction was higher, with improvements evaluated above 7 dBA.

Modified asphalt in Val Venosta (BZ)

The Autonomous Province of Bolzano includes over 2,757 km of state, provincial and municipal road network to be managed. In spite of the limited extension of annual high traffic infrastructures, the noise mapping has however shown the need to draw up an Action Plan to be implemented starting from 2013. On the occasion of a maintenance intervention of a road section between the municipalities of Coldrano and Vezzano in Val Venosta, with the aim of reducing traffic noise to the benefits of houses beside the roadway, the best solution seemed to be the use of pavements added with End of Life Tyres rubber.

Monitoring results carried out on experimental road sectors showed **the best acoustic performances of pavements made with recycled rubber powder**. Also the costs analysis, carried out by the Road Service Department, confirmed **the competitiveness of the choice made with respect to the hypothetical installation of soundproof barriers**.

The experience made with the use of pavements added with recycled rubber confirmed a significant reduction of transit noise, with a lower cost compared to usual soundproof barriers and a less invasive impact.

The Consortium of Trentino Municipalities

The aim of the Memorandum of Understanding signed between the Consortium of Trentino Municipalities and Ecopneus is to support employment and economy, thanks to environmentally sustainable actions; such collaboration led to the promotion of a series of training meetings addressed to local Public Administrations.

The aim is to turn the Trentino experience into a public-private collaboration model and to lead the way to spreading information about the advantages derived from “modified” asphalts.

Besides actions to favour the extension of such application to all bodies of the Consortium of Trentino Municipalities, the memorandum considers the realisation of different kinds of “rubber” pavements, to promote new competences and development opportunities for business projects on the territory.

Furthermore, the key element is the identification of initiatives intended to “create demand”, public in particular, within the GPP frame (Green Public Procurement, the “green” purchases of the Public Administration) and towards members, by means of conventions, meetings on the territory and if necessary, even modifying the provincial regulation.

The realisation of a first road section – 1.5 km with modified asphalt – containing recycled rubber in the Transacqua (TN) Municipality is the first result deriving from such collaboration activity.

Recycled rubber in sports structures

High shock-absorbing capability, elasticity and resistance to deformations, resistance to atmospheric agents.

Those ELT rubber characteristics are **particularly appreciated also in the production of sports surfaces**, antitrauma pavements, playgrounds and, in general, all those surfaces suitable for sports or recreational activities that may consider the possibility of accidental shocks and traumas for users, thus limited as much as possible.

To support the information and awareness promotion of such aspects, Ecopneus actively collaborates with different subjects for the promotion of a sustainability culture and the diffusion of high performances material in the field of sports plants.

UISP - Sports for All Italian Association

The collaboration, started in 2012, has synergistically put together the Ecopneus commitment for the development of such applications and the policy of associated sports companies towards the sustainability of managed infrastructures started by UISP.

Along that journey, in 2013 a **mapping of the UISP assets** all over Italy was carried out, in order to define the potentialities of a sustainable improvement.

The job allowed to **analyse 657 plants**, divided by region, indoor and outdoor, outlining their use conditions, type and practiced disciplines: a heritage of preliminary information to start from in spreading the recycle culture and promoting ELT rubber use to re-qualify surfaces.

On the side of the recovery market, it represents an important step to foster the meeting between the demand for quality and sustainable sports plants and the work of many Italian qualified companies producing such structures using recycled rubber.

The PalaMedolla in after earthquake Emilia

In 2013, a project saw the light thanks to the collaboration with UISP, having Ecopneus actively contributing to the realisation of a multisports plant in Medolla, a city in the Modena area hit by the 2012 earthquake, using End of Life Tyres recycled rubber.

To make the PalaMedolla multipurpose surface, the ELT recycled rubber was bound with polyurethane resins and transformed into rolls which were laid on the pavement to form a single surface. Upon the recycled rubber layer a coloured acrylic resin was applied and then were drawn the lines to define the playing grounds for the different disciplines.

That was a project **adding ethical value to the sustainable and technical value of the structure**, in the re-building of the social fabric in an area hit by the earthquake, where the structure will be able to constitute a new recreational and activity centre for the local communities.

A field for the kids from the Naples Quartieri Spagnoli

In 2013, another project saw Ecopneus directly contributing to the realisation of a **sports structure made with recycled rubber** in the Naples Quartieri Spagnoli in collaboration with Geos Environment, one of the logistic partner of the Ecopneus network.

The pavement was completely made with recycled rubber derived from End of Life Tyres granulation. The rubber granules bound with polyurethane resin were laid and then a layer of acrylic resin was applied, to be finished with non-toxic water paints.

In this case as well, the social aspect of the initiative has to be stressed; the initiative was part of a broader project of culture promotion and professional training developed by the “the other Naples Association”, **in favour of the young of the Naples Quartieri Spagnoli**.

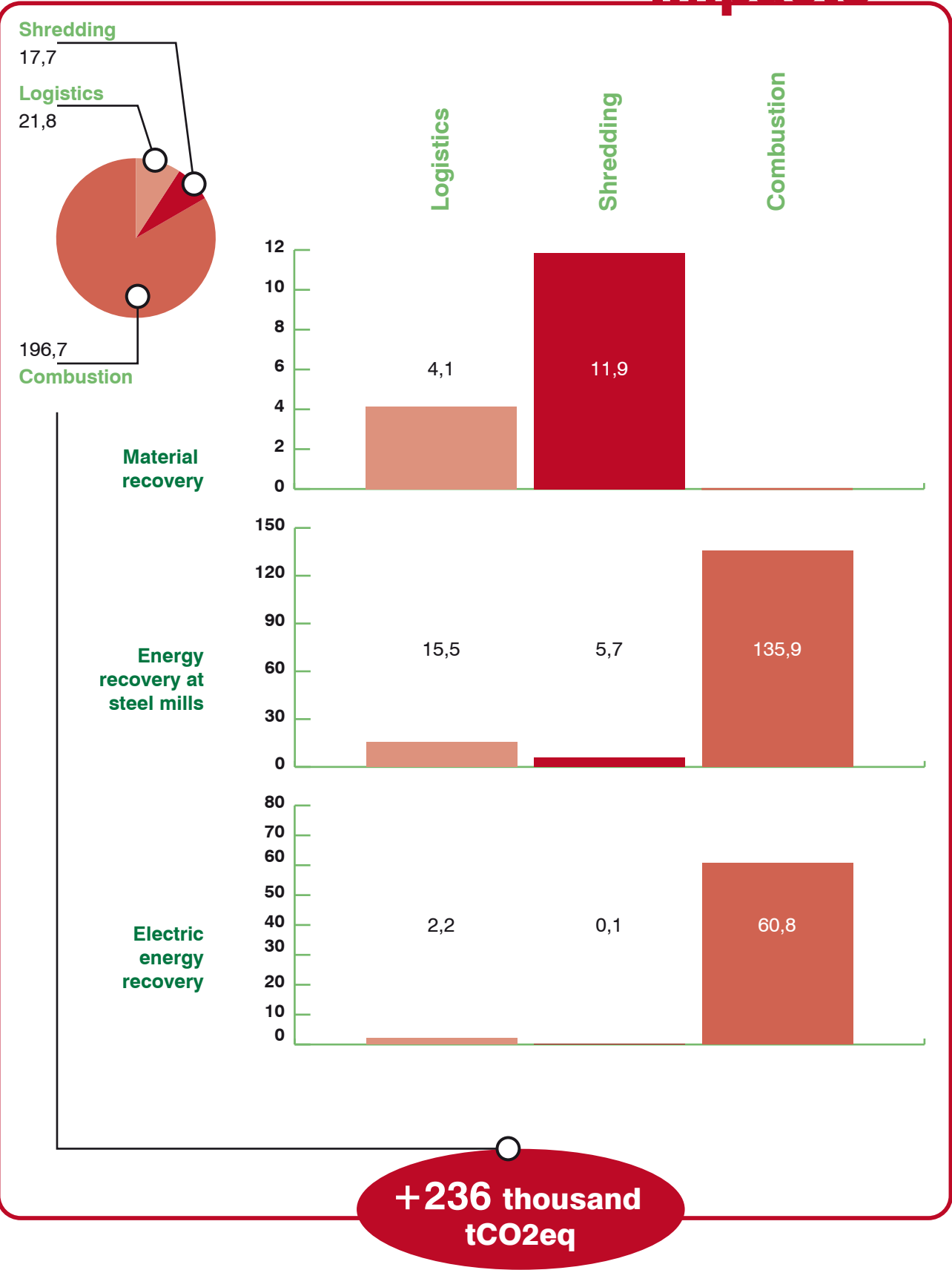


**Environmental
benefits**

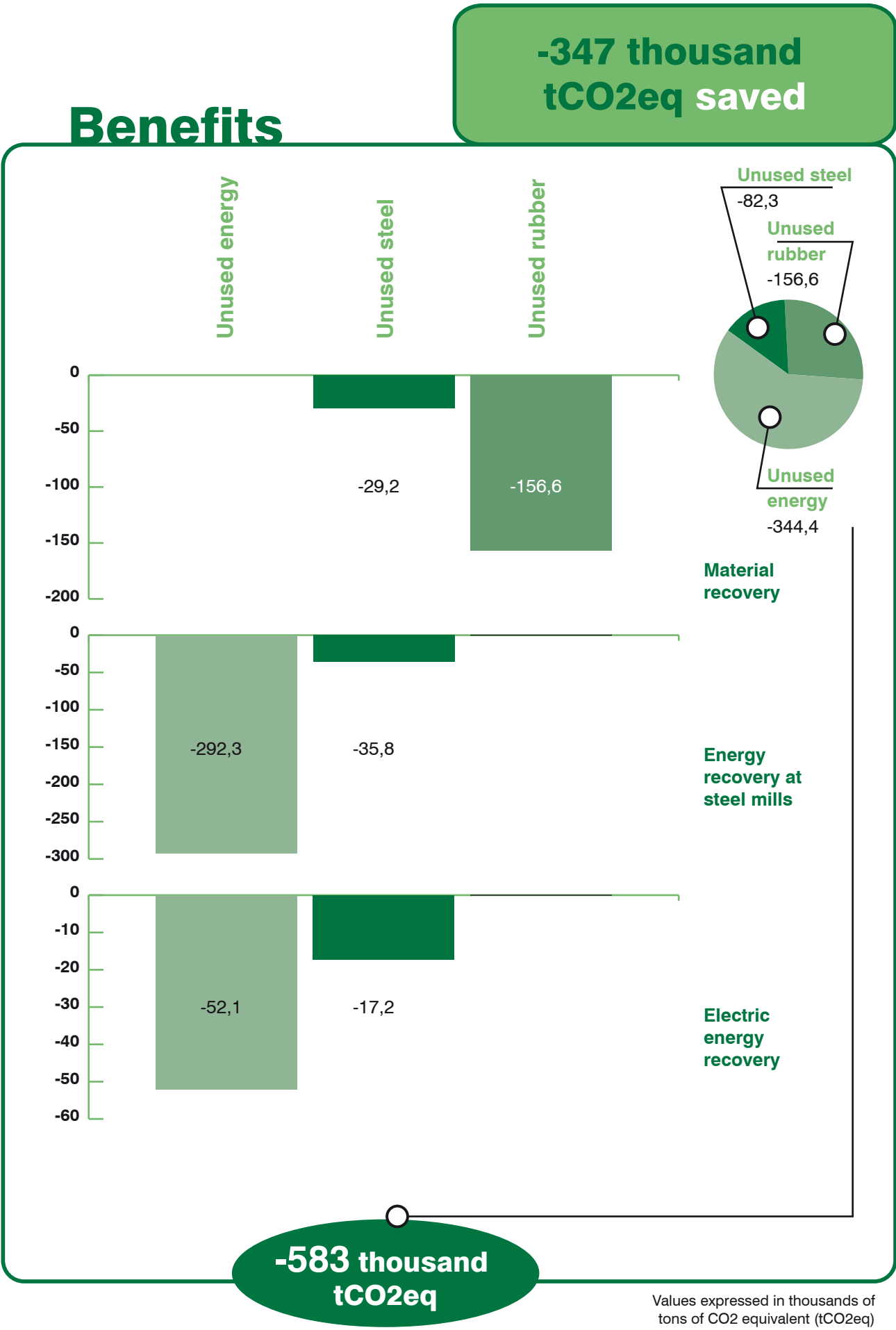
Environmental
benefits

Balance of greenhouse gas emissions

Impacts



Benefits



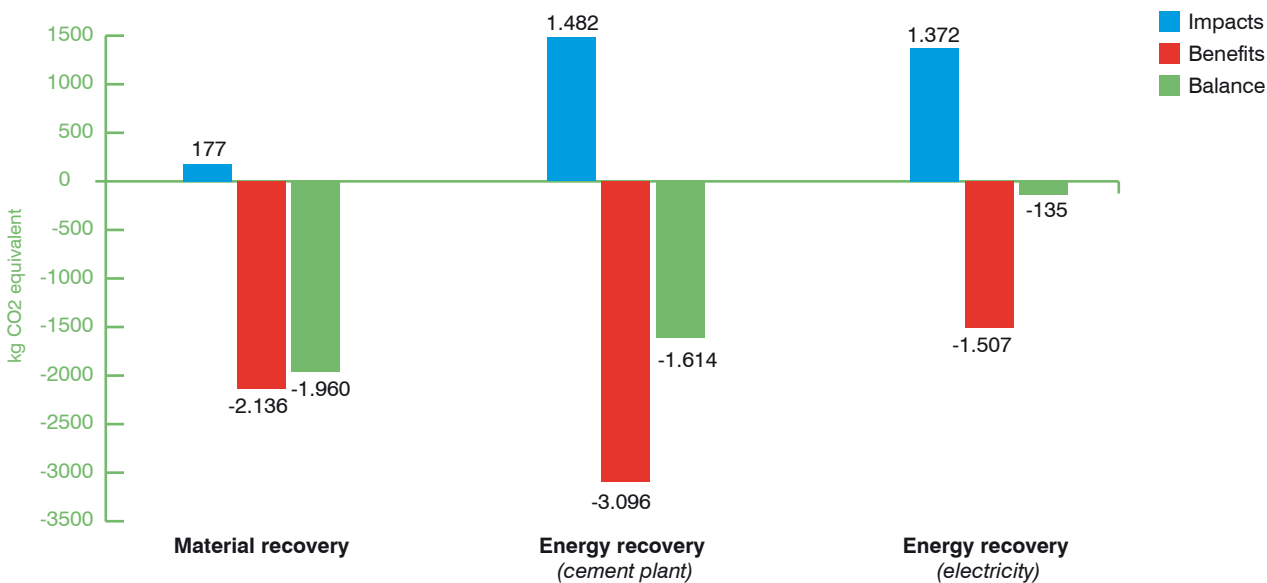
Values expressed in thousands of tons of CO2 equivalent (tCO2eq)

Reduction of greenhouse gas emissions

Note 5 - According to the latest assessment report of the Intergovernmental Panel on Climate Change (IPCC), the scientific body of the UNO Climate Convention, by 2050 it is necessary to reduce global greenhouse gas emission in the atmosphere up to 70% of the 2010 level, in order to keep global warming below the safety threshold of 2 C° of the pre-industrial period. The current international agreement about Climate states that new reduction targets should be fixed by the participating States by 2015. Such requirement will be quite relevant for Italy, as well as for all industrialised Countries showing higher per-capita emissions than the world's average.

Figure 5 - CO₂eq emissions balance and details of different ELT recovery options of the Ecopneus system (reference unit 1 ELT ton). The figure shows the detail of CO₂eq emissions balance for the three different ELT recovery options of the Ecopneus system highlighting the advantage deriving from material recovery with respect to energy recovery options: for each ELT ton sent to material recovery 1.96 tCO₂eq are avoided versus 1.62 tCO₂eq deriving from recovery in cement plants and 0.31 tCO₂eq from electric power production.

Can a correct End of Life Tyres management contribute to fight climatic changes? Maybe a connection between a commonly used object of which we take little care and the great theme of climate, may appear bizarre. Yet the link is there, because the huge greenhouse gas (GHG) emissions emitted in the atmosphere is the sum of billions of daily acts we do ignoring the need to keep together energy efficiency, economic efficiency and environmental efficiency. Such amount has now reached a level of danger for everybody. Between 2000 and 2010, global GHG emissions increased by 25% to reach 50 billion tons of CO₂ equivalents released into the atmosphere every year. If that trend continues, in a scenario business as usual, by the end of the century the average world temperature would increase well beyond the critical threshold of 2 degrees of the pre-industrial era, with even more dramatic consequences than those registered today due to the ongoing climatic changes. To avoid such trap it is necessary to apply policies integrating economic development with environmental sustainability for a low emissions economy. In such scenario, the core activities of Green economy for waste recovery and recycling, can be taken as standard for a development model based on the efficient use of energy and of resources able to determine significant emission savings in terms of products' life cycle. That is proved by the Green economy analysis carried out for the Ecopneus chain on ELT recovery.



347thousand tons of CO₂ equivalents saved by the Ecopneus recovery system

In 2013, the **benefit generated** by the management of 247 thousand ELT tons in the Ecopneus system, net of impacts determined by collection, transportation and treatment activities, was **347 thousand tons of CO₂ equivalents avoided**: a value comparable with average per-capita emissions of **50 thousand Italian citizens**.

The use of one ton of ELT recycled rubber allows to save over 90% emissions compared to the use of the same quantity of virgin rubber in mixes used for equivalent productions

Over half of such value and a **net balance of 170 thousand tCO₂eq avoided** was generated by the **recovery of 87 thousand material tons** that in itself generated benefits for over 186 thousand tCO₂eq, compared to 15 thousand tCO₂eq produced by the chain activities for ELT collection, transportation and shredding. The benefits come from rubber mix recycling as well as from the recovery of steel, considered as iron scrap in steel mills.

Alternative options of material recovery chosen by the Ecopneus system are the use of ELT, shredded or whole, as alternative fuel for cement production and for electric power production. In both cases, together with energy recovery, material recovery occurs in cement plants, thanks to co-burning in production furnaces, including steel and ashes into

Note 6 - The Global Warning Potential is measured summing up the effects of the six main greenhouse gases present in the atmosphere using as measure unit the CO₂ equivalent (CO₂eq), i.e. expressing the effect of each gas with respect to the carbon dioxide potential of affecting climate.

Green economy balance - Emissions: over 750 thousand tons of CO₂eq lower with respect to a disposal system without recovery

The figure shows Ecopneus's net balance in 2013. However, the Green economy contribution of waste recovery systems can be better assessed and understood if compared with a scenario of standard reference in which waste is disposed of without any kind of recovery. By taking as a reference virtual scenario the complete burning without recovery, ELT managed in 2013 by Ecopneus would have caused emissions of over 411 tCO₂eq. The theoretical Green economy balance for the system is equal to almost 760 thousand tCO₂eq saved, resulting by summing up absolute values of real savings (374 thousand tCO₂eq) and of theoretical emissions in case of burning without recovery (411 thousand tCO₂eq).

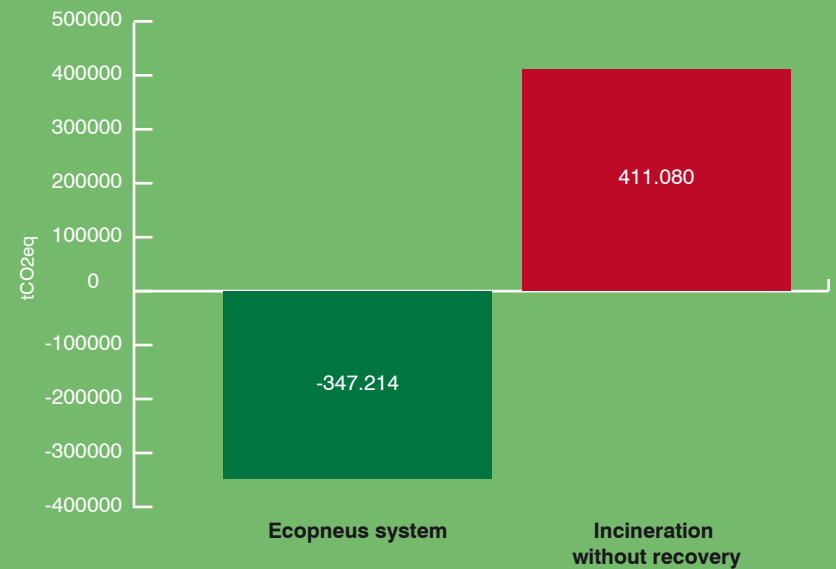


Figure 6 - Comparison between GHG emissions saved by the Ecopneus system and a treatment system by incineration without recovery.

From 2011 to 2013, the ELT recovery system managed by Ecopneus avoided emissions for a total of 841 thousand tons of CO₂ equivalents and caused a primary energy saving of about 7.5 billion kWh

the finished product; the same occurs during the recovery for electric power production thanks to the technologies adopted by plants selected by Ecopneus, which allow steel recovery from ashes and sulphur recovery from combustion smokes.

Balance details of the Green economy of the nearly 106 thousand ELT tons recovered in cement plants shows how net emissions generated by recovery (157 thousand CO₂eq tons, 87% of which coming from ELT combustion in production furnaces) are abundantly compensated for by the 328 thousand tCO₂eq avoided, mostly thanks to pet-coke substitution (a fossil fuel with high specific emissions and life cycle), determining a total net balance of **171 thousand tCO₂eq saved**.

Also **ELT energy recovery for electric power production** shows a positive balance, although lower than other recovery modalities. In fact, the emissions generated by combustion of the over 46 thousand ELT tons sent to energy recovery in the Ecopneus system are equal to 63 thousand tCO₂eq,

95% of which are due to ELT combustion in the production cycle of the thermoelectric plant. Instead, emissions avoided thanks to power production and to material recovery after combustion are 69 thousand tCO₂eq. Most of such saving is due to the substituted electric power, but a relevant share is due to steel recovery, without whose contribution the total balance, positive by about 6 thousand tCO₂eq would result otherwise negative. During ELT energy recovery for electric power production, it would be possible to obtain better results using co-generation plants, in order to allow also the recovery of that heat share deriving from ELT combustion otherwise wasted.

Note 7 - The low values obtained by the balance analysis of emissions from ELT sent to energy recovery to produce electric power suffer for the comparison with a very effective domestic energy mix, mainly due to the contribution coming from renewable energies, greatly increased in the past years.

ELT recovery for material recycling is absolutely the most advantageous option both in terms of saving greenhouse gas emissions and in terms of energy saving

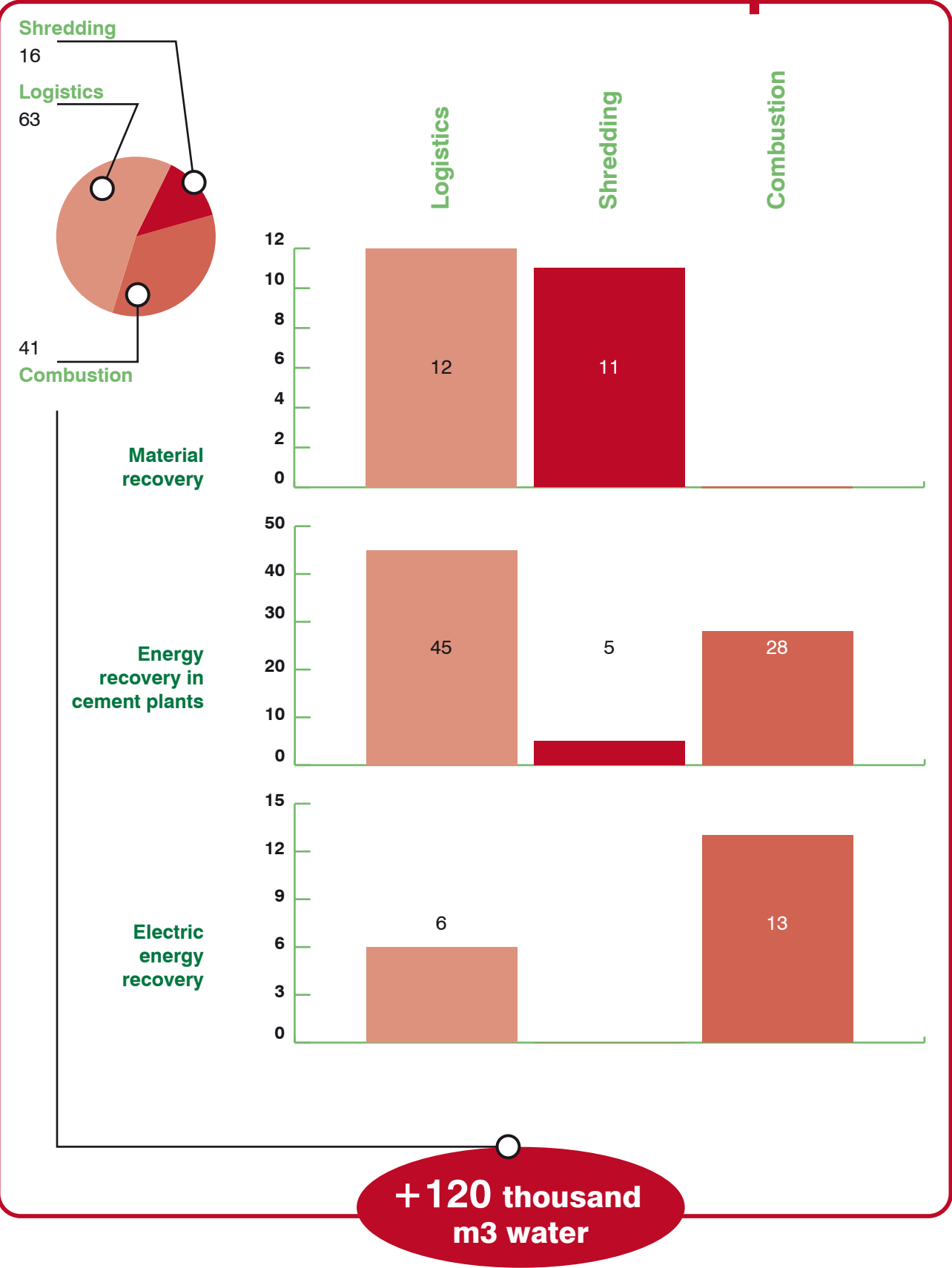
Thanks to the Ecopneus chain 3.2 billion kWh are saved

Besides the saving of GHG emissions, the ELT recovery activity organised by Ecopneus allows also considerable savings in terms of non-renewable energy. Indeed, against around 260 million kWh used for ELT collection, transportation and treatment along the chain, their recovery allowed savings of 3.4 billion kWh, mainly thanks to the avoided use of pet-coke, rubber and steel, as well as other components. Therefore, the Ecopneus system shows a positive net balance of around 3.2 billion kWh saved, equal to the average annual consumption of over 90 thousand people in Italy. 50% of such saving is attributable to material recovery, 34% to recovery in cement plants, and the remaining part to co-burning.

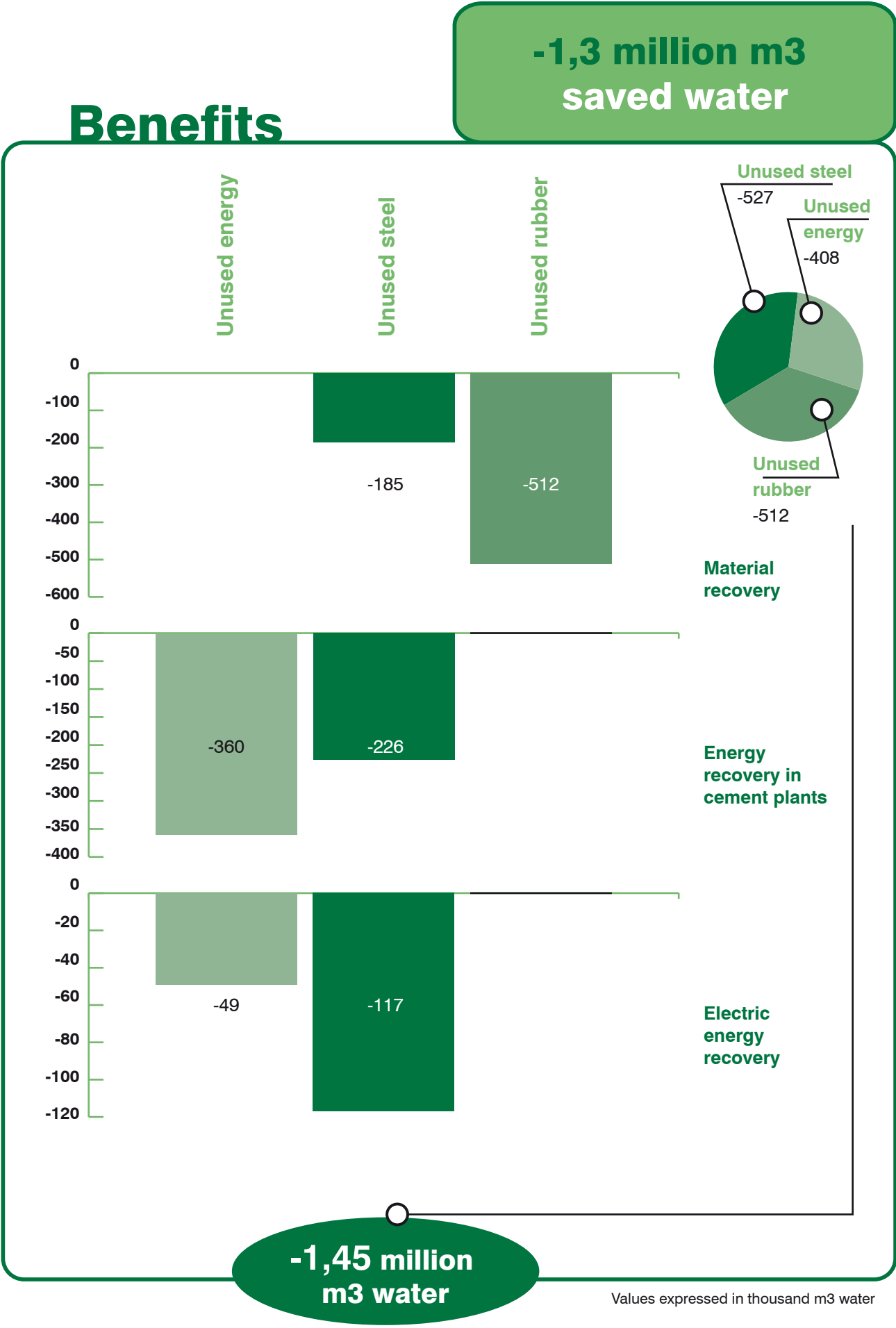
For each ELT ton sent to material recovery on average 18 thousand kWh are saved; the same ton used in cement production allows 12 thousand kWh saving; for a ton sent to electric energy recovery the saving is 6 thousand kWh.

Balance of water consumption

Impacts



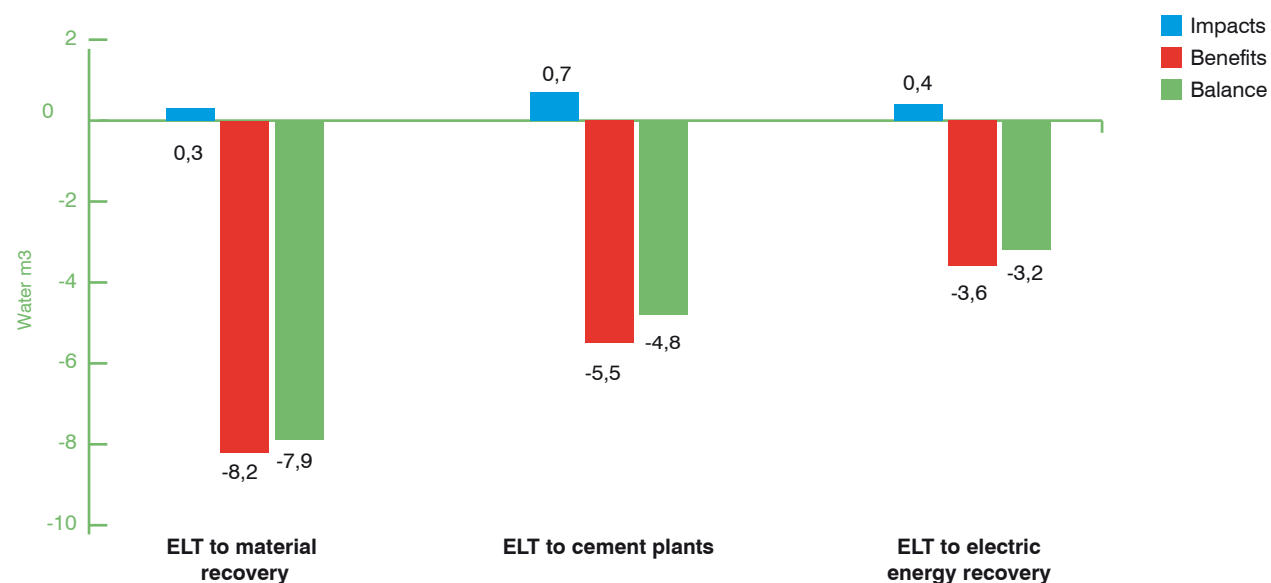
Benefits



Water saving and resources efficiency

Note 8 - Estimates about material consumption come from different studies carried out in the discipline of Material Flow Accounting. World data on the solid resources extraction are elaborated by the Sustainable Europe Research Institute (SERI): according to the latest valuations, between 1980 and 2008 resources extractions worldwide increased by 78% and, in prospect, by 2050 they could almost triple if strong efficiency policies in the resources use are not put into effect. In Italy, inside the scope of the environmental accounting project, Istat is the body monitoring material flows which feed our economy.

Figure 7 - Details and balance of water consumption for the different ELT recovery options in the Ecopneus system related to the treatment of 1 ELT ton



Most of our welfare is based on the consumption of material goods that, to be produced, require a great quantity of natural resources, which are extracted from the environment and input into a Country's production cycle. The increase in the natural resources extraction is one of the most alarming phenomena of unsustainability of the present production and consumption model: that is why it is under the attention of environmental policies at European and international level. According to reliable valuations, every year in the world the human being takes from the environment something like 70 billion tons of raw materials (solid): Italy requires about 900 million tons. Material recovery in the area of waste management represents an activity moving toward the circular economy, i.e. a system able to support itself by recycling materials in themselves, thus progressively reducing virgin raw material extractions from the environment. Of course there are many different kinds of resources and it is not easy to find a single accounting system common to all, measuring their consumption impacts. As far as the 2013 Green economy report is concerned, Ecopneus decided to focus **on the impacts of water consumption, water being a particularly critical resource** due to the risk of over-exploitation. A well-known problem also in Italy, that with over 40 billion m3 of annual m3 water extractions, results to be one of the Countries with the highest per-capita consumption worldwide.

1,3 million m3 water saved by ELT recovery

In 2013, all the activities connected with ELT collection and recovery in the Ecopneus system allowed a significant reduction in the use of water resources: against a consumption, direct and indirect, of about 120 thousand m3 **by the recovery chain, a water saving induced by material and energy recovery was estimated** to be equal to 1.45 million m3, with a total balance of 1.33 million m3 of non-used water. The major contribution comes once again from **material recovery**: the 87 thousand ELT recovered tons generated in 2013 water savings close to 700 thousand m3, about half the total benefit guaranteed by the Ecopneus system. That is water that would have been used to produce virgin rubber, steel and other tyre components. In detail, 73% of total benefits of such type of recovery comes from rubber mix recycling and 30% is due to steel and textile fibres recovery as fuel. As for the **106 thousand ELT tons sent to cement plant**, the net benefit in terms of water consumptions reduction is about 505 thousand m3. It is calculated as a **balance between the chain consumptions** (energy and resources use) necessary for ELT collection, transportation and transformation (80 thousand m3 water used, of which 53% is linked to logistics) and the saving of 585 thousand m3 water mainly due to the missed extraction and production of fuels and iron minerals. In particular, to substitute iron oxides for ELT steel over 220 thousand m3 water are avoided in the production process from extraction to mineral transformation. Eventually, the **46 thousand ELT tons sent to energy recovery for electric power production** allowed the saving of about 146 thousand m3 water: 100 thousand m3 avoided extractions for steel recovery and the remaining share for non-used electric power. Also in such case, as well as for GHG emissions, energy recovery without material recovery shows an aligned balance.

It would be possible to irrigate about 50 thousand hectares of agricultural soil to produce over 300 thousand wheat tons with the water saved by the Ecopneus system in 2013

Note 9 - The water m3 indicator, whose results are shown here following, is based on the methodology of the life cycle Analysis and thus includes direct as well as indirect consumptions, for example connected to the extraction or the processing of a specific raw material. In the specific case, the approach recommended by the European and international main standards was adopted, but excluding the component connected to the consumption for hydroelectric power production, for in that case water is returned to the environment. To be thorough, the above mentioned consumption shows very high values with respect to other consumption typologies, which would increase the benefit of the Ecopneus system to over 380 million m3 water saved only in 2013.

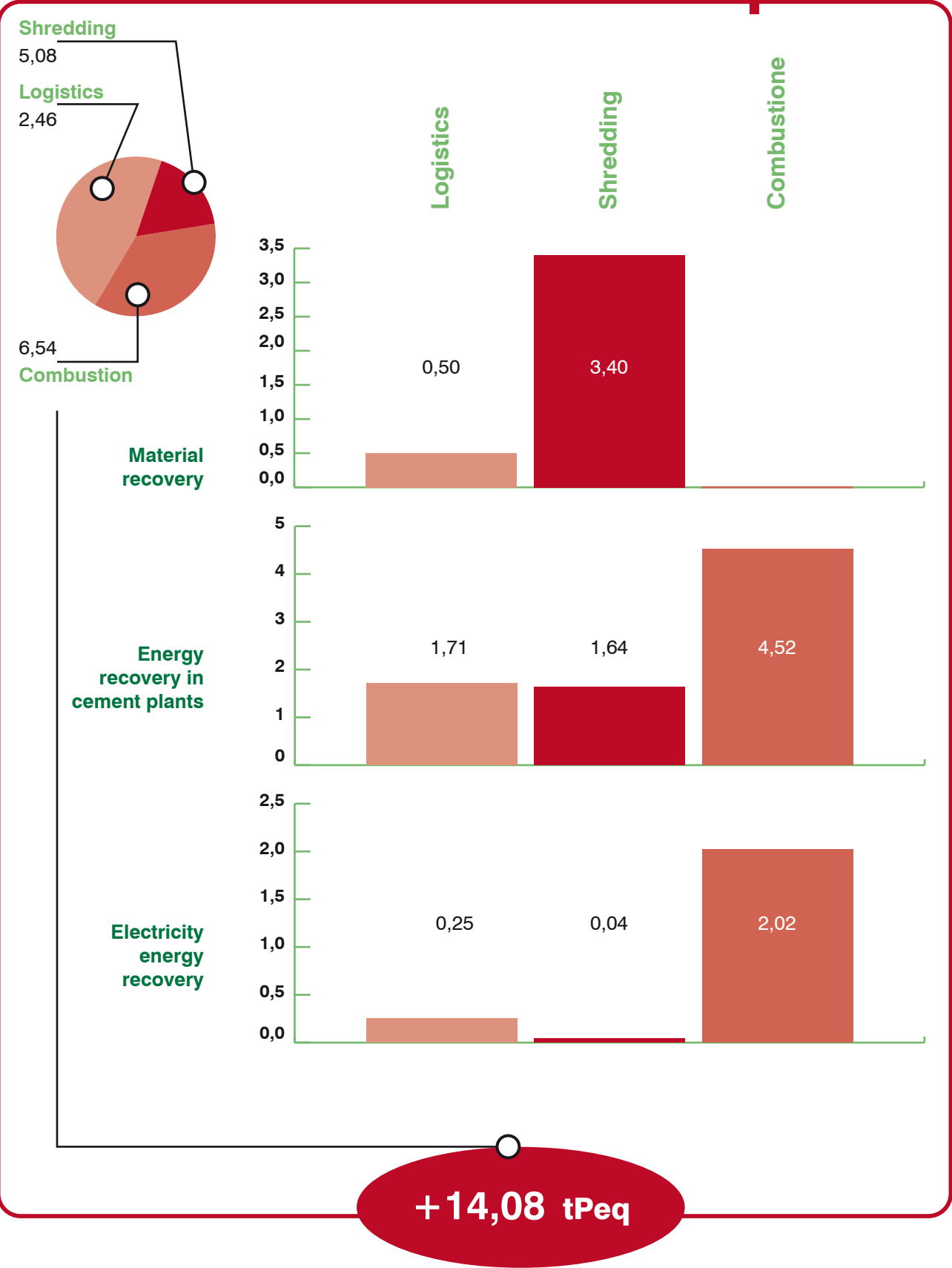
Equivalent antimony consumption: an innovative method to measure efficiency in the use of resources

Measuring resources consumption by an organisation (or a Company, a State, etc.) is not a simple task. Recently, in the life cycle analysis field, a new methodology has been introduced to measure the consumption of non-biologic raw materials based on Antimony equivalents (SbEq). As happens with CO2 equivalents, which allow to sum up the global warming potentials of different gases in a single indicator, the SbEq express the weighted sum of the environmental impact generated by the consumption of many different materials. That is then a matter of a technically effective system to better represent the impact of resources extraction resulting from human activities, though not immediately perceived.

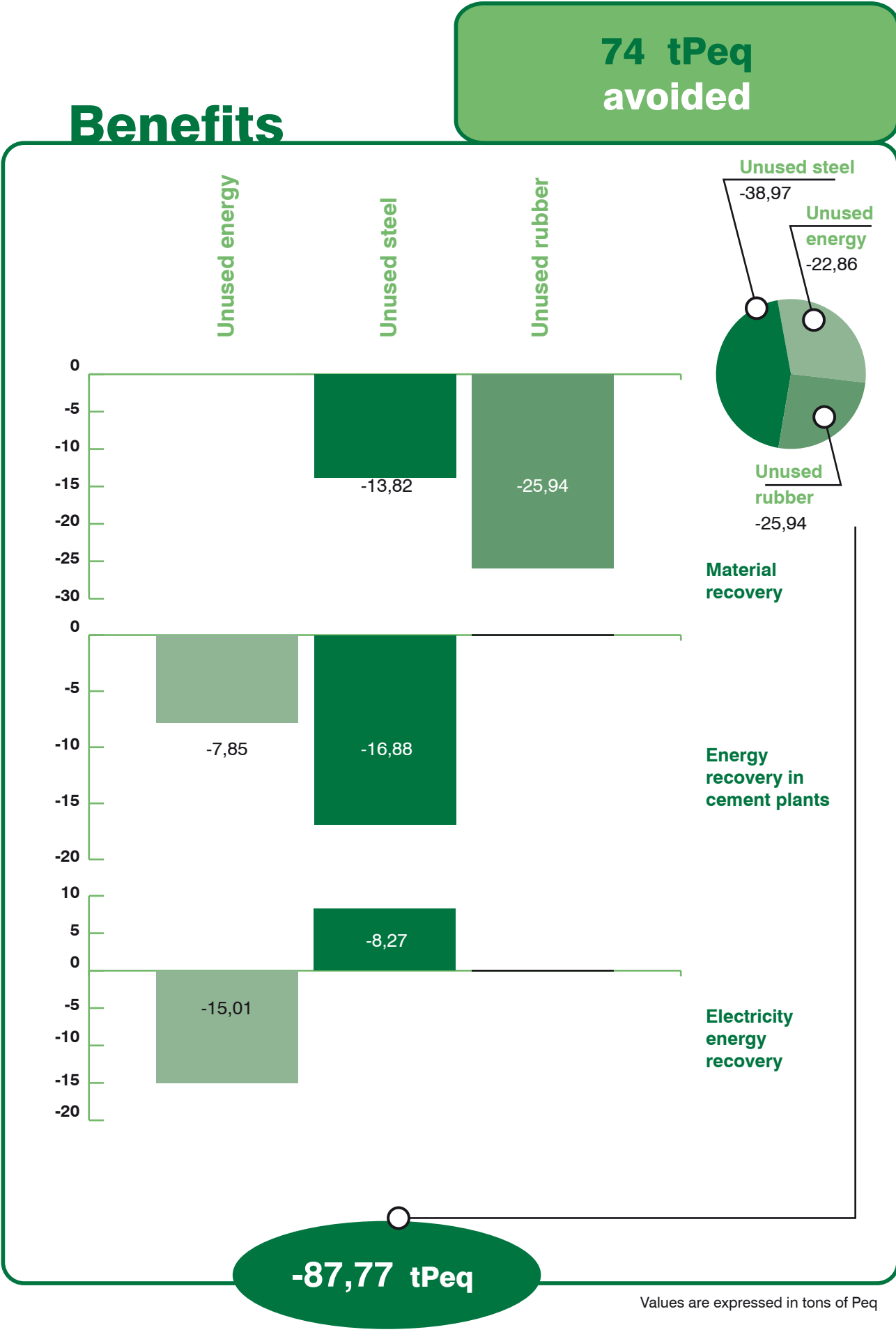
Beside the life cycle analyses carried out on water, a further simulation was carried out to measure the impacts of the Ecopneus system with respect to the extraction of abiotic natural resources. The 2013 balance is positive and indicated a generated saving of **over 5 thousand tons of SbEq**. Also such approach confirms the best performances of material recovery with reference to other treatment forms: each ELT ton sent to recovery allows savings in the range of 30 kg of SbEq, against 20 kg if sent to a cement plant and 10 kg in electric power recovery.

Balance of the water ecosystem alteration

Impacts



Benefits



Values are expressed in tons of Peq

Safeguard of biodiversity and ecosystemic services

In organising their economic activities, human beings avail themselves of a series of services freely supplied by nature. They are called *ecosystemic services* and the list is long. It includes soil composition, availability of pure drinkable water, climate regulation, pollination, agricultural infestation control, nutrients' cycle, raw materials and fuels availability, the balancing effect of nature from a psychological point of view. But the regeneration capability once guaranteed by such services has strongly diminished, especially in some areas of the planet, due to the organisation of an unsustainable production system.

To measure the vitality of ecosystems we have an important indicator at our disposal: biodiversity. An indicator which is often in the red because the planet's genetic richness, a key point in any sustainability strategy, undergoes strong pressures with serious risk of decline. Europe and the world's community have long been committed to policies to support biodiversity, aiming to stop its decline starting from 2015. Green economy contribution to reach such goal is vital to guarantee future well-being and social prosperity.

Up to now, there are no single approaches representative enough to allow an exhaustive assessment of the health status of biodiversity inside an ecosystem, as well as of the risk determined by pressures generated by human activities. Nevertheless the identification of a set of indicators to measure the progressions – or regressions – of biodiversity safeguard policies is today a target which Europe and the international community are intensively working on. The results accomplished so far make it possible for us to choose among those *Life Cycle Assessment* indicators the ones which better reflect the impacts determined by the activities analysed.

In the Ecopneus Green economy Report 2013 it was decided to offer an interpretation of the Ecopneus system sustainability also from a biodiversity safeguard standpoint, through the study of the ELT chain impacts on **three** life cycle **indicators**:

- pollution caused by nutrients of water systems;
- endangered species due to changes in the use of soil;
- emission of toxic substances in the environment.

Such choice is connected to the type of ELT generation activities (collection, transportation, transformation) and their related impacts, as well as to the life cycle of the raw materials forming an ELT (synthetic and natural rubber, steel, various polymers) which, by avoiding their extraction and transformation determines a benefit in terms

of: quality of water, use of soil, release of toxic substances. We deemed important to analyse such aspect inside a sustainability report, although being aware of the difficulties in the interpretation of some data and of the necessity to proceed the study of such important topic in the next Report's editions.

Water systems pollution due to nutrients

The presence of nutrient substances in water ecosystems is a fundamental requisite for their functioning. However, if such quantities increase, and the pollution generated by many human activities goes in this direction, there may happen phenomena of explosions of algae concentrations or reduction of oxygen dissolved in water which may lead to a rapid ecosystem's degradation, with the loss of biodiversity. Such particular kind of pollution is called eutrophication and is characterised by negative direct impacts on the biodiversity of water systems: among the main causes there are agricultural fertilizers and civil or industrial discharges of wastewaters. The indicator proposed to measure the impacts in terms of nutrients enrichment is expressed in *kg of equivalent phosphorus* (kgPeq).

According to the analyses carried out, the recovery of the 247 thousand ELT tons on the Ecopneus system in 2013 prevented 74 tons of Peq from entering the environment. Such number is obtained by subtracting the impacts resulting from the chain activities (logistics, shredding and combustion equal to 14 tPeq) from benefits produced by energy and material recovery (88 tPeq). Also in such case material recycling offers the main benefit along the analysed life cycle, though in competition with the net benefit deriving from the energy recovery for electric power production, that in case of one ELT ton is comparable to the benefit derived from the same quantity sent to material recycling. The recovery for cement production shows the poorest performances. However, that being a preliminary analysis about the chain, further studies will be necessary to confirm the coherence and reliability of the presented results.

Species endangered by the changes in the use of soil

The indicator measures the impact produced by a certain activity in terms of occupation and transformation in the use of soil, such as in the case of minerals extraction or of development in logistic infrastructures. Such impact translates into the number of species endangered by the territory transformation. That is a relatively new and complex indicator in its composition that nevertheless gives a direct indication in terms of lost biodiversity. With reference to land ecosystems, the indicator can be considered complementary to the one related to nutrients pollution in water environments.

The analysis carried out by Ecopneus using such indicator shows how in 2013 ELT recovery and recycling avoided the extinction of 1,57 species/year. Such result is determined by the balance between the impact on biodiversity generated during the transportation and treatment phases (responsible for the loss of 0,65 species/year) and the benefits deriving from recovery activities (which avoided the extinction of 2,2 species/year). Different factors affect such result: on the impacts side the main one is that related to ELT transportation (which alone is responsible for over three quarters of total damages); on the benefits side, material recovery gives the most important contribution, followed by the recovery in cement plants and by the energy recovery for electric power production.

Looking at the specific performances of each treatment typology investigated, the results of the previous indicator (eutrophication) coincide: indeed, also in this case electric energy recovery shows an advantage with respect to ELT recovery in cement plants.

Note 10 - Various components of phosphorus (P) and nitrogen (N) used in agriculture as fertilizers, as well as many products for domestic use, are the main nutrients able to activate eutrophication processer. The indicator of kg of Peq shows the compounded sum of the potentiality of eutrophication of water ecosystem derived from such compounds.

Material recovery remains the treatment option with the highest benefits.

Release of substances toxic for the environment

The last indicator tested on the Ecopneus system concerns the release into the environment of eco-toxic substances, i.e. able to damage single species and thus to modify the structure and the functioning of the same ecosystems. The impact is expressed by means of a measurement unit called *CTUe* (*Comparative Toxic Unit for ecosystems*), which assesses the effects caused by such substances on the animal and vegetable species of a defined ecosystem. The indicator is promoted by the United Nations' Environment Programme.

The analysis through such indicator, developed on the Ecopneus system, assessed a net benefit of 1,2 million avoided *CTUe* in 2013. 65% of such benefit comes from material recovery, followed by the supply to cement plants, while electric energy recovery shows a marginal contribution. Differently from the two previous indicators, the *CTUe* analysis is connected with the different ELT recovery modalities in line with those calculated for GHG emissions and of water extraction: one ELT ton sent to material recovery allows to avoid 3,8 *CTUe*, while electric energy recovery returns a benefit lower by nearly one degree.

Note 11 - The Comparative Toxic Unit ecosystems are the parameter through which toxic contributions are integrated for ecosystem of different chemical substances released into the environment. The algorithm is based on the compounded measure of the potential environmental damage produced by each substance. A similar indicator measuring human toxicity is also in use.

Biodiversity safeguard by comparison in the Ecopneus system

In the figure below, the performances of the different systems of ELT treatment are compared in the Ecopneus system and are measured by three indicators selected for the biodiversity topic. In order to compare different indicators a process of normalisation was necessary: taking -1 as the total benefit of material recovery and re-calculating the other values with reference to it.

Differently from the survey results for GHG emissions and water consumption, the results offered by the biodiversity analysis are more diversified. Material recovery is always the best option, except for the indicator on nutrient pollution, in which case, though slightly, energy recovery for electric power production seems to be more advantageous, showing in fact a benefit a little higher than -1,1. On the contrary, as far as the indicator of toxic substances is concerned, electric energy recovery shows a benefit by one degree lower than that of material recovery.

Regarding the comparison between the benefits from material recovery and recovery in cement plants, found differences are similar in the three indicators: sending a certain ELT quantity to cement plant rather than to material recovery the generated environmental benefit is halved.

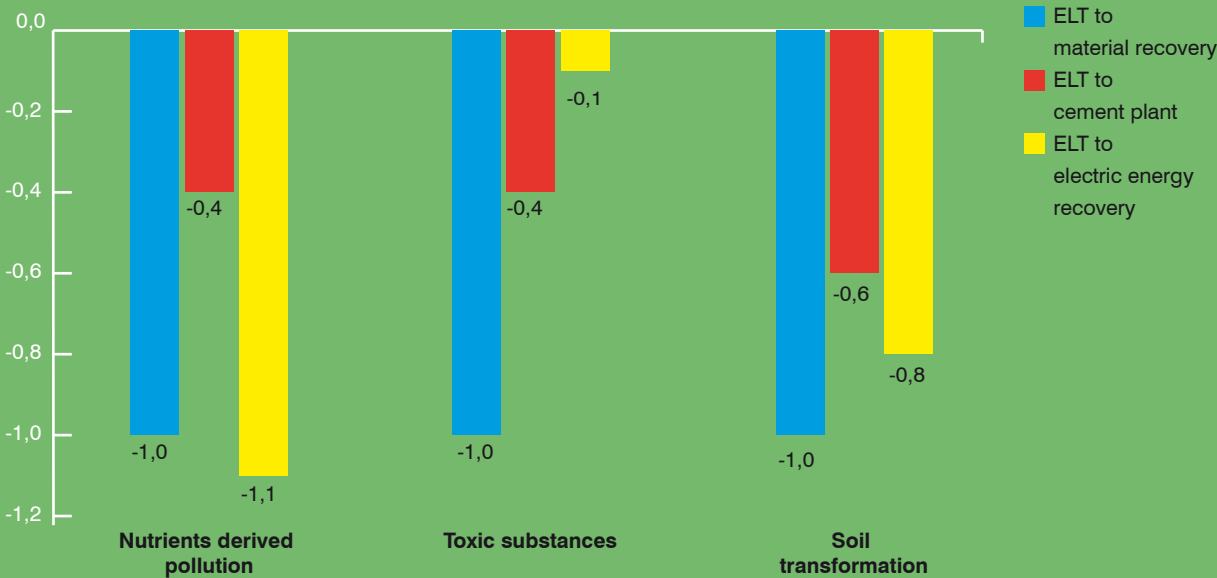
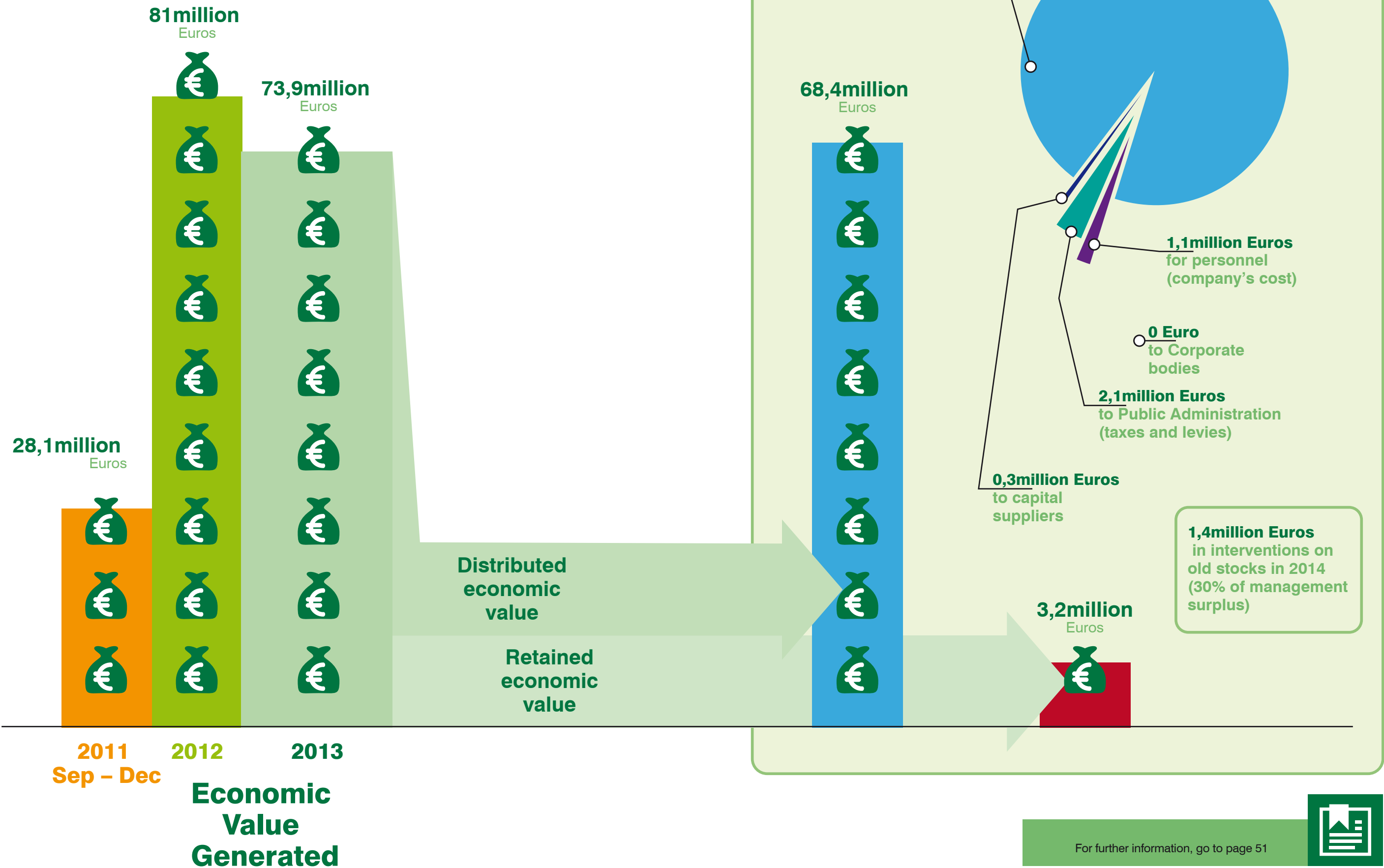


Figure 8 - Comparison between biodiversity benefits deriving from ELT sent to cement plants and electric power recovery and ELT sent to material recovery.



**Benefits for the
community**

Distribution of the economic value along the chain



The ELT recovery value

Over 110 million
of saved raw
material

The material and energy recovery matter no longer has only an environmental and ethical relevance, but it represents a key element for policies of economic revival. Such awareness has already reached also the most relevant international economic contexts. For example, during the World Economic Forum held in 2014 in Davos, the report "Towards a Circular Economy" was presented, in which it is stated that «Linear consumption is reaching its limits. The past 50 years of industrial evolution have been ruled by a one-way or linear model of production and consumption, where goods are produced with raw materials, sold, used, and then thrown away or burned as waste. Against the increasing instability causing cuts on the entire global economy and against the proliferation of signals of resources exhaustion, the demand for a new economic model is strongly increasing. The search for a substantial improvement of resources efficiency in all the economic fields has drawn business to explore new ways to reuse products and their components and to better recover their precious materials».

Suitable remarks for a Country like Italy, where energy imports represent a cost comparable to that of public debt and where imports of raw material weigh heavily on balance in some sectors. In such context, i.e. in an economy strongly depending on raw materials imports, the core activities of Green economy acquire strategic importance. The management of waste turned out into resources, allows the Country to keep an important part of the produced richness inside itself without losing it on an excessive import of raw materials. As far as End of Life Tyres are concerned, such economic saving can be evaluated with reference to quantities of ELT recovered as secondary raw material, replacing for example virgin rubber in mixes, pet-coke as fuel, iron minerals as binder in cement production or iron scraps, depending on the type of recovery made.

With reference to the average market prices of these four commodities, in 2013 **the economic saving generated by the Ecopneus system in terms of avoided raw materials import is about 110 million Euros. The 82% of which is due to ELT rubber recycling**, to further confirm how this kind of recovery offers the best advantages for the community, also from an economic point of view.

In order to have a complete picture of the value of ELT recovery of the Ecopneus system for Green economy, to such important results must be added the results connected to the economic value generated by the environmental fees collected by the consortium under the extended producer responsibility and used to finance recovery activities, as well as other activities aiming at promoting the rubber recycling market.

74 million Euros produced by environmental fees

Over 90% of the nearly **74 million Euros of economic value generated** by the fees collected by Ecopneus in 2013 were **distributed to the system's stakeholders for a total sum of 66,2 million Euros**. 86% was absorbed by the **chain operations management costs, a total of 62,629.658 M€** with an average management performance of 230 € for each recovered ELT ton.

68,4 million Euros to stakeholders

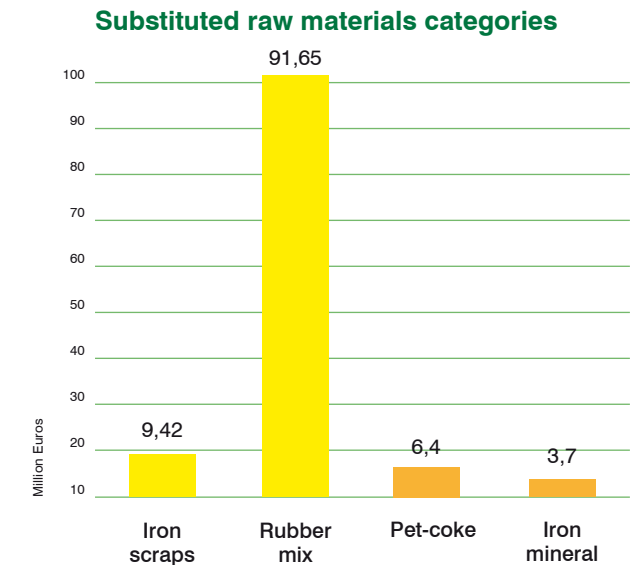
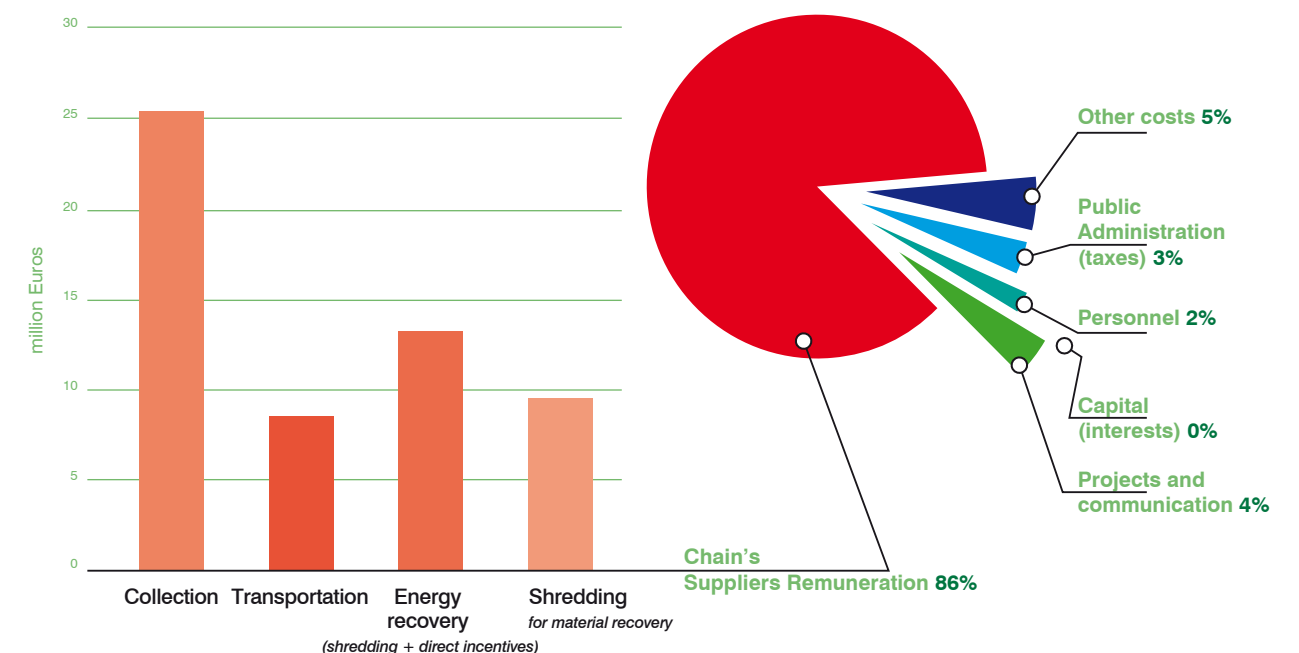


Figure 9 - Elaboration made on average prices registered in 2013 for: iron scraps, virgin rubber, pet-coke, iron mineral (sources: Eurofer, Indexmundi).

The share of **costs born for the remuneration of the companies involved in collection and storage activities sums up to 25.4 million Euros**. The share related to **costs of transportation from collection centres to shredding and energy recovery centres sums up to 8.5 million Euros**, 7,3 M€ of which for transportation on wheels (95% in Italy and 5% abroad) and 1,2 M€ for transportation by vessels, for ELT delivery as fuel to foreign cement plants. **The costs born by Ecopneus for ELT shredding suitable for recovery** and the remuneration of the activities carried out by the network companies sum up to **18,1 million Euros. For ELT recovery in rubber granules and powder**, costs sum up to **9,6 million Euros**, 97% of which was given to companies working in Italy and 3% to foreign companies. In terms of efficiency, the average contribution by Ecopneus for the production of **one granule ton** in Italy was around 150 €/ton, in comparison to 50 €/ton abroad (mainly Germany). The difference is due to various reasons, among which are

9,6 million Euros for shredding to 97% of companies in Italy

Figure 10 - Economic value subdivision of recovery activities in the Ecopneus system in 2013..



250 thousand Euros for applicative sectors' development, chain qualification, consumers' information, environmental education and associative participation

Note 12 - A 10% share is used for costs for subscription and participation in activities promoted by non-profit institutions constituting further spheres of discussion, confrontation, research about environmental sustainability in our Country. Among those bodies there are Symbola, the Italian Qualities Foundation - and the same Sustainable Development Foundation, which promoted the National Council of Green economy in Italy.

energy cost, granulation plants economies of scale, marginal Italian quantities to some plants and, above all, the value acknowledged to recycled rubber by the end market of North-European companies. Such dynamics, once started in Italy as well would allow a consistent reduction of the system's total costs.

End of life Tyres collected by Ecopneus and not absorbed by the material recycling market are directed to energy recovery inside a market dynamics that require fee payment to plants authorised to receive them. That happens because ELT sent to energy recovery keep their classification of special waste and as such they are negotiated by the alternative market, although they are actually alternative fuel and substitutive for other fuels. In this case as well, a regulatory intervention by institutional stakeholders is highly desirable in order to allow the system to exploit the ELT value from a point of view of reduction

of the environmental fees paid by consumers.

Net of transportation costs, the amount spent by Ecopneus for ELT **energy recovery is 13,2 million Euros**, of which 8,4 million of which are shredding costs for shreds and chips **completely carried out at the chain's companies in Italy**.

1,8 million in projects to support ELT recycling

The consolidation of ELT rubber recycling market and of the quality of recycled rubber along the *Italian* treatment chain, are the two main critical factors for reaching an economic balance of the national ELT management system with the minimum possible need of environmental fees. In 2013 Ecopneus dedicated to such scope **70% of the 2,6 million budget for the development of their application and for the communication**, for projects addressed to transparency, to consumers' information, to new generations' education, to develop applicative sectors and applications, and to qualify the industrial chain. Among the main **projects to support the recycling chain** it's worth

mentioning: the development of the **Ecopneus quality label** for rubber granule and powder produced by the system; the financing of part of the **international market analysis of recycled rubber** commissioned to an Italian consulting company; the **2013 Open Plants** initiative, as well as the various communication activities to support the recycling chain.

To support the development and the consolidation of the ELT market in Italy, the

approach by project management and by communication chosen by Ecopneus is articulated on various interdependent aspects, among which there are:

- **The publicity**, with the **portal dedicated to ELT recycled rubber products**

and the **advertising campaigns** to promote recycling in specific applications on specialised and general newspapers.

- **The wide participation** in order to involve specific stakeholders and local communities, **promoting** the realisation of road and highway sectors using **modified asphalts**, as well as the realisation of public **sports facilities**.
- **The technical-scientific aspect** aimed at verifying safety in terms of health and of environmental and performance benefits deriving from the use of ELT recycled rubber in all proposed applications (promoted through the publication of thematic **Technical Booklets**).
- The **institutional aspect** aimed at involving institutional, entrepreneurial and associative stakeholders in the solution of regulatory, economic or cultural criticalities.

300 thousand Euros spent on research and development to support quality and safety of ELT recycled rubber in modified asphalts

Table 3 - Profit and loss account, according to generated economic Value, distributed and retained by Ecopneus in the three year period from September 2011 to 2013 (standard GRI-G4)

	2013	2012	2011
Generated economic value	73.932.878	81.013.015	28.121.192
Earnings from environmental fees	73.823.842	80.995.047	28.120.943
Other earnings	109.036	17.968	249
Distributed economic value	68.379.805	77.520.382	24.798.102
to Suppliers	64.827.841	74.913.692	22.676.617
among which chain's Suppliers	58.991.901	70.748.891	19.911.144
among which other Suppliers	5.835.940	4.164.801	2.765.473
to Personnel (company's cost)	1.090.541	963.720	811.877
to corporate Bodies	0	0	0
to PA (taxes and levies)	2.143.966	1.266.446	1.216.997
to capital suppliers	317.457	376.524	92.611
Management surplus	4.640.483	2.652.826	2.532.079
30% of management surplus for old stock interventions (art. 3, clause 5 M.D. 82/2011)	1.392.145	795.848	759.624
Retained Economic Value	3.248.338	1.856.978	1.772.455

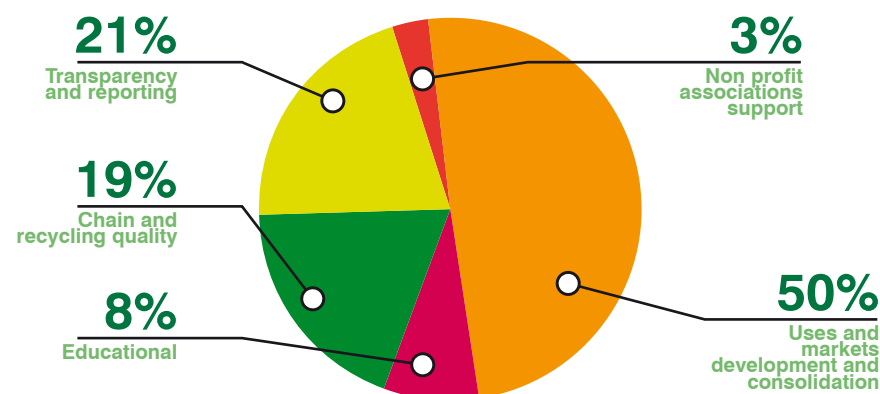
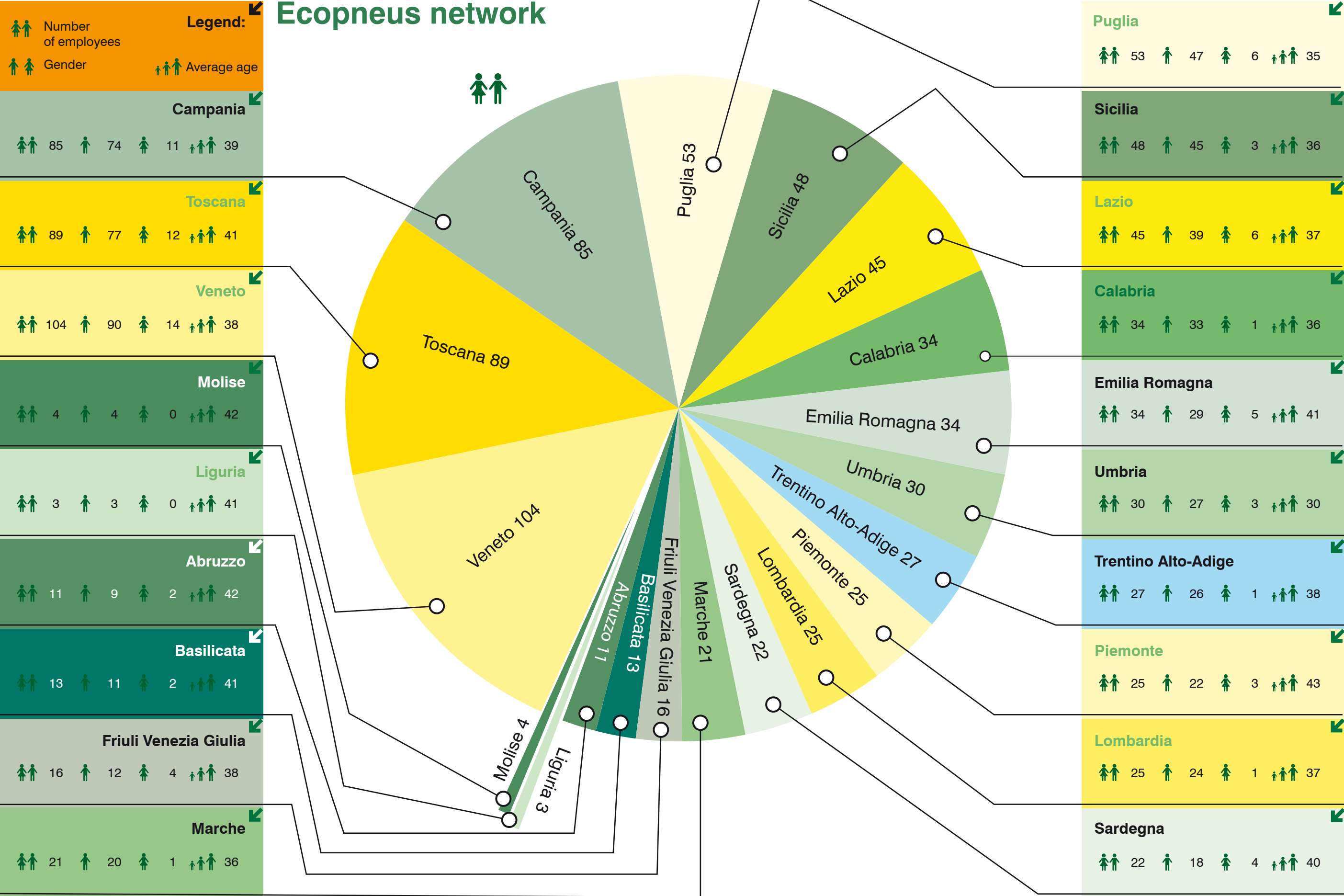


Figure 11 - % subdivision of expense supported by Ecopneus for activities such as transparency, accounting, information, education, applications development and chain's quality in 2013

The 689 authorised personnel of the Ecopneus network



Employment and social identity

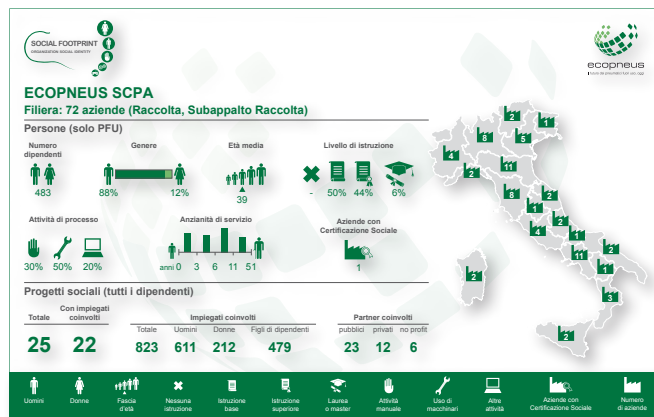


Figure 12 - Social Footprint: summary of the 72 collection companies (Elaboration: Capellini design and consulting for Ecopneus).

Note 13 - On April 15th, 2014 the European Parliament adopted the Directive proposal of the Commission on the disclosure of non-financial information for large companies and groups which, starting April 2017, will be bound to transparency on information related both to impacts and performances of environmental and social sustainability and to respect of human rights and working conditions. Such measure was announced in April 2011 in the Single Market Act and in the Communication “A renovated strategy 2011- 2014 for the Corporate Social Responsibility” published in October 2011. On February 6th, 2013 the European Parliament adopted on two resolutions (“Corporate Social Responsibility: accountable, transparent and responsible business behaviour and sustainable growth” and “Corporate Social Responsibility: promoting society’s interests and a route to sustainable and inclusive recovery”), recognising the importance of business transparency in those fields.

Identifying “who” and not only “what” is behind a product or service means giving a social-ethical value to the same product, involving consumers in a further step toward a conscious consumption. With this philosophy in mind, the Ministry of the Environment, within the Italian Programme to assess the Environmental Footprint, promotes the Social Footprint certification in Italy: a voluntary certification for companies and bodies willing to communicate transparently to the market, the social and ethical identity of their products and services.

To this end Ecopneus, one of the first companies in Europe, has promoted the Social Footprint for

companies adopting the consortium scheme, thus contributing to reassess the ELT value in the domestic Green economy and on the market, through the social identity of those companies of the system, recovering and recycling them: another strategic tile to system’s sustainability.

The project is part of an agreement between Ecopneus and the Ministry of the Environment and was carried out in collaboration with Capellini Design & Consulting, a company specialised in the promotion of sustainable products, contributing since 2011 to the development of the Social Footprint methodological standard in MATTM programmes.

The survey carried out by Ecopneus relates to Italian companies active in its system (excluding long distance transportations) up to a total of 89 companies, 40 of which are direct suppliers for collection and treatment services. The remaining part, instead, refers to the sub-suppliers supporting the collection service. Data were obtained by means of questionnaires and direct contacts with the involved companies.

It is to be noted that the quantity of data collected through the Social Footprint surveys, together with other economic and environmental information, allows a series of very important assessments to better understand the reality of the supply chain: a key step also in the light of the new European Directive about the **non-financial disclosure** of large size multinational companies.

689 employed in the Ecopneus ELT management

Overall, the companies involved by Ecopneus in ELT management employ 4,526 people. 689 full-time equivalents are employed totally in multiple activities connected to ELT recovery: these are **the dimensions of a big Italian company**. At national level, the employees’ average age is 38 years with a majority of men (89%) in comparison to women: non-surprising data, considering how specific are the activities carried out, being typically controlled by male manpower (82% of employees carries out activities such as manual or mechanical handling of collected ELT). Over half of employees have an average seniority between 3 and 10 years, versus 29% with a seniority of less than 2 years and 16% with over 11 years of seniority. 53% of the total has higher or university education.

ELT management represents a core business for 22% of the chain companies. More than half of such companies are shredding companies producing also granules and powder for recycling rubber. Companies are mainly distributed in the Centre and the South, with an average dimension of 11 employees. These data confirm the adaptability of the Italian production system to the needs in terms of flexibility of the activities of Green economy, even though showing the limited space of manoeuvre to reach a sustainable balance of the system, exploiting possible economies of scale in production.

But the value of the social identity of the Ecopneus system – as shown in the Social Footprint – is also linked to the strategies implemented by companies to create well-being for their employees and for the community. Among the different projects promoted by the companies – which in the course of time directly involved over 1,300 people between employees and relatives, as well as an undetermined but surely relevant number of other stakeholders – we find new ventures to be valued and recorded as a further contribution to the system’s sustainability. For example: support to fight school abandonment in poor areas; promotion of environment safeguard through awareness campaigns for spreading waste recycling or for alternative energies; sponsorships of events or sports and recreational activities; free donations to local schools and hospitals; promotion of local cultures and of food productions deriving from zero km local markets; financial support to international projects of cooperation toward development.

Figure 13 - Social Footprint: summary of the 17 Ecopneus’s system companies, involved in the material recovery.

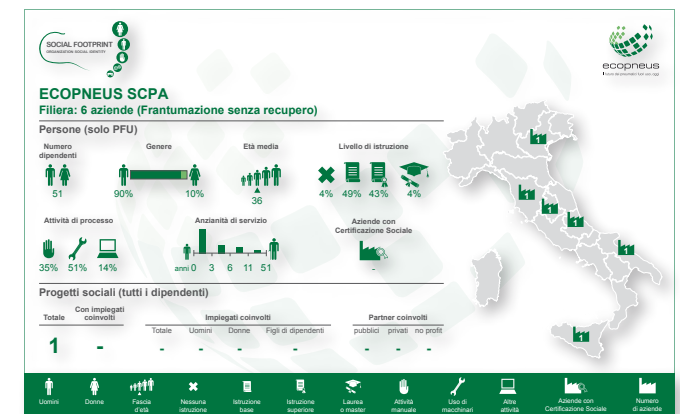
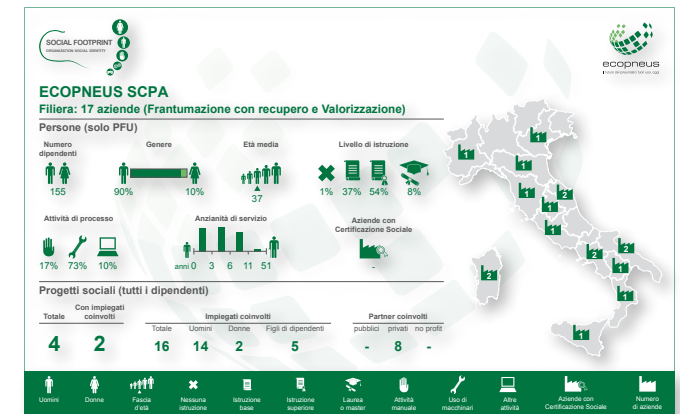
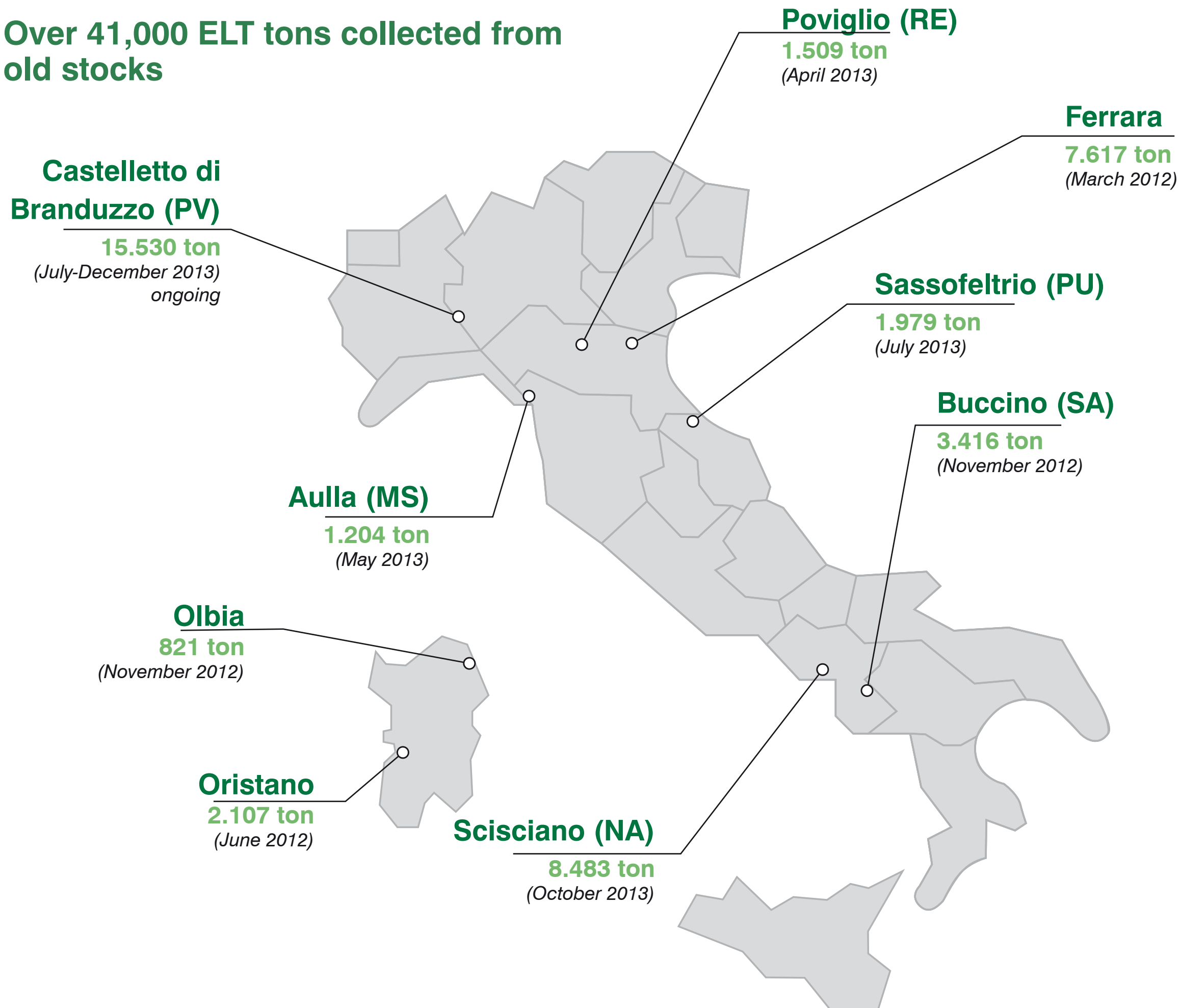


Figure 14 - Social Footprint summary card of the 6 shredding companies not doing material recovery (Preparation: Capellini design and consulting for Ecopneus).

Ecopneus’s 12

The Ecopneus system would not exist without the directional contribution given by the staff of the Consortium, that rule the system involving operators and stakeholders in the achievement of recovery targets, with qualified experience and management competence. Ecopneus scpa is made up of 12 people, 3 women and 9 men, with an average age of 38 years, all with higher or university education.

Over 41,000 ELT tons collected from old stocks



Legality pillar of Green economy

The black market of tyres sale causes relevant environmental problems, huge economic damages to State Treasury and it reverses onto the ELT abandonment, jeopardising the activities of companies correctly operating in the market that are deprived of raw material to be treated.

Legambiente 2012, "Copertone selvaggio" (Wild Tyre)

Note 15 - "Copertone Selvaggio" (Wild Tyre), started with the collaboration of Legambiente, drew an unknown picture of illegal traffics in the ELT sector by crossing the national territory mapping, with the monitoring of the survey and repression activities carried out by the Security Forces between 2005 and 2013. The result was a dossier where were analysed all forms of uncontrolled ELT abandonment and that characterised the scenario existing before the start of the present national system.

to reconstruct the mechanisms used by criminal networks, often connected with the criminal organisation, and to intervene with more and more efficiency to neutralise them. The illegal import and the black commercialisation of new tyres are the first tessera of a domino effect that creates a series of illegal behaviours in ELT management. The delivery of used tyres to non-transparent traders – who illegally export them to Asia and Africa or accumulate them dangerously or even illegally abandon them in the territory – caused over time a total environmental damage of over 400 million Euros spent in the costs for recovering the generated stocks. In Italy such illegal system, leveraging on the double economic convenience of a "black" sale and a cheaper disposal, has proliferated also due to consumers' disregard, seldom asking for their sales receipt.

Therefore, Ecopneus's action for ELT management under the extended producer responsibility is driven by a legality objective. In order to reach it and to enhance the environmental, economic and social **legality value as a pillar of Green economy**, Ecopneus gets going a series of actions among which the most significant are: the selection of companies through criteria of transparency and legality certification by the State's

competent bodies (registration in the "white lists" of provincial Prefectures); the rigorous traceability of quantities of ELT collected at the replacement operators registered to the service; the collaboration with the Customs Agency for the traceability of ELT exported; the use of the yearly profit to clear the territory from illegal piles; the development of projects involving local communities to create new employment related to recovery activities; the communication aimed to transparency and involvement of citizens also from an ethical point of view.

40 thousand ELT tons recovered from old stocks from the beginning of activities

Ecopneus's commitment for ELT recovery from old stocks in 2013

Used tyres represent waste that takes up much physical space and is difficult to compact, collect and eliminate [...] Inadequate disposal can block water channels, creeks and storm water drains, resulting in changes in flow patterns [...] Piled tyres increase the risk of fires, by arson or due to accidental causes such as lightning, which, once ignited, are difficult to control and put out. Tyre fires can burn for months, generating smoke, oil and leachate toxic contaminants that affect the soil, waterways and air. In landfills, tyres occupy valuable space, represent a fire hazard, are not biodegradable [...] It is for this reason that tyres have been banned from disposal in landfills in the European Union. [UNEP, 2011. Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal]

2013 saw Ecopneus committed in relevant collection interventions from *old stocks*, i.e. *tyres negligently and illegally accumulated on the territory, before the start of the national management system*. The activity removed around 29 thousand ELT tons sent to recovery. The interventions involved the **Poviglio** Municipality in Emilia Romagna (1,509 t), **Aulla** in Tuscany (1,204 t), **Sassofeltrio** in Marche (1,979 t), **Scisciano** in Campania (8,483 t).

The extraordinary collection in Scisciano is particularly relevant because: ELT had been laying abandoned on the site for over 20 years and their removal had a big echo, showing it is possible to counteract the difficult waste management in Campania, acting seriously and with the help of all institutional subjects involved.

The intervention at the **Castelletto di Branduzzo** site in Lombardy, the largest ELT piles in Europe, representing a potentially serious risk for the entire regional territory in case of fire, deserves special mention. In 2013 Ecopneus removed 15,530 tons and by 2016 the total removal from the site will be completed, for a total estimated over 60 thousand tons.

The extraordinary collection project in the “Terra dei Fuochi”

Note 16 - Apollo Vredestein Italia spa, B.R. Pneumatici spa, Bersangomme srl, Devalle Gomme snc, Gexpo spa, GRG Pneumatici srl, Laneve pneumatici srl, Mercedes-Benz Italia, Natale Illario, Parise Gomme snc, Pneus Sette srl, Pneusmarket spa, Pneusmarket Alpina spa, Ponente Gomme, R.G.S. pneumatici srl, Rossi Lamberto srl, Solideal Italia spa, Trelleborg W.S.I spa, Union Pneus Italia srl, Univergomme spa, Zuin spa.

Environmental and social benefits connected with the activities developed by Ecopneus are particularly evident and enhanced by the extraordinary intervention programme started in the “Terra dei Fuochi”.

The project originates from a Memorandum of Understanding signed with the Ministry of the Environment, the Naples and Caserta Prefectures, the Naples and Caserta Municipalities and the special Representative of the Ministry of Interior: some tyre manufacturers and importers partners of Ecopneus made 1,5 million Euros available, as management savings, to use for the collection of End of Life Tyres abandoned in the municipalities of the “Terra dei Fuochi”, preventing being used as fuel by criminals thus causing more toxic fires.

The activities, officially started on June 20th, 2013 and continuing along 2014 up to funds depletion, include:

- free of charge ELT collection at centres selected by the Municipalities, granting their delivery to the recovery
- availability of powder obtained by the collected ELT, free of charge for the Municipalities adhering to the project, for the realisation of infrastructures or interventions of public utility (roads, public gardens' paving, cycling lanes, etc.)
- an information and awareness campaign against the “black” purchase of tyres, which cause the illegality flow resulting in ELT abandonment in the environment, which implied:
 - in November 2013, 100 students from the “Terra dei Fuochi” travelling to those places where the Protocol is concretely operating and to the ELT shredding plant of RPN, partner of Ecopneus
 - an awareness day on November 30th, 2013 in Naples – with 700 kids from schools of the “Terra dei Fuochi” present at the theatre for a story show about environment and legality by journalist Luca Pagliari – and in Caserta, with a legality relay race through the Land of Fires holding a baton made with ELT, then delivered to the Ministry of the Environment in Naples.

The campaign against ELT abandonment in the “Terra dei Fuochi”

To support the Protocol's operational activities also the campaign “**I chose the right way**” was planned. Besides informing on the start of the ELT collection operations on the territory, it sends citizens a strong message so that, with the State presence and the intervention for the territory's benefit, they will contribute to choose legality,

thus breaking the chain of tyres abandonment linked to toxic fires.

In fact, the main object of the campaign is to stop the “black” purchase of tyres, a phenomenon that originates a continuous waste flow appearing in countryside or along roads, and becoming fires' prime. “If you buy them in black you will kill your land”: with this strong message and together with the picture of a tyre transformed into a revolver cylinder, the campaign aims at highlighting the possibility for each citizen to contribute concretely to legality and to make enduring the effects of the extraordinary collection.

Another fundamental step in the activities carried out by Ecopneus in the “Terra dei Fuochi” was the mobilization and awareness day “**The right way**”, on November 30th, 2013.

The event developed simultaneously at the Naples Teatro Politeama – where journalist, author and writer Luca Pagliari, illustrated a story of environment and legality together with hundreds of students of the “Terra dei Fuochi”, involved in collaboration with Legambiente. At the same time a legality relay race, coordinated by UISP and led by journalist Luca Abete, started from Piazza Dante in Caserta and arrived in Naples in Piazza Trieste e Trento, where a sports village and information points were set up for the public.

The Ministry of the Environment, the Naples and Caserta Prefects, the special Representative of the Ministry of Interior Donato Cafagna, the Scisciano Mayor Edoardo Serpico, Don Maurizio Praticciello and other Institutional representatives contributed with their presence to the success of the media event, besides quotations by important artists and writers, and particularly the voice of 100 Afragola kids that together with Legambiente visited the places where the Protocol is obtaining results and an ELT shredding plant.

While Luca Pagliari was telling his story, along the 37 km between Caserta and Naples, 100 amateur cyclists associated to the UISP, Sports for All Italian Association, carried from Municipality to Municipality in the “Terra dei Fuochi” a baton made with ELT rubber; they called at Caivano and Aversa, where school children and kids took part in entertainment activities and, once arrived at Teatro Politeama, they delivered the baton to the Ministry of the Environment, who received them in an ideal completion of the chain of different actions and responsibilities where everyone is called to take one's part.



Figure 15 - Advertising and billposting campaign.

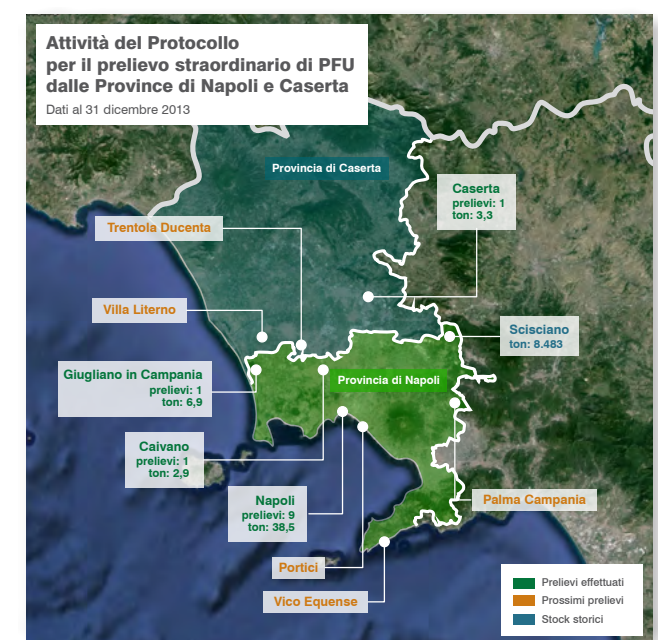


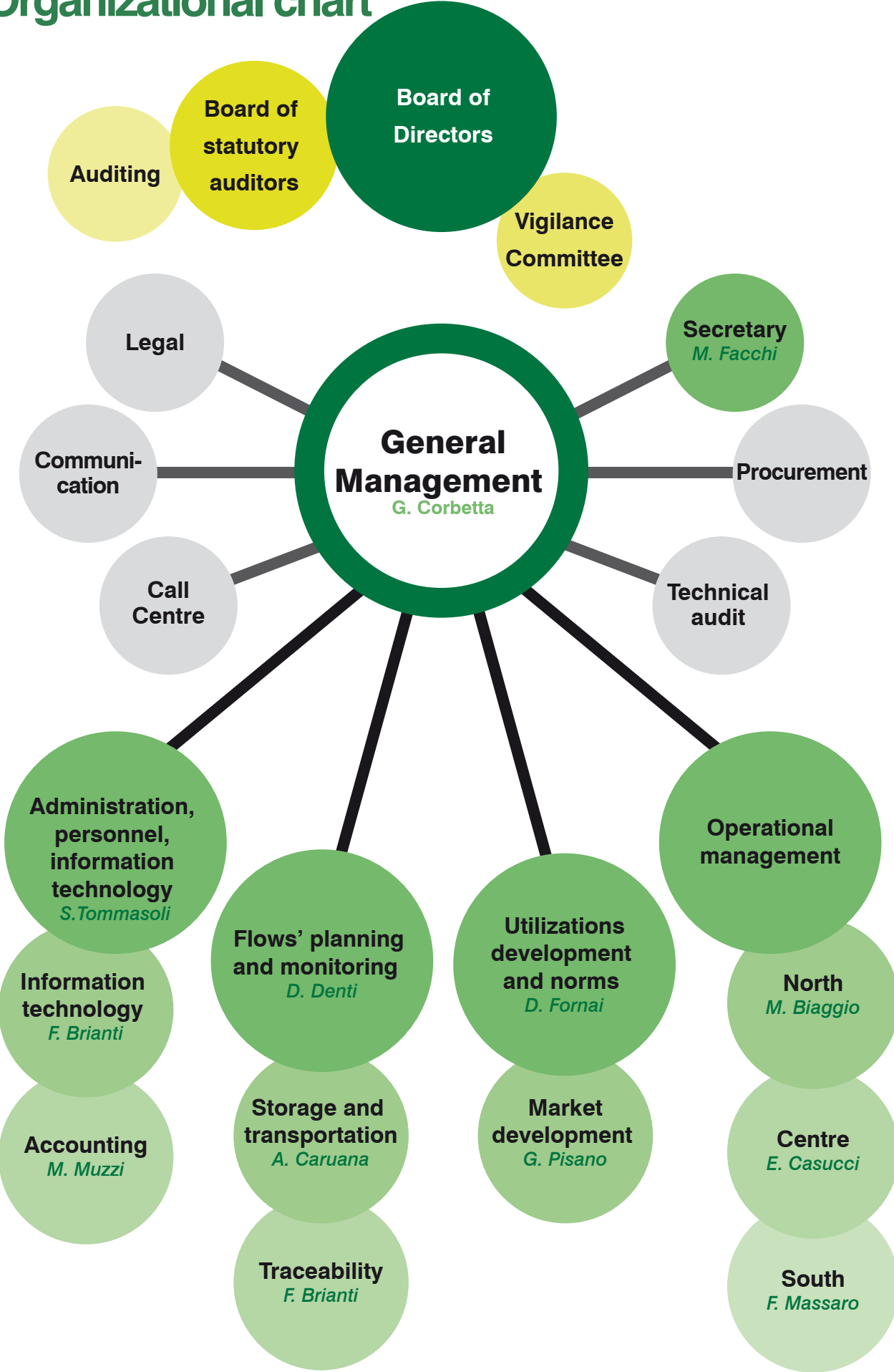
Figure 16 - Map of interventions carried out in 2013.



Governance, stakeholders and strategy

**Governance,
stakeholders and
strategy**

Organizational chart



Map of stakeholders in the Ecopneus system

Stakeholders macro-category	Main sub-categories	Contact tool
Citizens/Consumers	Tyre buyers; recipients of Ecopneus's actions even if non-buyers of tyres; consumers' associations	www.ecopneus.it; dossiers and informative notebooks; Social networks
Collaborators	Ecopneus's staff and direct employees; partner companies' staff and employees (suppliers and consultants); consultants and suppliers of indirect services	www.ecopneus.it; internal communications
Community	Environmental associations; sports associations; citizens	www.ecopneus.it; dossiers and informative notebooks; press office; events
Other operators of ELT national management system	Other consortium systems in Italy; other European consortia	www.ecopneus.it; industry's events; communication and ad hoc meetings
Institutions; Public Administrations and Regulatory bodies	Ministry of the Environment, Land and Sea; other Ministries (Industry, Agriculture, Transportation); European Institutions; competent parliamentary commissions; Customs Agencies; Italian finance police; State Forest Guard; Carabinieri Operative Ecological Unit (OEU); local authorities in areas subject to projects and initiatives; institutional technical bodies (ISPRA, ARPA)	www.ecopneus.it; dossiers and informative notebooks; industry's events and fairs; international symposia; regulatory reports and specific reports
Media	National/local newspapers; radio and TV; national and international sector magazines; online media (websites; forum, blogs)	Press office; www.ecopneus.it; dossiers and informative notebooks; events and fairs
Academic world and scientific community	University for research and development collaborations; laboratories and analysis centres; certification centres	www.ecopneus.it; dossiers and informative notebooks; industry's fairs; international symposia
Chain's operators	Waste generation points (tyre dealers, service stations; mechanic workshops); collecting companies; shredding companies; recovery plants (cement plants); companies producing ELT products; paving companies; companies producing football fields; building companies; category associations for various sectors	www.ecopneus.it; dossiers and informative notebooks; industry's fairs
Tyres' manufacturers and importers	Ecopneus's Partner Companies; sector companies non-partner of Ecopneus	www.ecopneus.it; internal communications

A governance for transparency and legality

Ecopneus scpa is a **non-profit private consortium** whose founding partners are the main six tyres manufacturers operating in Italy: Bridgestone, Continental, Goodyear Dunlop, Marangoni, Michelin, Pirelli, to which other partners joined over time, for a total of 59 companies forming the consortium today. Ecopneus's purpose is the management of End of Life Tyres reaching every year the end of their lives in Italy under the extended producer responsibility regimen, i.e. for the share of new tyres introduced into the market by partners. The boundary of the consortium responsibility is rigorously regulated by law both for collection targets, and for the indication regarding the recovery priorities towards address the collected ELT. The choice of the legal form of Limited Consortium Company binds Ecopneus to a form of corporate governance devoted to the highest transparency and control to safeguard the interests of all stakeholders.

The Statute adopted by Ecopneus at the time of its foundation and approved in conformity by the Ministry of the Environment defines its structure and functioning. Ecopneus's Board of Directors (BoD) is appointed by the six founding companies, holding ordinary shares, whereas joining partners (others subject to Ministerial Decree obligations) hold one share each, that gives them the only right to have access to Ecopneus's services. The appointment of the BoD President takes place annually by rotation among the six founding companies (rigorously in alphabetical order), whereas Directors can be re-elected also to provide continuity with the strategic choices adopted.

The BoD President represents the top management and is assisted by the General Manager whom the company's management is completely delegated to, as also required by ministerial decrees regarding waste management, so as to avoid conflict of interests among the partner companies of Ecopneus, that are competitors in the market. In order to guarantee the independence of his decisions, the General Manager participates in the Board of Directors' meetings and in the Shareholders' meetings, but without voting rights.

For its organisation, management and control, Ecopneus chose the reference "**model 231**", i.e. a group of principles, procedures and instructions binding the consortium in its management of external and internal relationships to what has been set forth by the Legislative Decree of June 8th, 2001 n. 231, regarding the discipline of penal responsibility of legal subjects. To further safeguard legality in its relationships with the stakeholders, Ecopneus added to "model 231" a Code of Ethics, including the principles of business deontology aiming at directing actions and behaviour of all people directly and indirectly involved in the carried out activities. Two are the control bodies set forth by

Ecopneus's governance. The **Board of Statutory Auditors**, made up of 3 members elected by the Shareholders assembly with a function of control of the respect of the law and of the Statute adopted by the consortium, as well as of the verification of the truthfulness and correctness of the profit and loss account (with the support of an external **Audit Accounting Company**). The second body is a "**Vigilance Committee**", with function of control of the aspects of civil and penal responsibility of the administration, with reference to the adopted management "model 231".

Inside such a sound governance frame, Ecopneus identified a minimal and highly qualified management structure as an effective management solution, by using outsourcing services for all operational and support activities of management team.

A strategy with stakeholders

As highlighted by the Green economy indicators, ELT recovery ways do not all offer the same benefit, and material recycling offers better advantages with respect to energy recovery, including the opportunity to bring the Italian ELT management system to reach an economic balance able to reduce the use of environmental fees to the minimum. Ecopneus is aware of the possibility to transform such opportunity into reality by strategically involving all the stakeholders participating in different ways to ELT's value chain.

"Make sure that an End of Life Tyre is not a danger for the environment and human health, but a resource"

(Ecopneus Vision)

Stakeholders of the Ecopneus system are all those subjects that directly or indirectly are influenced by or influence its activities, including, above all, consumers that, by paying the environmental fee when buying a new tyre, economically support the system. Relationships with stakeholders are kept by means of various communication and engagement tools, identified through a careful mapping of specific interests and of potential contribution to address strategic decisions. The analysis and management of the relationship with the stakeholders, carried out by Ecopneus in 2013, led to test a form of involvement finalised in the SWOT analysis of the industry's critical factors of ELT management, particularly referring to treatment technologies and to the market demand for recycled rubber (Note 15).

The engagement was carried out through two thematic workshops held in Rome, on February 20th and 21st, 2014, organised in collaboration with the Sustainable Development Foundation and the communication company Hill+Knowton Strategies. The event saw the involvement of over 30 representatives from business and financial areas, from research Bodies, and from Institutions among which were the Ministries of the Environment and of Economic Development. **The SWOT analysis** elaborated for the ELT value chain shows that the system's strengths and opportunities prevail on its weaknesses and threats, Also clearly indicates the priority intervention areas toward which to address future efforts and their related responsibilities, focusing on the development of the Country.

Note 17 - Art. 3–3.1 The consortium company acts toward the objective set forth by the L.D 152/06 art. 228 and following modifications and integrations and the enacting regulations of the related M.D. April 11th, 2011, n. 82. In order to safeguard the environment, it has the object to carry out the following activities: management of End of Life Tyres and/or not suitable for use [...], preparation and delivery of profit and loss account and balance sheet together with a report on the achievement of the targets defined by the competent Authority [...]

Note 18 - SWOT means Strengths, Weaknesses, Opportunities, Threats. It is a rational analysis of the area in which a programme of interventions is meant to be realised. It is used as a support instrument for strategic decisions, it allows to thightlighting the critical factors endogenous and external to the sector it is applied to.

Industrial strategy and Ecopneus's sustainability strategy are double linked in a development perspective in the Green economy



Figure 17 - SWOT matrix of Ecopneus's ELT value chain.

In particular, the key role of public administrations (central and local) appears clearly in the regulation sphere as well as in public expenditure planning. The **End of Waste** law (EoW) is the key point to unlock some of the highlighted criticalities, among which there are the fears (unfounded) by public administrators to break the

law about waste in authorising the use of structures containing a secondary raw material deriving from a "waste", in spite of all the authorisations in force.

The **Green Public Procurement** (GPP) and the regulation on **green purchases** of the public administration are effective tools to support the increase of demand for recycled products. The **memorandum of understanding with ANCI**, promoted by

Ecopneus to use recycled rubber derived from ELT collected from old stocks on the territory, in applications usable by the local populations, represents a further active tool worthy of greater attention.

Collaboration with central and local Public Administrations for sustainable development and legality

Another relevant topic is consumers' perception of possible harmful effects on health or of low quality of ELT recycled products. On that subject, it is worth remembering **Ecopneus's commitment in the diffusion of dossiers and researches carried out by independent third parties** showing that products made with ELT recycled rubber comply with the rules of

consumers' health safeguard and advocating how appropriate an intervention by competent authorities would be to disperse all doubts.

Guaranteeing ELT supply flows to the recycling operators is one of the main key points of the system, but it clashes with the limited internal market demand, which leads the system to use energy recovery.

The development of new markets and new demand of ELT recycled products requires a great commitment also and above all from the network's operators. ELT energy recovery at cement plants in Italy

suffers from the stagnating building market and from the limited number of plants authorised to use them as fuel in manufacturing processes. That makes it necessary to export part of ELT collected and treated in Italy by the Ecopneus system toward foreign plants.

The efficiency and quality of the logistics and treatment network are key elements to reduce the environmental impacts of the system, to increase the service level and to allow reduction policies of environmental fees paid by consumers: for such reasons, they must be subjected to a continuous and careful monitoring with more challenging goals.

Ecopneus promotes scientific research and information on ELT recycling

Ecopneus's targets in the Green economy

Growth and consolidation of ELT system in the Green economy goes also through the solution of critical points highlighted by the presented SWOT analysis. Ecopneus's commitment in such process is summarised in the mission's strategic targets for next years, identified through mapping the sustainability of the consortium system in accordance to the guiding lines of GRI-G4 standard.

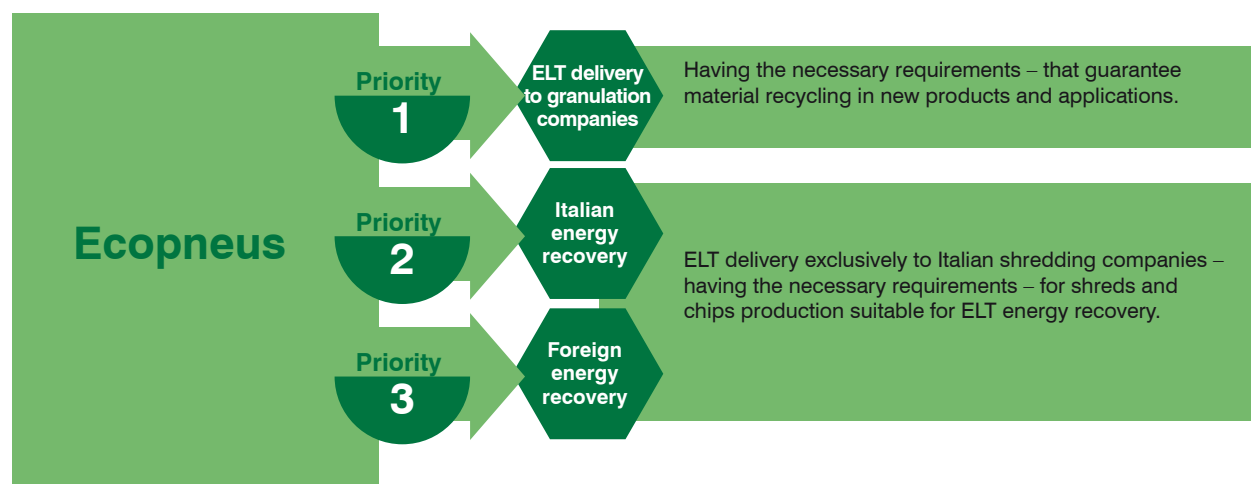


Figure 19 - Ecopneus's priorities in the recovery of collected ELT.

Reaching 1 million tons of recovered ELT by 2015

With the over 560 thousand ELT tons recovered from the start of its activities, Ecopneus aims at reaching the target of **1 million** ELT tons collected and sent to recovery by 2015, both through timely collection at generation points (operators in the replacement market, etc.), and through planning new collection activities from old stocks under ordinary and extraordinary management.

For energy recovery solutions, Ecopneus prefers whole or treated ELT deliveries to plants in Italy, using export only for surplus



Figure 18 - Sustainability material aspects relevant to Ecopneus's strategy

Privileging ELT material recovery in applications offering the greatest environmental benefit

The **LCA analysis programme, started in 2013 by Ecopneus in collaboration with ENEA**, considers the comparative analysis of environmental benefits for the various material recycling opportunities deriving from ELT treatment (in particular of rubber). The results of the first analysis cycle are already expected in 2014: they will be used as reference for the definition of strategic objectives of the network's development in future years, even related to the initiative launched at the end of 2012 to collect demonstrations of interest from investors for the realisation of new ELT treatment plants finalised to material recovery.

Demand development of granule and powder through the market

Ecopneus's commitment to support the development of market demand for ELT granule and powder will see further efforts in various directions among which:

- more intense promotion of the website dedicated to ELT recycled rubber applications at potential users, among which purchasing centres of central and local public administrations.
- Increase in communication efforts for spreading the knowledge of benefits and performances of ELT recycled rubber products, through the publication of technical notebooks, press office, communication campaigns of sectorial magazines, viral diffusion videos, organisation and participation in public events.
- Identification of new initiatives to support marketing activities of recycling companies engaged in rubber granules and powders export, in synergy with the development of the market analysis project commissioned to the management consulting firm CRS in 2013.

ELT treatment for shreds and chips production for energy recovery is carried out exclusively in Italian shredding companies holding the suitable requirements

Continuous improvement of efficiency and quality of treatment chain and of collection logistics.

Through the tender for renewal/assignment of contracts for ELT logistics and treatment in 2014, Ecopneus is going to intensify the verification programme of the network's quality and efficiency. In order to increase the service level required by operators, Certiquality will be involved in a further development of the ongoing project related to the operators certification auditing. Furthermore, the **Carbon Footprint** project of Ecopneus's network, started in 2013 in collaboration with the Ministry of Environment, will continue its survey aimed at identifying possible focused actions of the system impacts reduction.

Reducing environmental fees for consumers to the minimum.

The incentive to increase production efficiency and network quality, together with the expected increase of market demand for ELT granule and powder, is functional to further reducing the system's operating costs. **Such objective will produce a positive impact on the environmental fees paid by consumers, to go beyond the 23% reduction already reached from 2011 up to today.**



Communication

Communication

The main objective of Ecopneus's communication is spreading company's values and principles: transparency, ethics, rigour, independence, to which must be added the commitment about information on advantages deriving from the correct ELT recovery and the support to applications development.

Objective: information and training promotion on the correct ELT management in Public Administration. ELT Academy.

"ELT Academy" is the information and training platform conceived by Ecopneus and dedicated to the technical persons of Control and Vigilance Bodies and to the managers of Public Administrations, regarding End of Life Tyres collection and recovery system and its regulatory, administrative and legal implications.

A journey started on June 20th, 2013, at the National Training Centre of National Forest Service in Castel Volturno (Caserta province, through the workshop entitled "ELT management in Italy: competences, tools and synergies to enhance a resource and contrast illegality".

Objective: telling Ecopneus's reality, building up a recycling culture. ECOMONDO

Ecomondo in Rimini represents for Ecopneus the most important event of the year: all its reference audience and all main stakeholders are present there. In 2013 Minister of the Environment Andrea Orlando visited Ecopneus's booth for a short meeting with journalists on the finalities of the Protocol for the "Terra dei Fuochi" subscribed by Ecopneus and on the activities aimed at fighting ELT abandonment and at removing ELT from risk of waste fires.

During the Fair, Ecopneus promoted a meeting dedicated to Public Administration, focused on direct experiences and evidences of local and national administrators about the benefits brought to the community by the correct ELT recycling: from the use of ELT recycled rubber in numerous applications in urban areas, starting from modified asphalts, to abandonment contrast in order to safeguard territory and landscape, to business and jobs support in the recycling industry, to the benefit of local economies.

Objective: monitoring ELT illegal flows inside Municipalities. Ecopneus ANCI protocol

The Protocol signed between Ecopneus and ANCI, National Association of Italian Municipalities, goes in the same direction as well, aimed at joined study actions, monitoring and information about the phenomenon of ELT abandonment-delivery in municipal collecting centres and about the theme of using recycled rubber in applications and uses governed by the Public Administration.

Objective: fighting abandonment. Information on collections from old stocks

In 2013, Ecopneus removed at its own expense around 14,000 ELT tons, thanks to to 4 extraordinary collection from old stocks in the municipalities of Poviglio (Reggio Emilia), Aulla (Massa Carrara), Sassofeltrio (Perugia Urbino) e Scisciano (Napoli), by taking forward an extraordinary collection activity started in 2012.

The particularly important collection started in **Castelletto di Branduzzo**, in the Pavia province, must be added to such collection, and it will be concluded in 2016. Inside the Ex-Ecogomma area, over 60,000 ELT tons are laying abandoned; the largest piles in Europe. All interventions represented an occasion of information and communication on national and local media, in order to make people aware of the importance to fight abandonment. Such interventions have an important social value, because they allow the safeguard of citizens' health and of the environment from consequences, which could derive from fires and operating in situations that Public Administrations couldn't cure autonomously. In the case of Castelletto di Branduzzo, fire's consequences would have repercussions on the whole regional territory.

Object: fighting abandonment that can easily cause toxic waste fuels. The Protocol for the "Terra dei Fuochi"

On June 20th, 2013 in Caserta, Ecopneus signed a Memorandum of Understanding for extraordinary ELT collection operations in the so-called "Terra dei Fuochi". Besides Ecopneus, signatories were the Ministry of the Environment, Naples and Caserta Municipalities and Prefectures and the specific representative of the Ministry of Interior.

To support the Protocol operational activities also the **campaign "I choose the right way"** was defined, for informing on the start of ELT removal activities from the territory. Moreover it sends a strong message toward citizens, reminding that they can contribute with a legality choice to stop tyres abandonment connected to toxic fires, together with the State's presence and intervention to the territory's benefit.

In fact, from the campaign, an appeal starts against the "black" purchase of tyres, a phenomenon from which originates a waste flow reappearing in countryside or along roads and becomes fires' primer. "If you buy them in "black" you kill your land": through such strong message and the image of a tyre transformed into a revolver cylinder the campaign aims at highlighting the possibility for each citizen to provide a concrete contribution to legality and to allow that the effects of the extraordinary collection are durable.

Another fundamental step in the activities carried out by Ecopneus in the "Terra dei



Fuochi” was the mobilization and awareness day “**The right way**”, on November 30th, 2013. The event developed simultaneously at the Naples’ Teatro Politeama – where journalist, author and writer Luca Pagliari, illustrated a story of environment and legality together with hundreds of students of the “Terra dei Fuochi”, involved in collaboration with Legambiente – at the same time as a legality relay race, coordinated by UISP and led by journalist Luca Abete, started from Piazza Dante in Caserta and arrived in Naples in Piazza Trieste e Trento, where a sports village and information points were set up for the public.

The Ministry of the Environment, the Naples and Caserta Prefects, the specific representative of the Ministry of Interior Donato Cafagna, the Scisciano Mayor Edoardo Serpico, Don Maurizio Patriciello and other Institutional representatives, contributed with their presence to the success of the media event, besides quotations by important artists and writers, and particularly the voice of 100 Afragola kids that, together with Legambiente, visited the places where the Protocol is obtaining results and an ELT shredding plant.

While Luca Pagliari was telling his story, along the 37 km between Caserta and Naples, 100 amateur cyclists associated to the UISP (Sports for All Italian Association) carried from Municipality to Municipality in the “Terra dei Fuochi” a baton made with ELT rubber; they called at Caivano and Aversa, where school children and kids took part in entertainment activities and, once arrived at Teatro Politeama, they delivered the baton to the Ministry of the Environment, who received them in an ideal completion of the chain of different actions and responsibilities where everyone is called to take one’s part.

Objective: training new generations of aware citizens. Educational activity

In 2013 Ecopneus started a partnership with **Explora - the Children Museum in Rome**, to take the youngest ones to discover the importance of a correct tyres recycling.



“Second life of End of Life Tyres” is the title of the interactive exhibit that allows more children to share a group’s play by activating a joint mechanism made up of various kinds of objects made with coloured ELT granules.

Dedicated to children up to 12 years, the playground is completed with a town to be created with small bricks made by ELT derived material and rotating wheels full of coloured powder, together with the gear mechanism with recycled rubber wheels. In addition to the free visit, the Museum personnel organises laboratories for schools as well.

Furthermore, last June, the educational project dedicated to the first two years of secondary schools for the school year 2012-2013 and realised with **Legambiente** was concluded.

The initiative, entitled “the correct End of Life Tyres recycling” proposed a follow-up on life cycle analysis of the rubber, starting as a natural resource in rubber forests, and ending with End of Life Tyres recovery and recycling.

A brochure connected to the project was prepared and sent to the 10,000 schools all over the national territory together with graphic cards integrated with educational activities made available also on the internet, through a dedicated website.

179 classes of secondary schools coming from 34 institutes participated in the project, while 49 classes from 11 institutes of five regions (Lombardy, Marche, Piedmont, Puglia, Sicily)

hosted tutor lessons in the classroom.

The Legambiente collaboration for school project has been activated also for the school year 2013-2014, focusing on some schools in the “Terra dei Fuochi” in Campania.

Objective: qualifying the industrial chain. Communication toward operational partners

At the beginning of 2013, the Ecopneus Operational Partners Convention was held, with the participation of all companies that obtained a contract with Ecopneus for the two years period 2013/2014 for the collection, transportation, shredding and recovery services.

The Convention represents both a confrontation and a consideration occasion among the various companies and among companies and Ecopneus, and a kind of interactive “workshop” during which to study all the main technical/operational aspects of daily activity together with Ecopneus’s managers.

Objective: making the car’s chain aware on ongoing efforts. AUTOPROMOTEC

Autopromotec, the international Fair of car after-market, represents the main meeting occasion both with tyre manufacturers and importers, and with end of life tyre generation points, i.e. tyre fitters service station operators and mechanics workshops.

In the edition 2013 Ecopneus received the “Excellence GIPA Trophy - respect of the environment”, rewarding men, companies, projects that best distinguished themselves in terms of Strategy, Development, Innovation, drivers’ Assistance and Satisfaction, and spreading knowledge among sector’s players.

Ecopneus then promoted a conference in which was presented the survey carried out by Lorien Consulting on more than 30,000 operators served by Ecopneus. The results showed how careful Italian “tyre dealers” are: about environmental topics, how they consider that the start up of the new ELT management system has generated order and legality, and how they consider Ecopneus as a reference point for the sector, as a sound player with great performance, timely in intervening, equipped with an easy-to-use website, flexible and available to solve problems that can be met in managing bureaucracy.

Ecopneus’s last meeting at the Fair, beside the convention, was the assignment of celebrating plates to Shareholders, tyre manufacturers and importers, that entrusted Ecopneus with the management of ELT under their responsibilities.

Objective: making the territory aware of ELT recycling reality. Open Plants

After the success obtained by the three steps in 2012, also in 2013 Ecopneus promoted the Open Plants initiative, to closely show to institutions, industrial players, operators, control bodies and citizens how the treatment and recovery process is managed and, overall, to give concrete evidence about how it is possible to give new life to End of Life Tyres. Therefore, Open Plants represents an important occasion to show the work, the commitment, the seriousness and the competence of all players of the chain - tyre fitters, transporters, storage sites,



treatment plants - and besides all, to better convey such precious material with numerous and very interesting uses to public opinion and stakeholders.

Objective: developing the knowledge of powder use in rubber asphalts. Tests, literature, networking

The use of ELT rubber as additive to make longer lasting and more silent asphalts is one of the applications in which Ecopneus strongly believes. Besides the constant activity of stakeholder engagement with decision makers, in the local and national Public Administration, about the advantages of such an application, Ecopneus took active part in many tests all over the national territory, bringing to the realisation of road sections with bitumen modified with rubber powder. This reaches the double objective both of being able to make directly testing the benefits deriving from such asphalts, and to increase literature in such context, thanks to scientific tests and measures taken *ante* and *post operam* in the different experimentations.

The participation in the **Viatec Fair in Bolzano** followed an experimentation started by the Bolzano autonomous Province to test the traffic noise reduction that can be obtained thanks to such kind of pavements. The experimentation was also the object of a conference during the Fair, while at Ecopneus's booth were exposed technical posters showing the results obtained by this experimentation and the one carried out with the University of Bologna about post-consumer recycling of bitumen modified with ELT rubber.

In **Trento Autonomous Province**, after laying a first experimental road section in the Transacqua Municipality, Ecopneus started a series of meetings addressed to technicians of local Public Administration to spread the widest knowledge on modified asphalts, thanks also to the intervention of international experts. The meetings led to the signature of a Protocol between the **Consortium of Trento Municipalities and Ecopneus**, which provides the use of recycled End of Life Tyres rubber in the territory of Trento Province in applications in roads and sports areas. The hope is that test results carried out on already made pavements, would lead the Province Administration to expand its application in all infrastructures in the territory.

On the other hand, in **Ferrara**, the realisation of a road section with ELT rubber, in the maintenance of the main road entering into the town, represented a particular meaning because up to May 2012 there was a deposit containing around 8,000 tons of abandoned ELT just outside the city. Ecopneus emptied the deposit, thanks to the resources made available by previous year's management surplus.

Therefore, the realisation of the road sector represented the ideal closure of the recycling circle, from an incorrect waste management to a virtuous solution of re-use of a waste/resource.

In **Florence**, in view of the Road Cycling World Championships held in October 2013, the Municipality Administration carried out some road maintenance, choosing to pave one of those sectors with bitumen modified with ELT powder.

The occasion was seized to organise the presentation of the technical dossier "Acoustic performances of low noise asphalts in urban scenarios" prepared by Ecopneus together with Vie En.Ro.Se. Ingegneria. The dossier collects the results of multiple campaigns supporting vehicular traffic noise measurement in various Tuscany and Emilia Romagna municipalities and it represents a valid information instrument for the Public Administration about the use of those asphalts as a measure to reduce noise in urban and sub-urban areas. Furthermore, the dossier was sent to over 120 contacts selected from Public Administration and from operators in the sector throughout Italy.

Many other events represented an opportunity to inform people on the possible applications of ELT rubber with special reference to the "roads" area, such as the meetings organised in collaboration with associations such as **SITEB** (Italian Association of Road Bitumen and Asphalt), **ASSTRA** (Transportation Association), **AIAPP** (Italian Landscape Architecture Association).

Objective: promoting recycled rubber applications in the sports sector. Information, tests on the field, demonstrations

In order to promote information and awareness about the use of ELT rubber to make sports surfaces, Ecopneus has started a **partnership with UISP** (Sports for All Italian Association) for promotion and communication activities directed to UISP committees, sports companies and UISP members, to develop a culture of ELT use and to contribute to make high-quality and sustainable sports structures.

Developed activities are:

- draft of a dossier about UISP sport places as a base for potential development and collection of indications about UISP's plant managers, in order to integrate Ecopneus's catalogue with sports for all needs;
- realisation of pilot plants (Medolla in Modena Province and Naples) for sport activities, but also for demonstrative events.

Besides, a study group was created for the definition of guidelines for a sustainable re-qualification of UISP's structures, together with suitable technical-scientific documentation. The results expected by the working group at short-medium term are:

- collection of existing documentation at national and international level about the safety and appropriateness technical suitability of ELT materials for sports use;
- tests and analyses carry out to assess technical-sports performances of ELT material in laboratories and on the "field";
- analysis and collection of CEE and regional certifications and regulations supporting sports applications made with ELT.

Furthermore, some sport plants belonging to UISP, have been selected as key test areas, to proceed together with Ecopneus with the realisation and/or renovation of a sustainable re-qualification obtained with ELT materials.

In 2013 Ecopneus supported events for the promotion of ELT rubber use in sports fields, among which there is the inauguration of two structures:

- on **September 20th, in Naples**, Quartieri Spagnoli area, inauguration of multi-sports field made with ELT rubber. The structure is part of a social recovery and integration project developed by the "L'altra Napoli" association, dedicated to





young people;

- on **September 28th**, in Medolla, Modena Province, inauguration of **PalaMedolla**, multi-sports area dedicated to the local communities hit by the 2012's earthquake, made in collaboration with UISP;
- in October, in **downtown L'Aquila**, inauguration of a **recycled rubber field**. On the occasion of the maintenance of a playground dedicated also to disabled kids, a multi-sports small field, made with ELT recycled rubber was created.

Those are concrete examples of what Green economy should be: an activity able to create value combining “doing business” with social responsibility.

Publishing initiatives

Together with the above-mentioned activities, in 2013 an advertising and participation program was planned on the main general and specialised magazines, to support visibility and communication about the theme of ELT sustainability and quality in sports structures.

The concept was developed in three visuals, dedicated to tennis, athletics and basket, aiming at highlighting the environmental and performance advantages deriving from the addition of ELT rubber.

Similarly, a theme informing about modified asphalts was created, focusing the attention on benefits in terms of safety, duration and use of a precious recycled material, and above all the reduction of noise caused by passing cars.

In parallel, in order to reach the targets of key players and of decision makers in the road sector, a publishing/advertisement project was developed together with the two major national magazines on “infrastructures and road maintenance”, which are distributed to a selected subscribing public.

The collection of notebooks and technical dossiers

In order to further stimulate the spreading of information on the advantages of ELT rubber applications, Ecopneus promotes a book collection on the main topics of interest in this area, prepared together with important partners.

It is a collection of “technical notebooks”, some of which are nearly popularising, rapidly readable and with a non-technical language, but accurate and qualified.

Other ones are real “technical dossiers”, prepared together with Universities, experts and national research centres, and they analyse from a technical-scientific point of view the characteristics, the future developments and the critical aspects of the various applications.

In 2013 the latest of such technical dossiers prepared with “Vie En.Ro.Se Ingegneria” was published about the “Acoustic performances of low noise asphalts in urban scenarios”. The book, that has been also the main subject of a seminar in Florence dedicated to the local Public Administration, was distributed to 120 selected contacts among contracting bodies,

decision makers, road technicians of Italian provinces and other institutional representatives.

Prizes and awards

Ecopneus received many awards in 2013 thanks to the commitment shown in various activity areas.

GIPA Excellence Trophy 2013

In the course of Autopromotec 2013, Ecopneus won the “GIPA Excellence Trophy” in the category Respect for the Environment. During an interview carried out by GIPA in March 2013, the non-profit limited consortium was acknowledged by Italian maintenance operators and distributors as the company that particularly distinguished itself for its contribution in its respect for the environment.

GIPA Italia established the “Excellence Trophies” in 1997. Edition after edition, the Trophies have become an important meeting and comparison occasion for the major players of the automobile aftermarket. The main purpose of the “Excellence Trophies” is to reward people, companies, projects that distinguished themselves in terms of Strategy, Development, Innovation, car drivers’ Assistance and Satisfaction, Knowledge Diffusion among all the sector’s players.

Environment and Legambiente Prize 2013

Legambiente chose to assign the 2013 edition of the Environment and Legality prize to Ecopneus, because of its role in the rationalisation of the collection and management system of End of Life Tyres, with special attention to legality and to the fight against illegal disposals and trades, at national and international level. The latter causes serious environmental impacts and relevant economic consequences on the recycling industry. The award ceremony took place inside the event Festambiente, an International Festival dedicated to ecology and solidarity organised by Legambiente, now at its XXV edition, held in Parco Naturale Regionale della Maremma from August 9th to 18th, 2013.

Eco and the City - the Giovanni Spadolini Prize

Ecopneus won the prestigious “Eco and the City - the Giovanni Spadolini Prize for innovation” with the project “Noiseless Asphalts from Trentino”, aimed at publicising the widest possible knowledge and diffusion about the advantages of asphalts modified with ELT recycled rubber.

A prize that is awarded to projects related to the promotion of the territory’s appearance as well as its attractive power, to actions of **environment and landscape safeguard**, in order to guarantee a sustainable and compatible development under the environmental profile, without ignoring **virtuous and innovative companies**.

The Prize is meant to remind people of the activity of Giovanni Spadolini, one of the greatest Italian politician of the XX century, and who was actually the founder of the Ministry of National Heritage and of the Environment.

Aretè Prize for Responsible Communication

The Prize was awarded to the campaign “I choose the right way”, connected to the Protocol and to the collection activities of abandoned ELT in the “Terra dei Fuochi”.

The prize was promoted by Nuvolaverde in collaboration with Confindustria and ABI; the campaign promoted by Ecopneus together with the Ministry of the Environment was awarded with the prize of the category “public communication”, the journalists’ jury prize and the absolute prize.

References to international reporting standards

Tables of connection with GRI-G4 standard

- Fully reported
- ① Partially reported
- Not reported / Not Applicable

General Standard Disclosures	Status	Reference
Strategy and analysis		
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