ENVIRONMENTAL PROTECTION

Protecting the environment, improving energy efficiency and offering services that reduce emissions of greenhouse gases and other pollutants are the main intervention policies adopted by the Telecom Italia Group to promote sustainable development in its areas of influence. The specific actions taken are therefore aimed at reducing its environmental impacts and offering technological solutions aimed at individuals, businesses and public administration for the creation of a more inclusive and viable digital society.

The environment stakeholder consists of future generations and their right to live in a world not compromised by the negative effects of development by previous generations. The interests of this collective person are identified in the demands made by:
- national and international environmental organisations;
- national and supranational institutions;
- the community in general, particularly in the areas where Telecom Italia operates;
- industry associations and non-profit organisations dealing with issues relating to the environment. These include the following in particular: CSR Europe, European Telecommunications Network Operators' Association (ETNO), European Telecommunications Standards Institute (ETSI), Global e-Sustainability Initiative (GeSI), Carbon Disclosure Project (CDP), European Round Table of Industrialists (ERT), International Telecommunication Union (ITU).

Telecom Italia is attentive to the needs expressed by stakeholders interested in environmental protection and with them it has developed various communication channels, including a multi-stakeholder forum organized in October 2015. This tested method of listening and involvement reinforced the understanding of the demands and priorities of stakeholders on environmental matters and gathered contributions on possible development areas.

Finally, Telecom Italia promotes and in some cases coordinates national and international environmental projects.

The Companies of the Group pay particular attention to the fight against climate change, evidenced by continuous and significant investments in research on energy efficiency and the extensive use of energy generated by renewable sources. Telecom Italia is also deeply convinced it can play a key role, together and in synergy with other sectors of the economy, in facilitating the transition towards a low carbon emission economy.

Adaptation to climate change and mitigation of its adverse effects strongly depend on the policies and measures implemented at international and local level and can be made more effective through the development and application of suitable technologies. In view of the greenhouse gas reduction objectives agreed in Paris during the COP21[1], which once endorsed by governments must be achieved through the development of appropriate action strategies and the provision of technical and financial instruments to support the actions, Telecom Italia hopes that the potential of Information and Communication Technologies is recognized and integrated into the energy efficiency programmes of the various sectors of the economy and into the national emission reduction plans. In particular it hopes for the adoption of measures and incentives to encourage the development of the high speed fixed and mobile networks and that the process of digitising the Country in line with the aspirations and indications of the European Digital Agenda is speeded up.

The environmental strategy of the Group's companies is founded on the following principles:
- optimising the use of energy sources and other natural resources;
- constantly seeking to improve environmental and energy performance by reducing negative impacts and increasing positive ones;
- adopting procurement policies that take environmental issues into account;
- disseminating a culture that promotes a correct approach to environmental issues.

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[1] The XXI Conference of Parties to the Framework Convention of the United Nations on climatic changes (UNFCCC).

In order to ensure the effective and sustainable management of operational processes which have particular environmental impacts, Telecom Italia has equipped itself with an Environmental Management System (Sistema di Gestione Ambientale - SGA) which is ISO14001 certified. In some situations the Environmental Management System is integrated with the Quality Management System based on ISO 9001 standard as well as with the Security Management System based on OHSAS 18001 standard: the relative certification was obtained for all these systems. The certification of the Energy Management System, based on ISO 50001 standard, was also obtained for the Rome Parco de' Medici offices and the Bologna Corticella premises. In addition to the ISO 50001 certification, the Bologna Corticella site also achieved the ISO 14064 certification. The main aim of the ISO 14064 standard is to provide organisations with tools and procedures based on a scientific and systematic approach, in order to quantify, monitor, record and validate or verify inventories of greenhouse gas (GHG) emissions or projects related to cutting these emissions[1]. For further details on this subject go to the telecomitalia.com website.

CLIMATE CHANGE

The Green Economy is recognised as the driving force for sustainable development and the elimination of poverty. The ICT sector can make a significant contribution to developing the economy, improving energy efficiency and combating climate change, as demonstrated by several studies and analyses of the ICT industry, recently confirmed by the SMARTer 2030[2] Report published in 2015 by the Global e-Sustainability Initiative.

The Group's approach to the fight against climate change is based on three synergistic levels of action:

- reducing their own direct and indirect emissions of greenhouse gases;
- limiting the emissions of other sectors and customers in general by supporting virtualisation and the provisions of services that promote new ways of working, learning, travelling and living;
- contributing to disseminating a culture based on a correct approach to environmental issues inside and outside the Company.

Reduction of emissions

The environmental impact of Telecom Italia in terms of CO_2 emissions is essentially determined, as shown in the following paragraphs, by direct emissions from the use of fossil fuels, indirect emissions through the procurement of electricity and other indirect emissions due for example to home-work commuting and air travel by staff.

For details of current activities aimed at reducing emissions see the *Environmental performance/Energy and Environmental performance/Emissions sections.*

Risks associated with climate change

The risks associated with climate change for the telecommunications sector have implications of a physical, economical and regulatory nature, with major repercussions even on the image and reputation of the company. Climate change causes changes in meteorological models that can result in extreme situations.

In Italy, in particular, considerable flooding has occurred in recent years, which has had a devastating impact on vast areas of land, cities and infrastructure.

Telecom Italia's installations, network infrastructure and Data Centres are spread across the country and the Company believes that flooding is one of the most serious physical risks and the one most likely to occur. The evaluated effects consist of damage ranging from reduced use to loss of properties and, in extreme cases, total loss of the ability to provide the service to customers.

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[1] The energy efficiency of the Rozzano 2 data center is testified by the value of its Power Usage Effectivness (PUE), which was certified in 2014 and is equal to 1.66; such value can be considered a good one, since that the data center was built between 2008 and 2010. The PUE values of the other data centers have note been certified yet.
[2] The "SMARTer2030 report: ICT Solutions for 21st Century Challenges" represents the upgrading of the SMART2020 and SMARTer2020 studies respectively published in 2008 and 2012 by the Global e-Sustainability Initiative.

In order to prevent or limit the potential damage, Telecom Italia's new exchanges and buildings are built at a safe distance from rivers and bodies of water in general and, in order to ensure continuity of service, the network is designed considering appropriate levels of resilience and redundancy.

In Italy, the situation of the network infrastructure, particularly areas where there is a heightened hydro-geological risk, is monitored using the company's Ci.Pro. (Civil Protection) system, which uses a database of information relating to the territory and infrastructure, which is continuously updated with a view to planning the work required as quickly as possible. Lastly, the physical risks to which company assets are in any case subject, are managed by insurance cover that takes into account the value of the structure and equipment as well as any effects that these catastrophic events would cause for the service.

Changeable weather conditions increasingly give rise to extreme meteorological conditions and TIM Brasil has developed technologies and applications for effective and continuous monitoring, particularly in areas at greatest risk The Company has also invested heavily in advanced infrastructure and technologies, not only to guarantee the continuity and quality of the service offered to customers, but also to improve efficiency and reduce the consumption associated with its operations. At present in Brazil most of the electricity is generated by hydroelectric plants. Long periods of drought can lead to a dramatic reduction in the availability of electricity, to an increase in its cost and to increasing recourse to fossil fuels. Lower availability of water in water basins may lead to the rationing of energy and significant fluctuations in the cost per kWh.

In Brazil, in legislative terms, the national policy on climate change, which was defined in 2009 and is governed by decrees N. 7,390/2010 and 7,643/2011, supplemented by sectoral plans for mitigation and adaptation to climate change, provides for greenhouse gas emissions to be reduced by between 36.1% and 38.9% by 2020. The telecommunications sector is not currently involved directly, but it might be in a not too distant future. In the states of São Paulo and Rio de Janeiro, which are the ones where most of the Country's industrial and commercial activities are concentrated, specific state laws have been introduced on climate change: in future, TIM might also be asked to develop its own greenhouse gas emission reduction plan if the telecommunications sector is expected to contribute by setting quantitative reduction objectives, even on a voluntary basis.

A considerable amount of TIM's emissions are associated with electricity consumption, particularly by the network infrastructure. Energy industry policies tend to lead to an increase in the cost of energy and these increases are in turn transferred to users, and therefore to TIM (although the cost of electricity accounts for just over 5% of the total operating costs), which may see an increase in the cost of the goods and services it buys from suppliers.

Extreme weather conditions like highly frequent high intensity storms can damage the network infrastructure, particularly transmission towers and pylons, thus increasing the cost of management and insurance against risks, reducing coverage, weakening the signal and interrupting the service. Variations in the levels of humidity and salinity in the air can reduce the service life of equipment. Furthermore, an increase in the average temperature can lead to a greater consumption of electricity by air conditioning and cooling systems. Potential flooding make it difficult for staff to travel and do their work, thus reducing the efficiency of the system.

Opportunities associated with climate change

The ICT sector is required to play an important part in the fight against climate change by promoting the replacement of physical products and traditional services with digital products and processes (also see *Digitisation, connectivity and social innovation/Research & development and innovative services* chapter) that can promote the virtualization of the society by reducing the need for people and goods to travel. For example:

- audio/video conferencing services and teleworking reduce the need for people to travel;
- on line invoicing and payments, in addition to saving paper and therefore the energy required to produce and transport it, eliminate the need for transport to make payments;
- telemedicine services reduce the need for doctors to meet patients in person;
- infomobility systems, using information obtained from mobile handsets, allow the optimisation of traffic flows, reducing travel times and the emission of greenhouse gases;

■ systems for the monitoring and analysis of consumption allow the optimisation of the energy efficiency of offices and dwellings.

The efficiency improvements, savings achievable in economic terms and reduced environmental impacts associated with the use of these services are an interesting business opportunity for the Company, particularly considering the sensitivity of its stakeholders and citizens in general to the need to achieve significant reductions in greenhouse gas emissions and ensure a sustainable future for the planet and society. One example is illustrated in the box and relates to the Digital Territory Programme.

In Brazil too, climate change can affect the behaviour of investors, who increasingly tend to give priority to companies that are transparent about how they manage emissions and show that they know how to assess and anticipate potential risks and seize opportunities. As a demonstration of its commitment, in 2015 TIM Participações S.A. was again included in the BM&FBovespa's Corporate Sustainability Index (ISE) for the eighth year running, and in January 2016 in the Carbon Efficient Index, ICO_2, for the sixth year running.

TIM Brasil believes that in the not too distant future Brazilian legislation will make it compulsory for various industrial sectors to report their greenhouse gas emissions. For this purpose, its emissions have been quantified and communicated transparently since 2008, the CDP questionnaire has been completed since 2007 and the company has been involved in the national EPC (Empresas pelo Clima) programme since 2010 and this could be a competitive advantage.

Digital Territory Programme (2012–2014) and its development into Digital Life (2015–2017)

In the context of public sector services, in accordance with the Italian Digital Agenda or ADI (Agenda Digitale Italiana) and European Directives, Telecom Italia has developed its offer of Smart Services: a range of services for energy efficiency and digital services in urban areas which achieved revenues of 1,140,000 euros in 2013 and 2,000,000 euros in 2014.

Also in 2013, Telecom Italia launched a rationalisation of its Smart Services offer, which it combined with Urban Security and Nuvola It Energreen, which deliver new services dedicated to security, the environment and efficient energy management, providing a comprehensive response to the needs of cities and surrounding areas. The aim is to promote the "smart city" model to improve quality of life by developing innovative digital services. In 2015 the Digital Life programme produced revenues of 2.5 million euros. The following offers[1] will be part of the Digital Life Programme and become the Service Elements for the creation of Smart Cities:

Lighting Suite (replaces and supplements the previous Smart Town offer) for the integrated management of local infrastructure networks and for the construction of Smart City environments (for a description refer to the *Digitisation, connectivity and social innovation* chapter).

Energy saving is estimated within a range of values between 15% (light produced by high-efficiency lamps, e.g. LEDs) and over 30% in the case of light produced by old style lamps (e.g. sodium vapour or incandescence). Added to these values is the option of varying lighting by switching on and/or reducing the intensity of individual lamp posts.

Assuming that average per capita energy consumption in Italy is 107 kWh[2] and applying a 20% reduction (the replacement of conventional lamps with high efficiency ones is in progress in many towns) a town of 100,000 inhabitants would be able to achieve a total annual saving of 2,140,000 kWh, corresponding to 827 t of CO_2 emissions avoided[3].

Smart Building namely ad hoc solutions for the smart management and automation of buildings able to be implemented on a project basis through the components of the Lighting Suite and Nuvola IT Energreen offers (for a description refer to the *Digitisation, connectivity and social innovation* chapter).

The energy saved can be estimated at around 10%, if only the Metering & Reporting function is implemented, but it can rise to over 50% for specific energy efficiency projects.

Nuvola IT ENERGREEN, for the remote management of energy consumption, implemented on Telecom Italia assets and services for the purpose of saving energy. The services proposed are the following:

- On-site energy audit: on-site analysis for energy efficiency
- Metering & Reporting
- Efficiency strategy: advanced reporting and Energy Management consulting services
- Energy Cost Management Services
- Special Projects: ad hoc energy efficiency improvement work.

The energy saved can be estimated at around 10%, if only the Metering & Reporting function is implemented, but it can rise to over 50% for specific energy efficiency projects.

Nuvola IT Urban Security for the management of participated security and urban territory control.

Nuvola IT Urban Security is the Cloud platform of Telecom Italia | TIM, offering a suite of automated and integrable solutions that allow the online monitoring and management of important topics concerning the city and the region, both of public interest (e.g.: mobility, road control, polluting agents) and connected to the activities of companies and organizations (e.g.: inspections, maintenance).

It is a scalable and flexible solution which, on the one hand fits in with the offers for the Smart City of Telecom Italia | TIM according to the guidelines of the Italian Digital Agency and, on the other, meets the needs of companies that also operate in the region (for a description refer to the *Digitisation, connectivity and social innovation* chapter).

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[1] The actual names of the services offered may vary once work is under way.
[2] Source: from the blog of the Italian Government Commissioner for the Spending Review.
[3] Using the 2009 conversion factor for Italy calculated by the GHG Protocol, which is 0.3864 $kgCO_2$/kWh.

The revenue trend (in millions of euros) assumed by Telecom Italia for the overall programme over the next three years is the following:

- 2016: 4
- 2017: 6
- 2018: 7

ENVIRONMENTAL PERFORMANCE

The information regarding environmental performance is drawn from management data, some of which is estimated. The data shown below relate to energy use (heating, transport and electricity), eco-efficiency, atmospheric emissions, use of water, paper and waste production. The main indicators used to measure the Telecom Italia Group's environmental performance in 2015 performed as follows:

Indicator	Trend
Total electricity procured and produced	Up
Total CO_2 atmospheric emissions	Up
Total water consumption	Up (*)
Eco-efficiency	Up

(*) As explained further on, the review of the reporting method has meant that the quantities consumed in 2015 in Italy were significantly higher than those published in the sustainability Report in previous years. Whereas application of the same criteria to the calculation of previous consumption would presumably result in a reduction as compared with last year.

Energy

[G4-EN3], [G4-EN6] Energy consumption by the Group is presented according to the guidelines proposed by the Global Reporting Initiative regarding direct consumption for heating, electricity generation and transport (Scope 1, according to the GreenHouse Gas Protocol[1]) and indirect consumption for the purchase and use of electricity (Scope 2).

Heating systems					
			Group breakdown by Business Unit (%) and % variation compared to the previous 2 years		
		Group	Domestic	Brazil	Media
Energy generated by heating oil	MJ	59,486,649	100%	0%	0%
Energy generated by natural gas	MJ	488,602,104	100%	0%	0%
Total energy for heating	MJ	548,088,753	100%	0%	0%
2015 v. 2014		(24)%	(24)%	0%	0%
2015 v. 2013		(31)%	(31)%	0%	0%

[1] The Greenhouse Gas (GHG) Protocol, developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), defines the standards of reference for measuring, managing and recording greenhouse gas emissions.

The data in the table shows that in 2015 a significant reduction with respect to 2014 and 2013 can mainly be attributed to the review of the methods for reporting on fuel consumption, but also the climatic conditions that occurred during the year of reference and to real estate rationalisation and energy efficiency improvement actions.

In Brazil, given the particular climate conditions throughout the year, indoor heating is not used. INWIT, the company of the Group that operates in Italy in the electronic communication infrastructure sector, is much smaller than the Group and is therefore part of the Domestic BU.

Transport(*)					
			Group breakdown by Business Unit (%) and % variation compared to the previous 2 years		
		Group	Domestic	Brazil	Media
Energy generated by unleaded petrol	MJ	53,395,166	19%	80%	1%
Energy generated by diesel fuel	MJ	652,677,678	99%	0%	1%
Energy generated by LPG	MJ	5,182,862	100%	0%	0%
Energy generated by natural gas	MJ	328,017	100%	0%	0%
Total energy for transport(**)	MJ	711,583,723	93%	6%	1%
2015 v. 2014		1%	2%	(10)%	(5)%
2015 v. 2013		(2)%	(1)%	(14)%	(3)%
Total number of vehicles	no.	19,571	95%	5%	0%
2015 v. 2014		(2)%	(2)%	0%	(2)%
2015 v. 2013		(2)%	(2)%	(3)%	(9)%
Total distance travelled	km	308,809,797	95%	4%	1%
2015 v. 2014		2%	3%	(6)%	(10)%
2015 v. 2013		(1)%	0%	(12)%	(9)%

(*) The data shown in the tables and graphs relating to transport refer to all the Group's vehicles (industrial, commercial, used by senior managers/middle managers/sales people), both owned and hired. The vehicles, consumption and mileage of vehicles owned or in use by the sales force of Tim Brasil have been included only where usage is significant and continuous.

(**) Represents conversion into Megajoules of the consumption of unleaded petrol, diesel and LPG (expressed in litres) and natural gas (expressed in kg).

In general the energy uses for transport and the travel times are slightly up compared to the previous year, and slightly down compared to 2013. In Italy a project is underway to renew the operational fleet, which involved around 1,500 vehicles between November and December 2015.

Consumption figures for electricity used to operate telecommunications and civil/industrial technological plants are shown below.

Electricity procured and produced					
			Group breakdown by Business Unit (%) and % variation compared to the previous 2 years		
		Group	Domestic	Brazil	Media
Electricity from mixed sources	kWh	727.868.891	19%	77%	4%
2015 v. 2014		20%	47%	16%	(1)%
2015 v. 2013		(69)%	(93)%	39%	37%
Electricity from renewable sources	kWh	1.906.970.185	100%	0%	0%
2015 v. 2014		0%	0%	0%	0%
2015 v. 2013		4.774%	4.774%	0%	0%
Total electricity consumed	kWh	2.634.839.076	78%	21%	1%
2015 v. 2014		5%	2%	16%	(1)%
2015 v. 2013		10%	3%	39%	37%

Electric energy use across the Group has risen as a result of the increased volume of traffic and services offered to customers. In particular, the rate of growth is significant in Brazil as a consequence of the expansion in the network and the market.

In 2014, Telecom Italia entered into an agreement, that also covered 2015, to buy guarantees of origin that certify the electricity generated by renewable sources. This explains in the table the significant percentage changes in the quantities of electricity used, by type, in 2014 and 2015 compared to 2013.

In 2014, to offset its direct emissions, TIM Brasil purchased 6,000 tCO_2 of carbon credits by financing a forest protection project, and aims to offset the direct emissions produced in 2015 with the remaining credits added to the credits that will be purchased in 2016. The process to select the project that will be funded in 2016 is currently underway.

The Group continued with the ongoing research to improve its energy performance by means of:

- temperature alignment and redefinition of Group policies, improving the efficiency of the existing cogeneration plants and energy stations, recalibration of set-points in multi-system sites, cogeneration refrigeration systems, free cooling and disconnection of obsolete equipment;
- technological upgrading and distributed generation work, with investments aimed at achieving "less use at a lower cost", including new free cooling technologies, prioritising air conditioning, lighting of offices and industrial sites, trigeneration plants (including micro plants), geothermal and other renewable sources;
- communication and involvement measures aimed at the Company's staff to make everyone aware of the impact of their behaviour and to emphasise the "enabling factors" that help to save energy and reduce the carbon footprint, defining dedicated roles aimed at guiding the implementation of initiatives, disseminating the results achieved at all levels and promoting a culture of energy-saving and environmental respect within the Company.

Technological developments launched in 2015, related mainly to the NGAN (Next Generation Access Network) implementation plan and LTE technology, are generally leading to an increase in energy consumption. 2015 in particular saw a significant boost being given to the technological development of the fixed and mobile networks and a significant growth in new installations in the internal and external market in the field of Information Technology, as well being characterised by exceptional weather conditions, with average temperatures, during the summer months, well above the levels in 2014. All these factors resulted in a significant increase in energy demand for both fixed and mobile communication.

The increase in the demand for energy in 2015 was estimated to be approximately 165 GWh, 21% (35 GWh) of which was associated with the increase in temperatures.

This increase was offset by the savings made possible by a series of energy efficiency improvement measures undertaken and completed in 2013 and 2014, as well as new measures undertaken and completed during 2015, including, in particular,

projects involving the replacement of obsolete equipment with new, more efficient systems. A significant boost to electricity generation has been achieved by co- and tri-generation - resulting in an estimated increase of 45 GWh on 2014 - implementing measures to improve the efficiency of currently operating systems and bringing a further 6 into service, in addition to existing ones.

It is important to underline that cogeneration and trigeneration systems use around 30% less energy than traditional electricity generation systems, and play a by no means negligible role for Telecom Italia, particularly in industrial sites, typically data processing centres (DPCs), which have notable energy requirements and high heating/cooling requirements, allowing losses due to transfer from production site to consumption site to be minimised.

- trigeneration: the 3 large co-generation plants and the 3 Plug&Play plants launched in 2014 were brought into operation. Efforts to improve the performance of systems were also put in place to achieve an average rate of operation of 87% for high power plants and 75% for those with power below 600 kw (small co-generation);
- lighting: the plan to replace conventional (neon) light fittings in the main office premises with LED technology and motion sensors has achieved 50% of the initial target of 41,000 lighting fixtures. In line with the expectations, the plan to replace 100,000 traditional light fittings (neon) in the fixed network exchanges with LED tubing technology was completed. It is important to point out how the use of a LED tube, which produces a cold light, also permits energy savings on air conditioning;
- power systems: operations on power stations were completed in accordance with the plans, by both replacing older equipment with new stations with a higher performance, and by retrofitting which led to the replacement of just the rectifier modules;
- air conditioning systems: works to replace obsolete cooling and air conditioning systems with new higher performance equipment and, in the mobile network area, Dedicated Free Cooling works, namely the installation of air ducts directly onto the chassis of a Radio Base Station (Ericsson model 6000) to extract heat, allowing an even more efficient use of Free Cooling and the air conditioner, were completed according to plans;
- DPC: in 2016 optimization works will continue in the Data Centres identified following energy audits;
- trials:
  - the CAGE project: the testing of the CAGE system on a site in the Milan area was finalised with the creation of a row of exchanges for 7 incremental racks in indoor containers (cages) with the distribution of "cool side" conditioning, a fire-fighting system and a controlled access system. The aim of the project is to reduce the energy consumption of the air conditioners directly associated with the row containing the cages and to further reduce the consumption of the remaining conditioners in the room by eliminating the thermal energy no longer developed by equipment that was once compartmentalised (the energy saving is obtained from the room layout);
  - Vigilent: this solution was tested in a room of the Oriolo Romano Data Centre with the aim of optimizing the cooling system in the room. The project involves installing a probes system and the respective actuators on the air conditioning equipment in DPC rooms.

Over the year, during the summer period, further unscheduled work was carried out to combat the increase in drawings linked to the exceptional temperatures recorded in 2015 with respect to previous years.
In detail:
- the cleaning of air conditioner filters before the planned date (approximately 1,100 cases);
- ignition tests for the telephone exchange generators (around 420 cases);
- increase of 1° C of the room temperature in the plants (in August this affected around 3,800 rooms);
- summer closure of around 900 offices.

It is expected that in 2016 innovative infrastructural solutions will be implemented, the designs of which were launched in 2015.

In detail:

- modernisation of the hydronic circuit[1] of the refrigeration units from fixed capacity to variable capacity with an inverter to modulate the working speed of the pumps;
- Rotary UPS[2]: the project includes the introduction of dynamic UPSs on a vertical axis with the aim of eliminating static UPSs in the telephone exchange, increasing the power plant's reliability by streamlining the mains-Power Generator exchange system and reducing or eliminating batteries in the telephone exchange;
- management of the temperature set-points using the "well-being button" to ensure suitable climatic conditions during targeted and temporary work carried out by technicians.

During 2015, Telecom Italia was awarded energy efficiency certificates (Titoli di Efficienza Energetica - TEE) for 34 projects, corresponding to around 40,000 TOEs (Tonnes of Oil Equivalent) per year saved and an estimated financial value, at current prices, over 5 years, of around 40 million euros.[3]

The certificates, also known as white certificates, certify the achievement of energy savings in the final use of energy as a result of work and projects carried out to improve energy efficiency. Established by ministerial decree of July 20, 2004, these certificates are issued by GSE[4] to reward entities carrying out innovative projects resulting in a significant saving of electricity or fuel. One "White Certificate" corresponds to 1 Ton of Oil Equivalent (TOE) saved, and its economic value is negotiable. In fact, electricity and gas distribution companies – known as "required" entities as they are required to achieve specific annual quantitative targets for primary energy saving – can fulfil their obligation through energy efficiency projects that entitle them to white certificates or by purchasing TEEs from other entities on the energy efficiency certificates market organized by GME[5].

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[1] A hydronic system uses water to transport thermal energy, both to heat and to cool the atmosphere.
[2] UPS is the acronym for Uninterrupted Power Supply, or continuity unit; in this case it involves dynamic units fitted with a flywheel that is kept at a constant speed when the system is powered from the mains and therefore stores kinetic energy that is transformed into electricity in the event of a black-out.
[3] The reduction with respect to 2014 is mainly due to the fact that in 2015 the Authorities imposed the application of different regulations to already approved projects. These regulations involve a reduction in the assessments of the reporting planned for the upcoming years.
[4] Gestore Servizi Energetici – www.gse.it.
[5] Gestore del Mercato Elettrico, GME S.p.A. – www.mercatoelettrico.org.

Eco-efficiency

[G4-EN5] The Group measures its own energy efficiency by using an indicator that establishes a relationship between the service offered to the customer in terms of bits transmitted and the company's impact on the environment represented by joules of energy consumed. The factors taken into consideration are the amounts of data and voice traffic of the fixed/mobile networks and energy consumption for industrial purposes (transmission and climate control in exchanges), domestic purposes (electricity for office use, air conditioning and heating in the offices) and vehicles. The diagrams show the level of the eco-efficiency indicator over the past three years for the Domestic BU and Brazil.

Eco-efficiency Indicator - Domestic BU

bit/joule

Year	Value
2013	2,828
2014	3,543
2015	4,707
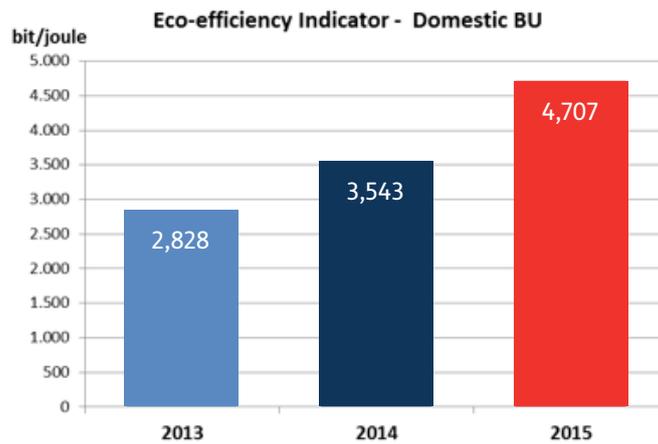
In 2015 the value of the indicator calculated for the Domestic BU was 4,707 bit/joule, up by around 33% compared to 2014 and by over 66% compared to 2013. The commitment continues with the establishment for 2016 of an objective of 5,300 bit/joule, an increase of + 12% on the figure for 2015 (see 2016 *Objectives* in the *Appendix*).

Eco-efficiency Indicator - Brazil

bit/joule

Year	Value
2013	527
2014	585
2015	833
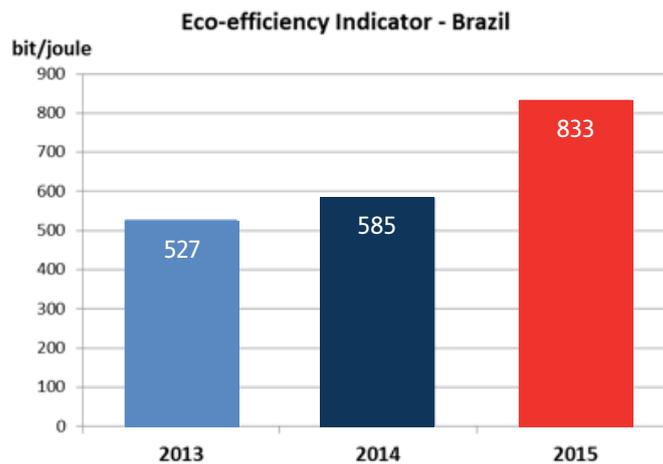
The eco-efficiency indicator calculated for Brazil also showed continuous improvement over time: in 2015 it grew by 42% compared to 2014 and by 58% compared to 2013. This was due to a considerable increase in the data traffic over the last year which did not lead to a corresponding increase in the electricity consumption thanks to the efficiency of the network. The values of the indicators calculated respectively for Italy and Brazil are not directly comparable because the two organisations are very different in operational and environmental terms: e.g. in Brazil the traffic is primarily mobile and, as previously mentioned, no heating fuels are used in view of the particular climate conditions.

Atmospheric emissions

[G4-EN15], [G4-EN16], [G4-EN19] Greenhouse gas emissions by Telecom Italia and the Group consist almost exclusively of carbon dioxide and are due to the use of fossil fuels for heating, transport, electricity generation, purchase of electricity produced by third parties and staff travel (for business trips and commuting between home and work). In addition to these, dispersals of hydrochlorofluorocarbons and hydrofluorocarbons (HCFC and HFC) from air conditioning plants are also considered and converted into kg of CO_2 equivalent.

For atmospheric emissions as well, use is made of the Global Reporting Initiative - GRI Version 4 - guidelines, which refer to the definitions of the GHG Protocol, distinguishing between direct emissions (Scope 1: use of fossil fuels for transport, heating, power generation), indirect emissions (Scope 2: purchase of electricity for industrial and civil use) and other indirect emissions (Scope 3). Unless otherwise stated, the atmospheric emission figures given in this Report have been calculated based on the updated coefficients made available by the GHG Protocol[1].

The following table shows the total CO_2 emissions of the Group.

Atmospheric emissions					
			Group breakdown by Business Unit (%) and % variation compared to the previous 2 years		
		Group	Domestic	Brazil	Media
CO_2 emissions from transport	kg	53,048,211	93%	6%	1%
CO_2 emissions from heating	kg	30,966,636	100%	0%	0%
Emissions of CO_2 equivalents for HCFC/HFC(*) dispersals	kg	6,653,780	100%	0%	0%
CO_2 emissions from electricity generation by cogeneration	kg	60,695,712	100%	0%	0%
CO_2 emissions from electricity generation using diesel	kg	3,012,587	77%	20%	3%
Total direct emissions of CO_2 - under Scope 1 GRI	kg	154,376,926	97%	3%	0%
2015 v. 2014		10%	10%	(5)%	(2)%
2015 v. 2013		(2)%	(2)%	(9)%	0%
CO_2 emissions from purchases of electricity generated by mixed sources	kg	82,266,006	3%	85%	12%
Total indirect emissions of CO_2 - under Scope 2 GRI	kg	82,266,006	3%	85%	12%
2015 v. 2014		4%	(33)%	7%	(1)%
2015 v. 2013		(89)%	(100)%	81%	37%

(*) The equivalent CO_2 emissions of the hydrochlorofluorocarbons (HCFC) and hydrofluorocarbons (HFC) are determined by reference to specific Global Warming Potential (GWP) parameters for the two gases: the index is based on a relative scale that compares the gas considered with an equal mass of carbon dioxide with a GWP of 1. The GWP of HCFC used was 1,780 and that of HFC was 1,300.

Atmospheric emissions					
			Group breakdown by Business Unit (%) and % variation compared to the previous 2 years		
		Gruppo	Domestic	Brasile	Media
CO_2 emissions from work-home commuting(†)	kg	67,271,551	91%	9%	0%
CO_2 emissions from air travel(‡)	kg	9,967,790	58%	42%	0%
Total of other indirect emissions of CO_2 – under Scope 3 GRI	kg	77,239,341	87%	13%	0%
2015 v. 2014		0%	(1)%	9%	(27)%
2015 v. 2013		(4)%	(7)%	24%	(24)%
Total emissions of CO_2	kg	313,882,273	70%	27%	3%
2015 v. 2014		6%	6%	7%	(2)%
2015 v. 2013		(69)%	(77)%	64%	34%

(†) In determining the impact of home-work commuting, reference is made to statistical data produced on the company's personnel. The scope taken into consideration has been extended from 2014 to all the Domestic BU while in previous years only the main companies were considered. The emissions were recalculated for a similar scope for 2013 too in order to obtain an accurate comparison.

(‡) Emissions due to air travel were calculated by the study and research centre of American Express (the Travel Agency used by Telecom Italia) supported by DEFRA (Department of Environment, Food and Rural Affairs of the United Kingdom) based on the number of journeys actually made, subdivided by the duration of each individual journey (short, medium or long).

The table showing emissions of carbon dioxide, particularly those under the GRI Scope2, is strongly and positively influenced, compared to previous years, by the agreement signed for the purchase, in 2014 and 2015, of guarantees of origin which certify the electricity generated by renewable sources. In both years, the agreement related to almost 100% of the electricity used by the Domestic BU.

Water
[G4-EN8]

Water consumption					
			Group breakdown by Business Unit (%) and % variation compared to the previous 2 years		
		Group	Domestic	Brazil	Media
Consumption of water drawn from artesian wells	m³	28,600	100%	0%	0%
Consumption of water provided by water supply companies	m³	5,656,777	97%	3%	0%
Consumption of water drawn from other sources	m³	27,108	0%	100%	0%
Total water consumption	m³	5,712,485	97%	3%	0%
2015 v. 2014		19%	22%	(22)%	672%
2015 v. 2013		17%	18%	(15)%	465%

The significant increase in water consumption by the Domestic BU and the Media BU in previous years is due to a review of the calculation method which made it possible to obtain more accurate data. Presumably the consumptions of previous years would also show a significant increase with respect to what was published[1]. In any case the comparison was made with data published in the previous Reports.

[1] A reworking of the evaluations of previous Group consumptions applying the current criteria would give the following approximate results: 6,360,000 m³ in 2014 and 5,560,000 m³ in 2013; therefore the total consumption in 2015 would show a reduction of 10% and an increase of 3% as compared with 2014 and 2013 respectively. Likewise, the total consumption of the Domestic BU, which is of 5,515,205 m³ in 2015, would have been of about 6,100,000 m³ in 2014 and 5,318,000 m³ in 2013.

Paper

Paper for office use					
		Group breakdown by Business Unit (%) and % variation compared to the previous 2 years			
		Group	Domestic	Brazil	Media
Non-recycled and non certified paper purchased	kg	1,821	100%	0%	0%
FSC certified paper purchased	kg	283,954	87%	13%	0%
Total paper purchased	kg	285,775	87%	13%	0%
2015 v. 2014		(19)%	(20)%	(14)%	2%
2015 v. 2013		(21)%	(20)%	(28)%	106%

Purchases of paper for office and commercial use (telephone bills) continue to be directed at product types that meet the highest environmental standards based on the responsible management of forests according to the Forest Stewardship Council (FSC, see fsc.org) requirements.

The reduction in paper consumption for office use shown in the following table is in line with a historical trend resulting from work done to raise awareness about the responsible use of paper in the workplace and rationalisation of energy use through the "printing on demand" project, which provides for the use of shared high performance printers and printing methods that save energy and consumables. Moreover, towards the end of 2015, Telecom Italia was involved in Olivetti's Cloud Printing project to deal with the need for the technological renewal of printing equipment, with the aim of optimizing printing processes and reducing the costs. The new printing equipment has high energy efficiency and reduced environmental impact.

Activities continued with the aim of achieving overall reductions in the use of paper for business purposes, including the promotion among customers of electronic invoices and statements.

Waste

[G4-EN23] The data shown in the table refer to the quantity of waste consigned[1] and recorded by law[2].

Waste consigned					
		Group breakdown by Business Unit (%) and % variation compared to the previous 2 years			
		Group	Domestic	Brazil	Media
Hazardous waste	kg	4,461,040	95%	5%	0%
Non-hazardous waste	kg	12,618,207	96%	4%	0%
Total waste consigned(*)	kg	17,079,247	95%	5%	0%
2015 v. 2014		31%	29%	88%	(19)%
2015 v. 2013		4%	3%	10%	(21)%
Waste sent for recycling or recovery	kg	16,465,964	98%	2%	0%
% Waste sent for recycling or recovery		96%	99%	44%	0%

(*) The data does not include the Domestic BU telephone poles because these are not disposed of as ordinary waste but under the framework agreement signed in 2003 with the Ministry of the Environment, the Ministry of Production Activities and the production and recovery companies, subject to the favourable opinion of the conference of State-Regions-Autonomous Provinces. In 2015, Telecom Italia decommissioned 126,163 poles weighing a total of 10,093,040 kg.

[1] By "waste consigned" is meant waste delivered to carriers for recycling or reclamation or disposal.
[2] Slight variations compared to the situation on December 31 may occur until the following March 30, because the source of the data is the records of waste loaded and unloaded, which are consolidated once the actual weight at destination has been verified. The information is supplied to the producer of the waste within 3 months of consignment, which is the reason for the potential variations in the data.

Waste data varies over time according to the quantities and types delivered to the companies contracted to treat it. The most important item of data for Telecom Italia's purposes is the ratio between waste produced and consigned for recycling/recovery, which reached a significant level.

Ministerial Decree No. 65 of March 8, 2010 (published in the Gazzetta Ufficiale on May 10, 2010) implemented the collection of Waste Electrical and Electronic Equipment (WEEE) by all Telecom Italia sales channels as of June 18, 2010, resulting in the company's registration as a "distributor" in the national Register of environmental managers.

Telecom Italia has entered into contracts aimed at recovering used, faulty and end-of-life products and materials, in order to allow components and raw materials to be reclaimed. In 2015, this allowed the landfill disposal of 1,300,000 products to be avoided and tangible financial benefits to be gained from their recovery.

The various management activities allowed logistics and network products (81,748 items) and commercial logistics products (127,782 items) to be regenerated, components and raw materials (1,012,476 items) to be sent for recovery and used products (83,880 items, almost exclusively of mobile telephony) to be resold.

In Brazil TIM collects and manages mobile terminals, batteries and accessories at its shops through the Recarregue o Planeta (Recharge the Planet) programme. This activity has a dual purpose: contributing to a reduction in WEEE produced while at the same time generating a financial benefit resulting from the difference between the cost that would be incurred for the purchase of new equipment and the cost of regeneration.

Electromagnetic emissions

The actions of the Group on the subject of electromagnetic emissions are essentially:

- careful management of its equipment during its entire life cycle and in compliance with current regulations and internal standards of efficiency and safety;
- deployment of, and constant research into, the latest technological instruments for checks and controls.

Systematic monitoring of the levels of electromagnetic emissions in installations aims to ensure that legal limits are respected and high safety standards are maintained for workers and the general population. According to the checks carried out in Italy, the electromagnetic emissions generated are well within legal limits.

As part of the certification of mobile phones sold on the market under the TIM brand, TILab performs tests on all technologically innovative products to check the SAR (Specific Absorption Rate) declared by suppliers. This parameter estimates the quantity of electromagnetic energy per unit of body mass absorbed by the human body in the event of exposure to the electromagnetic field generated by telephones and other mobile devices. Telecom Italia certifies and sells through its sales network only mobile devices with a SAR value lower than the limit set by European legislation. In determining this conformity Telecom Italia complies with the instructions given in the ICNIRP (International Commission on Non-Ionizing Radiation Protection) guidelines and subsequent declarations of conformity[1]. This qualification, which is carried out during the pre-marketing stage, when Telecom Italia does not often have the SAR value declared by the supplier, makes the test more valuable than a simple quality control check.

Joint activities are also taking place with a number of ARPAs (regional environmental protection agencies) to assess the electromagnetic fields generated by Radio Base Stations, considering the actual power transmitted based on traffic and power control mechanisms, in accordance with changes to the Prime Ministerial Decree of 8/7/2003 contained in the Decree Law on Growth 179/2012. Similar attention is paid to the emissions from mobile devices using the frequency bands operated by Telecom Italia.

In Brazil the non-ionising radiation emitted by the radio base stations of TIM Brasil are fully within the parameters dictated by the World Health Organization and adopted by ANATEL. All the radio base stations of TIM Brasil have a license to operate issued by ANATEL.

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[1] Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). Health Physics 74 (4): 494-522; 1998; Statement on the "Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz)". Health Physics 97(3):257-259; 2009.

Compliance with existing environmental legislation

As active and responsible members of the community, the Group's companies are committed to observing and ensuring the observance of the laws in force in the Countries in which they operate and adopt the organisational tools needed to prevent the violation of legal provisions[1]. During 2015, no significant financial penalties[2] were imposed on the Group's companies in Italy for violations of environmental legislation in the areas in which they perform their activities. This consideration is also valid for the previous two years. In Brazil a significant penalty was inflicted in 2015 for having put a radio base station into operation prior to obtaining the environmental authorization, while none were received in previous years. Now TIM has fulfilled all legal obligations, and is waiting to receive the authorization from the competent regulatory body.

Similarly, there are no non-financial administrative sanctions or environmental dispute resolutions via conciliation mechanisms to be reported for 2015 or the previous two years. In Brazil, there is no arrangement for environmental disputes to be resolved by conciliation.

ICT can influence the price, efficiency and relative convenience of products and services, eventually affecting the demand for services and increasing the overall demand for energy. It can also accelerate the obsolescence of products and require the resulting technological waste to be managed. It is the responsibility of the ICT sector, and therefore also of Telecom Italia, to consider these effects, focusing on research and development to create products with a low environmental impact throughout their entire life cycle (see *Digitisation, connectivity and social innovation* chapter).

In 2015, Telecom Italia handled centrally around 821 audio conferences and 5,778 video conferences between its offices in Rome and Milan. Using the specific automatic booking portal for audio and video conferencing services, employees independently held 44,425 video conferences (+30% compared to 2014) and 94,918 audio conferences (+16% compared to 2014). The use of these communication systems is estimated to have allowed a significant amount of carbon dioxide (and other pollutants) associated with the use of means of transport to be avoided.

TIM ECO-FRIENDLY

At the end of the 1990s, Telecom Italia launched a series of internal research and development activities to build terminals with a reduced environmental impact. In order to improve the environmental efficiency of products offered to private and business customers alike, attention has to be paid to their energy aspects, optimising consumption while meeting the needs of the services delivered and applying "Design For Environment" rules that reduce their environmental impact, particularly during the production phase and the end-of-life management of equipment.

Pursuing and expanding this logic, the Telecom Italia Green logo has been created, renamed TIM eco-friendly in 2015, to identify both Telecom Italia's environmental protection initiatives and projects and eco-friendly products.

For products and initiatives that bear this logo, information is provided about the features and specific solutions adopted, as a result of which their eco-friendliness and/or environmental benefit can be demonstrated. In the case of products, this information appears in the environmental statement drawn up in accordance with the UNI EN ISO 14021 standard, as well as in the sustainability section of the telecomitalia.com website, where information can also be found about the "eco-friendly" features of initiatives and projects.

The eco-friendly range includes a number of products developed with the assistance of suppliers and dedicated to business

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[1] Principles stated in the Group's Code of Ethics and Conduct and in the Human Rights Policy.
[2] Significant financial penalties for the Group in Italy are considered to be those that exceed 500,000 euros; for its own accounts, Brazil applies an amount of 100,000 reais.

and consumer customers alike.

The most recent environmental declarations issued relate to 4 new products launched in 2015, i.e.:

- the ADSL Wi-Fi N DA2210 modem produced by ADB and used for broadband services, which provides savings of over 28% on average annual electricity use with respect to a previous generation product, and comes with a high energy efficiency power supply (over 79%);
- the FACILE MAXI Panasonic cordless phone which provides electricity savings of 41% with respect to a previous product with the same functions;
- the FACILE SMILE Olivetti cordless phone which provides electricity savings of 38% with respect to a previous product with the same functions;
- the Range Extender Wireless WRE6505-AC750 produced by ZyXEL which, in the daily/annual operating cycle, provides a daily reduction of electricity consumption of over 39%.

The electricity savings also translate into an equivalent reduction of greenhouse gas emissions. It should also be pointed out that particular attention has been paid to the design and choice of the shell and packaging materials, which are homogeneous and recyclable.

CORPORATE SHARED VALUE
PROJECTS

ENERGY EFFICIENCY

Social Need
- ► Protection of the environment and landscape
- ► Research and innovation for companies

ECONOMIC SHARED VALUE

Social Value:
7,5 million euros

Business Value:
18 million euros

Scenario

The concept of efficiency pertains to the relationship between the inputs of a production process and the outputs sought by that process. Energy efficiency in the ICT context has economic and environmental relevance in terms of managing the energy required. The energy requirement and consequent consumption of the Domestic BU stands at around 2 TWh per year and the Group is the second biggest electricity consumer nationally.

The electricity purchased is almost all generated from renewable sources and is therefore covered by guarantee of origin certificates, contributing to a dramatic decrease in indirect carbon dioxide emissions.

Protecting the environment, improving energy efficiency and offering services that reduce emissions of greenhouse gases and other pollutants are the main intervention policies adopted by the Group to promote sustainable development in its areas of influence.

Environmental strategy

All the Group companies are inspired by the following fundamental principles: optimising the use of energy sources and natural resources; seeking to improve energy/environmental performance, minimising negative impacts and maximising positive ones; adopting purchasing policies that are sensitive to environmental themes; dissemination of the correct approach to environmental issues.

Environmental Management Systems (EMS)

Telecom Italia has an ISO 14001 certified EMS. In some situations the EMS is integrated with the Quality Management System based on ISO 9001 standard as well as with the Security Management System based on OHSAS 18001 standard.

Eco-efficiency

The Group measures its own energy efficiency by using an indicator that establishes a relationship between the service offered to the customer in terms of bits transmitted and the company's impact on the environment represented by joules of energy consumed. The factors taken into consideration are the amounts of data and voice traffic of the fixed and mobile networks and energy consumption for industrial purposes (transmission and climate control in exchanges), domestic purposes (electricity for office use, air conditioning and heating) and vehicles.
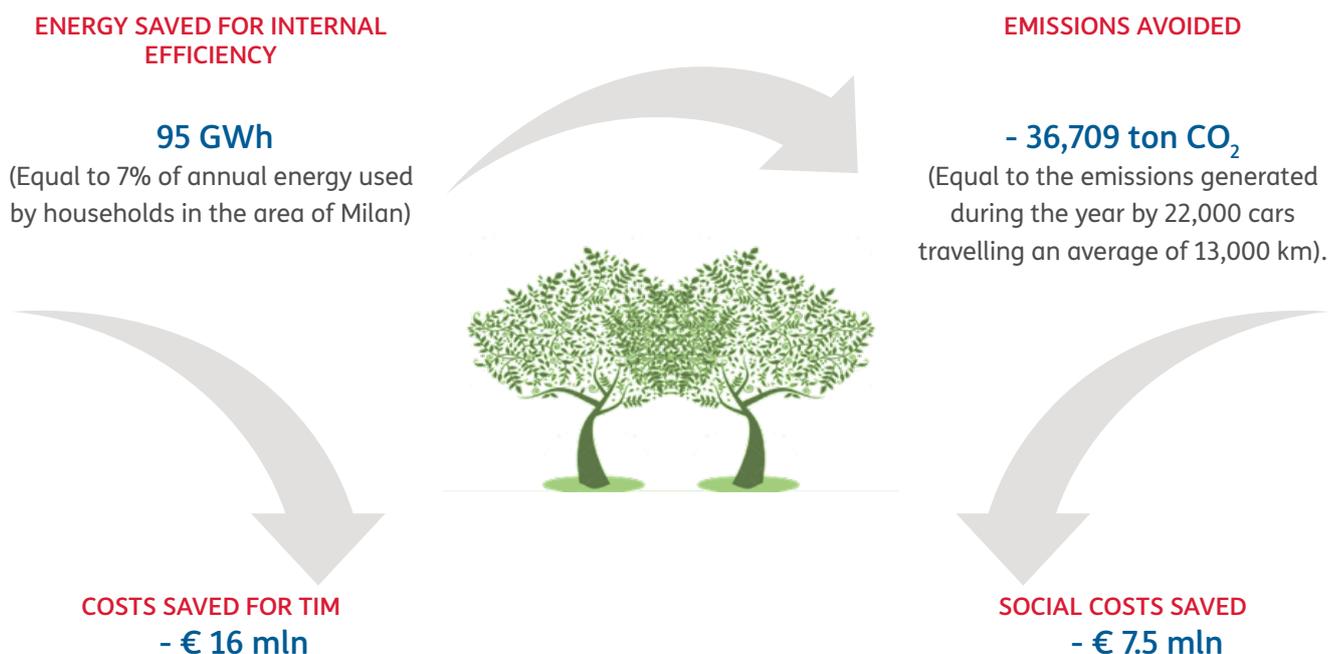
The *Titoli di Efficienza Energetica* (TEE) system

Also during 2015, Telecom Italia was awarded energy efficiency certificates (Titoli di Efficienza Energetica - TEE) for a total of 34 approved projects, corresponding to around 40,000 TOEs (Tonnes of Oil Equivalent) per year saved and an estimated financial value, at current prices, over 5 years, of around 40 million euros.

Consumption monitoring: internal use and supply to Customers

Consumption trends and the need to control them in real time, the ability to verify the effectiveness of optimisation activities, have promoted the creation of a proprietary monitoring system covering 42% of the group's total consumption, through a network of over 30,000 sensors. The number of fixed and mobile network sites with sensors is 2,768. Through these remote measurements and the processing done by the "TI Green" platform, the Company is able to certify the results of improvement actions implemented.

This experience and the great number of activities and projects aimed at reducing consumption and CO_2 emissions are an asset available to customers. The offer is able to fulfil the main requirements for optimisation of consumption among the various customer segments: from medium-sized industrial companies to public administration units and big multi-site industries with an international presence.

ENERGY SAVED FOR INTERNAL EFFICIENCY

95 GWh

(Equal to 7% of annual energy used by households in the area of Milan)

EMISSIONS AVOIDED

- 36,709 ton CO_2

(Equal to the emissions generated during the year by 22,000 cars travelling an average of 13,000 km).

COSTS SAVED FOR TIM
- € 16 mln

SOCIAL COSTS SAVED
- € 7.5 mln

Methodology

The Business Value, amounting to 18 million euros, consists of the following:

- 16 million: enhancement of the reduction of atmospheric emissions. This reduction is an estimate of energy savings as a result of energy efficiency initiatives (amounting to 95 GWh) calculated by the coefficient of 0.386411 kg CO_2/kWh[1].
- 2 million: sale of energy efficiency certificates (Titoli di Efficienza Energetica - TEE) related to projects approved in 2015.

The Social Value is an estimate of the reduction of CO_2 emissions according to the following parameters: ton CO_2 * € 203/Ton[2]

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[1] Emissions relating to the consumption of electricity purchased from mixed sources in the Italian market have been calculated by using the coefficient published by the GHG Protocol for 2009 - which considers the national energy mix - equal to 386 grams of CO_2/kWh.
[2] Source: Standford University - http://news.stanford.edu/news/2015/january/emissions-social-costs-011215.html.

BIOSITE

Social Need:
► Protection of the environment and landscape
► Research and innovation for companies

ECONOMIC SHARED VALUE

Social Value:
► Less environmental impact: a Biosite supports more technologies (data transmission, electricity and video cameras).
► Impact on the community: improvement in safety thanks to the installation of surveillance cameras.

Business Value:
about 18 million reais
(about 4 million euros)

Scenario

The rapid increase in the Brazilian population has led to a growing search for spaces to install telecommunication equipment, which has resulted in clusters of aerials springing up on roofs, the façades of buildings and metal structures.

In order to regulate this situation, many cities have established rules which have made the licensing process even more cumbersome. This has led to a slowdown in the expansion of the network.

The Brazilian telecommunication association estimates that there are over 250 different municipal laws relating to aerial permits.

In order to circumvent these barriers, TIM Brasil has launched the Biosite, a metal pole that supports all the equipment needed to install a Radio Base Station inside its own structure.

It is in effect a macro-site, developed and patented entirely by TIM Brasil, providing a triple benefit:

■ low TCO (Total Cost of Ownership);
■ quick installation;
■ minimal visual impact.

The Biosite is a multifunctional structure that improves the quality of data transmission and can be used at the same time to provide public lighting and video surveillance.

It uses less energy and has a lower environmental impact because it uses 99% less steel than a conventional radio base station and requires less physical space, avoiding the need for external cabins or auxiliary structures.

The first Biosite was installed in June 2014 in Curitiba (Paraná). Over 100 Biosites have so far been installed across the country. The technology can be found in Rio de Janeiro, Brasilia and a further 6 cities.

The project provides for the installation of new 3G and 4G sites in additional cities and is estimated to reach 300 new installations in Rio de Janeiro for the 2016 Olympic Games.

Methodologie

The Business Value consists of the cost reduction to install a Biosite versus a conventional Radio Base Station, calculated across 100 Biosites installed by 2015.