

Contents

Letter from the Chairman
 Criteria of 2002
 Report preparation
 Presentation of Pirelli SpA
 Pirelli and the Environment

CONTENTS

General		Pag.
Letter from the Chairman		3
Criteria of 2002 Report preparation		5
Presentation of Pirelli SpA		8
Pirelli and the Environment		10
<i>The Pirelli Environment Policy</i>		10
<i>The Organization</i>		11
<i>The Environmental Management System</i>		12
<i>Environmental Improvement Objectives</i>		13
<i>Environmental Risk Management</i>		14
<i>Environmental Product Evaluation</i>		15
<i>Recognitions and Voluntary Actions</i>		16
<i>The Activities of Pirelli Labs</i>		17
<i>Results at the Pirelli SpA Level</i>		20
The Energy Cables and Systems Sector		
Presentation of the Sector		21
Energy Cable Production		22
Rod Production		23
Production of Accessories		23
Special Activities and Technological Innovation		24
Results of the Energy Cables and Systems Sector		27
Telecom Cables and Systems Sector		
Presentation of the Sector		28
Telecom Cable Production		29
Optical Fiber Production		30
Special Activities and Technological Innovation		31
Results of the Telecom Cable and Systems Sector		32
The Tyre Sector		
Presentation of the Sector		33
Tyre Production		33
Steel Cord Production		34
Product Life Cycle		35
Research & Development Activity		41
Results of the Tyre Sector		42
Quantitative data		
Pirelli S.p.A.		43
Analysis of Quantitative Data by Category		52
“Energy Cables” Category		53
“Accessories” Category		57
“Rod” Category		60
“Telecom Cables” Category		64
“Optical Fiber” Category		68
“Tyres” Category		72
“Steel Cord” Category		76
Glossary		
2002 Environmental Report Audit Letter		82

Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

LETTER FROM THE CHAIRMAN

Pirelli S.p.A. is presenting its Environmental Report for the third consecutive year to inform our shareholders, customers, institutions, Company personnel and all our stakeholders about the environmental impact generated by our activities in 2002 and the actions taken to implement the principles set forth in our Environmental Policy.

Pirelli is one of the largest industrial players on the international scene, and we are aware of the responsibilities that this role entails with regard to the economic, social and environmental spheres in which we operate.

We believe, in fact, that the success of a modern company is increasingly linked to its ability to develop and manufacture products that not only satisfy customer expectations but also adequately respond to the various demands placed by society as a whole.

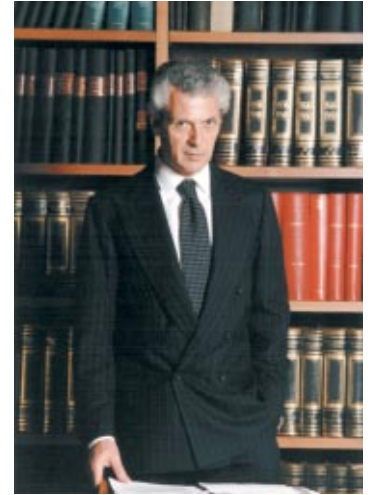
It is this sense of responsibility that inspires and guides our strategic decisions to achieve the dual objective to constantly expand our capacity for creating value and contribute to an improved quality of life.

It is from this perspective, therefore, that we keep our people ever mindful of the fact that sustainable development is a primary objective to pursue during the performance of our everyday work: from the highest profile activities, such as the design of new products and processes, to the day-by-day operations in our plant facilities.

One important aspect of this objective is our determination to endow all our plants with an Environmental Management System consistent with the ISO 14001 Standards, an objective that has been largely achieved. We want to have a rigorous control over all the environmental aspects associated with our activities around the globe and to formulate programs to continuously enhance our environmental stewardship.

In addition to managing the environmental aspects of our plants, we are constantly improving our knowledge of the environmental impact of the entire chain that involves us, from an integrated viewpoint that considers the entire life cycle of our products, from design to end-of-life.

In this sense, I would point out the activities of our research staff and the important results already achieved both in designing new products that combine improved



Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

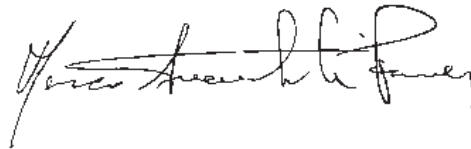
technical performance with less environmental impact and in developing innovative processes such as MIRS and the CCM technology. Such technological breakthroughs permit not only a significant improvement in the working environment but also a drastic reduction in the principal environmental parameters with respect to traditional technologies.

With Pirelli Labs, we have launched and implemented some research projects toward advanced technologies in the environmental field regarding the recycling of end-of-life tyres and innovative systems for producing clean energy, such as fuel cells and photovoltaics.

Along with Pirelli Ambiente, whose primary strategic mission for the creation of value is technological innovation applied to end-of-life tyres, we are obtaining meaningful results as demonstrated by the first integrated plant for the production and combustion of CDR-Pirelli in northern Italy.

The international recognition we received in 2002, such as our inclusion in the two most prestigious international sustainability indices: the *Dow Jones STOXX Sustainability Indices (DJSI STOXX)* and the *FTSE4GOOD Series*. This confirms that our efforts are aimed in the right direction and that the implementation of rigorous environmental standards and related investments also provide important visibility for those investors who increasingly wish to allocate their resources based on criteria of sustainability.

In conclusion, I feel that the information contained in this third Environmental Report is exhaustive and demonstrates that we are aware of our role and our responsibilities in providing present and future generations the conditions and instruments for a better quality of life..



Contents

Letter from the Chairman

 Criteria of 2002
Report preparation

 Presentation of Pirelli SpA
Pirelli and the Environment

CRITERIA OF 2002 REPORT PREPARATION

The 2002 Environmental Report is largely consistent with the previous reports but presents some significant modifications and additions largely of an editorial nature.

More specifically, this year's Report is divided into two parts: the first part provides an exhaustive description of how Pirelli S.p.A. approaches and manages the relationship between its activities and the environment; the second part includes the quantitative data, organized to make them easier to interpret.

As mentioned in last year's Report, the reorganization of the Cables and Systems Sector was completed in 2001 with the formation of two separate companies: Pirelli Energy Cables and Systems and Pirelli Telecom Cables and Systems. In this Report the two companies are therefore presented separately in both the descriptive and quantitative parts. The Operating Units with mixed energy and telecommunication cables production have been included in the Energy Cables and Systems Sector, as they are managed industrially.

The Report concerns all the operating units of Pirelli SpA that produced during 2002, including those that operated only part of the year due to divestitures and other industrial decisions. The purpose is to provide a picture as complete and accurate as possible of Pirelli's total environmental load during the year in question.

The Report does not consider the following operating units:

- Invex (production of enamelled wire in Italy), sold during the year, for which no data could be collected. This resulted in the elimination of the enamelled wire category from the Report this year and the inclusion of data on the only enamelled wire production unit remaining in Pirelli SpA, the one in Brazil;
- Settimo Torinese (energy cable production in Italy) and Clayton (energy cable production in Australia), whose gradual shutdown over the course of the year made it impossible to collect significant data.

This year the quantitative data include values relative to:

- CO₂ emissions linked to internal fuel consumption for energy production and the consumption of fuel necessary to produce the electrical energy that was purchased. The factors used to convert energy quantities into kg of CO₂ emitted, shown in the following table, were taken from international databases (BUWAL250 and IDEMAT2001)¹.

Energy/CO₂ conversion factors

Type of energy	Source	Conversion factor	
Natural gas (in GJ)	BUWAL 250	57,0	Kg CO ₂ / GJ
Diesel oil (in tons)	Idemat 2001	2983,3	Kg CO ₂ / t diesel
LPG (in tons)	Idemat 2001	2703,6	Kg CO ₂ / t LPG
Fuel oil (in GJ)	BUWAL 250	88,9	Kg CO ₂ / GJ
Electricity (in GJ)	BUWAL 250	119	Kg CO ₂ / GJ

¹ Okoinventare für Verpackungen Schriftenreihe Umwelt 250, Bern, 1996 – Idemat 2001, Delft University of Technolog.

Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

- Ozone layer depleting substances present in cooling/conditioning and/or firefighting equipment or used in degreasing, cleaning of metallic parts, and in the laboratory, both in use and in storage.
- Quantity of dielectric oil containing polychlorinated biphenyls and polychlorinated triphenyls present in transformers, condensers, etc., in use, in storage and awaiting disposal, regardless of their concentrations.
- With respect to energy consumption, the definition of “electrical energy” has changed, compared to previous reports. In fact, in this report, the actual electricity consumed by each Operating Unit has been considered, as recorded by the individual electricity meters on site. In previous years the consumption analysis also took into account the transformation efficiency of electrical energy production, occurring upstream from the Operating Unit. This definition led to higher consumption values.

To allow for accurate comparison of historical data, this new definition has been applied to consumption values from previous years.

The environmental database

In 2002 we pursued the development of a centralized “database” at the corporate level for analyzing and processing the data collected through the archiving of 20 specially prepared data-sheets.

To further improve the reliability of the system, we refined the procedures for data collection and management, including the following steps:

- a) initial consistency check by comparison with prior years' data and with process characteristics;
- b) entry to the database;
- c) additional cross-check with other data, such as those for production; this reveals any anomalies with respect to standard data;
- d) requests for clarification from the operating units or audit of the data entry process.

If data passes the four phases described above, they are considered reliable and can therefore be forwarded to the next phase of processing.

In 2002 a project was also initiated to transform the current database, resident on a central server, into an archive developed according to Web-based logic on the Intranet so as to permit the operating units to enter data directly via computer and increase the efficiency of the entry, checking and processing phases. This modification will become available in 2003.

Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

Revision of prior years' data

As part of the continuing improvement of data acquisition and analysis, a complete audit was performed on all the information already present in the database.

This audit enabled us to detect and correct some inaccuracies related to prior years. In order to maintain the maximum transparency and credibility of the data presented, we decided to furnish the correct data in every case, even where this meant reducing comparability with prior years' data.

International references

In drafting the Report we sought to refer, wherever possible, to the document "Sustainability Reporting Guidelines" of the 2002 Global Reporting Initiative, for the part regarding the environmental dimension, particularly the procedures for presenting and processing data.

Review of the Environmental Report by SGS Italia Srl

Pirelli decided to subject this Environmental Report to verification by SGS, an independent inspection, testing and certification organisation, well respected at international level.

From 2003 onwards, SGS will be able to carry out a certain number of assessments concerning the effectiveness and reliability of data processing methodologies in the Operating Units during the ISO 14001 Environmental Management System certification and surveillance audits.

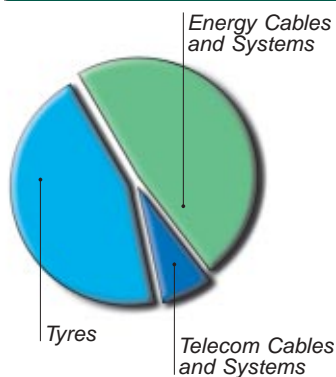
Contents

- Letter from the Chairman
- Criteria of 2002
- Report preparation
- Presentation of Pirelli SpA
- Pirelli and the Environment

PRESENTATION OF PIRELLI SPA

The business of Pirelli SpA for the year ended 31 December 2002 was divided into three industrial sectors – Energy Cables and Systems, Telecom Cables and Systems, and Tyres – with a sales breakdown of 48%, 7% and 45%, respectively.

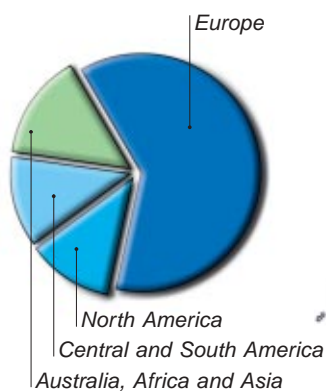
Geographically, sales were divided as follows: Europe 61.7%, North America 11.6%, Central and South America 12.3%, Australia, Africa and Asia 14.4%.



Pirelli SpA in figures

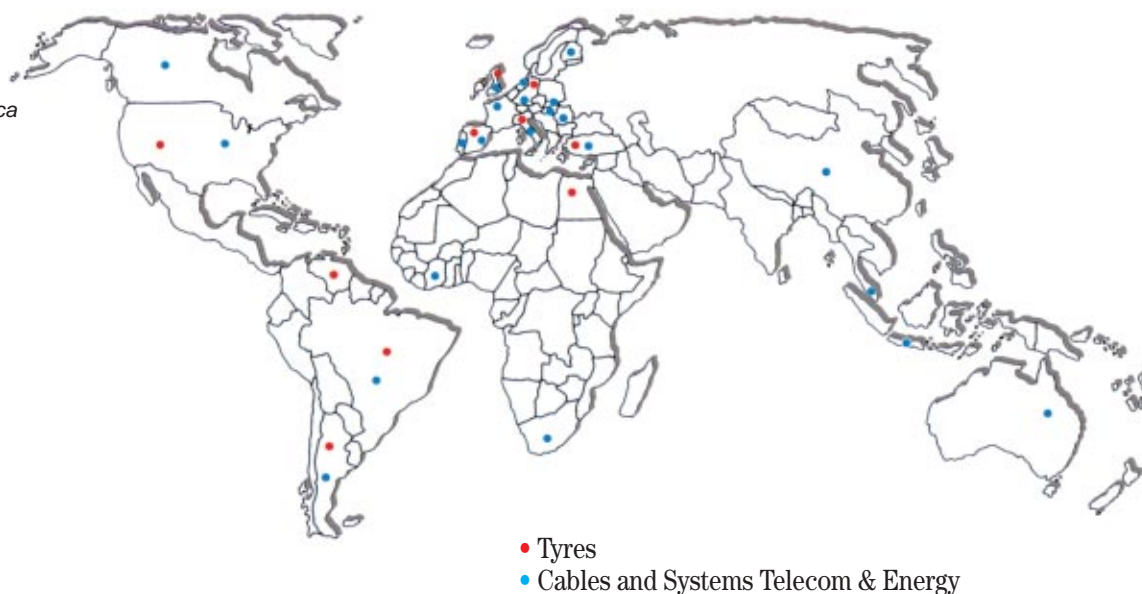
	2002	2001	2000	1999
Consolidated revenues (EUR millions)	6,311	7,509	7,477	6,482
Employees (no.)	36,079	39,127	41,914	40,103
Plants (no.)	79	84	87	87

Breakdown of Pirelli SpA 2002 sales by industrial sector and geographical area



Operating Units of Pirelli SpA worldwide

At 31 December 2002, Pirelli was present in 24 countries on the five continents with 79 factories, five less than in 2001 due to industrial rationalization in 2002.



Contents
 Letter from the Chairman
 Criteria of 2002
 Report preparation
 Presentation of Pirelli SpA
 Pirelli and the Environment

We considered 89 operating units in preparing the Report, however, following the principle of including all those factories that produced in even a part of 2002. Three factories (Sorocaba in Brazil, Prescott and Bishopstoke in the UK) were divided into various operating units, as there are several types of production at the same industrial sites.

The following table shows the distribution of the operating units by country.

	Number of Operating Units		Number of Operating Units		Number of Operating Units
EUROPE	58	NORTH AMERICA	6	AFRICA, AUSTRALIA AND ASIA	10
Finland	1	Canada	2	Australia	2
France	9	USA	4	China	3
Germany	6			Egypt	1
The United Kingdom	14	SOUTH AMERICA	15	Indonesia	1
Italy	14	Argentina	3	Malaysia	1
Netherlands	1	Brazil	11	South Africa	1
Portugal	1	Venezuela	1	Zimbabwe	1
Romania	1				
Slovakhia	1				
Spain	4				
Turkey	3				
Hungary	3				



The first MIRS™ factory overseas went into operation in Rome, Georgia (United States).

Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

PIRELLI AND THE ENVIRONMENT

The Pirelli Environment Policy

The "Pirelli Environment Policy" issued by top management in 1999 is totally adequate to express clearly the strategic guidelines by which Pirelli intends to develop its business, at the same time ensuring particular attention to the continuous improvement of environmental performance and pollution prevention. The policies of the affiliates and/or individual operating units were generated from the Group policy, as prescribed by the Environmental Management Systems developed in accordance with ISO standard 14001.

The following are the general principles adopted by Pirelli in its Environmental Policy:

Pirelli Group considers environmental protection as one of the essential elements of its activities. To this end, it has adopted the following principles:

- to identify the environmental impact of its activities in order to eliminate or minimize them, complying with existing legislation in different countries as a minimum requirement;
- to manage its production activities by adopting Environmental Management Systems in compliance with international standards;
- to abide by the principle of "sustainable development" and to put it into practice;
- to assess the environmental impact of its products adopting a "full life cycle" approach and to promote the development of products to reduce their impact on the environment;
- to contribute to preserving natural resources also by re-using, recycling materials or by recovering energy from materials;
- to promote the use of the most advanced technologies in order to achieve excellence in the environmental field, maintaining contacts with international scientific circles;
- to actively involve all levels of the organization and all Group employees;
- to ensure that its business locations are in harmony with their natural and human surroundings
- to communicate and spread environmental information internally and externally, developing co-operation with customers, suppliers, the public and other interested parties.

Contents

Letter from the Chairman
 Criteria of 2002
 Report preparation
 Presentation of Pirelli SpA
 Pirelli and the Environment

The organization

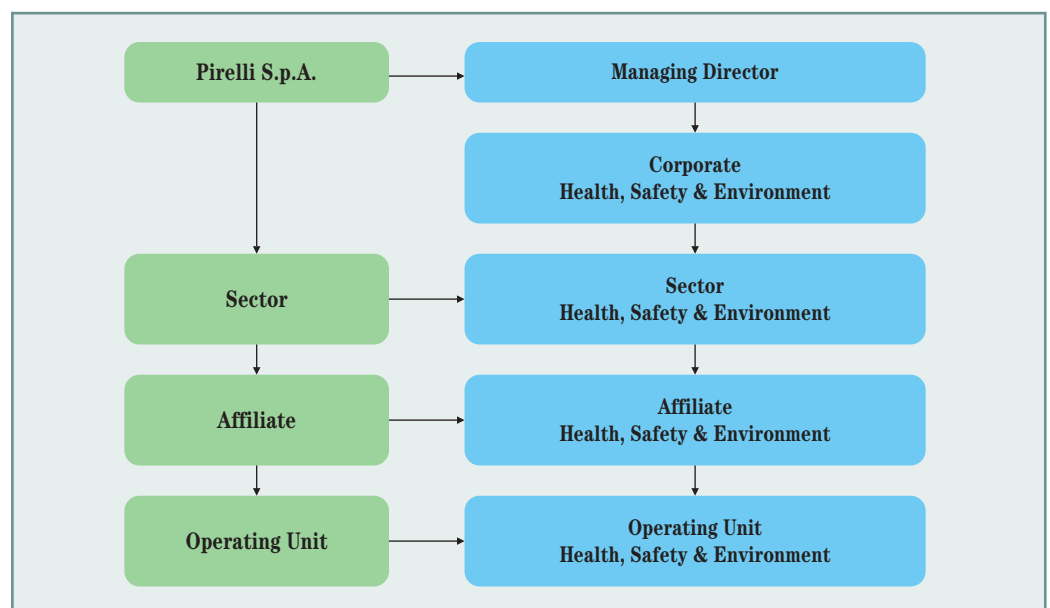
The structure and duties of the specialized functions appointed within the company to safeguard the environment have changed little with respect to previous years. The function name has been changed to “*Health, Safety and Environment*” to further emphasize its across-the-board role regarding all aspects that concern the overall impact of our work on people and the environment, inside and outside the factory.

The Corporate function is responsible for guidance, coordination and control and also acts as an excellence centre for resolving problems that are particularly complex from the technical and/or managerial standpoint. It is also responsible for conducting environmental “due diligence” in cases of acquisitions and divestitures.

In some especially important geographical areas (North and South America), we have instituted *HS&E* functions that report to the Area Manager and functionally to the Corporate *HS&E* function.

The Sector *HS&E* structures, which answer hierarchically to the Sector management and functionally to the Corporate *HS&E* function, have the duty of adapting Corporate guidelines into operational terms for the specific industrial contexts and ensuring that they are implemented through *HS&E* functions at the Affiliate (country) and Operating Unit levels.

The *HS&E* functions of the Affiliates and Operating Units are organizationally dependant on Manufacturing or Human Resources. Considering the different contexts in the various countries, however, the tendency is to favour the former solution, partly to ensure that the *HS&E* function is positioned organizationally as close as possible to those who manage the life of the Operating Units on a day-to-day basis. Considering the organizational structure indicated in the following diagram, one can understand the important dimensions the *HS&E* function covers at the Pirelli SpA level, with around a hundred persons assigned full-time.



Contents

Letter from the Chairman
 Criteria of 2002
 Report preparation
 Presentation of Pirelli SpA
Pirelli and the Environment

The Environmental Management System

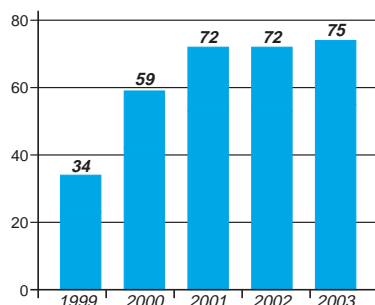
To give practical implementation to the principles set forth in the Environmental Policy, a program was launched in 1998 to implement and certify the Environmental Management System (EMS) in the Operating Units of Pirelli SpA in accordance with ISO standard 14001.

That same year the “*Environmental Steering Committee*” (ESC) was formed, chaired by the Corporate HS&E function and composed of the HS&E managers of the three Sectors. The duties of the ESC are to develop standard Pirelli methodologies for implementing the EMS, selecting and training the internal auditors, ensure the correctness of the auditing activity, and supervise the management of nonconformities and corrective actions, while keeping company top management constantly informed.

The EMS focuses on manufacturing activities, since they are the most significant from the standpoint of potential environmental impact, but in some cases engineering, research laboratories, and logistics and service activities have been involved.

During 2002 seven Operating Units achieved certification, to add to the 72 certified in previous years (though four of them have been divested).

At 31 December 2002, around 90% of the Operating Units were ISO 14001 certified, including the units acquired recently. Projections call for the extension of certification to the Operating Units of Guacara (Venezuela), Slatina (Romania), and Verreniging (South Africa) by the end of 2003.



Number of Operating Units
 certified ISO 14001
 (1999-2002 and objective 2003)

The Pirelli Audit Team

One of the peculiarities of the approach adopted by Pirelli is the creation of a Group EMS audit team composed of 19 auditors at 31 December 2002. The Team includes auditors selected from the central functions and from the local HS&E functions in the various countries, specifically trained to conduct EMS audits in accordance with requirements established by the ESC in agreement with SMS certification body.

Sixty-two audits were conducted in 2002 in 17 countries: over 60% of these audits were conducted by the Pirelli auditors, while the others were conducted by SMS according to a program agreed at the beginning of the year, in conformity with the sampling criteria established by contract.

The auditing system adopted by Pirelli through the use of internal auditors not only ensures a continuous, direct oversight of the EMS but has resulted in a series of significant accomplishments at the Group level:

- The creation of a new professional role—the Pirelli auditor—within the Group, highly qualified and accountable;
- The exchange of experiences and improvement opportunities within the environmental operation;
- The optimisation of certification and EMS maintenance costs.

The results obtained with the audit system developed for the EMS convinced us to apply this experience to the implementation of the safety management system, now in progress.

Contents

Letter from the Chairman
 Criteria of 2002
 Report preparation
 Presentation of Pirelli SpA
Pirelli and the Environment

Environmental Improvement Objectives

In accordance with the principles of the Environmental Policy and ISO standard 14001, Pirelli establishes and periodically reviews its environmental improvement objectives and programs. In most cases, these programs are formulated by the individual Operating Units based on the specific environmental aspects and their significance, bearing local legislation and operating requirements in mind.

Through the Corporate HS&E function Pirelli also provides continuous improvement of the operating procedures for significant environmental aspects in the Operating Units through the publication and maintenance of operational standards. The operational control mechanisms are also periodically reviewed through the audit system mentioned earlier and through targeted checks and monitoring.

The following table shows an example of some action completed, or scheduled for completion in early 2003, in a few Operating Units.

Operating Unit	Action	Results	Amount (euros)
Tyres Sector			
Celikord (Turkey)	Installation of an exhaust, ventilation and soundproofing system for part of the machinery	Improved air exchange and noise reduction in the cord department	109 000
Guacara (Venezuela)	Installation of an oil entrapment system	Reduction of contamination in effluent water	43 000
Sumarè (Brazil)	Improvement and automation of control over the effluent water treatment unit	Improved efficiency of the effluent water treatment unit	75 000
Energy Cables and Systems Sector			
Bishopstoke (UK)	Modification of effluent treatment unit for the tinning process	Reduced water pollution, reduced waste	200 000
Bratislava (Slovakia)	Installation of new devices for filtering fumes and powder from the rubber compound production process	Reduced emission of pollutants into the air	20 000
Delft (Netherlands)	Action to reduce scrap and waste	Reduction waste	76 000
Livorno (Italy)	Installation of containment tanks	Elimination of risk of soil and subsoil contamination	20 000
Paron (France)	Installation of a new oil aerosol filtering system and suppression of the external filter	Reduction of the noise emission, reduction of contaminating emissions into the air	38 000
Quilmes (Argentina)	Creation of an underground water barrage system	Reduced risk of contaminating underground water	7 500
Wrexam (UK)	Installation of new compressors	Reduced power consumption	100 000
Wuxi (China)	Construction of a noise containment wall	Reduced noise emission	6 000
Telecom Cables and Systems Sector			
Battipaglia (Italy)	Soundproofing of some smokestacks	Reduced noise emission	18 000
Bishopstoke Optical Fibre (UK)	Elimination of Halon 131 and installation of a new CFC-free firefighting system	Reduced use of ozone layer depleting substances	519 000

Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

Success of the unified approach and future prospects

The introduction of the EMS in the Units, and its maintenance over time, has led to greater sensitivity throughout the organization regarding the proper management of the environmental aspects and a general reduction in environmental risks and environmental impact and the associated economic risks. In many cases, it has also brought an improvement in performance, as demonstrated by the principal environmental indicators. This has convinced us to pursue this program and extend it to activities less related to production.

In 2002 we began a program to broaden the scope of application of the EMS to cable installation activities, bearing in mind that Pirelli's specific role may be operational or managerial. An important initial result was certification of the EMS at the cable installation site in Hong King, principle center for the installation of an extensive cable network in China.

We expect to implement the EMS in other cable installation sites in the future, including them in the certification program beginning in 2004.

Environmental Risk Management

The database centralized at the Corporate *HE&S* level, described earlier, which collects and processes environmental information from the Operating Units, provides us with a centralized vision of the environmental factors and risks requiring management and the basis for defining improvement objectives at the Group level.

This will also serve to forestall potential future problems, keeping the most significant sources of environmental risk under control.

The topics of general interest that have been dealt with so far at the Group level are prevention procedures and the management of emergencies, protection of the soil and subsoil, and the management of materials containing asbestos.

Regarding the management of *HS&E* emergencies, a series of minimum requirements has been formulated to ensure that all possible measures are taken to avoid damage to persons and the environment in the case of natural events (such as floods, earthquakes) and events linked to human causes (e.g. spills of liquids during storage tank refilling operations).

With reference to soil and subsoil protection, in 2000 the Corporate *HS&E* function, in conjunction with the Sectors, launched a program to check, reclaim and, where necessary, replace the buried tanks and reservoirs in all the Operating Units, as described in previous reports. After completion of this phase the Units, under the supervision of Corporate *HS&E*, included the inspection of buried structures in the operating control routine contemplated by the Environmental Control System.



The reclamation of a dismantled industrial area.

- Contents
- Letter from the Chairman
- Criteria of 2002
- Report preparation
- Presentation of Pirelli SpA
- Pirelli and the Environment

The procedure for managing materials containing asbestos in the building structures and/or insulation for piping and equipment was drafted in the Operating Procedure “Assessing the State of Repair of Materials Containing Asbestos and Planning the Necessary Actions”. Pursuant to that procedure, all Units conducted a census of structures, piping and equipment where asbestos is present, assessed their conditions applying a common methodology, and established reduction objectives with the relative priorities and timetable.

In 2002, as in previous years, we pursued our “*Environmental Due Diligence*”, in close conjunction with the various company functions involved, regarding the acquisition or divestiture of Operating Units by Pirelli.

These activities provide essential support to decision-making during divestiture and/or acquisition operations by identifying the environmental risks and liabilities of industrial activities so that they can be managed or prevented.

From the practical standpoint, these activities were carried out by applying specific procedures described in company operating procedures, with the support of outside consultants, where necessary, but always under the direct responsibility of the Corporate function.

Environmental Product Evaluation

Life Cycle Assessment

The methodology of Life Cycle Assessment is important know-how for Pirelli, with expertise at both the central and peripheral levels.

The plan to develop and implement this methodology has resulted in numerous studies over the years on various products, such as medium-, low- and high-voltage energy cables, overhead lines, enamelled wire, fibre-optic “action” cables, “airbag” and oil-filled cables, vehicle tyres and steel cord, and was continued in 2002.

More specifically, analyses focused on submarine cables and certain types of fibre-optic and copper telecom cables, with the intention not of producing complete studies but rather to further refine Pirelli’s in-house methodologies and expertise.

An in-depth study was then conducted on the existing databases and assessment methodologies to determine whether it was necessary to supplement those used as standards by the Group: BUWAL, APME, ETH, Boustead, and Idemat for databases; Ecoindicator 99 for assessment methodologies.

The objective for the future is to further improve our expertise in this field and make our available instruments increasingly reliable, to further their integration with the current instruments for new product design.

It was also decided that Pirelli would participate as an observer in “*INTEND*”, a research project financed by the European Union within the LIFE framework, the objective being to formulate a system of Environmental Product Declaration in accordance with ISO standard 14025 and test it in two countries, Italy and Sweden.

Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

Recognitions and voluntary actions

In September 2002 Pirelli was included in two important international index families: the Dow Jones STOXX Sustainability Indexes (DJSI STOXX) and the FTSE4GOOD Series.

These are two of the most prestigious indexes of this type that permit and encourage investors to allocate their resources based on sustainability criteria, and Pirelli's inclusion represents a sort of seal of approval of our efforts to integrate environmental concepts into our business.

The *Dow Jones Sustainability Index* at the world level (*DJSI World*) indicates among the components of the *Dow Jones Global Index* the leaders in the field of sustainability and currently includes 300 companies in 23 countries.

At the European level, the *Pan-European Sustainability Benchmark (DJSI STOXX)* includes 180 companies in 14 countries. Effective 4 September 2002, Pirelli S.p.A. belongs to the macro industrial sector "Good and Services" and is one of four Italian companies selected in 2002.

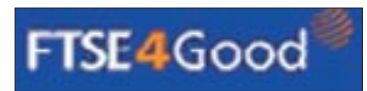
The *FTSE4GOOD* index selects companies that uphold and support human rights, support and promote strong relationships with stakeholders, and work constructively for the achievement of environmental sustainability.

Pirelli was selected as a member of the *FTSE4GOOD Global Index* with a weight of 0.02%, effective 23 September 2002, after demonstrating its level of commitment and the results achieved in the field of corporate social responsibility.

Pirelli is therefore authorized to use the specific "*Member of DJSI - 2003*" and "*FTSE4Good Index*" logos on all internal and external communications.

These two important recognitions are further incentive to continue responding promptly to requests from all those interested in learning of Pirelli SpA's commitment to sustainable development.

For this reason Pirelli not only publishes its Environmental Report but has also created a section on its website (www.pirelli.com) entitled "*Environment*", where official documents relating to environmental management are posted. Pirelli also maintains contacts with outside environmental rating companies, constantly updating the data and information furnished to them so they can systematically evaluate our environmental performance compared with other companies, through the use of dedicated indexes.



The logos of FTSE4GOOD and DJSI, two of the leading international sustainable environment indices.

Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

The Activities of Pirelli Labs

Pirelli has addressed some R&D activities of Pirelli Labs toward technologies consistent with its commitment to sustainable development. The projects regard clean energy production (fuel cells, photovoltaics) and waste recycling (end-of-life tyres).

Latest developments on the Fuel Cell projects

Fuel cells represent an optimal choice for producing electrical energy in a context of decreasing reserves of combustible fuels and rising demand for clean forms of energy that reduce greenhouse gas emissions.

The ideal fuel, from the technical and environmental standpoint, is hydrogen, though it still presents some problems because of its high cost and critical aspects related to its transport and storage. The feeling, therefore, is that at least for some years fuels cells will be fed with hydrogen only for stationary applications, while mobile applications will still be fed by other fuels, such as alcohol.

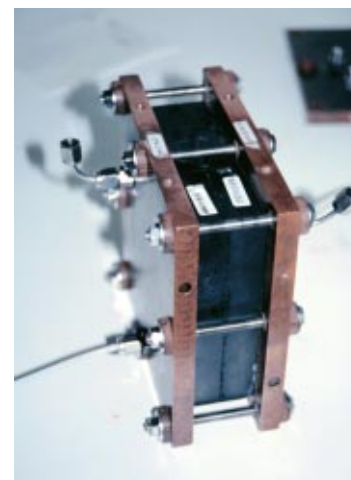
The research activities of Pirelli Labs in the field of alternative fuels for fuel cells is being developed in two highly promising technological directions: "Solid Oxide Fuel Cells" (SOFCs) and "Polymer Electrolyte Fuel Cells".

The strategy in SOFCs is oriented toward the development of electrolytic anodes whose performance permits them to directly oxidize hydrocarbons, thus avoiding the "reforming" process that increases the complexity of the entire device and its costs.

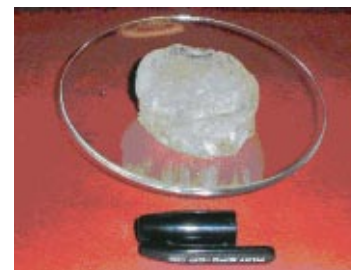
A reduction in operating temperatures can also be obtained with the use of alternative electrolytic materials ($\leq 750^{\circ}\text{C}$ versus the $900\text{-}1000^{\circ}\text{C}$ of traditional materials), with obvious advantages also in terms of costs.

The research of Pirelli Labs began with the synthesis of nanoparticles and nanocompounds, using colloid and sol-gel chemistry to synthesize the raw nanomaterials. With this type of "soft chemistry" the crystallization temperatures of oxides can be significantly decreased, obtaining a material formed of extremely small particles with high surface area and easy to transform.

In the beside pictures there is a gel containing a precursor solution that can be readily transformed into nanoparticles used to manufacture fuel cells.



A combustible cell.



Gel containing the solution used in the synthesis of nanoparticles.

Contents
 Letter from the Chairman
 Criteria of 2002
 Report preparation
 Presentation of Pirelli SpA
 Pirelli and the Environment

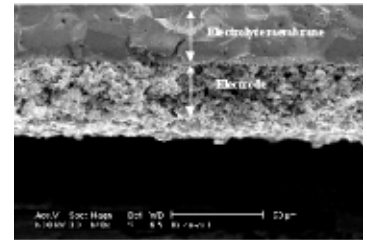
The beside picture shows the cross-section of a half-fuel cell consisting of an electrode and a solid electrolytic membrane.

The beside diagram shows the result of a test performed on a new fuel cell prepared using the procedure described above, operating with dry methane as a fuel. The cell has a maximum excellent power density of (0.25 Wcm^{-2} @ 750°C); the operating time reached so far is 1,500 hours with no loss of electrochemical performance.

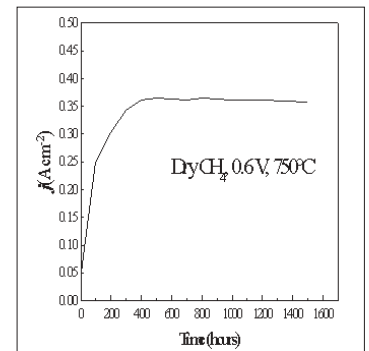
The second approach regards low-temperature “Polymer Electrolyte Fuel Cells”, fuelled with hydrogen or methanol and intended primarily for the development of new polymer membranes.

The membranes most commonly used today are of “Nafion®” (Du Pont), based on perfluorinated polymers functioning through the presence of sulfonic groups. These membranes have the chemical-physical properties needed to operate under the conditions required by fuel cells but are extremely costly due to the complexity of the chemical processes required to produce them, and thus unsuitable for practical use.

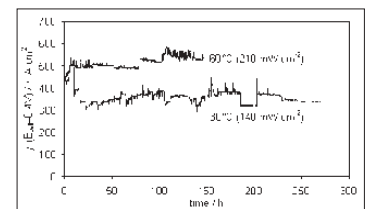
The activity of Pirelli Labs in “Polymer Electrolyte Membrane Fuel Cells” is focused primarily on the development of polymer electrolytes that have the same or better technological characteristics but can be produced at costs that would make them practical to use. The diagram shows the performance of a Pirelli membrane in a fuel cell at 30 and 60°C : the power generated is absolutely comparable with that generated by a Nafion membrane of the same thickness, and its behaviour is constant over time.



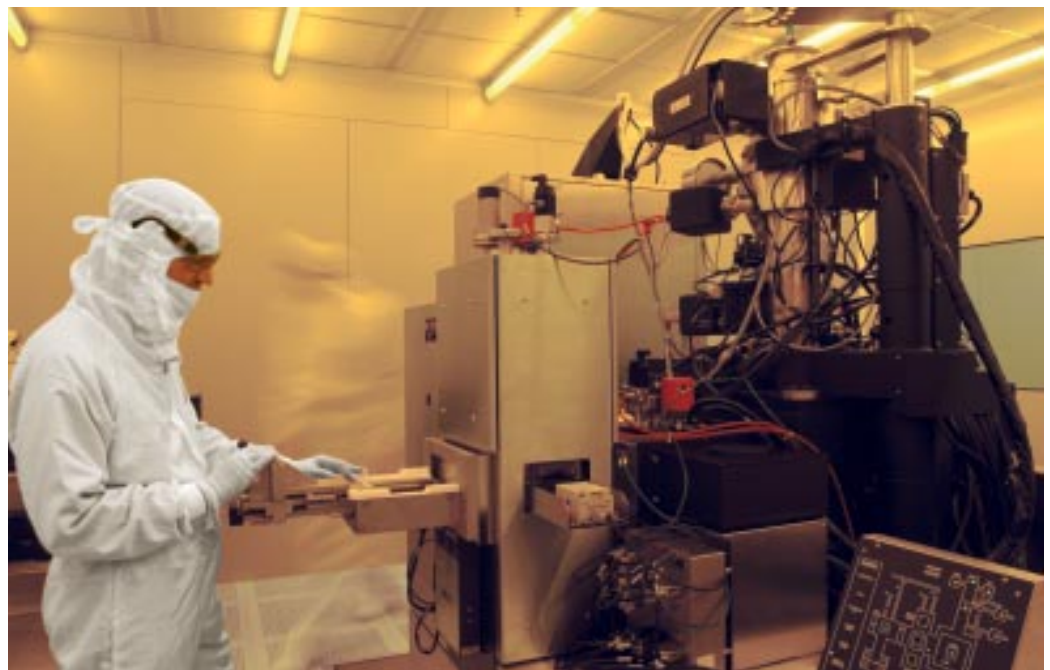
Section of an SOFC (half a cell).



Result of a Pirelli SOFC test, using CH_4 as a combustible.



Stability test over time, carried out in an H_2/air cell at 30°C and 60°C .



Pirelli Labs research activity.

Contents

Letter from the Chairman

Criteria of 2002

Report preparation

Presentation of Pirelli SpA

Pirelli and the Environment

Photovoltaics

Solar radiation is by far the most abundant energy resource available on earth, estimated at 10,000 times current global energy consumption. Photovoltaic cells transform light directly into electrical energy: for this reason they are one of the most promising technologies for the production of "clean" energy.

The chief obstacle to the widespread use of photovoltaic systems is their high cost.

Pirelli Labs formed new partnerships in 2002 with prestigious research centers in Italy and abroad and with industrial partners, seeking to become an advanced competence center for "clean" energy.

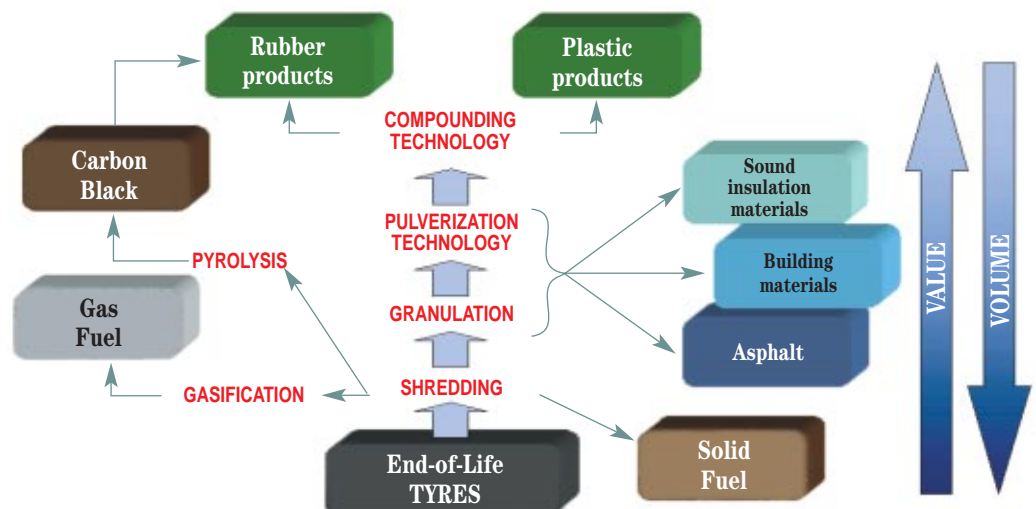
The first agreement involves the CNR's Institute for the Study of Nanostructured Materials (ISMN) in Bologna and the National Interuniversity Science Consortium in St. Petersburg. The objective is to develop solid-state photovoltaic cells based on patterned nanostructured materials capable of significantly reducing the cost of the energy produced while maintaining good levels of efficiency.

The second partnership is between Pirelli Labs and the Camfin Group, and its objective is the development of activities for the production of electrical energy from renewable sources in the wind and photovoltaic fields and related technologies.

Latest developments on projects related to the reuse of End-of-Life Tyres (ELT)

The disposal of end-of-life tyres has been a research objective of Pirelli Labs for some years.

The activities focus on the recycling of the materials. This is still not well developed and almost exclusively limited to products of little value added, because of the difficulty of breaking the bonds formed between polymer chains in the vulcanisation process, which make the material unprocessable by simple fusion.

Tyre Recycling Diagram


Contents
 Letter from the Chairman
 Criteria of 2002
 Report preparation
 Presentation of Pirelli SpA
 Pirelli and the Environment

The technologies developed thus far have, in fact, focused on the production of rubber powder used as a simple reinforcing material for athletic flooring, shoe soles, internal and external cladding, road accessories, water draining conduits, modified asphalts and in civil engineering works.

The purpose of Pirelli Labs research is to identify and test possible methods and processes of chemical, physical and thermal treatment that would generate a second-life product for high-value added applications.

More specifically, Pirelli Labs Materials Innovation is developing chemical processes for making the powders compatible with rubbers, plastics, bitumen, asphalts and building materials and physical processes for obtaining powder of extremely fine particle size, and thus technologically valuable, at a reasonable cost.

Results at the Pirelli SpA Level

The part of the Report related to quantitative data, to which we refer readers for greater detail, presents the tables and charts regarding the various environmental parameters and indicators considered.

These data were aggregated at two different levels: Pirelli S.p.A and the Categories.

In general terms, for Pirelli SpA, the results were as follows:

- Water consumption remained generally stable with respect to 2001;
- Energy consumption decreased by 3.5% with respect to 2001;
- The consumption of organic solvents declined sharply with respect to 2001, around 40%;
- Hazardous waste decreased (- 2,5%) from 2001 levels, while non-hazardous waste increased by 7%. Recycled waste increased substantially with respect to 2001, from 31% of total waste to 48% in 2002;
- The quantity of dielectric oils containing PCBs and PCTs declined by 12% versus 2001;
- The quantity of ozone layer depleting substances decreased by 20% with respect to 2002;
- Since the figure for CO₂ emissions is being presented for the first time, no comparisons are possible for viewing the trend.

The general picture thus shows a reduction in overall environmental impact caused by Pirelli S.p.A. in 2002.

In some cases this reduction is particularly significant, as in the case of organic solvents, dielectric oils containing PCBs or PCTs, and ozone layer depleting substances. These results are in line with the objective of gradually but steadily eliminating or replacing high-impact substances with substances of less or no environmental impact.

In the case of the non-hazardous waste, the increased values are attributable to a more refined method of data collection by the Operating Units, but especially to the partial modification of the classification criteria with respect to 2001.

The results achieved in terms of waste recycling are significant.

The Energy Cables and Systems Sector
Presentation of the Sector

Energy Cable Production

Rod Production

Production of Accessories

Special Activities and Technological Innovation

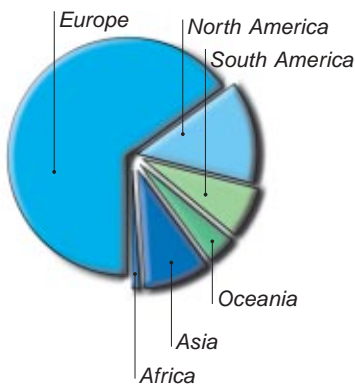
Results of the Energy Cables and Systems Sector

THE ENERGY CABLES AND SYSTEMS SECTOR

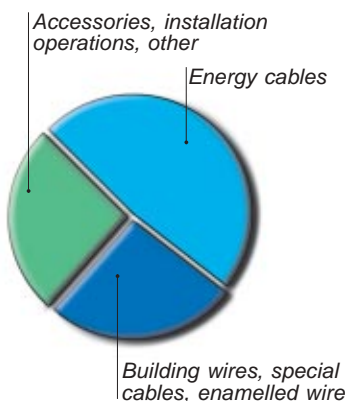
Presentation of the Sector

Pirelli Energy Cables and Systems offers the market an integrated range of products, components, systems, engineering and installations for global turnkey projects.

This Report considers 57 Operating Units, identified in accordance with the criteria indicated in the chapter “*Criteria of Preparation of the 2002 Report*”, broken down by geographical area as follows: 40 Operating Units in Europe, 4 in North America, 6 in South America and 7 in Australia, Asia and Africa.



Breakdown of Pirelli Energy Cables and Systems sales in 2002 by geographical area and product category



The personnel at 31 December 2002 totalled 12,479, with a reduction of around 2000 persons with respect to a year earlier.

Sales totalled EUR 3,021 million, distributed as indicated in the chart below. For the purposes of this Report, three types of production are mentioned - “Energy cables”, “Accessories” and “Rod” - indicated with the term “category”. They present homogeneous characteristics in terms of industrial process and environmental impact. The principal characteristics of these three categories are illustrated in the paragraphs that follow. For the quantitative data regarding environmental impact indicators, please refer to the Quantitative Data portion of this Report.

There were 46 Operating Units certified under ISO 14001 at 31 December 2002.



Testing a high voltage cable.

The Energy Cables and Systems Sector

Presentation of the Sector

Energy Cable Production

Rod Production

Production of Accessories

Special Activities and Technological Innovation

Results of the Energy Cables and Systems Sector

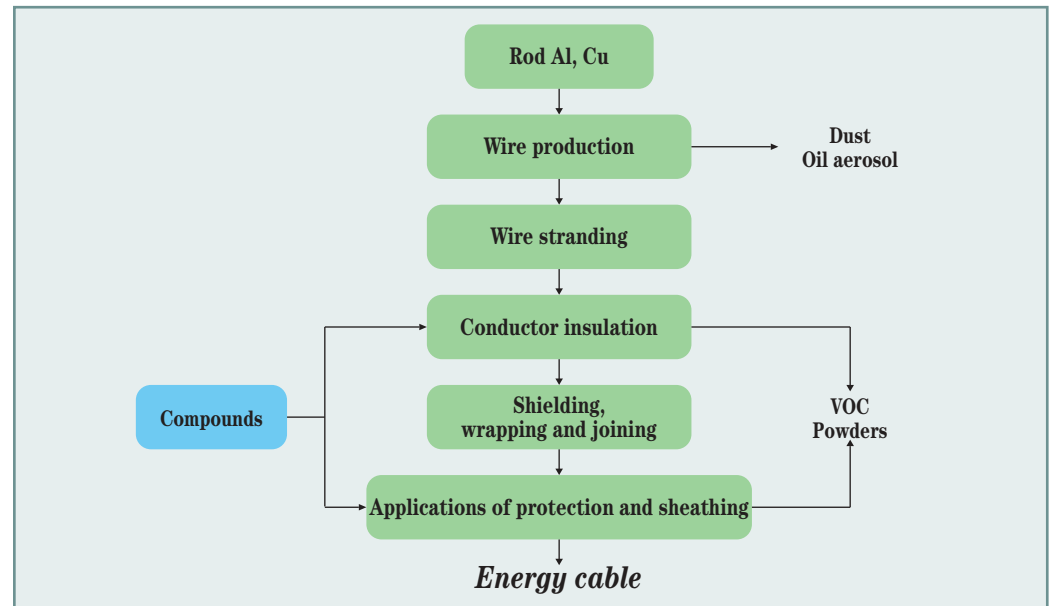
Energy Cable Production

Pirelli produces a vast ranges of cable types for energy transmission, from high to low voltage, for land, sea and overhead applications.

The types of processing vary according to the types of cable and their functions. In general terms, the principal phases of the process and the principal inputs and outputs due to the production of an energy cable are shown in the following figure.

This Report considered 49 Operating Units belonging to the present category.

Principal phases of processing and principal inputs and outputs in the production of an energy cable



Submarine cables

Pirelli produces and installs submarine cables for energy transmission with the utmost attention to minimizing environmental impact in both the design phase, through the use of materials compatible with the marine environment, and in the installation phase.

For the installation of submarine cables, Pirelli generally uses its own cable-laying vessel *Giulio Verne*, with a close eye to environmental aspects. In fact, in addition to strict compliance with the rules issued by the international maritime authorities and the controlling Register of Shipping, frequent modifications are made (even when not required by regulations) to minimize the potential environmental impact of the activities. As an example, a tin-free antifouling paint was applied to the entire hull in early 2002 (this paint will not become mandatory until 2003), and a new, more effective system of waste water disposal was recently installed in replacement of the existing system (as required by a regulation currently valid only in certain parts of the world but soon to become international in a few years).



The cable laying ship *Giulio Verne*.

The Energy Cables and Systems Sector

Presentation of the Sector

Energy Cable Production

Rod Production

Production of Accessories

Special Activities and Technological Innovation

Results of the Energy Cables and Systems Sector

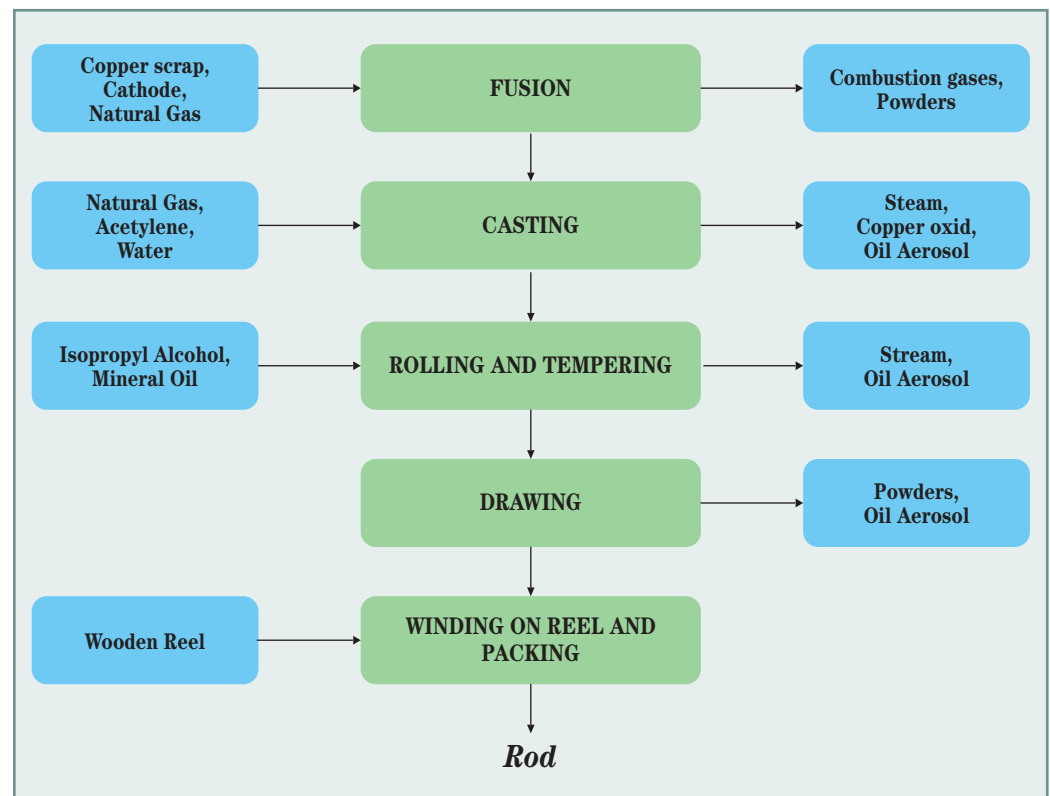
Rod Production

Pirelli produces the copper rod used to manufacture the conducting elements of energy cables and in part for the transmitting elements of telephone cables.

Copper rod is produced in two Operating Units in South America (Argentina and Brazil), and two in the UK.

The following figure shows the principal processing phases and the principal inputs and outputs due to the production of copper rod.

Principal processing phases and principal inputs and outputs in the production of rod



Production of Accessories

Pirelli produces a broad range of accessories in order to offer customers complete systems. The range of accessories includes: joints for energy cables of high, medium and low voltage; glands for installations "offshore" and in hazardous areas, and assemblies.

Accessories are produced in four European Operating Units: France, Italy, and two in the UK.

The production of components includes the melting and turning of metals, the production of resins, the assembly of joints and the preparation of joint kits. Because of the different and variable nature of this activity, the values of the environmental indicators per unit of product in the "Quantitative Data" section are not indicated by product unit but only absolute value.

The Energy Cables and Systems Sector

Presentation of the Sector

Energy Cable Production

Rod Production

Production of Accessories

Special Activities and Technological Innovation

Results of the Energy Cables and Systems Sector

Special activities and technological innovation

The Research and Development of the Energy Cables and Systems Sector focused in 2002 on the introduction of high-tech products with minimal environmental impact, in line with the constant commitment of the Pirelli Group to environmental stewardship.

The areas of R&D range from problems related to the stability of networks for distributing and transmitting electric power (HECCS cables) to the use of network accessories and components that are highly reliable and eco-compatible: High Voltage AIR-BAG™ Systems, OptoPower™ Systems, oil-free terminals for voltages up to 275 kV, and advanced LS0H-Afumex technologies for industrial systems and for special high-voltage (HV) installations.



An Air-Bag™ high voltage cable system.

High Electrical Capacitance Components Systems (HECCS)

The burying of overhead lines with insulated cable systems, in addition to an obvious advantage in appearance, also helps reduce electrosmog, a problem of great concern to international public opinion. In this problem area, various compact insulated cable systems have been developed, characterized by high electrical capacity. They permit more efficient distribution of electric power and an overall improvement in service quality and reliability.

A special characteristic of these cables is their compact dimension and the presence of Air-Bag protection layers that enhance network performance and electrical reliability. These systems can also reduce active power losses up to 30%, with highly significant benefits from the environmental standpoint (reduced consumption of non-renewable resources and reduced emissions generated in power production)

High Voltage AIR-BAG Systems.

High-voltage (HV) power transmission systems are subject to potential mechanical damage when they leave the plant, during installation, and throughout the duration of service (average 30 years). In this HV field, the Air-Bag™ technology is finding widespread application.

Some of the most important HV power circuits being installed (132 kV cable systems in the city of Florence and in the suburban area of Milan) use 1000 mm² aluminium conductors, are insulated with crosslinked polyethylene (XLPE), and are shielded by a welded sheet of aluminium impermeable to water. The outer protection consists of the Air-Bag™ system, composed of an internal layer of polyolefin, a “core” layer and an outer layer, also of polyolefin. This sandwich provides multipurpose functionality, i.e. against mechanical impacts, against chemical corrosion and, of course, insulation from the ground of the aluminium-sheet shield.

The Air-Bag™ HV cable is delivered in lengths of 500m to 700m, according to the needs of the circuit layout. These multiple lengths are interconnected with Pirelli prefabricated joints.

Thanks to the multifunctional protection provided by the Air-Bag™ system, the cable is installed directly in a trench without the need for additional protection.



Section of an Air Bag™ high voltage cable.

The Energy Cables and Systems Sector

Presentation of the Sector

Energy Cable Production

Rod Production

Production of Accessories

Special Activities and Technological Innovation

Results of the Energy Cables and Systems Sector

The environmental benefits of this system are a) a reduction in the materials used for filling the laying trench in the installation phase, since the materials recovered from the excavation can be reused, and b) reduced cable weight, and consequently reduced consumption of materials and energy and transport.



Layout of the high voltage cable installed in Florence (Italy).

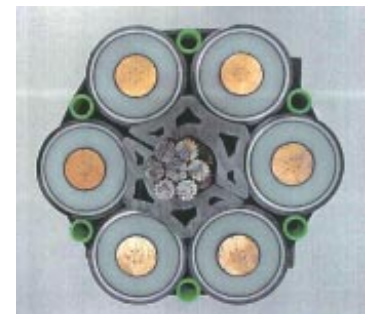
Furthermore, as in the case of Florence (Italy), the buried cable system can cross artistic and historical areas without detracting from their aesthetic qualities.

OptoPower™ Systems

Optopower™ monitoring systems are a mixed application of optical communication and electric power transmission ensuring, by an optical support monitoring, the management of underground power transmission network.

Through the monitoring system, the buried network "dialogues" continuously with users, informing them of its performance and status. This technology is proving a powerful tool in promoting the burial of overhead lines, virtually making the underground network "visible", with total protection of the environment in terms of appearance and safety.

This purpose is achieved by constantly monitoring the operating life of the networks "equipped with optical sensors" (consisting of optical fibre generally contained in small tubes incorporated into the cable structure, see picture), the actual conditions of use, and projecting its use potential under overload. This provides real-time protection against hazardous situations that could lead to failures and consequently the generation of pollutant materials.



Cable with tubing incorporated into the structure for housing the optical monitoring sensors.

Performance optimisation is monitored and managed from various standpoints:

- Thermal: through the RTTR (Real Time Thermal Rating) module, which permits the optimal exploitation of buried networks, with an increase in their operating lives, a decrease in failures generated by overheating, and an improvement in the use of raw materials (cables optimised to actual operation).
- External damage: over 40% of the failures on HV cables are the result of external causes, such as civil works and excavation in proximity to the buried cables. The WPM (Water Penetration Monitoring) module immediately recognizes failure of the protecting shielding,

The Energy Cables and Systems Sector

Presentation of the Sector

Energy Cable Production

Rod Production

Production of Accessories

Special Activities and Technological Innovation

Results of the Energy Cables and Systems Sector

also precisely identifying the point of failure and limiting repair activities, the amount of cable to be replaced, and environmental impact.

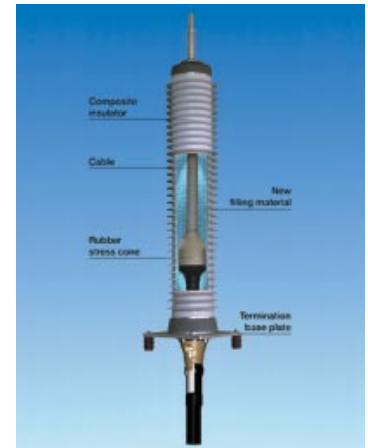
Oil-free terminals for voltages up to 275 KV

The traditional terminals for high and extra-high voltage were conceived with an external porcelain covering filled entirely with dielectric oil or with pressurized SF₆ gas. Although this provided excellent service reliability, the presence of a filling fluid requires highly precise assembly and monitoring during operation, to avoid leakage of oil or gas, resulting in the emptying of the terminal with consequent danger of explosion due to internal arc.

To avoid these problems, Pirelli has developed a new generation of “Dry type” terminals for voltages up to 275 KV, with the following advantages:

- Use of a halogen-free vulcanised polymer blend as filler, in place of the oil or gas.
- Replacement of the outer porcelain insulator with a composite polymer-based one.

This new concept makes the terminal easier to install, eliminates monitoring during service, and makes it safe and eco-friendly. In fact, in the event of an internal arc, no hazardous external manifestations are generated, with the ejection of porcelain fragments, inflamed oil or toxic fumes.



Oil-free terminal.

LSOH - Afumex Cables

Pirelli has expanded its range of Low Smoke Zero Halogen (LSOH) products to interesting segments of the Industrial/Special market (trains, ships, etc...). For this purpose, a new LSOH-AFUMEX line was introduced for industrial uses in mechanically hostile environments (heavy industry, underground trains, etc...). LSOH-AFUMEX technology is currently applied by the building wire to medium-voltage cables (tunnels, underground railways, etc.) and high-voltage cables for special installation (wells, etc.).

The advantage of these cables is the elimination of those halogenated polymers and additives, or those containing sulphur and nitrogen, that are used to protect against fire propagation, without sacrificing the level of fire protection. Thus in case of fire no toxic gases (HCl, HBr, etc.) are generated and opaque smoke does not quickly develop, permitting the evacuation of persons affected by the fire in the early minutes.



A LSOH cable of the Afumex family.

The Energy Cables and Systems Sector

Presentation of the Sector

Energy Cable Production

Rod Production

Production of Accessories

Special Activities and Technological Innovation

Results of the Energy Cables and Systems Sector

Results of the Energy Cables and Systems Sector

The quantitative data section of the Report, to which we refer readers for additional details, contains tables and charts concerning the various environmental parameters considered for the three categories organizationally associated with the Energy Cables and Systems Sector: Energy Cables, Accessories and Rod.

Aggregating these data at the Sector level, we find the following results:

- Water consumption decreased by 5% with respect to 2001;
- Energy consumption decreased by 15% with respect to 2001
- The consumption of organic solvents dropped by a dramatic 52% with respect to 2001. This is consistent with the objectives to gradually reduce or replace them with other substances that do not cause emissions of volatile organic compounds;
- Hazardous waste decreased by 6% with respect to 2001;
- Non-hazardous waste decreased slightly;
- The rate of waste recycling increased from 41% in 2001 to 55% in 2002;
- The quantity of dielectric oils containing PCBs and PCTs decreased by 11% with respect to 2001, consistent with our objective to gradually eliminate or replace those substances;
- The quantities of ozone layer depleting substances decreased drastically by 51% with respect to 2001, again as the result of efforts to gradually eliminate or replace them with non-damaging substances.
- No prior-year comparisons are possible for the CO₂ emissions data, since they are being presented for the first time.

The overall picture is therefore one of a general reduction in the environmental impact produced by the Sector, with some highly significant results such as the reduction in solvent consumption, the reduction in energy consumption, and the reduced quantities of dielectric oils containing PCBs and PCTs and ozone layer depleting substances.

We should point out, however, that the results expressed in absolute values were significantly affected in 2002 by a reduction in certain types of production and by the divestiture of certain activities.

Telecom Cables and Systems Sector
Presentation of the Sector

Telecom Cable Production

Optical Fiber Production

Special Activities and Technological Innovation

Results of the Telecom Cable and Systems Sector

TELECOM CABLES AND SYSTEMS SECTOR

Presentation of the Sector

Pirelli Telecom Cables and Systems offers the market an integrated range of products, components, systems, engineering and installation for global turnkey products.

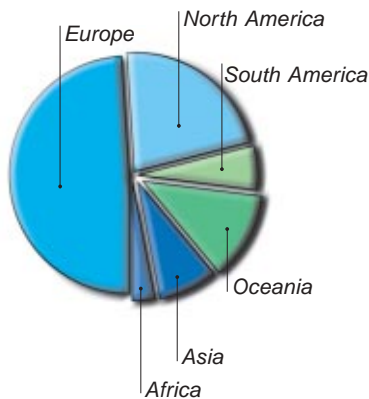
This Report considers 11 Operating Units, identified in accordance with the criteria indicated in the chapter “Criteria of Preparation of the 2002 Report”, broken down by geographical area as follows: 6 Operating Units in Europe, 1 in North America, 2 in South America and 2 in Australia, Asia and Africa.

Total personnel at 31 December 2002 consisted of 2,546 employees, with a change of 1,100 persons with respect to a year earlier.

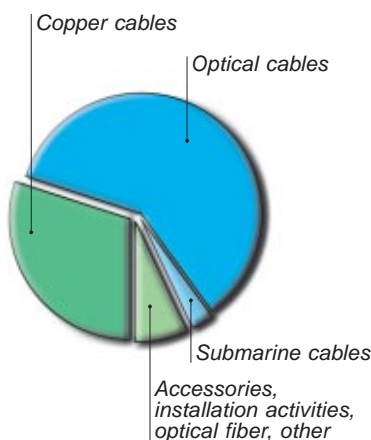
Sales amounted to EUR 468 million and were distributed as indicated in the chart below.

For purposes of this Report, we identified two types of production, “Telecom cables” and “Optical fiber”, indicated by the term “category”, which present homogeneous characteristics in terms of industrial process and environmental impact. The following paragraphs will illustrate the principal characteristics of these two categories. For the quantitative data on environmental impact indicators, please refer to the “quantitative data” portion of this Report.

All 11 Operating Units have been certified under ISO 14001.



Breakdown of sales of Pirelli Telecom Cables and Systems in 2002 by geographical area and product category



A section of an optical fibre cable.



An optical amplifier for submarine cables.

Telecom Cables and Systems Sector

Presentation of the Sector

Telecom Cable Production

Optical Fiber Production

Special Activities and Technological Innovation

Results of the Telecom Cable and Systems Sector

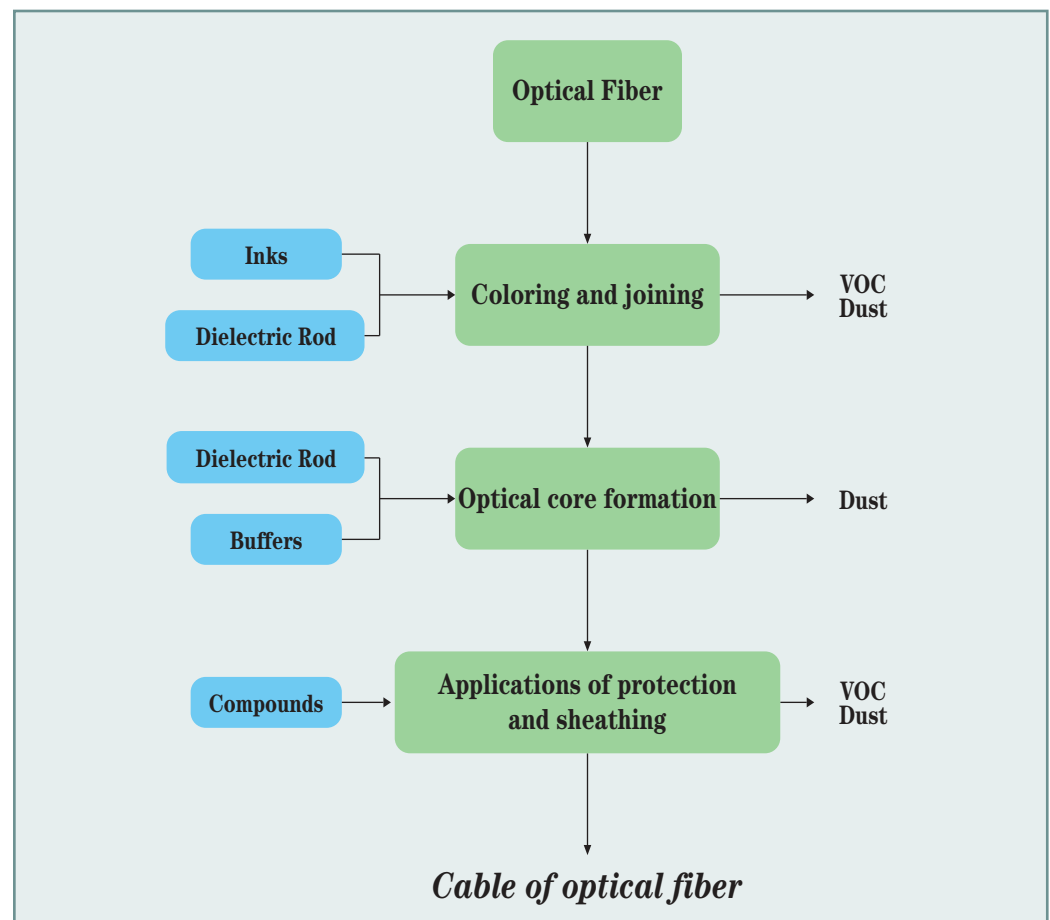
Telecom Cable Production

In the telecommunications sector, Pirelli is in the vanguard with its production of optical fibre and fibre-optic cables.

Processing takes various forms depending on the type of cable and its function. In general terms, the main processes and the principal inputs and outputs due to cable production are shown in the following figure.

This Report considers 8 Operating Units belonging to the present category.

Principal phases of processing and principal inputs and outputs in the production of cables for telecommunications



Telecom Cables and Systems Sector

Presentation of the Sector

Telecom Cable Production

Optical Fiber Production

Special Activities and Technological Innovation

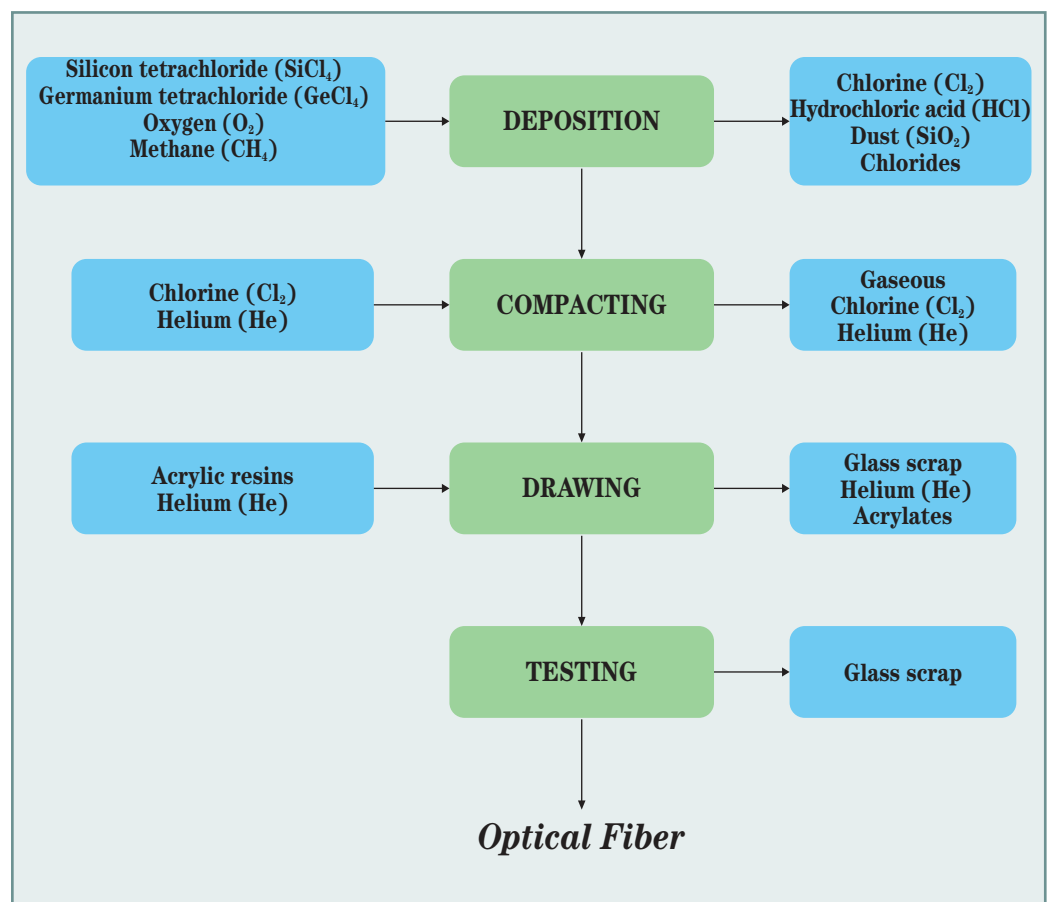
Results of the Telecom Cable and Systems Sector

Optical Fibre Production

Because of the sharp decline in the telecommunication market in 2002, production in one optical fibre plant was halted. There were two production units operating in 2002, one in Brazil and one in Italy.

The processing technologies differ from one Operating Unit to another, since the production processes are based on different patents.

Optical Fiber – Principal phases of processing and principal inputs and outputs (with reference to the FOS Operating Unit in Battipaglia (SA) - Italy)



Telecom Cables and Systems Sector

Presentation of the Sector

Telecom Cable Production

Optical Fiber Production

Special Activities and Technological Innovation

Results of the Telecom Cable and Systems Sector

Special activities and technological innovation

Products innovative from the environmental standpoint

The development of products with low environmental impact particularly concerned:

- fibre-optic cables with central tube less than 5 mm in diameter, for pneumatic installation in minitubing, which permit a 30% reduction in the quantity of raw materials per unit length and a parallel reduction in energy consumption to manufacture them (they retain the functional characteristics but do not require additional coloration with crosslinkable UV inks).
- simple sheath optical cables in lieu of the traditional cables with double plastic sheathing, which permit a further reduction in raw material and energy consumption for production.
- optical cables with stranded tubing and “dry” core, without interstitial grease, protected against longitudinal propagation of water by means of a special hygroexpanding dry “hot melt” applied on the optical core. The result is a reduction in non-recyclable waste in production and installation and a reduction in the time necessary to prepare the joints.

We continued expanding the applications of Afumex-type “telecommunication/data transmission cables”, which generate no toxic gasses or opaque fumes and at the same time retard fire propagation

Fiber Optics Labs

Within in context of fibre optics, we would report:

- the development and industrial feasibility study to introduce octamethylcyclo-tetrasiloxane (D4) in the deposition phase as an alternative to silicon tetrachloride. This technology produces a) an 80% reduction in reaction hydrochloric acid, and thus an equal reduction in the amount of water necessary to remove the acid fumes, b) improved efficiency of deposition, with a consequent reduction in the raw materials consumed, and c) a reduction in processing time and related energy consumption. As a secondary effect, there is also a reduction in the road transport of aggressive materials;
- the development of an algorithm to optimise the conditions of deposition and coating distribution, also reducing scrap and emissions in this way.



Widely tunable laser, for optical networks, produced in the Pirelli Labs.

Telecom Cables and Systems Sector

Presentation of the Sector

Telecom Cable Production

Optical Fiber Production

Special Activities and Technological Innovation

Results of the Telecom Cable and Systems Sector

Results of the Telecom Cable and Systems Sector

The Quantitative Data section of the Report, to which we refer you for greater details, contains tables and charts regarding the various environmental parameters considered for the following two categories, organizationally related to the Cables and Telecom Systems Sector: Telecom Cables and Optical Fibre.

Aggregating the data at the Sector level, we find the following results:

- Water consumption decreased by 16% with respect to 2001;
- Energy consumption decreased by 18% with respect to 2001;
- A reduction of 51% in the consumption of organic solvents with respect to 2001. This is in line with our objectives to gradually reduce them or replace them with other substances that emit not volatile organic substances;
- Hazardous waste products decreased by a full 31% with respect to 2001;
- Non-hazardous waste registered a decrease of 22% with respect to 2001;
- Recycled waste increased slightly, from about 27% in 2001 to about 28% in 2002;
- The quantity of dielectric oils containing PCBs and PCT decreased by 13% with respect to 2001, consistent with our objective to gradually eliminate or replace those substances;
- The quantities of ozone layer depleting substances decreased 2% with respect to 2001;
- The figure for CO₂ emissions is being presented for the first time, so no comparisons are possible to determine a trend.

The overall picture is a reduction of environmental impact produced by the Sector linked on the one hand to actions to improve efficiency, as in the case of water and energy consumption, and on the other to the definition of specific reduction objectives, as in the case of consumption of organic solvents, and the quantity of dielectric oils and ozone layer depleting substances. We should also stress, regarding absolute values, that during 2002 there was a significant reduction in production as a consequence of the serious worldwide crisis in the industry.

The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

Research & Development Activity

Results of the Tyre Sector

THE TYRE SECTOR

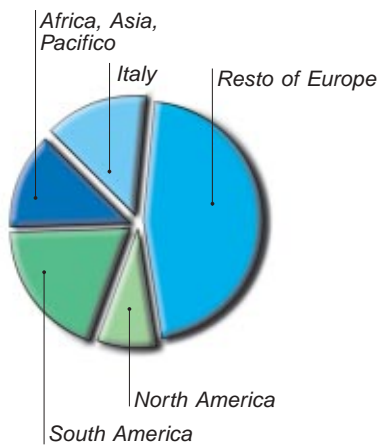
Presentation of the Sector

The main Tyre Sector activities involve tyre production, of car, truck, commercial vehicle and motorbike - and steel cord manufacture that is mainly used for tyre production.

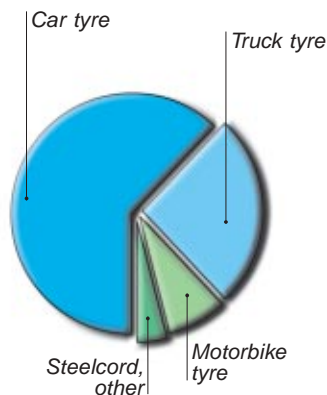
In this report, 21 Operating Units have been considered - 17 tyre production and 4 steel cord. Significant data from the Operating Unit in Rome (USA), was not available as the plant was still in the construction and pre-production stages during 2002.

The number of employees in the Sector, as at 31st December, was around 20,200, with a sales revenue of 2.857 million Euros and with a geographical distribution of 12 Operating Units in Europe, 2 in North America (including MIRS), 7 in South America and 1 in Africa.

For this Report, two types of production processes have been identified: "Tyre Production" and "Steel Cord Production" referred to by the term "category", which are homogeneous regarding the industrial processes and the related environmental impacts. The following paragraphs refer to the main characteristics of these two categories, whilst the quantitative data and the environmental impact indicators are shown in the "Quantitative Data" section of this Report.



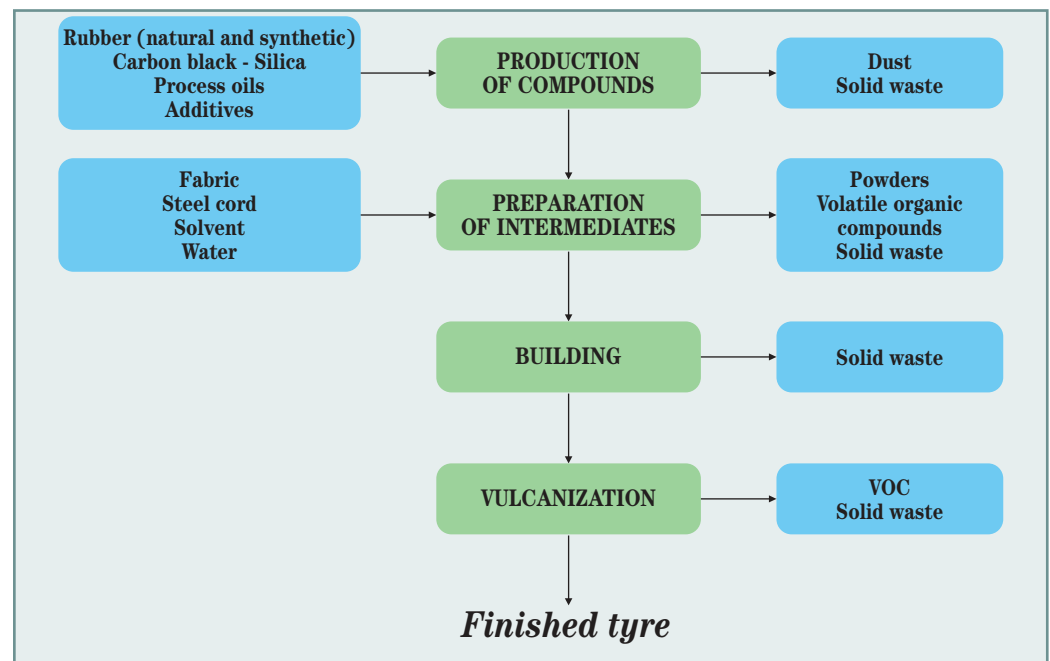
Breakdown of 2002 Pirelli tyre sales by geographical area and product category



Tyre Production

The Pirelli product range includes tyres for cars (series, high-performance and racing), for off-road vehicles, industrial vehicles, buses and motorcycles. The following diagram illustrates the principal phases of processing and the principal inputs and outputs of a standard tyre production process.

Principal phases of processing and principal inputs and outputs in the production of tyre.



The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

Research & Development Activity

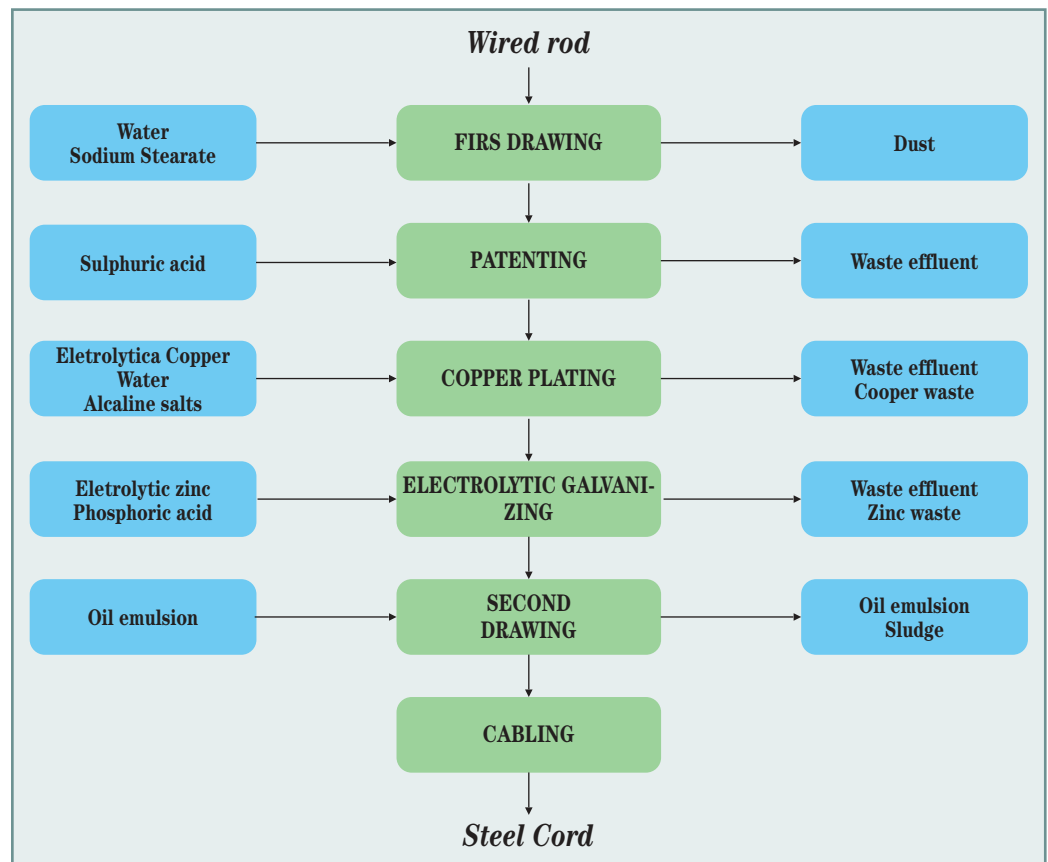
Results of the Tyre Sector

Steel cord production

Steel cord is an intermediate used in the production of tyres, steel plies and in bead cores. It is produced in 4 Operating Units in Italy, Turkey, Germany and Brazil.

The following diagram illustrates the principal phases of processing and the principal inputs and outputs of a standard process of steel cord production.

Principal production phases and main inputs and outputs for the production of steel cord



The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

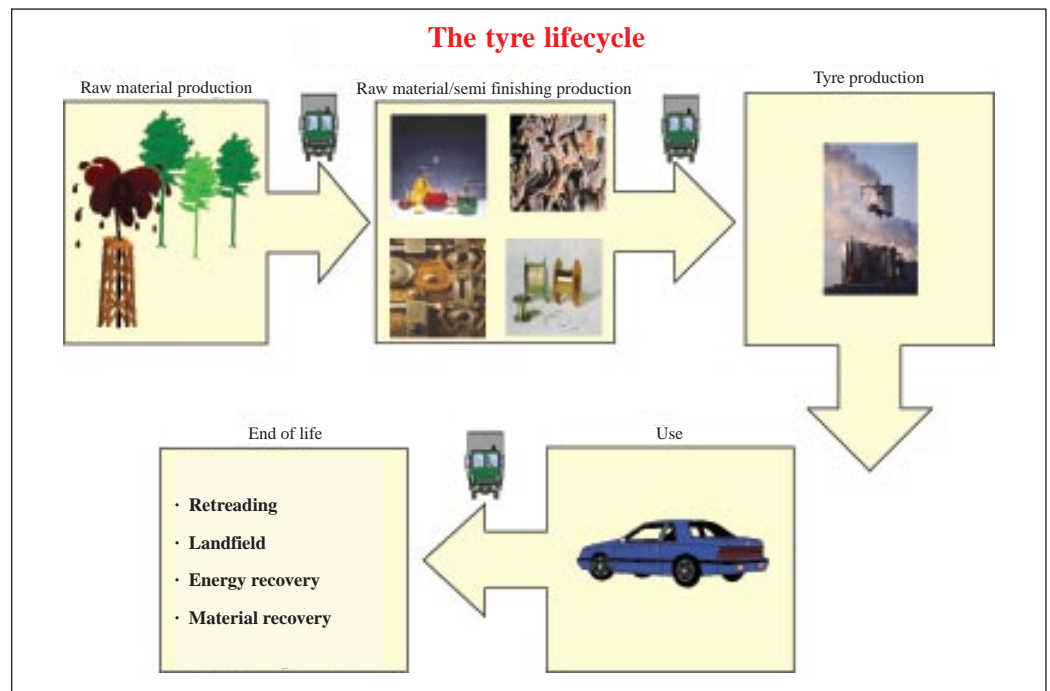
Product Life Cycle

Research & Development Activity

Results of the Tyre Sector

Product Life Cycle

With reference to the product life cycle, from cradle to grave, as shown in the following figure, the principal activities that Pirelli Tyres has completed or initiated during 2002 are the following.


PRODUCTION AND USE OF THE RAW MATERIALS
The Evaluation of New Raw Materials and the Black List

Each new raw material, before use, undergoes an evaluation from the standpoint of hazardousness and impact on man and environment. A Black List is also formulated and constantly updated, indicating all the substances that must not be used in the processes or for which a replacement search is being conducted. Fifty new materials were evaluated in 2002.

Heavy metals

Pirelli Tyres is already in conformity with the ban on using raw materials of lead, cadmium, mercury or hexavalent chromium established by European Directive 2000/53/EC. It has also selected vendors capable of controlling and guaranteeing that the level of impurities of these metals is below the narrowest specified limits.

Environmental Vendor Rating

Vendor qualification activities continued in 2002 also considering their environmental performance. To this parameter, valued through a questionnaire, a value is assigned of 9% of the total score. The objective of this assessment is the creation of a "pool of vendors" that share the principles set forth in the Environmental Policy of the Pirelli Group.

The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

Research & Development Activity

Results of the Tyre Sector

The Vendor Rating conducted in 2002 involved a total of 64 vendors with 84 plant facilities. More than 35% of the vendor production units are ISO 14001 certified. Of the remaining facilities, 80% expect to receive certification within two to three years.

PRODUCTION
Environmental certification of production sites

In the Tyre Sector, 19 production sites have already obtained environmental certification under ISO 14001; for the three remaining sites, certification is scheduled by the end of 2003.

MIRS and the new CCM process

As planned, 2002 saw the completion of the Modular Integrated Robotized System - MIRS project with the completion of CCM (Continuous Compound Mixing), the only compound production process like it in the world, capable of controlling the metering of raw materials at unprecedented level of accuracy.

The CCM continuous mixing system, protected by seven families of patents, is based on two twin-screw extruders working continuously. A pneumatic distribution system, entirely computer-controlled, transports the ingredients directly from storage to the extruders. From the environmental standpoint, this keeps the airborne powder levels in the department at extremely low values, consequently reducing the quantity of powders emitted to the outside and the adoption of powder capturing system that permit their collection and recycling.

There has also been a net reduction in occupied space and a 20% reduction in energy consumption per unit of product.

As described in the preceding Reports, MIRS is a new tyre production technology with a completely innovative process that reduces the 13 phases of the conventional process to three: preparation of intermediates, assembly-vulcanisation, finishing.

The expansion of MIRS installations continued in 2002, and the first plant dedicated to motorcycle tyre production was built; a MIRS truck project is also in progress.



The new CCM™ (Continuous Compound Mixing) technology, integrated into a MIRS™ plant at Bicocca, Milan.

The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

Research & Development Activity

Results of the Tyre Sector

Here is the situation of MIRS facilities completed and operational at the end of 2002:

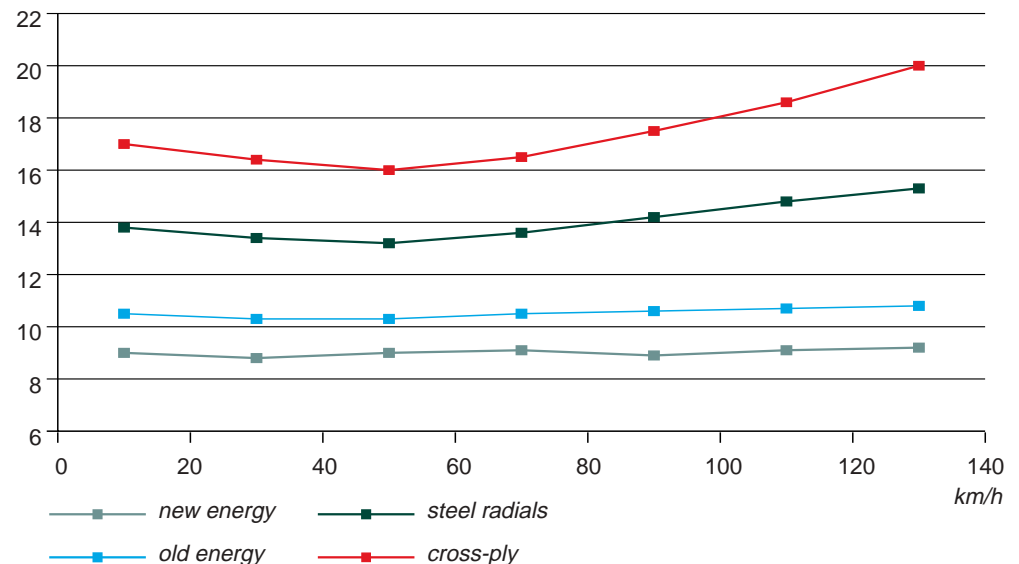
- Italy: (2 car lines and 1 motorcycle line);
- Germany (Breuberg): 3 car lines with a plan to reach a total of 7 car lines and 2 motorcycle lines by the end of 2003;
- United Kingdom (Burton on Trent): 2 car lines;
- United States (Georgia): inauguration of a new factory that will ultimately house 10 car lines.

USE

The three principal sources of environmental impact during tyre use are:

- *Rolling resistance*, i.e. the force a tyre opposes to vehicle advancement and which along with friction of the mechanical components and air drag, affects fuel consumption and relative exhaust gas emissions;
- *wear*: due to the abrasion resulting from friction between tread and road surface, the cause of tyre debris, to be discussed in the next chapter;
- *noise*: caused by the wheel rolling on the road surface, which creates discomfort for motorists (noise inside the vehicle) and the community (external emission).

Rolling resistance index



Different values of the RR index for different tyre types

Consistent with the principles of its Environmental Policy, the development of new product lines is oriented toward a reduction in environmental impact with respect to previous lines.

Pirelli Tyres is constantly committed to achieving these objectives through:

- research and development of new compounds that reduce rolling resistance and increase resistance to tread abrasions during use;
- the design and development of new product lines with innovative internal structures and new tread designs that reduce rolling resistance and increase tyre life;

The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

Research & Development Activity

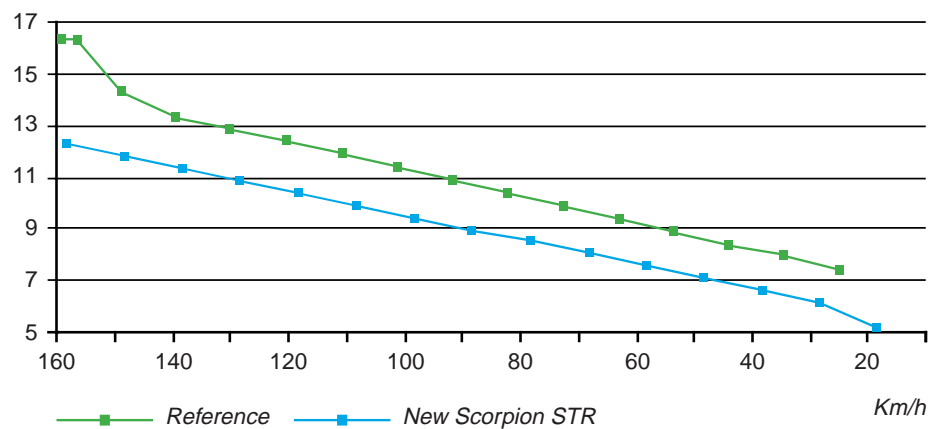
Results of the Tyre Sector

- optimisation of the tread design “mosaic” that impacts the ground and generates the tyre “sound”. Each new product line is known to consumers by the appearance of its tread design. This is the visible part or “face” of the product and therefore must be attractive to customers. But few people know that tread design is a key element of the tyre and is meticulously studied in every dimension, form and detail. The sound emission of the tyre is studied with the aid of software and experimental tests. The two charts that follow show the results of new-concept tyre versus benchmark values in terms of reducing rolling resistance and noise emission.

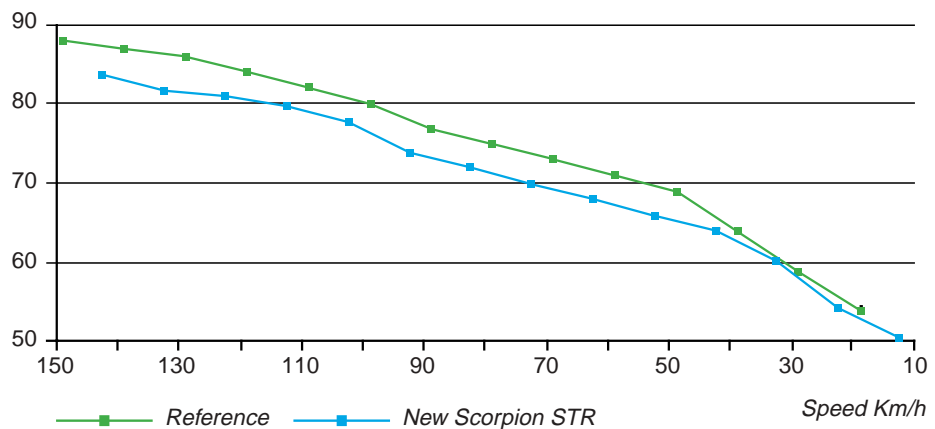


The X-Pressure System™ for measuring the air pressure inside the tyre.

Rolling resistance index



Noise Level



Maintaining proper tyre inflation pressure has important implications not only from the standpoint of safety but also of wear and rolling resistance.

Underinflation of 0.2 bars causes a 1% increase in fuel consumption (and relative atmospheric emissions), while it increases wear by 5%.

For this reason, at the 2003 Geneva Auto Show, Pirelli Tyres plans to launch “XPRESSURE” (<http://www.pirelli.it/xpressure/it/>), a system based on sensors inside the wheel that communicate with an electronic control unit inside the car. A display keeps the driver constantly informed on the thermal and inflation conditions of his tyres.

The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

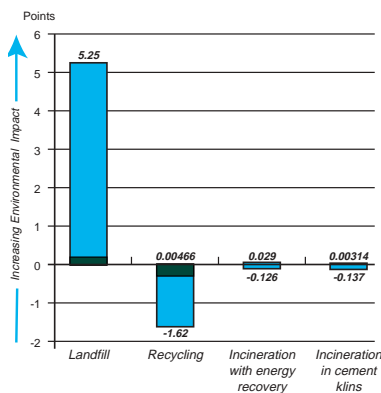
Research & Development Activity

Results of the Tyre Sector

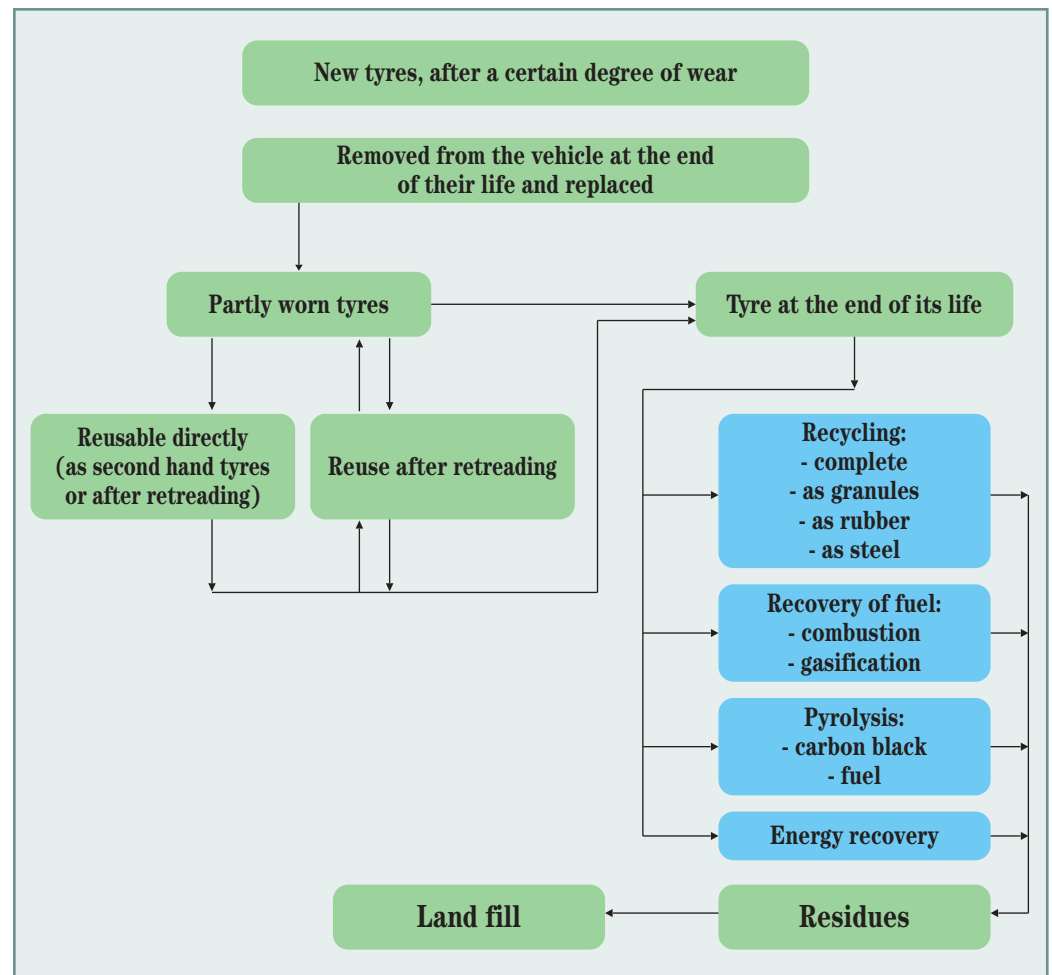
END OF LIFE
Managing end-of-life tyres

The end-of-life phase contributes only modestly to the overall impact of the entire life cycle, and among the various options of disposal the landfill is certainly the one least compatible from the environmental standpoint, as indicated by the following chart.

We would point out, among other things, that European Directive 1999/31/EC prohibits the disposal of whole end-of-life tyres (ELTs) in landfills, beginning in 2003, and even shredded tyres beginning in 2006, so this type of disposal must shortly be abandoned in favour of alternative solutions, as indicated in the following diagram.



Comparison between the impacts of the different end of life scenarios for tyres

Identification of the various categories of used tyres and various end-of-life possibilities


The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

Research & Development Activity

Results of the Tyre Sector

Pirelli conducts a major activity in the research, promotion and implementation of recovery and recycling activities for end-of-life tyres through collaboration with Pirelli Labs and Pirelli & C. Ambiente.

More specifically, Pirelli & C. is involved in building and managing production facilities, designed on the basis of proprietary international patents, for a fuel from waste, CDR-P, consisting of a blend of the dry fraction of solid urban waste with components of high caloric power, such as end-of-life tyres and non-chlorinated plastics.

This fuel represents an alternative to traditional fossil fuels in existing industrial plants.

In September 2001, Pirelli & C. Ambiente and a consortium of municipalities that manages the environmental services for 154,000 inhabitants in a Cuneo Province area in Italy formed the company I.D.E.A. GRANDA. During 2002 Pirelli & C. Ambiente then designed and built the installation of Roccavione (CN), scheduled to go into production in early 2003.

This is an innovative project, the only one of its kind in Europe. CDR-P effectively recovers energy thanks to its use in direct co-combustion in a cement factory located in the area, fuelling its main burner in partial substitution of fossil fuel.

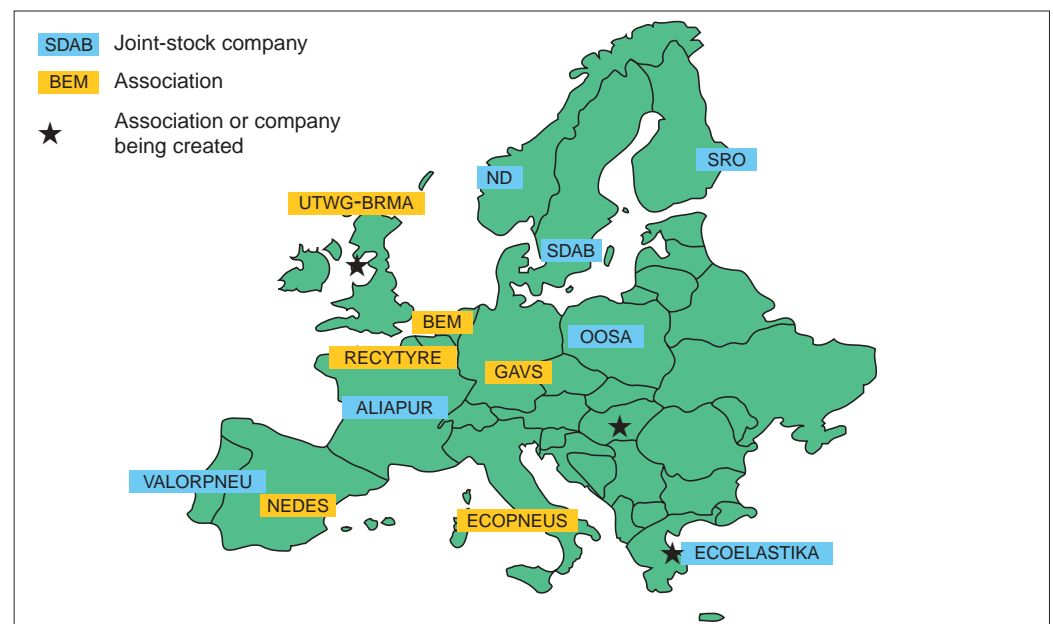
Lastly, Pirelli supports and participates directly in the national associations or joint-stock company that promote and manage the recovery of ELTs and the activities of the working group instituted at the EU's Bureau de Liaison des Industries du Caoutchouc (BLIC), created to coordinate activities in the various European countries and promote interchanges among the various national organizations.



The logo of Pirelli & C. Ambiente.



The new IDEA GRANDA plant, in the Province of Cuneo, Italy.



Map illustrating the associations and "joint stock companies" in Europe.

The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

Research & Development Activity

Results of the Tyre Sector

Research & development activity***Zinc oxide***

In 2002 Pirelli, along with the principal producers and users of zinc oxide, continued its support to the European Commission, which is conducting a risk assessment of the material, to determine whether it is harmful particularly for the aquatic environment.

Aromatic oil

Aromatic oil is a product used by the entire tyre industry as a plasticizer in preparing compounds, but it presents some critical factors because it contains aromatic hydrocarbons. Pirelli is heavily involved in analysis and research on alternative materials. To this end, we participates in the working group formed under BLIC to define the technical and toxicological characteristics of alternative oils, to coordinate activities with the other industries involved, and to provide support to EU institutions. This replacement, particularly in summer car tyres, is particularly complex and requires the redefinition of formulations so as to ensure the maintenance of safety and the performance characteristics required by specific laws and regulations and by the market.

Where it has been technological possible, i.e. in the tread compound for some winter products and for industrial vehicles, aromatic oil has already been eliminated.

Recyclability

In the compounds necessary for tyre production, we use an average of 2-4% of powder produced by recycling ELTs through grinding and regeneration. Pirelli has a current R&D project aimed at doubling the quantity of recycled product used.

Tyre Debris

“Tyre Debris” is the term used to indicate the particles generated by abrasion of tyres during their use on the road. During its life cycle, a tyre produces around 10% of its weight in tyre debris.

The impact of these particles on the environment is still being studied, and the results are conflicting. In past years Pirelli has promoted and financed in-depth studies by important research institutes which ultimately published the results in scientific publications.

The topic is also constantly monitored through participation in studies, research and exchanges of information and experience with the other principal tyre manufacturers in Italy and abroad.



Real tyre debris particles at scanning electron microscope (dimension of the largest particle around 0.3 mm)

The Tyre Sector

Presentation of the Sector

Tyre Production

Steel Cord Production

Product Life Cycle

Research & Development
Activity**Results of the Tyre Sector****Results of the Tyre Sector**

The Quantitative Data portion of this Report, to which we refer you for greater details, contains tables and charts concerning the various environmental parameters considered for the following two categories belonging organizationally to the Tyre Sector: Tyres and steel cord.

Aggregating the data at the Sector level reveals the following:

- Water consumption increased by 8% with respect to 2001;
- Energy consumption increased by 6% with respect to 2001;
- The consumption of organic solvents declined by 25% with respect to 2001. This is in line with our objectives to gradually reduce them or replace them with other substances that emit no volatile organic substances;
- Hazardous waste products remained essentially stable with respect to 2001;
- Non-hazardous waste increased by 19% ;
- The ratio of waste recycled increased strongly from 23% in 2001 to 43% in 2002;
- The quantity of dielectric oils containing PCBs and PCTs declined by 15% with respect to 2001, consistent with objectives to gradually eliminate or replace those substances;
- The quantities of ozone layer depleting substances decreased slightly 2% with respect to 2001;
- The figure for CO₂ emissions is being reported for the first time and thus has no terms of comparison.

The increases in the indicators for water consumption, energy consumption and waste production are essentially attributable to the increase in production that involved both categories in 2002, though to a lesser extent the Tyres category.

For non-hazardous waste, the increase in values was due in part to more precise data collection procedures by the Operating Units but primarily to the partial change in the classification of certain waste with respect to 2001.

Some results should be highlighted, however, such as the reduction in the consumption of organic solvents, the increase in recycled waste, and the decrease in ozone layer depleting substances, all linked to a long-term strategy that year by year is producing important results.

Pirelli S.p.A.

Analysis of Quantitative Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category

QUANTITATIVE DATA

1. Pirelli S.p.A.

The data at the Pirelli S.p.A. level refer to all the Operating Units of the three industrial Sectors: Energy Cables and Systems, Telecom Cables and Systems and Tyres.

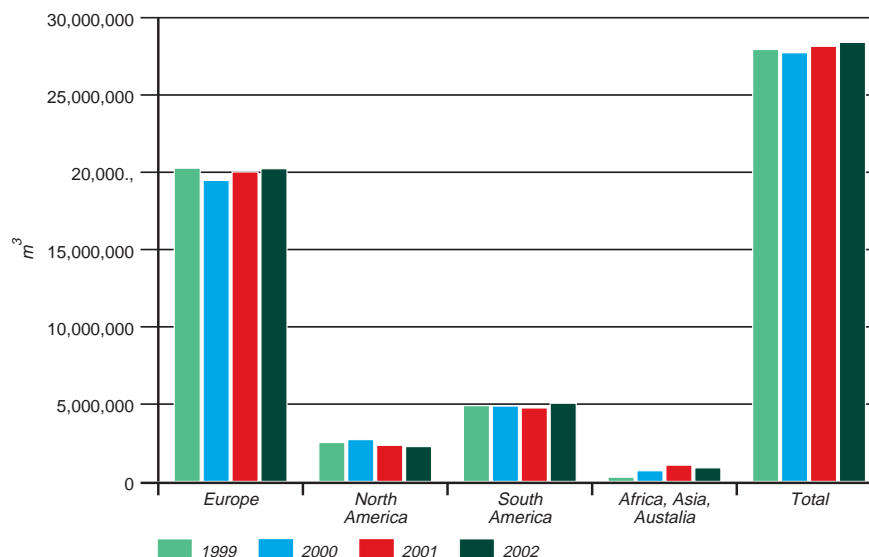
This aggregation provides an idea of the overall environmental load expressed through the parameters considered (water consumption, energy consumption, consumption of organic solvents, production of hazardous and non-hazardous waste, total and hazardous waste recycled, quantity of dielectric oils containing PCBs/PCTs, ozone layer depleting substances, and CO₂ emissions) of the affiliates in the various geographical areas: Europe, North America, South America and Africa/Asia/Australia.

The data, of course, are expressed in terms of absolute values or as percentages but not in terms of consumption per unit of production, which would have no significance given the diversity of the products.

1.1 Water consumption

m ³	1999	2000	2001	2002
Europe	20,261,863	19,471,284	20,019,126	20,226,483
North America	2,512,618	2,700,602	2,331,495	2,249,650
South America	4,899,277	4,873,805	4,749,713	5,053,207
Africa, Asia, Australia	270,639	684,433	1,050,570	873,808
Total	27,944,397	27,730,124	28,150,904	28,403,148

Consumption of water by Pirelli S.p.A.



Consumption was stable over the four years reported, both the total and the quantities for the various geographical areas.

Europe is the area of highest consumption, with 20,226,000 cubic meters or 71% of the total.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

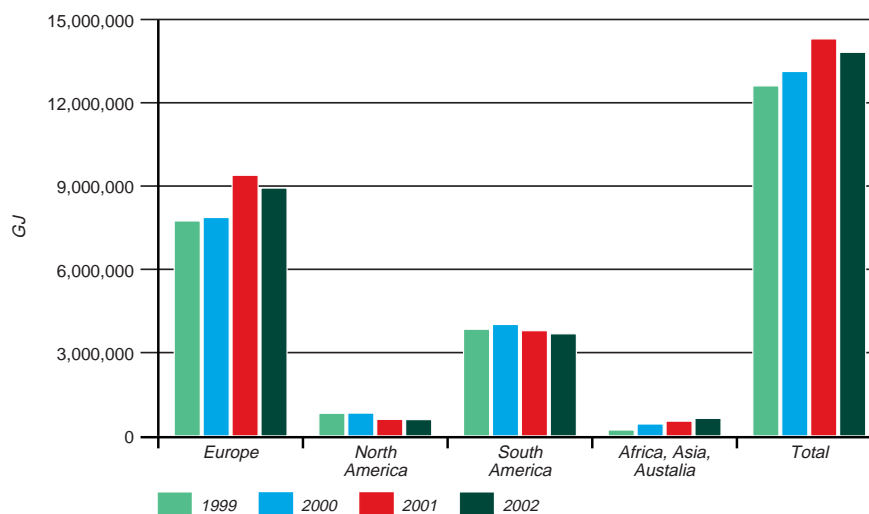
"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category

1.2 Energy consumption

GJ	1999	2000	2001	2002
Europe	7,742,381	7,865,935	9,387,532	8,926,406
North America	812,932	820,125	594,249	584,910
South America	3,840,870	4,012,615	3,787,648	3,675,538
Africa, Asia, Australia	211,151	427,477	530,094	630,098
Total	12,607,334	13,126,151	14,299,523	13,816,952

Consumption of energy by Pirelli


Energy consumption declined slightly with respect to 2001, from 14,299,523 GJ to 13,816,952 GJ, with a reduction of 3.4%. This decrease was attributable primarily to Europe, the area of greatest consumption, which declined from 9,387,532 GJ in 2001 to 8,926,406 GJ in 2002, a decrease of 5 %.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

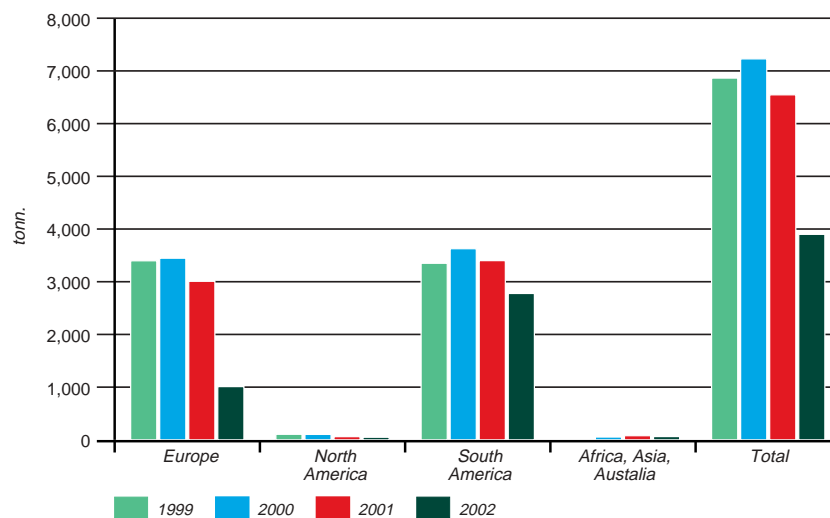
"Tyres" Category

"Steel Cord" Category

1.3 Consumption of organic solvents

tonne	1999	2000	2001	2002
Europa	3,397	3,446	3,008	1,010
Nord America	105	103	60	49
Sud America	3,350	3,626	3,400	2,777
Africa, Asia, Australia	11	53	78	62
Totale	6,864	7,228	6,546	3,899

Consumption of organic solvents by Pirelli S.p.A.



There was a dramatic reduction in the consumption of organic solvents in 2002, from 6,546 tons in 2001 to 3,899 tons in 2002. In percentage terms, the reduction was 40% and was due to gradual elimination or substitution of these solvents in the production processes.

The greatest reduction was in Europe, where consumption declined from 3,008 tons to 1,010 tons in 2002.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

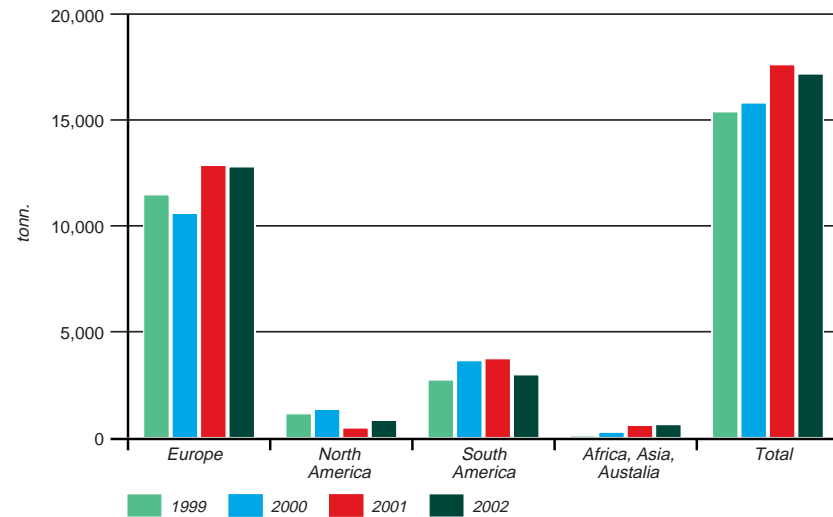
"Tyres" Category

"Steel Cord" Category

1.4 Waste
1.4.1 Hazardous waste

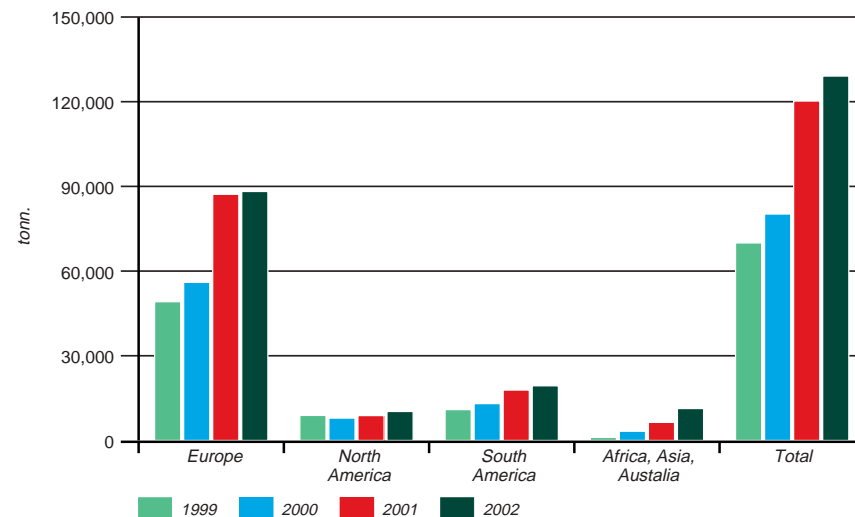
tonne	1999	2000	2001	2002
Europe	11,463	10,587	12,854	12,784
North America	1,124	1,331	452	812
South America	2,719	3,631	3,724	2,962
Africa, Asia, Australia	77	253	578	612
Total	15,383	15,801	17,607	17,170

Hazardous waste produced by Pirelli S.p.A.


1.4.2 Non-hazardous waste

tonne	1999	2000	2001	2002
Europe	49,135	56,003	87,196	88,185
North America	8,858	7,914	8,793	10,254
South America	10,913	13,034	17,844	19,342
Africa, Asia, Australia	1,062	3,258	6,401	11,295
Total	69,968	80,207	120,234	129,076

Hazardous waste produced by Pirelli S.p.A.



Pirelli S.p.A.

Analysis of Quantitative

Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

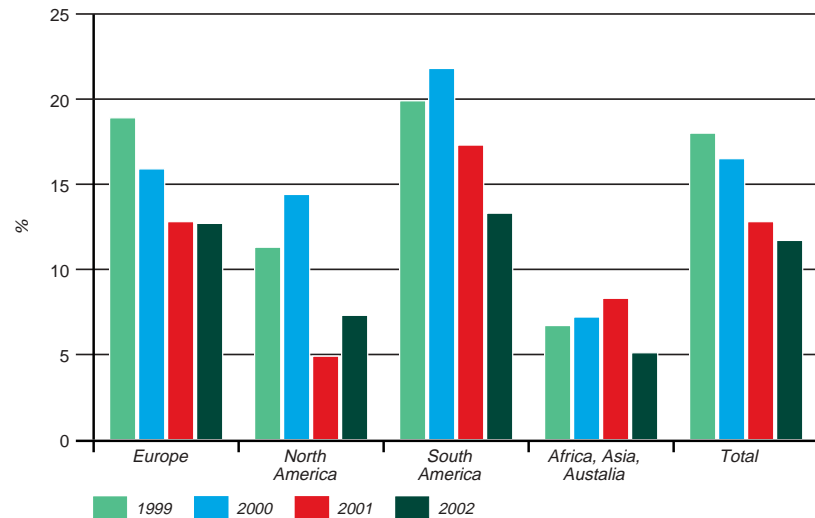
"Optical Fiber" Category

"Tyres" Category

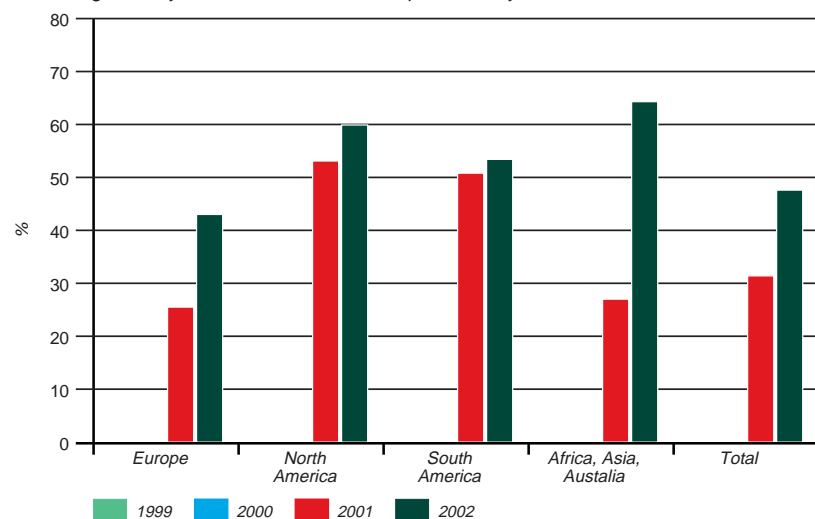
"Steel Cord" Category

1.4.3 Hazardous waste/ Total waste

%	1999	2000	2001	2002
Europe	18.9	15.9	12.8	12.7
North America	11.3	14.4	4.9	7.3
South America	19.9	21.8	17.3	13.3
Africa, Asia, Australia	6.7	7.2	8.3	5.1
Total	18.0	16.5	12.8	11.7

Percentage of hazardous waste on total waste produced by Pirelli

1.4.4 Total recycled waste/total waste

%	1999	2000	2001	2002
Europe	n.d.	n.d.	25.5	43.0
North America	n.d.	n.d.	53.1	59.9
South America	n.d.	n.d.	50.8	53.4
Africa, Asia, Australia	n.d.	n.d.	27.0	64.3
Total	n.d.	n.d.	31.4	47.6

Percentage of recycled waste on total waste produced by Pirelli


Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category

Hazardous waste

The production of hazardous waste declined slightly from 17,607 tons in 2001 to 17,170 tons in 2002, equal to a reduction of 2.5%.

Hazardous waste represents 12% of total waste, essentially stable with respect to 2001.

Europe represents the largest contributor with 12,784 tons in 2002, 74% of total production.

Non-hazardous waste

The production of non-hazardous waste increased with respect to 2001 from 120,234 tons to 129,076 tons, equal to 7%.

This increase, uniformly distributed in the various geographical areas, was due to improvements in the collection of data from the Operating Units. Furthermore, while recycled waste was not computed in 2000, and the 2001 data included only that recycled waste that was sold, in 2002 all recycled waste was included, regardless of whether there was a cost or revenue associated with its recycling.

Europe was the largest producer tons in 2002 with 88,185, corresponding to 70% of total production.

Recycled waste

The total of recycled waste rose from 31% in 2001 to 48% in 2002, increasing in all the geographical areas but particularly in Europe (+70%) and in Africa/Asia/Australia (+300%). Data for 1999-2000 are not available (NA).

Recycled hazardous waste rose from 1,926 tons in 2001 to 6,342 tons in 2002, with an increase of 230%, due primarily to the increase registered in Europe, from 815 to 5,057 tons.

Recycled non-hazardous waste increased from 41,378 tons in 2001 to 63,032 tons in 2002, with a percentage increase of 52%. Here, again, the increase was attributable essentially to Europe, which went from 24,739 tons in 2001 to 38,127 in 2002.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

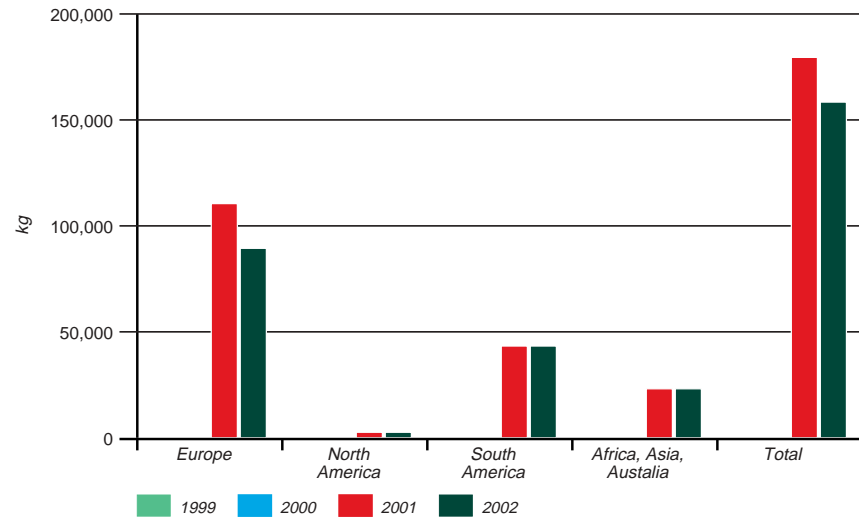
"Tyres" Category

"Steel Cord" Category

1.5 Dielectric oils containing PCBs/PCTs

kg	1999	2000	2001	2002
Europe	n.d.	n.d.	110,501	89,403
North America	n.d.	n.d.	2,600	2,600
South America	n.d.	n.d.	43,292	43,292
Africa, Asia, Australia	n.d.	n.d.	23,114	23,114
Total	n.d.	n.d.	179,507	158,409

Dielectric oils containing PCB/PCT of Pirelli S.p.A.



There was a 12% reduction in dielectric oils containing PCBs/PCTs in use or stored. This reduction took place in Europe, which went from 110,501 kg in 2001 to 89,403 kg in 2002, a reduction of 22%. Data for years 1999 and 2000 are not available (NA).

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

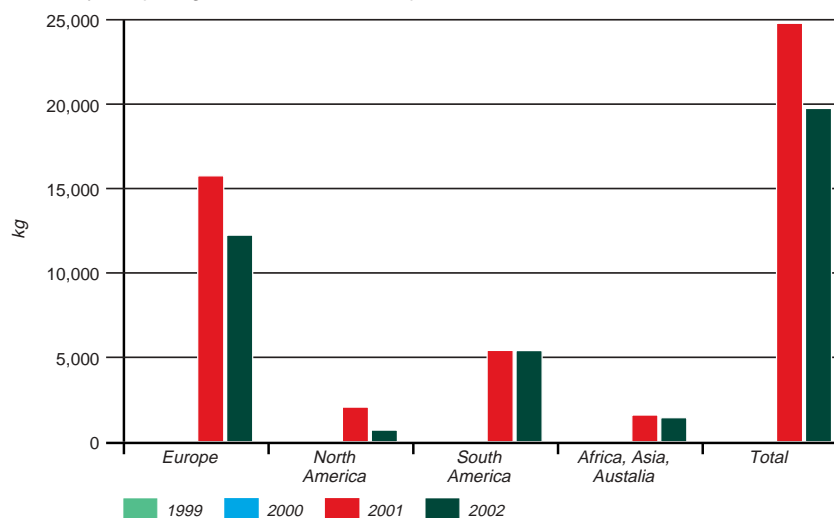
"Tyres" Category

"Steel Cord" Category

1.6 Ozone layer depleting substances

kg	1999	2000	2001	2002
Europe	n.d.	n.d.	15,751	12,238
North America	n.d.	n.d.	2,050	687
South America	n.d.	n.d.	5,409	5,399
Africa, Asia, Australia	n.d.	n.d.	1,580	1,421
Total	n.d.	n.d.	24,789	19,744

Ozone layer depleting substances of Pirelli S.p.A.



The data regarding ozone layer depleting substances refer to those substances that are contained in fixed refrigeration and firefighting systems, since those substances are not used in production. These substances dropped from 24,789 kg in 2001 to 19,744 kg in 2002 with a reduction of 20%. The largest reduction in absolute terms was registered in Europe, which went from 15,751 kg to 12,238. The reduction was the result of programs to eliminate those substances or replace them with other not damaging to the ozone layer. Data for years 1999 and 2000 are not available (NA).

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

“Telecom Cables” Category

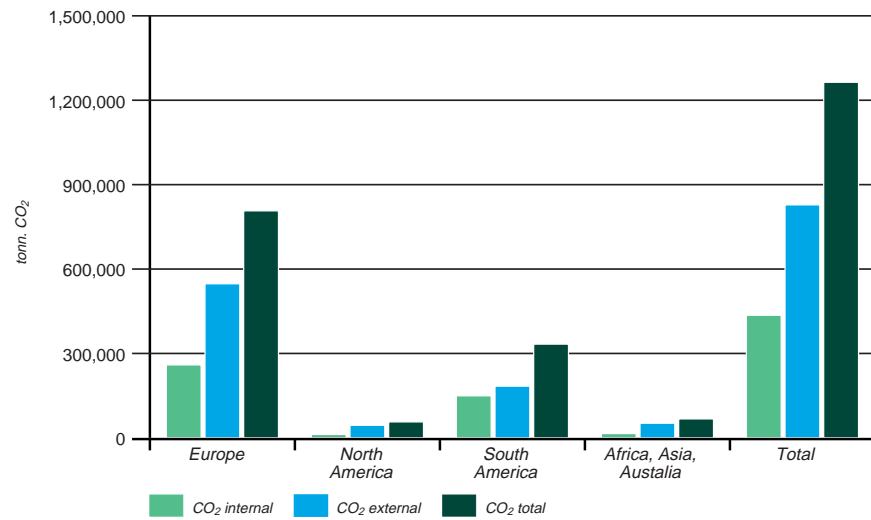
“Optical Fiber” Category

“Tyres” Category

“Steel Cord” Category

1.7 CO₂ emissions

tonne	CO ₂ internal	CO ₂ external	CO ₂ total
Europe	259,246	547,564	806,811
North America	11,978	44,714	56,692
South America	149,386	183,720	333,106
Africa, Asia, Australia	15,202	52,015	67,217
Total	435,812	828,014	1,263,825

 CO₂ emissions from Pirelli S.p.A.


The data regarding CO₂ emissions refer both to the consumption of fuels used for producing energy within the Operating Units (internal) and to the consumption of fuels theoretically necessary to produce the electric power that was purchased outside (external). The calculations were based on the factors for converting energy to kg of CO₂ emitted indicated in table 1 of this Report.

Europe is the area that made the greatest contribution with 806,811 tons of CO₂, equal to 64% of the total, followed by South America with 26%.

Pirelli S.p.A.

Analysis of Quantitative Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

“Telecom Cables” Category

“Optical Fiber” Category

“Tyres” Category

“Steel Cord” Category

2. Analysis of Quantitative Data by Category

The term "category" is used to define a type of production, such as Steel Cord or Optical Fibre, which is homogeneous from the standpoint of the industrial processes followed and the relative indicators of environmental impact.

The categories considered are the following:

Sector	Category
Energy Cables and Systems Sector	<i>Energy Cables</i>
	<i>Accessories</i>
	<i>Rod</i>
Telecom Cables and Systems Sector	<i>Telecom Cables</i>
	<i>Optical Fibre</i>
Tyres Sector	<i>Tyres</i>
	<i>Steel Cord</i>

The following changes were introduced with respect to prior reports:

- Starting with 2002, the data for the energy cables and telecom cables categories are being presented separately. This was not possible before last year because the two productions belonged to the same industrial sector.
- The data regarding the production of enameled wire are not provided in this report, since the relative Operating Units were sold off during the year.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category

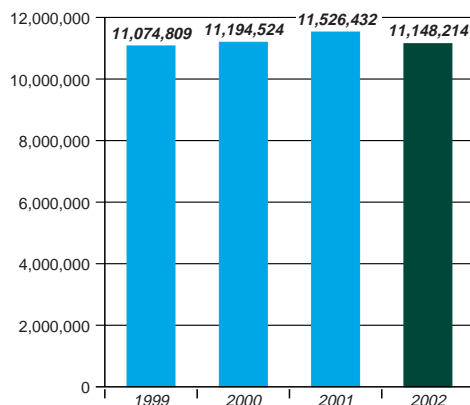
2.1. "Energy Cables" Category

In 2002 there was a moderate reduction in the quantity of energy cables produced, equal to the 8% in weight, due essentially to divestitures during the year but also to industrial rationalization at some Operating Units.

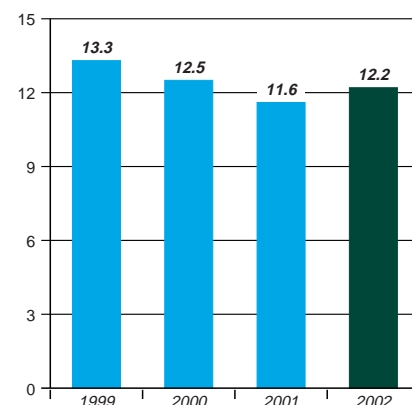
This reduction, though moderate, affected the absolute values of certain indicators. The specific values, as ratio of water consumption to production, still provide significant comparisons with prior years.

2.1.1. Water

Consumption of water by energy cables category



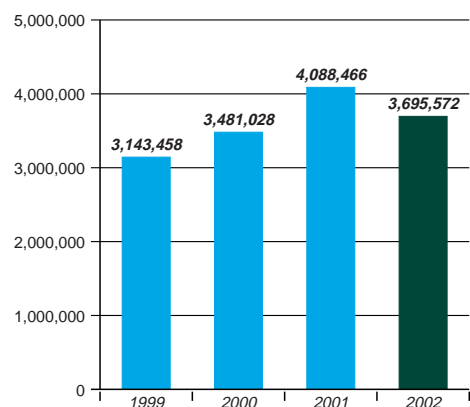
Specific consumption of water by energy cables category



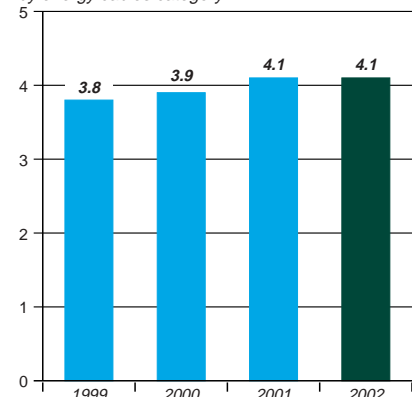
The value of specific consumption for 2002 shows a reversal with respect to the trend registered in the previous three years (1999-2001), although there was a reduction (-3.3%) in the total consumption of water from 11,526,000 cubic meters in 2001 to 11,148,000 in 2002. This was due to the reduction in production, since water consumption tends to decline less than production due to the presence of basic uses at least partially independent from it.

2.1.2. Energy

Consumption of energy by energy cables category



Specific consumption of energy by energy cables category



Specific energy consumption remained basically constant, while the absolute value decreased by 9.6% due to the decline in production but also to actions to make more efficient use of the energy.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

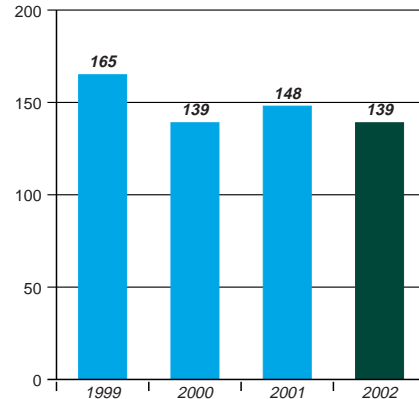
"Optical Fiber" Category

"Tyres" Category

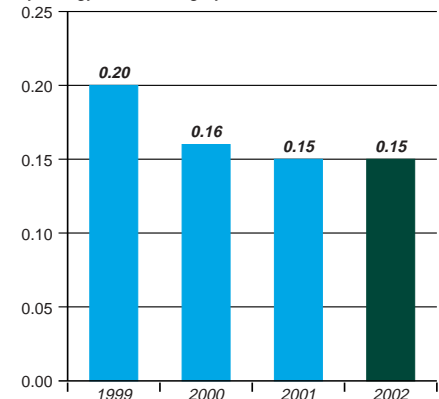
"Steel Cord" Category

2.1.3. Organic solvents

Consumption of organic solvents
by energy cables category



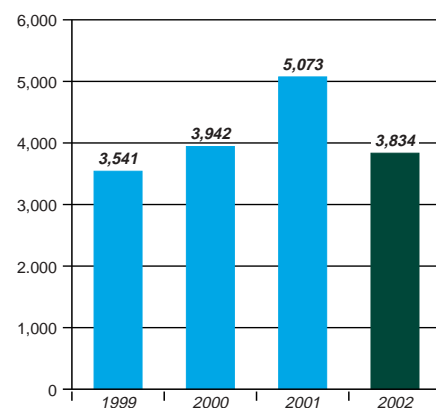
Specific consumption of organic solvents
by energy cables category



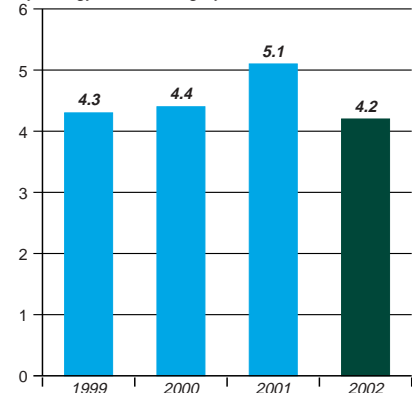
The consumption of organic solvents, after decreasing in prior years, registered stability in specific consumption, which rose from 0.148 to 0.152 kg per ton of product, and a reduction of 5.8% in absolute terms.

2.1.4. Waste

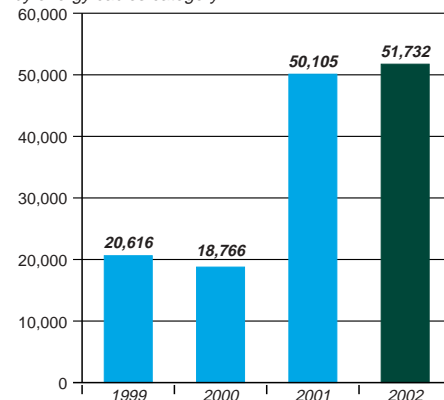
Hazardous waste produced by energy cables category



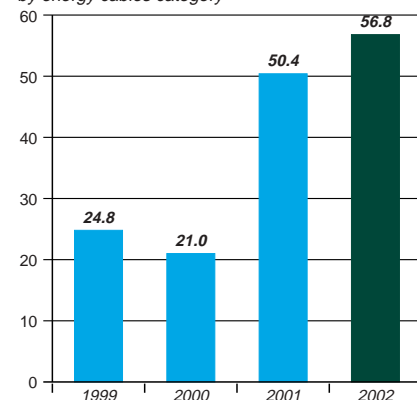
Specific production of hazardous waste
by energy cables category



Non-Hazardous waste produced
by energy cables category



Specific production of non-hazardous waste
by energy cables category



Pirelli S.p.A.

Analysis of Quantitative Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

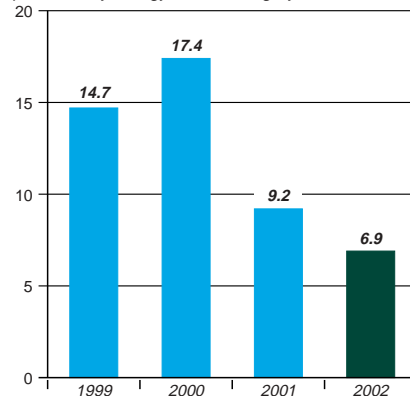
“Telecom Cables” Category

“Optical Fiber” Category

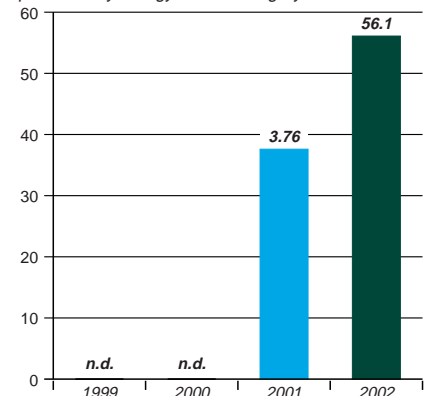
“Tyres” Category

“Steel Cord” Category

Percentage of hazardous waste on total waste produced by energy cables category



Percentage of recycled waste on total produced by energy cables category



Hazardous waste

After increases in the 1999-2001 period, the specific production of waste declined in 2002 from 5.1 to 4.2 kg per ton of product. In absolute terms, the reduction was equal to 24% with respect to 2001.

Consequently, the percentage of waste hazardous to total waste dropped from 9.2 % to 6.9 %.

Non-hazardous waste

In 2002 there was a slight increase in both the specific value and the absolute value of non-hazardous waste. This increase was due in part to improvements in the collection of information from the Operating Units and in part because in 2000 recycled waste was not included, in 2001 only recycled waste that was sold was included and in 2002 all recycled waste was considered, including those for which a charge was paid for recovery/recycling. The data are therefore not comparable but, for reasons of transparency, we preferred to repeat in full the values provided in the preceding reports.

The percentage of non-hazardous waste to total waste increased from 90.8% in 2001 to 93.1%.

Recycled waste

Consistent with the preceding paragraph, the percentage of recycled waste increased from 37.6 % to the 56.1%. This increase was due to actions to increase waste recycling in the various Operating Units and to the various classification methods mentioned earlier.

Recycled hazardous waste dropped from 0.5% in 2001 to 4.9% in 2002 as a percentage of total recycled waste.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

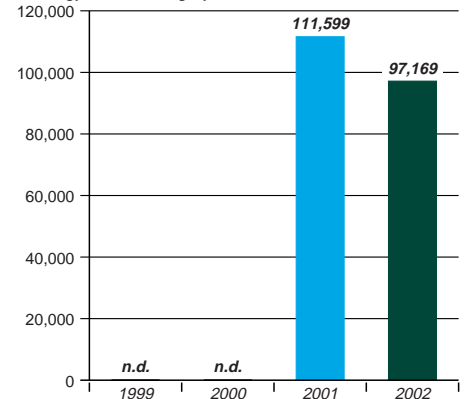
"Tyres" Category

"Steel Cord" Category

2.1.5. Dielectric oils containing PCBs/PCTs

The dielectric oils containing PCBs/PCTs declined by 12.9%, from 111,599 kg in 2001 to 97,169 kg in 2002, as a result of substitution and transformer reclamation in a few European Operating Units. No data are available for 1999 and 2000.

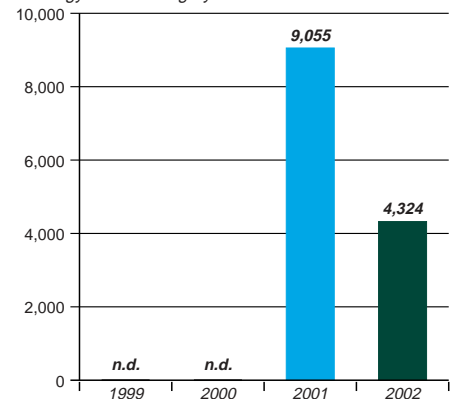
Dielectric oils containing PCB-PCT
of energy cables category



2.1.6. Ozone layer depleting substances

With respect to 2001 there was a drastic reduction of 50% in ozone layer depleting substances, from 9,055 kg to 4,324 kg, due to operations to gradually replace substances with ozone-friendly substances. No data are available for 1999 and 2000.

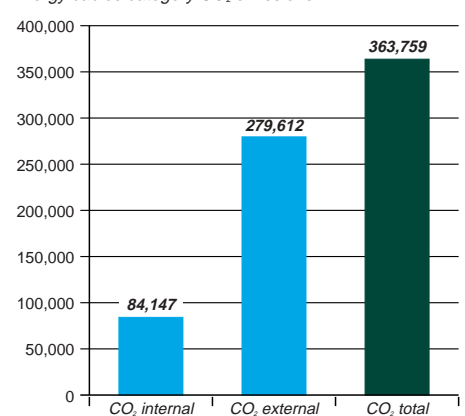
Ozone layer depletion substances
of energy cables category



2.1.7 CO₂ emissions

CO₂ emissions, reported for the first time in 2002, refer to the consumption of fuels for the production of energy within the Operating Units (internal) and to the consumption of fuel for the production of the electric power purchased outside (external). We used the factors for converting from energy quantities to kg of CO₂ emitted as indicated in table 1 of this Report.

Energy cables category CO₂ emissions



Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category

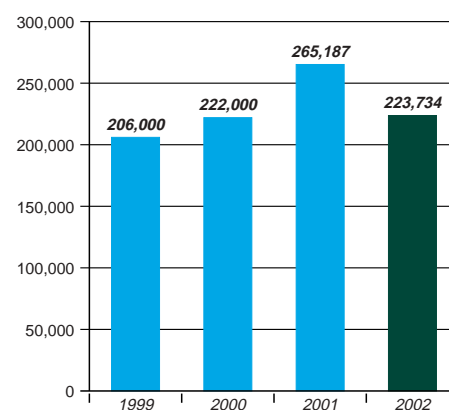
2.2. "Accessories" Category

As in prior years for the cable accessories category we are presenting the absolute values of the parameters, omitting specific values per unit of product since, considering the extreme diversification of these products, the relative values would have no significance.

2.2.1. Water

The consumption of water showed a reduction of 16%, from 265,187 cubic meters in 2001 to 223,734 in 2002, despite the addition of the "Bishopstoke Accessories" Unit and the doubling of production at the Operating Unit in Italy. This reduction was due essentially to improvements made in the water systems at two Operating Units.

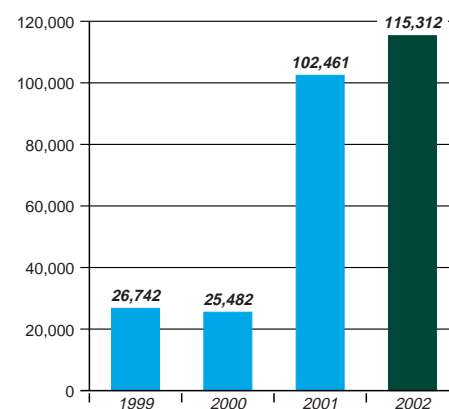
Consumption of water by accessories category



2.2.2. Energy

Energy consumption registered a 12% increase, from 102,461 GJ in 2001 to 115,312. This increase was associated with the inclusion of the "Bishopstoke Accessories" for the first time and the doubling of production at the Operating Unit in Italy.

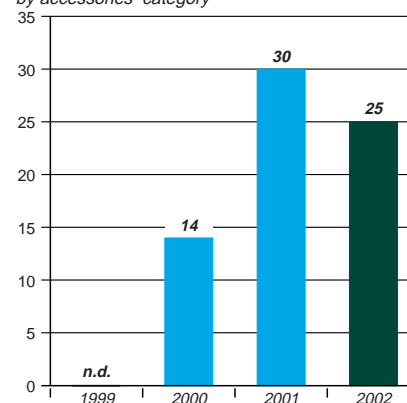
Consumption of energy by accessories category



2.2.3. Organic solvents

In 2002 there was a reduction of 18% with respect to 2001, from 30 tons to 25, despite the addition of the "Bishopstoke Accessories" Unit and the doubling of production at the Operating Unit in Italy.

Consumption of organic solvents by accessories category



Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

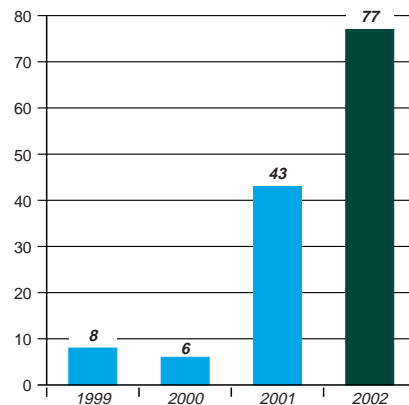
"Optical Fiber" Category

"Tyres" Category

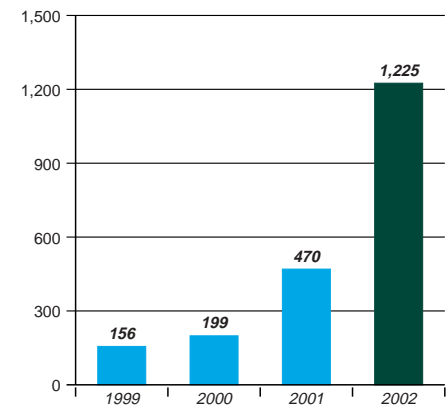
"Steel Cord" Category

2.2.4. Waste

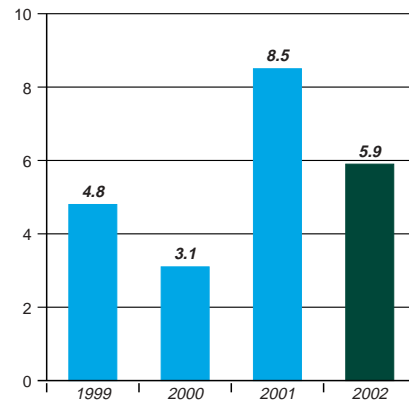
Hazardous waste produced by accessories category



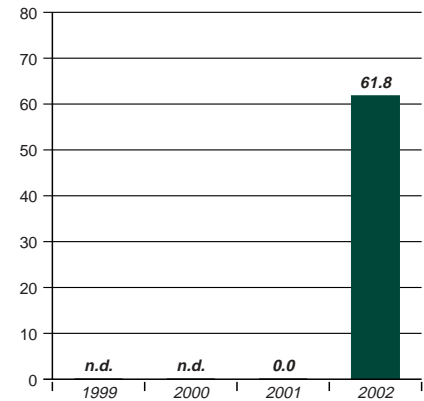
Non-Hazardous waste produced by accessories category



Percentage of hazardous waste on total waste produced by accessories category



Percentage of recycled waste on total waste produced by accessories category



Hazardous waste

Hazardous waste increased by 76% in 2002, from 43 tons to 77. This increase is associated with the addition of the "Bishopstoke Accessories" Unit and the doubling of production at the Operating Unit in Italy.

The percentage of hazardous waste to total waste declined from 8.5% to 5.9%.

Non-hazardous waste

Non-hazardous waste followed the same trend as the hazardous variety, with an increase of 161% from 470 tons to 1,225. This increase is due to the addition of the "Bishopstoke Accessories" Unit as well as the doubling of production at the Operating Unit in Italy, the improvement of information collection from the Operating Units, and the fact that, mentioned earlier, that in 2000 recycled waste was not considered, in 2001 only the recycled waste sold was included, and in 2002 all the recycled waste was reported, even that for which a recycling or disposal charge was paid.

The percentage of non-hazardous waste to total waste increased from 91.5% to 94.1%.

Recycled waste

The percentage of recycled waste was 61.8% in 2002, including 3.2% of hazardous waste. No data are available for previous years.

Pirelli S.p.A.

Analysis of Quantitative
Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

“Telecom Cables” Category

“Optical Fiber” Category

“Tyres” Category

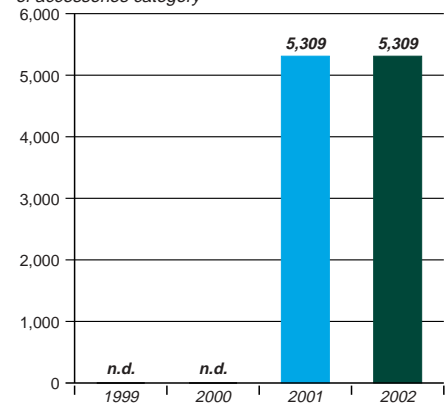
“Steel Cord” Category

2.2.5. Dielectric oils containing PCBs/PCTs

The quantity of oil containing PCBs/PCTs remained unchanged with respect to 2001 at 5,309 kg.

No data are available for 1999 and 2000.

Dielectric oils containing PCB-PCT
of accessories category

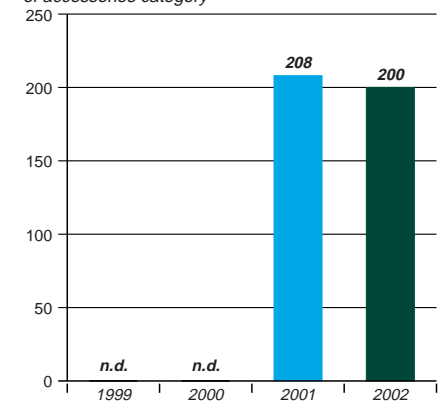


2.2.6. Ozone layer depleting substances

With respect to 2001 there was a slight reduction of around 3.8%, from 208 kg to 200 kg.

No data are available for 1999 and 2000.

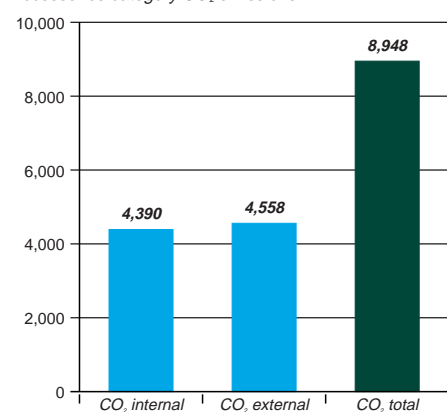
Ozone layer depletion substances
of accessories category



2.2.7. CO₂ emissions

CO₂ emissions, reported for the first time in 2002, refer to the consumption of fuels for the production of energy within the Operating Units (internal) and to the consumption of fuel for the production of electric power purchased outside (external). This was calculated using the factors for converting energy quantities into kg of CO₂ emitted, as indicated in table 1 of this Report.

Accessories category CO₂ emissions



Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

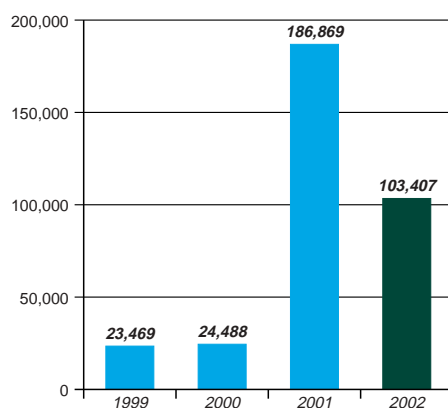
"Steel Cord" Category

2.3. "Rod" Category

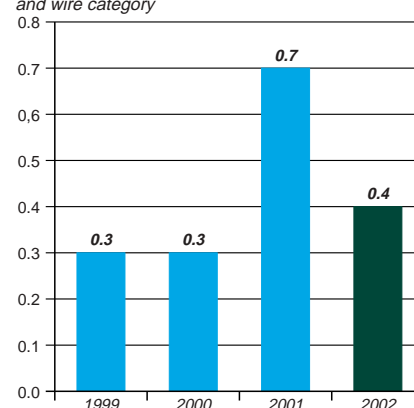
In 2002 the production of rod declined by 10% with respect to 2001, and this partially affected the absolute values of some of the indicators chosen. By presenting these indicators in terms of specific values, i.e. as a percentage of production, significant year-to-year comparisons can still be made.

2.3.1. Water

Consumption of water by copper rod and wire category



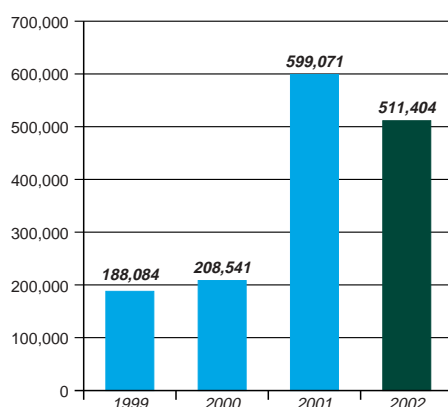
Specific consumption of water by copper rod and wire category



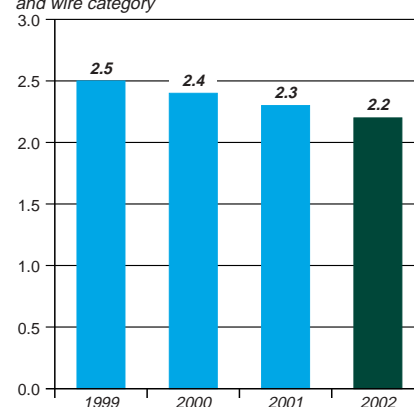
In 2002 water consumption dropped by a substantial 45%, from 186,869 cubic meters to 103,407, with a significant reduction in specific consumption from 0.7 to 0.4 cubic meters per ton of product. This reduction was attributable in part to the actions to make the use of this resource more efficient and in part to the reduction in production with respect to 2001.

2.3.2. Energy

Consumption of energy by copper rod and wire category



Specific consumption of energy by copper rod and wire category



Energy consumption showed a modest but constant decline in terms of specific consumption. Consistent with this, the decrease in absolute consumption was slightly greater than the decrease in production (-15% and -10%, respectively).

Pirelli S.p.A.

Analysis of Quantitative Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

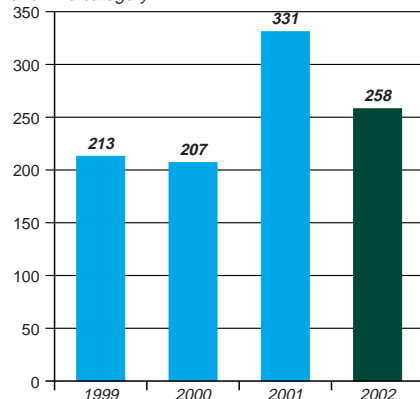
"Optical Fiber" Category

"Tyres" Category

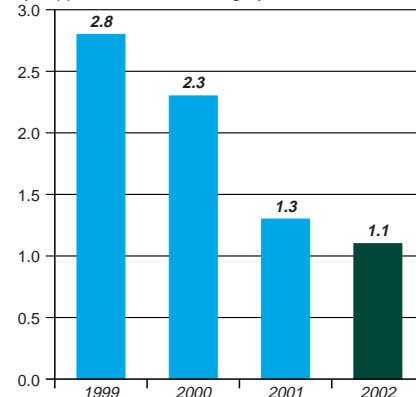
"Steel Cord" Category

2.3.3. Organic solvents

Consumption of organic solvents by copper rod and wire category



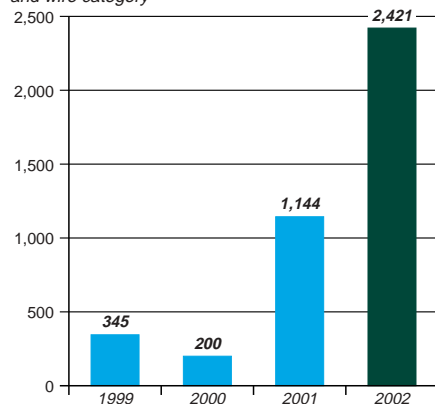
Specific consumption of organic solvents by copper rod and wire category



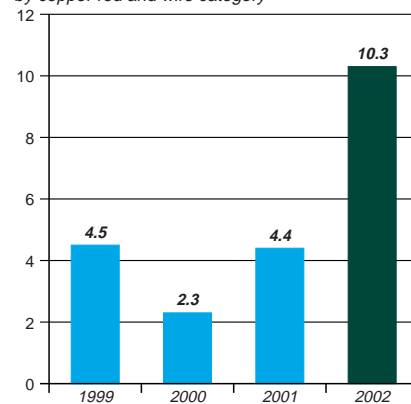
There was a further reduction in organic solvent consumption in 2002, confirming the downward trend of recent years, in line with the objectives of reduction and substitution in the Operating Units. In absolute terms, the reduction in 2002 was 22% with respect to 2001, from 331 kg to 258 kg, and the specific consumption dropped from 1.3 to 1.1 kg per ton of product.

2.3.4. Waste

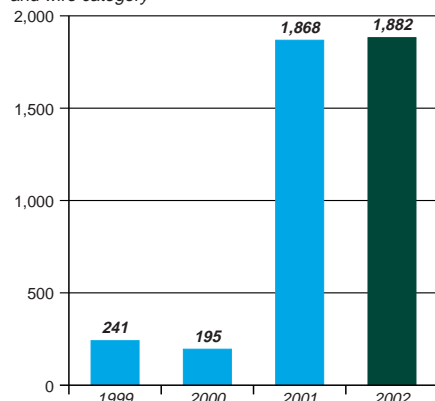
Hazardous waste produced by copper rod and wire category



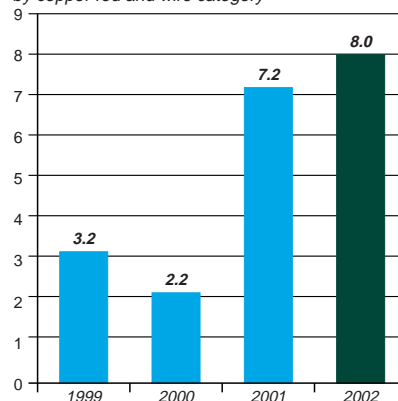
Specific production of hazardous waste by copper rod and wire category



Non-Hazardous waste produced by copper rod and wire category



Specific production of non-hazardous waste by copper rod and wire category



Pirelli S.p.A.

Analysis of Quantitative Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

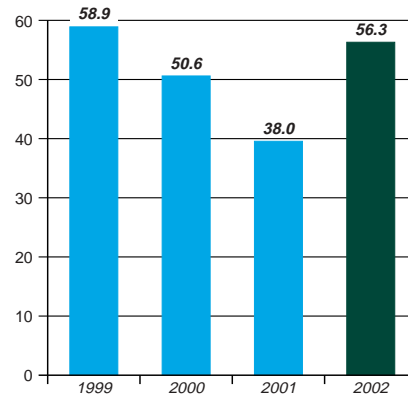
“Telecom Cables” Category

“Optical Fiber” Category

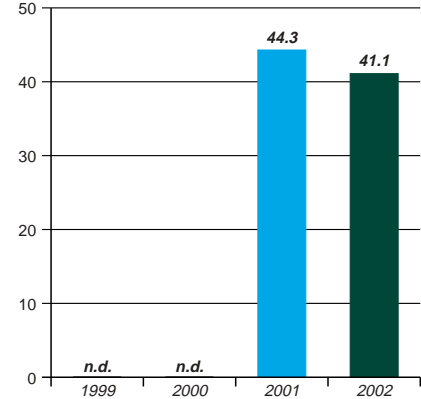
“Tyres” Category

“Steel Cord” Category

Percentage of hazardous waste on total waste produced by copper rod and wire category



Percentage of recycled waste on total waste produced by copper rod and wire category



Hazardous waste

In 2002 there was a large increase in the values relative to the specific production of hazardous waste, which rose from 4.4 to 10.3 kg per ton of product. This was due to the registration of spent oily emulsions at the UK facility, which had not been counted in previous years.

The ratio of hazardous waste to total waste rose from 38.0% in 2001 to 56.3% in 2002.

Non-hazardous waste

The quantity of non-hazardous waste was stable in terms of absolute values but increased in terms of specific value as a result of the reduction in production, rising from 7.2 to 8.0 kg per ton of product. This increase was due in part to the improved collection of information from the Operating Units; and, as previously mentioned, in 2000 recycled waste was not considered, in 2001 only recycled waste sold was reported, and in 2002 all recycled waste was counted regardless of whether it was sold or a disposal charge was paid. Consistent with the foregoing data, the ratio of non-hazardous waste to total waste decreased from 62.0% in 2001 to 43.7% in 2002.

Recycled waste

In 2002 there was an increase in the absolute value of recycled waste of 25%, from 1,334 to 1,768. Therefore, for the reasons mentioned in the preceding paragraph, the percentage of recycled waste on total waste declined from 44.3% in 2001 to 41.1% in 2002. Recycled hazardous waste as a percentage of total recycled waste rose from 0.2 % in 2001 to 5.6 % in 2002.

Pirelli S.p.A.

Analysis of Quantitative Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

“Telecom Cables” Category

“Optical Fiber” Category

“Tyres” Category

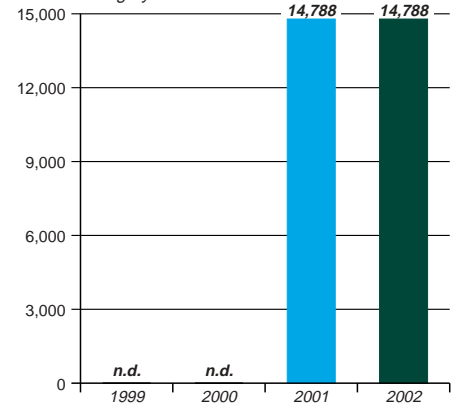
“Steel Cord” Category

2.3.5. Olii dielettrici contenenti PCB / PCT

The 2001 figure of 14,788 kg was confirmed. In reality, in this case, the concentrations of PCB/PCT in the dielectric oils were well below the threshold values established by regulations applicable in the various countries for the classification of oil with PCB/PCT.

No data are available for 1999 and 2000.

Dielectric oils containing PCB-PCT of copper rod and wire category

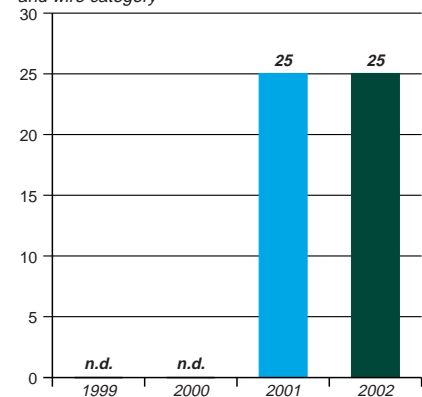


2.3.6. Ozone layer depleting substances

With respect to 2001 there were no changes in the quantity of 25 kg.

No data are available for 1999 and 2000.

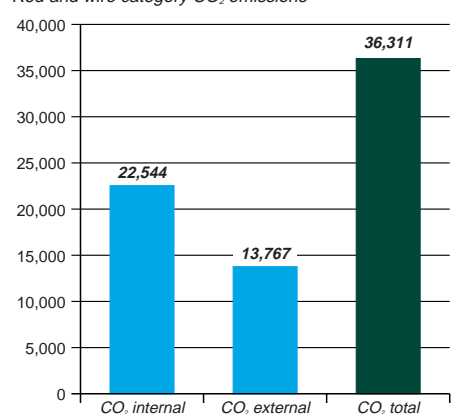
Ozone layer depletion substances of copper rod and wire category



2.3.7. CO₂ emissions

CO₂ emissions, reported for the first time in 2002, refer to the consumption of fuels necessary for the production of energy within the Operating Units (internal) and to the consumption of fuels for the production of the electrical power purchased outside (external). The conversion factors used are described in table 1 of this Report.

Rod and wire category CO₂ emissions



Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category

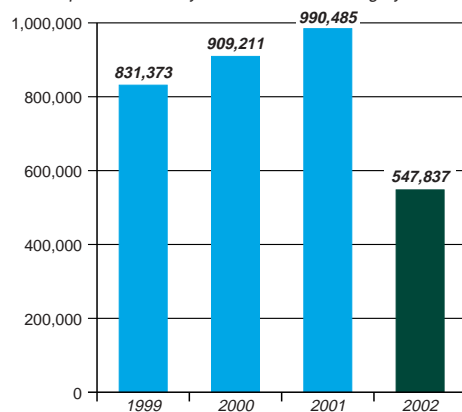
2.4. "Telecom Cables" Category

In 2002 there was a sharp reduction (over 40%) in the volume produced, due to the well-known worldwide crisis in the industry.

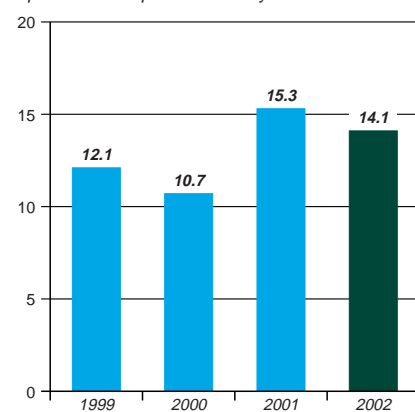
This reduction significantly affected the absolute values of the selected indicators, while the specific values (per unit of product) still permit meaningful comparisons with previous years.

2.4.1. Water

Consumption of water by Telecom Cables category



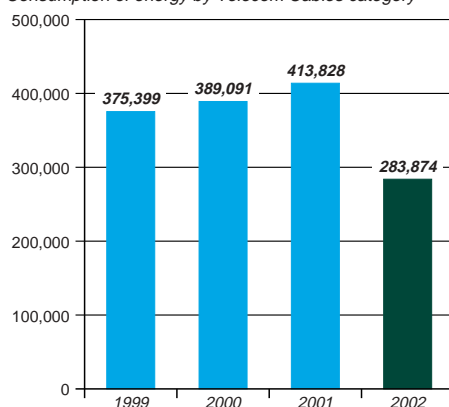
Specific consumption of water by Telecom Cables category



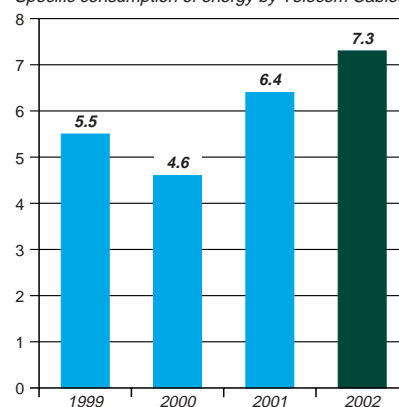
Water consumption declined significantly in both absolute values and in values per unit of product, from 15.3 to 14.1 cubic meters per ton of product: this reduction was largely due to the elimination of a prolonged water loss in one Operating Unit that occurred in 2001.

2.4.2. Energy

Consumption of energy by Telecom Cables category



Specific consumption of energy by Telecom Cables category



There was a 31.4% decline in absolute consumption, from 413,828 GJ in 2001 to 283,874 GJ, and an increase in specific consumption from 6.4 to 7.3 GJ per ton of product.

The reduction in absolute consumption was attributable to decreased production, while the increase in specific consumption was linked to the fact that energy consumption tends to decline less than production due to fixed volumes of consumption.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

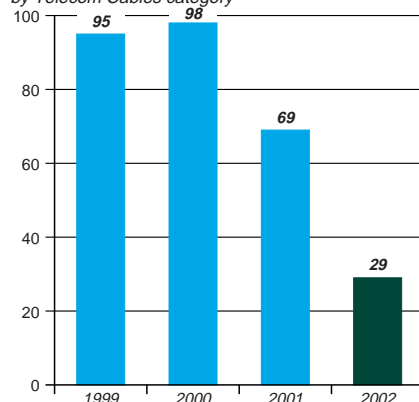
"Optical Fiber" Category

"Tyres" Category

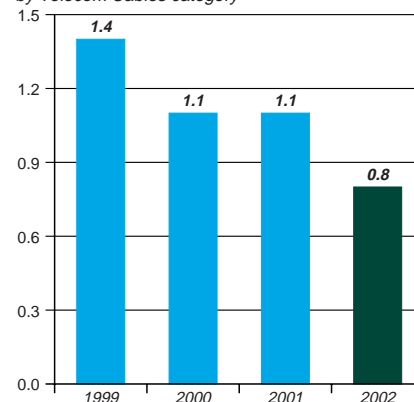
"Steel Cord" Category

2.4.3. Organic solvents

Consumption of organic solvents
by Telecom Cables category



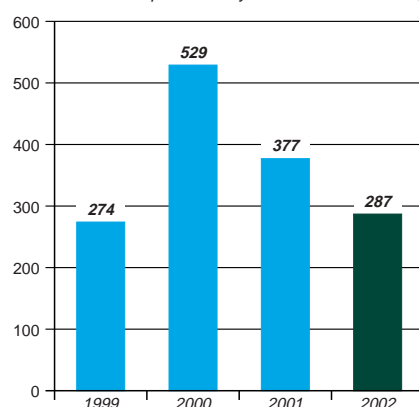
Specific consumption of organic solvents
by Telecom Cables category



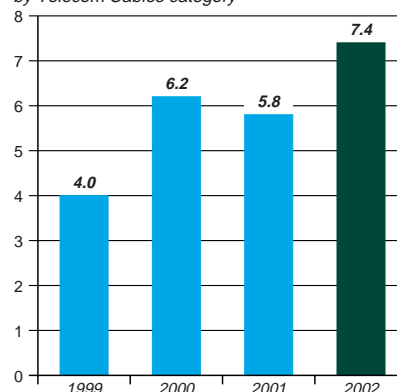
The pattern of steady reduction in the consumption of organic solvents continued in 2002, from 1.1 kg per ton of product in 2001 to 0.8 in 2002 due to the gradual implementation of programs to reduce their use and their replacement with other substances. In terms of absolute consumption, the reduction was 57% with respect to the value for 2001.

2.4.4. Waste

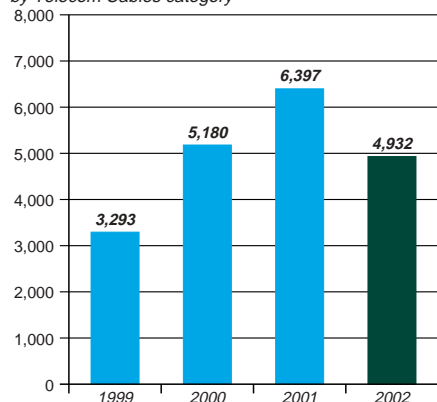
Hazardous waste produced by Telecom Cables category



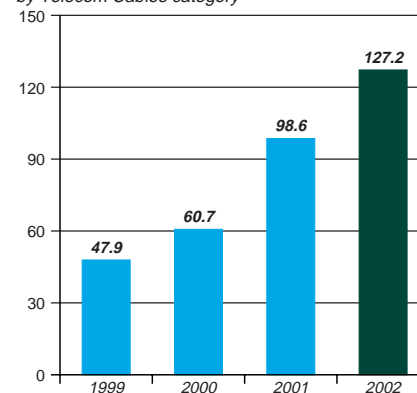
Specific production of hazardous waste
by Telecom Cables category



Non-Hazardous waste produced
by Telecom Cables category



Specific production of non-hazardous waste
by Telecom Cables category



Pirelli S.p.A.

Analysis of Quantitative
Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

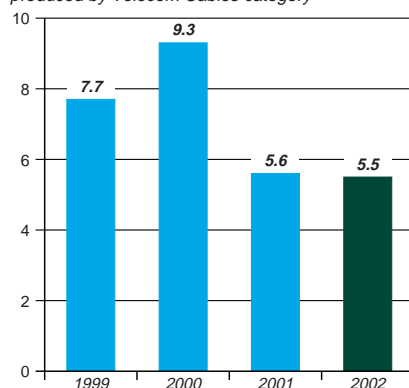
“Telecom Cables” Category

“Optical Fiber” Category

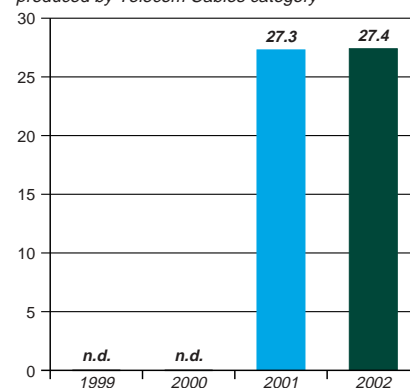
“Tyres” Category

“Steel Cord” Category

Percentage of hazardous waste on total waste
produced by Telecom Cables category



Percentage of recycled waste on total waste
produced by Telecom Cables category



Hazardous waste

The production of hazardous waste in 2002 declined in absolute terms by 23% with respect to 2001 but increased in specific value from 5.8 to 7.4 kg per ton of product.

This reduction in absolute value was linked to decreased production, while the increase in specific production was due, in some cases, to a more accurate classification and collection of data in the Operating Units, and in other cases to the fact that some waste produced in 2001 was disposed of in 2002.

The ratio between hazardous waste and total waste, on the other hand, declined slightly from 5.6% in 2001 to 5.5% in 2002.

Non-hazardous waste

The reduction linked to decreased production was 30% in absolute terms, while there was an increase in specific production from 98.6 to 127.2 kg per ton of product.

This increase in the relative values was due in part to the improved collection of information from the Operating Units and in part to the different classification of recycled waste in 2000, 2001 and 2002, often mentioned earlier in this Report. The percentage of non-hazardous waste to total waste increased from 94.4% to 94.5%.

Recycled waste

The percentage of recycled waste was basically stable, rising slightly from 27.3% in 2001 to 27.4% in 2002. The ratio of recycled hazardous waste to total recycled waste went from 0% in 2001 to 6.5 % in 2002.

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 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

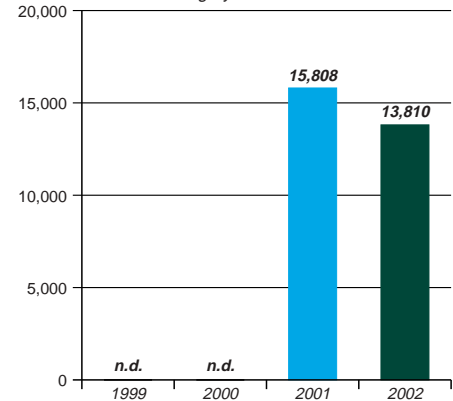
"Tyres" Category

"Steel Cord" Category

2.4.5. Dielectric oils containing PCBs/PCTs

The quantity of dielectric oils containing PCBs/PCTs declined from 15,808 in 2001 to 13,810 kg in 2002, due primarily to the disposal of these oils in one Operating Unit. No data are available for 1999 and 2000.

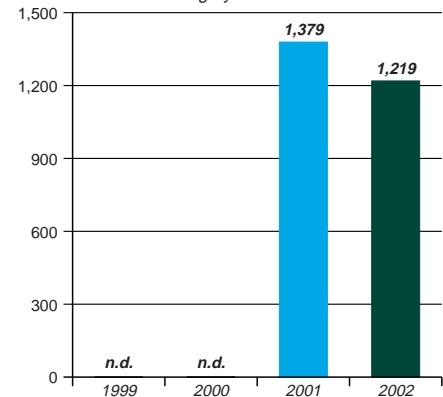
Dielectric oils containing PCB/PCT of Telecom Cables category



2.4.6. Ozone layer depleting substances

With respect to 2001 there was a reduction of 12% (from 1,379 kg to 1,219 kg), as a consequence of the gradual substitution of those substances with substances not damaging to the ozone layer. No data are available for 1999 and 2000.

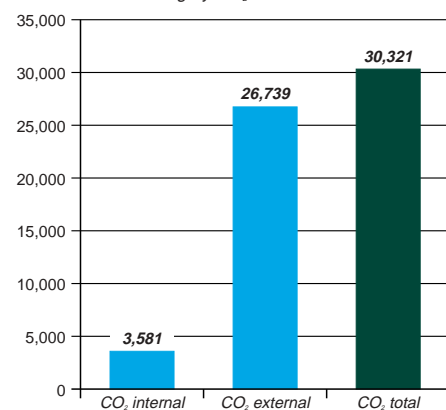
Ozone layer depletion substances of Telecom Cables category



2.4.7. CO₂ emissions

As for the other categories, CO₂ emissions, reported for the first time in 2002, refer to the consumption of fuels for the production of energy within the Operating Units (internal) and to the consumption of fuels calculated for the production of electric power purchased outside (external). The conversion factors used are those shown in table 1 of this Report.

Telecom Cables category CO₂ emissions



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 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category

2.5. "Optical Fibre" Category

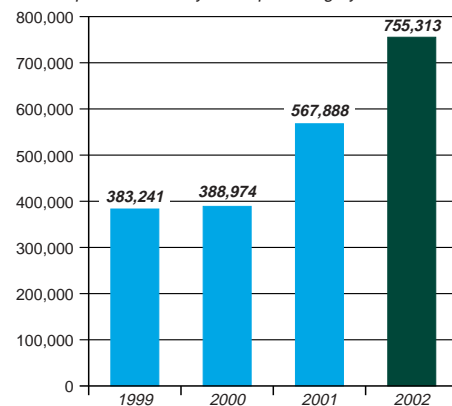
Optical Fibre production declined sharply (40%) in 2002 with respect to the previous year, due to the well-known crisis in the world market.

As for the telecom cables category, this reduction affected the absolute values of some of the selected indicators. Presenting these indicators in terms of specific value, i.e. per unit of production, still permits significant year-to-year comparisons.

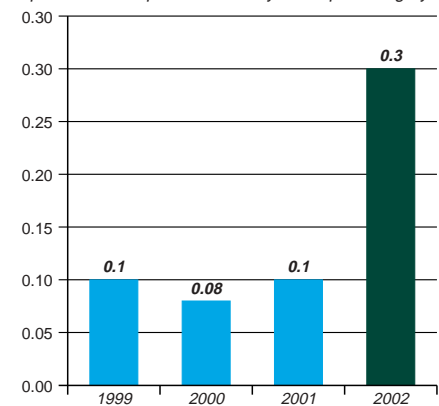
There is no data comparing the relative characteristics emissions, chlorine, hydrochloric acids, particulate hydrofluoric acid) into the atmosphere with the 2001 Report, since the values of concentration have now settled to well below the most restrictive limits taken as reference.

2.5.1. Water

Consumption of water by fibre optic category



Specific consumption of water by fibre optic category

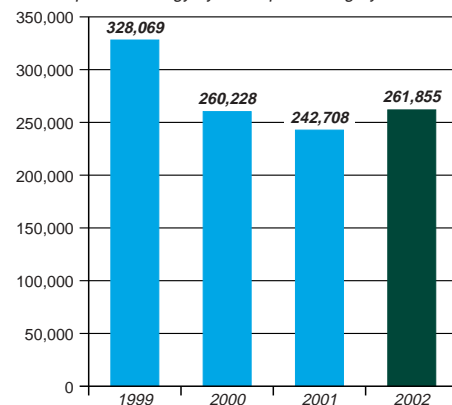


Water consumption increased in 2002 with respect to 2001, in terms of both specific consumption (from 0.1 to 0.3 cubic meters per km of product) and absolute value (increase of 33%).

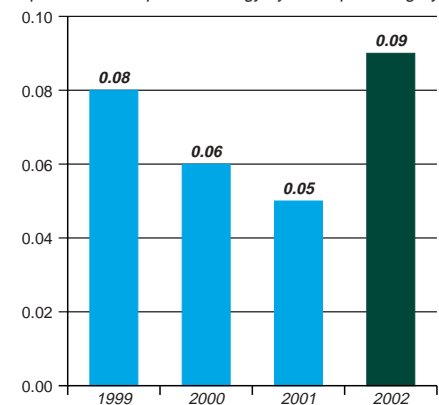
This figure, running counter to the trend in production, was due to extraordinary consumption, not associated with any product, for startup testing on the new production equipment at the Operating Unit in Italy, as part of the restructuring of that facility.

2.5.2. Energy

Consumption of energy by fibre optica category



Specific consumption of energy by fibre optic category



Energy consumption increased in 2002 both in absolute terms (+ 8%, from 242,708 GJ in 2001 to 261,855 GJ) and in terms of specific consumption (from 0.05 to 0.09 GJ per km of fibre). Again in this case, the increase was due to extraordinary consumption at the Operating Unit in Italy.

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

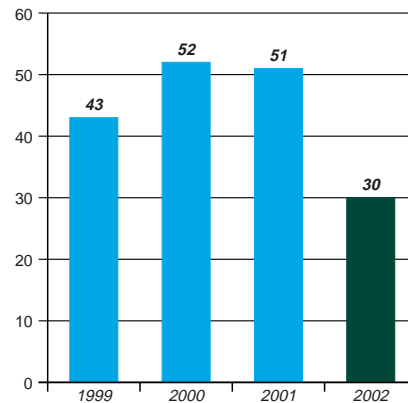
"Optical Fiber" Category

"Tyres" Category

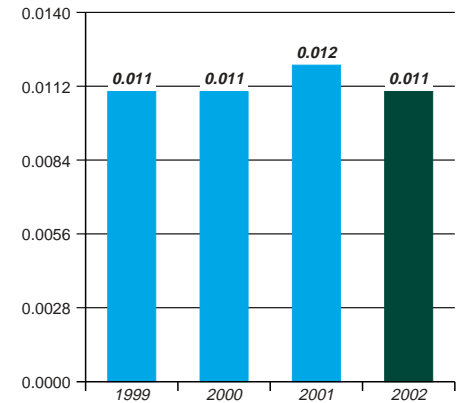
"Steel Cord" Category

2.5.3. Organic solvents

Consumption of organic solvents by fibre optic category



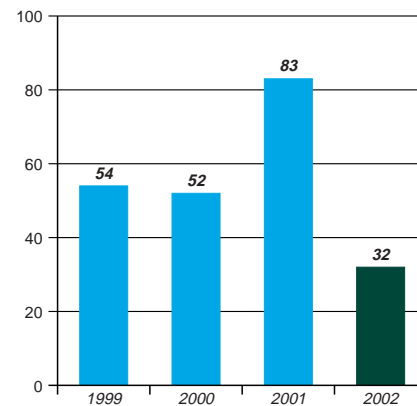
Specific consumption of organic solvents by fibre optic category



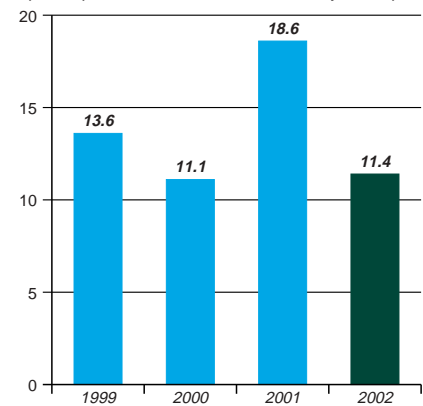
The consumption of organic solvents declined in absolute value (from 51 tons to 30), consistent with the reduction in production, while the consumption per unit of product remained basically unchanged.

2.5.4. Waste

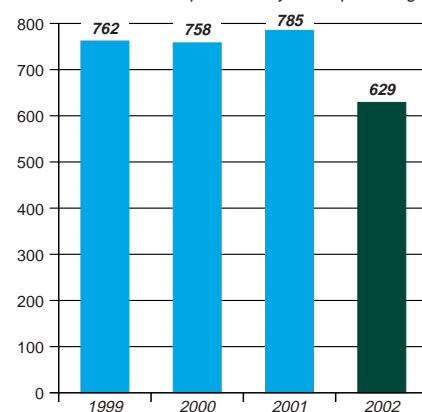
Hazardous waste produced by fibre optic category



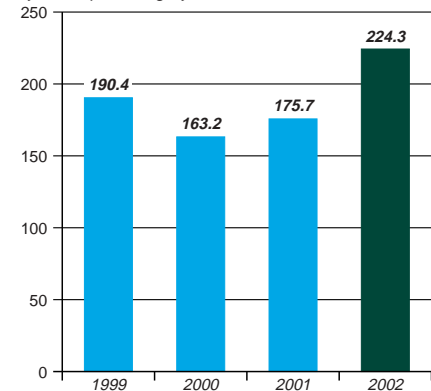
Specific production of hazardous waste by fibre optic category



Non-hazardous waste produced by fibre optic category



Specific production of non-hazardous waste by fibre optic category



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 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

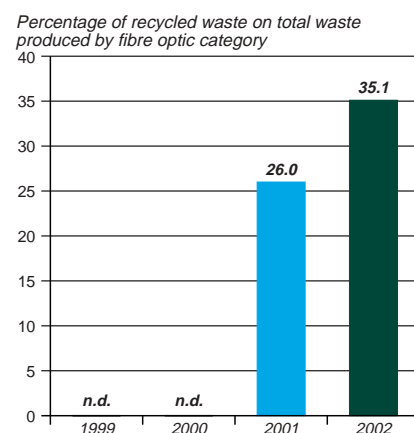
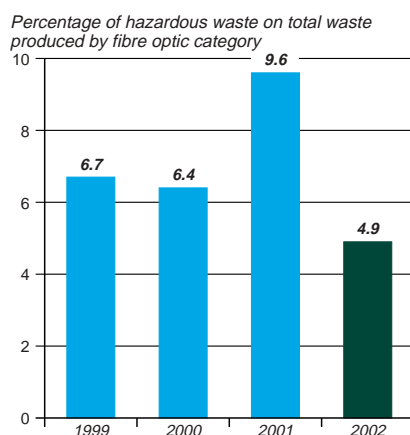
"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category



Hazardous waste

There was a reduction in hazardous waste in 2002 both in absolute terms (-61%) and in specific production (from 18.6 to 11.4 kg per 1000 km of fibre). Most of the reduction was registered at the Italian facility and was due to an anomalous situation that occurred at that Unit during 2001, also reported in the previous Report, which resulted in the generation of exceptional waste.

The reduction in hazardous waste was also reflected in the ratio of hazardous waste to total waste, which dropped from 9.6% to 4.9%.

Non-hazardous waste

Non-hazardous waste registered a different situation: a reduction in absolute terms of 20% against an increase of the specific value from 176 to 224 kg per 1000 km of fibre. The first figure is linked to decreased production, while the second reflects the change in the classification of waste applied in 2002 with respect to previous years..

Consequently, the ratio of non-hazardous waste to total waste increased from 90.4% to 95.1%.

Recycled waste

Recycled waste increased from 225 metric tons in 2001 to 232 tons in 2002, with an increase of 3%. In percentage terms, recycled waste rose from 26 % in 2001 to 35 % with a significant increase. The ratio of recycled hazardous waste to total recycled waste increased from 0.4% in 2001 to 3.9% in 2002.

2.5.5. Dielectric oils containing PCBs/PCTs

The 2001 figure was confirmed: no dielectric oils containing PCBs or PCTs were present in the Operating Units. No data is available for 1999 or 2000.

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Analysis of Quantitative Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

“Telecom Cables” Category

“Optical Fiber” Category

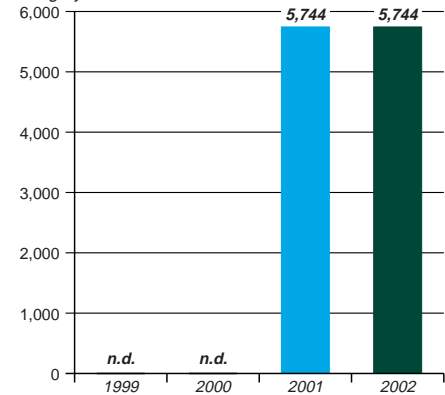
“Tyres” Category

“Steel Cord” Category

2.5.6. Ozone layer depleting substances

There was no change with respect to 2001, with a quantity of 5,744 kg. No data are available for 1999 and 2000.

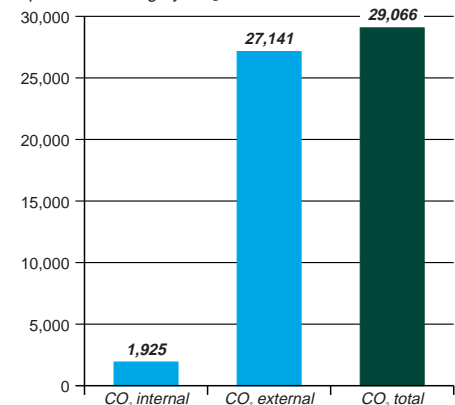
Ozone layer depletion substances of fibre optic category



2.5.7. CO₂ emissions

CO₂ emissions, reported for the first time in 2002, refer to total CO₂ emissions deriving from the fuel used within the company (internal) and that necessary to produce the electric power purchased externally. The quantities were calculated using the conversion factors shown in table 1 of this Report.

Optical fibre category CO₂ emissions



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 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

"Steel Cord" Category

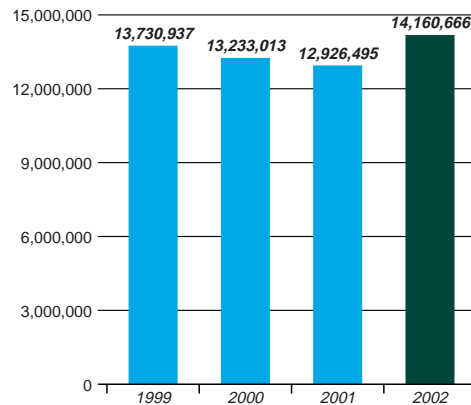
2.6. . "Tyres" Category

In 2002 production increased by 8% in weight.

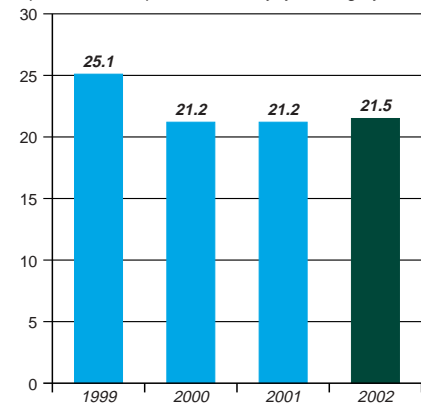
This increase affected the absolute values of some of the selected indicators but had no effect on values per unit of product.

2.6.1. Water

Consumption of water by tyre category



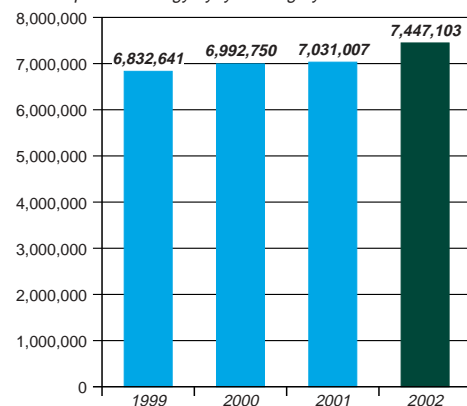
Specific consumption of water by tyre category



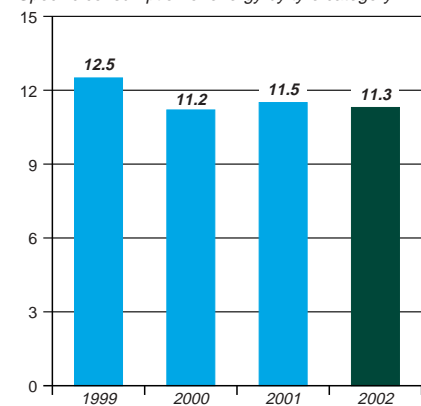
In 2002 water consumption increased with respect to 2001 in absolute terms by 9.5% parallel with the increase in production, from 12,926,000 cubic meters to 14,161,000, while the specific consumption rose from 21.2 to 21.5 cubic meters per ton of product.

2.6.2. Energy

Consumption of energy by tyre category



Specific consumption of energy by tyre category



Compared to 2001, the consumption per ton of product declined slightly, while absolute energy consumption increased by 6%, from 7,031,007 GJ in 2001 to 7,447,103 GJ.

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 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

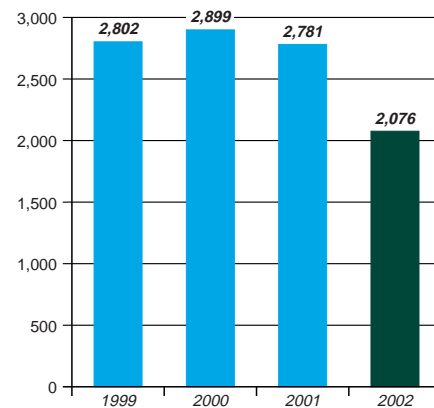
"Optical Fiber" Category

"Tyres" Category

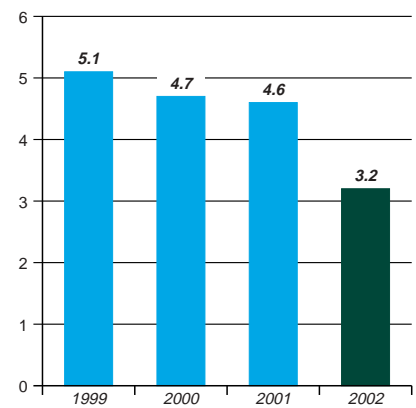
"Steel Cord" Category

2.6.3. Organic solvents

Consumption of organic solvents by tyre category



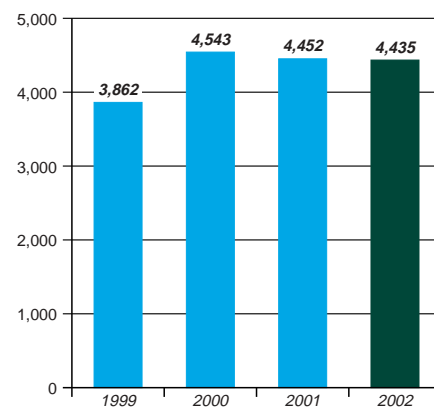
Specific consumption of organic solvents by tyre category



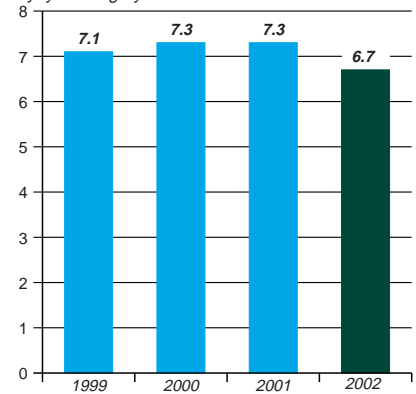
The 2002 data confirmed the downward trend in specific consumption observed since 1999. In 2002 the specific consumption of organic solvents decreased dramatically, from 4.6 to 3.2 kg per ton of product. This drastic reduction also led to a decrease in absolute consumption, even though production increased, from 2,781 tons in 2001 to 2,076 tons in 2002 (-25%). The reduction of the consumption was due to implementation of a program to eliminate the use of organic solvents in the grouting and packing phases and other actions taken in the Sector.

2.6.4. Waste

Hazardous waste produced by tyre category



Specific production of hazardous waste by tyre category



Pirelli S.p.A.

Analysis of Quantitative Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

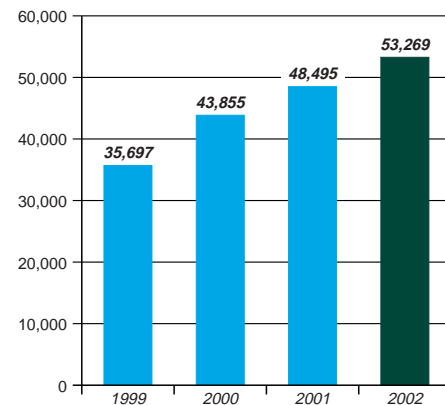
“Telecom Cables” Category

“Optical Fiber” Category

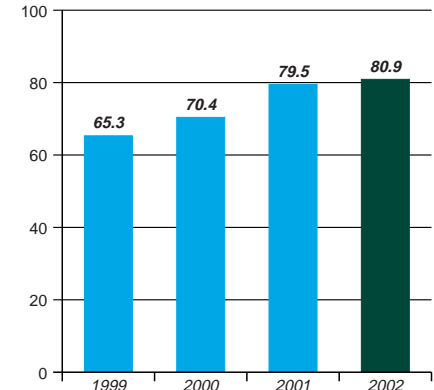
“Tyres” Category

“Steel Cord” Category

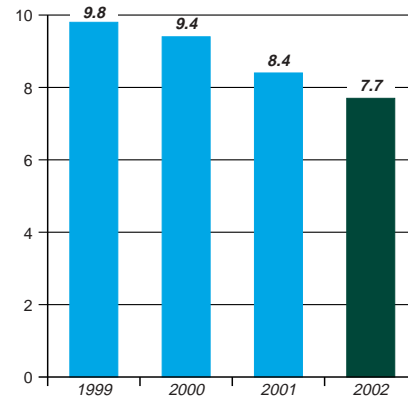
Non-Hazardous waste produced by tyre category



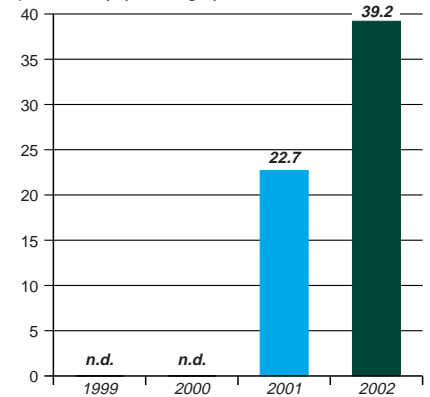
Specific production of non-hazardous waste by tyre category



Percentage of hazardous waste on total waste produced by tyre category



Percentage of recycled waste on total waste produced by tyre category



Hazardous waste

The production of hazardous waste per unit of product, basically stable in the 1999-2001 period, declined dramatically in 2002, from 7.3 to 6.7 kg per ton of product. The absolute values also decreased by 0.4 % with respect to 2001, despite the increase in tyre production. The ratio of hazardous waste to total waste dropped from 8.4% in 2001 to 7.7 %.

Non-hazardous waste

The values, both absolute and per unit of product, increased in 2002. This increase, as often illustrated, was due to change in the classification of non-hazardous waste. In 2000, in fact, recycled waste was not considered, in 2001 only the recycled waste sold was reported, and in 2002 all recycled waste was considered, including that on which a recovery/recycling charge was paid.

The percentage of non-hazardous waste to total waste increased from 91.6% in 2001 to 92.3%.

Recycled waste

For the reasons presented in the preceding paragraph, and because of action to increase the recycling of generated waste, there was an increase in the ratio of recycled waste to total waste. The ratio of recycled hazardous waste to total recycled waste increased from 2.3% in 2001 to 8.4% in 2002.

Pirelli S.p.A.

Analysis of Quantitative
Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

“Telecom Cables” Category

“Optical Fiber” Category

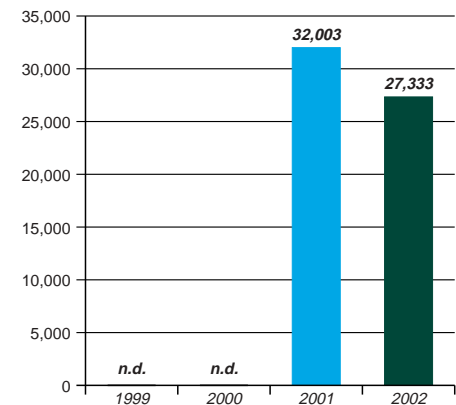
“Tyres” Category

“Steel Cord” Category

2.6.5. Dielectric oils containing PCBs/PCTs

The dielectric oils containing PCBs/PCTs declined by 14.6%, from 32,003 kg in 2001 to 27,333 kg in 2002, as a result of replacement actions and the reclamation of transformers in some Operating Units. No data are available for 1999 and 2000.

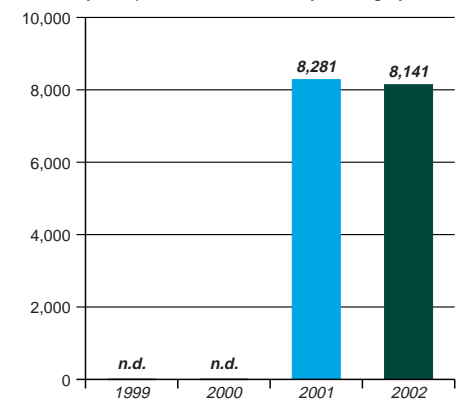
Dielectric oils containing PCB/PCT of tyre category



2.6.6. Ozone layer depleting substances

The quantities of ozone layer depleting substances present in the production facilities and storage decreased by 1.6 %, from 8,281 kg in 2001 to 8,141kg in 2002. No data are available for 1999 and 2000.

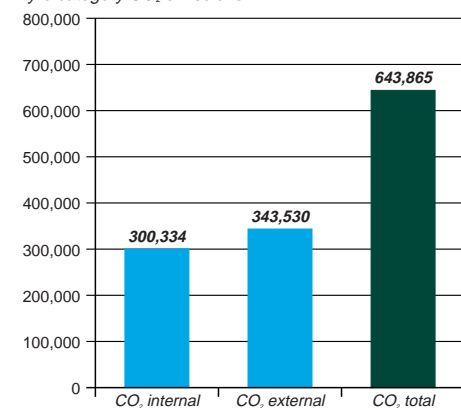
Ozono layer depletion substances of tyre category



2.6.7. CO₂ emissions

CO₂ emissions, reported for the first time in 2002, refer to the consumption of fuels for the production of energy within the Operating Units (internal) and to the consumption of fuels for producing the electric power purchased externally. We used the factors for converting from energy quantities to kg of CO₂ emitted indicated in table 1 of this Report.

Tyre category CO₂ emissions



Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

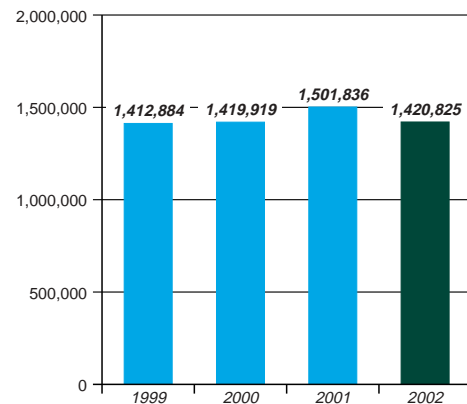
"Steel Cord" Category

2.7. "Steel Cord" Category

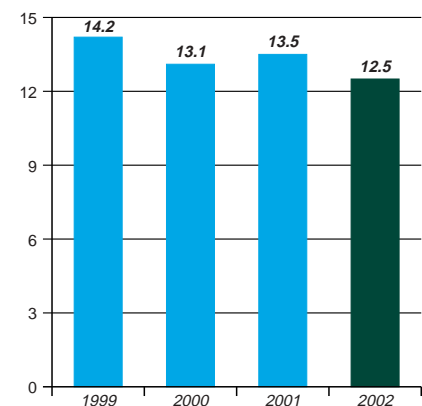
In 2002 there was a moderate 2% increase in the production of steel cord, which had little impact on the data reported.

2.7.1. Water

Consumption of water by steel cord category



Specific consumption of water by steel cord category

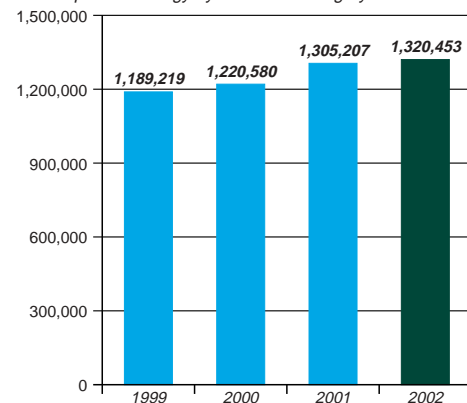


Water consumption dropped sharply again in 2002 with respect to previous years, from 13.5 to 12.5 m³ per ton of product. In absolute terms, consumption declined by 5.3 %, from 1,502,000 cubic meters in 2001 to 1,421,000 cubic meters in 2002.

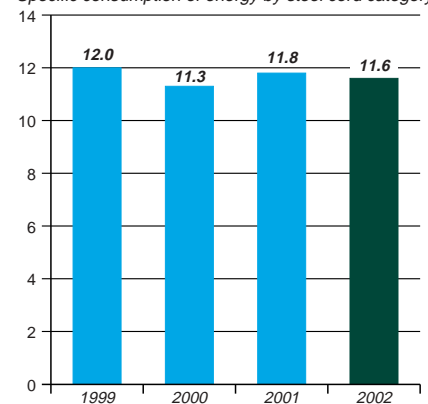
This reduction is linked to a general improvement in the efficiency of use and an increase in the recycling rates within the production cycles.

2.7.2. Energy

Consumption of energy by steel cord category



Specific consumption of energy by steel cord category



The values of specific energy consumption remained generally unchanged with respect to previous years, while the modest increase in absolute values (+1.2%) is consistent with increase in production (+2%).

Pirelli S.p.A.

 Analysis of Quantitative
Data by Category

"Energy Cables" Category

"Accessories" Category

"Rod" Category

"Telecom Cables" Category

"Optical Fiber" Category

"Tyres" Category

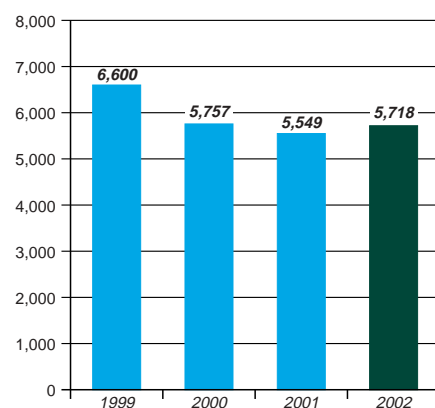
"Steel Cord" Category

2.7.3. Organic solvents

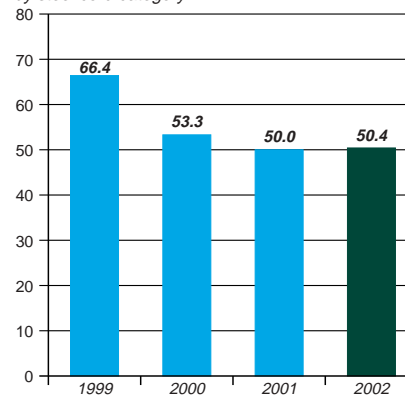
Data on organic solvents were not collected, since these are not used as process ancillaries but only in small quantities for minor maintenance operations, particularly on mechanical parts.

2.7.4. Waste

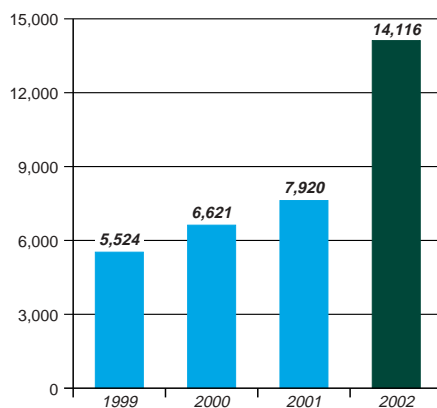
Hazardous waste produced by steel cord category



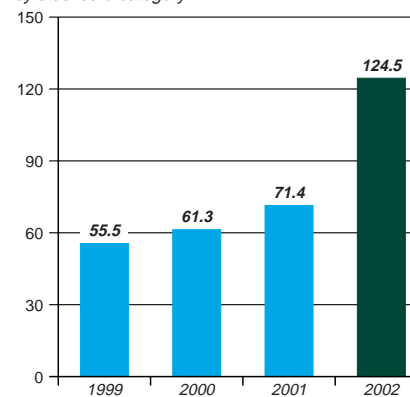
Specific production of hazardous waste by steel cord category



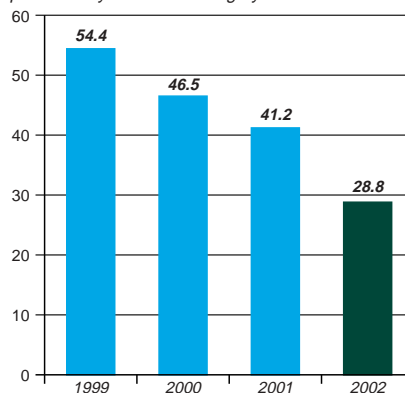
Non-Hazardous waste produced by steel cord category



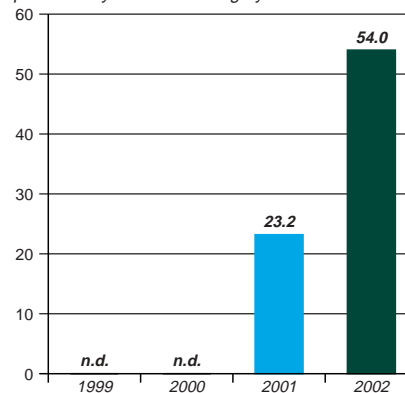
Specific production of non-hazardous waste by steel cord category



Percentage of hazardous waste on total waste produced by steel cord category



Percentage of recycled waste on total waste produced by steel cord category



Pirelli S.p.A.

Analysis of Quantitative
Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

“Telecom Cables” Category

“Optical Fiber” Category

“Tyres” Category

“Steel Cord” Category

Hazardous waste

The specific production of hazardous waste, which declined sharply from 1999 to 2001, stabilized in 2002.

The ratio of hazardous waste to total waste declined, however, from 41.2 % in 2001 to 28.8 % in 2002.

Non-hazardous waste

The production of non-hazardous waste increased both in absolute values and in values per unit of product.

As pointed out repeatedly in the preceding chapters, the increase in values is linked to the fact that in 2002 all the recycled waste was reported, regardless of whether a charge was paid for its disposal, while in 2001 only the recycled waste sold was considered an din 2000 recycled waste was not reported.

The ratio of non-hazardous waste to total waste increased from 58.8% in 2001 to 71.2% in 2002.

Recycled waste

Consistent with the content of the preceding paragraph, the percentage of recycled waste increased from 23.2 % to 54 %. The ratio of recycled hazardous waste to total recycled waste went from 49.1% in 2001 to 25.0% in 2002.

2.7.5. Dielectric oils containing PCBs/PCTs

The Operating Units for Steel Cord have no dielectric oils containing PCBs/PCTs.

Pirelli S.p.A.

Analysis of Quantitative
Data by Category

“Energy Cables” Category

“Accessories” Category

“Rod” Category

“Telecom Cables” Category

“Optical Fiber” Category

“Tyres” Category

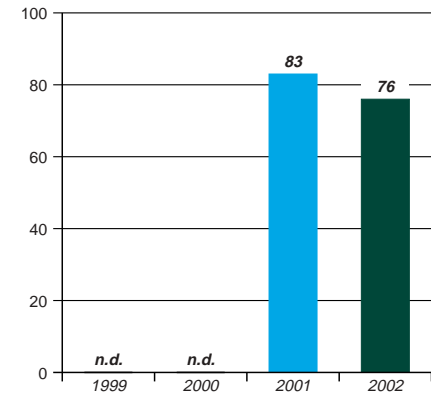
“Steel Cord” Category

2.7.6. Ozone layer depleting substances

With respect to 2001 there was a slight reduction (from 82.8 kg to 76.2 kg) linked to actions to gradually replace those substances with substances not damaging to the ozone layer.

No data are available for 1999 and 2000

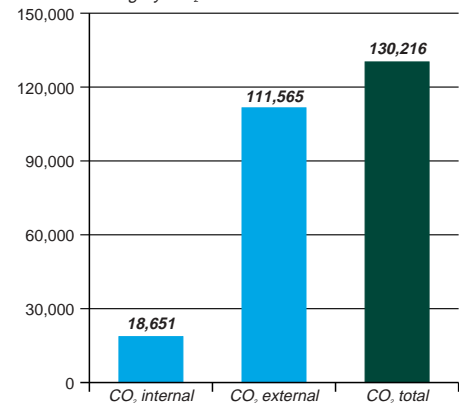
Ozone layer depletion substances
of steel cord category



2.7.7. CO₂ emissions

CO₂ emissions, reported for the first time in 2002, refer to the consumption of fuels in the plants (internal) and to the CO₂ deriving from the production of electric power purchased externally. For the calculation we used the factors for converting energy quantities to kg of CO₂ emitted indicated in table 1 of this Report.

Steel cord category CO₂ emissions



Glossary

GLOSSARY

Carbon dioxide (CO ₂)	Natural component of the atmosphere-colorless, odorless and tasteless-and an end-product of the combustion of materials containing carbon; it contributes toward increasing the greenhouse effect
Environmental audit	Systematic, documented verification process to analyze and evaluate, with objective evidence, whether environmental management methods and procedures conform to the requirements established and implemented by an organization or part thereof
Fuel cells	Electrochemical devices that convert chemical energy into electrical energy; they are classified on the basis of the electrolyte used in the process; various fuels can be used, including natural gas, liquefied petroleum gas, and hydrogen
Photovoltaic cells	Elementary devices for converting solar energy into electrical energy based on the photovoltaic effect; photovoltaic cells consist of thin layers of semiconducting materials (primarily silicon)
Volatile Organic Compounds (CO ₂)	Organic compounds of natural or anthropic origin present in the atmosphere in a vaporous or gaseous state; they participate in the production of photochemical smog with impact on human health and the environment
Environmental Due Diligence	Systematic verification of environmental conditions at a site to determine current or potential liabilities of an environmental nature
Emission	Any solid, liquid or gaseous substance introduced into the atmosphere by a production facility or other source that may generate atmospheric pollution
Aromatic hydrocarbons	Stable organic compounds whose structures are characterized by the presence of at least one benzene ring; some aromatic hydrocarbons are carcinogenic
Environmental impact	Any modification in the environment, negative or beneficial, total or partial, resulting from the activities, products or services of an organization
Environmental indicator	A parameter or numerical value that describes the impact of a human activity on the environment
ISO 14001	Specific standard issued by ISO (International Organisation for Standardization) to specify the requisites of an Environmental Management System that enables an organization to formulate an environmental policy and establish objectives, considering the legislative and aspects and information regarding significant environmental impact
Life Cycle Analysis, LCA	Methodology for evaluating the total environmental impact of a product, considering its entire life cycle from the activities associated with the extraction and treatment of the raw materials to the manufacturing processes and its transport, distribution, use, recycling, reuse and disposal
Asbestos-containing materials	Substances containing asbestos, i.e. a fibrous mineral of silicate origin used as thermal insulation; some types of asbestos fiber are carcinogenic
Nanocompound	Blend of materials (ceramic, metals, etc.) with dimensions on the order of a nanometer (10 ⁹ m)
Nanomaterial	Material with a dimension on the order of a nanometer (10 ⁻⁹ m)
Nanoparticle	Solid particle with a dimension on the order of a nanometer (10 ⁻⁹ m)
Dielectric oil	Oil with very low conductivity, used as insulation in electrical equipment (transformers, condensers, etc.)
PCB/PCT	Polychlorinated biphenyls/polychlorinated triphenyls; hazardous substances, bioaccumulable and carcinogenic, with insulating and fire-resistant characteristics, used in electrical equipment (transformers and/or condensers)
PE	Polyethylene; synthetic polymer formed from ethylene monomer
PVC	Polyvinyl chloride; synthetic polymer with a structure similar to PE but with an chloride atom in place of one hydrogen atom
Rolling resistance	Component of resistance to the advancement of a vehicle attributable solely to the tires

Glossary

Non-hazardous waste	Categories of waste that are not dangerous to human health or the environment, classified on the basis of European Community Directive 2000/532, modified by Directives 2001/118/EC, 2001/119/EC and 2001/573/EC; the non-hazardous waste materials considered by PIRELLI S.p.A. include the compounds in rubber (CER code 070299) and copper scrap (CER code 170401)
Hazardous waste	Categories of waste with substantive or potential hazard for human health or the environment due to their characteristics of chemical reactivity, toxicity, explosiveness, radioactivity or other, classified based on European Community Directive 2000/532, modified by directives 2001/118/EC, 2001/119/EC and 2001/573/EC; the hazardous waste materials considered by PIRELLI S.p.A. include spent lubricants (CER code 130205) and spent emulsions (CER code 120109)
Environmental Management System	Part of the overall operating system including the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources to develop, institute, realize, review and maintain the environmental policy
Organic solvent	Any VOC used alone or in combination with other agents to dissolve raw materials, products or reject materials without undergoing chemical transformations or used as a cleaning agent to dissolve contaminants or as a solvent, dispersion medium, viscosity corrector, surface tension corrector, plasticizer or preservative

Verification Statement of the 2002 Environmental Report of Pirelli S.p.A.



Verification Statement of the 2002 Environmental Report of Pirelli S.p.A.

SGS Italia S.r.l. was engaged to verify the 2002 Environmental Report of Pirelli S.p.A..

The verification concerned the data and information related to environmental topics and the system implemented by Pirelli S.p.A. to collect and process the data used to prepare the report.

This verification was conducted on a sample basis and primarily concerned the comprehensiveness and comprehensibility of the environment report, as well as the reliability of the data management system and its consistency with the environmental management system put in place by Pirelli S.p.A..

In particular, the comprehensiveness of the document was verified by ascertaining that the information and principal data referring to the manufacturing activities of the various Operating Units throughout the world were present, while the comprehensibility was evaluated by verifying the readability and ease of interpretation of the data, the adequacy of the parameters, and the presentation formats adopted. The reliability concerned the data examination through the evaluation of the related management system and the adequacy of the relevant procedures for collecting, checking, processing and storing data.

The verification activity was based on guidelines promoted by the Fondazione Eni Enrico Mattei for the preparation of company environmental report and by that same Fondazione and Ernst & Young Revisione e Studi Ambientali for the certification of environmental reports. Other references were the ISO 14001 standard, the procedures and the 2001 environmental report of Pirelli S.p.A..

The verification essentially involved an examination of the various steps of the document development and an evaluation of how the procedures for data collection and processing were implemented. The data collection and processing system was also sampled-tested to gain sufficient confidence regarding the reliability of the system in managing and aggregating the data and information coming from the various levels of the Pirelli S.p.A. organization, with particular reference to the Operating Units.

Our activity also brought to the identification of the verification methodology to follow for future environmental reports, which should include an evaluation of the data collection process conducted directly at a few Operating Units, using the ISO 14001 certification assessments.

In consideration of the above, the 2002 environmental report of Pirelli S.p.A. was considered to be comprehensive and comprehensible as well as based on a reliable data collection system.

The environmental report is an important summary document of the activities performed and of the environmental stewardship of Pirelli S.p.A.. The quality of the report could, in our view, be further improved by a more organic presentation of the relationships between the company policy and the improvement programs of future years. The report could also be further enhanced by extending the data management procedures and completing the project to transform the existing data collection database.

ing. Fabrizio Carnasciali
International Certification Manager

Milan - July 17, 2003

ing. Paolo Pineschi
General Manager



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